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November 2, 1993

93 NOV -4 AM 11:02

Ms. Jennifer Eberlee
Alameda County Health Care Service Agency
80 Swan Way, Room 200
Oakland, California 94621

RE: Work Plan for Soil and Groundwater Sampling
Former Shell Service Station
461 Eighth Street
Oakland, California
WIC 204-5508-6205

Dear Ms. Eberlee:

At the request of Shell Oil Company, we are forwarding a copy of a **Work Plan** for site investigation at the above referenced site.

As we previously discussed, Shell and Enviros are continuing efforts to obtain a right of entry from the current property owner to perform this investigation. Work will be scheduled when this right of entry is received.

If you have any questions, please call.

Sincerely,

Enviros, Inc.

Diane M. Lundquist

Diane M. Lundquist, P.E.
Senior Engineer

cc: Mr. Lynn Walker, Shell Oil Company
Mr. Jim Matthews, Shell Oil Company
Mr. John Kaiser, Regional Water Quality Control Board

Enviros, Inc. 19411 Riverside Drive P.O. Box 259 Sonoma, California 95476-0259 Tel 707 / 935-4850 Fax 707 / 935-4855

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November 2, 1993

Mr. Lynn Walker
Shell Oil Company
P.O. Box 5278
Concord, California 94520

RE: Work Plan for Soil and Groundwater Sampling
Former Shell Service Station
461 Eighth Street
Oakland, California
WIC #204-5508-6205

Dear Mr. Walker:

Enviros, Inc. (Enviros) has prepared this Work Plan for the above referenced location. This Work Plan presents objectives and a technical approach for using the Geoprobe (or Hydropunch original) to further evaluate the presence of petroleum hydrocarbons in subsurface soils and first-encountered groundwater beneath the subject property (Plates 1 and 2). Enviros intends to employ the Geoprobe system owned and operated by Shell Oil Company. The scope of work presented in this work plan will take two days to complete using the Geoprobe system. If the Geoprobe is not available, Enviros will use the Hydropunch. Enviros will coordinate required field activities with a drilling contractor from Shell's approved contractor list. Only one day of field work will be performed if the Hydropunch is employed.

Site Background

According to data provided by the previous site consultant, a service station was constructed on the subject property in 1965 and was initially operated by American Oil Company. Shell Oil Company began operation of the site around 1974 and continued until May 1980. The service station was demolished and the underground storage tanks were removed in 1985. Currently, the subject property is operated by City Services Parking and is used as a parking lot.

The following summary was provided by the previous site consultant:

- In January 1979, the Bay Area Rapid Transit District (BART) noticed a gasoline odor in the water leaking into a nearby BART tunnel under the intersection of 7th Street and Broadway, approximately 20 feet southwest of the subject property. The tanks and product lines were immediately tested. The tanks were tight, although a leak was discovered in the product lines. The product and vapor lines were replaced and the system tested tight.

- During 1981, Monitoring Wells S-1, S-2 and S-3 were installed on the Shell site. Well S-4 was installed adjacent to the BART Tunnel. Wells S-5 and S-6 were installed near the reported leak in the tunnel. Well S-7 was installed at Washington and 5th Street on the southwest side of Highway 880. A recovery well was also installed adjacent to Well S-6. BART sealed the groundwater leak in approximately 1981.

- Recovery of contaminated groundwater continued from February 1982 to August 1982, when the system was shut down because the effluent discharge exceeded permitted discharge levels. Well S-7 and the recovery well were destroyed in 1985. Wells S-1, S-2 and S-3 were destroyed in 1987.

- A Preliminary Site Assessment (PSA) was prepared by GeoStrategies in June 1993. The PSA included seven sites with known leaking USTs within one-quarter mile of the subject site. Based on proximity to the subject property, groundwater flow direction and the nature of leakage, the PSA concluded that four of the seven sites with leaking USTs may have had an impact on soil or groundwater conditions at the former Shell site. Additionally, [redacted] No regulatory files concerning the Police Department site activities were uncovered during the preparation of the GeoStrategies PSA.

- Quarterly monitoring has been conducted in offsite wells S-4, S-5, and S-6 since October 1988. Separate phase hydrocarbons have been periodically been observed in Wells S-5 and S-6 and have been removed by bailing the wells or by a vacuum truck.

Geology and Hydrogeology

The geology of the subject property has described by Radbruch (1967). According to Radbruch, the site is underlain by the Merritt Sand; a fine-grain, silty to clayey sand deposit that contains lenses of sandy clay and clay. Local subsurface conditions have been described on exploratory boring logs for wells installed at the site. The boring logs indicate that encountered sand deposits are intercalated with finer grained material such as silts and clays.

Groundwater has been encountered in Wells S-4, S-5 and S-6 at approximately 15 to 20 feet below grade. Groundwater flow directions have historically ranged from north to the northeast. However, [redacted] historical groundwater level measurements. Whether this phenomena is the result of tidal influences and/or current well conditions cannot be discerned at this time.

Soil and Groundwater Sampling (Geoprobe)

Objectives

Additional soil and groundwater data are necessary to evaluate the presence of petroleum hydrocarbons beneath the subject property. The purpose of using the Geoprobe system to investigate soils and groundwater is to achieve the following objectives:

- Allow for rapid data collection,

- Provide a continuous soil profile to evaluate subsurface pathways for petroleum hydrocarbon migration potential at a maximum of two selected probe locations,

- Collect representative groundwater samples at strategic locations (near the former UST locations, product lines, pump islands),
- Analyze selected soil and groundwater samples for Total Petroleum Hydrocarbons calculated as Gasoline (TPH-Gasoline) and Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) compounds, and
- Minimize disruption of current on-site activities.

did they have a diesel tank? Analyze TPH-d even if USTs were gas, due to weathering

Geoprobe System

Enviros proposes to utilize the Geoprobe System owned and operated by Shell Oil Company to collect unsaturated soil samples from five feet below ground surface to first-encountered groundwater at five foot intervals and at significant lithological contacts (see Attachment 1). Sampling intervals shall be staggered between probe locations to permit a more comprehensive evaluation of subsurface stratigraphic relationships. **Two locations will be selected for continuous coring using soil sampling probes to evaluate subsurface heterogeneity and potential preferential pathways for hydrocarbon migration. We estimate that depth to groundwater will be approximately 25 feet below ground surface.** A Geoprobe groundwater sampling tool will be utilized to retrieve a representative *in situ* groundwater sample at five locations on the subject property. Proposed soil and groundwater sampling locations are presented on Plate 2.

Technical Approach

The focus of the work proposed in this work plan will be to further evaluate the presence of TPH-Gasoline and BTEX in soils and groundwater beneath the subject property. The primary goal of the proposed scope of work is to implement a rapid and cost-effective reconnaissance of soil and groundwater quality in an effort to better understand subsurface conditions beneath the subject property.

Enviros intends to utilize the Geoprobe system owned and operated by Shell Oil Company to meet the aforementioned objectives. **Two days are planned for the use of the Geoprobe.** Five probe locations have been prioritized as primary targets for subsurface evaluation. These primary target sites were selected based on previous site use and location of underground facilities (i.e. former tank complex, waste oil tank, product lines and dispenser islands). **Four probe locations have been included as secondary targets if time permits investigation at these additional locations.**

how many analyzed per SB?

Soil and groundwater samples requiring chemical analyses will be sent to a Shell Oil Company contract laboratory. Soil and groundwater samples will be analyzed for specified analyses on a normal turnaround time basis (approximately 2 weeks).

Required permits, right-of-entry and underground clearances will be obtained before any work is begun.

Field Procedures

The Geoprobe system utilizes a percussion hammer and hydraulically-powered system to drive and retrieve soil and groundwater sampling probes (Attachment 1). Soil sampling probes no greater than 1.75-inches in diameter will be either hydraulically pushed or percussion hammered to retrieve a soil core sample for lithologic description, field screening using an Organic Vapor Meter (OVM) utilizing a photoionization detector (PID), and chemical analysis.

The Geoprobe system will be used to hydraulically push or drive soil probes less than 1.75-inches in diameter to the desired depth to retrieve a sample. Each probe location will be logged by an Enviros geologist using the Unified Soil Classification System and standard geologic techniques. **An exploratory boring log will be completed for each probe location.**

Selected soil samples will be screened for the presence of organic vapors using a PID/OVM. Soil will be immediately extruded from the Geoprobe soil sampling tube and placed in a clean mason jar. The top of the jar will be covered by aluminum foil and sealed with a threaded ring. After approximately 20 minutes, the aluminum foil will be pierced by the OVM and vapors that have accumulated in the jar head space will be measured and recorded.

Soils selected for chemical analysis will be immediately capped and logged onto a chain-of-custody form. The soil samples will be placed in a cooler equipped with blue ice for sample preservation during transport to the analytical laboratory. **Soil samples sent to the laboratory will be analyzed for TPH-Gasoline** (EPA Method 5030/8015-Modified) **and BTEX** (EPA Method 5030/8020). **Samples taken from the geoprobe location adjacent to the former waste oil tank location will be analyzed for the aforementioned constituents as well as Oil & Grease** (Method 5520 E&F), **TPH-Diesel** (EPA Method 8015-Modified), **CL HC** (EPA Method 8010) **and ICAP metals.**

Soils not sent to the laboratory for chemical analysis will be stored in 55-gallon drums on site for disposition following the results of the chemical analyses. Each borehole will be backfilled with neat cement to ground surface.

follow up

A Geoprobe groundwater sampling tool will be used to collect *in situ* groundwater samples from the first encountered water-bearing zone. The groundwater sampler will be hydraulically pushed into the saturated zone where the sampler screen is opened and a water sample is obtained. The *in situ* water sample is transported to the ground surface using an inert tubing. Water samplers are then transferred to 40 milliliter vials equipped with teflon caps. The 40 milliliter vials will be inspected to ensure that no visible air is trapped in the head space (i.e. no air bubbles present in the vials). Each water sample vial will be properly labeled, entered onto a chain-of-custody form and placed in a cooler with blue ice for preservation during transport to the analytical laboratory.

Enviros will coordinate the disposition of soils, groundwater and decontamination fluids stored in 55-gallon drums following the receipt of chemical data.

good

Hydropunch System (Optional)

If the Geoprobe is not available for use for this work, a hollow-stem auger drilling rig will be used to collect soil samples and operate the Hydropunch system to collect representative groundwater samples. If the Hydropunch system is employed, Enviros will use a Shell Oil Company contract driller to perform the required field work and only the primary target locations will be investigated (refer to Plate 2).

The Hydropunch system is used exclusively for retrieving a representative groundwater sample. The Hydropunch is hydraulically pushed into the saturated zone for retrieval of a groundwater sample. The Hydropunch is then pulled to ground surface where a groundwater sample is decanted into a 40 milliliter vial equipped with a teflon cap. Sample preservation techniques and documentation are the same as for the Geoprobe work.

Soil samples will be collected using a Modified California Split-Spoon sampler equipped with three 6-inch long brass rings. The top ring will be discarded as sluff material. The center 6-inch ring will be capped at both ends with aluminum foil and teflon end caps and placed on blue ice in a cooler for transport to the laboratory for chemical analysis. Each soil sample will be entered onto a chain-of-custody form.

The bottom 6-inch soil ring will be used to describe the subsurface lithology and also measure volatile organic vapors. Soils will be immediately extruded into a clean mason jar seals with aluminum foil and a ring-type lid. After approximately 20 minutes, an OVM will be used to pierce the foil and measure the organic vapors present in the head space. Vapors will be recorded on the boring log forms.

Cuttings generated during the use of the hollow-stem auger drilling will be stored in 55-gallon drums for disposition following receipt of chemical analyses for soils. Enviros will coordinate with Shell Oil Company personnel on disposition of these materials.) good

Report Preparation

A report documenting the field procedures used to collect soil and groundwater samples as well as soil and groundwater chemical analytical results will be prepared after Enviros has received chemical reports from the laboratory. The report will be completed and submitted to Shell Oil Company within three weeks after receiving chemical data.

Schedule

Enviros is prepared to begin work as soon as right-of-entry has been obtained from the current property owner. The right-of-entry agreement is presently under review by representatives of the property owner.

Enviros will secure necessary permits, have underground utilities cleared and marked, and schedule the Geoprobe truck. If the Hydropunch is used because the Geoprobe is not available, Enviros will schedule a Shell Oil Company contract drilling company to perform the required drilling and sampling using the Hydropunch.

If you have any questions regarding the scope of work outlined in this work plan, please call.

Sincerely,

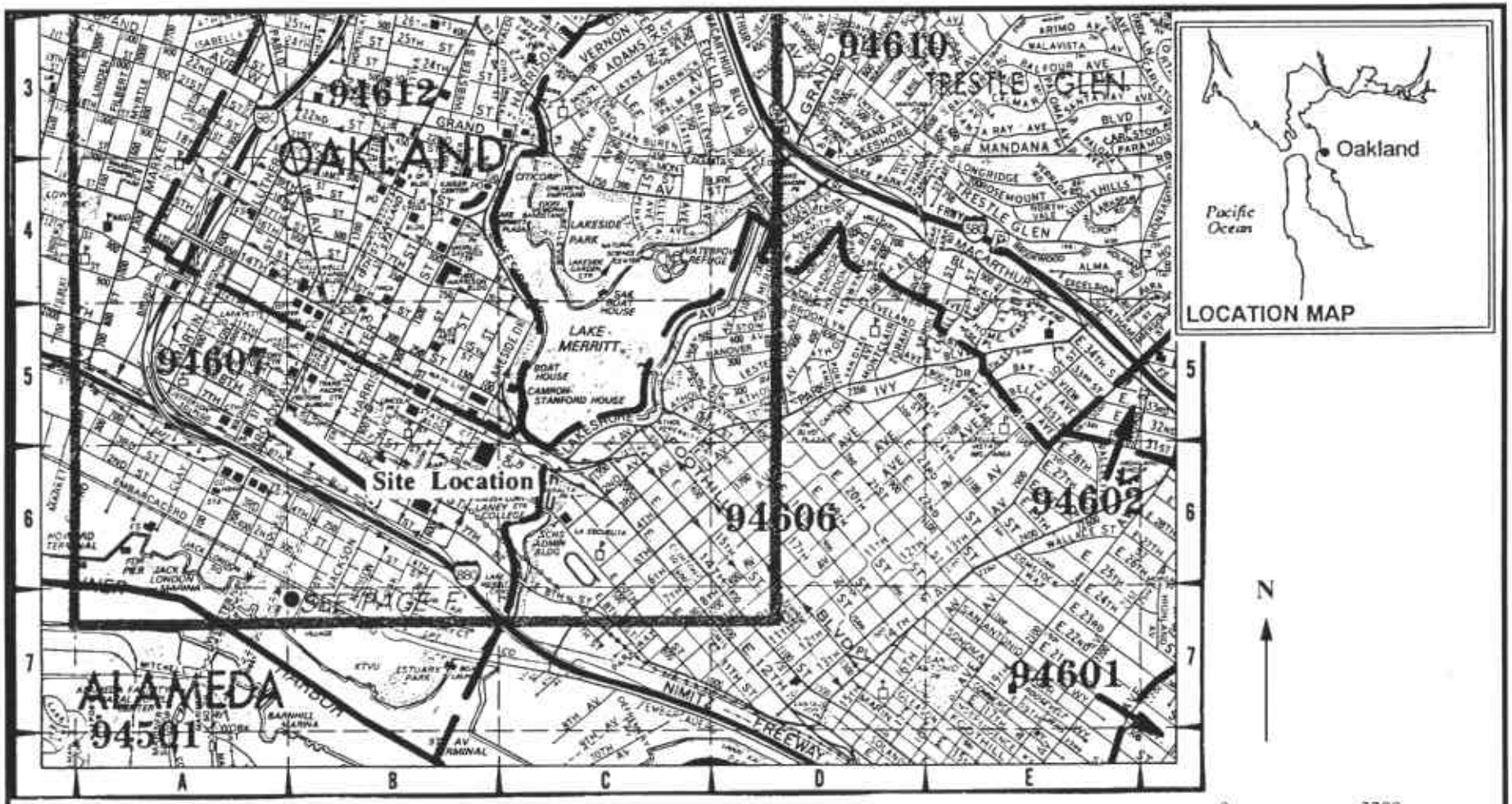
Enviros, Inc.

Jeffrey L. Peterson
Hydrogeologist

Diane M. Lundquist, P.E.
Senior Engineer
C46725

REGISTERED PROFESSIONAL ENGINEER
DIANE M. LUNDQUIST
NO. C46725
CIVIL
STATE OF CALIFORNIA
Exp. 6-30-95

Attachment 1: Geoprobe Equipment



Base Map 1993 Thomas Guide

Plate 1

VICINITY MAP
Former Shell Service Station
461 Eighth Street
Oakland, California

enviros®
E-4/930721604

Drawn By: DML Date: 10/27/93

Approved By: _____ Date: 11-2-93

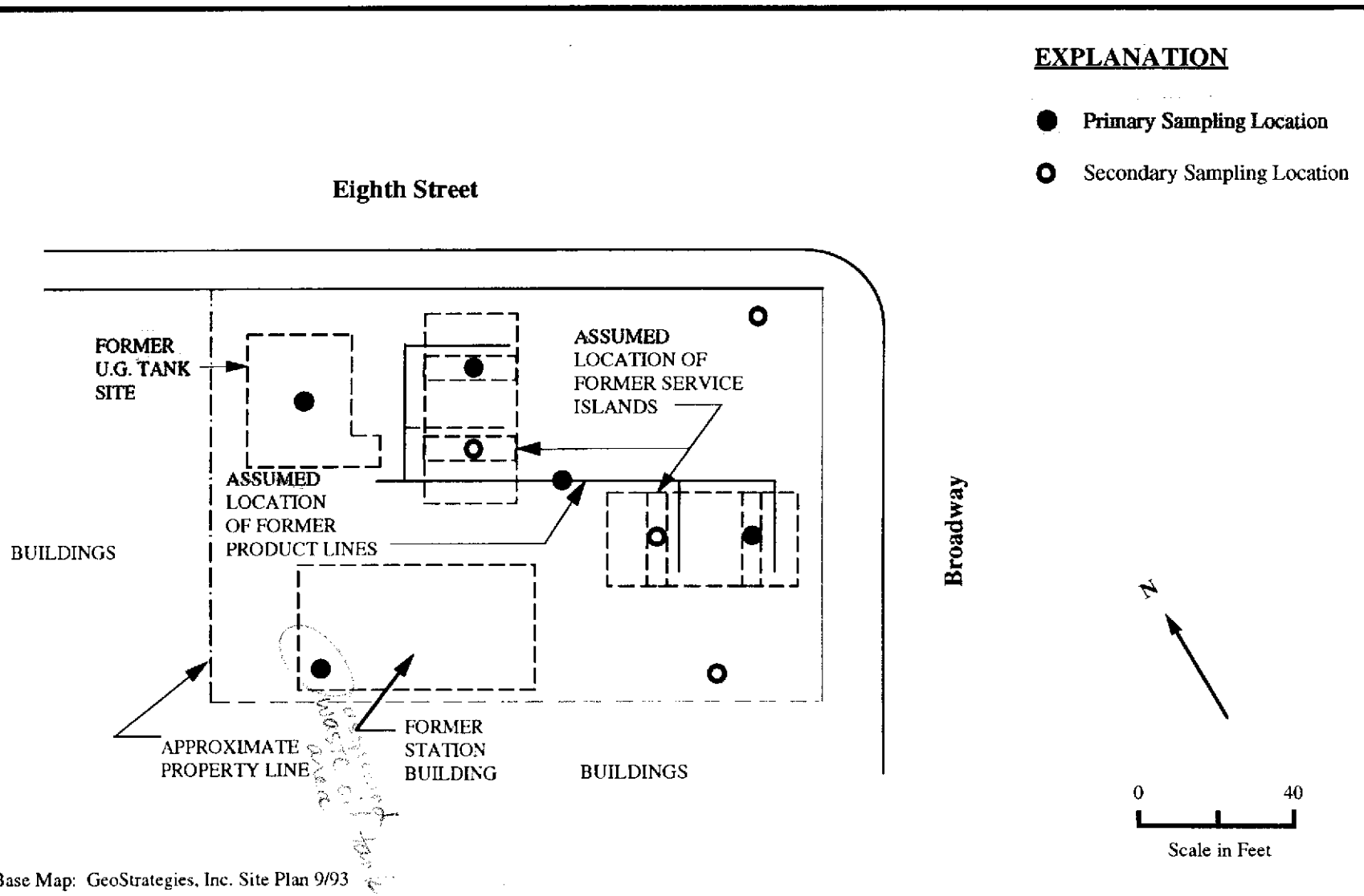


Plate 2.

SITE PLAN
Former Shell Service Station
461 Eighth Street
Oakland, California

enviros®
E-4/930721604

Drawn By: DML Date: 10/27/93

Approved By: AK Date: 11-2-93

Distribution List

Ms. Jennifer Eberlee, Alameda County Health Care Services Agency

John Kaiser, Regional Water Quality Control Board, San Francisco Region

The Probe-Drive* Soil Sampling System

*Patent Pending

Soil Samplers that remain completely sealed while being pushed or driven to depth...

◄ Standard 10" or 24"

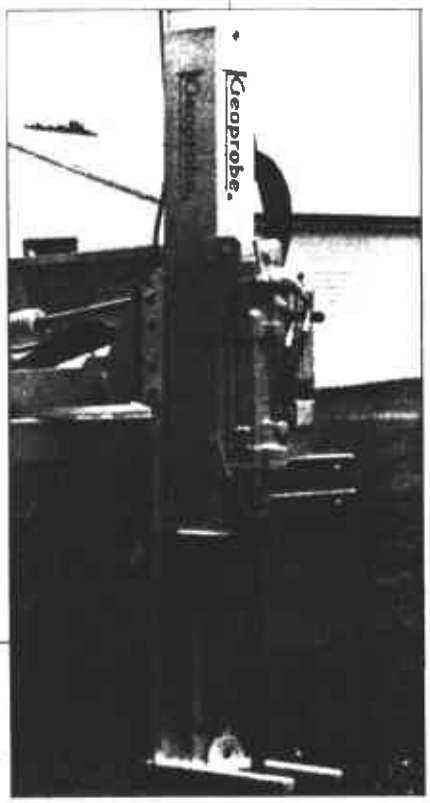
◄ Large Bore

◄ Kansas Stainless

Typical Applications

Retrieval of Discrete Soil Samples at Depth Using Driven Probes

- Soil Sampling Beneath UST sites.
- Studies of chemical dissipation with soil depth.
- Pesticide studies.
- Hazardous waste site investigations.
- Property transaction surveys.
- Chemical carryover/residue studies.



Using a truck mounted Geoprobe Model 8-M Hydraulic Probe to drive the Large Bore Soil Sampler. ►

GROUND WATER SAMPLING TOOLS

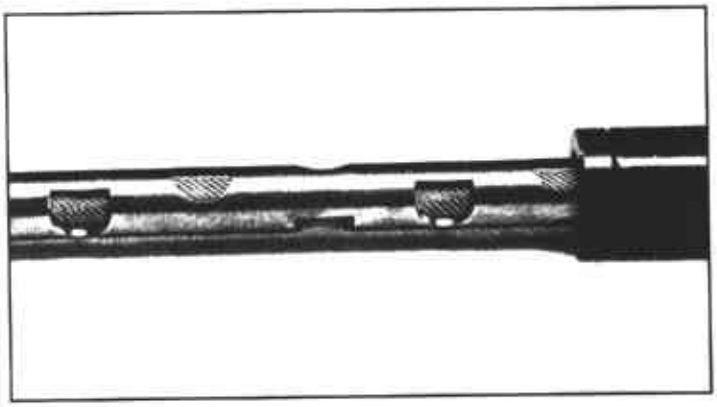
Geoprobe Screen Point Ground Water Sampler

GW-440 Series

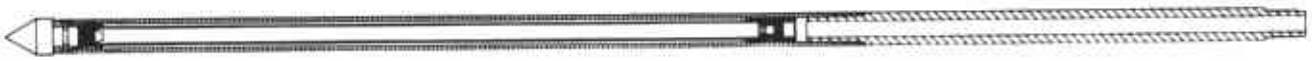
This sampler allows you to send a sealed stainless steel screen to depth, open the screen, and obtain a water sample via a tubing system to the surface. Features a 19″ screen encased in a perforated stainless sleeve. The screen remains totally enclosed in the sheath until it is pushed out into the formation at the desired depth. Flexible tubing can be connected to the top of the screen section using PRT adapters (**Note:** See the "PRT" section of this catalog for an explanation of available tubing and adapter sizes.) Water samples can be bailed from the rod bore or pumped directly from the screen section using a peristaltic pump.

This sampler is easily disassembled for cleaning. The sampler screen section is inexpensive and easily replaced.

Assembled sampler is 1″ O.D. by 36″ overall length and threads onto the leading probe rod. This device is also useful for measurement of piezometric levels.



Screen Point Sampler in open position.



GW-440K
(Assembled Screen Point Sampler)

Sub-Assembly Parts

Mill-Slot Drive Head
Part No. GW-43B

GW-43B

Screen Point Sampler Sheath
Part No. GW-440

GW Drive Point Seat
Part No. GW-440-1

GW-440-1

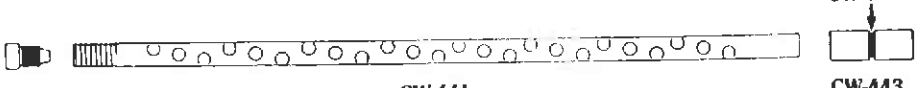
GW-440

Screen Sleeve
Part No. GW-441

Screen Plug
Part No. GW-442

Screen Connector
Part No. GW-443

Screen Connector "O"-Ring
Part No. GW-443R



GW-443R

Stainless Screen Insert
Part No. GW-444

GW-444