DRAFT
HAZARDOUS WASTE PRELIMINARY SITE INVESTIGATION REPORT
TASK ORDER NUMBER: 04-911175-47

ETTIE MAINTENANCE STATION
OAKLAND, CALIFORNIA

prepared for

CALIFORNIA DEPARTMENT OF TRANSPORTATION
District 4
111 Grand Avenue
Oakland, California

prepared by

Professional Service Industries, Inc.
3777 Depot Road, Suite 418
Hayward, California 94545
(510) 785-1111

October 7, 1997
575-7I022

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STATEMENT OF LIMITATIONS AND PROFESSIONAL CERTIFICATION

Information provided in this Site Investigation Report, by Professional Service Industries, Inc. (PSI), is intended exclusively for the use of Caltrans for the evaluation of subsurface conditions as it pertains to the subject site. The professional services provided have been performed in accordance with practices generally accepted by other geologists, hydrologists, hydrogeologists, engineers, and environmental scientists practicing in this field. No other warranty, either expressed or implied, is made. As with all subsurface investigations, there is no guarantee that the work conducted identified any or all sources or locations of contamination.

This Report is issued with the understanding that Caltrans is responsible for ensuring that the information contained herein is brought to the attention of the appropriate regulatory agency. This Report has been reviewed by a geologist who is registered in the State of California and whose signature and license number appear below.

John P. Neville
Project Geologist

Frank R. Poss
Associate Hydrogeologist

John Whiting, RG #5951
Senior Geologist

1.0 INTRODUCTION

Professional Service Industries, Inc. (PSI) has been retained by the California Department of Transportation (Caltrans), under Task Order Number 04-911175-46 and Contract Number 43Y097, to conduct a hazardous waste site assessment of current soil and groundwater conditions at the Ettie Street Maintenance Station, Oakland, California (subject site; Figure 1). The scope of work for this investigation included:

- Soil and groundwater sampling and laboratory analyses to assess the lateral and vertical extent of soil and groundwater contamination beneath the site, if present;
- Generation of a Final Report detailing the results of the data analysis and site investigation.

1.1 SITE BACKGROUND

Information provided by Caltrans in the Task Order, dated May 28, 1997, indicates that two underground fuel tanks (UST) at the Ettie Maintenance Station were removed from the site on October 19 and 20, 1995. Laboratory analyses of soil and groundwater samples collected from the UST excavation indicated the presence of diesel and waste oil hydrocarbons.

On February 8, 1996, soil and groundwater samples were collected by Tetra Tech from two borings drilled downgradient from the former USTs and dispensers. The results of the soil analyses indicated that detectable concentrations of total petroleum hydrocarbons as oil (TPH-Oil) were as high as 1,200 milligrams per kilogram (mg/kg), while detectable concentrations of TPH-oil and TPH as diesel (TPH-D) in groundwater samples were as high as 2,300 milligrams per liter (mg/l) and 62.5 mg/l, respectively. A copy of the Tetra Tech Final Report dated June 1996 is presented in Appendix A.

An additional investigation of the site area was completed by PSI in February and March 1996 for seismic retrofitting of the freeway columns and bents. PSI drilled over 100 borings in the general area with four of the borings (BM-29 through BM-32) being adjacent to the bents shown in Figure 2. Soil samples were collected at 0.15, 0.3, 0.6, and 1.5 meters (0.5, 1, 2, and 5 feet) bgs. The soil samples from borings BM-29 and BM-30 were analyzed for selected metals; benzene, toluene, ethylbenzene, and total xylenes (BTEX); and total recoverable petroleum hydrocarbons (TRPH). The soil samples from borings BM-31 and BM-32 were analyzed for selected metals, BTEX, total petroleum hydrocarbons as gasoline (TPH-G), TPH-D, and TRPH. The results of the soil analyses indicated that two soil samples from these four borings had soluble lead concentrations greater than the soluble threshold limit concentration (STLC) for lead (5 milligrams per

liter (mg/l)). These samples were collected at 0.6 meters (2 feet) in boring BM-30 and at 0.3 meters (1 foot) in boring BM-32. None of the organic compounds were detected with the exception of TRPH. TRPH concentrations ranged from not detected to 400 milligrams per kilogram (mg/kg). The conclusion of the report stated that there was no correlation between lead and TRPH concentrations and their spatial distribution (PSI report for Caltrans Distribution Structure April 4, 1996).

1.2 PROJECT OBJECTIVE

The purposes of this phase of work were to determine the concentrations of selected potentially hazardous constituents in soil and groundwater across the site, and assess their potential impacts on the surrounding environment and personnel at the site. Analytical results from the soil and groundwater investigation were examined with respect to regulatory requirements and guidelines.

2.0 PRE-FIELD ACTIVITIES

This section describes the tasks performed by PSI prior to initiating any field activities. Prior to initiation of field activities, PSI marked the boring locations in white paint and contacted Underground Service Alert a minimum of 48-hours prior to beginning work to locate buried utilities.

A site-specific Health and Safety Plan (HSP) was developed in compliance with 29 CFR 1910.120, and reviewed and signed by a Certified Industrial Hygienist. The HSP was designed to address the potential hazardous materials that may be encountered during field activities at the site and to minimize the exposure to potentially hazardous materials and unsafe working conditions to on-site personnel. PSI also obtained a permit from the Zone 7 Water Agency for the installation of four monitoring wells and drilling of two borings at the site.

3.0 SUBSURFACE INVESTIGATION

This section describes the methodology used to conduct a soil and groundwater investigation at the site. The sampling procedures establish protocols for conducting an investigation that will provide an accurate assessment of the current soil and groundwater conditions and to minimize the potential for cross-contamination during sampling operations.

3.1 SOIL BORINGS

On July 29, 1997, five soil borings (B1, B2/MW-3, B3/MW-2, B4/MW-1, B5, and B6/MW-4) were completed at the site (Figure 2). Soil borings were advanced using a Geoprobe 5400 direct push sampling rig. Geoprobe services were provided by Fisch Environmental of Valley Springs, California. The borings were advanced using a 1-inch diameter core sampler fitted with a retractable tip and lined with stainless steel, brass, or acetate sleeves (Appendix B). The core was advanced using a hydraulic press to the desired sampling depth and the retractable tip was released. The core sampler was driven approximately 0.6 meters (2 feet) into the undisturbed native soil using a percussion hammer. An undisturbed soil sample was recovered from the desired sampling depth. The borings were sampled at 1.5 and 3.0 meters (5 and 10 feet) below ground surface (bgs). Soil samples were not collected below first detected groundwater.

Groundwater was detected in each of the borings at approximately 3.3 meters (11 feet bgs), however the lithology consisted of Bay Muds, which would not yield water. Following completion of borings B2/MW-3, B3/MW-2, B4/MW-1, and B6/MW-4, they were converted to monitoring wells. Additionally, to facilitate future groundwater sampling, temporary wells were constructed in borings B1 and B5. The wells were constructed with pre-packed filter pack and 1-inch diameter Polyvinyl chloride (PVC) casing slotted from 2.1 to 4.8 meters (7 to 16 feet) bgs. A 0.2 meter (6-inch) bentonite seal was placed above the pre-packed sand and hydrated. The remaining annulus was filled to within 0.2 meters (6-inches) of the surface with neat Portland cement.

The soil samples were logged on chain-of-custody records and transported to GEOTEST of Long Beach, California, a California Department of Health Services certified hazardous materials testing laboratory, following chain-of-custody protocol.

Soils were logged according to the Unified Soil Classification System (USCS). Other information recorded on the boring logs included visible or olfactory evidence of potential contaminants and the depth to the groundwater interface. An organic vapor analyzer (OVA) was used to field screen soil samples for volatile organic compounds (VOCs).

VOC concentrations detected in the samples ranged from 0 to 20 parts per million (ppm). OVA readings were recorded on the boring logs (Appendix C). Soil cuttings and liquids generated from decontamination were collected in 55-gallon drums for temporary storage while awaiting disposal characterization.

Soils observed during drilling activities in borings B1, B2/MW-1, and B3/MW-2 consisted of a grayish brown gravel in the upper 0.9 meters (3 feet). The gravel was underlain by a yellowish brown gravelly clay to 2.1 meters (7 feet) bgs, which was underlain by a black "Bay Mud" clay, which continued the remainder of the boring. In boring B1, a thin gravel layer was observed at 3 meters (10 feet) bgs. In borings B4/MW-3 and B5, the upper 1.5 meters (5 feet) consisted of interbedded clay, sand, and gravel. The interbedded sediments was underlain by a black "Bay Mud" clay, which continued the remainder of the boring. In boring B6/MW-4, the upper 1.5 meters (5 feet) consisted of a greyish to greenish brown gravelly clay with sand. The gravelly clay was underlain by a black "Bay Mud" clay, which continued the remainder of the boring. Groundwater was detected in each of the borings at approximately 3.3 meters (11 feet), however, after the groundwater in the wells had stabilized, the water level had risen to approximately 2.9 meters (9.5 feet) bgs.

3.2 GROUNDWATER MONITORING

On August 7, 1997, PSI collected a water sample from boring B5 using a single-use bailer. Temporary casing had been installed in the well to facilitate the collection of the sample. No water was evident in the temporary casing for boring B1. Upon completion of the sampling, each of the borings was backfilled with hydrated bentonite pellets using the temporary casing as a tremie pipe.

On September 5, 1997, PSI conducted groundwater monitoring activities on three of the newly installed monitoring wells. As the site had been asphalted, the monument casing for monitoring well B6/MW-4 had been destroyed and a groundwater sample could not be collected. Each of the new wells was surveyed by David L. Contreras, Land Surveyor, a California State licensed surveyor, for horizontal location relative to a fixed point on the site to within 3 centimeters (0.1 foot). The elevation at the top of casing was surveyed to within 0.3 centimeters (0.01 foot) accuracy relative to mean sea level (msl). A copy of the surveyor's report is included in Appendix D. Prior to groundwater sampling, the depth to water was measured in each well, and the groundwater elevation was calculated. The depth to groundwater ranged from 2.8 meters to 2.9 meters (9.47 to 9.72 feet) above msl. Based on these elevations, the groundwater flow direction appears to be toward the southwest (Figure 3). The hydraulic gradient is approximately 0.015 meter per meter (0.015 foot per foot).

Each of the wells was purged of three to five well volumes prior to sampling to assure the collection of representative groundwater samples (Appendix B). Due to very poor recharge, not all of the specific tests slated for analyses could be conducted. The groundwater was purged using a PVC bailer that was decontaminated with a non-phosphate detergent solution and deionized water rinse prior to use in each well. During purging procedures incremental field measurements were collected for groundwater temperature, conductivity, and pH until the values stabilized to assure the groundwater in the well was in equilibrium with the surrounding aquifer. The purged water was placed in 5-gallon buckets while awaiting profiling for disposal. The groundwater in each well was allowed to recharge to within 90 percent of the initial level before samples were collected. Groundwater samples were collected by lowering a clean, single-use, bailer into the groundwater and pouring the water into laboratory provided containers. Groundwater samples were stored in an ice chest and transported under chain-of-custody protocol.

4.0 ANALYTICAL RESULTS

The soil and ground-water samples were submitted to GEOTEST of Long Beach, California. The results of the sampling program are presented in Tables 1 through 3. A copy of the laboratory reports and chain-of-custody record are included in Appendix E.

4.1 LABORATORY ANALYTICAL RESULTS FOR SOIL

The results of the soil analyses indicated that all of the soil samples were not detected for the following analyses: TPH-G, TPH-D, BTEX, MTBE, and SVOC. All of the soil samples had detectable concentrations of TOG with the concentrations ranging from 5,200 milligrams per kilogram (mg/kg) in the soil sample collected at 1.5 meters (5 feet) bgs in Boring B4 to 10 mg/kg in several soil samples. However, only two soil samples (B4-5 and B6-5) had concentrations above 100 mg/kg.

Trace concentration of tetrachloroethene (Perc) was found in soil sample B4-5 (0.03 mg/kg), while trace concentrations of 1,2,4 trimethylbenzene (0.025 mg/kg) and 1,3,5 trimethylbenzene (0.0078 mg/kg) were detected in soil sample B4-10.

Soil samples were analyzed for TOC, porosity, and moisture content. The moisture content ranged from 11 to 24 percent, the porosity of the samples ranged from 32 to 38 percent, and the TOC ranged from 742 to 3,960 mg/kg.

$4000 (ppm) \rightarrow 4 \times 10^{-6} = 4 \times 10^{-3}$

$f_{oc} = (1/100)(.01) = .0004$

4.2 LABORATORY ANALYTICAL RESULTS FOR GROUNDWATER

The results of the groundwater sampling indicated that all of the groundwater samples were not detected with the following exceptions:

- BTEX was detected at 1.1, 0.5, 1.2, and 1.4 micrograms per liter (ug/l), respectively in monitoring well B4/MW-1.

5.0 DISCUSSION

5.1 SOIL

The results of the soil analyses indicated that all of the soil samples were not detected except for TOG and trace concentrations of volatile organics. The TOG concentrations detected at the site are representative of the concentrations found in the previous study completed by PSI in the general area. The TOG concentrations typically decrease in concentration with depth. Additionally, the higher TOG concentrations detected at the site do not appear to have any correlation with the potential sources of hydrocarbons at the site (former USTs and abandoned sump). The concentrations of the trace organics were all below the USEPA Region IX Preliminary Remediation Goals (PRG) for those compounds that have established PRGs.

Metal concentrations were detected in each of the soil samples collected, however none of the concentrations were above ten times their respective soluble threshold limit concentration (STLC).

5.2 GROUNDWATER

The results of the groundwater analyses indicate that BTEX was detected at 1.1, 0.5, 1.2, and 1.4 micrograms per liter (ug/l), respectively in monitoring well B4/MW-1. None of the other constituents analyzed had detectable concentrations. Of the BTEX compounds detected only benzene at 1.1 ug/l had a concentration above their respective State of California Primary Drinking Water Standard (PDWS). The PDWS for benzene is 1 ug/l, therefore the benzene concentration found in B4/MW-1 is only 0.1 ug/l above the PDWS. Additionally, monitoring well B4/MW-1 is the well furthest from the former gasoline UST and is hydraulically upgradient. The data indicates that the trace BTEX concentrations found in the monitoring well is not the result of practices associated with the USTs or the abandoned sump.

6.0 CONCLUSIONS AND RECOMMENDATIONS

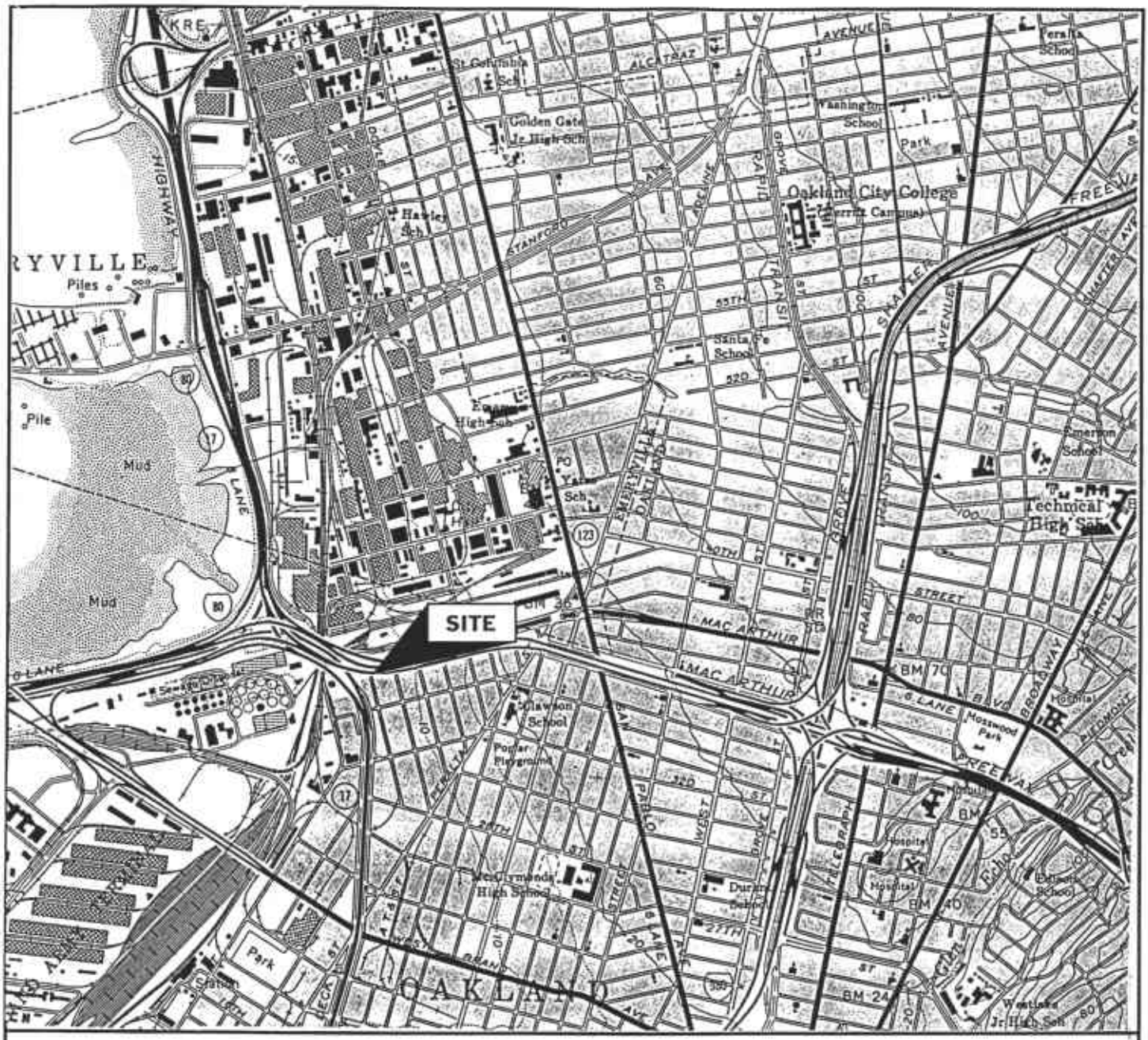
Based on the information presented in this report, the following conclusions have been reached:

- TOG impacted soil was detected in all of the soil samples at the site, however only two of the soil samples had concentrations above 100 mg/kg. The data indicates that the former USTs and the abandoned sump are not the source of the TOG in the soil. Additionally, the TOG concentrations do not appear to be significantly impacting the groundwater in the area. Trace concentrations of volatile organics were found in two soil samples. The concentrations detected are below regulatory concern.

- Since soil concentrations were below the EPA PRGs, which are risk based, it appears that the concentrations present will not pose a significant risk to human health and the environment.

- BTEX concentrations were found in only one of the groundwater samples collected with the benzene concentration just above the PDWS. The data indicates that the former USTs and the abandoned sump are not the source of the BTEX in the groundwater.

As a full suite of analyses could not be completed from the wells at the site due to the lack of water in the wells, PSI recommends further groundwater monitoring at the site be completed in late November or December. Typically groundwater levels are higher during these months, which should aid in the collection of a full suite of analyses. Upon the collection of this data, PSI recommends request for site closure if the contaminant levels and groundwater flow direction is similar to those found during this investigation.

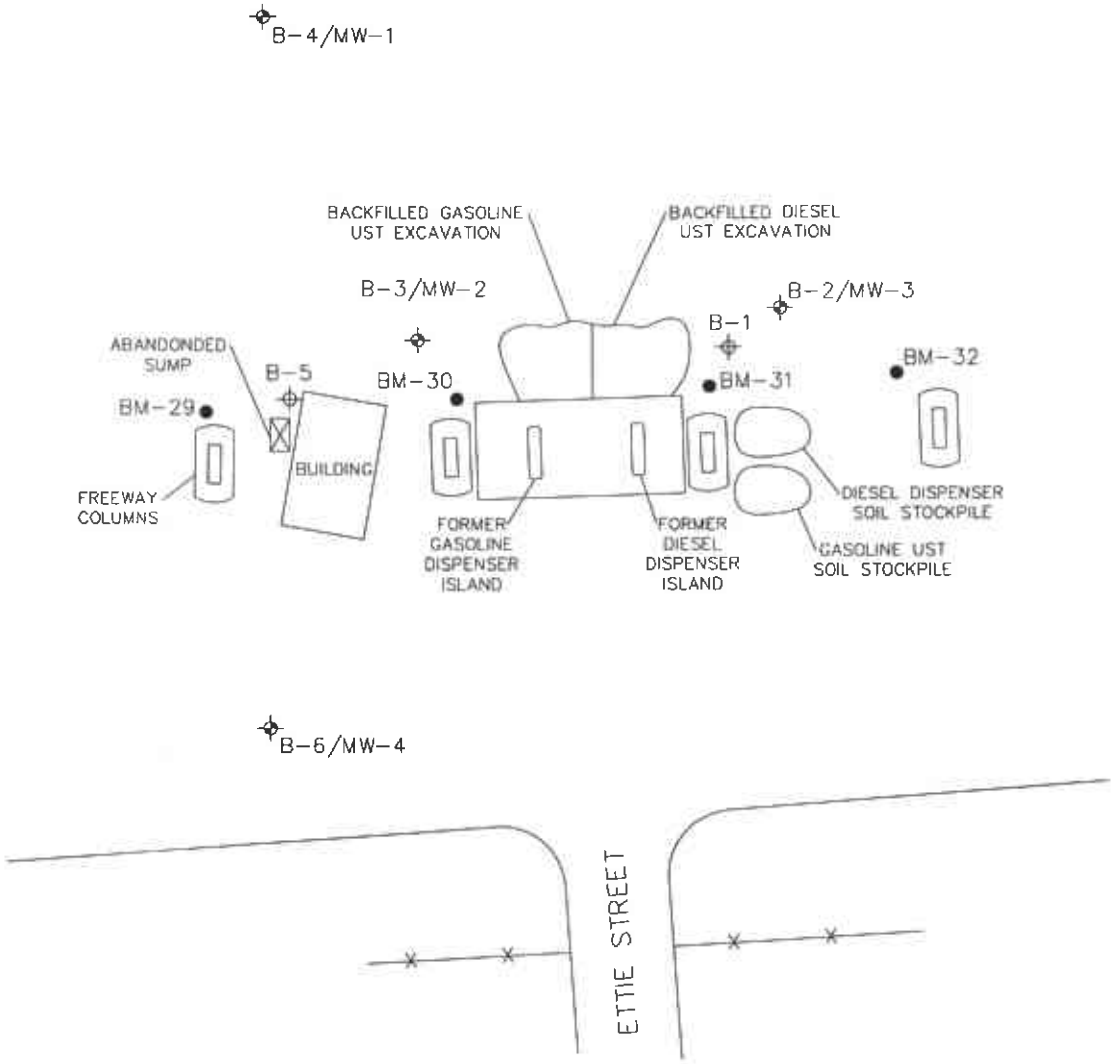


REFERENCE:
U.S.G.S. OAKLAND, CALIFORNIA, 1959
PHOTOREVISED 1980

psi ENVIRONMENTAL GEOTECHNICAL CONSTRUCTION
CONSULTING • ENGINEERING • TESTING

SITE LOCATION
FORMER CALTRANS MAINTENANCE FACILITY
3456 ETTIE STREET
OAKLAND, CALIFORNIA
PROJECT NUMBER: 575-71022

DATE:	5/13/97	CKD BY:	FIGURE NO: 1
FILE NO:	71022-1		DRAWN BY: S.BOWERS



LEGEND

B-1 BORING LOCATION AND DESIGNATION

B-2/MW-3 GROUNDWATER MONITORING WELL LOCATION AND DESIGNATION

BM-29 PSI BORING (APRIL 4, 1996)

NORTH

0 15 30 60

SCALE IN FEET

PSI ENVIRONMENTAL GEOTECHNICAL CONSTRUCTION
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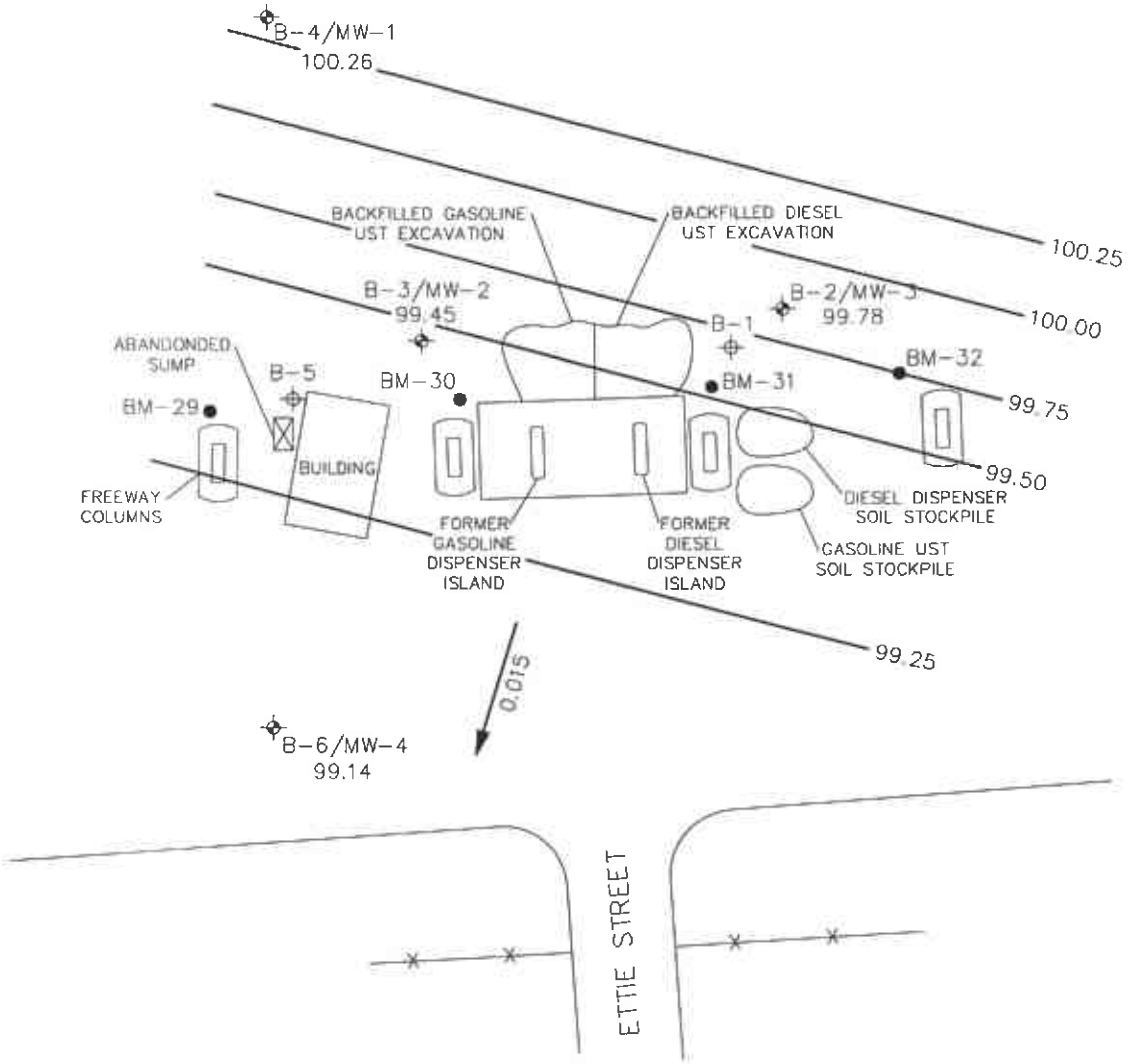
SITE PLAN
CALTRANS MAINTENANCE STATION
3456 ETTIE STREET
OAKLAND, CALIFORNIA
PROJECT NUMBER: 575-71022

DATE: 10/06/97	CKD BY:	FIGURE NO.: 2
FILE NO: 71022-2B		DRAWN BY: L.KOCHIAN



LEGEND

- B-1 — BORING LOCATION AND DESIGNATION
- B-2/MW-3 99.45 — GROUNDWATER MONITORING WELL LOCATION DESIGNATION AND GROUNDWATER ELEVATION
- BM-29 — PSI BORING (APRIL 4, 1996)
- 99.50 — GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION AND GRADIENT

NORTH

0 15 30 60

SCALE IN FEET

PSI ENVIRONMENTAL GEOTECHNICAL CONSTRUCTION
CONSULTING • ENGINEERING • TESTING

GROUNDWATER ELEVATION AND GRADIENT MAP
CALTRANS MAINTENANCE STATION
3456 ETTIE STREET
OAKLAND, CALIFORNIA
PROJECT NUMBER: 575-71022

DATE: 10/09/97	CKD BY:	FIGURE NO.: 3
FILE NO: 71022-3		DRAWN BY: L.KOCHIAN

TABLE 1

LABORATORY RESULTS FOR SOIL SAMPLES

CALTRANS MAINTENANCE STATION
ETTIE STREET, CALIFORNIA

SAMPLE ID	TPH-G	TPH-D	TOG	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES	MTBE	VOCs	SVOCs
B1-5	<1	<10	20	<0.005	<0.005	<0.005	<0.015	<0.005	---	ND
B1-10	<1	<10	30	<0.005	<0.005	<0.005	<0.015	<0.005	---	ND
B2-5	<1	<10	20	<0.005	<0.005	<0.005	<0.015	<0.005	---	ND
B2-10	<1	<10	10	<0.005	<0.005	<0.005	<0.015	<0.005	---	ND
B3-5	<1	<10	20	<0.005	<0.005	<0.005	<0.015	<0.005	---	ND
B3-10	<1	<10	10	<0.005	<0.005	<0.005	<0.015	<0.005	---	ND
B4-5	<1	<10	5200	<0.005	<0.005	<0.005	<0.015	<0.005	0.03	ND
B4-10	<1	<10	20	<0.005	<0.005	<0.005	<0.015	<0.005	0.033	ND
B5-5	<1	<10	50	<0.005	<0.005	<0.005	<0.015	<0.005	ND	ND
B5-10	<1	<10	10	<0.005	<0.005	<0.005	<0.015	<0.005	ND	ND
B6-5	<1	<10	380	<0.005	<0.005	<0.005	<0.015	<0.005	ND	ND
B6-10	<1	<10	20	<0.005	<0.005	<0.005	<0.015	<0.005	ND	ND

Notes:

All analyses are reported in milligrams per kilogram (mg/kg).

TOG = Total Oil and Grease

TPH-G = total petroleum hydrocarbons as gasoline.

TPH-D = total petroleum hydrocarbons as diesel.

MTBE = Methyl tertiary butyl ether

VOCs = Volatle organic compounds, reported as total concentration of all constituents.

SVOCs = Semi-volatile organic compounds, reported as total concentration of all constituents.

--- = Not analyzed

ND = Not Detected for all constituents analyzed.

TABLE 2

LABORATORY RESULTS FOR SOIL SAMPLES: METALS

CALTRANS MAINTENANCE STATION
ETTIE STREET, CALIFORNIA

SAMPLE	SB	AS	BA	BE	CD	CR	CO	CU	PB	HG	MO	NI	SE	AG	TL	V	ZN
B4-5	<5.0	<5.0	43	<0.5	0.6	16	8.2	44	6.7	0.11	<2.5	17	<2.5	<0.5	8.5	36	49
B4-10	<5.0	<5.0	220	<0.5	<0.5	13	9.6	10	2.7	<0.10	<2.5	33	<2.5	<0.5	<5.0	9	24
B5-5	<5.0	<5.0	120	<0.5	0.6	29	7.6	13	12	0.11	<2.5	36	<2.5	<0.5	<5.0	21	35
B5-10	<5.0	<5.0	98	<0.5	<0.5	14	3.6	9.1	2.6	<0.10	<2.5	35	<2.5	<0.5	<5.0	13	22
B6-5	<5.0	<5.0	100	<0.5	<0.5	21	11	21	38	0.18	<2.5	35	<2.5	<0.5	8	15	73
B6-10	<5.0	<5.0	150	<0.5	<0.5	20	7.9	16	24	<0.10	<2.5	31	<2.5	<0.5	10	20	48
TTLC	500	500	10,000	75	100	500	8,000	2,500	1,000	20	3,500	2,000	100	500	700	2,400	5,000
STLC	15	5	100	0.75	1	5	80	25	5	0.2	350	20	1	5	7	24	250

Notes:

<0.01 = not detected at or above the laboratory detection limits

Metals are designated by their symbol on the periodic table of elements.

All samples are reported as total concentration in milligrams per kilogram (mg/kg), unless indicated.

TTLC = total threshold limit concentration

STLC = soluable threshold limit concentration.

TABLE 3
LABORATORY RESULTS FOR WATER SAMPLES
CALTRANS MAINTENANCE STATION
ETTIE STREET, CALIFORNIA

SAMPLE ID	DATE	TPH-G	TPH-D	TOG	BENZENE	TOLUENE	ETHYL-BENZENE	TOTAL XYLENES	MTBE	VOCs
MW-1	9/5/97	<500	<500	<500	1.1	0.5	1.2	1.4	<0.6	ND
MW-2	9/5/97	<500	<500	---	<0.3	<0.3	<0.3	<0.6	<0.6	ND
MW-3	9/5/97	<500	<500	<500	<0.3	<0.3	<0.3	<0.6	<0.6	ND
B-5	8/7/97	<500	---	---	<0.3	<0.3	<0.3	<0.6	---	---

Notes:
All analyses are reported in micrograms per liter (ug/l).
TPH-G = total petroleum hydrocarbons as gasoline.
TPH-D = total petroleum hydrocarbons as diesel.
TOG = total oil and grease
VOCs = volatle organic compounds, reported as total concentration of all constituents.
MTBE = Methyl Tertiary Butyl Ether
--- = Not Analyzed
ND = Not Detected at a concentration presented on laboratory reports

APPENDIX A

TETRA TECH FINAL REPORT

TC 0637-08

FINAL REPORT

UNDERGROUND TANK REMOVAL AND SITE INVESTIGATION
ETTIE STREET MAINTENANCE FACILITY
3465 ETTIE STREET
OAKLAND, CALIFORNIA

Contract No. 56S067
Work Order No. 04-56S067-17

Prepared for

Caltrans
District 4
111 Grand Avenue
Oakland, CA 94623

June 1996

Prepared by

Tetra Tech
180 Howard Street, Suite 250
San Francisco, CA 94105

TETRA TECH

TETRA TECH, INC.
180 Howard Street, Suite 250
San Francisco, CA 94105-1617
Telephone (415) 974-1221
(510) 286-0152
FAX (415) 974-5914

June 11, 1996

Mr. Michael Hilliard
California Department of Transportation
District 4
111 Grant Avenue
P.O. Box 23660
Oakland, CA 94623

Subject: Submittal of the Final Report for the Underground Storage Tank Removal at the Ettie Street Maintenance Facility, Contract No. 56S067, Work Order No. 04-56S067-17, TC 0637-08

Dear Mr. Hilliard:

I have enclosed five copies of the final report for the Ettie Street Maintenance Facility tank removal project. If you have any questions, please do not hesitate to call me at (415) 974-1221.

Very truly yours,

Bob Cotton, PE
Senior Hydrogeologist

Michael Wopat, RG
Project Manager

enclosures

TC 0637-08

FINAL REPORT

UNDERGROUND TANK REMOVAL AND SITE INVESTIGATION
ETTIE STREET MAINTENANCE FACILITY
3465 ETTIE STREET
OAKLAND, CALIFORNIA

Contract No. 56S067
Work Order No. 04-56S067-17

Prepared for

Caltrans
District 4
111 Grand Avenue
Oakland, CA 94623

June 1996

Prepared by

Tetra Tech
180 Howard Street, Suite 250
San Francisco, CA 94105

TC -0637-08

FINAL REPORT

UNDERGROUND TANK REMOVAL AND SITE INVESTIGATION
ETTIE STREET MAINTENANCE FACILITY
OAKLAND, CALIFORNIA

Contract No. 56S067
Work Order No. 04-56S067-17

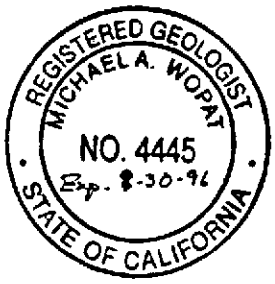
Prepared for

Caltrans
District 4
111 Grand Avenue,
Oakland, CA 94623-0660

Prepared by:

W. Robert Cotton, PE
Senior Hydrogeologist

Michael Wopat, RG
Senior Geologist and Project Manager



Tetra Tech
180 Howard Street, Suite 250
San Francisco, CA 94105

June 1996

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1. INTRODUCTION

This final report has been prepared to document an underground storage tank (UST) removal and disposal at the Ettie Street Maintenance Facility, 3465 Ettie Street, Oakland, Alameda County, California. The work was requested by Caltrans District 4 pursuant to Contract No. 56S067, Work Order No. 56S067-17

1.1 WORK COMPLETED

The work completed during this project, as presented in the work order and discussed during the pre-work site visit, included the following:

- Conducting an initial site visit, including file review, and preparing a work plan and health and safety plan for the tank removal;
- Removing one 4,000-gallon and one 7,500-gallon underground fuel tank and ancillary piping, vent lines, dispenser islands, and fill ports on October 19 and 20, 1995;
- Sampling the soil beneath the tanks and the ground water in the excavation; and
- Backfilling the excavation and bringing the ground surface up to grade with road base rock on November 11, 1995.

Following receipt of the analytical results from the soil and ground water, additional work was requested. The additional work included the following:

- Preparing a UST Unauthorized Release Report (Appendix A) and submitting the report to the RWQCB and Alameda County.
- Excavating TPH-d contaminated soil from beneath the former diesel fuel dispenser island.
- Backfilling the dispenser island excavation with clean fill material.
- Arranging transport and disposal of the fuel-contaminated excavated soil in compliance with applicable state and federal regulations.
- Drilling and sampling two soil borings to depths of 13 to 15 feet below ground surface (bgs).

- Collecting grab ground water samples from temporary monitoring wells installed in the borings.

- Containerizing rinse water from the drilling in U.S. Department of Transportation approved containers, pending waste characterization.

- Backfilling all soil borings with cement/bentonite grout and repairing the ground surface to its original condition.

- Arranging transport and disposal of rinse water in compliance with applicable state and federal regulations.

The following sections describe the historical background and environmental setting of the site and the procedures used in meeting the project objectives.

1.2 SITE DESCRIPTION

The site is located at the north end of Ettie Street, directly under the Interstate 580 structure (Figures 1-1 and 1-2). The site is in northwest Oakland, approximately one-half mile southeast of San Francisco Bay and one-quarter mile south of the Emeryville city limit.

The maintenance facility was built in 1959, and the property is owned and formerly operated by Caltrans; the site is presently unused. The property is about 240 feet (ft) wide and about 480 ft long and covers an area of about three acres.

The elevation of the site is approximately 10 ft above mean sea level (msl). The eastbound and westbound lanes of Interstate 580 are elevated on support structures about 40 to 50 ft above the ground level at the site.

1.2.1 Land Use

The site is located on the Oakland West 7.5 minute U.S. Geological Survey Quadrangle (1979). Topographic relief is about 50 ft within a radius of one mile of the site. The land use in the vicinity of the site is predominantly urban and is relatively densely populated. The East Bay Municipal Utility District sewage treatment plant is located one-third mile west-northwest of the facility, and the Oakland Army Base is located one-half mile to the west.

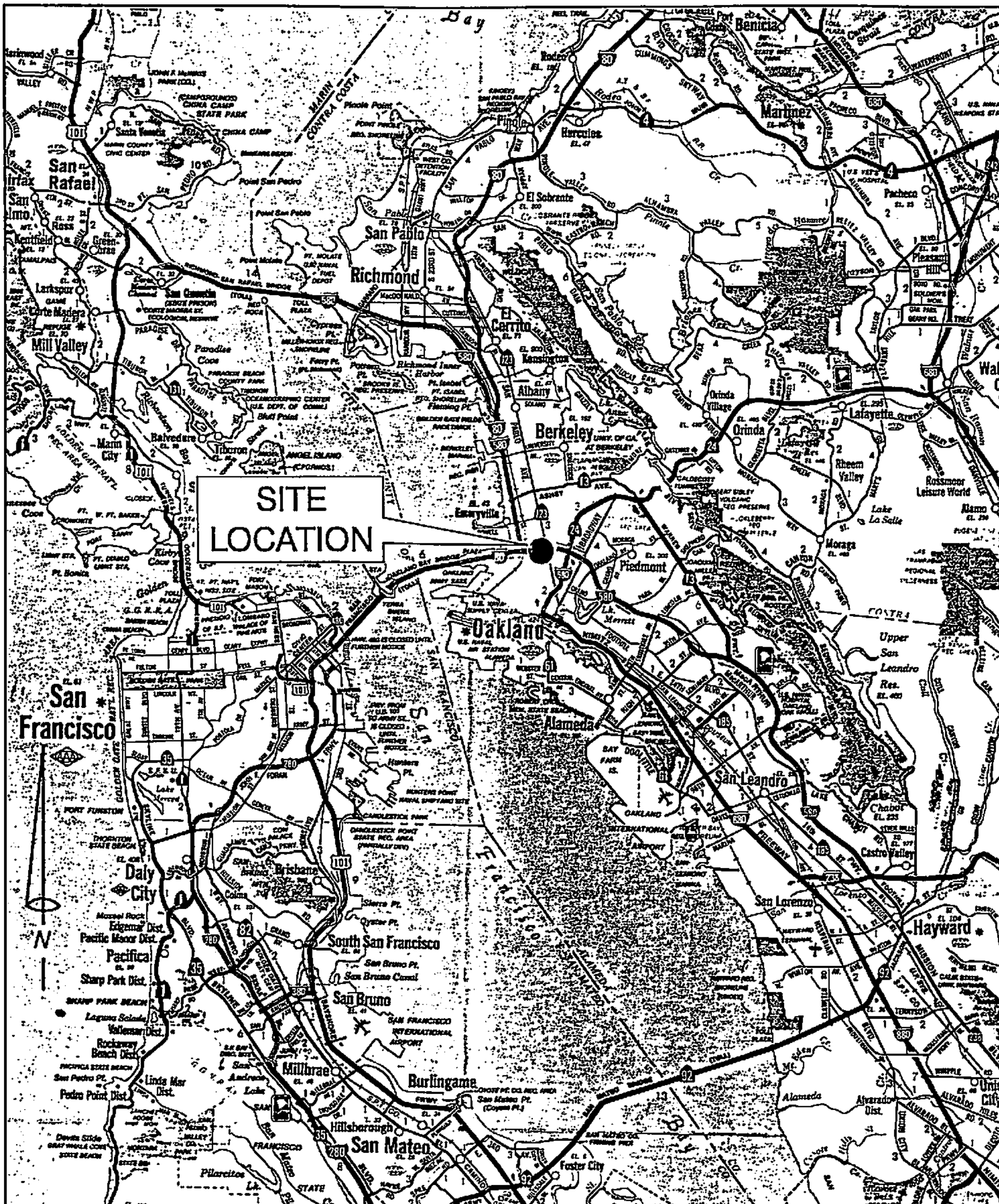


Figure 1-1 Regional Site Location

Scale: 1" = 4 miles

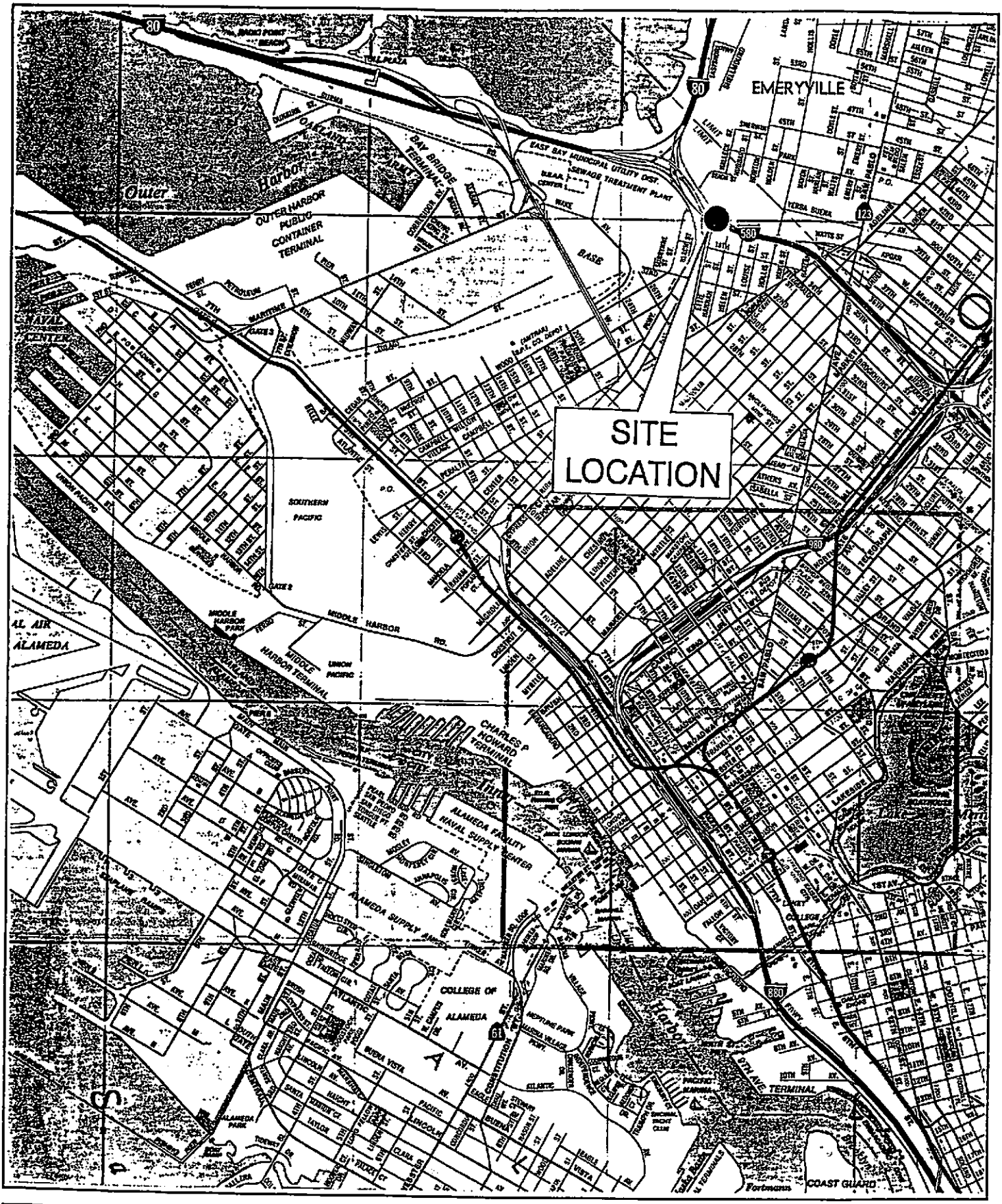


Figure 1-2 Site Location

N

Scale: 1" = 1/2 mile

1.2.2 Geologic Setting

Soils

The surface soils at the site have been mapped as urban land (USDA 1980), a miscellaneous area consisting of land improved with urban structures. The soil material is mostly heterogeneous fill. The Clear Lake complex soils may also underlie portions of the site. Typically, the surface layer of the Clear Lake soil is a very dark clay. The underlying material is dark gray and grayish brown calcareous clay and silty clay that extends to a depth of 60 inches or more. The Clear Lake soil is very deep, poorly drained, and has a low permeability.

Geology

The local geology in the area is primarily artificial fill and Quaternary Bay Mud (Radbruch 1957). Several potentially active faults have been identified in the area; the closest is the Hayward Fault, which follows a northwesterly trend at the foot of the Oakland and Berkeley Hills.

The site geology is interpreted as being composed of artificial fill and Bay Mud, similar to the geology of the local area. The artificial fill generally consists of miscellaneous refuse, or Bay Mud, or sand dredged from the bay. Its thickness is variable, and it typically lies above the Bay Mud. The Bay Mud is of Holocene age and consists of unconsolidated, water-saturated, dark plastic clay and silty clay rich in organic material. Its thickness in coastal lagoons and estuaries is estimated to be approximately 10 feet (Helley et al. 1979).

1.2.3 Hydrogeology

Ground water in the vicinity of the site is found at sea level near the shore and roughly follows the topography in higher areas. Recharge is primarily through rainfall and infiltration. Ground water levels may be tidally influenced due to the proximity to San Francisco Bay, located one-half mile to the northwest. Ground water closest to the surface is believed to be present in an unconfined water table aquifer, with ground water flow generally west and northwest towards the bay. During the tank removals, advancement of soil borings, and soil excavations ground water was encountered at depths of five to eight feet below ground surface.

2. TANK REMOVAL

2.1 DESCRIPTION OF UNDERGROUND STORAGE TANKS

The two underground storage tanks reportedly were installed in 1959 when the Ettie Street Maintenance Facility was built. One tank had a 7,500-gallon capacity, was constructed of single-walled steel, and was used to store gasoline. The second tank had a 4,000-gallon capacity, was constructed of single-walled fiberglass, and was used to store diesel fuel. No plans showing the construction details of the tanks were available. A site plan is presented as Figure 2-1.

2.2 SITE PREPARATION

Site preparation activities included obtaining all applicable permits, notifying the county health department and fire department, and locating underground utilities. A staging area for excavated soil was prepared near the tank removal site. Pea gravel was staged near the excavation.

2.2.1 Permits

An underground storage tank removal permit was obtained from the Alameda County Department of Health for closure of the underground storage tanks. Permits also were obtained from the Oakland Fire Department and the Bay Area Air Quality Management District.

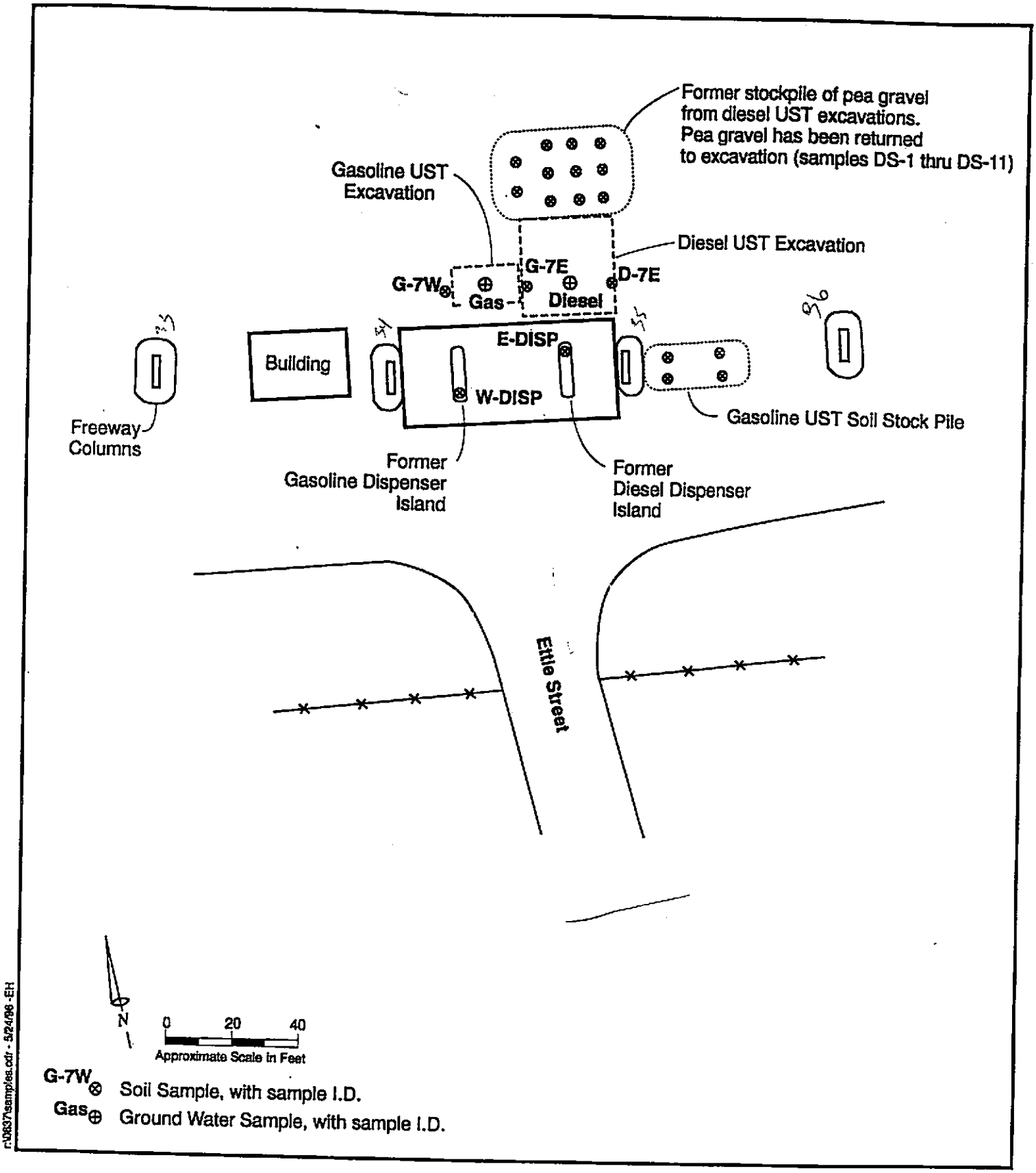
2.2.2 Utilities

Prior to beginning the excavation, utilities were located and marked by Underground Service Alert (USA).

2.3 TANK REMOVAL

The procedure for the tank removals was as follows:

- The electric power was shut off and no smoking signs and barricades were placed in conspicuous areas;



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TETRA TECH

Site Plan Showing Locations of Soil and Ground Water Samples Collected October 19 and 20, 1995

Caltrans Ettie Street Maintenance Facility
Oakland, California

Figure 2-1

- Pumpable contents of the tanks were placed in 55-gallon drums;
- The concrete/asphalt surface was removed;
- The soil was excavated to expose the top of the tank;
- After removal of the liquids remaining in the dispenser piping, the piping, fixtures, the drop tube, and pump were removed from the tank;
- The tanks were purged with dry ice;
- Soil was excavated to the bottom of the tank to free the sides of the tank;
- The tanks were hoisted from the excavation; and
- The tanks were labeled, manifested, and hauled as hazardous waste to Erickson, Inc., in Richmond, California.

2.3.1 Cleaning

A total of 250 gallons of gasoline and diesel fuel were pumped out of the tanks. These liquids were removed from the site October 24, 1995, by Enviropur West, Inc., of Patterson, California, and were transported to the Napa Transfer Station in Napa, California (see Appendix B).

2.3.2 Excavation to Expose the Top of the Tank

The asphalt and concrete surfacing were cut using a jackhammer. After removing the concrete and asphalt, the top of each tank was uncovered by the backhoe operator who took care not to disturb the external piping. The fill pipes were located directly over the tanks. The product lines from the valve boxes to the dispenser island were drained of remaining fuel, disconnected, and pulled from underneath the pad. Also, the vent lines from the tanks were cut at the bridge columns, the aboveground portion removed, and the underground portion pulled from the ground. The remaining external piping, the drop tube, and submersible pumps were removed. The two dispenser islands and crash bollards were broken up and removed.

2.3.3 Purging

The tanks were rendered inert in place by pouring crushed dry ice into each tank (20 lb./1000 gallons of tank volume), as required by the Alameda County Health

Department. The atmosphere within the tanks was monitored by the excavation contractor using a combustible gas meter until it was maintained at less than 10 percent of the lower explosive limit, and the oxygen content was less than 10 percent. Susan Hugo of the Alameda County Health Department monitored this process and gave authorization to proceed after the proper atmosphere had been achieved. The tanks were then removed from the excavation.

2.3.4 Tank Removal

The soil along one side of the tanks was removed to the depth of the bottom of the tanks (approximately 11 ft below the ground surface) to a distance of approximately two feet from the wall of the gasoline tank. It was necessary to remove more sidewall soils from around the diesel tank since pea gravel that had been placed around the tank was sloughing against the tank. The soil from around the gasoline UST was placed in the staging area prepared for this purpose.

Approximately 50 to 70 cubic yards of soil were removed from the gasoline UST excavation and stockpiled. The soil removed from around the former diesel storage tank was composed almost entirely of pea gravel. Eleven soil samples were collected from the pea gravel, as directed by the Susan Hugo. Her approval to replace the soil into the diesel UST excavation is contained within the hazardous materials inspection form attached in Appendix A.

2.3.5 Removal of Underground Piping

Underground vent and product piping were removed by pulling them out from under the pavement. After inspection, the tank and lines were placed on a truck licensed to carry hazardous waste.

2.3.6 Tank Disposal

The tanks were inspected, labeled, and properly manifested (Manifest #95592426) as hazardous waste. They were transported by Erickson, Inc., a state-licensed hazardous waste hauler, for disposal at Erickson's permitted facility in Richmond, California. The hazardous waste manifest was signed by a representative of Caltrans. Copies of all manifests for all wastes are attached as Appendix B.

2.4 SAMPLE COLLECTION PROCEDURE

The following sections describe soil and ground water sample collection procedures.

2.4.1 Soil Samples from Tank Pits

Samples were collected of the soil around the tanks to confirm the presence or absence of contamination and to help identify the source(s) of the contamination, if present. LUFT Manual and Regional Water Quality Control Board guidelines require that at least two samples be collected from each tank pit, one from under each end of the tank, within two ft of the bottom of the tank. The underground piping from each tank was less than 20 feet in length; therefore one soil sample was collected from beneath each dispenser island.

Soil samples were collected in stainless steel sample liners. As directed by Susan Hugo, one soil sample was collected from each end of the gasoline excavation from a depth of approximately seven feet. This depth was chosen as there was ground water present in both tank excavations at a depth of approximately eight feet. Samples were collected from the east and west end of the gasoline UST pit and from the east end of the diesel UST pit. No sample was collected from the west end of the diesel pit as this was a point common to the west end of the gasoline UST. The samples were collected by pushing a liner tube into soil excavated and removed to the surface with a backhoe bucket.

Each sample was prepared by placing Teflon film over the ends of the sample liner covering the film with plastic end caps, and then sealing the tube with cohesive silicon rubber tape. Each sample was labeled with the sample ID number, the date, and time collected, and stored on ice in a cooler under chain of custody until received by the laboratory.

All soil samples were analyzed by a state-certified laboratory using the methods specified in Section 2.6.

2.4.2 Ground Water Samples from Tank Pits

Ground water samples were collected from the water, which collected in the excavation pits, using a glass sample container. The water samples were then transferred to containers supplied by the laboratory. No sheen or odor was observed on the samples or the water in the excavations. Samples were labeled, stored, and shipped as described in the previous section and were analyzed by the methods specified in Section 2.6.

2.4.3 Soil Samples from Stockpiled Soil

Four discrete soil samples were collected from the stockpile of soil excavated from the gasoline pit. The purpose of these samples was to obtain a preliminary characterization of the stockpiled soil for evaluation of soil disposal options. The

laboratory was instructed to composite the discrete samples. The samples were collected at selected representative locations by removing about 1 foot of soil to expose fresh material and then pushing a sample liner into the newly exposed soil. The sample liners were sealed and labeled as described in Section 2.4.1. A sketch of the sample points on the soil pile was recorded in the field log. The approximate locations of the samples are shown on Figure 2-1. The 220 cubic yards of samples were analyzed as specified in Section 3.0.

Eleven discrete samples were collected from the soil removed from around the diesel UST. Susan Hugo requested that one discrete sample be collected for every 20 cubic yards of soil removed. These samples were required as Caltrans preferred to replace the soil into the excavation. As an estimated 220 cubic yards of soil were removed, 11 samples were necessary (see Figure 2-1 for approximate locations). The sampling procedure was the same as described in the preceding paragraph. The 220 cubic yards of excavated pea gravel was then replaced into the diesel UST pit.

2.4.4 Soil Samples from Under Dispenser Islands

Following removal of the dispenser islands, a single soil sample was collected from under each island at a location approved by Susan Hugo. Each sample was collected by first scraping away several inches of soil, then driving a soil sampler containing a 2 inch x 6 inch sample liner into the ground using a slide hammer. The sample liner then was retrieved and was sealed and labeled as described in Section 2.4.1.

2.5 BACKFILL AND COMPACTION

The remaining diesel tank excavation and the gasoline excavation were backfilled with clean pea gravel to within 15 inches of the ground surface. The excavation was then filled to grade with compacted road base. At the instruction of Caltrans, the ground surface was not paved with asphalt or concrete because additional excavation and/or drilling may be required.

2.6 LABORATORY ANALYSIS

Samples were analyzed by Entech Analytical Labs (formerly Hull Development Labs), a California-certified laboratory in Sunnyvale, California. Samples were shipped to Entech under a chain of custody that identified the samples, the date collected, and the analyses to be performed. The samples were analyzed by the following methods:

- Soil samples collected from the diesel tank excavation, underneath the diesel dispenser island, and from the stockpile were analyzed by EPA

Method 3550/8015 modified, for total petroleum hydrocarbons as diesel (TPH-d), and by EPA Method 8020 for benzene, toluene, ethylbenzene, and total xylenes (BTEX);

- The ground water sample collected from the diesel tank excavation was analyzed by EPA Method 602 for BTEX and by EPA Method 3550/8015 modified, to determine TPH-d;

- Soil samples collected from the gasoline tank excavation, underneath the gasoline dispenser island and from the stockpile of soil from the gasoline UST pit were analyzed by EPA Method 5030/8015 modified, for total petroleum hydrocarbons as gasoline (TPH-g), by EPA Method 7420 for total lead, and by EPA Method 8020 to determine BTEX and methyl-tert-butyl ether (MTBE) concentrations;

- The ground water sample collected from the gasoline tank excavation was analyzed by EPA Method 602 for BTEX and MTBE, total lead by EPA Method 239.1 and by EPA Method 5030/8015 modified, to determine TPH-g; and

- Analysis for reactivity, corrosivity, and ignitability (RCI) were performed to characterize for disposal the soil stockpile from the gasoline UST pit.

2.7 ANALYTICAL RESULTS FROM INITIAL SOIL AND GROUND WATER SAMPLING

2.7.1 Soil Samples

The results of soil sample analyses are summarized in Table 1.

- Confirmation soil samples collected from the west and east ends of the gasoline UST tank pit (G-7W and G-7E) contained no total petroleum hydrocarbons as gasoline (TPH-g), BTEX compounds, or methyl-tert-butyl ether (MTBE) above the method detection limits. Total lead concentrations were 6.5 and 11 mg/kg, and probably represent normal soil concentrations.

- Confirmation soil samples collected from the west and east ends of the diesel UST tank pit (G-7E and D-7W) contained no TPH as diesel (TPH-d) or BTEX compounds above the method detection limits. The samples did contain 23 and 13 mg/kg TPH as motor oil (TPH-oil). The source and volume of the motor oil release is unknown.

Table 1
Analytical results for soil samples collected October 19 and 20, 1995, at Caltrans' Ettie Street Maintenance Facility
3465 Ettie Street, Oakland, California

Sample ID	Date Collected	TPH-oil (8015 mod) (mg/kg)	TPH-d (8015 mod) (mg/kg)	TPH-gas (8015 mod) (mg/kg)	Benzene (8020) (mg/kg)	Toluene (8020) (mg/kg)	Ethylbenzene (8020) (mg/kg)	Xylenes (8020) (mg/kg)	MTBE (8020) (mg/kg)	Lead (7420) (mg/kg)
Samples collected from beneath USTs										
G-7W	10/19/95	na	na	ND	ND	ND	ND	ND	ND	*6.5*
G-7E	10/19/95	*23*	ND	ND	ND	ND	ND	ND	ND	*11*
D-7E	10/19/95	*13*	ND	na	ND	ND	ND	ND	na	na
Samples collected from beneath dispensers										
W-DISP	10/20/95	na	na	ND	ND	ND	ND	ND	ND	*18*
E-DISP	10/20/95	na	*64000*	na	ND	ND	ND	ND	na	na
Sample composited from soil from gasoline UST excavation										
COMP	10/20/95	na	na	ND	ND	ND	ND	ND	ND	*26*
Samples collected from pea gravel removed from around diesel UST										
DS-1	10/19/95	ND	*35*	na	ND	ND	ND	ND	ND	na
DS-2	10/19/95	ND	*71*	na	ND	ND	ND	ND	ND	na
DS-3	10/19/95	ND	*31*	na	ND	ND	ND	ND	ND	na
DS-4	10/19/95	*110*	*39*	na	ND	ND	ND	ND	ND	na
DS-5	10/19/95	*62*	*39*	na	ND	ND	ND	ND	ND	na
DS-6	10/19/95	*29*	*12*	na	ND	ND	ND	ND	ND	na
DS-7	10/19/95	*72*	ND	na	ND	ND	ND	ND	ND	na
DS-8	10/19/95	*560*	ND	na	ND	ND	ND	ND	ND	na
DS-9	10/19/95	*91*	*24*	na	ND	ND	ND	ND	ND	na
DS-10	10/19/95	*49*	ND	na	ND	ND	ND	ND	ND	na
DS-11	10/19/95	*30*	ND	na	ND	ND	ND	ND	ND	na
Method Detection Limit		1.0	1.0	1.0	0.005	0.005	0.005	0.005	0.05	0.5

NOTES:

mg/kg	milligrams per kilogram (ppm)
TPH-oil	total petroleum hydrocarbons quantified as motor oil
TPH-d	total petroleum hydrocarbons quantified as diesel
TPH-g	total petroleum hydrocarbons quantified as gasoline
na	not applicable, analysis not performed for this analyte
ND	analyte not detected (ND) at or above the laboratory reporting limits
COMP	composite of four samples (SP-SW, SP-SE, SP-NW, SP-NE) collected from the soil removed from the gasoline UST excavation

- The confirmation soil sample collected from beneath the gasoline dispenser island (W-DISP) did not contain TPH-g, BTEX compounds, or MTBE above the method detection limits. Total lead content was 18 mg/kg.

- The confirmation soil sample collected from beneath the diesel dispenser island (E-DISP) contained TPH-d at a concentration of 64,000 mg/kg and no BTEX compounds above the method detection limits.

This indicates that there was a release of diesel fuel in the vicinity of the sample collection point and is the reason why additional soil excavation and confirmatory sampling, as described below in this report, was necessary.

- The composite soil sample collected from the stockpile of soil excavated from around the gasoline UST (COMP) contained no detectable concentration of TPH-g, BTEX compounds, or MTBE. Total lead content is 26 mg/kg, well below concentrations of regulatory concern. Therefore, this soil can be treated as ordinary clean fill material.

- Most of the soil samples collected from the pea gravel removed from around the diesel UST (OS-1-DS-11) contained quantifiable concentrations of TPH-d and TPH-oil. The average concentration of TPH-d was 23.0 mg/kg, and the average concentration of TPH-oil was 91.3 mg/kg. This pea gravel was returned to the tank pit.

2.7.2 Ground Water Samples

The results of ground water sample analyses are summarized in Table 2.

Table 2
Analytical results for petroleum hydrocarbons in grab ground water samples collected October 19, 1995, at Caltrans' Ettie Street Maintenance Facility

Sample ID	TPH-oil (8015 mod) (µg/L)	TPH-d (8015 mod) (µg/L)	TPH-g (8015 mod) (µg/L)	Benzene (602) (µg/L)	Toluene (602) (µg/L)	Ethylbenzene (602) (µg/L)	Xylenes (602) (µg/L)	MTBE (602) (µg/L)	Lead (602) (mg/L)
Gas	na	na	ND	ND	ND	ND	*36*	*260*	ND
Diesel	170*	*2000*	na	ND	ND	ND	ND	na	na
Method Detection Limit	50	50	50	0.5	0.5	0.5	0.5	5.0	0.05

Notes:

TPH-oil	total petroleum hydrocarbons quantified as motor oil.
TPH-d	total petroleum hydrocarbons quantified as diesel
TPH-g	total petroleum hydrocarbons quantified as gasoline
µg/L	micrograms per liter (= ppb)
mg/L	milligrams per liter (= ppm)
na	not applicable, analysis not performed for this analyte
ND	analyte not detected (ND) at or above the laboratory reporting limit
Gas	ID for water sample from pit resulting from removal of gasoline UST
Diesel	ID for water sample from pit resulting from removal of diesel UST
*	TPH in motor oil range does not match typical motor oil pattern (see Appendix C).

- The ground water sample collected from the gasoline UST tank pit (Sample ID = "Gas") contained no TPH-g, benzene, toluene, ethylbenzene, or dissolved lead above the method detection limits. The

analyses did detect 36 µg/L xylenes and 260 µg/L MTBE. The California Department of Public Services Primary Maximum Contaminant Level (MCL, also known as the drinking water standard) for xylenes is 1,750 µg/L, well above the level found in the Ettie Street sample; therefore it should not be an issue of concern. There is no primary or secondary MCL for MTBE; therefore it is not an issue of concern.

- The water sample collected from the diesel UST pit (Sample ID = "Diesel") contained 170 µg/L TPH-oil and 2,000 µg/L TPH-d. The TPH-d concentration could trigger a requirement for additional ground water assessment by the lead regulatory agency. The TPH-oil concentration represents a carry over from the adjacent diesel fuel range rather than the presence of motor oil (see December 21, 1995, report in Appendix C). Concentrations of BTEX compounds were below the method detection limits.

3. SOIL EXCAVATION FROM BENEATH FORMER DIESEL DISPENSER ISLAND AND SOIL DISPOSAL

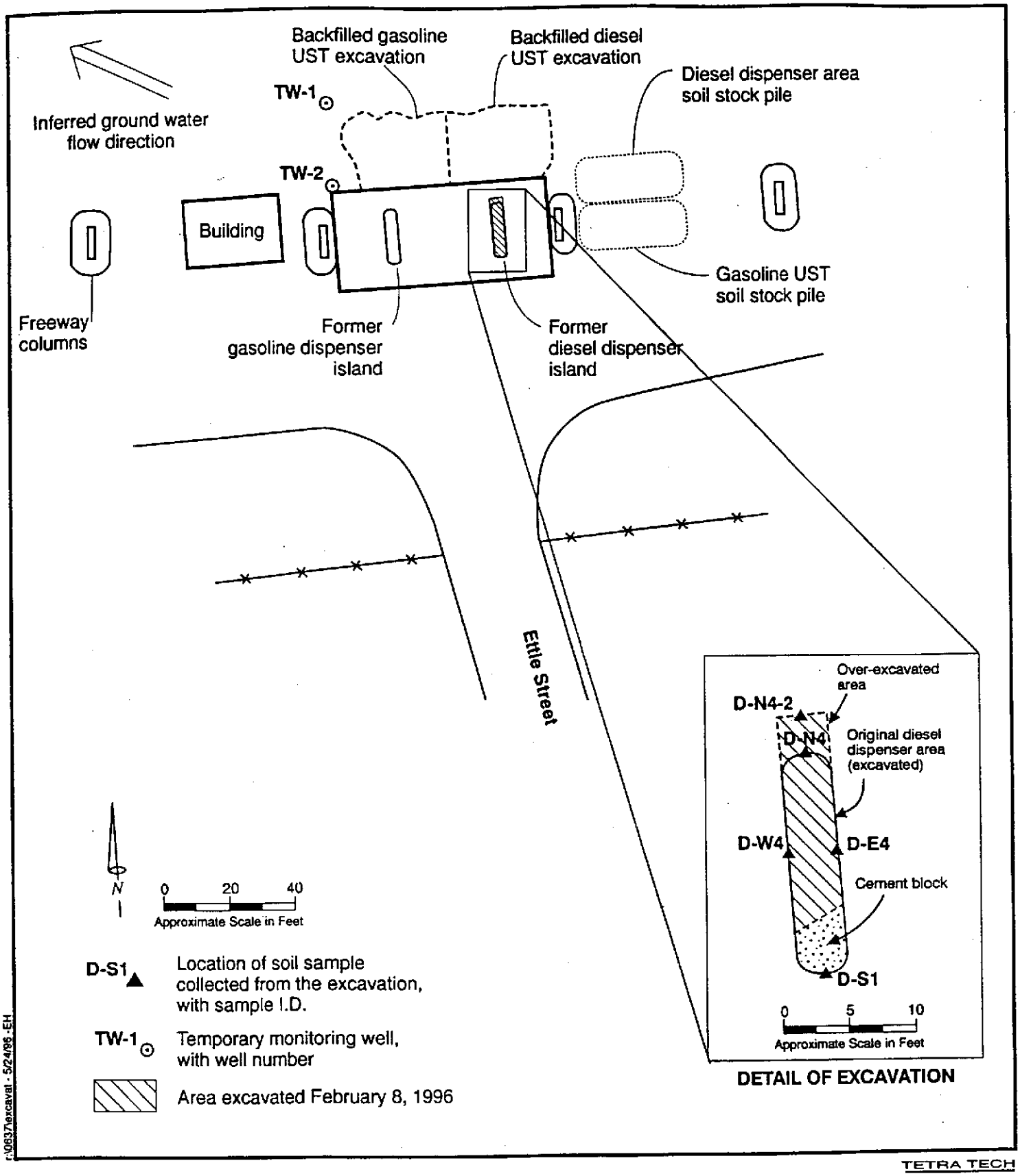
The following sections describe the methods used during the excavation, stockpiling, transport, and disposal of soil removed from beneath of the former diesel dispenser island. The soil excavation and stockpiling was completed on February 8, 1996. On April 16, 1996, the soil was loaded and transported to REMCO in Richmond, California, for treatment.

3.1 SOIL STAGING AREA

A soil staging area for the soils excavated from under the former diesel dispenser island was prepared in the vicinity of the tank excavation site at the location shown on Figure 3-1. The staging area was constructed by first placing 6-mil plastic sheeting on the ground surface. Contaminated soil was placed on the plastic sheeting and was covered with plastic sheeting at the end of the work day.

3.2 SOIL EXCAVATION UNDER THE FORMER DIESEL DISPENSER

When the cement diesel dispenser island was removed on October 19, 1995, the resulting shallow excavation was brought to grade by backfilling with clean road base sized gravel. This material was removed and separately staged before removing the contaminated soil. Soil was then removed from beneath the former diesel dispenser using a backhoe. Excavation work was directed by a Tetra Tech representative. Excavated soils were visually inspected and screened with a photoionization detector (PID). Obviously contaminated soils were placed on the soil staging area. The depth of excavation extended to the depth of the water table, which was encountered at 5.5 feet from ground surface. A plan view of the location and size of the initial excavation is shown on Figure 3-1. A large cement block was encountered in the southern end of the excavation. The top of the block was at 2.25 feet bgs and the block extended downward below the base of the excavation at 5.5 feet. This cement block was left in place in the excavation. After all obviously contaminated soils were removed, samples were collected from the four sidewalls (see Figure 3-1 for sample locations). The samples collected from the north, east, and west excavation walls were collected from a depth of four feet. The presence of the cement block on the south end prohibited sampling below its top face; therefore



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TETRA TECH

Site Plan Showing Locations of Temporary Monitoring Wells and Excavation Sampled February 8, 1996

Caltrans Ettie Street Maintenance Facility
Oakland, California

Figure 3-1

the southern soil sample was collected from a depth of one foot. These samples were analyzed for the parameters described in Section 2.7. Results of the north sample analysis was 180 mg/kg TPH-d, greater than the proposed closure goal (Section 5.1), therefore the excavation was extended three feet to the north and the excavation wall was resampled. The results of soil analyses from the south, west, and east sidewalls and the resampling of the north sidewall were all less than the analysis method detection limit and the proposed closure goals; therefore the soil removal was halted at that point. The total estimated volume of removed soils is 12 cubic yards.

After completion of the soil excavation, the resulting pit was backfilled with clean pea gravel to a depth of approximately 15 inches. The excavation was then brought to grade by filling with the previously removed clean roadbase sized gravel, and the gravels were compacted using the backhoe.

3.3 SOIL SAMPLE COLLECTION AND ANALYSIS PROCEDURES

3.3.1 Soil Samples from the Excavation

Soil samples collected from the excavation were labeled with a sample number descriptive of the location and depth of the sample and the date and time of collection. Sample numbers were composed of the sample or tank pit location followed by a number corresponding to the depth of the sample and a letter corresponding to the direction (N,E,S,W) from the center of the pit that the sample was taken from.

After the samples were described, labeled, and packaged, they were transported to the on-site mobile laboratory where they were logged in, placed in a cooler or refrigerator, and maintained at a temperature of about 4 degrees Celsius until analysis. A chain of custody was maintained at the on-site laboratory.

Soil samples were collected by pushing a liner tube into soil excavated and brought to the surface with a backhoe bucket. All soil samples were analyzed for TPH-d using modified EPA Method 8015/3550 by a mobile state-certified laboratory operated by Geochem Environmental Laboratories of San Jose, California.

3.3.2 Composite Soil Samples from the Soil Stockpile

Four discrete soil samples were collected from the stockpile of soil excavated from under the former diesel dispenser island. The purpose of the soil samples was to obtain a preliminary characterization of the stockpiled soil for evaluation of soil disposal options. The samples were collected by pushing a sample liner into the

stockpiled soil at four quadrants within the stockpile. The discrete samples were identified with separate sample numbers. A sketch of the sample points on the soil pile was recorded in the field log. The laboratory was instructed to composite the discrete samples and analyze the composite.

The composite sample was analyzed for TPH-d using modified EPA Method 8015/3550 by the mobile state-certified laboratory operated by Geochem Environmental Laboratories. Analyses for BTEX compounds, reactivity (cyanide and sulfide), corrosivity (pH), and ignitability (flash point), the LUFT metals (cadmium, chromium, lead, nickel, and zinc), and soluble lead were conducted by Entech Analytical Labs.

3.4 BACKFILL AND COMPACTION

The excavation was backfilled with clean pea gravel and was compacted to Caltrans' specifications as soon as the excavation was completed and all samples were collected and analyzed. Backfill was staged on site prior to the start of work. The upper one foot of fill consisted of compacted road base.

3.5 RESULTS OF ANALYSES FROM DIESEL DISPENSER ISLAND EXCAVATION AND SOIL STOCKPILE

The results of the soil analyses are summarized on Table 3.

- The soil samples collected from the south, west, and east ends (D-S1, D-E4, and D-W4) of the diesel dispenser island excavation contained no TPH-d above the method detection limit.

- The first soil sample collected from the north end (D-N4) of the diesel dispenser island excavation contained 180 mg/kg TPH as diesel. After excavating an additional three feet northward, another soil sample (D-N4-2) was collected. This sample contained no detectable TPH-d.

- The composite sample (SS-NW, NE, SW, SE) was collected from the stockpile composed of soil removed from beneath the former diesel dispenser for the purpose of characterizing the soil for disposal. The composite sample was found to contain 150 mg/kg TPH-d and no detectable BTEX compounds. None of the other parameters shown on Table 3 were at levels that would qualify the soil as a hazardous waste.

Table 3
Analytical results for soil samples collected February 8, 1996 at Caltrans' Ettie Street Maintenance Facility
3465 Ettie Street, Oakland, California

Sample ID	TPH-d (8015 mod) (mg/kg)	Benzene (8020) (mg/kg)	Toluene (8020) (mg/kg)	Ethylbenzene (8020) (mg/kg)	Xylenes (8020) (mg/kg)	Cyanide (9030) (mg/kg)	Sulfide (9030) (mg/kg)	pH (9045) (units)	Flash Point (1010) (°F)
Confirmation samples collected from the excavation beneath the former diesel dispenser island									
D-S1	ND	na	na	na	na	na	na	na	na
D-E4	ND	na	na	na	na	na	na	na	na
D-W4	ND	na	na	na	na	na	na	na	na
D-N4	*180*	na	na	na	na	na	na	na	na
D-N4-2	ND	na	na	na	na	na	na	na	na
Composite sample collected from the diesel soil stockpile									
SS-NW,NE,SW,SE	*150*	ND	ND	ND	ND	ND	ND	9.1	> 200
Method Detection Limit	10	0.005	0.005	0.005	0.005	0.2	0.5	na	na

Sample ID	Cadmium (7130) (mg/kg)	Chromium (7190) (mg/kg)	Lead (7420) (mg/kg)	Soluble Lead* (7420) (mg/l)	Nickel (7520) (mg/kg)	Zinc (7950) (mg/kg)
Composite sample collected from the diesel soil stockpile (cont'd)						
SS-NW,NE,SW,SE	0.61	19	74	2.7	26	120
Method Detection Limit	0.5	0.5	0.5	0.10	0.5	0.5

NOTES:

mg/kg	milligrams per kilogram (ppm)
TPH-d	total petroleum hydrocarbons quantified as diesel
na	not applicable; analysis not performed for this analyte
ND	analyte not detected (ND) at or above the laboratory reporting limits
*	soluble lead extracted following procedures of the California waste extraction test (Cal WET)

3.6 DISPOSAL OF SOIL EXCAVATED FROM BENEATH THE FORMER DIESEL DISPENSER ISLAND

On April 16, 1996, Tetra Tech supervised the loading of the soil onto two roll-off boxes. The soil was transported by Alhambra Environmental Services of Richmond, California, to the rotary kiln disposal facility owned and operated by Remedial Environmental Marketing Company, Inc., in Richmond, California. The weight of the soil was 20.6 tons, indicating a total soil volume of about 16 cubic yards. The soil was remediated by passing it through the rotary kiln. A copy of the nonhazardous waste manifest is included in Appendix B.

4. DRILLING AND SAMPLING SOIL BORINGS

Two soil borings were placed downgradient of the tank pit and the diesel dispenser island to permit collection of soil and grab ground water samples. The northernmost boring (TW-1) was located near the former gasoline UST tank pit in what was inferred to be the hydraulically downgradient direction from both the gasoline and diesel former USTs. The other soil boring (TW-2) was located further south in an area inferred to be the hydraulically downgradient direction from the diesel dispenser island. Figure 3-1 shows the proposed soil boring locations.

4.1 DRILLING

The two soil borings were installed by Precision Sampling, Inc., a California licensed drilling company (License No. C-57 636387). The borings were installed using the Enviro-Core™ continuous soil sampling system, which uses a 2.375-inch diameter drive casing to drill the soil borings and a 3-foot long, 1.5-inch diameter inner sample barrel containing six 6-inch long stainless-steel sample liners to collect the soil samples. The 3-foot sample barrel is simultaneously advanced with the drive casing. Soil samples were collected continuously in each borehole for the entire length of the soil boring. After collection of each 3-foot sample, the amount of recovery was recorded in the boring log. Soil was field-screened for contamination by visual examination and with a PID. All PID readings were recorded on the boring logs. All soils descriptions were recorded in the boring log. Soil boring logs are presented in Appendix D.

The soil generated during drilling was placed on the soil stockpile that resulted from excavating beneath the former diesel fuel dispenser island. Upon completion of the ground water sampling (described below), the boreholes were backfilled with cement/bentonite grout that was tremied to the bottom of the borehole. After backfilling, the ground surface was repaired with asphalt patch to match the original condition.

4.1.1 Drilling Permits

Alameda County requires that all soil borings be permitted prior to drilling. A drilling permit was obtained from Alameda County Flood Control and Water Conservation District. A copy of the permit is shown in Appendix D.

4.2 SAMPLING AND ANALYSIS

4.2.1 Soil Sampling and Analysis

Because native soil in the tank pit walls was shown by confirmation samples to contain only low concentrations of TPH-d and TPH-motor oil below the proposed cleanup goals (PCGs), only one soil sample was collected from each boring for chemical analysis. Each soil sample was collected across the interval where the top of the saturated zone was found in the boring.

Samples were collected within the 1.5-inch diameter core barrel in 1.5-inch diameter by 6-inch long stainless steel sample sleeves. After the sample sleeves were screened with a PID, the sample sleeve containing the appropriate soil interval was chosen by the geologist and prepared for shipment to the laboratory by covering the ends of the sleeves with Teflon film, securing the file with plastic caps, and sealing the film and caps with adhesiveless (cohesive) tape. Each sample sleeve was then labeled with the site name, date, time, samples number, and sampler's initials and placed in a cooler with sufficient blue ice to lower the sample temperature to 4° C for transport to the state-certified laboratory for analysis. The soil samples were submitted to Entech Analytical Laboratories for analysis for TPH-g, TPH-d, and TPH-motor oil using EPA Method 8015 modified, BTEX using EPA Method 8020, and total lead using either EPA method 7420 or 6010.

4.2.2 Ground Water Sampling and Analysis

Grab ground water samples were collected from both monitoring wells. After completion of the boring, 10 feet of one-inch inner diameter PVC screen was attached to one-inch diameter PVC casing and lowered into each borehole to create a temporary well. Ground water samples were collected by lowering a 0.75-inch diameter stainless-steel bailer into the casing until it was filled and then retrieving the full bailer.

Ground water samples were collected into the appropriate containers for each analysis. Each container was labeled with the sample ID, date and time collected, site name, and sampler's initials and placed in a cooler with sufficient blue ice to lower the sample temperature to 4° C for transport to the state-certified laboratory for analysis. The samples were submitted to Entech Analytical Laboratories for analysis for TPH-g, TPH-d, and TPH-motor oil using EPA Method 8015 modified, BTEX using EPA Method 602, and dissolved lead using EPA Method 7420. The lead sample was filtered by the laboratory prior to analysis to eliminate any lead resulting from suspended sediment in the water. The natural background lead concentration in soil and sediment is several-fold higher than the Cal/EPA MCL for

lead in drinking water of 0.05 mg/l and can cause significantly elevated lead concentrations in water samples unless the sediment is removed.

4.2.3 Sample Documentation

The depth of each soil sample is shown on the soil boring log (Appendix D) and is coded into the soil-sample ID along with the boring number. The boring from which each water sample was collected is also coded into the water-sample ID. All samples from the borings were accompanied by chain-of-custody documentation from the time of collection until their delivery to Entech Analytical Laboratories.

4.3 DECONTAMINATION

The drilling tools, such as the drive casing and shoe, were steam-cleaned prior to use in each soil boring and after the final boring. Soil and ground water sampling equipment, such as sample barrels and the bailer, also were decontaminated by steam cleaning prior to each use and following the final use. Steam cleaning of portable equipment was done in a portable wash rack. Liquids generated during steam cleaning activities were pumped into a DOT-approved 55-gallon drum, which was labeled and staged on site pending disposal (see Section 4.5).

4.4 ANALYTICAL RESULTS

4.4.1 Soil Samples

The soil samples collected from each soil boring contained no concentrations above the practical quantitation limit (PQL) of TPH-d, TPH-g, or BTEX compounds (Table 4). TPH as motor oil (TPH-oil) was detected in elevated concentrations of 1,200 mg/kg in TW1-6.5 and 380 mg/kg in TW2-09. Lead was present at a background concentration of 11 mg/kg in TW1-6.5 and at an elevated concentration of 120 mg/kg in TW2-09.

4.4.2 Ground Water Samples

The ground water samples contained no TPH-d or dissolved lead above their respective PQLs (Table 4). Sample TW1-W1 contained low concentrations of TPH-g (52 µg/l) and BTEX compounds (3.9 µg/l benzene, 8.9 µg/l toluene,

Table 4
Analytical results for soil and ground water samples collected February 8, 1996
from soil borings and temporary wells at
Caltrans' Ettie Street Maintenance Facility
3465 Ettie Street, Oakland, California

Sample ID	Depth (feet)	TPH-oil (8015 mod) (mg/kg)	TPH-d (8015 mod) (mg/kg)	TPH-gas (8015 mod) (mg/kg)	Benzene (8020) (mg/kg)	Toluene (8020) (mg/kg)	Ethylbenzene (8020) (mg/kg)	Xylenes (8020) (mg/kg)	Lead (7420) (mg/kg)
Soil samples									
TW1-6.5	6.5-7.0	*1,200*	ND<25	ND	ND	ND	ND	ND	*11*
TW2-09	9.0-9.5	*380*	ND<5	ND	ND	ND	ND	ND	*120*
Method Detection Limit		*1.0*	*1.0*	*1.0*	*0.005*	*0.005*	*0.005*	*0.005*	*0.50*

Sample ID	Depth to water (feet)	TPH-oil (8015 mod) (µg/l)	TPH-d (8015 mod) (µg/l)	TPH-gas (8015 mod) (µg/l)	Benzene (8020) (µg/l)	Toluene (8020) (µg/l)	Ethylbenzene (8020) (µg/l)	Xylenes (8020) (µg/l)	Lead (7420) (mg/l)
Ground water samples									
TW1-W1	3.8	*2,400*	ND	*52*	*3.9*	*8.9*	*1.3*	*2.4*	ND
TW2-W2	3.8	*2,300,000*	ND<62,500	ND	ND	ND	ND	ND	ND
Method Detection Limit		50.0	50.0	50.0	*0.5*	*0.5*	*0.5*	*0.5*	*0.005*

NOTES:

µg/kg	milligrams per kilogram (ppm)
TPH-oil	total petroleum hydrocarbons quantified as motor oil
TPH-d	total petroleum hydrocarbons quantified as diesel
TPH-g	total petroleum hydrocarbons quantified as gasoline
na	not applicable, analysis not performed for this analyte
ND	analyte not detected (ND) at or above the laboratory reporting limits

1.3 µg/l ethylbenzene, and 2.4 µg/l total xylenes), and 2,400 µg/l (2.4 mg/l) TPH-oil. Sample TW2-W1 contained no concentrations of TPH-g or BTEX compounds above their respective PQLs but did contain 2,300,000 µg/l (2,300 mg/l) TPH-oil.

4.5 DISPOSAL OF RINSATE FROM DECONTAMINATION

On April 16, 1996, Tetra Tech supervised the removal of the DOT-approved 55-drum in which the rinsate was stored and the contents of the drum, which totaled 37 gallons. The drum and its contents were removed by personnel of Armour Petroleum Service and Equipment Corporation, who transported the rinsate to Solano Community College in Vacaville, California (see Appendix B), where the rinsate will be used in a fire-fighting training program.

5. PROPOSED CLEANUP GOALS AND HANDLING OF STOCKPILED SOIL

Section 5 presents the rationales for the proposed cleanup goals for TPH-d and TPH-oil and for handling the stockpile of soil excavated from the gasoline UST pit.

5.1 PROPOSED CLEANUP GOALS (PCG) FOR TPH-D AND TPH-OIL

Tetra Tech proposes the following PCGs for soil at this site:

TPH-d	PCG = 100 mg/kg
TPH-oil	PCG = 1,000 mg/kg

Tetra Tech proposes these PCGs for the following reasons:

1. The October 1995 report "Recommendations to Improve the Cleanup Process for California's Leaking Underground Fuel Tanks," prepared by Lawrence Livermore National Laboratory (LLNL) and submitted to the State Water Resources Control Board (SWRCB), concluded that fuel hydrocarbons have limited impacts on human health, the environment, or California's ground water resources. The costs of cleaning up LUFT fuel hydrocarbons are often inappropriate when compared to the magnitude of the impact on ground water resources.

2. The major chemicals of concern in gasoline and diesel fuel are the BTEX compounds. No BTEX compounds were detected in any of the soil samples.

3. The PCG of 100 mg/kg for TPH-d in soil is based on the concentration of BTEX compounds in diesel fuel and their potential impact on ground water. According to the LUFT Field Manual (LUFT Task Force, 1989, p. 27-28, Table 2-1), concentrations of 100 mg/kg TPH-d in soil are sufficiently low that resulting ground water BTEX concentrations should not exceed California DHS action levels or primary MCLs for drinking water.

   Analytical results for the ground water sample collected from the diesel UST pit support the 100 mg/kg PCG for TPH-d in soil. Even though the diesel-contaminated pea gravel is in contact with the ground water in the pit and a sample of the ground water from the pit contained 2,000

µg/l TPH-d, BTEX compounds were not present in the sample in detectable concentrations.

4. The TPH-oil PCG value of 1,000 mg/kg for soil is proposed because motor oil contains even lower concentrations of BTEX compounds than diesel fuel, and because the ground water samples collected from the diesel UST tank pit contained no TPH-oil that is attributable to motor oil, even though the pea gravel in the pit contains up to 560 mg/kg TPH oil.

5. Any TPH contamination is unlikely to migrate off site. Shallow ground water at the site lies within the low-permeability Bay Mud. The low permeability of the mud and the inferred low hydraulic gradient at the site will result in very slow ground water flow rates. The migration rate of any TPH in the ground water will be even slower because of the high concentration of organic matter and clay in the mud. The constituents of fuel hydrocarbons bind to the organic material and clay and therefore migrate several times more slowly than the ground water. Such slow movement of the fuel hydrocarbons will allow abundant time for mitigation of the contamination by intrinsic *in-situ* aerobic bioremediation before the contaminant plume, if any, could migrate any substantial distance. Consequently, any fuel hydrocarbon contamination from this site is not likely to migrate off site or into nearby surface waters.

6. Because shallow ground water at the site lies within the low-permeability Bay Mud, the ground water at the site is not likely to meet the California State Water Resources Control Board (SWRCB) criterion for municipal or private water supplies of "... provid(ing) sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day" (SWRCB Res. No. 88-63). Therefore, contamination of such water would not impact a potential source of drinking water.

7. At present, the site is completely paved with asphalt or cement concrete except for the backfilled excavations where the UST and dispenser island were removed. These unpaved areas will be paved following the imminent retrofitting of the adjacent freeway support footings. The paving at the site serves as a surface seal to prevent precipitation from infiltrating and leaching contaminants from the soil. This significantly reduces the possibility that any TPH remaining in unexcavated soil will be leached and transported to the saturated zone.

On the basis of the above reasons, Tetra Tech believes that PCGs for TPH-d and TPH-oil are sufficiently protective of potential sources of drinking water and

requests that the PCGs be adopted for this site by Alameda County Environmental Protection (ACEP). If ACEP accepts these PCGs, the slightly contaminated pea gravel in the diesel UST pit will be left in place.

5.2 HANDLING OF STOCKPILED SOIL FROM GASOLINE UST PIT

Tetra Tech proposes that the 50 cubic yards or so of soil excavated from the gasoline UST pit and stockpiled on the site be considered clean and be used as ordinary fill material. Therefore, no soil management plan will be required by ACEP.

Analytical results show that the stockpiled soil from the gasoline UST pit contains no detectable petroleum hydrocarbons and 26 mg/kg total lead. Although the lead concentration of the stockpiled soil is somewhat higher than the lead concentrations in the confirmation samples collected from the gasoline UST pit, the concentrations are well below the total threshold limit concentration (TTLC) for total lead of 1,000 mg/kg. The concentrations are also below the threshold of 50 mg/kg total lead above which the soluble lead content could conceivably exceed the soluble threshold limit concentration (STLC) for lead of 5.0 mg/l. Wastes containing total lead exceeding the TTLC or soluble lead exceeding the STLC are defined as hazardous wastes on the basis of the characteristic of toxicity (CCR title 22, Section 6626.24). It is clear the soil cannot be considered hazardous on the basis of its lead content.

The lead content of the stockpiled soil is not believed to be a threat to drinking water supplies for the following reasons:

1. The lead concentrations in the soil are low, being only 1.5 times the mean concentration of 17 mg/kg for lead in soils of the western United States (Shacklette and Boerngen 1984, Table 2) and therefore should not significantly affect the ground water. This is supported by the analytical results for the water sample collected from the gasoline UST pit following excavation of stockpiled soil. The water sample contained no detectable lead above the California DHS primary MCL for drinking water of 50 µg/l.

2. Because shallow ground water at the site lies within the low-permeability Bay Mud, the ground water at the site is not likely to meet the SWRCB criterion for municipal or private water supplies of "... provid(ing) sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day" (SWRCB Res. No. 88-63). Therefore, contamination of such water would not impact a potential source of drinking water.

On the basis of the above discussion, Tetra Tech proposes that the 50 cubic yards or so of soil excavated from the gasoline UST pit and stockpiled on the site be used as ordinary fill material.

6. DISCUSSION

Confirmation sampling demonstrates that the remaining native soil contains no detectable TPH-d, TPH-g, BTEX compounds, or MTBE. Pea gravel excavated from and returned to the diesel UST pit contains low concentrations (less than 100 mg/kg) of TPH-d and TPH-oil.

Low concentrations (<25 mg/kg) of TPH-oil were detected in soil adjacent to the former diesel UST pit, and moderate concentrations (380 to 1,200 mg/kg) were detected in soil from near the top of the saturated zone in the soil borings downgradient from the former UST pits and near the small building.

Total lead concentrations in soil were all below regulatory thresholds. The maximum soil lead concentration was 120 mg/kg in boring TW-2; all other soil lead concentrations were less than 27 mg/kg.

Ground water in the former UST pits contained no TPH-g or BTEX compounds, except for a very low concentration (36 µg/l) of xylenes in water from the gasoline UST pit. Ground water from the diesel UST pit contained 2,000 µg/l of TPH-d.

Ground water from the two soil borings contained elevated concentrations (2,400 to 2,300,000 µg/l) of TPH-oil and no detectable TPH-d or dissolved lead, demonstrating that the elevated soil lead observed in boring TW-2 apparently does not affect ground water. Ground water in the northern well (TW-2), downgradient of the former gasoline UST tank, also contained low concentrations of TPH-g and BTEX compounds. The TPH-g concentration in the TW-2 water was approximately 10 times greater than the 5 µg/l taste and odor threshold for gasoline, and the benzene concentration was approximately 4 times greater than the DHS MCL for benzene in drinking water.

7. CONCLUSIONS AND RECOMMENDATIONS

Tetra Tech concludes that soil contamination associated with the gasoline and diesel USTs and dispensers has been successfully addressed. No further remedial activity is recommended for the soil in the area of the USTs and the dispensers.

The stockpile of soil removed from the former gasoline UST pit contained no detectable TPH-g, BTEX compounds, or MTBE, and a low concentration of total lead. Tetra Tech recommends that this soil be considered clean and usable by Caltrans as ordinary fill material.

Ground water downgradient of the tank pits has been shown to contain elevated concentrations of TPH-oil, TPH-g, and BTEX compounds. Elevated concentrations of TPH-oil also are found in soil from the same area.

The source of the oil in the soil and ground water is not known. TPH-oil concentrations are higher downgradient of the former UST pits, suggesting that the source of the oil is located downgradient of the pits. Possible sources include spillage or leakage from a hydraulic lift near the small building or from present or former above-ground or underground oil storage tanks or from an unknown source.

The TPH observed in the ground water and soil is unlikely to migrate off site or to impact potential sources of drinking water. The TPH is unlikely to migrate off site because the shallow ground water at the site lies within the organic-rich low-permeability Bay Mud and is inferred to have a low hydraulic gradient. These factors result in very slow ground water flow rates and even slower TPH migration rates. Furthermore, the site is almost completely paved with asphalt or cement concrete and will be completely paved following imminent retrofitting of the adjacent freeway support columns. The paving serves as a surface seal to prevent precipitation from infiltrating and leaching into the saturated zone any TPH remaining in the soil.

Sources of ground water are not threatened by the TPH because shallow ground water at the site lies within the low-permeability Bay Mud, and therefore is not likely to meet the SWRCB criterion for municipal or private water supplies of "... provid(ing) sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day" (SWRCB Res. No. 88-63). Therefore, contamination of such water would not impact a potential source of drinking water.

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APPENDIX B

FIELD PROCEDURES

FIELD PROCEDURES

I. FIELD DOCUMENTATION OF SAMPLING PROCEDURES

The following outline describes the procedures adhered by PSI for proper sampling documentation.

1. Sampling procedures will be documented in field notes that contain:

    1. Sample collection procedures
    2. Date and time of collection
    3. Date of shipping
    4. Sample collection location
    5. Sample identification number(s)
    6. Intended analysis
    7. Quality control samples
    8. Sample preservation
    9. Name of sampler
    10. Any pertinent observations

2. Samples will be labeled with the following information:

    1. Sample designation number
    2. Date and time sample was collected
    3. Sampler's name
    4. Sample preservatives (if required)

3. The following is the sample designation system for the site:

    For Borings the samples will be labeled B-(Boring Number)-(Depth) (i.e. sample collected from boring 4 at 5 feet would be B4-5).

    For hydropunch groundwater samples (W) (Boring Number) (i.e. WB4)

    For monitoring well groundwater samples (MW) (Well Number) (i.e. MW4)

4. Handling of the samples will be recorded on a chain of custody form which shall include:

    1. Project name
    2. Site location
    3. Signature of Collector
    4. Date and time of collection
    5. Sample identification number
    6. Number of containers in sample set
    7. Description of sample and container
    8. Name and signature of persons, and the companies or agencies they represent, who are involved in the chain of possession
    9. Inclusive dates and times of possession
    10. Analyses to be completed

II. ADVANCING OF SOIL BORINGS AND COLLECTION OF SOIL SAMPLES

The following procedures were used for advancing soil borings and collecting soil samples at the site:

1. Prior to the commencement of soil boring activities at the site, soil boring locations were marked with white paint. Underground Service Alert (USA) was contacted to identify underground utilities in the vicinity of the soil borings.

2. Soil boring and sampling activities were conducted by Fisch Environmental of Pleasant Valley, California. The soil borings were advanced using GeoProbe direct push method. Flush-threaded rods with a stainless steel sampler were advanced into the ground using a hydraulic press and percussion hammer. The opening of the sampler was sealed with a drive tip held in place by a threaded pin.

3. Soil samples were collected using a 2-foot long, 1-inch inside diameter macro-core stainless steel sampler. Soil samplers were washed between sampling intervals with Alconox soap followed by two deionized water rinses. The sampler was lined with clean brass, stainless steel, or acetate sleeves. When the boring was advanced to the desired sampling depth the threaded pin was removed allowing the drive tip to retract as the sampler was advanced 2-feet into native soil using a percussion hammer.

4. After the sampler was retrieved the sleeves were extracted from the sampler without disturbing the sample. The sample was collected for analyses from the lowest tube in the sampler. The ends of the sample were covered with Teflon™ sheets and capped with polyethylene end caps. The sample was labeled and placed in a zip-lock bag in a chilled cooler prior to delivery to the laboratory for analyses.

5. Soil samples were assigned identification numbers such as B1-5, where B1 indicates the boring designation and -5 indicates that the sample was collected at 5 feet bgs. The samples were labeled with the project name, date and time of sample collection, sampling depth, and client name.

6. Chain-of-custody procedures using chain-of-custody records were implemented during handling and transportation of the samples to the laboratory for analyses.

7. Boring logs were prepared for the soil borings under the supervision of a California-Registered Geologist. Soil from each sample was described in accordance with Unified Soil Classification System by a PSI geologist and recorded on a field boring log. The data recorded on the logs were based on examination of soil samples retrieved in the tubes, and drilling conditions observed in the field. Boring logs include information regarding the location of each boring, geologic descriptions of materials encountered, occurrence of groundwater (if applicable) and organic vapor analyzer (OVA) measurements in the soil samples collected.

8. A Century 128 organic vapor analyzer (OVA) was used to monitor volatile organic compounds (VOCs) in the ambient air during drilling at the site in accordance with the site health and safety plan. VOC concentrations in the soil were measured at the sampling depths by partially filling a zip-loc bag and closing the top. The components of the soil were allowed to volatilize and fill the head space in the bag for approximately 15 to 30 minutes prior to inserting the OVA probe through the top of the bag and recording the measurements.

9. Soil cuttings generated during drilling activities at the site were contained in Department of Transportation (DOT) approved 5-gallon buckets. The buckets were labeled with the contents, boring designation of origin, client name, project number, and PSI contact phone number.

III. BACKFILL OF SOIL BORINGS

The following procedures were used to backfill the soil borings at the site:

1. Soil borings were backfilled to grade with Portland grout slurry. The slurry consisted of neat cement and 5% bentonite powder.

IV. HYDROPUNCH GROUNDWATER SAMPLING

The following outline describes the procedures utilized by PSI for collecting groundwater samples.

1. After the last soil sample was collected a decontaminated stainless steel screen concealed in a stainless steel sheath was advanced down the boring below the top of groundwater. The screen was exposed by removing a threaded pin from the sheath and lifting the rods four feet (the length of the screen).

2. Disposable Teflon tubing with a check-valve affixed to the bottom was used to collect water through the center of the rods and exposed screen. The Teflon tubing was vertically agitated to positively displace water upward through the tubing till the groundwater sample containers were filled.

3. Each collected water sample was labeled, recorded on a Chain-of-Custody record, and placed in a chilled cooler while awaiting transport to a certified hazardous waste laboratory.

4. Chain-of-custody procedures, including chain-of-custody forms, were used to document water sample handling and transport from collection to delivery to the laboratory for analysis.

5. Water samples were delivered to a State-certified hazardous waste laboratory within approximately 24 hours of collection.

V. GROUND-WATER SAMPLING

The following procedures were used for ground water sampling:

1. All equipment shall be washed prior to entering the well with an Alconox solution, followed by two tap water rinses and a deionized water rinse.

2. Prior to purging wells, depth-to-water were measured using an Solinst water-interface probe to an accuracy of approximately 0.01 foot. The measurements were made to the top of the well casing on the north side.

3. Free floating product thickness and depth-to-ground water were measured in wells containing free floating product using a Solinst oil-water interface probe to an accuracy of approximately 0.003 meters (0.01 foot). The measurements were made to the top of the well casing on the north side.

4. Water samples were collected with a polyethylene disposable bailer. The water collected were immediately decanted into laboratory-supplied vials and bottles. The containers were overfilled, capped, labeled, and placed in a chilled cooler, prior to delivery to the laboratory for analysis.

5. Chain-of-custody procedures, including chain-of-custody forms, were used to document water sample handling and transport from collection to delivery to the laboratory for analysis.

6. Ground-water samples were delivered to a State-certified hazardous waste laboratory within approximately 24 hours of collection.

APPENDIX C

BORING LOGS

SOIL BORING LOG

BORING NO: B1	
SHEET 1 OF	

DATE: 7/29/97	PROJECT NAME: CALTRANS ETTIE STREET	PROJECT NC575-7I022

BORING SITE LOCATION PLAN:

SEC: TWN: RGE: LAT:	LONG:
DRILLING CO:	FISCH ENVIRONMENTAL
DRILL CREW:	DAVE FISCH
DRILLING METHOD:	GEOPROBE 5400
BORING DIMENSIONS:	WIDTH DEPTH

GROUNDWATER LEVELS

DATE	ACTUAL TIME	DEPTH BGS

DEPTH	SAMPLE NO.	PEN. RATE/ BLOW COUNTS	DESCRIPTION	FID ■ PID □ (PPM)	USCS	REMARKS
			GRAVEL; greyish brown, loose, dense, fine to coarse, no HC odor.	GW		
			GRAVELLY CLAY; yellowish brown, very moist, soft, low plasticity, no HC odor.	CL		
5	B1-5		CLAY; bay mud, black, soft, med. plasticity, very moist, no HC odor.	CL		
10	B1-10		perched groundwater at 10 feet bgs in a thin gravel layer underlain by CLAY; pale yellowish brown, med. stiff, med. plasticity, moist, no HC odor.	GW CL		Groundwater at 11 feet bgs. No groundwater accumulation in the boring.
			Boring terminated at 12 feet bgs. Groundwater is slow to accumulate in the boring. PVC pipe is left in the boring and the top sealed with bentonite chips. boring backfilled with neat Portland cement.			
15						
20						

REVIEWED BY: JOHN D. WHITING	PREPARED BY:

SOIL BORING LOG

BORING NO: B2/MW-1	
SHEET 1 OF 1	
DATE: 7/29/97	PROJECT NAME: CALTRANS ETTIE STREET
PROJECT NC575-7I022	

BORING SITE LOCATION PLAN:

SEC:	TWN:	RGE:	LAT:	LONG:
DRILLING CO:	FISCH ENVIRONMENTAL			
DRILL CREW:	DAVE FISCH			
DRILLING METHOD:	GEOPROBE 5400			
BORING DIMENSIONS:			WIDTH	DEPTH

GROUNDWATER LEVELS

DATE	ACTUAL TIME	DEPTH BGS

DEPTH	SAMPLE NO.	PEN. RATE/ BLOW COUNTS	DESCRIPTION	FID ■ PID □ (PPM)	USCS	REMARKS
			GRAVEL; greyish brown, loose, dense, fine to coarse, no HC odor.	GW		
			GRAVELLY CLAY; yellowish brown, very moist, soft, low plasticity, no HC odor.	CL		
5	B2-5		CLAY; bay mud, black, soft, med. plasticity, very moist, no HC odor.	CL		
10	B2-10		Soils appear wet at 11 feet. No groundwater in the boring.			Groundwater detected at 11 feet bgs. No groundwater accumulation in the boring
15			Boring terminated at 16 feet bgs. Prepacked screen from 7 to 16 feet bgs. Bentonite seal from 5 to 7 feet bgs. Neat portland cement to grade			
20						

REVIEWED BY: JOHN D. WHITING

PREPARED BY:

SOIL BORING LOG

BORING NO:	B3/MW-2
SHEET	1 OF

DATE: 7/29/97	PROJECT NAME: CALTRANS ETTIE STREET	PROJECT NC575-7I022

BORING SITE LOCATION PLAN:

SEC:	TWN:	RGE:	LAT:	LONG:
DRILLING CO:	FISCH ENVIRONMENTAL			
DRILL CREW:	DAVE FISCH			
DRILLING METHOD:	GEOPROBE 5400			
BORING DIMENSIONS:			WIDTH	DEPTH

GROUNDWATER LEVELS

DATE	ACTUAL TIME	DEPTH BGS

DEPTH	SAMPLE NO.	PEN. RATE/ BLOW COUNTS	DESCRIPTION	FID ■ PID □ (PPM)	USCS	REMARKS
			GRAVEL; greyish brown, loose, dense, fine to coarse, no HC odor.		GW	
			GRAVELLY CLAY; yellowish brown, very moist, soft, low plasticity, no HC odor.		CL	
5	B3-5		CLAY; bay mud, black, soft, med. plasticity, very moist, no HC odor.		CL	
10	B3-10		Soils appear wet at 11 feet. No groundwater in the boring.			Groundwater detected at 11 feet bgs. No groundwater accumulation in the boring.
15			Boring terminated at 16 feet bgs. Prepacked screen from 7 to 16 feet bgs. Bentonite seal from 5 to 7 feet bgs. Neat portland cement to grade			
20						

REVIEWED BY: JOHN D. WHITING

PREPARED BY:

SOIL BORING LOG

BORING NO:	B4/MW-3
SHEET	1 OF
PROJECT NC	575-71022

DATE:	7/29/97
PROJECT NAME:	CALTRANS ETTIE STREET
BORING SITE LOCATION PLAN:	
SEC: TWN: RGE: LAT: LONG:	
DRILLING CO:	FISCH ENVIRONMENTAL
DRILL CREW:	DAVE FISCH
DRILLING METHOD:	GEOPROBE 5400
BORING DIMENSIONS:	WIDTH DEPTH

GROUNDWATER LEVELS

DATE	ACTUAL TIME	DEPTH BGS

DEPTH	SAMPLE NO.	PEN. RATE/ BLOW COUNTS	DESCRIPTION	FID ☒ PID ☐ (PPM)	USCS	REMARKS
			Interbedded clay, sand, and gravel, dense, moist, greyish to greenish brown, clays are medium plasticity, sands are well graded, no HC odor.			
5	B4-5		CLAY; black, soft, low plasticity, moist, no HC odor, trace of sand.		CL	
			Same as above.			
10	B4-10					groundwater detected at 10.5 feet bgs. No water accumulation in the boring.
15			Boring terminated at 16 feet bgs. Prepacked screen from 7 to 16 feet bgs. Bentonite seal from 5 to 7 feet bgs. Neat portland cement to grade			
20						

REVIEWED BY: JOHN D. WHITING

PREPARED BY: JOHN P. NEVILLE

SOIL BORING LOG

BORING NO: B5	
SHEET 1 OF	
DATE: 7/29/97	PROJECT NAME: CALTRANS ETTIE STREET
PROJECT NC575-7I022	

BORING SITE LOCATION PLAN:

SEC: TWN: RGE: LAT: LONG:	
DRILLING CO:	FISCH ENVIRONMENTAL
DRILL CREW:	DAVE FISCH
DRILLING METHOD:	GEOPROBE 5400
BORING DIMENSIONS:	WIDTH DEPTH

GROUNDWATER LEVELS

DATE	ACTUAL TIME	DEPTH BGS

DEPTH	SAMPLE NO.	PEN. RATE/ BLOW COUNTS	DESCRIPTION	FID ☒ PID ☐ (PPM)	USCS	REMARKS
			Interbedded clays and gravels, greyish to orangish brown, dense, low plasticity, moist concrete debris, refusal at 4 feet. Stepped over twice.			
5	B5-5		CLAY; bay mud, black, soft, some sand, low plasticity, no HC odor.		CL	
10	B5-10		Transition to grey clay; med. stiff, high plasticity, wet, no HC odor.		CL	Groundwater detected at 10.5 feet bgs. No groundwater accumulation in the boring.
15	B5-15					
20	B5-20		Boring continued to 20 feet bgs. No accumulation of groundwater in the boring PVC pipe left in the boring and sealed with bentonite chips. Backfilled with neat Portland cement.			

REVIEWED BY: JOHN D. WHITING

PREPARED BY: JOHN P. NEVILLE

SOIL BORING LOG

BORING NO: B6/MW-4	
SHEET 1 OF	
DATE: 7/29/97	PROJECT NAME: CALTRANS ETTIE STREET
PROJECT NC575-7I022	

BORING SITE LOCATION PLAN:

SEC: TWN: RGE: LAT: LONG:	
DRILLING CO:	FISCH ENVIRONMENTAL
DRILL CREW:	DAVE FISCH
DRILLING METHOD:	GEOPROBE 5400
BORING DIMENSIONS:	WIDTH DEPTH

GROUNDWATER LEVELS

DATE	ACTUAL TIME	DEPTH BGS

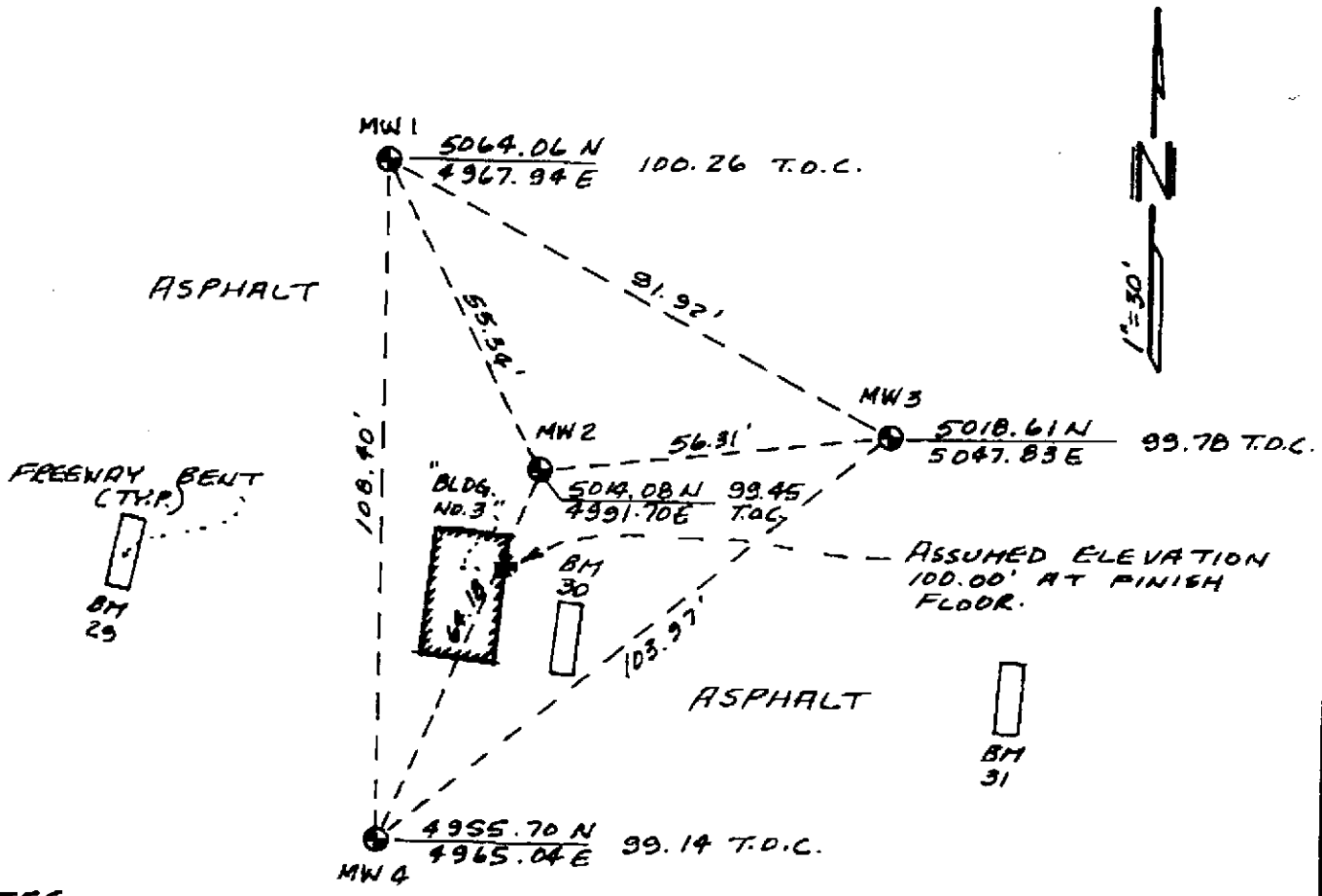
DEPTH	SAMPLE NO.	PEN. RATE/ BLOW COUNTS	DESCRIPTION	FID ☒ PID ☐ (PPM)	USCS	REMARKS
			GRAVELLY CLAY w/ SAND; greyish to greenish brown, dense, moist, loose, no HC odor.		CL	
5	B6-5		CLAY; black and green mottling, soft, low plasticity, very moist, no HC odor.		CL	
			Same as above.			
10	B6-10					Groundwater detected at 10.5 feet bgs. No groundwater accumulation in the boring.
15			Boring terminated at 16 feet bgs. Prepacked screen from 7 to 16 feet bgs. Bentonite seal from 5 to 7 feet bgs. Neat portland cement to grade			
20						

REVIEWED BY: JOHN D. WHITING

PREPARED BY:

APPENDIX D

SURVEY DATA



NOTES

1) PUNCH MARK SET AT TOP OF CASING (T.O.C.) AT MW1 THROUGH MW4 IS BASIS OF MEASUREMENT OF COORDINATES, DISTANCES, & ELEVATIONS. PUNCH MARK SET AT NORTH SIDE MW1, 3, 4; SOUTH SIDE OF MW2.

2) ELEVATION DATUM: ASSUMED ELEVATION 100.00' AT FINISH FLOOR, "BLDG. NO. 3."

GATE

ETTIE ST.

MONITORING WELL SURVEY OF CALTRANS MAINTENANCE STATION 3456 ETTIE ST., OAKLAND, CA FOR P.S.I.

DAVID L. CONTRERAS, LAND SURVEYOR
(415) 892-5905
20 VIVIAN CT. NOVATO, CA

SCALE: 1"=30' SEPT. 15, 1997

DAVID L. CONTRERAS
L.S. 5065
LICENSE EXPIRES 6-30-99

SURVEY NO. 8182

APPENDIX E

LABORATORY RESULTS AND CHAIN-OF-CUSTODY RECORDS

GEOTEST

An Environmental Monitoring and Testing Service
(562)498-9515 (800)624-5744

ANALYTICAL REPORT

Client Name: PROFESSIONAL SERVICE INDUSTRIES, INC.
3777 DEPOT ROAD, SUITE 418
HAYWARD, CA 94545

Report To: FRANK POSS

Project Name: CALTRANS ETTIE STREET
Site Location: ETTIE STREET, OAKLAND, CA

GEOTEST Project #: 970731-02
GEOTEST WO #: 11391A
Client ID #: 575-7I022

Date: 10/7/97

GEOTEST is pleased to provide you with analytical data for your above referenced project. Samples were collected on 7/29/97 and received on 7/31/97. Please refer to the chain of custody included at the end of this report for conditions of the samples upon receipt. In accordance with the chain of custody, the samples were analyzed for the following analytical parameters:

In addition, the analyses for 8260, TOC and Porosity were subcontracted to an outside laboratory with results issued on a separate report.

Lily Bayati

Reviewed by,
Lily Bayati, Project Manager

GEOTEST
An Environmental Monitoring and Testing Service
(310)498-9515 (800)624-5744

ANALYTICAL REPORT

Analyst: ST, WK
Preparation Analyst: ST, WK

Matrix: Soil

ANALYSIS OF TOTAL PETROLEUM HYDROCARBONS - DIESEL
EPA 8015 Modified

Units			TPH Diesel mg/Kg	MDL mg/Kg	DF
Sample ID	Preparation Date	Analysis Date			
Method Blank	8/1/97	8/1/97	<10	10	1
B1-5	8/1/97	8/1/97	<10	10	1
B1-10	8/1/97	8/1/97	<10	10	1
B5-5	8/1/97	8/1/97	<10	10	1
B5-10	8/1/97	8/1/97	<10	10	1
B4-5	8/1/97	8/1/97	<10	10	1
B4-10	8/1/97	8/1/97	<10	10	1
B2-5	8/1/97	8/1/97	<10	10	1
B2-10	8/1/97	8/1/97	<10	10	1
B3-5	8/1/97	8/1/97	<10	10	1
B3-10	8/1/97	8/1/97	<10	10	1
B6-5	8/1/97	8/1/97	<10	10	1
B6-10	8/1/97	8/1/97	<10	10	1
B2-10 Duplicate	8/1/97	8/1/97	<10	10	1
B5-10 Duplicate	8/1/97	8/1/97	<10	10	1

GEOTEST
An Environmental Monitoring and Testing Service
(310)498-9515 (800)624-5744

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY

Analyst: ST, WK
Preparation Analyst: ST, WK

Matrix: Soil

ANALYSIS OF TOTAL PETROLEUM HYDROCARBONS - DIESEL
EPA 8015 Modified

	LCS % REC	Acceptable Range	Matrix Spike % REC	Matrix Spike Dup. % REC	Acceptable Range	RPD %	Acceptable Range
Analysis Date:	8/1/97		8/1/97	8/1/97			
TPH-Diesel	108	68-127	115	92	61-127	22	0-22

GEOTEST

An Environmental Monitoring and Testing Service

(310)498-9515 (800)624-5744

ANALYTICAL REPORT

Analyst: VN

Preparation Method: 5030
Matrix: Soil

ANALYSIS OF VOLATILE ORGANICS BY GAS CHROMATOGRAPHY/PID/FID
GASOLINE (TPH-G) BY DOHS/LUFT METHOD/BTEX/MTBE BY EPA METHOD 8020

Client ID:	B1-5	B1-10	B5-5	B5-10	B4-5	Method Blank	MDL	DF
Units:	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	
Analysis Date:	8/1/97	8/1/97	8/1/97	8/1/97	8/1/97	8/1/97		
Analyte								
Benzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	1
Toluene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	1
Ethylbenzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	1
Total Xylenes	<15	<15	<15	<15	<15	<15	15	1
Methyl-t-butyl Ether	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	1
Gasoline	<1000	<1000	<1000	<1000	<1000	<1000	1000	1
Surrogate Recovery %:							Acceptable Range:	
a,a,a-Trifluorotoluene	89	96	98	100	76	100	59-134	

GEOTEST
An Environmental Monitoring and Testing Service
(310)498-8515 (800)824-5744

ANALYTICAL REPORT

Analyst: VN

Preparation Method: 5030
Matrix: Soil

ANALYSIS OF VOLATILE ORGANICS BY GAS CHROMATOGRAPHY/PID/FID
GASOLINE (TPH-G) BY DOHS/LUFT METHOD/BTEX/MTBE BY EPA METHOD 8020

Client ID:	B4-10	B2-5	B2-10	B3-5	B3-10	B6-5	MDL	DF
Units:	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	
Analysis Date:	8/1/97	8/4/97	8/4/97	8/4/97	8/4/97	8/4/97		
Analyte								
Benzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	1
Toluene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	1
Ethylbenzene	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	1
Total Xylenes	<15	<15	<15	<15	<15	<15	15	1
Methyl-t-butyl Ether	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	5.0	1
Gasoline	<1000	<1000	<1000	<1000	<1000	<1000	1000	1
Surrogate Recovery %:							**Acceptable Range:**	
a,a,a-Trifluorotoluene	112	88	86	88	86	86	59-134	

GEOTEST

An Environmental Monitoring and Testing Service

(310)498-9515 (800)624-5744

ANALYTICAL REPORT

Analyst: VN

Preparation Method: 5030
Matrix: Soil

ANALYSIS OF VOLATILE ORGANICS BY GAS CHROMATOGRAPHY/PID/FID
GASOLINE (TPH-G) BY DOHS/LUFT METHOD/BTEX/MTBE BY EPA METHOD 8020

Client ID:	B6-10	B4-10 Duplicate	B2-10 Duplicate	MDL	DF
Units:	µg/kg	µg/kg	µg/kg	µg/kg	
Analysis Date:	8/4/97	8/1/97	8/4/97		
Analyte					
Benzene	<5.0	<5.0	<5.0	5.0	1
Toluene	<5.0	<5.0	<5.0	5.0	1
Ethylbenzene	<5.0	<5.0	<5.0	5.0	1
Total Xylenes	<15	<15	<15	15	1
Methyl-t-butyl Ether	<5.0	<5.0	<5.0	5.0	1
Gasoline	<1000	<1000	<1000	1000	1
Surrogate Recovery %:				**Acceptable Range:**	
a,a,a-Trifluorotoluene	84	118	91	59-134	

GEOTEST
An Environmental Monitoring and Testing Service
(310)498-9515 (800)624-5744

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY

Analyst: VN

Preparation Method: 5030
Matrix: Soil

ANALYSIS OF VOLATILE ORGANICS BY GAS CHROMATOGRAPHY/PID/FID
GASOLINE (TPH-G) BY DOHS/LUFT METHOD/BTEX/MTBE BY EPA METHOD 8020

	LCS % Rec.	Acceptable Range	Matrix Spike % Rec.	Matrix Spike Dup. % Rec.	Acceptable Range	RPD %	Acceptable Range
Analysis Date:	8/1/97		8/1/97	8/1/97			
Analyte							
Benzene	98	74-116	96	94	72-115	2.1	0-26
Toluene	99	73-116	91	88	70-114	3.4	0-22
Ethylbenzene	101	75-118	85	82	68-119	3.6	0-24
Total Xylenes	105	78-120	87	84	74-117	3.5	0-22
Methyl-t-butyl Ether	111	70-130	104	102	70-130	1.9	0-25
Gasoline	100	73-126	93	89	80-120	4.4	0-25

	LCS % Rec.	Acceptable Range	Matrix Spike % Rec.	Matrix Spike Dup. % Rec.	Acceptable Range	RPD %	Acceptable Range
Analysis Date:	8/4/97		8/4/97	8/4/97			
Analyte							
Benzene	85	74-116	81	82	72-115	1.2	0-26
Toluene	84	73-116	79	83	70-114	4.9	0-22
Ethylbenzene	84	75-118	78	82	68-119	5.0	0-24
Total Xylenes	87	78-120	80	85	74-117	6.1	0-22
Methyl-t-butyl Ether	90	70-130	89	89	70-130	0	0-25
Gasoline	84	73-126	98	99	80-120	1.0	0-25

GEOTEST
An Environmental Monitoring and Testing Service
(310)498-9515 (800)624-5744

ANALYTICAL REPORT

Analyst: ST
Preparation Analyst: ST

Matrix: Soil

ANALYSIS OF OIL AND GREASE
STANDARD METHODS (17th Ed.) 5520B

Units			OIL & GREASE mg/Kg	MDL mg/Kg	DF
Sample ID	Preparation Date	Analysis Date			
Method Blank	8/1/97	8/1/97	<10	10	1
B1-5	8/1/97	8/1/97	20	10	1
B1-10	8/1/97	8/1/97	30	10	1
B5-5	8/1/97	8/1/97	50	10	1
B5-10	8/1/97	8/1/97	10	10	1
B4-5	8/1/97	8/1/97	5200	10	20
B4-10	8/1/97	8/1/97	20	10	1
B2-5	8/1/97	8/1/97	20	10	1
B2-10	8/1/97	8/1/97	10	10	1
B3-5	8/1/97	8/1/97	20	10	1
B3-10	8/1/97	8/1/97	10	10	1
B6-5	8/1/97	8/1/97	380	10	1
B6-10	8/1/97	8/1/97	20		
B2-5 Duplicate	8/1/97	8/1/97	20	10	1
B6-10 Duplicate	8/1/97	8/1/97	10	10	1

GEOTEST

An Environmental Monitoring and Testing Service
(310)498-9515 (800)624-5744

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY

Analyst: ST
Preparation Analyst: ST

Matrix: Soil

ANALYSIS OF OIL AND GREASE
STANDARD METHODS (17th Ed.) 5520B

	LCS % REC	Acceptable Range	Matrix Spike % REC	Matrix Spike Dup. % REC	Acceptable Range	RPD %	Acceptable Range
Analysis Date:	8/1/97		8/1/97	8/1/97			
Oil & Grease	106	70-130	113	113	70-130	0	0-25

GEOTEST

An Environmental Monitoring and Testing Service

(310)498-9515 (800)624-5744

ANALYTICAL REPORT

Analyst:	LH
Preparation Analyst:	LH
Preparation Method:	3510
Matrix:	Soil

ANALYSIS OF SEMI-VOLATILE ORGANICS BY GAS CHROMATOGRAPHY/MASS SPECTROMETRY
EPA METHOD 8270

Client ID:	B1-5	B1-10	B5-5	B5-10	Method Blank	MDL	DF
Units:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Preparation Date:	8/1/97	8/1/97	8/1/97	8/1/97	8/1/97		
Analysis Date:	8/1/97	8/1/97	8/1/97	8/1/97	8/1/97		
Analyte							
Acenaphthene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Acenaphthylene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Anthracene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Benzo (a) anthracene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Benzo (a) pyrene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Benzo (b) fluoranthene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Benzo (g,h,i) perylene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Benzo (k) fluoranthene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Benzoic acid	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Benzyl alcohol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Benzyl butyl phthalate	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
bis (2-Chloroethoxy) methane	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
bis (2-Chloroethyl) ether	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
bis (2-Chloroisopropyl) ether	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
bis (2-Ethylhexyl) phthalate	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
4-Bromophenyl phenyl ether	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
4-Chloro-3-methylphenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
4-Chloroaniline	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2-Chloronaphthalene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2-Chlorophenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
4-Chlorophenyl phenyl ether	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Chrysene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Di-n-butyl phthalate	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Di-n-octyl phthalate	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Dibenzo (a,h) anthracene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Dibenzofuran	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
1,2-Dichlorobenzene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
1,3-Dichlorobenzene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
1,4-Dichlorobenzene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
3,3'-Dichlorobenzidine	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2,4-Dichlorophenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Diethyl phthalate	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2,4-Dimethylphenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Dimethyl phthalate	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2,4-Dinitrophenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2,4-Dinitrotoluene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2,6-Dinitrotoluene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Fluoranthene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Fluorene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1

GEOTEST
An Environmental Monitoring and Testing Service
(310)498-9515 (800)624-5744

ANALYTICAL REPORT

Analyst: LH
Preparation Analyst: LH
Preparation Method: 3510
Matrix: Soil

ANALYSIS OF SEMI-VOLATILE ORGANICS BY GAS CHROMATOGRAPHY/MASS SPECTROMETRY
EPA METHOD 8270

Client ID:	B1-5	B1-10	B5-5	B5-10	Method Blank	MDL	DF
Units:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Preparation Date:	8/1/97	8/1/97	8/1/97	8/1/97	8/1/97		
Analysis Date:	8/1/97	8/1/97	8/1/97	8/1/97	8/1/97		
Analyte							
Hexachlorobenzene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Hexachlorobutadiene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Hexachlorocyclopentadiene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Hexachloroethane	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Indeno (1,2,3-c,d) pyrene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Isophorone	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2-Methyl-4,6-dinitrophenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2-Methylnaphthalene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2-Methylphenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
4-Methylphenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
N-Nitrosodi-n-propylamine	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
N-Nitrosodimethylamine	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
N-Nitrosodiphenylamine	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Naphthalene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2-Nitroaniline	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
3-Nitroaniline	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
4-Nitroaniline	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Nitrobenzene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2-Nitrophenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
4-Nitrophenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Pentachlorophenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Phenanthrene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Phenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Pyrene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
1,2,4-Trichlorobenzene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2,4,5-Trichlorophenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2,4,6-Trichlorophenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Surrogate recovery %:						Acceptable Range:	
Nitrobenzene-d5	38	18	28	41	40	23-120	
2-Fluorobiphenyl	42	20	30	42	42	30-115	
Terphenyl-d14	46	24	36	52	55	18-137	
Phenol-d6	52	25	41	63	52	24-113	
2-Fluorophenol	53	25	42	61	53	25-121	
2,4,6-Tribromophenol	46	21	39	56	60	20-130	

GEOTEST

An Environmental Monitoring and Testing Service
(310)498-9515 (800)824-5744

ANALYTICAL REPORT

Analyst:	LH
Preparation Analyst:	LH
Preparation Method:	3510
Matrix:	Soil

ANALYSIS OF SEMI-VOLATILE ORGANICS BY GAS CHROMATOGRAPHY/MASS SPECTROMETRY
EPA METHOD 8270

Client ID:	B4-5	B4-10	B2-5	B2-10	B3-5	MDL	DF
Units:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Preparation Date:	8/1/97	8/1/97	8/1/97	8/1/97	8/1/97		
Analysis Date:	8/1/97	8/1/97	8/1/97	8/1/97	8/1/97		
Analyte							
Acenaphthene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Acenaphthylene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Anthracene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Benzo (a) anthracene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Benzo (a) pyrene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Benzo (b) fluoranthene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Benzo (g,h,i) perylene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Benzo (k) fluoranthene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Benzoic acid	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Benzyl alcohol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Benzyl butyl phthalate	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
bis (2-Chloroethoxy) methane	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
bis (2-Chloroethyl) ether	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
bis (2-Chloroisopropyl) ether	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
bis (2-Ethylhexyl) phthalate	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
4-Bromophenyl phenyl ether	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
4-Chloro-3-methylphenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
4-Chloroaniline	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2-Chloronaphthalene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2-Chlorophenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
4-Chlorophenyl phenyl ether	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Chrysene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Di-n-butyl phthalate	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Di-n-octyl phthalate	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Dibenzo (a,h) anthracene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Dibenzofuran	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
1,2-Dichlorobenzene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
1,3-Dichlorobenzene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
1,4-Dichlorobenzene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
3,3'-Dichlorobenzidine	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2,4-Dichlorophenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Diethyl phthalate	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2,4-Dimethylphenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Dimethyl phthalate	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2,4-Dinitrophenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2,4-Dinitrotoluene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2,6-Dinitrotoluene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Fluoranthene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Fluorene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1

GEOTEST
An Environmental Monitoring and Testing Service
(310)498-8515 (800)624-5744

ANALYTICAL REPORT

Analyst: LH
Preparation Analyst: LH
Preparation Method: 3510
Matrix: Soil

ANALYSIS OF SEMI-VOLATILE ORGANICS BY GAS CHROMATOGRAPHY/MASS SPECTROMETRY
EPA METHOD 8270

Client ID:	B4-5	B4-10	B2-5	B2-10	B3-5	MDL	DF
Units:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Preparation Date:	8/1/97	8/1/97	8/1/97	8/1/97	8/1/97		
Analysis Date:	8/1/97	8/1/97	8/1/97	8/1/97	8/1/97		
Analyte							
Hexachlorobenzene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Hexachlorobutadiene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Hexachlorocyclopentadiene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Hexachloroethane	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Indeno (1,2,3-c,d) pyrene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Isophorone	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2-Methyl-4,6-dinitrophenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2-Methylnaphthalene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2-Methylphenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
4-Methylphenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
N-Nitrosodi-n-propylamine	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
N-Nitrosodimethylamine	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
N-Nitrosodiphenylamine	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Naphthalene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2-Nitroaniline	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
3-Nitroaniline	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
4-Nitroaniline	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Nitrobenzene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2-Nitrophenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
4-Nitrophenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Pentachlorophenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Phenanthrene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Phenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Pyrene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
1,2,4-Trichlorobenzene	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2,4,5-Trichlorophenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
2,4,6-Trichlorophenol	<0.66	<0.66	<0.66	<0.66	<0.66	0.66	1
Surrogate recovery %:						Acceptable Range:	
Nitrobenzene-d5	41	38	40	44	47	23-120	
2-Fluorobiphenyl	44	38	39	41	45	30-115	
Terphenyl-d14	58	47	49	52	57	18-137	
Phenol-d6	58	56	55	59	64	24-113	
2-Fluorophenol	56	55	54	57	57	25-121	
2,4,6-Tribromophenol	62	52	57	59	64	19-122	

GEOTEST
An Environmental Monitoring and Testing Service
(310)498-9515 (800)624-5744

ANALYTICAL REPORT

Analyst: LH
Preparation Analyst: LH
Preparation Method: 3510
Matrix: Soil

ANALYSIS OF SEMI-VOLATILE ORGANICS BY GAS CHROMATOGRAPHY/MASS SPECTROMETRY
EPA METHOD 8270

Client ID:	B3-10	B6-5	B6-10	MDL	DF
Units:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Preparation Date:	8/1/97	8/1/97	8/1/97		
Analysis Date:	8/1/97	8/1/97	8/1/97		
Analyte					
Acenaphthene	<0.66	<0.66	<0.66	0.66	1
Acenaphthylene	<0.66	<0.66	<0.66	0.66	1
Anthracene	<0.66	<0.66	<0.66	0.66	1
Benzo (a) anthracene	<0.66	<0.66	<0.66	0.66	1
Benzo (a) pyrene	<0.66	<0.66	<0.66	0.66	1
Benzo (b) fluoranthene	<0.66	<0.66	<0.66	0.66	1
Benzo (g,h,i) perylene	<0.66	<0.66	<0.66	0.66	1
Benzo (k) fluoranthene	<0.66	<0.66	<0.66	0.66	1
Benzoic acid	<0.66	<0.66	<0.66	0.66	1
Benzyl alcohol	<0.66	<0.66	<0.66	0.66	1
Benzyl butyl phthalate	<0.66	<0.66	<0.66	0.66	1
bis (2-Chloroethoxy) methane	<0.66	<0.66	<0.66	0.66	1
bis (2-Chloroethyl) ether	<0.66	<0.66	<0.66	0.66	1
bis (2-Chloroisopropyl) ether	<0.66	<0.66	<0.66	0.66	1
bis (2-Ethylhexyl) phthalate	<0.66	<0.66	<0.66	0.66	1
4-Bromophenyl phenyl ether	<0.66	<0.66	<0.66	0.66	1
4-Chloro-3-methylphenol	<0.66	<0.66	<0.66	0.66	1
4-Chloroaniline	<0.66	<0.66	<0.66	0.66	1
2-Chloronaphthalene	<0.66	<0.66	<0.66	0.66	1
2-Chlorophenol	<0.66	<0.66	<0.66	0.66	1
4-Chlorophenyl phenyl ether	<0.66	<0.66	<0.66	0.66	1
Chrysene	<0.66	<0.66	<0.66	0.66	1
Di-n-butyl phthalate	<0.66	<0.66	<0.66	0.66	1
Di-n-octyl phthalate	<0.66	<0.66	<0.66	0.66	1
Dibenzo (a,h) anthracene	<0.66	<0.66	<0.66	0.66	1
Dibenzofuran	<0.66	<0.66	<0.66	0.66	1
1,2-Dichlorobenzene	<0.66	<0.66	<0.66	0.66	1
1,3-Dichlorobenzene	<0.66	<0.66	<0.66	0.66	1
1,4-Dichlorobenzene	<0.66	<0.66	<0.66	0.66	1
3,3'-Dichlorobenzidine	<0.66	<0.66	<0.66	0.66	1
2,4-Dichlorophenol	<0.66	<0.66	<0.66	0.66	1
Diethyl phthalate	<0.66	<0.66	<0.66	0.66	1
2,4-Dimethylphenol	<0.66	<0.66	<0.66	0.66	1
Dimethyl phthalate	<0.66	<0.66	<0.66	0.66	1
2,4-Dinitrophenol	<0.66	<0.66	<0.66	0.66	1
2,4-Dinitrotoluene	<0.66	<0.66	<0.66	0.66	1
2,6-Dinitrotoluene	<0.66	<0.66	<0.66	0.66	1
Fluoranthene	<0.66	<0.66	<0.66	0.66	1
Fluorene	<0.66	<0.66	<0.66	0.66	1

GEOTEST

An Environmental Monitoring and Testing Service

(310)498-9515 (800)624-5744

ANALYTICAL REPORT

Analyst: LH
Preparation Analyst: LH
Preparation Method: 3510
Matrix: Soil

ANALYSIS OF SEMI-VOLATILE ORGANICS BY GAS CHROMATOGRAPHY/MASS SPECTROMETRY
EPA METHOD 8270

Client ID:	B3-10	B6-5	B6-10	MDL	DF
Units:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	
Preparation Date:	8/1/97	8/1/97	8/1/97		
Analysis Date:	8/1/97	8/1/97	8/1/97		
Analyte					
Hexachlorobenzene	<0.66	<0.66	<0.66	0.66	1
Hexachlorobutadiene	<0.66	<0.66	<0.66	0.66	1
Hexachlorocyclopentadiene	<0.66	<0.66	<0.66	0.66	1
Hexachloroethane	<0.66	<0.66	<0.66	0.66	1
Indeno (1,2,3-c,d) pyrene	<0.66	<0.66	<0.66	0.66	1
Isophorone	<0.66	<0.66	<0.66	0.66	1
2-Methyl-4,6-dinitrophenol	<0.66	<0.66	<0.66	0.66	1
2-Methylnaphthalene	<0.66	<0.66	<0.66	0.66	1
2-Methylphenol	<0.66	<0.66	<0.66	0.66	1
4-Methylphenol	<0.66	<0.66	<0.66	0.66	1
N-Nitrosodi-n-propylamine	<0.66	<0.66	<0.66	0.66	1
N-Nitrosodimethylamine	<0.66	<0.66	<0.66	0.66	1
N-Nitrosodiphenylamine	<0.66	<0.66	<0.66	0.66	1
Naphthalene	<0.66	<0.66	<0.66	0.66	1
2-Nitroaniline	<0.66	<0.66	<0.66	0.66	1
3-Nitroaniline	<0.66	<0.66	<0.66	0.66	1
4-Nitroaniline	<0.66	<0.66	<0.66	0.66	1
Nitrobenzene	<0.66	<0.66	<0.66	0.66	1
2-Nitrophenol	<0.66	<0.66	<0.66	0.66	1
4-Nitrophenol	<0.66	<0.66	<0.66	0.66	1
Pentachlorophenol	<0.66	<0.66	<0.66	0.66	1
Phenanthrene	<0.66	<0.66	<0.66	0.66	1
Phenol	<0.66	<0.66	<0.66	0.66	1
Pyrene	<0.66	<0.66	<0.66	0.66	1
1,2,4-Trichlorobenzene	<0.66	<0.66	<0.66	0.66	1
2,4,5-Trichlorophenol	<0.66	<0.66	<0.66	0.66	1
2,4,6-Trichlorophenol	<0.66	<0.66	<0.66	0.66	1
Surrogate recovery %:				**Acceptable Range:**	
Nitrobenzene-d5	22	47	45	23-120	
2-Fluorobiphenyl	21	43	41	30-115	
Terphenyl-d14	29	55	50	18-137	
Phenol-d6	30	65	60	24-113	
2-Fluorophenol	28	58	59	25-121	
2,4,6-Tribromophenol	30	69	66	19-122	

GEOTEST
An Environmental Monitoring and Testing Service
(310)498-9515 (800)624-5744

ANALYTICAL REPORT

Analyst: ST

Matrix: Soil

ANALYSIS OF WATER (MOISTURE) CONTENT
ASTM D 2216

Client ID:	Analysis Date	Moisture	MDL	DF
Units:		%	%	
Method Blank	8/1/97	<0.01	0.01	1
B4-4	8/1/97	11	0.01	1
B4-10	8/1/97	24	0.01	1
B4-4 Duplicate	8/1/97	9	0.01	1

GEOTEST

An Environmental Monitoring and Testing Service

(310)498-9515 (800)624-5744

ANALYTICAL REPORT

Analyst: SC
Preparation Analyst: SC
Preparation Method: EPA3010
Matrix: Soil

ANALYSIS OF CCR TITLE 22/26 TTLC METALS

Client ID:	B5-5	B5-10	B4-5	Method Blank	MDL	DF	Analysis Date	EPA Method
Units:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg			
Analyte								
Antimony (Sb)	<5.0	<5.0	<5.0	<5.0	5.0	1	8/1/97	6010
Arsenic (As)	<5.0	<5.0	<5.0	<5.0	5.0	1	8/1/97	6010
Barium (Ba)	120	98	43	<10	10	1	8/1/97	6010
Beryllium (Be)	<0.5	<0.5	<0.5	<0.5	0.5	1	8/1/97	6010
Cadmium (Cd)	0.6	<0.5	0.6	<0.5	0.5	1	8/1/97	6010
Chromium (Cr)	29	14	16	<0.5	0.5	1	8/1/97	6010
Cobalt (Co)	7.6	3.6	8.2	<1.0	1.0	1	8/1/97	6010
Copper (Cu)	13	9.1	44	<2.5	2.5	1	8/1/97	6010
Lead (Pb)	12	2.6	6.7	<1.0	1.0	1	8/1/97	6010
Mercury (Hg)	0.11	<0.10	0.11	<0.10	0.10	1	8/1/97	7471
Molybdenum (Mo)	<2.5	<2.5	<2.5	<2.5	2.5	1	8/1/97	6010
Nickel (Ni)	36	35	17	<0.5	0.5	1	8/1/97	6010
Selenium (Se)	<2.5	<2.5	<2.5	<2.5	2.5	1	8/1/97	6010
Silver (Ag)	<0.5	<0.5	<0.5	<0.5	0.5	1	8/1/97	6010
Thallium (Tl)	<5.0	<5.0	8.5	<5.0	5.0	1	8/1/97	6010
Vanadium (V)	21	13	36	<0.5	0.5	1	8/1/97	6010
Zinc (Zn)	35	22	49	<10	10	1	8/1/97	6010

GEOTEST

An Environmental Monitoring and Testing Service

(310)498-9515 (800)624-5744

ANALYTICAL REPORT

Analyst:	SC
Preparation Analyst:	SC
Preparation Method:	EPA3010
Matrix:	Soil

ANALYSIS OF CCR TITLE 22/26 TTLC METALS

Client ID:	B4-10	B6-5	B6-10	B4-5 Duplicate	MDL	DF	Analysis Date	EPA Method
Units:	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg			
Analyte								
Antimony (Sb)	<5.0	<5.0	<5.0	<5.0	5.0	1	8/1/97	6010
Arsenic (As)	<5.0	<5.0	<5.0	<5.0	5.0	1	8/1/97	6010
Barium (Ba)	220	100	150	41	10	1	8/1/97	6010
Beryllium (Be)	<0.5	<0.5	<0.5	<0.5	0.5	1	8/1/97	6010
Cadmium (Cd)	<0.5	<0.5	<0.5	0.5	0.5	1	8/1/97	6010
Chromium (Cr)	13	21	20	15	0.5	1	8/1/97	6010
Cobalt (Co)	9.6	11	7.9	7.7	1.0	1	8/1/97	6010
Copper (Cu)	10	21	16	42	2.5	1	8/1/97	6010
Lead (Pb)	2.7	38	24	6.7	1.0	1	8/1/97	6010
Mercury (Hg)	<0.10	0.18	<0.10	<0.10	0.10	1	8/1/97	7471
Molybdenum (Mo)	<2.5	<2.5	<2.5	<2.5	2.5	1	8/1/97	6010
Nickel (Ni)	33	35	31	18	0.5	1	8/1/97	6010
Selenium (Se)	<2.5	<2.5	<2.5	<2.5	2.5	1	8/1/97	6010
Silver (Ag)	<0.5	<0.5	<0.5	<0.5	0.5	1	8/1/97	6010
Thallium (Tl)	<5.0	8.0	10	8.9	5.0	1	8/1/97	6010
Vanadium (V)	9.0	15	20	34	0.5	1	8/1/97	6010
Zinc (Zn)	24	73	48	46	10	1	8/1/97	6010

GEOTEST
An Environmental Monitoring and Testing Service
(310)498-9515 (800)824-5744

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY

Analyst:	SC
Preparation Analyst:	SC
Preparation Method:	EPA3010
Matrix:	Soil

ANALYSIS OF CCR TITLE 22/26 TTLC METALS

Analyte	Analysis Date:	EPA Method	LCS % Rec.	Acceptable Range	Matrix Spike % Rec.	Matrix Spike Dup. % Rec.	Acceptable Range	RPD %	Acceptable Range
Antimony (Sb)	8/1/97	6010	100	70-130	56	56	60-130	0	0-25
Arsenic (As)	8/1/97	6010	99	78-104	95	94	34-135	1.1	0-15
Barium (Ba)	8/1/97	6010	100	81-117	101	101	55-130	0	0-25
Beryllium (Be)	8/1/97	6010	100	70-130	101	101	70-130	0	0-25
Cadmium (Cd)	8/1/97	6010	101	75-104	103	103	73-115	0	0-15
Chromium (Cr)	8/1/97	6010	100	81-103	97	97	62-125	0	0-15
Cobalt (Co)	8/1/97	6010	100	70-130	100	100	70-130	0	0-25
Copper (Cu)	8/1/97	6010	100	70-130	109	110	70-140	0.9	0-25
Lead (Pb)	8/1/97	6010	100	77-104	97	98	48-120	1.0	0-30
Mercury (Hg)	8/1/97	7471	105	76-121	89	89	70-135	0	0-30
Molybdenum (Mo)	8/1/97	6010	101	70-130	96	97	70-130	1.0	0-25
Nickel (Ni)	8/1/97	6010	100	70-130	98	98	70-130	0	0-25
Selenium (Se)	8/1/97	6010	102	79-102	95	96	42-120	1.0	0-16
Silver (Ag)	8/1/97	6010	100	77-107	98	98	53-115	0	0-19
Thallium (Tl)	8/1/97	6010	104	70-130	97	97	70-130	0	0-25
Vanadium (V)	8/1/97	6010	100	70-130	101	101	70-130	0	0-25
Zinc (Zn)	8/1/97	6010	100	70-130	100	101	70-130	1.0	0-25

GEOTEST

An Environmental Monitoring and Testing Service

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List of Abbreviations and Definitions

SM	=	Standard Methods for the examination of water and waste water
EPA	=	EPA approved methodology, 40 CFR Part 136
SW	=	EPA SW 846, Test Methods for Evaluating Solid Wastes
TCLP	=	Toxicity Characteristic Leaching Procedure
STLC	=	Soluble Threshold Limit Concentration
mg/L	=	milligrams per liter, parts per million (ppm), unit of measurement for a liquid
mg/Kg	=	milligrams per kilogram, parts per million (ppm), unit of measurement for a solid
µg/L	=	micrograms per liter, parts per billion (ppb), unit of measurement for a liquid
µg/Kg	=	micrograms per kilogram, parts per billion (ppb), unit of measurement for a solid
MDL	=	Laboratory Method Detection Limit, minimum level of detection derived from actual laboratory data
DF	=	Dilution Factor, the magnitude in which a sample must be diluted to eliminate matrix interference and/or to bring the sample concentration within the linear calibration range
RPD	=	Relative Percent Difference, measure of precision
% REC	=	Percent Recovery, measure of accuracy
<	=	less than, analyte of interest below stated numerical value
NA	=	Not Applicable
LCS	=	Laboratory Control Sample
DOHS	=	Department of Health Services
ELAP	=	Environmental Laboratory Accreditation Program
CCS	=	Calibration Check Standard
ICV	=	Initial Calibration Verification
PQL	=	Practical Quantitation Limit

GEOTEST
3960 E. Gilman Street
Long Beach, 90815
Telephone: (310) 498-9515 (800) 624-5744
Fax: (310) 597-0786

CHAIN-OF-CUSTODY RECORD

GEOTEST PROJECT NO: 970731-02
DATE 7/30/97 PAGE 1 OF 2

PROJECT NAME: CALTRANS ETTIE STREET
ADDRESS: Ettie Stret Oakland, CA
SAMPLER'S SIGNATURE: John P Neville
PRINTED NAME: JOHN P NEVILLE
CLIENT PROJECT NO.: 525-21022
PROJECT MANAGER: FRANK R ROSS

SAMPLE NO.	DATE	TIME	LOCATION	TPH GASOLINE	TPH DIESEL	BTEX & MTBE	TRPH POROSITY	O&G	8270	8260	6010	MOISTURE	TOC	MATRIX	CONTAINER TYPE	# OF CONTAINERS	SPECIAL HANDLING
B1-5	7/29/97	0920		X	X	X		X	X	~~X~~	~~X~~			S	A	1	
B1-10		0930		X	X	X		X	X								
B5-5		1000		X	X	X		X	X	X	X						
B5-10		1010		X	X	X		X	X	X	X						
B5-15		1020		~~X~~	~~X~~	~~X~~		~~X~~	~~X~~	~~X~~	~~X~~	~~X~~					HOLD
B5-20		1030		~~X~~	~~X~~	~~X~~		~~X~~	~~X~~	~~X~~	~~X~~	~~X~~					HOLD
B4-4		1100					X					X	X				
B4-5		1155		X	X	X		X	X	X	X						
B4-10		1200		X	X	X	X	X	X	X	X	X	X				
B2-5	↓	1340		X	X	X		X	X					↓	↓	↓	

1 RELINQUISHED BY: John P Neville	DATE: 7/30/97	3 RELINQUISHED BY:	DATE:	5 RELINQUISHED BY:	DATE:	SAMPLE CONDITIONS: RECEIVED ON ICE (YES/NO)	
SIGNATURE: John P Neville		SIGNATURE:		SIGNATURE:		CHAIN OF CUSTODY SEAL YES/NO	
PRINTED NAME: John P Neville	TIME: 1700	PRINTED NAME:	TIME:	PRINTED NAME:	TIME:	PROJECT COMMENTS: 48 Hour Turnaround	
COMPANY: PSI		COMPANY:		COMPANY:			
2 RECEIVED BY:	DATE: 7/30/97	4 RECEIVED BY:	DATE:	6 RECEIVED BY (LAB): Lily Bayati	DATE: 7/31/97		
SIGNATURE:		SIGNATURE:		SIGNATURE:			
PRINTED NAME: Anderson Express	TIME: 1700	PRINTED NAME:	TIME:	PRINTED NAME: Lily Bayati	TIME: 11:15		
COMPANY:		COMPANY:		COMPANY: Geotest			

ORIGINAL

GEOTEST
3960 E. Gilman Street
Long Beach, 90815
Telephone: (310) 498-9515 (800) 624-5744
Fax: (310) 597-0766

CHAIN-OF-CUSTODY RECORD

GEOT [redacted] PROJECT NO: 97073.02
DATE 7/30/97 PAGE 2 OF 2

PROJECT NAME CALTRANS ETTIE STREET
ADDRESS ETTIE STREET, OAKLAND, CA
SAMPLER'S SIGNATURE John P Neville
PRINTED NAME JOHN P NEVILLE
CLIENT PROJECT NO. 575-21022
PROJECT MANAGER FRANK R ROSS

SAMPLE NO.	DATE	TIME	LOCATION	TPH GASOLINE	TPH DIESEL	BTEX (MTBE)	418.1	O&G	8270	8260	6010			MATRIX	CONTAINER TYPE	# OF CONTAINERS	SPECIAL HANDLING
B2-10	7/29/97	1350		X	X	X		X	X					S	A	1	
B3-5		1430		X	X	X		X	X								
B3-10		1440		X	X	X		X	X								
B6-5		1530		X	X	X		X	X	X	X						
B6-10		1540		X	X	X		X	X	X	X						

1 RELINQUISHED BY	DATE 7/30/97	3 RELINQUISHED BY	DATE	5 RELINQUISHED BY	DATE	SAMPLE CONDITIONS	
SIGNATURE John P Neville		SIGNATURE		SIGNATURE		RECEIVED ON ICE	YES/NO
PRINTED NAME JOHN P NEVILLE	TIME 1700	PRINTED NAME	TIME	PRINTED NAME	TIME	CHAIN OF CUSTODY SEAL	YES/NO
COMPANY PSI		COMPANY		COMPANY			
2 RECEIVED BY	DATE 7/30/97	4 RECEIVED BY	DATE	6 RECEIVED BY (LAB)	DATE 7/31	PROJECT COMMENTS	
SIGNATURE		SIGNATURE		SIGNATURE Lily Bayati		48 Hour Turnaround	
PRINTED NAME Airborne Express	TIME 1700	PRINTED NAME	TIME	PRINTED NAME Lily Bayati	TIME 11:15		
COMPANY		COMPANY		COMPANY Geotest			

ORIGINAL

GEOTEST
3960 E. Gilman Street
Long Beach, 90815
Telephone: (310) 498-9515 (800) 624-5744
Fax: (310) 597-0786

CHAIN-OF-CUSTODY RECORD

GEOTEST PROJECT NO: 970731-01
DATE 7/31/97 PAGE 1 OF 1

PROJECT NAME CALTRANS ETTLE Street
ADDRESS
SAMPLER'S SIGNATURE
PRINTED NAME
CLIENT PROJECT NO.
PROJECT MANAGER Frank Poss

SAMPLE NO.	DATE	TIME	LOCATION	TPH GASOLINE	TPH DIESEL	BTEX	418.1	8260	TOC					MATRIX	CONTAINER TYPE	# OF CONTAINERS	SPECIAL HANDLING
B5-5	7/29							X						S	6 Jar	1	
B5-10	↓							X						↓	↓	↓	
B4-4									X								
B4-5								X									
B4-10								X	X								
B6-5								X									
B6-10	↓							X						↓	↓	↓	

1 RELINQUISHED BY SIGNATURE Kenneth Kyny PRINTED NAME COMPANY	DATE 7.31.97 TIME	3 RELINQUISHED BY SIGNATURE PRINTED NAME COMPANY	DATE TIME	5 RELINQUISHED BY SIGNATURE PRINTED NAME COMPANY	DATE TIME	SAMPLE CONDITIONS RECEIVED ON ICE YES/NO CHAIN OF CUSTODY SEAL YES/NO	
2 RECEIVED BY SIGNATURE Diane Galvan PRINTED NAME Diane Galvan COMPANY ATL	DATE 7-31-97 TIME 14:55	4 RECEIVED BY SIGNATURE PRINTED NAME COMPANY	DATE TIME	6 RECEIVED BY (LAB) SIGNATURE PRINTED NAME COMPANY	DATE TIME	PROJECT COMMENTS Need results by Monday 8/4/97 noon.	

ORIGINAL

Client: GeoTest
Attn: Ms. Lily Bayati

Client's Project: Caltrans Ettle Street, 970731-02, 11391A
Date Received: 07/31/97
Matrix: Soil
Units: ug/kg

EPA Method 8260

Lab No.:	Method Blank		19331-001		19331-002		19331-004		19331-005	
Client Sample I.D.:	--		B5-5		B5-10		B4-5		B4-10	
Date Sampled:	--		07/29/97		07/29/97		07/29/97		07/29/97	
QC Batch #:	P97VOCS105		P97VOCS105		P97VOCS105		P97VOCS105		P97VOCS105	
Date Analyzed:	08/01 & 04/97		08/01 & 04/97		08/01/97		08/01/97		08/01/97	
Analyst Initials:	YP		YP		YP		YP		YP	
Dilution Factor:	1		1		1		1		1	
ANALYTE	MDL	DLR	Results	DLR	Results	DLR	Results	DLR	Results	DLR	Results
Benzene	5	5	ND	5	ND	5	ND	5	ND	5	ND
Bromobenzene	5	5	ND	5	ND	5	ND	5	ND	5	ND
Bromodichloromethane	5	5	ND	5	ND	5	ND	5	ND	5	ND
Bromoform	5	5	ND	5	ND	5	ND	5	ND	5	ND
Bromomethane	5	5	ND	5	ND	5	ND	5	ND	5	ND
n-Butylbenzene	5	5	ND	5	ND	5	ND	5	ND	5	ND
sec-Butylbenzene	5	5	ND	5	ND	5	ND	5	ND	5	ND
tert-Butylbenzene	5	5	ND	5	ND	5	ND	5	ND	5	ND
Carbon tetrachloride	5	5	ND	5	ND	5	ND	5	ND	5	ND
Chlorobenzene	5	5	ND	5	ND	5	ND	5	ND	5	ND
Chloroethane	5	5	ND	5	ND	5	ND	5	ND	5	ND
Chloroform	5	5	ND	5	ND	5	ND	5	ND	5	ND
Chloromethane	5	5	ND	5	ND	5	ND	5	ND	5	ND
2-Chlorotoluene	5	5	ND	5	ND	5	ND	5	ND	5	ND
4-Chlorotoluene	5	5	ND	5	ND	5	ND	5	ND	5	ND
Dibromochloromethane	5	5	ND	5	ND	5	ND	5	ND	5	ND
1,2-Dibromo-3-chloropropane	10	10	ND	10	ND	10	ND	10	ND	10	ND
1,2-Dibromoethane	5	5	ND	5	ND	5	ND	5	ND	5	ND
Dibromomethane	5	5	ND	5	ND	5	ND	5	ND	5	ND
1,2-Dichlorobenzene	5	5	ND	5	ND	5	ND	5	ND	5	ND
1,3-Dichlorobenzene	5	5	ND	5	ND	5	ND	5	ND	5	ND
1,4-Dichlorobenzene	5	5	ND	5	ND	5	ND	5	ND	5	ND
Dichlorodifluoromethane	5	5	ND	5	ND	5	ND	5	ND	5	ND
1,1-Dichloroethane	5	5	ND	5	ND	5	ND	5	ND	5	ND
1,2-Dichloroethane	5	5	ND	5	ND	5	ND	5	ND	5	ND
1,1-Dichloroethene	5	5	ND	5	ND	5	ND	5	ND	5	ND
cis-1,2-Dichloroethene	5	5	ND	5	ND	5	ND	5	ND	5	ND

MDL = Method Detection Limit
ND = Not Detected (Below DLR).
DLR = MDL X Dilution Factor
NA = Not Analyzed

Reviewed/Approved By: _____ Date 8/4/97
Lee Ingvaldson
Department Supervisor

The cover letter is an integral part of this analytical report.

Client: GeoTest
Attn: Ms. Lily Bayati

Client's Project: Caltrans Ettle Street, 970731-02, 11391A
Date Received: 07/31/97
Matrix: Soil
Units: ug/kg

EPA Method 8260											
Lab No.:	Method Blank		19331-001		19331-002		19331-004		19331-005	
Client Sample I.D.:	--		B5-5		B5-10		B4-5		B4-10	
ANALYTE	MDL	DLR	Results	DLR	Results	DLR	Results	DLR	Results	DLR	Results
trans-1,2-Dichloroethene	5	5	ND	5	ND	5	ND	5	ND	5	ND
1,2-Dichloropropane	5	5	ND	5	ND	5	ND	5	ND	5	ND
1,3-Dichloropropane	5	5	ND	5	ND	5	ND	5	ND	5	ND
2,2-Dichloropropane	5	5	ND	5	ND	5	ND	5	ND	5	ND
1,1-Dichloropropene	5	5	ND	5	ND	5	ND	5	ND	5	ND
Ethylbenzene	5	5	ND	5	ND	5	ND	5	ND	5	ND
Hexachlorobutadiene	5	5	ND	5	ND	5	ND	5	ND	5	ND
Isopropylbenzene	5	5	ND	5	ND	5	ND	5	ND	5	ND
p-Isopropyltoluene	5	5	ND	5	ND	5	ND	5	ND	5	ND
Methylene Chloride	15	15	ND	15	ND	15	ND	15	ND	15	ND
Naphthalene	5	5	ND	5	ND	5	ND	5	ND	5	ND
n-Propylbenzene	5	5	ND	5	ND	5	ND	5	ND	5	ND
Styrene	5	5	ND	5	ND	5	ND	5	ND	5	ND
1,1,1,2-Tetrachloroethane	5	5	ND	5	ND	5	ND	5	ND	5	ND
1,1,2,2-Tetrachloroethane	5	5	ND	5	ND	5	ND	5	ND	5	ND
Tetrachloroethene	5	5	ND	5	ND	5	ND	5	30	5	ND
Toluene	5	5	ND	5	ND	5	ND	5	ND	5	ND
1,2,3-Trichlorobenzene	5	5	ND	5	ND	5	ND	5	ND	5	ND
1,2,4-Trichlorobenzene	5	5	ND	5	ND	5	ND	5	ND	5	ND
1,1,1-Trichloroethane	5	5	ND	5	ND	5	ND	5	ND	5	ND
1,1,2-Trichloroethane	5	5	ND	5	ND	5	ND	5	ND	5	ND
Trichloroethene	5	5	ND	5	ND	5	ND	5	ND	5	ND
Trichlorofluoromethane	5	5	ND	5	ND	5	ND	5	ND	5	ND
1,2,3-Trichloropropane	10	10	ND	10	ND	10	ND	10	ND	10	ND
1,2,4-Trimethylbenzene	5	5	ND	5	ND	5	ND	5	ND	5	25
1,3,5-Trimethylbenzene	5	5	ND	5	ND	5	ND	5	ND	5	7.8
Vinyl Chloride	5	5	ND	5	ND	5	ND	5	ND	5	ND
Xylenes (Total)	5	5	ND	5	ND	5	ND	5	ND	5	ND
EPA Method 8260 (additional analytes)											
MTBE	5	5	ND	5	ND	5	ND	5	ND	5	ND

Surrogate Recovery										
Surrogate	%Rec.	Limits	%Rec.	Limits	%Rec.	Limits	%Rec.	Limits	%Rec.	Limits
Dibromofluoromethane	106	50-150	108	50-150	94	50-150	113	50-150	106	50-150
1,2-Dichloroethane-d4	99	90-118	98	90-118	90	90-118	118	90-118	105	90-118
Toluene-d8	102	81-128	102	81-128	98	81-128	88	81-128	99	81-128
4-Bromofluorobenzene	101	71-120	98	71-120	94	71-120	76	71-120	95	71-120

MDL = Method Detection Limit
ND = Not Detected (Below DLR).
DLR = MDL X Dilution Factor
NA = Not Analyzed

Reviewed/Approved By: _____ Date 8/4/97
Lee Ingvaldson
Department Supervisor

The cover letter is an integral part of this analytical report.

Client: GeoTest
Attn: Ms. Lily Bayati

Client's Project: Caltrans Ettle Street, 970731-02, 11391A
Date Received: 07/31/97
Matrix: Soil
Units: ug/kg

EPA Method 8260

Lab No.:	19331-006			19331-007			19331-006D			LCS		
Client Sample I.D.:	B6-5			B6-10			B6-5			----		
Date Sampled:	07/29/97			07/29/97			07/29/97			----		
QC Batch #:	P97VOCS105			P97VOCS105			P97VOCS105			P97VOCS105		
Date Analyzed:	08/01/97			08/01/97			08/01/97			08/01/97		
Analyst Initials:	YP			YP			YP			YP		
Dilution Factor:	1			1			1			1		
ANALYTE	MDL	DLR	Results	DLR	Results		DLR	Results		%Rec.	Limits	
Benzene	5	5	ND	5	ND		5	ND		99	59-172	
Bromobenzene	5	5	ND	5	ND		5	ND		92	59-172	
Bromodichloromethane	5	5	ND	5	ND		5	ND		96	59-172	
Bromoform	5	5	ND	5	ND		5	ND		91	59-172	
Bromomethane	5	5	ND	5	ND		5	ND		97	59-172	
n-Butylbenzene	5	5	ND	5	ND		5	ND		95	59-172	
sec-Butylbenzene	5	5	ND	5	ND		5	ND		74	59-172	
tert-Butylbenzene	5	5	ND	5	ND		5	ND		94	59-172	
Carbon tetrachloride	5	5	ND	5	ND		5	ND		100	59-172	
Chlorobenzene	5	5	ND	5	ND		5	ND		95	59-172	
Chloroethane	5	5	ND	5	ND		5	ND		97	59-172	
Chloroform	5	5	ND	5	ND		5	ND		99	59-172	
Chloromethane	5	5	ND	5	ND		5	ND		88	59-172	
2-Chlorotoluene	5	5	ND	5	ND		5	ND		90	59-172	
4-Chlorotoluene	5	5	ND	5	ND		5	ND		94	59-172	
Dibromochloromethane	5	5	ND	5	ND		5	ND		92	59-172	
1,2-Dibromo-3-chloropropane	10	10	ND	10	ND		10	ND		85	59-172	
1,2-Dibromoethane	5	5	ND	5	ND		5	ND		94	59-172	
Dibromomethane	5	5	ND	5	ND		5	ND		95	59-172	
1,2-Dichlorobenzene	5	5	ND	5	ND		5	ND		93	59-172	
1,3-Dichlorobenzene	5	5	ND	5	ND		5	ND		92	59-172	
1,4-Dichlorobenzene	5	5	ND	5	ND		5	ND		91	59-172	
Dichlorodifluoromethane	5	5	ND	5	ND		5	ND		75	59-172	
1,1-Dichloroethane	5	5	ND	5	ND		5	ND		95	59-172	
1,2-Dichloroethane	5	5	ND	5	ND		5	ND		96	59-172	
1,1-Dichloroethene	5	5	ND	5	ND		5	ND		99	59-172	
cis-1,2-Dichloroethene	5	5	ND	5	ND		5	ND		99	59-172	

MDL = Method Detection Limit
ND = Not Detected (Below DLR).
DLR = MDL X Dilution Factor
NA = Not Analyzed

Reviewed/Approved By: _____ Date 8/4/97
Lee Ingvaldson
Department Supervisor

The cover letter is an integral part of this analytical report.

Client: GeoTest
Attn: Ms. Lily Bayati

Client's Project: Caltrans Ettle Street, 970731-02, 11391A
Date Received: 07/31/97
Matrix: Soil
Units: ug/kg

EPA Method 8260											
Lab No.:		19331-006		19331-007		19331-006D		LCS			
Client Sample I.D.:		B6-5		B6-10		B6-5		—			
ANALYTE	MDL	DLR	Results	DLR	Results	DLR	Results	%Rec.	Limits		
trans-1,2-Dichloroethene	5	5	ND	5	ND	5	ND	94	59-172		
,2-Dichloropropane	5	5	ND	5	ND	5	ND	98	59-172		
,3-Dichloropropane	5	5	ND	5	ND	5	ND	93	59-172		
2,2-Dichloropropane	5	5	ND	5	ND	5	ND	99	59-172		
,1-Dichloropropene	5	5	ND	5	ND	5	ND	99	59-172		
thylbenzene	5	5	ND	5	ND	5	ND	99	59-172		
Hexachlorobutadiene	5	5	ND	5	ND	5	ND	95	59-172		
sopropylbenzene	5	5	ND	5	ND	5	ND	96	59-172		
-Isopropyltoluene	5	5	ND	5	ND	5	ND	95	59-172		
Methylene Chloride	15	15	ND	15	ND	15	ND	99	59-172		
Naphthalene	5	5	ND	5	ND	5	ND	83	59-172		
-Propylbenzene	5	5	ND	5	ND	5	ND	98	59-172		
Styrene	5	5	ND	5	ND	5	ND	95	59-172		
1,1,1,2-Tetrachloroethane	5	5	ND	5	ND	5	ND	96	59-172		
,1,2,2-Tetrachloroethane	5	5	ND	5	ND	5	ND	87	59-172		
Tetrachloroethene	5	5	ND	5	ND	5	ND	99	59-172		
Toluene	5	5	ND	5	ND	5	ND	100	59-172		
,2,3-Trichlorobenzene	5	5	ND	5	ND	5	ND	89	59-172		
,2,4-Trichlorobenzene	5	5	ND	5	ND	5	ND	89	59-172		
1,1,1-Trichloroethane	5	5	ND	5	ND	5	ND	98	59-172		
,1,2-Trichloroethane	5	5	ND	5	ND	5	ND	94	59-172		
Trichloroethene	5	5	ND	5	ND	5	ND	100	59-172		
Trichlorofluoromethane	5	5	ND	5	ND	5	ND	94	59-172		
1,2,3-Trichloropropane	10	10	ND	10	ND	10	ND	86	59-172		
,2,4-Trimethylbenzene	5	5	ND	5	ND	5	ND	94	59-172		
1,3,5-Trimethylbenzene	5	5	ND	5	ND	5	ND	94	59-172		
Vinyl Chloride	5	5	ND	5	ND	5	ND	94	59-172		
Xylenes (Total)	5	5	ND	5	ND	5	ND	100	59-172		
EPA Method 8260 (additional analytes)											
MTBE	5	5	ND	5	ND	5	ND	90	59-172		

Surrogate Recovery										
Surrogate	%Rec.	Limits	%Rec.	Limits	%Rec.	Limits	%Rec.	Limits		
Dibromofluoromethane	107	50-150	103	50-150	107	50-150	99	50-150		
,2-Dichloroethane-d4	110	90-118	99	90-118	98	90-118	104	90-118		
Toluene-d8	94	81-128	98	81-128	102	81-128	100	81-128		
4-Bromofluorobenzene	87	71-120	94	71-120	101	71-120	99	71-120		

MDL = Method Detection Limit
ND = Not Detected (Below DLR).
DLR = MDL X Dilution Factor
NA = Not Analyzed

Reviewed/Approved By: _____ Date 8/4/97
Lee Ingvaldson
Department Supervisor

The cover letter is an integral part of this analytical report.

Spike Recovery and RPD Summary Report - SOIL (ug/kg)

Method : C:\HPCHEM\1\METHODS\VOC35.M (RTE Integrator)
Title : Volatile Organic Compounds
Last Update : Fri Aug 01 08:58:46 1997
Response via : Initial Calibration

Non-Spiked Sample: P9701828.D

	Spike Sample	Spike Duplicate Sample
File ID :	P97S1829.D	P97S1830.D
Sample :	19311-003 5G MS	19311-003 5G MSD
Acq Time:	1 Aug 1997 3:43 pm	1 Aug 1997 4:11 pm

Compound	Sample Conc	Spike Added	Spike Res	Dup Res	Spike %Rec	Dup %Rec	RPD	QC Limits RPD	QC Limits % Rec
1,1-dichloroethene	0.0	50	53	57	105	113	8	23	37-166
benzene	0.0	50	49	52	98	104	6	21	68-133
trichloroethene	0.0	50	51	55	101	109	8	23	65-129
toluene	0.0	50	47	50	92	100	8	21	74-136
chlorobenzene	0.0	50	48	52	94	103	9	19	83-122

QC Batch # P97VOCS105

Reviewed/Approved By: _____ Date: 8/4/97

Lee Ingvaldson
Organics Supervisor

Client: GeoTest
Attn: Ms. Lily Bayati

Client's Project: Caltrans Ettle Street, 970731-02, 11391A

Date Received: 07/31/97
Date Sampled: 07/29/97

Lab No.	Sample I.D.	Analysis	Date Analyzed	Results	Matrix, Units	MDL	DLR	Analyst
19331-003	B4-4	EPA 9060 (TOC)	08/01/97	3960	Soil, mg/kg	30	60	IG
19331-005	B4-10	EPA 9060 (TOC)	08/01/97	742	Soil, mg/kg	30	60	IG

MDL = Method Detection Limit
ND = Not Detected (Below DLR)
DF = Dilution Factor (DLR/MDL)

Reviewed/Approved By: _____ Date: 8-4-97
Cheryl De Los Reyes
Department Supervisor

The cover letter is an integral part of this analytical report.

Spike Recovery and RPD Summary Report

Method: EPA 9060
Analyst: IG
Data File 7213-1S

Date Analyzed 08/01/97
Sample ID: 19331-003
Matrix: Soil

ANALYTE	UNITS	LCS Conc	LCS Res	% Rec	METH BLANK	SPL CONC	SPL DUP	% Dev	SPK ADDED	MS RESULT	MSD RESULT	%MS REC	%MSD REC	% REC Limit	RPD	RPD Limit	MDL
TOC	mg/kg	2000	2000	100	ND	3960	N/A	N/A	4000	8640	7890	117	98	50-150	17	50	30

Approved by: _____
Cheryl De Los Reyes
Inorganics Supervisor

Date: 8-4-97

Advanced Technology Laboratories

August 4, 1997

CLIENT : PSI LONG BEACH (GEOTEST)

PROJECT : CALTRANS

E H6 Strect

PROJECT NO. : 970731-02

Sample I.D.	Wet Density (PCF)	Moisture Content (%)	Dry Density (PCF)	Volume of Voids (CF)	Total Volume (CF)	Porosity
B4-4'	120.5	19.9	100.5	0.000328	0.001022	0.32
B4-10'	119.9	24.6	96.2	0.000387	0.001022	0.38

NOTES:

1. Samples were remolded in a 1.5" diameter by 1" high plastic mold, volume = 0.001022 CF.
2. Porosity was calculated using formulas related to volume and weight relationships.

Tested By:

C:\labdat2

GEOTEST

An Environmental Monitoring and Testing Service
Phone: (562)498-9515 Fax: (562)597-0786

ANALYTICAL REPORT

Client Name: PROFESSIONAL SERVICE INDUSTRIES, INC.
3777 DEPOT ROAD, SUITE 418
HAYWARD, CA 94545

Report To: FRANK POSS

Project Name: CALTRANS ETTIE SOIL & GW
Site Location: OAKLAND, CA

GEOTEST Project #: 970808-02
GEOTEST WO #: 11423A
Client ID #: 575-7I022

Date: 8/11/97

GEOTEST is pleased to provide you with analytical data for your above referenced project. Sample was collected on 8/7/97 and received on 8/8/97. Please refer to the chain of custody included at the end of this report for conditions of the samples upon receipt. In accordance with the chain of custody, the sample was analyzed for the following analytical parameters:

Lily Bayati
Reviewed by,
Lily Bayati, Project Manager

GEOTEST

An Environmental Monitoring and Testing Service

(310)498-9515 (800)624-5744

ANALYTICAL REPORT

Analyst: VN

Preparation Method: 5030
Matrix: Water

ANALYSIS OF VOLATILE ORGANICS BY GAS CHROMATOGRAPHY/PID/FID
GASOLINE (TPH-G) BY DOHS/LUFT METHOD/BTEX BY EPA METHOD 8020

Client ID:	B5	B5 Duplicate	Method Blank	MDL	DF
Units:	µg/L	µg/L	µg/L	µg/L	
Analysis Date:	8/8/97	8/8/97	8/8/97		
Analyte					
Benzene	<0.3	<0.3	<0.3	0.3	1
Toluene	<0.3	<0.3	<0.3	0.3	1
Ethylbenzene	<0.3	<0.3	<0.3	0.3	1
Total Xylenes	<0.6	<0.6	<0.6	0.6	1
Gasoline	<500	<500	<500	500	1
Surrogate Recovery %:				**Acceptable Range:**	
a,a,a-Trifluorotoluene	98	98	96	62-131	

GEOTEST
An Environmental Monitoring and Testing Service
(310)498-9515 (800)624-5744

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY

Analyst: VN

Preparation Method: 5030
Matrix: Water

ANALYSIS OF VOLATILE ORGANICS BY GAS CHROMATOGRAPHY/PID/FID
GASOLINE (TPH-G) BY DOHS/LUFT METHOD/BTEX BY EPA METHOD 8020

	LCS % Rec.	Acceptable Range	Matrix Spike % Rec.	Matrix Spike Dup. % Rec.	Acceptable Range	RPD %	Acceptable Range
Analysis Date:	8/8/97		8/8/97	8/8/97			
Analyte							
Benzene	87	81-117	87	85	61-127	2.3	0-21
Toluene	90	78-110	88	87	62-120	1.1	0-16
Ethylbenzene	93	74-115	91	88	63-125	3.4	0-20
Total Xylenes	92	85-117	91	90	68-125	1.1	0-21
Gasoline	89	74-115	98	100	86-111	2.0	0-20

GEOTEST
An Environmental Monitoring and Testing Service
(310)498-9515 (800)624-5744

List of Abbreviations and Definitions

SM	=	Standard Methods for the examination of water and waste water
EPA	=	EPA approved methodology, 40 CFR Part 136
SW	=	EPA SW 846, Test Methods for Evaluating Solid Wastes
TCLP	=	Toxicity Characteristic Leaching Procedure
STLC	=	Soluble Threshold Limit Concentration
mg/L	=	milligrams per liter, parts per million (ppm), unit of measurement for a liquid
mg/Kg	=	milligrams per kilogram, parts per million (ppm), unit of measurement for a solid
µg/L	=	micrograms per liter, parts per billion (ppb), unit of measurement for a liquid
µg/Kg	=	micrograms per kilogram, parts per billion (ppb), unit of measurement for a solid
MDL	=	Laboratory Method Detection Limit, minimum level of detection derived from actual laboratory data
DF	=	Dilution Factor, the magnitude in which a sample must be diluted to eliminate matrix interference and/or to bring the sample concentration within the linear calibration range
RPD	=	Relative Percent Difference, measure of precision
% REC	=	Percent Recovery, measure of accuracy
<	=	less than, analyte of interest below stated numerical value
NA	=	Not Applicable
LCS	=	Laboratory Control Sample
DOHS	=	Department of Health Services
ELAP	=	Environmental Laboratory Accreditation Program
CCS	=	Calibration Check Standard
ICV	=	Initial Calibration Verification
PQL	=	Practical Quantitation Limit

GEOTEST
3960 E. Gilman Street
Long Beach, 90815
Telephone: (310) 498-9515 (800) 624-5744
Fax: (310) 597-0786

CHAIN-OF-CUSTODY RECORD

11423a
GEOTEST PROJECT NO: 970808-02
DATE 8-7-97 PAGE 1 OF 1

PROJECT NAME Caltrans Ettie Soil & GW
ADDRESS Oakland, CA
SAMPLER'S SIGNATURE
PRINTED NAME Scott Bowers
CLIENT PROJECT NO. 525-7I022
PROJECT MANAGER Frank Ross

SAMPLE NO.	DATE	TIME	LOCATION	METHODS: TPH GASOLINE	TPH DIESEL	BTEX	418.1						MATRIX	CONTAINER TYPE	# OF CONTAINERS	SPECIAL HANDLING
B5	8/7/97		Boring B5	X		X							W	→	2	2

1 RELINQUISHED BY
SIGNATURE
PRINTED NAME Scott Bowers
COMPANY P.S.I.
DATE
TIME

2 RECEIVED BY
SIGNATURE
PRINTED NAME A.V. Brace Caltrans
COMPANY
DATE
TIME

3 RELINQUISHED BY
SIGNATURE
PRINTED NAME
COMPANY
DATE
TIME

4 RECEIVED BY
SIGNATURE
PRINTED NAME
COMPANY
DATE
TIME

5 RELINQUISHED BY
SIGNATURE
PRINTED NAME
COMPANY
DATE
TIME

6 RECEIVED BY (LAB)
SIGNATURE Kenneth Nguyen
PRINTED NAME
COMPANY PSI
DATE 8-8-97
TIME 11:45

SAMPLE CONDITIONS
RECEIVED ON ICE (YES/NO)
CHAIN OF CUSTODY SEAL YES/NO

PROJECT COMMENTS
48-Hour Rush

GEOTEST

An Environmental Monitoring and Testing Service

Phone: (562)498-9515 Fax: (562)597-0786

ANALYTICAL REPORT

Client Name: PROFESSIONAL SERVICE INDUSTRIES, INC.
1320 WEST WINTON AVENUE
HAYWARD, CA 94545

Report To: FRANK POSS

Project Name: CALTRANS ETTIE STREET
Site Location: 3456 ETTIE STREET, OAKLAND, CA

GEOTEST Project #: 970909-03
GEOTEST WO #: 11544A
Client ID #: 575-7I022

Date: 9/24/97

GEOTEST is pleased to provide you with analytical data for your above referenced project. Samples were collected on 9/5/97 and received on 9/9/97. Please refer to the chain of custody included at the end of this report for conditions of the samples upon receipt. In accordance with the chain of custody, the samples were analyzed for the following analytical parameters:

In addition, the analysis for 8260 was subcontracted to an outside laboratory with results issued on a separate report.

Lily Bayati

Reviewed by,
Lily Bayati, Project Manager

GEOTEST

An Environmental Monitoring and Testing Service

Phone: (562)498-9515 Fax: (562)597-0786

ANALYTICAL REPORT

Analyst: RV
Preparation Analyst: RV

Matrix: Water

ANALYSIS OF TOTAL PETROLEUM HYDROCARBONS - DIESEL
EPA 8015 Modified

Sample ID	Preparation Date	Analysis Date	TPH Diesel mg/L	MDL mg/L	DF
Units					
Method Blank	9/9/97	9/12/97	<0.5	0.5	1
MW-1	9/9/97	9/12/97	<0.5	0.5	1
MW-2	9/9/97	9/12/97	<0.5	0.5	1
MW-3	9/9/97	9/12/97	<0.5	0.5	1
MW-3 Duplicate	9/9/97	9/12/97	<0.5	0.5	1

GEOTEST

An Environmental Monitoring and Testing Service

Phone: (562)498-9515 Fax: (562)597-0786

ANALYTICAL REPORT

Analyst: RV
Preparation Analyst: RV

Matrix: Water

ANALYSIS OF TOTAL PETROLEUM HYDROCARBONS - DIESEL
EPA 8015 Modified

	LCS % REC	Acceptable Range	Matrix Spike % REC	Matrix Spike Dup. % REC	Acceptable Range	RPD %	Acceptable Range
Analysis Date:	9/12/97		9/12/97	9/12/97			
TPH-Diesel	118	80-120	91	92	70-130	1.1	0-30

GEOTEST
An Environmental Monitoring and Testing Service
Phone: (562)498-9515 Fax: (562)597-0786

ANALYTICAL REPORT

Analyst: VN

Preparation Method: 5030
Matrix: Water

ANALYSIS OF VOLATILE ORGANICS BY GAS CHROMATOGRAPHY/PID/FID
GASOLINE (TPH-G) BY DOHS/LUFT METHOD/BTEX/MTBE BY EPA METHOD 8020

Client ID:	MW-1	MW-2	MW-3	MW-1 Duplicate	Method Blank	MDL	DF
Units:	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	
Analysis Date:	9/10/97	9/10/97	9/10/97	9/10/97	9/10/97		
Analyte							
Benzene	**1.1**	<0.3	<0.3	**0.6**	<0.3	0.3	1
Toluene	**0.5**	<0.3	<0.3	**0.4**	<0.3	0.3	1
Ethylbenzene	**1.2**	<0.3	<0.3	**1.1**	<0.3	0.3	1
Total Xylenes	**1.4**	<0.6	<0.6	**1.2**	<0.6	0.6	1
Methyl-t-butyl ether	<0.6	<0.6	<0.6	<0.6	<0.6	0.6	1
Gasoline	<500	<500	<500	<500	<500	500	1
Surrogate Recovery %:						Acceptable Range:	
a,a,a-Trifluorotoluene	111	112	102	108	112	62-131	

GEOTEST

An Environmental Monitoring and Testing Service

Phone: (562)498-9515 Fax: (562)597-0786

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY

Analyst: VN

Preparation Method: 5030
Matrix: Water

ANALYSIS OF VOLATILE ORGANICS BY GAS CHROMATOGRAPHY/PID/FID
GASOLINE (TPH-G) BY DOHS/LUFT METHOD/BTEX/MTBE BY EPA METHOD 8020

	LCS % Rec.	Acceptable Range	Matrix Spike % Rec.	Matrix Spike Dup. % Rec.	Acceptable Range	RPD %	Acceptable Range
Analysis Date:	9/10/97		9/10/97	9/10/97			
Analyte							
Benzene	96	81-117	93	91	61-127	2.2	0-21
Toluene	100	78-110	95	94	62-120	1.1	0-16
Ethylbenzene	100	74-115	97	99	63-125	2.0	0-20
Total Xylenes	99	85-117	96	100	68-125	4.1	0-21
Methyl-t-butyl ether	108	70-130	83	85	50-150	2.4	0-25
Gasoline	94	74-115	101	107	86-111	5.8	0-20

GEOTEST
An Environmental Monitoring and Testing Service
Phone: (562)498-9515 Fax: (562)597-0786

ANALYTICAL REPORT

Analyst: ST
Preparation Analyst: ST

Matrix: Water

ANALYSIS OF OIL AND GREASE
STANDARD METHODS (17th Ed.) 5520B

Units			OIL & GREASE mg/L	MDL mg/L	DF
Sample ID	**Preparation Date**	**Analysis Date**			
Method Blank	9/11/97	9/11/97	<10	10	1
MW-1	9/11/97	9/11/97	<20	10	2
MW-3	9/11/97	9/11/97	<20	10	2

GEOTEST

An Environmental Monitoring and Testing Service

Phone: (562)498-9515 Fax: (562)597-0786

QUALITY ASSURANCE/QUALITY CONTROL SUMMARY

Analyst: ST
Preparation Analyst: ST

Matrix: Water

ANALYSIS OF OIL AND GREASE
STANDARD METHODS (17th Ed.) 5520B

	LCS % REC	Acceptable Range	Matrix Spike % REC	Matrix Spike Dup. % REC	Acceptable Range	RPD %	Acceptable Range
Analysis Date:	9/11/97		9/11/97	9/11/97			
Oil & Grease	80	70-130	94	92	70-130	2.2	0-25

GEOTEST
An Environmental Monitoring and Testing Service
Phone: (562)498-9515 Fax: (562)597-0786

List of Abbreviations and Definitions

SM	=	Standard Methods for the examination of water and waste water
EPA	=	EPA approved methodology, 40 CFR Part 136
SW	=	EPA SW 846, Test Methods for Evaluating Solid Wastes
TCLP	=	Toxicity Characteristic Leaching Procedure
STLC	=	Soluble Threshold Limit Concentration
mg/L	=	milligrams per liter, parts per million (ppm), unit of measurement for a liquid
mg/Kg	=	milligrams per kilogram, parts per million (ppm), unit of measurement for a solid
µg/L	=	micrograms per liter, parts per billion (ppb), unit of measurement for a liquid
µg/Kg	=	micrograms per kilogram, parts per billion (ppb), unit of measurement for a solid
MDL	=	Laboratory Method Detection Limit, minimum level of detection derived from actual laboratory data
DF	=	Dilution Factor, the magnitude in which a sample must be diluted to eliminate matrix interference and/or to bring the sample concentration within the linear calibration range
RPD	=	Relative Percent Difference, measure of precision
% REC	=	Percent Recovery, measure of accuracy
<	=	less than, analyte of interest below stated numerical value
NA	=	Not Applicable
LCS	=	Laboratory Control Sample
DOHS	=	Department of Health Services
ELAP	=	Environmental Laboratory Accreditation Program
CCS	=	Calibration Check Standard
ICV	=	Initial Calibration Verification
PQL	=	Practical Quantitation Limit

GEOTEST
3960 E. Gilman Street
Long Beach, 90815
Telephone: (310) 498-9515 (800) 624-5744
Fax: (310) 597-0786

CHAIN-OF-CUSTODY RECORD

11544
GEOTEST PROJECT NO: 970909-03
DATE _____ PAGE 1 OF 1

PROJECT NAME Cattuno Ettie Street
ADDRESS 3456 Ettie Street, Oakland, CA
SAMPLER'S SIGNATURE John P Neville
PRINTED NAME JOHN P NEVILLE
CLIENT PROJECT NO. 575-7I022
PROJECT MANAGER FRANK R Ross

SAMPLE NO.	DATE	TIME	LOCATION	TPH GASOLINE	TPH DIESEL	BTEX & MTBE	418.1	8260	Oil and Grease	MATRIX	CONTAINER TYPE	# OF CONTAINERS	SPECIAL HANDLING
MW-1	9/5/97	1200		X	X	X		X	X	H_2O	VOA BTEX	8 / 1	
MW-2	↓	1215		X	X	X		X		↓	↓	8 / 0	
MW-3		1230		X	X	X		X	X	↓	↓	8 / 1	

1 RELINQUISHED BY	DATE	3 RELINQUISHED BY	DATE	5 RELINQUISHED BY	DATE
SIGNATURE John P Neville	9/8/97	SIGNATURE		SIGNATURE	
PRINTED NAME John P Neville	TIME 1700	PRINTED NAME	TIME	PRINTED NAME	TIME
COMPANY PST		COMPANY		COMPANY	
2 RECEIVED BY	**DATE**	**4 RECEIVED BY**	**DATE**	**6 RECEIVED BY (LAB)**	**DATE**
SIGNATURE	9/8/97	SIGNATURE		SIGNATURE Kenneth Nguyen	9.9.97
PRINTED NAME Disbourse Express	TIME 1700	PRINTED NAME	TIME	PRINTED NAME Geotest	TIME 12:30
COMPANY		COMPANY		COMPANY	

SAMPLE CONDITIONS
RECEIVED ON ICE 5°C (YES/NO)
CHAIN OF CUSTODY SEAL YES/NO

PROJECT COMMENTS

Advanced Technology
Laboratories

September 22, 1997

ELAP No.: 1838

GeoTest
3960 Gilman St
Long Beach, CA 90815

ATTN: Ms. Lily Bayati

Client's Project: Caltrans Ettie Street, 970909-03, 11544a
Lab No.: 20397-001/003

Enclosed are the results for sample(s) received by Advanced Technology Laboratories and tested for the parameters indicated in the enclosed chain of custody.

Thank you for the opportunity to service the needs of your company. Please feel free to call me at (562) 989 - 4045 if I can be of further assistance to your company.

Sincerely,

Edgar P. Caballero
Laboratory Director
EPC/mc

Enclosures

This cover letter is an integral part of this analytical report.

Client: Geotest
Attn: Mr. Lily Bayati

Client's Project: Caltrans Ettie Street, 970909-03/11544a
Date Received: 09/18/97
Matrix: Water
Units: ug/l
Date Amended: 09/23/97

EPA Method 8260

Lab No.:	Method Blank		20397-001		20397-002		20397-003		LCS	
Client Sample I.D.:	--		MW-1		MW-2		MW-3		---	
Date Sampled:	--		09/05/97		09/05/97		09/05/97		09/05/97	
QC Batch #:	Q97VOCW217		Q97VOCW217		Q97VOCW217		Q97VOCW217		Q97VOCW217	
Date Analyzed:	09/19/97		09/19/97		09/19/97		09/19/97		09/19/97	
Analyst Initials:	YP		YP		YP		YP		YP	
Dilution Factor:	1		1		1		1		1	
ANALYTE	MDL	DLR	Results	DLR	Results	DLR	Results	DLR	Results	%Rec	Limit
Benzene	5	5	ND	5	ND	5	ND	5	ND	97	61-145
Bromobenzene	5	5	ND	5	ND	5	ND	5	ND	99	61-145
Bromodichloromethane	5	5	ND	5	ND	5	ND	5	ND	96	61-145
Bromoform	5	5	ND	5	ND	5	ND	5	ND	96	61-145
Bromomethane	5	5	ND	5	ND	5	ND	5	ND	112	61-145
n-Butylbenzene	5	5	ND	5	ND	5	ND	5	ND	100	61-145
sec-Butylbenzene	5	5	ND	5	ND	5	ND	5	ND	105	61-145
tert-Butylbenzene	5	5	ND	5	ND	5	ND	5	ND	103	61-145
Carbon tetrachloride	5	5	ND	5	ND	5	ND	5	ND	102	61-145
Chlorobenzene	5	5	ND	5	ND	5	ND	5	ND	94	61-145
Chloroethane	5	5	ND	5	ND	5	ND	5	ND	108	61-145
Chloroform	5	5	ND	5	ND	5	ND	5	ND	102	61-145
Chloromethane	5	5	ND	5	ND	5	ND	5	ND	108	61-145
2-Chlorotoluene	5	5	ND	5	ND	5	ND	5	ND	97	61-145
4-Chlorotoluene	5	5	ND	5	ND	5	ND	5	ND	103	61-145
Dibromochloromethane	5	5	ND	5	ND	5	ND	5	ND	94	61-145
1,2-Dibromo-3-chloropropa	10	10	ND	10	ND	10	ND	10	ND	93	61-145
1,2-Dibromoethane	5	5	ND	5	ND	5	ND	5	ND	100	61-145
Dibromomethane	5	5	ND	5	ND	5	ND	5	ND	101	61-145
1,2-Dichlorobenzene	5	5	ND	5	ND	5	ND	5	ND	101	61-145
1,3-Dichlorobenzene	5	5	ND	5	ND	5	ND	5	ND	93	61-145
1,4-Dichlorobenzene	5	5	ND	5	ND	5	ND	5	ND	96	61-145
Dichlorodifluoromethane	5	5	ND	5	ND	5	ND	5	ND	99	61-145
1,1-Dichloroethane	5	5	ND	5	ND	5	ND	5	ND	101	61-145
1,2-Dichloroethane	5	5	ND	5	ND	5	ND	5	ND	96	61-145
1,1-Dichloroethene	5	5	ND	5	ND	5	ND	5	ND	110	61-145
cis-1,2-Dichloroethene	5	5	ND	5	ND	5	ND	5	ND	100	61-145

MDL = Method Detection Limit
ND = Not Detected (Below DLR).
DLR = MDL X Dilution Factor
NA = Not Analyzed

Reviewed/Approved By: _____ Date 9/23/97
Lee Ingvaldson
Department Supervisor

The cover letter is an integral part of this analytical report.

Client: Geotest
Attn: Mr. Lily Bayati

Client's Project: Caltrans Ettie Street, 970909-03/11544a
Date Received: 09/18/97
Matrix: Water
Units: ug/l
Date Amended: 09/23/97

EPA Method 8260

Lab No.:		Method Blank		20397-001		20397-002		20397-003		LCS	
Client Sample I.D.:		--		MW-1		MW-2		MW-3		---	
ANALYTE	MDL	DLR	Results	DLR	Results	DLR	Results	DLR	Results	%Rec	Limit
trans-1,2-Dichloroethene	5	5	ND	5	ND	5	ND	5	ND	102	61-145
1,2-Dichloropropane	5	5	ND	5	ND	5	ND	5	ND	95	61-145
1,3-Dichloropropane	5	5	ND	5	ND	5	ND	5	ND	97	61-145
2,2-Dichloropropane	5	5	ND	5	ND	5	ND	5	ND	97	61-145
1,1-Dichloropropene	5	5	ND	5	ND	5	ND	5	ND	101	61-145
Ethylbenzene	5	5	ND	5	ND	5	ND	5	ND	95	61-145
Hexachlorobutadiene	5	5	ND	5	ND	5	ND	5	ND	93	61-145
Isopropylbenzene	5	5	ND	5	ND	5	ND	5	ND	102	61-145
p-Isopropyltoluene	5	5	ND	5	ND	5	ND	5	ND	100	61-145
Methylene Chloride	5	5	ND	5	ND	5	ND	5	ND	100	61-145
Naphthalene	5	5	ND	5	ND	5	ND	5	ND	109	61-145
n-Propylbenzene	5	5	ND	5	ND	5	ND	5	ND	105	61-145
Styrene	5	5	ND	5	ND	5	ND	5	ND	95	61-145
1,1,1,2-Tetrachloroethane	5	5	ND	5	ND	5	ND	5	ND	93	61-145
1,1,2,2-Tetrachloroethane	5	5	ND	5	ND	5	ND	5	ND	98	61-145
Tetrachloroethene	5	5	ND	5	ND	5	ND	5	ND	95	61-145
Toluene	5	5	ND	5	ND	5	ND	5	ND	97	61-145
1,2,3-Trichlorobenzene	5	5	ND	5	ND	5	ND	5	ND	100	61-145
1,2,4-Trichlorobenzene	5	5	ND	5	ND	5	ND	5	ND	96	61-145
1,1,1-Trichloroethane	5	5	ND	5	ND	5	ND	5	ND	106	61-145
1,1,2-Trichloroethane	5	5	ND	5	ND	5	ND	5	ND	106	61-145
Trichloroethene	5	5	ND	5	ND	5	ND	5	ND	98	61-145
Trichlorofluoromethane	5	5	ND	5	ND	5	ND	5	ND	112	61-145
1,2,3-Trichloropropane	10	10	ND	10	ND	10	ND	10	ND	94	61-145
1,2,4-Trimethylbenzene	5	5	ND	5	ND	5	ND	5	ND	95	61-145
1,3,5-Trimethylbenzene	5	5	ND	5	ND	5	ND	5	ND	99	61-145
Vinyl Chloride	5	5	ND	5	ND	5	ND	5	ND	86	61-145
Xylenes (Total)	5	5	ND	5	ND	5	ND	5	ND	95	61-145
Methyl-tert Butyl Ether	5	5	ND	5	ND	5	ND	5	118	90	61-145

Surrogate Recovery

Surrogate	%Re	Limits	%Rec	Limits	%Re	Limits	%Re	Limits	%Re	Limits
Dibromofluoromethane	97	50-150	116	50-150	114	50-150	113	50-150	100	50-150
1,2-Dichloroethane-d4	93	91-114	107	91-114	104	91-114	116	91-114	100	91-114
Toluene-d8	98	83-121	101	83-121	100	83-121	105	83-121	100	83-121
4-Bromofluorobenzene	103	66-133	116	66-133	113	66-133	90	66-133	97	66-133

MDL = Method Detection Limit
ND = Not Detected (Below DLR).
DLR = MDL X Dilution Factor

Reviewed/Approved By: _____ Date 9/23/97
Lee Ingvaldson
Department Supervisor

The cover letter is an integral part of this analytical report.

Spike Recovery and RPD Summary Report - WATER (ug/L)

Method : C:\HPCHEM\1\METHODS\VOCW.M
Title : Volatile Organic Compounds
Last Update : Fri Sep 19 13:38:58 1997
Response via : Initial Calibration

Non-Spiked Sample: 20296-33.D

	Spike Sample	Spike Duplicate Sample
File ID :	QVS0919E.D	QVS0919D.D
Sample :	20296-033 MS	20296-033 MSD
Acq Time:	19 Sep 97 5:44 pm	19 Sep 97 4:15 pm

Compound	Sample Conc	Spike Added	Spike Res	Dup Res	Spike %Rec	Dup %Rec	RPD	QC Limits RPD	QC Limits % Rec
1,1-dichloroethene	0.0	50	56	54	111	106	4	19	49-154
benzene	0.0	50	49	48	97	96	1	15	67-128
trichloroethene	0.0	50	51	52	102	103	1	16	67-130
toluene	0.0	50	50	48	99	95	5	15	74-123
chlorobenzene	0.0	50	45	46	90	93	3	14	80-122

QC Batch # Q97VOCW217

Reviewed/Approved By: _____ Date: 9/23/97

Lee Ingvaldson
Organics Supervisor

GEOTEST
3960 E. Gilman Street
Long Beach, 90815
Telephone: (310) 498-9515 (800) 624-5744
Fax: (310) 597-0786

ATL

11544a

CHAIN-OF-CUSTODY RECORD

GEOTEST PROJECT NO: 970909-03
DATE 9.18.97 PAGE 1 OF 1

PROJECT NAME Caltrans Ettie Street
ADDRESS
SAMPLER'S SIGNATURE
PRINTED NAME
CLIENT PROJECT NO.
PROJECT MANAGER Frank Poss

SAMPLE NO.	DATE	TIME	LOCATION	METHODS: TPH GASOLINE	TPH DIESEL	BTEX	418.1	8260+MTBE						MATRIX	CONTAINER TYPE	# OF CONTAINERS	SPECIAL HANDLING
MW-1	9/5/97	1200						X						W	Voa	1	
MW-2	↓	1215						↓						↓	↓	↓	
MW-3	↓	1230						↓						↓	↓	↓	

1 RELINQUISHED BY: Kenneth Nguyen / Kenneth Nguyen / Caltrans	DATE: —	3 RELINQUISHED BY	DATE	5 RELINQUISHED BY	DATE	SAMPLE CONDITIONS RECEIVED ON ICE YES/NO CHAIN OF CUSTODY SEAL YES/NO
SIGNATURE / PRINTED NAME / COMPANY	TIME	SIGNATURE / PRINTED NAME / COMPANY	TIME	SIGNATURE / PRINTED NAME / COMPANY	TIME	PROJECT COMMENTS
2 RECEIVED BY: Diane Galvan / Diane Galvan / ATL	DATE: 9-18-97	4 RECEIVED BY	DATE	6 RECEIVED BY (LAB)	DATE	
SIGNATURE / PRINTED NAME / COMPANY	TIME: 1200	SIGNATURE / PRINTED NAME / COMPANY	TIME	SIGNATURE / PRINTED NAME / COMPANY	TIME	

ORIGINAL