MITZI STOCKEL

3234 Castro Valley Boulevard
Castro Valley, California

Work Plan for
Preliminary
Site Characterization Investigation

KTW & ASSOCIATES

43289 Osgood Road, Fremont, Calif. 94539
(415) 623-0480
Cal. State Cont. Lic. # 572427

1.0 INTRODUCTION

The project site is located at 3234 Castro Valley Blvd. in the City of Castro Valley, in Alameda County, California as indicated on Figure 1. The site is the location of a former automotive repair facility (see Figure 2) and private residence. A 650 gallon underground gasoline storage tank was located along the northern side of the automotive shop and was removed on March 8, 1990 by KTW & Associates.

The former underground tank held leaded gasoline. The storage tank was excavated and removed on March 3, 1990 by KTW & Associates with soil samples obtained from the excavation by David C. Glick Associates personnel. The soil samples were submitted for analytical testing for Total Petroleum Hydrocarbons (TPH) as Gasoline and Benzene, Toluene, Ethylbenzene, and Total Xylenes (BTXE). Discolored soils were observed in the excavation during the tank removal and strong hydrocarbon vapors were emitted from the removed and in-situ soils. Several small holes (1/2" - 1" diameter) were observed in the lower half of the tank at each end.

Subsequent to the tank removal and soil sampling, the excavation was continued to a depth of 9 feet below existing grade by KTW & Associates personnel to further remove existing fuel contaminated soils in the immediate vicinity of the former tank. Ground water seepage was encountered in the excavation at a depth of 6 feet with free flowing water at a depth of 8 1/2 feet. The excavated soil was stockpiled on-site pending initiation of the site characterization investigation, additional soil excavation, and initiation of on-site soil aeration for reduction of the hydrocarbon content. The ground water level subsequent stabilized at a depth of 6 feet.

2.0 PROPOSED SCOPE OF WORK

To further characterize the impact to the surrounding soil and underlying ground water resources present at the site, KTW & Associates has developed an investigation program as outlined below:

(1) Remove by demolition the existing shed and fencing located adjacent to the existing excavation and relocate the existing stockpiled soils;

(2) Advance 5-8 subsurface exploration borings to a depth of 6 feet in the accessible areas to define the subsurface conditions, obtain soil samples from the soil borings for analytical testing, and determine the extent of existing fuel contaminated soils at the site;

(3) Installation of 3-5 ground water monitoring wells to define the ground water conditions at the site, to collect ground water samples for analytical testing, and to evaluate the impacts to the underlying ground water resources;

and (4) Evaluation of remedial action of alternatives.

Specifics of the individual investigative phases are described in the following sections.

3.0 SUBSURFACE INVESTIGATION

3.1 Soil Borings

Soil borings would be advanced to a maximum depth of 8 feet below the ground surface or ground water, which ever is encountered first, using an eight (8) inch, nominal diameter, continuous flight hollow stem auger. The borings would be advanced to achieve maximum vertical and horizontal coverage of the site. The exploratory borings would terminate upon intercepting ground water. The proposed locations of the soil borings would be as indicated on Figure 2; however, the actual boring locations could be modified based on the findings of the investigation.

Soil samples would be obtained from the borings at depths of five feet and at the bottom of the borings (6-8 foot depth), at changes in lithology, and where obvious soil contamination exists. The soil samples would be obtained through the use of a 2 inch I.D. split-barrel sampler advanced into the undisturbed soil by a 140 pound hammer repeatedly falling 30 inches. Sand catchers would be used as necessary to retain the samples. A split-barrel, standard penetration sampler would be used should the 2 inch sampler prove ineffective at obtaining the samples.

Drilling and sampling equipment would be thoroughly steam cleaned before drilling begins on each boring to prevent the introduction of off-site contamination and cross contamination between borings. Sampling equipment would be cleaned between sample events to prevent cross contamination. Pre-cleaned brass liners would be placed in the sampler to retain the soil. The blow counts necessary to advance the sampler would be recorded for each 6-inch interval. The borings would be logged under the supervision of a State of California Certified Engineering Geologist.

The drill cuttings and soil samples would be monitored in the field for evidence of hydrocarbon content through the use of a portable photo-ionization detector (PID), organic vapor meter (OVM), or similar device. The soil samples would be immediately sealed in the liners using aluminum foil and plastic caps and properly labeled including: the date, time, sample location, and project number. The samples would be placed on ice immediately for transport to the laboratory under chain-of-custody documentation.

Soil cuttings derived from the boring would be retained and stored on-site during the drilling and well construction pending results of the analytical testing. The soil borings would be backfilled with a cement slurry to within one foot of grade. The final foot would be finished in such a manner as to conform to the surrounding conditions. Should the borings prove to contain hydrocarbon products which exceed concentrations of 100 parts per million (ppm) based on field monitoring with the OVM or by physical evidence (soil discoloration, etc.) the borings would be backfilled with the soil cuttings for subsequent over-excavation.

3.2 Monitoring Well Installation

Following completion of the subsurface borings and initial delineation of the extent of soil contamination, a minimum of three (3) open standpipe piezometer monitoring wells would be installed to assess the impact from the former underground storage tank. It is anticipated that up to five (5) monitoring wells could be installed at the site during this initial phase of investigation. Tentative locations for the Monitoring Wells are indicated on Figure 2. The actual locations of the proposed Monitoring Wells would be determined subsequent to completion of the subsurface exploration borings such as to optimize the location of the wells and to place one of

the wells in a suspected "down-gradient direction" from the tank location. Site specific ground water flow direction and gradient data would be determined as outlined later in this Work Plan.

The borings for the Monitoring Wells would be advanced at approved locations to encounter ground water using an eight (8) inch, nominal diameter, continuous flight hollow stem auger. The borings would be advanced a minimum of 15 feet into the saturated zone (total depth of 20 feet). The drilling procedures used in the well installation would be consistent with the procedures previously specified for the Soil Borings. Soil samples would be obtained at five foot intervals, at changes in lithology, and where obvious soil contamination exists. The drill cuttings and soil samples obtained from the borings would be monitored during drilling to observe moisture changes in the soils and to determine the depth of the first saturated zone. It is intended that the borings would be advanced a minimum of 15 feet into the saturated zone unless a low permeable material is encountered prior to achieving this depth. Should a low permeable zone be encountered prior to achieving the 15 foot depth, the screened interval of the well would be reduced such that the low permeable zone is not penetrated to protect underlying aquifers.

3.3 Monitoring Well Construction

The monitoring wells would be constructed by installing 2-inch diameter polyvinyl chloride (PVC) flush-threaded casing and slotted pipe directly through the hollow stem auger. The slotted section of the PVC pipe installed through the saturated zone would have 0.020 inch factory perforations. Materials used in the well construction would be thoroughly cleaned prior to introduction into the boring.

The monitoring wells would be filter-packed with clean monterey silica sand throughout the screened interval. The filter material would be determined based on lithology encountered during drilling and would likely consist of No. 3 Monterey Sand or No. 2/12 Lonestar Sand. The filter-pack material would be installed in the annular spacing between the monitoring well pipe and the auger as the auger is removed and would extend a minimum of two feet above the top of the screened interval. To assure continuity and integrity of the filter material, and to prevent the bore hole from caving, no more than five foot of auger would be removed at a time.

A one foot thick layer of bentonite pellets would be placed above the filter material to provide an annular seal and the remainder of the boring would be filled with a cement slurry to within one foot of grade. The grouting would be performed under the direct observation of a representative from Zone 7 and/or the Alameda County Department of Environmental Health.

The well casings would have a locking cap and will be enclosed inside a watertight cast iron or aluminum traffic box installed in concrete flush with the surface. Figure 3 illustrates the construction of a typical monitoring well.

Water levels in the monitoring wells would be measured to determine the ground water gradient and direction of ground water flow. Should it be determined that one of the aforementioned wells is not in the down-gradient direction of the location of the former underground storage tanks, a fourth monitoring well would be installed in the down-gradient direction. The supplemental well would be installed/constructed in accordance with the aforementioned well installation/construction procedures.

3.4 Well Development and Sampling

The initial well development would be through the use of a 1.7 inch Brainard-Killman mechanical lift hand pump, an air-lift or nitrogen-lift pump, or a positive displacement bladder pump. The wells would be developed until a minimum of three well volumes have been purged and the discharged water appears clear of sediment. Electrical conductivity, temperature, and pH of the ground water would be recorded throughout the development process. The well development would continue until the electrical conductivity, temperature, and pH of the discharged water have stabilized. Depth to water measurements would be recorded prior to and following the well development activities.

The wells would be allowed to recover for a minimum of 24 hours between development and sampling activities. Free product measurements would be obtained utilizing a product/ground water interface probe or through the use of an acrylic or teflon bailer lowered into the well to obtain a surface water sample. The teflon bailer would be used to collect a surface water sample to observe the presence of hydrocarbon odors, visible sheen, or free product. Depth to water measurements would be also be recorded at this time using an electronic water level probe.

Prior to sampling, a minimum of three well volumes would be purged from the well through the use of the positive displacement bladder pump. Electrical conductivity, temperature, and pH of the ground water would be recorded throughout the purging process. The purging activities would continue until the electrical conductivity, temperature, and pH of the discharged water have stabilized. Water samples for analytical testing would be obtained through the use of the bladder pump.

The water developed from the monitoring wells would be contained on-site pending receipt of the laboratory test results. Storage and disposal of the contained water remains the responsibility of the Client.

The water samples would be collected in sterilized glass vials with Teflon lined screw caps. For initial ground water characterization, travel blanks and duplicate field blanks would not be collected for analysis. The samples would be immediately sealed in the vials and properly labeled including: the date, time, sample location, project number, and indication of any preservatives added to the sample. The samples would be placed on ice immediately for transport to the laboratory under chain-of-custody documentation.

3.5 Ground Water Depth and Gradient Measurements

The location and elevation of each Monitoring Well would be surveyed following completion of the well construction. Vertical control would be to the nearest 0.01 inch. Water levels in the wells would be measured using an electronic water level probe. The depth to water measurements would be consistently recorded from a scribed location on the top of the well casing. The depth to water measurements would be used to determine the direction of ground water flow and ground water gradient beneath the project site.

Should it be determined that one of the aforementioned wells is not in the down-gradient direction of the location of the former underground storage tank, additional monitoring wells would be installed in the down-gradient direction. The supplemental well would be installed/constructed in accordance with the aforementioned well installation/construction procedures.

3.6 Free Product Measurements

Free product measurements would be obtained for each Monitoring Well at the time of each sample acquisition utilizing a product/ground water interface probe or through the use of an acrylic or teflon bailer lowered into the well to obtain a surface water sample. The teflon bailer would be used to collect a surface water sample to observe the presence of hydrocarbon odors, visible sheen, or free product.

4.0 ANALYTICAL TESTING

Soil and ground water samples would be submitted to and tested by a State of California, Department of Health Services certified testing laboratory. Analytical testing would be scheduled and performed in accordance with the State of California, Regional Water Quality Control Board (RWQCB) Guidelines. Soil samples would be tested for Total Petroleum Hydrocarbons as gasoline by RWQCB Method GCFID (5030) and Volatile Aromatics by EPA Method 8020. Ground water samples would be be tested for Total Petroleum Hydrocarbons as gasoline by RWQCB Method GCFID (5030) and Volatile Aromatics by EPA Method 602.

The anticipated analytical detection/reporting limits are as follows: Total Petroleum Hydrocarbon as Gasoline, 1.0 ppm (soil) and 50 ppb (water) and Volatile Aromatics (BTXE), 0.005 ppm (soil) and 0.5 ppb (water); however, the actual reporting limits would be dependent on the concentration of product contained in soil/water samples.

5.0 REPORT

A report documenting the findings and observations of the investigation and the results of the analytical laboratory testing would be prepared to include: the findings and data logs for the subsurface investigation, well logs and well development records; analytical test data, chain-of-custody records, along with other pertinent information obtained throughout the investigative process. Conclusions would be presented, particularly with respect to the existence and extent of fuel contaminated soils remaining at the site, depth to ground water and local hydraulic gradient, ground water conditions and assessment of the impact from the former storage tanks. Proposed remedial action and/or monitoring alternatives would be presented.

6.0 SCHEDULE

It is anticipated that upon approval of this work plan by the Alameda County Department of Environmental Health, the work described herein would be initiated within one week of receipt of authorization to proceed. Installation of the ground water monitoring wells would be initiated following completion of the soil boring phase of work and upon receipt of well permits from Zone 7. It is anticipated that the field investigation would be completed within one week.

Standard analytical testing turnaround time of two (2) weeks is anticipated to be used unless directed otherwise. The final report would be submitted within three weeks following receipt of the analytical test data for the ground water samples.

7.0 KEY PERSONNEL

The names and addresses of personnel associated with this project are listed below:

Property Owner
Mitzi Stockel
3234 Castro Valley Blvd.
Castro Valley, CA

Contractor/
Consultant
KTW & Associates
Kevin Krause, Tom Gregory
43289 Osgood Road
Fremont, CA 94539
(415) 623-0480

Geologic Consultant
David C. Glick Associates
David Glick
179 Eunice Ave,
Mountain View, CA 94040
(415) 962-1948 (415) 990-7456

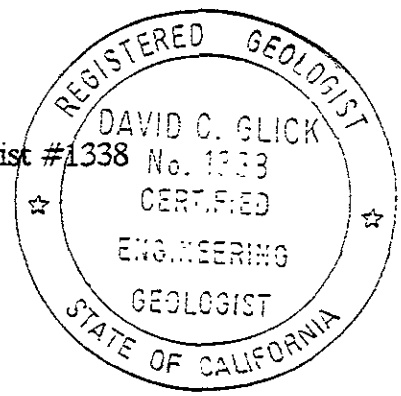
* * * * *

The following Figures are attached and complete this work plan:

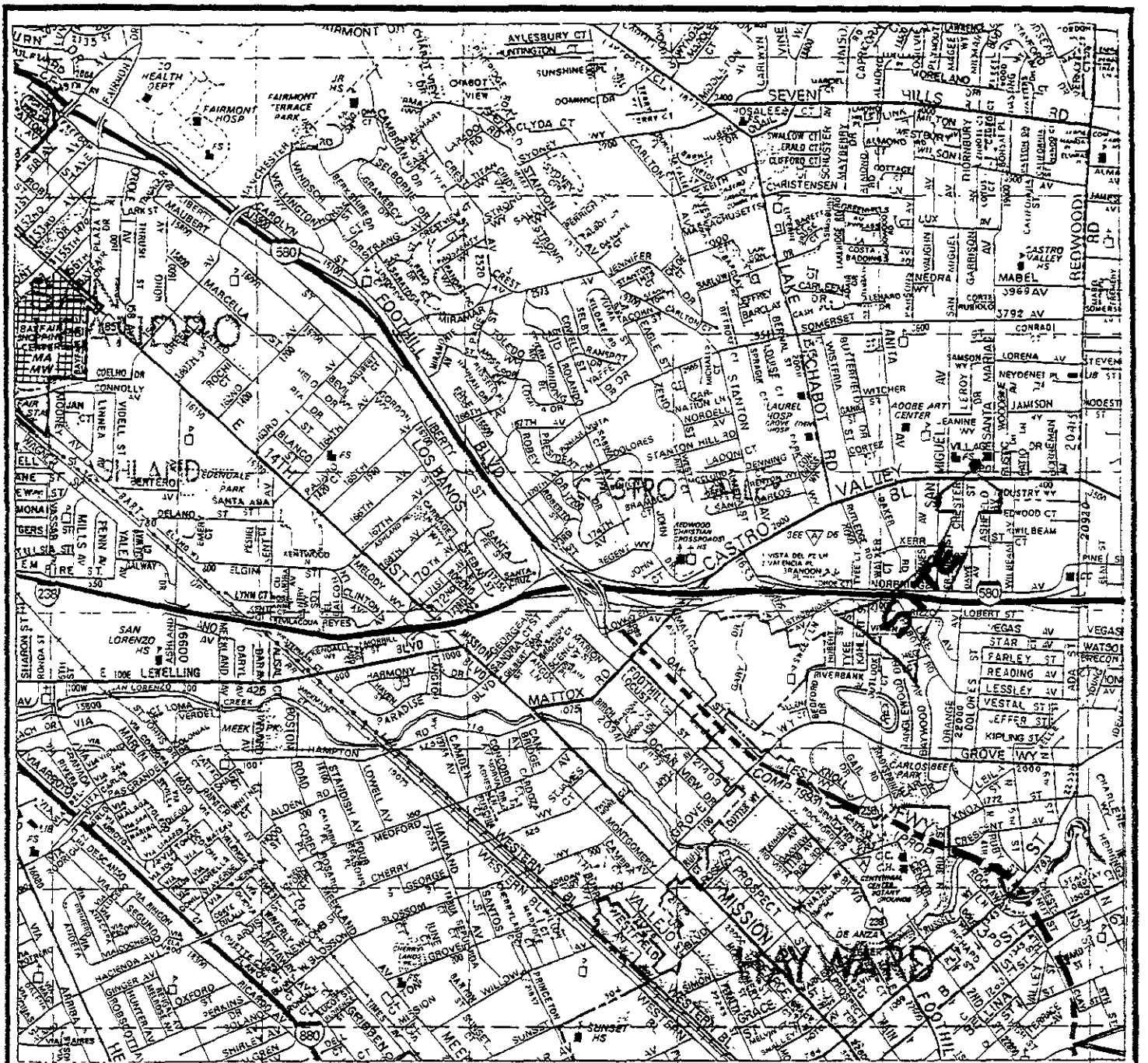
Figure 1 Location Plan
Figure 2 Site Plan
Figure 3 Typical Well Detail

Respectfully submitted,

David C. Glick
Certified Engineering Geologist #1338



DCG:dg



SCALE	NTS
DATE	3/27/90
DRWG. BY	CLS

KTN & ASSOCIATES

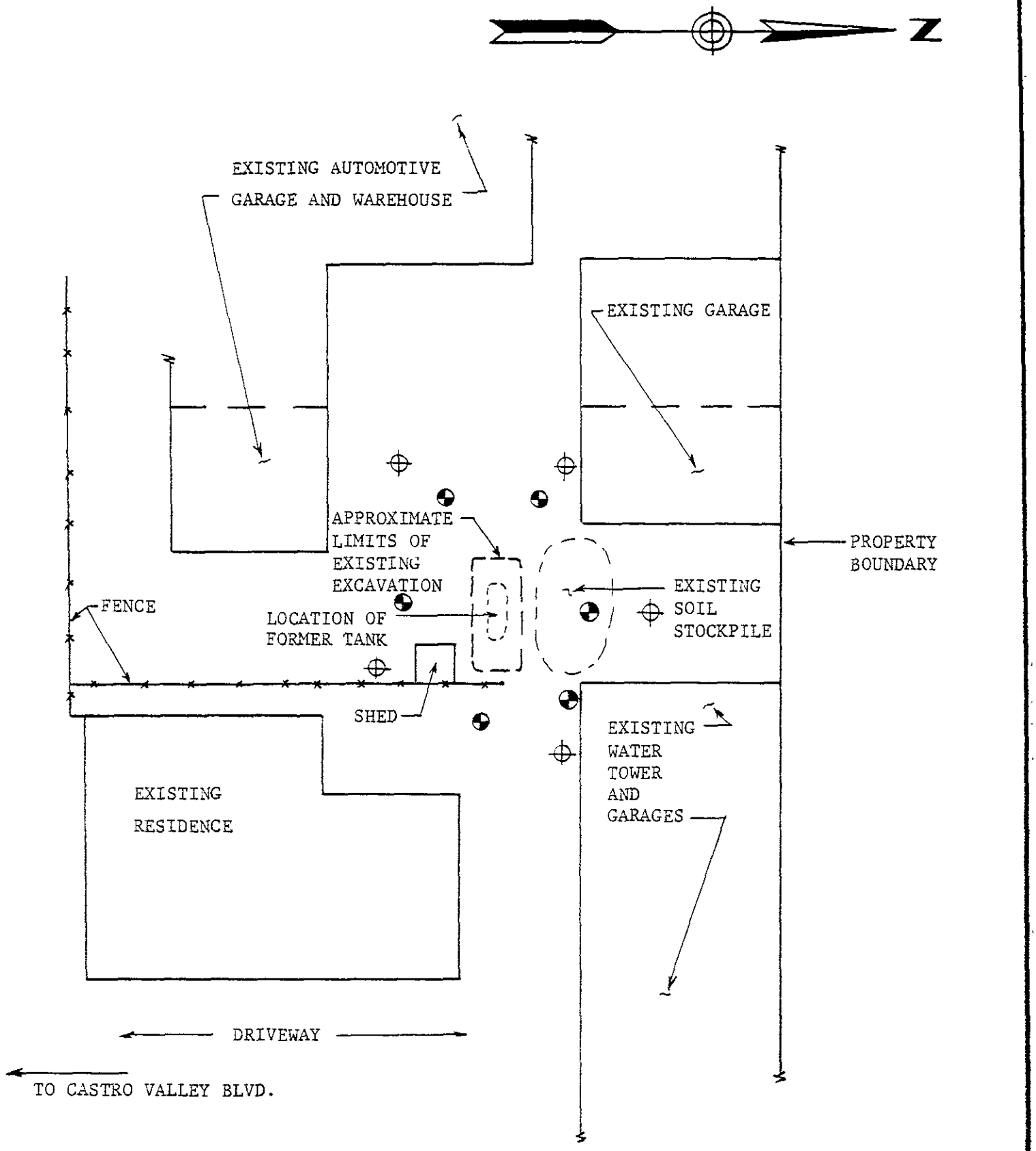
PROJECT: #1059

SITE MAP

MITZI STOCKEL
3234 Castro Valley Blvd.
Castro Valley, CA

PLATE

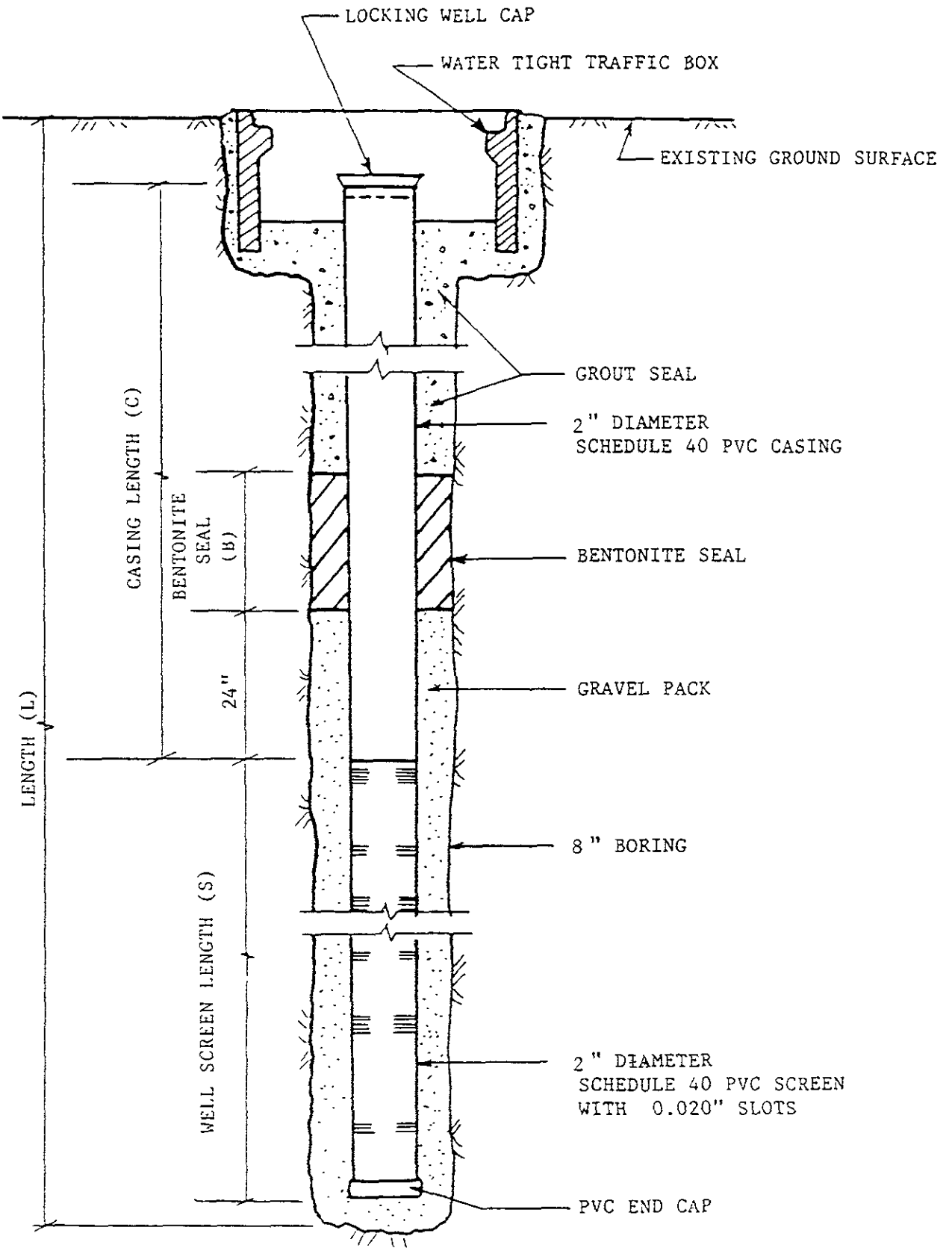
1



◓ APPROXIMATE LOCATION OF PROPOSED EXPLORATION BORINGS

⊕ APPROXIMATE LOCATION OF INITIAL GROUND WATER MONITORING WELLS (SUBJECT TO RELOCATION BASED ON THE FINDINGS OF THE SUBSURFACE BORINGS)

WORK PLAN - MITZI STOCKEL		
DATE	SCALE	DRAWN BY
4-17-90	1"=20'	DCG
SITE PLAN		
		Figure 2



L=
S=
C=
B=

MITZI STOCKEL - WORK PLAN		
DATE 4-17-90	SCALE N/A	DRAWN BY DCG
TYPICAL WELL DETAIL		
	Figure 3	

SITE SAFETY PLAN
3234 CASTRO VALLEY BOULEVARD
CASTRO VALLEY, CALIFORNIA

Introduction:

A Site Safety Plan (SSP) has been designed to address safety provisions during the site investigation. Its purpose is to provide established procedures to protect all on-site personnel from direct skin contact, inhalation, or ingestion of potentially hazardous materials that may be encountered at the site. The SSP establishes personnel responsibilities, personal protective equipment standards, decontamination procedures, and emergency action plans.

K.T.W. & Associates seeks to enter the property previously described for the purpose of conducting a site investigation - soil sample procedures are as follows.

Each sample to be chemically analyzed will be collected in a brass sleeve, capped with aluminum foil lined plastic lids, sealed with tape, and placed on blue ice at or below 4 degrees Centigrade in a cooler immediately. All Chain of Custody protocol will be followed.

This SSP describes means for protecting all on-site personnel from contamination or personal injury while conducting on-site activities. As described below, we will strive to meet all requirements mandated by the California Department of Health Services.

Responsibilities of Key Personnel:

All personnel on-site will have assigned responsibilities. Wayne Gathright will serve as Project Manager Mr. Gathright will also serve as Site Safety Officer (SSO). As SSO, Mr. Gathright will assure that on-site personnel have

received a copy of SSP. Compliance with the SSP will be monitored at all times by the SSO. Appropriate personnel protective equipment, will be available and utilized by all on-site personnel.

David Glick R.G. # 1338 will be responsible for keeping field notes, collecting and securing samples, and assuring sample integrity by adherence to Chain of Custody protocol. All on-site employees will take reasonable precautions to avoid unforeseen hazards. After documenting understanding of the SSO, each on-site employee will be responsible for strict adherence to all points contained herein. On-site employees are held responsible to perform only those tasks for which they believe they are qualified. Provisions of the SSO are mandatory and personnel associated with on-site activities will adhere strictly hereto.

Job Hazard Analysis:

Hazards likely to be encountered on-site include those commonly encountered when operating any mechanical equipment, such as the danger of falling objects or moving machinery. Simple precautions will reduce or eliminate risks associated with operating such equipment.

Qualified personnel only will have any contact with equipment. (Note: It is assumed by K.T.W. & Associates that regulatory personnel from Alameda County Health Care Services Agency are well versed in the precautions necessary; however, all persons on the job site will defer to the site safety officer.) All on-site personnel are required to wear hard hats when in close proximity to equipment. Latex sampling gloves will be worn by persons collecting or handling samples to prevent exposure to contaminates. Gloves will be changed between samples, and used ones discarded, to avoid cross-contamination.

Risk Assessment Summary:

Exposure to chemicals anticipated on-site include gasoline, benzene, toluene,

xylene and ethylbenzene (BTX&E). These chemicals present a hazard because they are moderately to extremely toxic and most are highly flammable. Threshold Limit Values (TLV's), Short Term Exposure Limits (STEL's) and Toxicity levels (LD50, oral-rate), all in mg/kg (ppm), are listed below.

Compound	TLV	STEL	Toxicity
Gasoline	50	75	
Benzene	10.0	150	4894
Toluene	10.0	150	5000
Xylene	10.0	150	4300

Personal Protective Equipment:

Personnel on-site will have access to appropriate personal protective equipment (level C or greater). When handling samples, the on-site geologist will wear latex gloves.

Work Zones:

Access to the site will be restricted to authorized personnel. A set of cones, placards, or wide yellow tape, surrounding the site will define the perimeter. The Project Manager will be responsible for site security.

Decontamination Measures:

Avoidance of contamination whenever possible is the best method for protection. Common sense dictates that on-site personnel avoid sitting, leaning, or placing equipment on possibly contaminated soil. All personnel will be advised to wash their hands, neck and face with soap and water following each day's use. Well purging water will be drummed on site pending analysis, as will all cuttings from the augers.

General Safe Work Practices:

Personal safety and hygiene should be of utmost consideration while on-site. To prevent ingestion of contaminates no person shall be allowed to eat, drink, or smoke on the site. The SSO will designate an appropriate near-by area, where it will be safe to allow lunches, etc.

During the drilling process, and during sampling, an explosimeter (Gas-Tech) will be on-site to determine proper levels. Two (2) ABC rated fire extinguishers will be on-site for the duration of the project. Whereas the known contaminant levels at this site are not indicative of any danger from explosion, in the interest of prudence and caution the aforementioned procedures will be adhered to.

Medical Surveillance Program:

According to CFR 29, 1910.120, Paragraph (F), employees who wear respirators 30 days or more during one year or who have been exposed to hazardous substances or health hazards above established permissible exposure limits are required to be monitored medically. All site personnel will be required to have had a complete chemical/physical examination to comply with the medical monitoring program.

Contingency Plans:

In the event of accident, injury, or other emergency, the Project Director, Senior Project Manger, or other person will notify appropriate governmental agencies or individuals as follows:

1. Alameda County Health Care Services
   80 Swan Way, Room 200
   Oakland, CA 94621
   415 271-4320

2. Police/Fire/EMT
   911

3. In the event of a mobile-class injury, the injured person(s) will be immediately transported (after completion of first aid) to Laurel Hospital, Lake Chabot Road, approximately two miles west of this job site.