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Accutite Environmental Engineering

35 So. Linden Avenue, South San Francisco, CA 94080-6407 Tel: (650) 952-5551 Fax: (650) 952-7631 Tank Testing: (650) 952-0327

GROUNDWATER SAMPLING AND ANALYSIS

**AT
FORMER SERVICE STATION
1435 WEBSTER STREET
ALAMEDA, CA**

**PREPARED FOR
OLYMPIAN
260 MICHELLE COURT
SOUTH SAN FRANCISCO, CA**

**PREPARED BY:
ACCUTITE ENVIRONMENTAL ENGINEERING
35 SOUTH LINDEN AVENUE
SOUTH SAN FRANCISCO, CA 94080**

SAMPLING DATE: JULY 31, 1998

1435QMWP

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1.0 INTRODUCTION

Olympian retained Accutite Environmental Engineering (Accutite) to conduct groundwater sampling and analysis from three monitoring wells at the former service station, 1435 Webster Street in Alameda, California (Figure 1). This report presents the analytical findings from the sixth sampling episode, performed on July 31, 1998. Also included is a workplan to advance four borings.

2.0 BACKGROUND

For background information about the subject site, please review BT Associates report, dated August 16, 1993 (Attachment A) and the subsequent quarterly groundwater monitoring reports.

Below we detail the sampling results of MW-1, MW-2, and MW-3 from the sixth sampling episode, completed on July 31, 1998.

3.0 ELEVATION DATA AND GROUND WATER FLOW DIRECTION

On July 30, 1998, prior to sampling, Accutite surveyed the ground water elevations in all three wells. The reference mark considered as a base for calculating these elevations was a fire hydrant, located on the sidewalk of Webster Street (Figure 2).

The calculated ground water flow direction was to the southeast (Figure 2) with a gradient of 0.0038 ft/ft. Table 1 below summarizes the elevation data from 7/30/98:

Table 1. Elevation Data

Well Identification	Elevation of Casing in ft	Depth to Ground-Water in ft on July 30, 1998	Ground Water Elevation in ft
MW-1	19.53	8.24	11.29
MW-2	19.80	8.50	11.30
MW-3	19.79	8.33	11.46

4.0 SAMPLING

On July 31, 1998, Accutite sampled all three monitoring wells MW-1, MW-2, and MW-3. Wells were purged prior to sampling. The sampling logs are included in Appendix B. The Groundwater samples were obtained through a disposable bailer, and were directly transferred into the sampling vials and containers. The samples were transported in a cooler at approximately 4°C. A completed chain of custody accompanied the samples to Sequoia Analytical Laboratory.

5.0 LABORATORY ANALYSIS

The laboratory results are included in Appendix C. A tabulated summary of the analytical findings to date is included in Table 2, below.



Table 2. Cumulative Ground Water Analytical Results

Sample ID	Date Of Sampling	Depth to Water (ft)	TPH-D ⁽¹⁾	TPH-G ⁽³⁾	Benzene	Toluene	Ethyl Benzene	Xylenes	MTBE ⁽⁴⁾	TRPH ⁽⁵⁾
			in ppb ⁽²⁾	in ppb	in ppb	in ppb	in ppb	in ppb	in ppb	in ppb
MW-1	6/03/93	N/A ⁽⁷⁾	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	9/14/94	11.46	<50	14,000	44	28	25	50	NA ⁽⁸⁾	0.8
	12/30/94	9.22	<50	4,000	12	9	6.8	30	NA ⁽⁸⁾	<0.5
	3/26/95	6.76	<50	1,000	21	10	7.1	25	NA ⁽⁸⁾	2.1
	07/9/95	8.92	<50	16,000	57	28	25	53	NA ⁽⁸⁾	NA
	07/31/98	8.30	1,700	4,700	1,300	48	140	150	6,600	<5
MW-2	6/03/93	9.54	<50	<50	5.8	<0.5	<0.5	<0.5	N/A	<0.5
	9/14/94	11.82	<50	<50	<0.5	<0.5	<0.5	<0.5	NA ⁽⁸⁾	<0.5
	12/30/94	9.46	<50	160	1.4	1.4	0.8	5.0	NA ⁽⁸⁾	<0.5
	3/26/95	6.82	<50	<50	<0.5	<0.5	<0.5	<0.5	NA ⁽⁸⁾	<0.5
	07/9/95	9.22	NA	NA	NA	NA	NA	NA	NA ⁽⁸⁾	NA
	07/31/98	8.56	220	<50	<0.5	<0.5	<0.5	<0.5	73	<5
MW-3	6/03/93	9.80	<50	<50	<0.5	<0.5	<0.5	<0.5	N/A	<0.5
	9/14/94	12.19	<50	<50	<0.5	<0.5	<0.5	<0.5	NA ⁽⁸⁾	<0.5
	12/30/94	9.72	<50	<50	<0.5	<0.5	<0.5	<0.5	NA ⁽⁸⁾	<0.5
	3/26/95	6.88	<50	<50	<0.5	<0.5	<0.5	<0.5	NA ⁽⁸⁾	<0.5
	07/9/95	9.52	NA	NA	NA	NA	NA	NA	NA ⁽⁸⁾	NA
	07/31/98	8.40	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	<5

- (1) TPH-D = Total Petroleum Hydrocarbons as Diesel
- (2) ppb = part per billion or microgram per liter
- (3) TPH-G = Total Petroleum Hydrocarbons as Gasoline
- (4) MTBE = Methyl tertiary butyl ether
- (5) TRPH = Total Recoverable Petroleum Hydrocarbons as Oil and Grease
- (6) ppm = part per million or milligram per liter
- (7) Well was not accessible because of a parking car in its location
- (8) Not analyzed for the indicated compound

6.0 FINDINGS

Accutite concludes the following:

- The present groundwater flow direction is toward the Southeast with gradient 0.0038 ft/ft.
- Non-detect to non-significant concentrations of the analyzed contaminants were obtained in MW-2 and MW-3.
- Benzene was detected in MW-1 at 1,300 ppb and MTBE was detected at 6,600 ppb. MTBE was confirmed by using the GC/MS, EPA Method 8260.

7.0 RECOMMENDATIONS

Based on the analytical findings to date, Accutite recommends the following:

- Based on the recent calculation of the groundwater flow direction and the historical groundwater flow, it appears that MW-1 is located in the path of the plume.



- Since no significant concentrations of any of the analyzed contaminants was detected in MW-2 or MW-3, Accutite recommends no further sampling of these wells.
- Accutite recommends further plume definition at this site. Such plume definition could be achieved by advancing direct push borings north, east, and southeast of the former USTs. Sampling and analysis of the groundwater from these borings will help assess the condition of the plume and the location of any future monitoring well. Accutite's workplan to advance four borings is presented in the remaining sections of this submittal.

8.0 WORKPLAN TO ADVANCE FOUR BORINGS

Accutite proposes to execute the following tasks:

TASK #1: HEALTH AND SAFETY PLAN

Prior to conducting field activities, a Health and Safety Plan will be prepared. Development of a written site safety plan helps ensure that all safety aspects of site operations are thoroughly examined prior to commencing fieldwork. The site safety plan will be modified as needed for every stage of site activity.

TASK #2 PERMITTING AND CLEARING UTILITIES

Once this workplan is approved by Alameda County Health Care Agency, a permit application for the boring installation will be submitted. Underground Service Alert (USA) will be contacted to locate the underground utilities. Client will be requested to supplement USA's markings for private utilities installed onsite.

TASK #3: SUBSURFACE INVESTIGATION BY PERFORMING EXPLORATORY PUNCH BORINGS

This task calls for the installation of four punch borings B1 through B4. These borings will be advanced using the Geoprobe system to a depth of approximately 15 feet below surface grade (Figure 3). Depth to groundwater at this site is between 8 and 9 feet below surface grade. Historically, the range of the groundwater flow direction was from the northeast to the southeast. Therefore, the locations of the borings are chosen to intercept the plume.

Please see Attachment D for the standard procedures. One soil sample will be collected from each boring, at the soil-groundwater interface. The soil will be logged according to the Unified Soil Classification system and boring logs will be prepared for each borehole. One Ground water sample will be collected from each boring. Once the sampling is complete, Accutite will grout in place all four borings.

TASK #4 SOIL AND GROUNDWATER ANALYSIS

Stain, smell or any sign of petroleum hydrocarbon contamination will be noted from the collected soil samples. The collected soil and groundwater samples from all borings will be analyzed for TPH-G, BTEX, MTBE, and TPH-D. MTBE will be confirmed by the GC/MS, EPA Method 8260. One soil and one groundwater sample will be analyzed for lead (Pb).

soluble



TASK #5: REPORT PREPARATION AND REGULATORY LIAISON

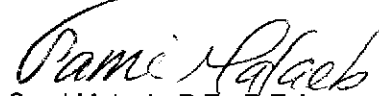
Accutite will prepare a detailed report summarizing all field activities and analytical findings. Accutite will submit report to Alameda County Health Care Agency.


9.0 LIMITATIONS

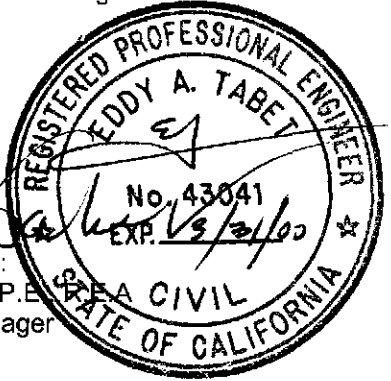
Our services consist of professional opinions, conclusions, and recommendations made today in accordance with generally accepted engineering principles and practices. This warranty is in lieu of all other warranties either expressed or implied.

Thank you for your cooperation. If you have any questions, please contact the undersigned at (650) 952-5551, Ext. 209.

Sincerely,
Accutite Environmental Engineering

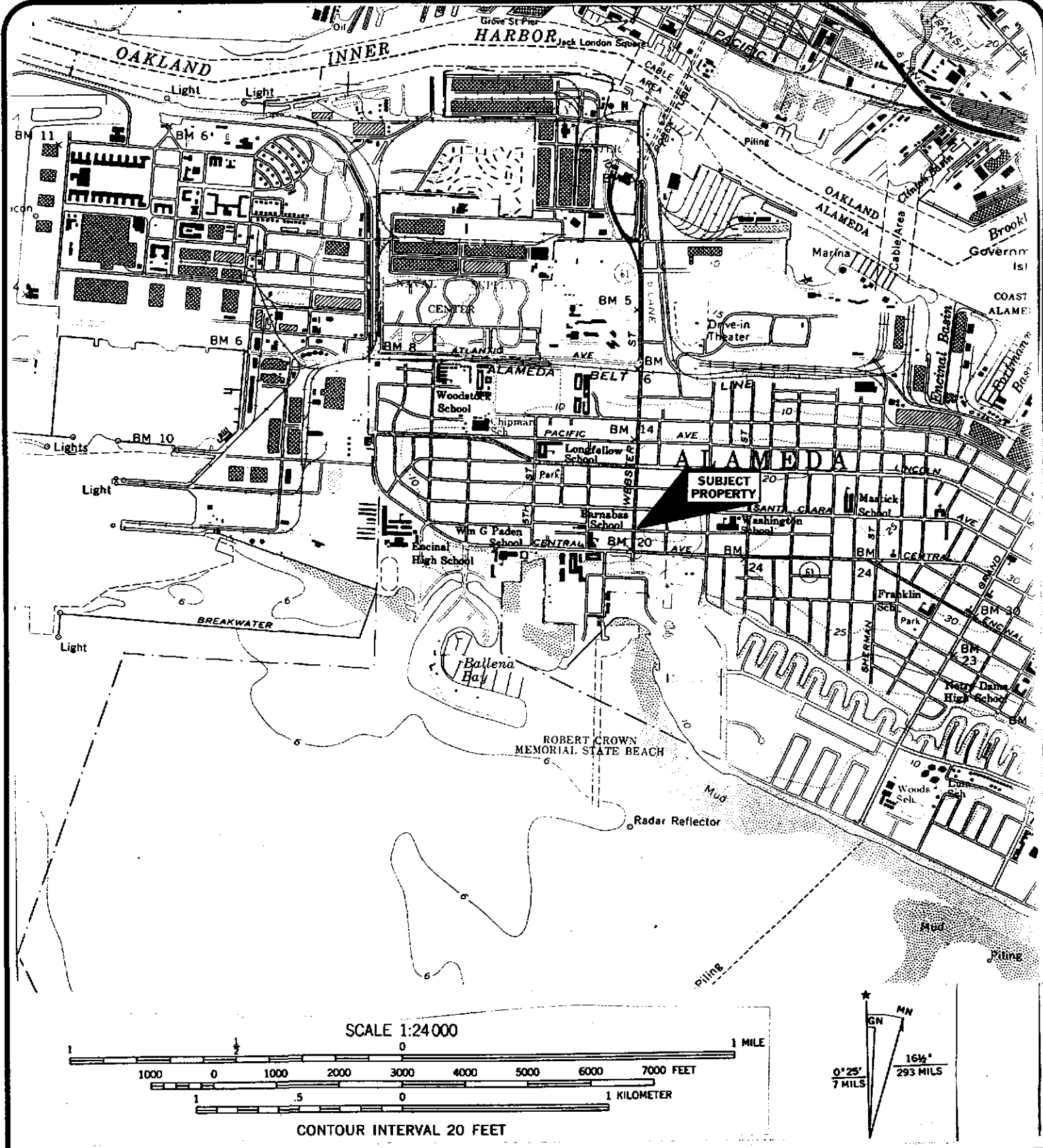

Sami Malaeb, P.E., R.E.A.
Project Manager


Reviewed by:
Eddy Tabet, P.E.
General Manager



- cc: Mr. Dan Koch, Olympian, 260 Michelle Court, South San Francisco, CA 94080
- Mr. David Harris, Esq., Trump, Alioto, Trump & Prescott, LLP, 2280 Union Street, San Francisco, CA 94123
- Mr. Jeff Ferrar, 3100 Cohasset Road, Chico, CA 95973





REVISIONS	DATE 7/30/98	PAGE 1 of 1
SCALE: AS INDICATED ABOVE		
LEGEND:		

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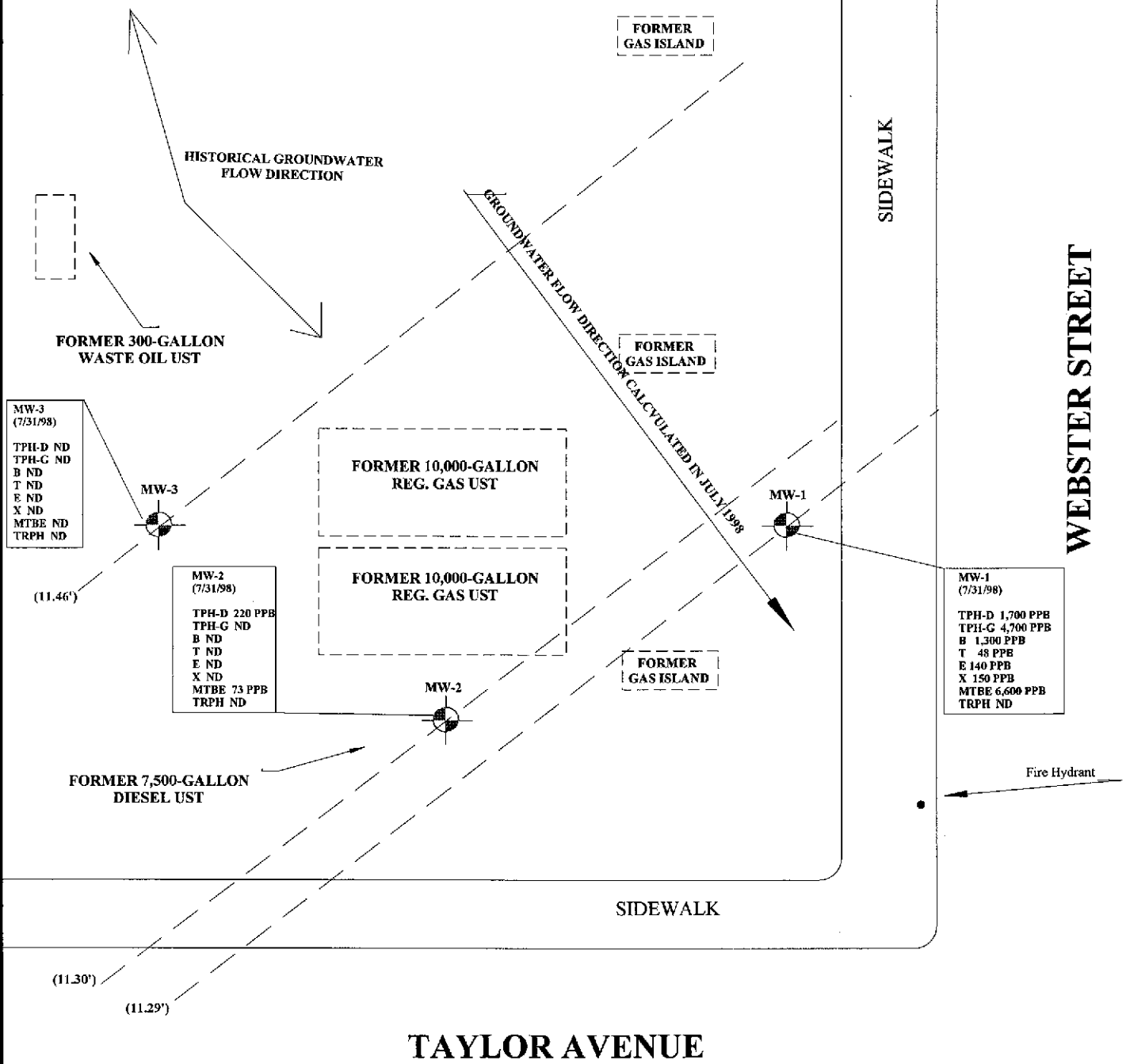
 35 SOUTH LINDEN AVENUE
 SOUTH SAN FRANCISCO, CA 94080
 1435

FIGURE 1

SITE LOCATION

 SITE:
 1435 Webster Street Alameda, California

**PUBLIC PARKING LOT
AND FORMER GAS STATION
1435 WEBSTER STREET
ALAMEDA, CALIFORNIA**



REVISIONS	DATE 7/30/98	PAGE 1 of 1
	SCALE: 20 FEET 	
	LEGEND: LOCATION OF MONITORING WELLS	

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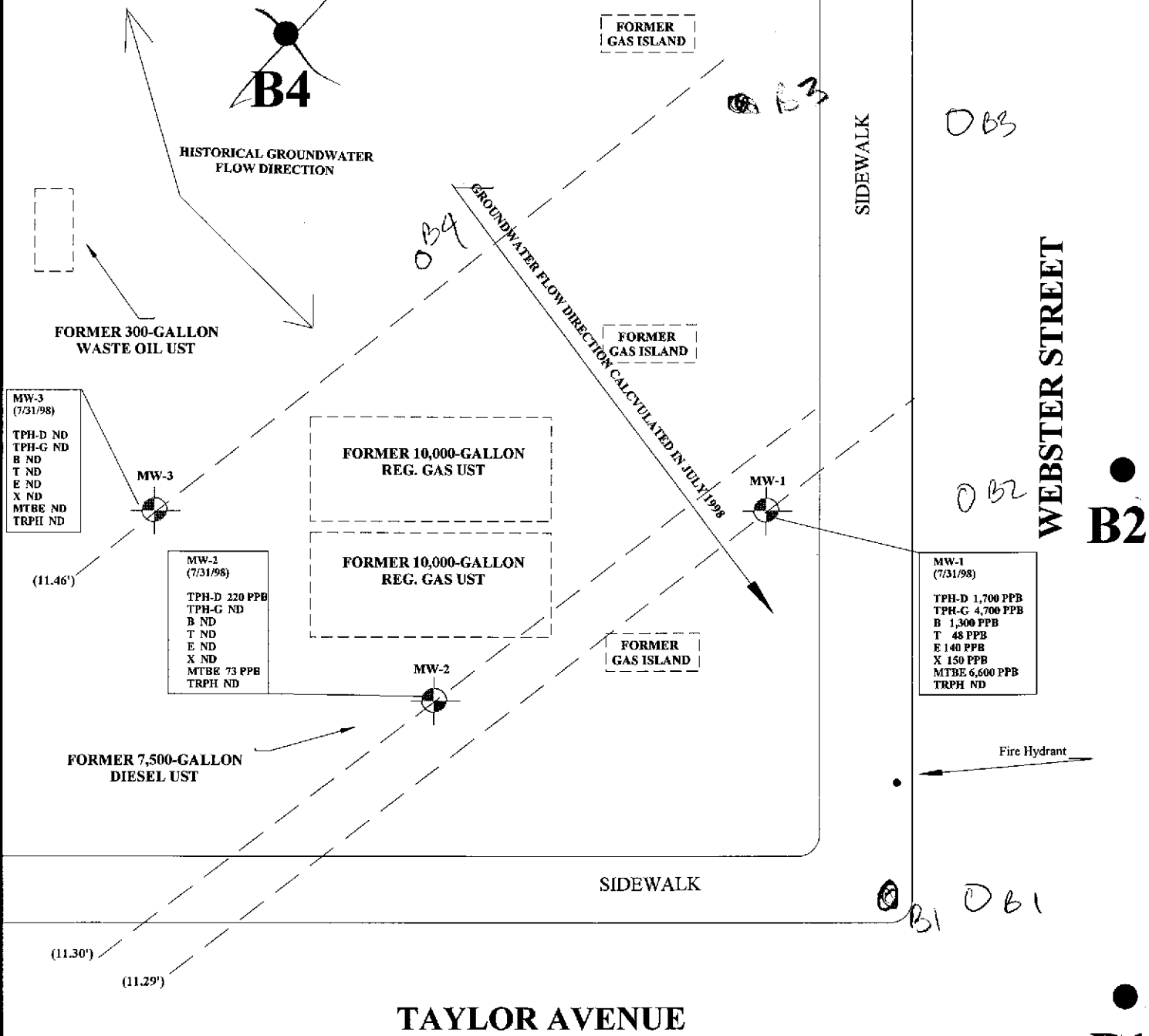
35 SOUTH LINDEN AVENUE
SOUTH SAN FRANCISCO, CA 94080

FIGURE 2
LOCATIONS OF THE MONITORING WELLS

1435 Webster Street
Alameda, California

KEY:
 TPH-D = DIESEL
 TPH-G = GASOLINE
 B = BENZENE
 T = TOLUENE
 E = ETHYLBENZENE
 X = XYLENES
 MTBE = METHYL-T-BUTYL ETHER
 TRPH = PETROLEUM OIL AND GREASE

**PUBLIC PARKING LOT
AND FORMER GAS STATION
1435 WEBSTER STREET
ALAMEDA, CALIFORNIA**



REVISIONS	DATE 7/30/98	PAGE 1 of 1
	SCALE: 20 FEET	
	LEGEND: LOCATION OF MONITORING WELLS LOCATION OF THE PROPOSED BORINGS	

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1435BL

FIGURE 3

LOCATIONS OF THE PROPOSED BORINGS

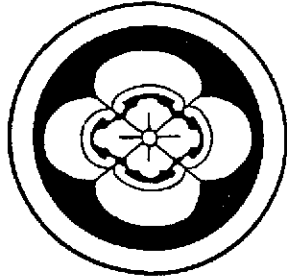
1435 Webster Street
Alameda, California

KEY:

- TPH-D = DIESEL
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- B = BENZENE
- T = TOLUENE
- E = ETHYLBENZENE
- X = XYLENES
- MTBE = METHYL-T-BUTYL ETHER
- TRPH = PETROLEUM OIL AND GREASE

APPENDIX A
SITE BACKGROUND REPORT





BT Associates

Environmental Services

31 Nightowl Court, Richmond, CA 94803
(Office) 510-222-1541 (Fax) 510-525-2178

QUARTERLY GROUNDWATER MONITORING WELL SAMPLING REPORT FOR:

1435 WEBSTER STREET
ALAMEDA, CA

(August 16, 1993)

SITE DESCRIPTION

1435 Webster Street is located in the northwest portion of the City of Alameda, which is in Alameda County, California (see Figures 1 and 2). This address is on the northwest corner of the intersection of Webster and Taylor Streets, and occupies Alameda County Assessor's Parcel number 74-427-51 (see Figure 3). It is 1.5 miles south of the Webster Street Tunnel, approximately 3.0 miles south of Interstate Highway 880, and 1.0 mile southeast of the U.S. Naval Air Station. The subject site is currently a City of Alameda public parking lot (street level only). Property use in the area is multi-purpose in nature with commercial, residential, and light industrial usage.

GEOLOGY AND HYDROGEOLOGY

The subject site is located on bay plain deposits approximately 1/4 mile east of the San Francisco Bay. The bay is a drowned valley which is thought to have originally been formed by erosion of the ancestral Sacramento River and subsequently widened by subsidence and rise in the level of the sea. Quaternary (Pleistocene to recent) sediments deposited in what is now San Francisco Bay include both shallow marine and continental deposits known as "Bay Mud". The geologic deposits encountered during drilling in January of 1993 consisted primarily of fine to medium, loose to medium-dense, poorly-sorted, brown sand with some gravel. Groundwater was encountered at 11.5 feet below ground surface (bgs).

OVERVIEW OF PREVIOUS ENVIRONMENTAL COMPLIANCE ACTIVITIES PERFORMED AT THE SITE

Removal of Underground Storage Tanks

On October 11, 1988, CHIPS Environmental Consultants, Inc. performed soil gas analyses at the subject site at the request of Accutite Tank Testing and Maintenance Services (a division of Olympian Oil Company) of South San Francisco. The CHIPS study was specific to the area occupied by two (2) 10,000-gallon underground gasoline storage tanks, one 7,500-gallon underground diesel storage tank, and one 500-gallon waste oil tank. High soil gas readings were obtained on the east side of one of two (2) gasoline pump islands, between the islands, and from the backfill between the gasoline storage tanks at both 8 and 11 feet below ground surface (bgs). Soil gas concentrations on the west side of the tank pits were relatively low.

All underground storage tanks were removed during September of 1989. Soil samples acquired for certified laboratory analyses attendant to the removal of the tanks contained concentrations of Total Petroleum Hydrocarbons as Gasoline (TPH-G) to 220 parts per million (ppm), Total Petroleum Hydrocarbons as Diesel (TPH-D) to 430 ppm, and 650 ppm Total Oil and Grease (TOG).

Over-excavation of the Former Tank Pits and Attendant Sampling

On January 11, 15, and 23, 1991, exploratory/remedial excavations of the fuel hydrocarbon contaminated soil were conducted by AAA Tank Removal/Forcade Excavation Services (California licensed contractors) under the direction of a staff geologist from Uriah Environmental Services, Inc. (UES) of Livermore/Modesto. The work performed was done in accordance with a workplan previously submitted to, and approved by, the Alameda County Health Care Services Agency (ACoHCSA).

Approximately 550 cubic yards of contaminated soil was removed from the area of the pit(s) previously occupied by the underground storage tanks. At that time, the dimensions of the excavation measured 34' (W) x 40' (L) x 18' (D). No further excavation was undertaken as the surface of the site was fully occupied by treatment beds constructed for the biological detoxification of previously excavated soil.

Following the bioremediation of the previously excavated soil, excavation activities resumed on September 23, 24, and 25, 1991. All work was performed

by W.A. Craig, Inc. (a California licensed contractor), under the direction of a UES staff hydrogeologist. The excavation was expanded to 34' (W) x 55' (L) x 18' (D), and an additional 300 cubic yards of contaminated soil was removed. During the course of the expanded excavation, contamination was observed to be confined to sandy clay lenses that were present at various depths along the south wall of the pit.

On September 27, 1991, four (4) discrete soil samples were acquired from the sidewalls of the expanded excavation. These samples were found to be free of detectable concentrations of TPH-G, TOG, and benzene, toluene, ethylbenzene, and total xylenes (BTEX), but contained 21-24 ppm TPH in the diesel range. The "non-standard diesel pattern" reported by the laboratory was previously compared to a tar wrap fabric by running comparative chromatographic standards. This comparative study appeared to confirm the hypothesis that the "non-standard" TPH-D range material detected was composed of partially-degraded, extractable hydrocarbons which comprise a portion of the tar wrap material.

A soil sample acquired from the floor of the expanded excavation was found to contain benzene at 120 parts per billion (ppb), toluene at 16 ppb, and ethylbenzene at 23 ppb.

Bioremediation of Hydrocarbon-Contaminated Soil

Following the excavation of contaminated soil in January, 1991, this material and approximately 50 cubic yards of stockpiled soil remaining from the underground storage tank excavation was configured on-site in quadrilateral beds atop bermed, hydrocarbon resistant liners. The treatment beds were inoculated with a bio-nutrient solution containing common, non-pathogenic, hydrocarbon-utilizing soil bacteria and a dilute commercial fertilizer solution. During the course of treatment, the soil was monitored to determine rates of degradation, soil temperature, moisture, pH, and nutrient levels.

On September 20, 1991, soil samples were acquired and submitted for uncertified analyses. Levels of TPH-G were found to be below the detection limit of 10 ppm, while concentrations of TPH-Oil had been reduced to below the detection limit of 50 ppm. Based upon these results, twelve (12) discrete samples (one for every 50 cubic yards of soil under treatment) were obtained for certified analyses. All samples were free of detectable concentrations of TPH-G, BTEX, and TOG. Ten (10) of twelve (12) samples were found to be free of detectable concentrations of TPH-D, with the two (2) remaining samples containing 16 and 44 ppm TPH-D, respectively. According to UES (and as noted above), these levels of "TPH-D"

Was treated soil removed from site or was it used to backfill pit?

were not represented by a chromatographic pattern typical of diesel fuel and represented, instead, partially degraded tar wrap.

On December 2, 1991, ten (10) discrete soil samples (one for every 20 cubic yards of soil under treatment) were acquired from approximately 200 cubic yards of contaminated soil remaining under treatment. All samples were found to be free of detectable concentrations of the referenced analytes.

For additional and/or more specific information regarding these sampling and remediation activities (sample locations, methodologies, etc.), please refer to the aforementioned UES workplan and the UES Report, "Installation of Three Groundwater Monitoring Wells (March 25, 1993).

Installation of Groundwater Monitoring Wells

On January 11 and 12, 1993, three (3) soil borings were advanced on the subject site under the direction of a UES staff hydrogeologist. Discrete soil samples were collected at five-foot intervals between the ground surface and the top of the capillary fringe. The samples collected were submitted for certified analyses for TPH-D, TPH-G, BTEX, and TOG. All samples were found to be free of detectable concentrations of the referenced analytes.

Following completion of the drilling and soil sampling, each boring was converted into a 2-inch inside-diameter groundwater monitoring well (see Figure 4). All work performed was done under the authority of a permit (#92664) issued by the Alameda County Zone 7 Water Resources Agency.

For additional and/or more specific information regarding these borings (boring logs, well construction details, etc.), please refer to the UES Report, "Installation of Three Groundwater Monitoring Wells (March 25, 1993).

COMPLIANCE MONITORING/ON-SITE GROUNDWATER MONITORING WELLS

According to information made available to BT Associates, the on-site groundwater monitoring wells were developed and sampled at some time near the end of the first quarter of 1993. The hydraulic gradient was calculated as 0.005 ft/ft, and the direction of groundwater flow was determined to be to the southeast (S66°E). At the time of this report, however, the analytical results for the initial groundwater samples collected by UES were not available.

In April of 1993, UES ceased business operations. In May of 1993, the sampling and reporting responsibilities for the subject site were assumed by BT Associates.

With the approval of ACoHCSA, BT Associates collected groundwater samples from the on-site monitoring wells on June 3, 1993. At that time, however, MW-1 was inaccessible as a car had been parked directly over the well. The sampler remained on site for approximately five (5) hours, but the owner of the vehicle did not return. Door-to-door inquiries were also made in an attempt to locate the owner of the vehicle, but were unsuccessful. The vehicle remained parked over MW-1 for several more days, at which time further attempts to sample the well were discontinued.

Preparation of the quarterly report was also delayed due to concerns previously developed by staff of JL Analytical Services, Inc. (JLAS) of Modesto regarding the accuracy of the detection limits for the TPH-D and TPH-G analyses they had achieved for the samples acquired by BT Associates on June 3 (there were no problems with the BTEX or TOG analyses). JLAS informed BT Associates that they had used the LUFT Method for the TPH-D and TPH-G analyses, based upon the recommendation of a representative of the State Department of Health Services. At the time the groundwater samples from 1435 Webster Street were submitted to the laboratory, JLAS was conducting an extensive review of the LUFT Method, as well as an examination of its own processes, equipment specifications, data, etc. In response to JLAS' concern, re-sampling of the groundwater at the subject site (all three wells) was scheduled. In its preliminary evaluation, however, JLAS reported that it did not find indication(s) of problems with the detection limits for TPH-G or TPH-D. A decision was then made to delay re-sampling until the laboratory had concluded its investigation.

JLAS' review was completed during the week of July 19, 1993, with the laboratory concluding that the data it had initially reported was accurate. The final report pertaining to the analyses of the samples collected in June was received by BT Associates on August 10, 1993 (see Appendix B). As the time for the next quarterly sampling event is now less than one month away, the decision was made to forego re-sampling (primarily to include MW-1) at this time, while

ensuring that all wells are sampled as scheduled in future events. Analytical results for the samples collected in June have been summarized in Table I, below:

Table I - Groundwater Sampling Results

Well #	Date	Depth to Water (ft)	TPH-G (ppb)	TPH-D (ppb)	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Total Xylenes (ppb)	TOG (ppm)
MW-1	2/93-3/93	7.91	(Data not available from UES)						
	6/3/93	na	(Well inaccessible due to presence of vehicle parked over well)						
MW-2	2/93-3/93	8.02	(Data not available from UES)						
	6/3/93	9.54	ND	ND	5.8	ND	ND	ND	ND
MW-3	2/93-3/93	8.25	(Data not available from UES)						
	6/3/93	9.80	ND	ND	ND	ND	ND	ND	ND
Method Detection Limits	6/3/93	-	50	50	0.2	0.2	0.2	0.6	2
TPH-G = Total Petroleum Hydrocarbons as Gasoline TPH-D = Total Petroleum Hydrocarbons as Diesel UES = Uriah Environmental Services, Inc. ND = Not detected at or above the Method Detection Limit						TOG = Total Oil and Grease na = Not analyzed ppm = Parts per million ppb = Parts per billion			

Well Sampling Methodology

Depth to water and total well depth were measured using an electric tape, and the volume of water within the 2-inch inside-diameter casings computed. Each well was then purged using a clean, disposable polyethylene bailer until the groundwater was free of significant sand, silt, and/or other grit material, and pH, conductivity, and temperature readings stabilized. Over three (3) well volumes were removed from each well. Measurements of pH, conductivity, and temperature were recorded as referenced within Appendix B.

Subsequent to purging the wells, a groundwater sample was collected from each well using a clean, disposable polyethylene bailer lowered to a point just below the water surface. Using a Voss VOC Sampler, each groundwater sample was immediately transferred into four (4) Volatile Organic Analysis (VOA) vials which contained sufficient hydrochloric acid preservative to reduce the pH of the sample to <2.0, and two (2) one-liter, amber glass bottles. Each sample container was promptly sealed with a teflon-lined screw cap, labeled, placed on blue ice, and then transported under chain-of-custody to a California state-certified hazardous waste analytical laboratory for analysis for Total Petroleum

Hydrocarbons as Gasoline (TPH-G), benzene, toluene, ethylbenzene, and total xylenes (BTEX) using EPA Methods 5030/8015-8020 (602); Total Petroleum Hydrocarbons as Diesel (TPH-D) using EPA Methods 3510/8015; and Total Oil and Grease (TOG) using EPA Method 5520.

Extracted groundwater, in excess of that acquired for laboratory analysis, was placed into a covered DOT drum and stored on site pending the receipt of the report of laboratory analysis and the development of an appropriate disposal protocol.

Results of Certified Laboratory Analyses

With the exception of benzene, all other target analytes were non-detectable (ND) in all groundwater samples collected on June 3, 1993. Benzene was detected in MW-2 at a level of 5.8 parts per billion (ppb), and was ND in MW-3. Analytical results for the groundwater samples collected have been summarized in Table I (page 5, above, and Appendix A). Copies of all laboratory results as received from the certified hazardous waste analytical laboratory are enclosed within Appendix B.

CONCLUSIONS AND RECOMMENDATIONS

The levels of Total Petroleum Hydrocarbons as Diesel (TPH-D), Total Petroleum Hydrocarbons as Gasoline (TPH-G), Total Oil and Grease (TOG), toluene, ethylbenzene, and total xylenes were found to be below the limits of laboratory detection. Benzene was detected in only one well at 5.8 parts per billion.

As the sampling conducted on June 3, 1993, represents only the first or second round of quarterly groundwater sampling (depending upon the availability of the analytical results for the samples collected by UES earlier this year), it is recommended that quarterly groundwater monitoring be continued.

The next quarterly groundwater monitoring event for this site will be scheduled to take place in early September, 1993.

APPENDIX A

FIGURES AND TABLES

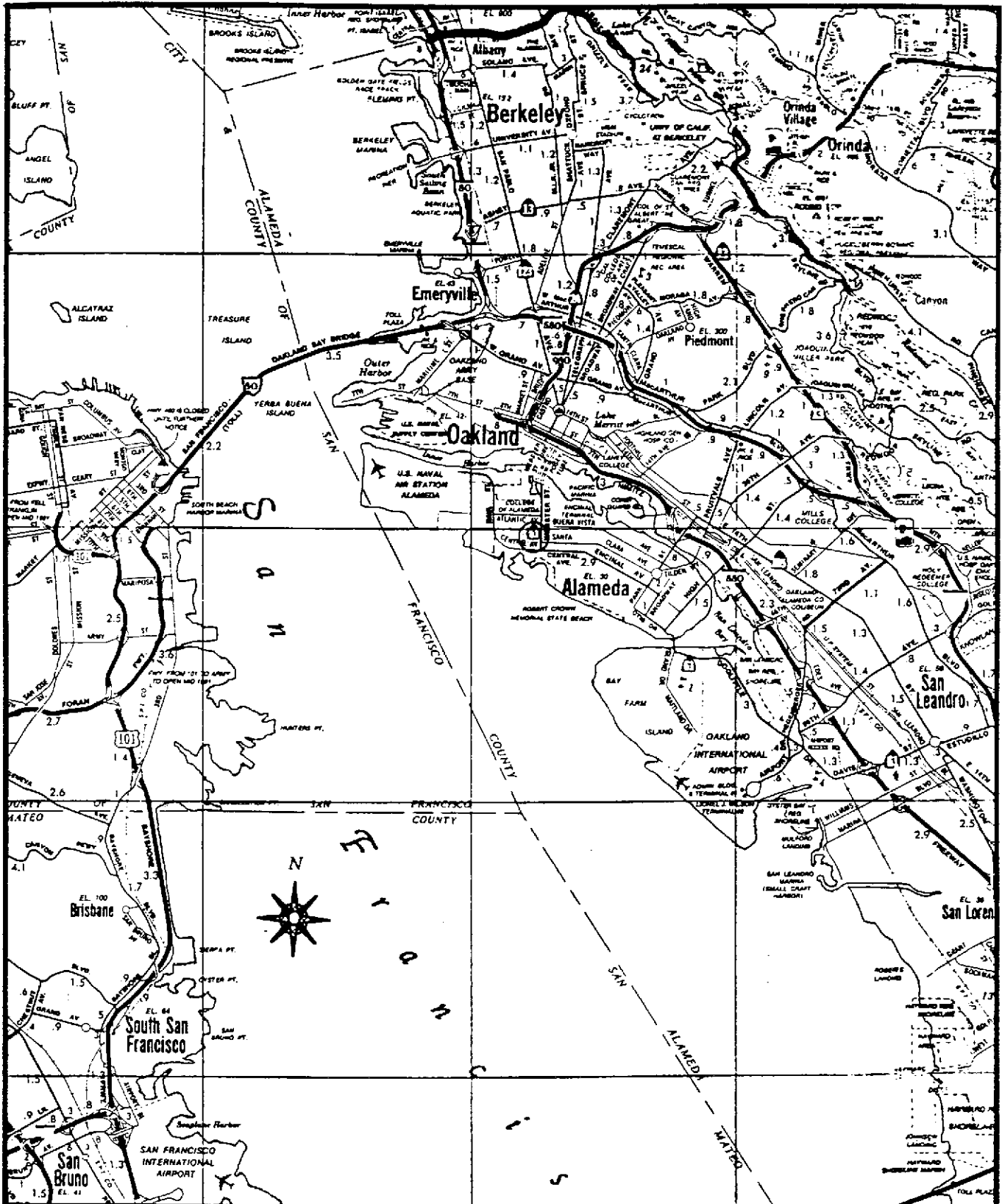
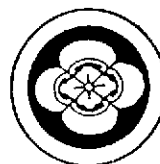


Figure 1 - Regional Map

Colored circle denotes location of
1435 Webster Street,
Alameda, CA



Scale (miles)



BT Associates
Environmental Services

31 Nightowl Court, Richmond, CA 94803

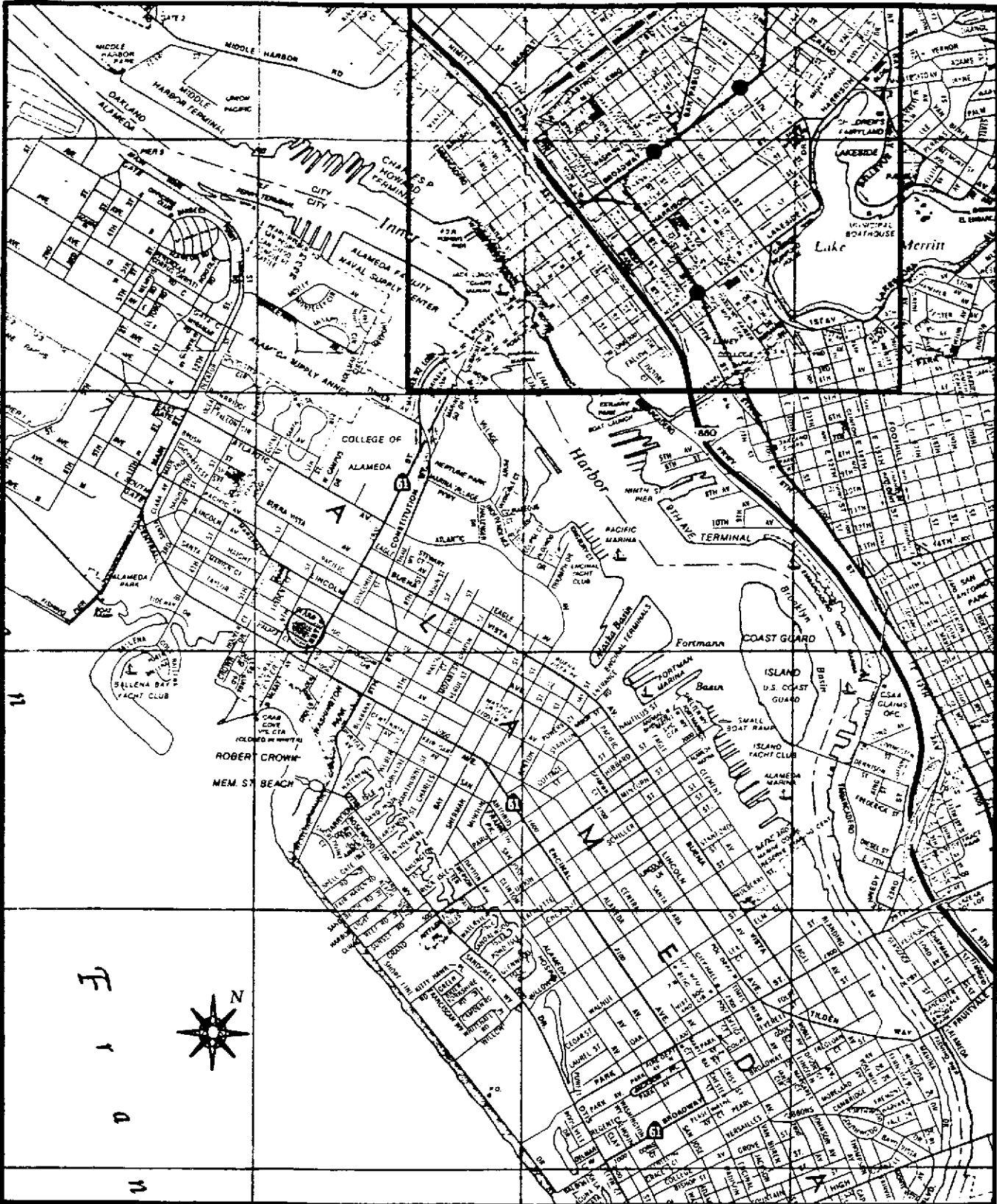
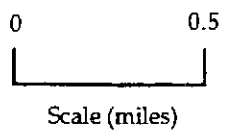


Figure 2 - Locality Map

Colored circle denotes location of
 1435 Webster Street,
 Alameda, CA



BT Associates
 Environmental Services

31 Nightowl Court, Richmond, CA 94803

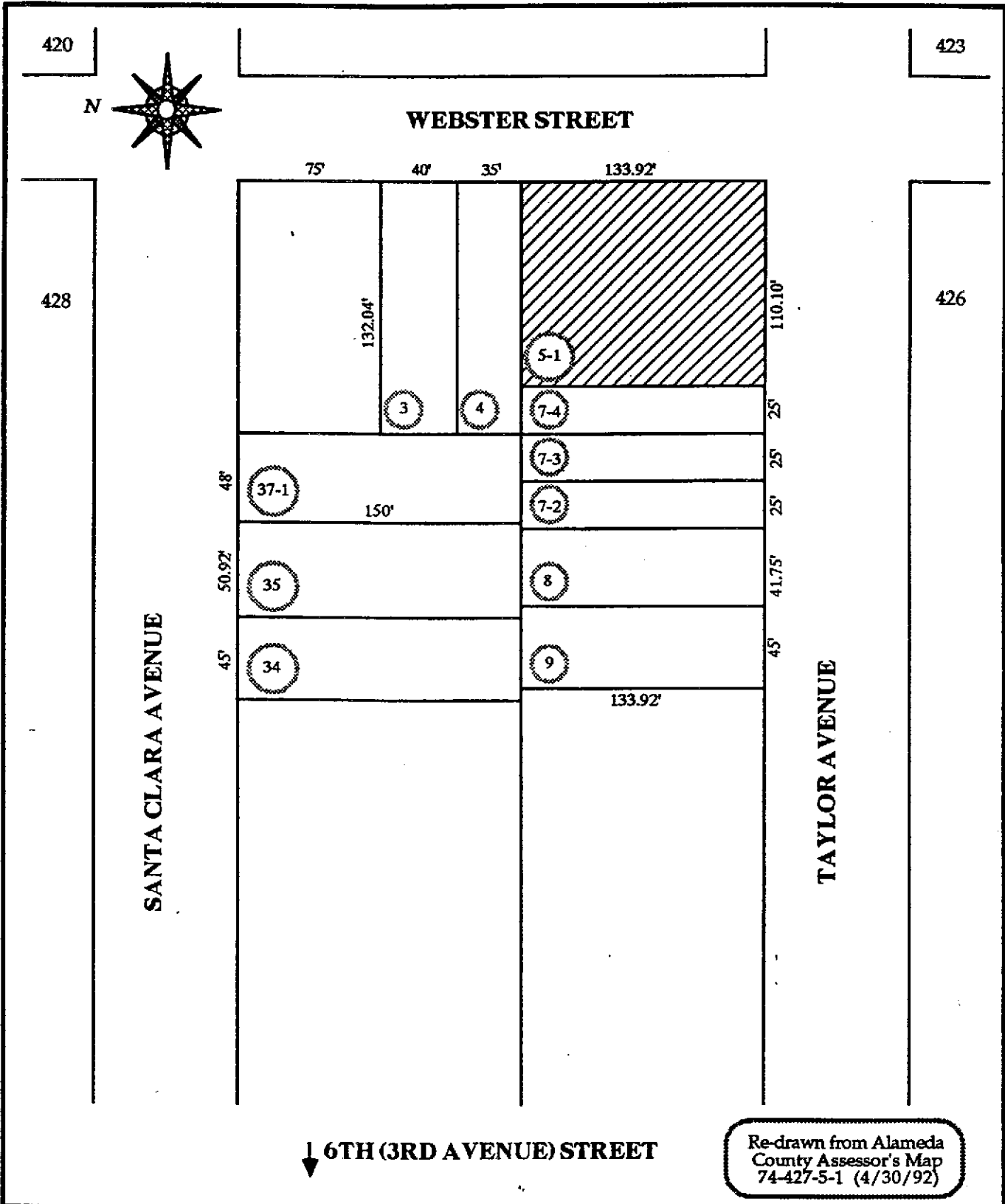
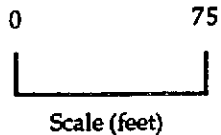


Figure 3 - Detail Map
 Location and shape of subject site
 at 1435 Webster Street,
 Alameda, CA



BT Associates
 Environmental Services

31 Nightowl Court, Richmond, CA 94803

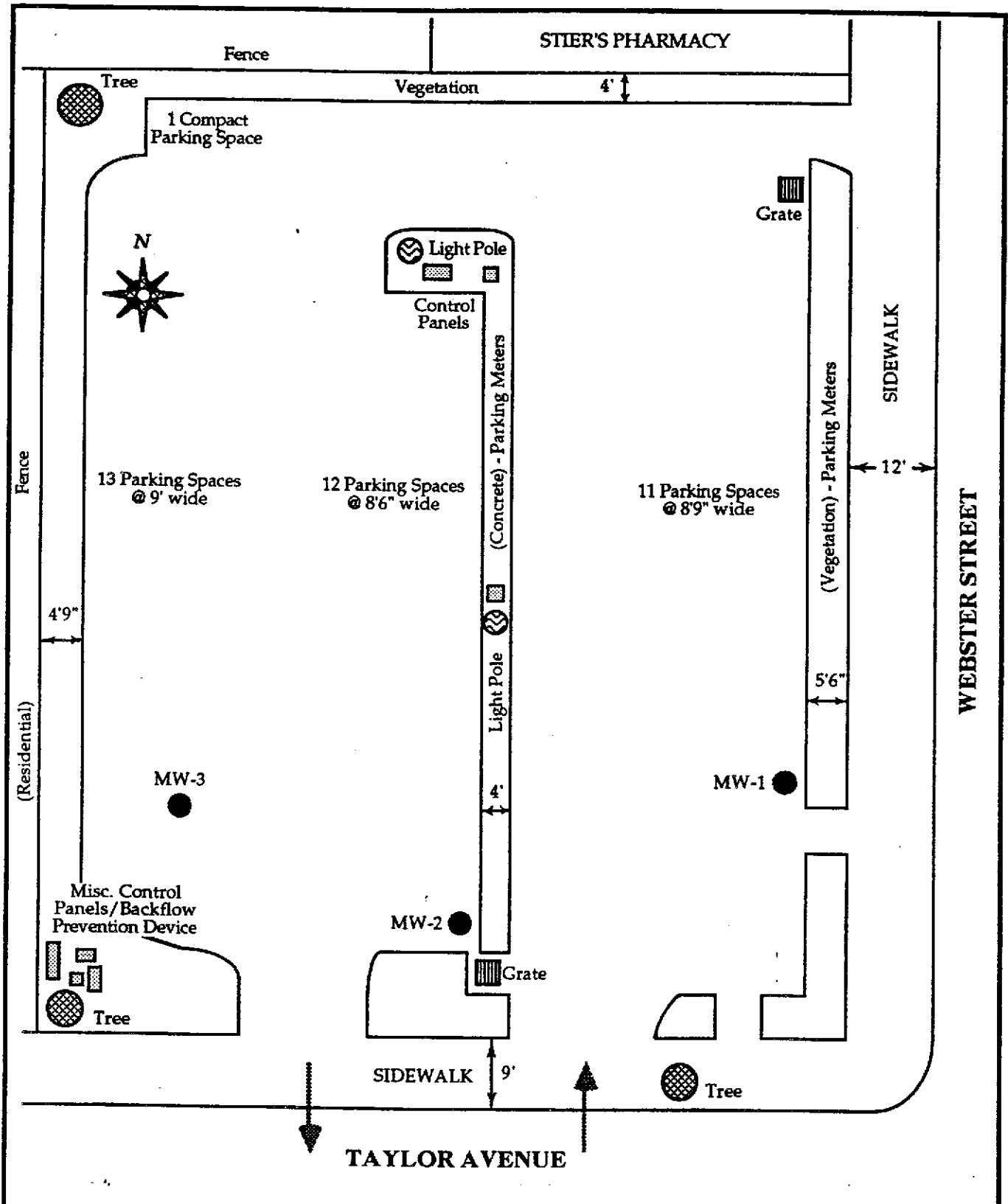
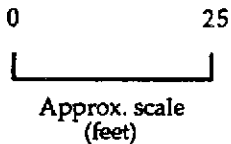


Figure 4 - Detail Map

Location and shape of subject site
at 1435 Webster Street,
Alameda, CA



BT Associates
Environmental Services

31 Nightowl Court, Richmond, CA 94803

Table I - Groundwater Sampling Results

Well #	Date	Depth to Water (ft)	TPH-G (ppb)	TPH-D (ppb)	Benzene (ppb)	Toluene (ppb)	Ethylbenzene (ppb)	Total Xylenes (ppb)	TOG (ppm)
MW-1	2/93-3/93	7.91	(Data not available from UES)						
	6/3/93	na	(Well inaccessible due to presence of vehicle parked over well)						
MW-2	2/93-3/93	8.02	(Data not available from UES)						
	6/3/93	9.54	ND	ND	5.8	ND	ND	ND	ND
MW-3	2/93-3/93	8.25	(Data not available from UES)						
	6/3/93	9.80	ND	ND	ND	ND	ND	ND	ND
Method Detection Limits	6/3/93	-	50	50	0.2	0.2	0.2	0.6	2
TPH-G = Total Petroleum Hydrocarbons as Gasoline TPH-D = Total Petroleum Hydrocarbons as Diesel UES = Uriah Environmental Services, Inc. ND = Not detected at or above the Method Detection Limit					TOG = Total Oil and Grease na = Not analyzed ppm = Parts per million ppb = Parts per billion				

APPENDIX B

**REPORTS OF CERTIFIED LABORATORY ANALYSES
CHAIN-OF-CUSTODY AND QA/QC DOCUMENTS
WELL MONITORING FORMS**



J L ANALYTICAL SERVICES, INC.

217 Primo Way • P.O. Box 576185 • Modesto, California 95357
Office (209) 538-8111 • FAX (209) 538-3966

Company:	Project ID:	Date Sampled: 06/03/93
B T Associates	Ferrar	Date Received: 06/04/93
31 Nightowl Court	1435 Webster, Alameda	TPH Analysis: 06/09/93
Richmond, CA 94803	Client Contact:	BTEX Analysis: 06/07/93
	Bruce Tsutsui	

Low Boiling Point TPH (as Gasoline) and BTEX

DOHS LUFT procedure; EPA method 602

Lab Number	Client I D	TPH-G	Benzene	Toluene	Ethyl Ben- zene	Xylenes
	(Water)	ug/L	ug/L	ug/L	ug/L	ug/L
30600573	MW-2	ND	5.8	ND	ND	ND
30600574	MW-3	ND	ND	ND	ND	ND
Blank			ND	ND	ND	ND
Method Detection Limit		50	0.2	0.2	0.2	0.6
Analytical Method		LUFT	602	602	602	602

TPH-G - Total Petroleum Hydrocarbons as Gasoline
 mg/L - Milligrams per 1,000 milliliters (parts per million {ppm})
 ug/L - Micrograms per 1,000 milliliters (parts per billion {ppb})
 1 ppm = 1,000 ppb
 ND - Not Detected

RESPECTFULLY SUBMITTED

Mary A. Jacobs

MARY A. JACOBS, DIRECTOR

received
AUG 12 1993



J L ANALYTICAL SERVICES, INC.

217 Primo Way • P.O. Box 576185 • Modesto, California 95357
Office (209) 538-8111 • FAX (209) 538-3966

Company:		Project ID:		Date Sampled: 06/03/93	
B T Associates		Ferrar		Date Received: 06/04/93	
31 Nightowl Court		1435 Webster, Alameda		TPH Analysis: 06/09/93	
Richmond, CA 94803		Client Contact:		O/G Analysis: 06/11/93	
		Bruce Tsutsui			
Medium Boiling Point TPH (as Diesel) and Oil/Grease					
DOHS LUFT procedure; Standard Method 503.D					
Lab Number	Client I D	TPH-D		Oil & Grease	
	(Water)	ug/L		mg/L	
30600573	MW-2	ND		ND	
30600574	MW-3	ND		ND	
Method Detection Limit		50		2.0	
Analytical Method		LUFT		503.D	

TPH-D - Total Petroleum Hydrocarbons as Diesel
 mg/L - Milligrams per 1,000 milliliters (parts per million {ppm})
 ug/L - Micrograms per 1,000 milliliters (parts per billion {ppb})
 1 ppm = 1,000 ppb
 ND - Not Detected

RESPECTFULLY SUBMITTED

MARY A. JACOBS, DIRECTOR

received
AUG 12 1993



BT Associates
Environmental Services

31 Nightowl Court
Richmond, CA 94803
(Office) 510-222-1541 (Fax) 510-525-2178

CHAIN OF CUSTODY

Date: WHE 3 1993 Page 1 of 1

PROJECT I.D. <u>FERRAR</u>				ANALYSIS REQUEST												# OF CONTAINERS			
ADDRESS <u>1435 WEBSTER ST. ALAMEDA</u>				TPHG	TPHD	TPHG & BTEX	BTEX	O & G	METALS	PHARLGOACBARRBONS	VOORGIANATICS	ORGANIC LEAD	TOTAL LEAD	SOLUBLE LEAD					
SAMPLER'S NAME <u>JOHN E. RAFF</u>																			
SIGNATURE <u>J.E. Raff</u>																			
TELEPHONE NUMBER <u>(209) 551-3591</u>																			
SAMPLE I.D.	DATE	TIME	MATRIX	TPHG	TPHD	TPHG & BTEX	BTEX	O & G	METALS	PHARLGOACBARRBONS	VOORGIANATICS	ORGANIC LEAD	TOTAL LEAD	SOLUBLE LEAD					
<u>MW-2</u>	<u>6-3-93</u>	<u>ICE-CELL UNIT FORM</u>	<u>Soil Water</u>	X	X			X											<u>6</u>
<u>MW-3</u>	<u>6-3-93</u>	<u>.</u>	<u>Soil Water</u>	X	X			X											<u>6</u>
			Soil Water																
			Soil Water																
			Soil Water																
			Soil Water																

LABORATORY INSTRUCTIONS / COMMENTS: Turn-around Time (Circle One) Same Day 24 Hrs. 48 Hrs. 72 Hrs. <u>Normal</u> MW-2: 2 1-LITER AMBES 4 PRESERVED VOA MW-3: 2 1-LITER AMBES, 4 PRESERVED VOA	RELINQUISHED BY: <u>JOHN E. RAFF</u> Printed Name <u>BT ASSOCIATES</u> Company <u>J.E. Raff</u> Signature Time <u>4:43</u> Date <u>6-4-93</u>	RELINQUISHED BY: Printed Name Company Signature Time _____ Date _____	RELINQUISHED BY: Printed Name Company Signature Time _____ Date _____
	RECEIVED BY: <u>Melody Santos</u> Printed Name <u>J.L.</u> Company <u>Melody Santos</u> Signature Time <u>4:43</u> Date <u>6-4-93</u>	RECEIVED BY: Printed Name Company Signature Time _____ Date _____	RECEIVED BY: Printed Name Company Signature Time _____ Date _____

ANALYTICAL LABORATORY <u>JL ANALYTICAL</u> CITY <u>MODESTO</u>

0-
573-
574-

R.V.



BT Associates

Environmental Services

31 Nightowl Court, Richmond, CA 94803

(Office)
510-222-1541

(Fax)
510-525-2178

WELL MONITORING FORM

CLIENT: Ferrari Property

DATE: 6/3/93

SITE ADDRESS: 1435 Webster Street

COUNTY REPRESENTATIVE: Ms. Juliet Shin

Alameda, CA

COUNTY REPRESENTATIVE CONTACTED PRIOR TO SAMPLING? Yes

Note 1: TOTAL WELL DEPTH & DEPTH TO WATER measurements are read to an accuracy of .01' from a straight edge placed in a north-south orientation on top of the christy box.

Note 2: The 0.17 figure used below to convert WATER COLUMN HEIGHT to gallons has units of gallons/linear foot, and is for a 2" diameter, Schedule 40 PVC pipe with an inside diameter of 2.067". Similarly, use a conversion factor of 0.66 for a 4" pipe, which has a 4.026" I.D.

TOTAL WELL DEPTH 23.80' MONITORING WELL # MW-2

- DEPTH TO WATER 9.54' PURGE METHOD: Disposable Bailer

= WATER COLUMN HEIGHT 14.26' x 0.17 = 2.42 Gallons (1 well volume)

Multiply 1 well volume by 3 to obtain the minimum number of gallons of water to be purged from monitoring well prior to taking samples.

3 x 2.42 = 7.26 Gallons (3 Well Volumes)

TIME	GALLONS	TEMPERATURE (°F)	pH	CONDUCTIVITY μ mhos/cm
1407	0	70.0	6.90	793
1422	2	67.3	7.04	963
1430	4	67.3	6.98	890
1438	6	71.1	6.98	846
1446	8	66.7	6.95	856
1456	10	67.3	6.95	834

CONTAMINANT ODOR? No

TIME OF SAMPLE COLLECTION: 1500

TURBIDITY LEVEL: Moderate

WITNESSED BY: No Witness

SHEEN ON WATER? No

SAMPLER'S SIGNATURE: *Bruce Tautui*

(Bruce Tautui for John Rapp)



BT Associates

Environmental Services

31 Nightowl Court, Richmond, CA 94803

(Office)
510-222-1541

(Fax)
510-525-2178

WELL MONITORING FORM

CLIENT: Ferrari Property
SITE ADDRESS: 1435 Webster Street
Alameda, CA

DATE: 6/3/93
COUNTY REPRESENTATIVE: Ms. Juliet Shin
COUNTY REPRESENTATIVE CONTACTED PRIOR TO SAMPLING? Yes

Note 1: TOTAL WELL DEPTH & DEPTH TO WATER measurements are read to an accuracy of .01' from a straight edge placed in a north-south orientation on top of the christy box.

Note 2: The 0.17 figure used below to convert WATER COLUMN HEIGHT to gallons has units of gallons/linear foot, and is for a 2" diameter, Schedule 40 PVC pipe with an inside diameter of 2.067". Similarly, use a conversion factor of 0.66 for a 4" pipe, which has a 4.026" I.D.

TOTAL WELL DEPTH 23.20' MONITORING WELL # MW-3
- DEPTH TO WATER 9.80' PURGE METHOD: Disposable Bailer
= WATER COLUMN HEIGHT 13.40' x 0.17 = 2.28 Gallons (1 well volume)

Multiply 1 well volume by 3 to obtain the minimum number of gallons of water to be purged from monitoring well prior to taking samples.

3 x 2.28 = 6.84 Gallons (3 Well Volumes)

TIME	GALLONS	TEMPERATURE (°F)	pH	CONDUCTIVITY μ mhos/cm
1237	0	70.5	7.61	520
1302	2.3	68.7	7.62	585
1313	4.6	69.1	7.61	600
1330	7.0	69.3	7.63	606

CONTAMINANT ODOR? No

TURBIDITY LEVEL: Moderate

SHEEN ON WATER? No

TIME OF SAMPLE COLLECTION: 1356

WITNESSED BY: No Witness

SAMPLER'S SIGNATURE: [Signature]

(Bruce Tsutsui for John Rapp)

APPENDIX B
MONITORING WELL SAMPLING LOGS



WATER SAMPLING FORM

CLIENT:
 ADDRESS: 1435 Webster Street, Alameda, CA
 WELL # TESTED MW-1

To convert water column height to total amount of gallons in one (1) well volume, multiply the water column height by A.

WELL DIAMETER	A
2"	0.17
3"	0.36
4"	0.65

TOTAL WELL DEPTH 22.7
 - DEPTH TO WATER 8.240
 = WATER COLUMN HEIGHT x A = GAL (1 well volume)

Multiply one (1) well volume by three (3) to obtain the minimum # of gallons to be extracted before taking well sample(s)

3 x = (3 well volume)

DATE 7/31/98
 TIME
 WATER LEVEL

TIME	GALS PUMPED	TEMP	COND.	PH
<u>2</u>	<u> </u>	<u>20.9</u>	<u>-2.9</u>	<u>7.06</u>
<u>4</u>	<u> </u>	<u>20.9</u>	<u>7.6</u>	<u>6.96</u>
<u>6</u>	<u> </u>	<u>20.5</u>	<u>10.3</u>	<u>6.84</u>
<u>8</u>	<u> </u>	<u>20.2</u>	<u>16.5</u>	<u>6.72</u>
<u>10</u>	<u> </u>	<u>20.3</u>	<u>18.3</u>	<u>6.68</u>
<u>12</u>	<u> </u>	<u>20.3</u>	<u>18.3</u>	<u>6.68</u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>

Time:
 Volume Pumped
 Sampler

Sheen or inches of free product
 Analyzed for:

WATER SAMPLING FORM

CLIENT:
 ADDRESS: 1435 Webster St., Alameda, CA
 WELL # TESTED MW-2

To convert water column height to total amount of gallons in one (1) well volume, multiply the water column height by A.

WELL DIAMETER	A
2"	0.17
3"	0.36
4"	0.65

TOTAL WELL DEPTH 23.5
 DEPTH TO WATER 8.50
 = WATER COLUMN HEIGHT $\times A =$ GAL (1 well volume)

Multiply one (1) well volume by three (3) to obtain the minimum # of gallons to be extracted before taking well sample(s)

$3 \times$ = (3 well volume)

DATE 7/31/98
 TIME
 WATER LEVEL

TIME	GALS PUMPED	TEMP	COND	PH
<u>2</u>	<u>22.1</u>	<u>14.7</u>	<u>7.24</u>	
<u>4</u>	<u>21.6</u>	<u>19.1</u>	<u>7.33</u>	
<u>6</u>	<u>21.3</u>	<u>22.8</u>	<u>7.39</u>	
<u>8</u>	<u>21.3</u>	<u>25.0</u>	<u>7.93</u>	
<u>10</u>	<u>21.1</u>	<u>26.8</u>	<u>7.46</u>	
<u>12</u>	<u>21.0</u>	<u>26.9</u>	<u>7.46</u>	
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Time:
 Volume Pumped
 Sampler

Sheen or inches of free product
 Analyzed for:

WATER SAMPLING FORM

CLIENT:
 ADDRESS: 1435 Webster Street, Alameda, CA
 WELL # TESTED MW-3

To convert water column height to total amount of gallons in one (1) well volume, multiply the water column height by A.

WELL DIAMETER	A
2"	0.17
3"	0.36
4"	0.65

TOTAL WELL DEPTH 22.1
 - DEPTH TO WATER 8.33
 = WATER COLUMN HEIGHT $\times A =$ GAL (1 well volume)

Multiply one (1) well volume by three (3) to obtain the minimum # of gallons to be extracted before taking well sample(s)

3 x = (3 well volume)

DATE 7/31/98
 TIME
 WATER LEVEL

TIME	GALS PUMPED	TEMP	COND	PH
	<u>2</u>	<u>21.5</u>	<u>14.7</u>	<u>6.76</u>
	<u>4</u>	<u>21.2</u>	<u>18.4</u>	<u>6.68</u>
	<u>6</u>	<u>21.0</u>	<u>17.9</u>	<u>6.71</u>
	<u>8</u>	<u>20.7</u>	<u>20.7</u>	<u>6.64</u>
	<u>10</u>	<u>20.6</u>	<u>20.1</u>	<u>6.65</u>
	<u>12</u>	<u>20.6</u>	<u>20.1</u>	<u>6.64</u>
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____

Volume Pumped
 per

Sheen or inches of free product
 Analyzed for:



Sequoia Analytical

680 Chesapeake Drive
404 N. Wiger Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Accutite 35 South Linden Avenue S. San Francisco, CA 94080	Client Proj. ID: 1435 Webster Street Alameda	Sampled: 07/31/98
Attention: Sami Malaeb	Lab Proj. ID: 9807J24	Received: 07/31/98
		Analyzed: see below
		Reported: 08/17/98

LABORATORY ANALYSIS

Analyte	Units	Date Analyzed	Detection Limit	Sample Results
Lab No: 9807J24-01 Sample Desc: LIQUID,MW-1				
TRPH (SM 5520 B&F)	mg/L	08/10/98	5.0	N.D.
Lab No: 9807J24-02 Sample Desc: LIQUID,MW-2				
TRPH (SM 5520 B&F)	mg/L	08/10/98	5.0	N.D.
Lab No: 9807J24-03 Sample Desc: LIQUID,MW-3				
TRPH (SM 5520 B&F)	mg/L	08/10/98	5.0	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210



Richard Herling
Project Manager





Accutite 35 South Linden Avenue S. San Francisco, CA 94080	Client Proj. ID: 1435 Webster Street Alameda Sample Descript: MW-1 Matrix: LIQUID Analysis Method: EPA 8015 Mod Lab Number: 9807J24-01	Sampled: 07/31/98 Received: 07/31/98 Extracted: 08/06/98 Analyzed: 08/08/98 Reported: 08/17/98
Attention: Sami Malaeb		

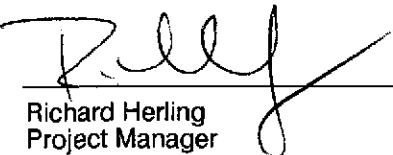
QC Batch Number: GC0806980HBPEXZ
Instrument ID: GCHP5B

Total Extractable Petroleum Hydrocarbons (TEPH)

Analyte	Detection Limit ug/L	Sample Results ug/L
TEPH as Diesel Chromatogram Pattern: Unidentified HC	50	1700 C9-C24
Surrogates n-Pentacosane (C25)	Control Limits % 50 150	% Recovery 96

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210


Richard Herling
Project Manager





Accutite 35 South Linden Avenue S. San Francisco, CA 94080 Attention: Sami Malaeb	Client Proj. ID: 1435 Webster Street Alameda Sample Descript: MW-1 Matrix: LIQUID Analysis Method: 8015Mod/8020 Lab Number: 9807J24-01	Sampled: 07/31/98 Received: 07/31/98 Extracted: 08/05/98 Analyzed: 08/05/98 Reported: 08/17/98
--	--	--

QC Batch Number: GC080598802004A
Instrument ID: GC-4


Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	500	4700
Methyl t-Butyl Ether	25	5400
Benzene	5.0	1300
Toluene	0.50	48
Ethyl Benzene	0.50	140
Xylenes (Total)	0.50	150
Chromatogram Pattern:		Gas

Surrogates	Control Limits %	% Recovery
Trifluorotoluene	70 130	116

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210


 Richard Herling
 Project Manager





**Sequoia
Analytical**

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

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(916) 921-9600 FAX (916) 921-0100
(707) 792-1865 FAX (707) 792-0342

Accutite 35 South Linden Avenue S. San Francisco, CA 94080 Attention: Sami Malaeb	Client Proj. ID: 1435 Webster Street Alameda Sample Descript: MW-1 Matrix: LIQUID Analysis Method: EPA 8260 Lab Number: 9807J24-01	Sampled: 07/31/98 Received: 07/31/98 Analyzed: 08/14/98 Reported: 08/17/98
--	--	---


QC Batch Number: MS081298MTBEH6A
Instrument ID: H6

Methyl t-Butyl Ether (MTBE)

Analyte	Detection Limit ug/L	Sample Results ug/L
Methyl t-Butyl Ether	100	6600
Surrogates	Control Limits %	% Recovery
1,2-Dichloroethane-d4	76 114	93

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210


Richard Herling
Project Manager





Accutite 35 South Linden Avenue S. San Francisco, CA 94080	Client Proj. ID: 1435 Webster Street Alameda Sample Descript: MW-2 Matrix: LIQUID Analysis Method: EPA 8015 Mod Lab Number: 9807J24-02	Sampled: 07/31/98 Received: 07/31/98 Extracted: 08/06/98 Analyzed: 08/08/98 Reported: 08/17/98
Attention: Sami Malaeb		

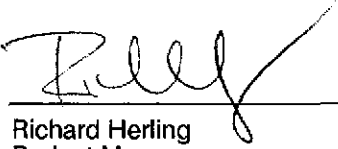
QC Batch Number: GC0806980HBPEXZ
Instrument ID: GCHP5B

Total Extractable Petroleum Hydrocarbons (TEPH)

Analyte	Detection Limit ug/L	Sample Results ug/L
TEPH as Diesel Chromatogram Pattern: Unidentified HC	50	220 C9-C24
Surrogates n-Pentacosane (C25)	Control Limits % 50 150	% Recovery 97

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210



Richard Herling
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
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FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Accutite	Client Proj. ID: 1435 Webster Street Alameda	Sampled: 07/31/98
35 South Linden Avenue	Sample Descript: MW-2	Received: 07/31/98
S. San Francisco, CA 94080	Matrix: LIQUID	Extracted: 08/05/98
Attention: Sami Malaeb	Analysis Method: 8015Mod/8020	Analyzed: 08/05/98
	Lab Number: 9807J24-02	Reported: 08/17/98

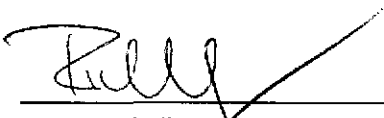
QC Batch Number: GC080598802004A
Instrument ID: GC-4

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	50	N.D.
Methyl t-Butyl Ether	2.5	73
Benzene	0.50	N.D.
Toluene	0.50	N.D.
Ethyl Benzene	0.50	N.D.
Xylenes (Total)	0.50	N.D.
Chromatogram Pattern:		
Surrogates	Control Limits %	% Recovery
Trifluorotoluene	70 130	85

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210



 Richard Herling
 Project Manager





**Sequoia
Analytical**

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Accutite 35 South Linden Avenue S. San Francisco, CA 94080	Client Proj. ID: 1435 Webster Street Alameda Sample Descript: MW-3 Matrix: LIQUID Analysis Method: EPA 8015 Mod Lab Number: 9807J24-03	Sampled: 07/31/98 Received: 07/31/98 Extracted: 08/06/98 Analyzed: 08/08/98 Reported: 08/17/98
--	--	--


QC Batch Number: GC0806980HBPEXZ
Instrument ID: GCHP5B

Total Extractable Petroleum Hydrocarbons (TEPH)

Analyte	Detection Limit ug/L	Sample Results ug/L
TEPH as Diesel Chromatogram Pattern:	50	N.D.
Surrogates	Control Limits %	% Recovery
n-Pentacosane (C25)	50 150	80

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210


Richard Herling
Project Manager





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Analytical**

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
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(650) 364-9600 FAX (650) 364-9233
(925) 988-9600 FAX (925) 988-9673
(916) 921-9600 FAX (916) 921-0100
(707) 792-1865 FAX (707) 792-0342

Accutite 35 South Linden Avenue S. San Francisco, CA 94080 Attention: Sami Malaeb	Client Proj. ID: 1435 Webster Street Alameda Sample Descript: MW-3 Matrix: LIQUID Analysis Method: 8015Mod/8020 Lab Number: 9807J24-03	Sampled: 07/31/98 Received: 07/31/98 Extracted: 08/05/98 Analyzed: 08/05/98 Reported: 08/17/98
--	--	--


QC Batch Number: GC080598802004A
Instrument ID: GC-4

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX and MTBE

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	50	N.D.
Methyl t-Butyl Ether	2.5	N.D.
Benzene	0.50	N.D.
Toluene	0.50	N.D.
Ethyl Benzene	0.50	N.D.
Xylenes (Total)	0.50	N.D.
Chromatogram Pattern:		
Surrogates	Control Limits %	% Recovery
Trifluorotoluene	70 130	79

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210


Richard Herling
Project Manager





Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

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(925) 988-9600
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FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Accutite
35 South Linden Avenue
South San Francisco, CA 94080
Attention: Sami Malaeb

Client Project ID: 1435 Webster Street, Alameda
Matrix: Liquid

Work Order #: 9807J24 -01-03

Reported: Aug 18, 1998

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes	Gas
QC Batch#:	GC080598802004A	GC080598802004A	GC080598802004A	GC080598802004A	GC080598802004A
Analy. Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020	EPA 8015M
Prep. Method:	EPA 5030	EPA 5030	EPA 5030	EPA 5030	EPA 5030

Analyst:	S. L.	S. L.	S. L.	S. L.	S. L.
MS/MSD #:	98080050	98080050	98080050	98080050	-
Sample Conc.:	3773	1231	867	716	-
Prepared Date:	8/5/98	8/5/98	8/5/98	8/5/98	-
Analyzed Date:	8/5/98	8/5/98	8/5/98	8/5/98	-
Instrument I.D.#:	GC4	GC4	GC4	GC4	-
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L	-
Result:	789	819	776	790	-
MS % Recovery:	-	-	-	124	-
Dup. Result:	782	816	773	786	-
MSD % Recov.:	-	-	-	117	-
RPD:	0.89	0.37	0.39	0.51	-
RPD Limit:	0-25	0-25	0-25	0-25	-

LCS #:	LCS080598	LCS080598	LCS080598	LCS080598	LCS080598
Prepared Date:	8/5/98	8/5/98	8/5/98	8/5/98	8/5/98
Analyzed Date:	8/5/98	8/5/98	8/5/98	8/5/98	8/5/98
Instrument I.D.#:	GC4	GC4	GC4	GC4	GC4
Conc. Spiked:	20 µg/L	20 µg/L	20 µg/L	60 µg/L	500 µg/L
LCS Result:	19	20	21	60	507
LCS % Recov.:	97	99	106	100	101

MS/MSD	60-140	60-140	60-140	60-140	
LCS	70-130	70-130	70-130	70-130	60-140
Control Limits					

SEQUOIA ANALYTICAL
Elap #2142

Richard Herling
Richard Herling
Project Manager

Please Note:

The LCS is a control sample of known, interferent-free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

** MS=Matrix Spike, MSD=MS Duplicate, RPD=Relative % Difference

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Sequoia Analytical

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
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FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Accutite
35 South Linden Avenue
South San Francisco, CA 94080
Attention: Sami Malaeb

Client Project ID: 1435 Webster Street, Alameda
Matrix: Liquid

Work Order #: 9807J24-01-03

Reported: Aug 18, 1998

QUALITY CONTROL DATA REPORT

Analyte: Total Recoverable
Petroleum Hydrocarbons

QC Batch#: SP0806985520EXB
Analy. Method: SM 5520BF
Prep. Method: SM 5520BF

Analyst: H. Olanan
BS/BSD #: BLK080698
Sample Conc.: N.D.
Prepared Date: 8/6/98
Analyzed Date: 8/10/98
Instrument I.D.#: MANUAL
Conc. Spiked: 10 mg/L

Result: 8.1
BS % Recovery: 81

Dup. Result: 9.0
BSD % Recov.: 90

RPD: 11
RPD Limit: 0-30

LCS #:

Prepared Date:
Analyzed Date:
Instrument I.D.#:
Conc. Spiked:

LCS Result:
LCS % Recov.:

MS/MSD 60-140
LCS 70-130
Control Limits

SEQUOIA ANALYTICAL

Richard Herling
Richard Herling
Project Manager

Please Note:

The LCS is a control sample of known, interferent-free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

** MS=Matrix Spike, MSD=MS Duplicate, RPD=Relative % Difference

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**Sequoia
Analytical**

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Accutite
35 South Linden Avenue
South San Francisco, CA 94080
Attention: Sami Malaeb

Client Project ID: 1435 Webster Street, Alameda
Matrix: Liquid

Work Order #: 9807J24-01

Reported: Aug 18, 1998

QUALITY CONTROL DATA REPORT

Analyte: MTBE
QC Batch#: MS081298MTBEH6A
Analy. Method: EPA 8260
Prep. Method: N.A.

Analyst: S. Goldstein
MS/MSD #: 980838603
Sample Conc.: N.D.
Prepared Date: 8/12/98
Analyzed Date: 8/12/98
Instrument I.D.#: H6
Conc. Spiked: 50 µg/L

Result: 41
MS % Recovery: 82

Dup. Result: 56
MSD % Recov.: 112

RPD: 31
RPD Limit: 0-25

LCS #: LCS081398
Prepared Date: 8/13/98
Analyzed Date: 8/13/98
Instrument I.D.#: H6
Conc. Spiked: 50 µg/L

LCS Result: 43
LCS % Recov.: 86

MS/MSD 60-140
LCS 70-130
Control Limits

Please Note:
The LCS is a control sample of known, interferent-free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

Richard Herling
Richard Herling
Project Manager

** MS=Matrix Spike, MSD=MS Duplicate, RPD=Relative % Difference

9807J24.ACC <3>





**Sequoia
Analytical**

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
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FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Accutite
35 South Linden Avenue
So. San Francisco, CA 94080
Attention: Sami Malaeb

Client Project ID: 1435 Webster Street Alameda

QC Sample Group: 9807J24-01-03

Reported: Aug 17, 1998

QUALITY CONTROL DATA REPORT

Matrix: Liquid
Method: EPA 8015A
Analyst: A. Porter

ANALYTE Diesel

QC Batch #: GC0806980HBPEXZ

Sample No.: 9808028-3
Date Prepared: 8/6/98
Date Analyzed: 8/7/98
Instrument I.D.#: GCHP5B

Sample Conc., ug/L: 75
Conc. Spiked, ug/L: 1000

Matrix Spike, ug/L: 900
% Recovery: 82

Matrix Spike Duplicate, ug/L: 930
% Recovery: 86

Relative % Difference: 4.8

RPD Control Limits: 0-50

LCS Batch#: BLK080698ZS

Date Prepared: 8/6/98
Date Analyzed: 8/7/98
Instrument I.D.#: GCHP5B

Conc. Spiked, ug/L: 1000

Recovery, ug/L: 860
LCS % Recovery: 86

Percent Recovery Control Limits:

MS/MSD 50-150
LCS 60-140

Quality Assurance Statement: All standard operating procedures and quality control requirements have been met.

Please Note:

The LCS is a control sample of known, interferent free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

SEQUOIA ANALYTICAL

Richard Herling
Richard Herling
Project Manager



Chain of Custody Accutite Environmental Engineering

9807J24

Client Accutite Environmental Engineering		Report To <i>Sami Malaeb</i>		Turnaround			
Address 35 South Linden Avenue South San Francisco, CA 94080		Bill To: Accutite		ASAP	1 Day	2 Day	3 Day
Phone 650-952-5551		Billing Reference# <i>954</i>		1 Week	<u>2 Week</u>	Others	
Project Name/Address <i>1435 Webster Street Alameda, CA</i>		Date: <i>7/31/98</i>		Analysis Required			
Sampler <i>Bulmaro</i>		Date: <i>7/31/98</i>		Analysis Required			
Sample ID	Sample Matrix	#of Containers	Container Type	Sample Date/Time	TPH-G BTX MTBE	TPH-D	Oil & Grease SSLO EIN
MW-1	Water	3	40 ml VOA	7/31/98 am.	X		
MW-1	"	1	Amber	" "		X	
MW-1	"	1	Amber	" "			X
MW-2	"	3	40 ml VOA	" "	X		
MW-2	"	1	Amber	" "		X	
MW-2	"	1	Amber	" "			X
MW-3	"	3	40 ml VOA	" "	X		
MW-3	"	1	Amber	" "		X	
MW-3	"	1	Amber	" "			X

Remarks: *please confirm MTBE using EPA 8260 highest sample*

Add preservative if needed

Add preservative if needed

Add preservative if needed

7/31/98

Relinquished by:	Date	Time	Received by:	Date	Time
<i>Sami Malaeb</i>	<i>7/31/98</i>		<i>[Signature]</i>	<i>7/31/98</i>	<i>4:40</i>
Relinquished by:	Date	Time	Received by:	Date	Time
<i>[Signature]</i>	<i>7/31/98</i>		<i>[Signature]</i>		
Relinquished by:	Date	Time	Received by:	Date	Time
<i>[Signature]</i>	<i>7/31/98</i>		<i>[Signature]</i>	<i>7/31/98</i>	<i>1:07:08</i>



**Sequoia
Analytical**

680 Chesapeake Drive
404 N. Wiget Lane
819 Striker Avenue, Suite 8
1455 McDowell Blvd. North, Ste. D

Redwood City, CA 94063
Walnut Creek, CA 94598
Sacramento, CA 95834
Petaluma, CA 94954

(650) 364-9600
(925) 988-9600
(916) 921-9600
(707) 792-1865

FAX (650) 364-9233
FAX (925) 988-9673
FAX (916) 921-0100
FAX (707) 792-0342

Accutite
35 South Linden Avenue
S. San Francisco, CA 94080
Attention: Sami Malaeb

Client Proj. ID: 1435 Webster Street Alameda

Received: 07/31/98

Lab Proj. ID: 9807J24

Reported: 08/17/98

LABORATORY NARRATIVE

In order to properly interpret this report, it must be reproduced in its entirety. This report contains a total of 4 pages including the laboratory narrative, sample results, quality control, and related documents as required (cover page, COC, raw data, etc.).

SEQUOIA ANALYTICAL


Richard Herling
Project Manager





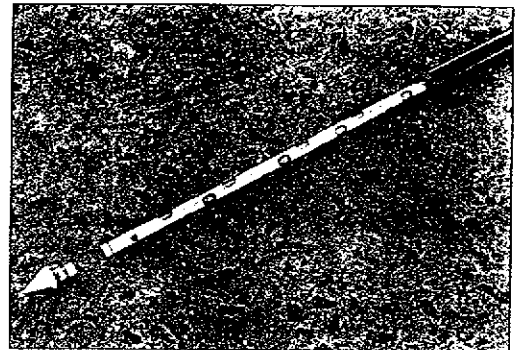
APPENDIX D
STANDARD PROCEDURES



GROUNDWATER SAMPLING THROUGH ADVANCING HYDROPUNCH BORINGS

- 1) A concrete breaking auger is connected to an extension rod. The auger is turned and pushed down by hydraulic pressure, created by the truck mounted motor. This process is used to break the top layer of concrete.
- 2) Once the auger breaks the concrete, the water sample is collected through a screen point ground water sampler. The sampler is then collected to a plastic tubing, inserted in the ground, through the Geoprobe. A tubing bottom check valve and check ball are connected to the bottom of the tubing. The attached pages explain in details the water sample retrieving methods.
- 3) Once the water sample is retrieved, the sample is collected in a 40 ml vial tube, 1 liter amber bottle, and/or a 1 liter plastic bottle. Upon being filled, the vial and bottle are sealed with Teflon-lined screw caps, labeled, immediately placed in a 4°C ice chest, and delivered to a State Certificate Environmental Laboratory for analysis.
- 4) Following sampling, all borings are sealed with cement/ 5% bentonite.

Screen Point Ground Water Sampler Operation



After the Screen Point Ground Water Sampler is driven to depth, the rods are retracted and the screen insert is pushed out into the formation.

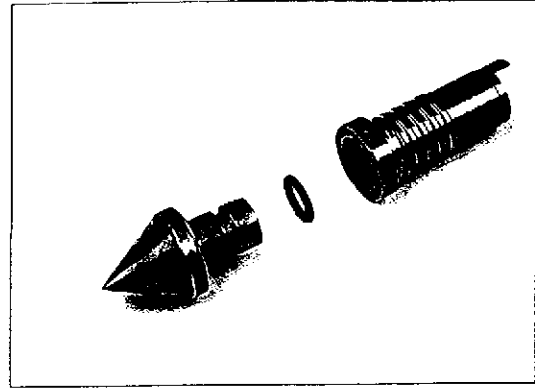


Screen Point Ground Water Sampler – Operation

Assembly

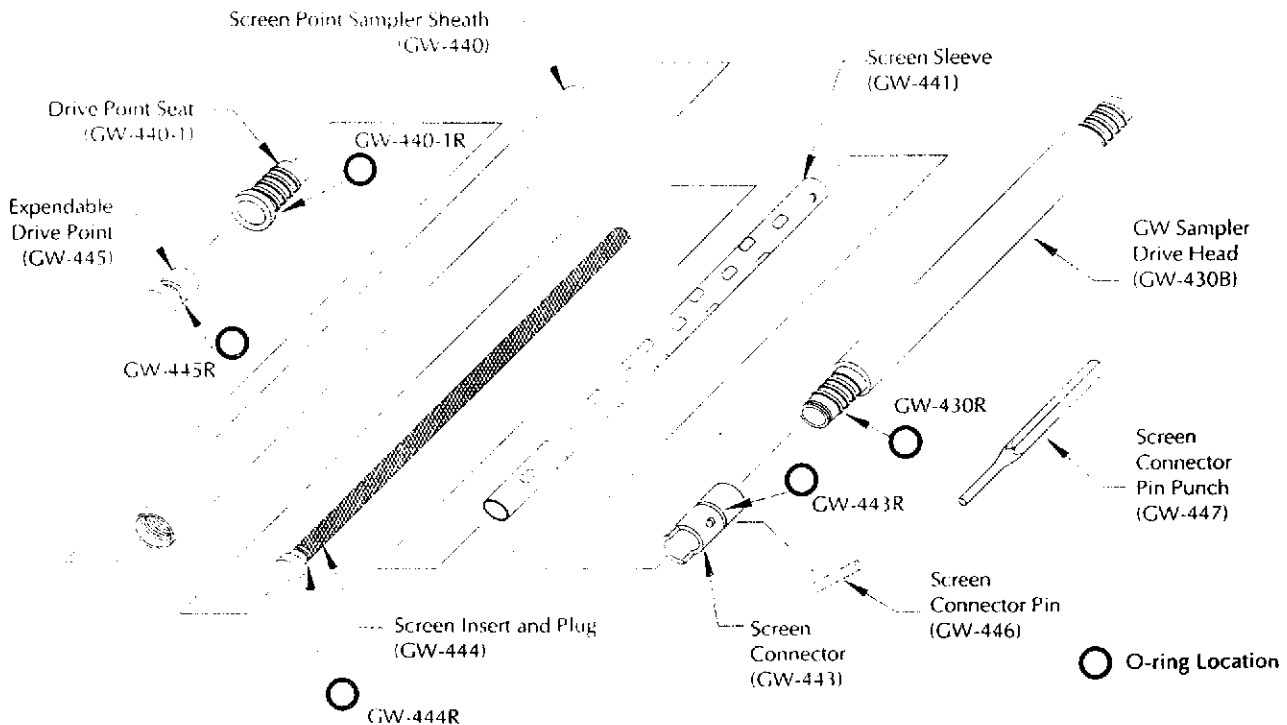
Clean all parts thoroughly before assembly. An uncontaminated screen insert should be used for each new sample. It is recommended that new O-rings be installed at each O-ring location prior to each sample. O-ring numbers correspond to the individual part numbers. After O-rings have been installed, follow these steps:

1. Push the Screen Insert and Plug into the Screen Sleeve from the bottom. The bottom end has one drain hole (Figure 1).
2. Push the Screen Connector over the top end of the Screen Sleeve and push the Screen Connector Pin into place (Figure 2). It has a loose fit so use your thumb and forefinger to hold it in place.
3. Insert the Screen Sleeve, Screen Connector first, halfway into the Sampler Sheath (either end is okay) (Figure 3).
4. Slide the Drive Point Seat over the end of the screen assembly that protrudes from the Sampler Sheath (Figure 4). Thread it in until tight using a 7/8-in. wrench.
5. Push the screen assembly just far enough into the Sampler Sheath that an Expendable Drive Point (GW-445) can be pushed into place in the Drive Seat (Figure 5).
6. Screw the Drive Head with the O-ring end first into the open end of the Sampler Sheath (Figure 6).



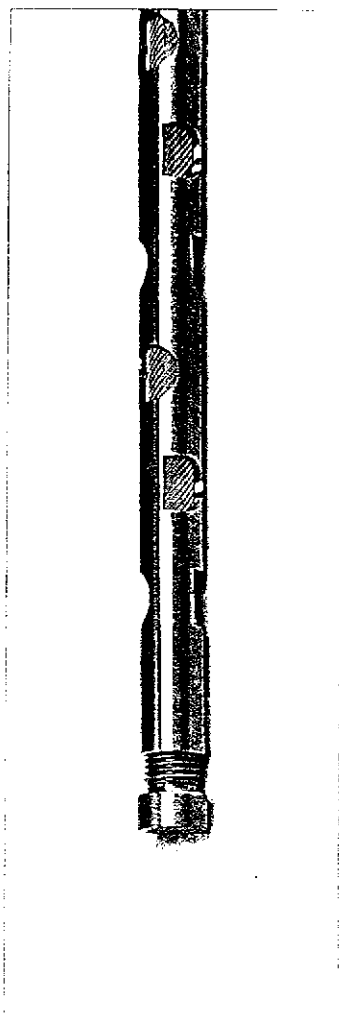
New O-rings should be used at each O-ring location prior to each sample. Shown here is the Expendable Drive Point (GW-445), O-ring (GW-445R), and Drive Point Seat (GW-440-1).

NOTE: These parts must be assembled so as to allow free movement of the screen assembly inside the Sampler Sheath. There should be no internal binding. The assembled sampler is now ready to be driven into the subsurface. Wetting the O-rings with a small amount of distilled water will aid in free movement of the parts.



▲ Screen Point Sampler (GW-440K)

Screen Point Ground Water Sampler – Operation



Wire mesh stainless steel Screen Insert inside stainless steel Screen Sleeve. Screen Insert has 0.145-mm pore openings which filter out sediment.

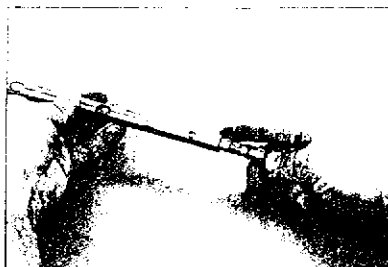


Figure 1. Push the Screen Insert and Plug into Screen Sleeve.

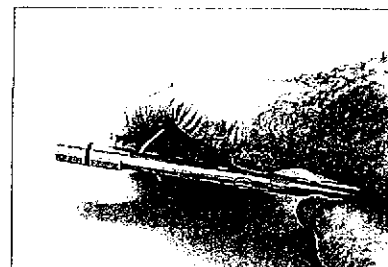


Figure 2. Push the Screen Connector Pin into place.

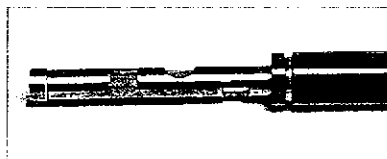


Figure 3. Insert Screen Sleeve halfway into Screen Point Sampler Sheath.

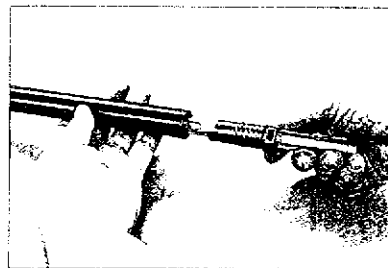


Figure 4. Slide Drive Point Seat over end of Screen Sleeve and screw into Sampler Sheath.

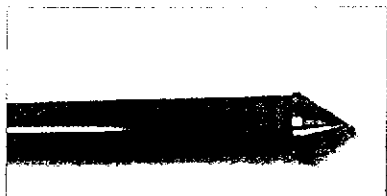


Figure 5. Insert Expendable Drive Point into Drive Point Seat.

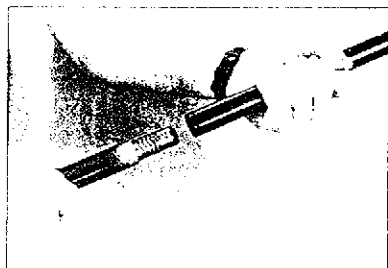
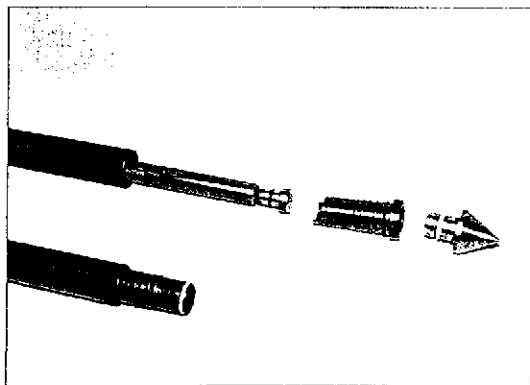


Figure 6. Screw O-ring end of Drive Head into top of Sampler Sheath.



Partially assembled Screen Point Sampler (GW-440K).



Screen Point Ground Water Sampler – Operation

Probing

Place a drive cap on the assembled sampler and drive it into the subsurface (Figure 1). Continue driving by adding Geoprobe probe rods until the sampler tip has been driven about one foot (12.5 mm) below the target sampling depth (Figure 2). Once that depth has been reached, disengage the expendable drive point by replacing the drive cap with a pull cap and pulling the rods back a distance of about 2 ft. (1 m) (Figure 3).

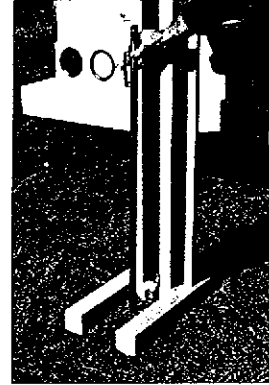


Figure 1. Assembled Screen Point Sampler is driven to depth.

Exposing the Screen

In stable formations, the screen assembly may be pushed out into the open borehole by lowering 3/8-in. tubing affixed with a PRT Adapter (TB-25L and PR-25S) to the top end of the screen assembly (Figure 4). The threads on the PRT adapter are engaged with the threads on the Screen Connector by pushing gently downward on the tubing and rotating it counterclockwise. When properly connected, the screen assembly can be pushed out of the Sampler Sheath by pushing down on the tubing. A water sample can be drawn through the tubing.

In unstable formations, the screen assembly may have to be pushed out of the Sampler Sheath by means of extension rods coupled together and inserted down the inside of the probe rods (Figure 5). The leading end of the extension rods should be equipped with an extension rod coupler to engage the threads on the Screen Connector. A steady push is sufficient. Excessive hammering on the rods should be avoided. After pushing the screen into the formation, the extension rods need to be removed in order to begin sampling.

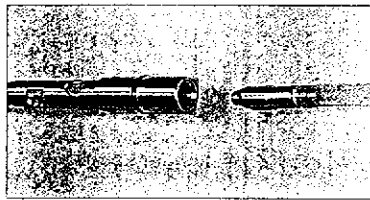


Figure 4. PRT-Adapter (PR-25S) inserted in tubing (TB-25L) prior to connection down-hole with Screen Connector.

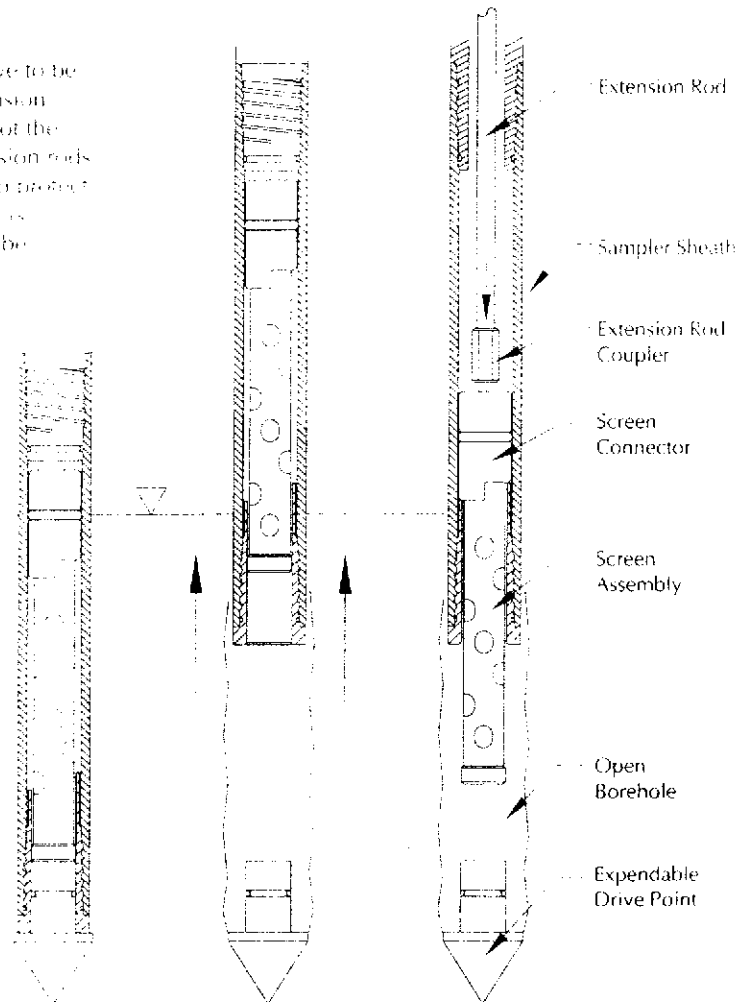


Figure 2. Sample Depth is Reached.

Figure 3. Pull Back Sampler 2 ft. (1 m).

Figure 5. Push Out Screen Assembly with Extension Rods.

Screen Point Ground Water Sampler – Operation

Sampling

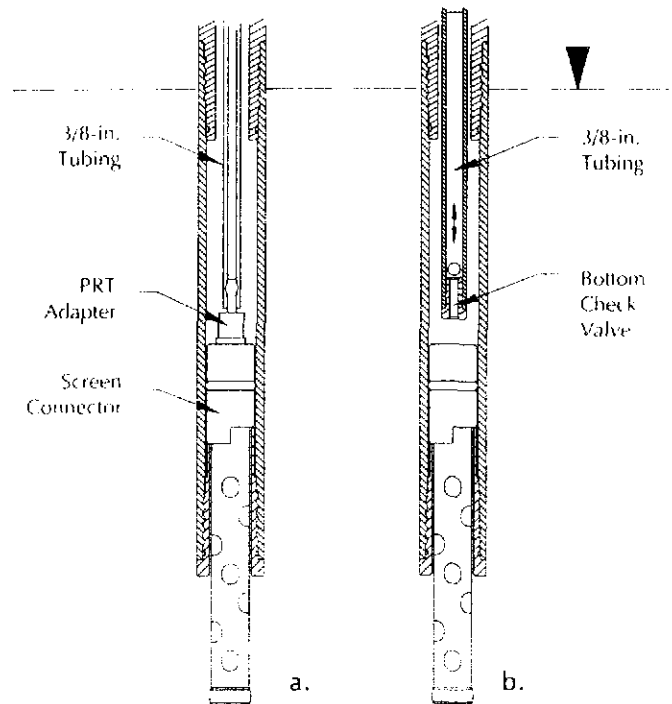
Water sampling may be accomplished by using 3/8-inch tubing and a stainless steel PRT adapter as previously described (TB-25L and PR-25S). Once the PRT adapter has made connection with the Screen Connector, a vacuum may be applied to the top of the tubing (Figure 6a). This may be done with a peristaltic pump (Figure 7) or by using a vacuum pump with an in-line trap.

If the PRT system is not used, the same tubing equipped with a Tubing Bottom Check Valve (GW-42) may be used (Figures 8 and 9). The tubing is oscillated up and down and the water sample is pushed upward into the tubing as the ball repeatedly lifts and seats (Figure 6b). The tubing will begin to feel heavier as it fills with several feet of water. It can then be lifted out of the probe rods, cut, and the water poured into a vial for analysis. This same tubing/check valve arrangement has been used to pump multi-liter samples from the probe rod.

Removal

When the sampling procedure is finished, the probe rods and sampler may be extracted. If the PRT system is used, remove the tubing by pulling up firmly on it until it disconnects from the PRT adapter down-hole. The PRT adapter will remain attached to the Screen Connector.

After the sampler has been recovered, examine all parts for wear, damage, or contamination. Thoroughly clean all parts, replace all O-rings, and prepare for the next sample.



Figures 6a and 6b. Sampling options.

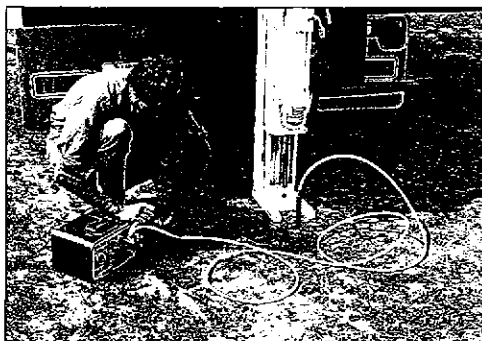


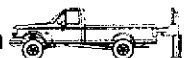
Figure 7. Using a peristaltic pump to collect a groundwater sample using the Screen Point Sampler.



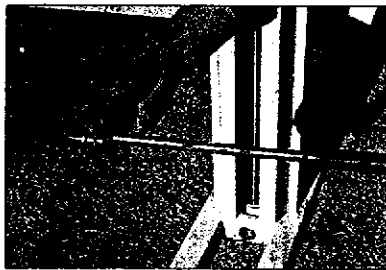
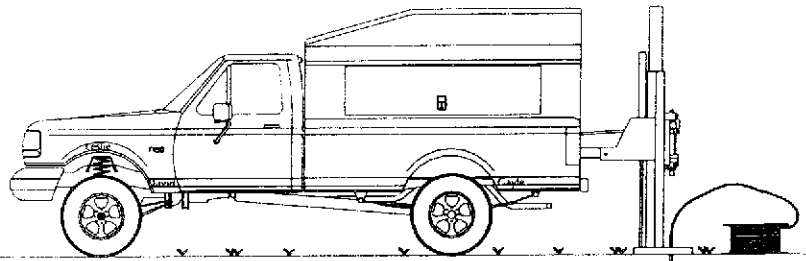
Figure 8. Tubing Bottom Check Valve and Check Ball are installed onto Tubing . . .



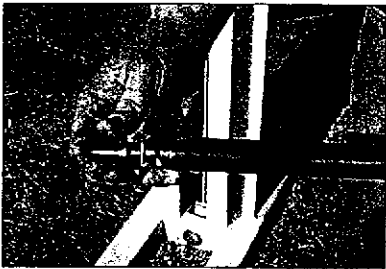
Figure 9. . . . and are then fed through the diameter of the probe rods to retrieve the water sample.



Screen Point Ground Water Sampler – Operation



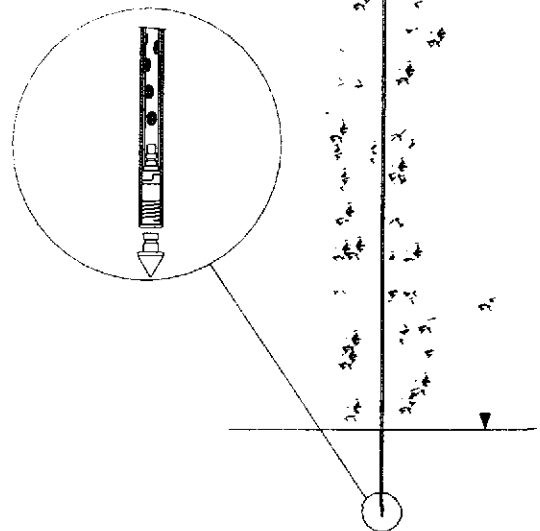
An Expendable Drive Point, Screen Insert, and Screen Sleeve are inserted into Sampler Sheath . . .



. . . the Screen Insert and Sleeve are inserted just far enough for the Expendable Drive Point to be inserted . . .



. . . and the assembled Screen Point Sampler is ready to be driven to depth.

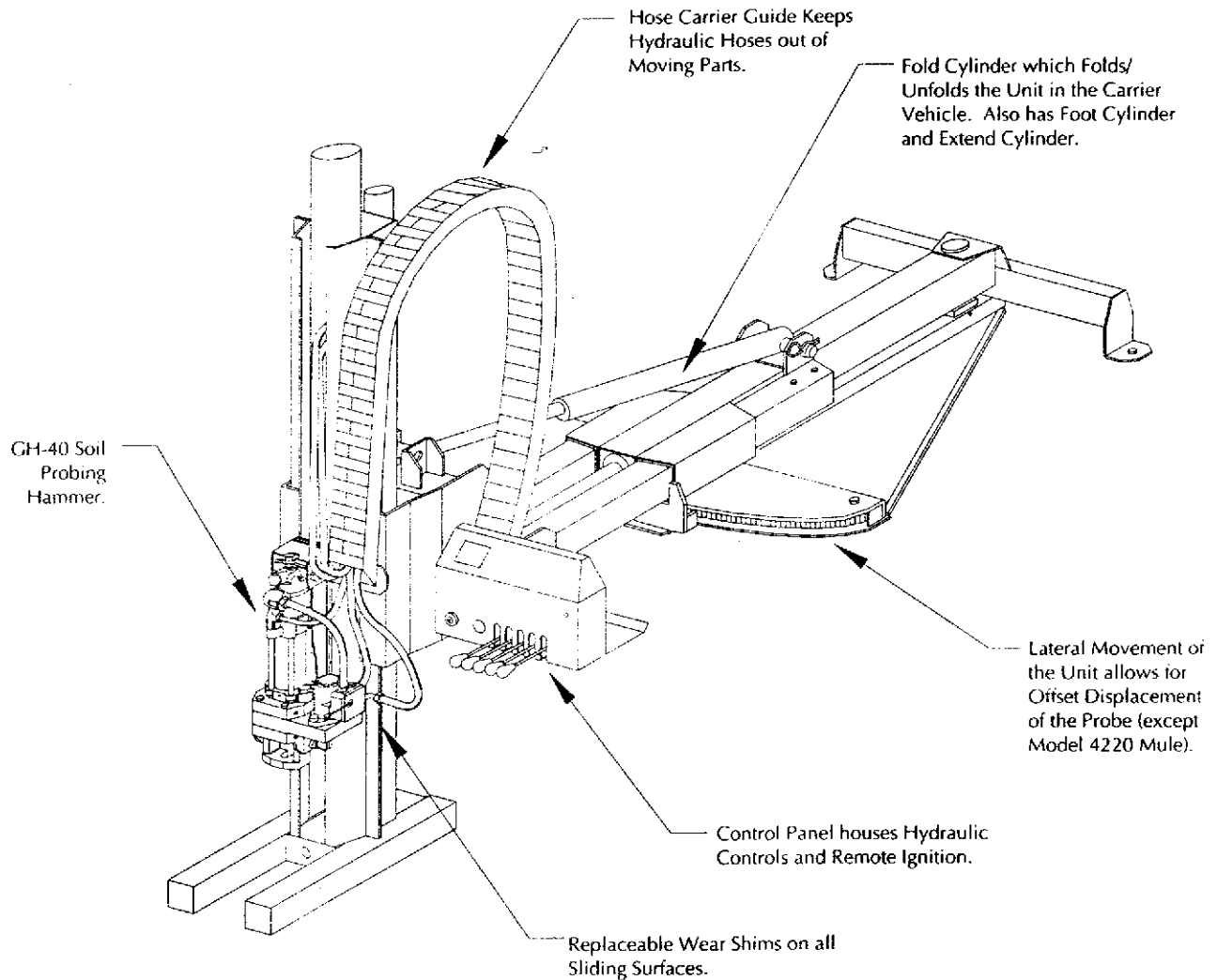


Screen Point Sampler at depth using Tubing Bottom Check Valve system for retrieving groundwater sample.



Geoprobe Components

Features of the Geoprobe Soil Probing Equipment



Geoprobe Model 5400

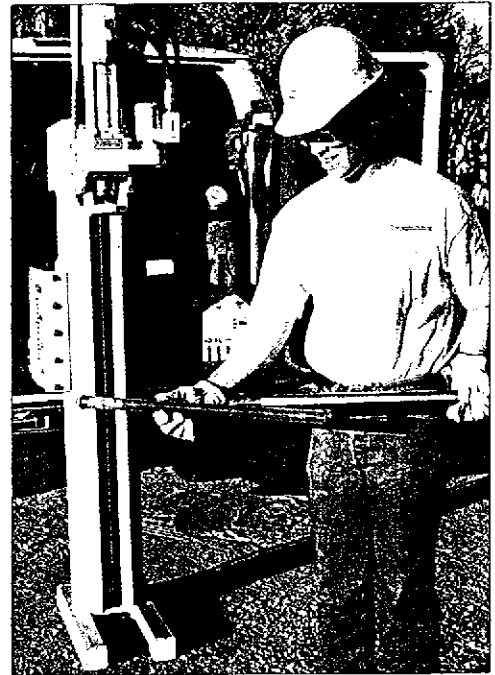


SOIL SAMPLING THROUGH ADVANCING HYDROPUNCH BORINGS

The borings are completed as follows:

- 1) A concrete breaking auger is connected to an extension rod. The auger is turned and pushed down by hydraulic pressure, created by the truck mounted motor. This process is used to break the top layer of concrete.
- 2) Once the auger breaks the concrete, the soil sample is collected through a larger bore sampler operation. The attached pages explain in details the sample retrieving methods.
- 3) Once the soil is retrieved, the soil is classified using the Unified Soil Classification System. Lithologies encountered, changes in lithologies, and sampling locations are noted on the *boring logs*.
- 4) Once the soil is retrieved, a soil sample is collected in a 1" x 6" brass tube. Each end of the tube is covered with Teflon liner and then capped with a polyethylene lid, taped, and labeled. The samples are placed in a 4°C ice chest and delivered to a State Certificate Environmental Laboratory.
- 5) Following sampling, all borings are sealed with cement/ 5% bentonite.

Large Bore Sampler Operation



The Large Bore Sampler recovers a 22-in. long x 1.0625-in. diameter (559 mm x 27 mm) core, 320 mL in volume from depths of over 60 feet (18 m).



Large Bore Sampler – Operation

Assembly

After cleaning parts thoroughly, assemble the Large Bore Sampler (Figure 1). All parts must fit tightly. The stop-pin should be tightened down with a wrench so that it exerts pressure against the piston rod (Figure 2). Damage to the stop-pin or drive head could occur during driving if the stop-pin is not tight. **NOTE:** The piston stop-pin uses an O-ring to prevent vibration from loosening the stop-pin threads. Use a new O-ring each time you assemble the sampler.

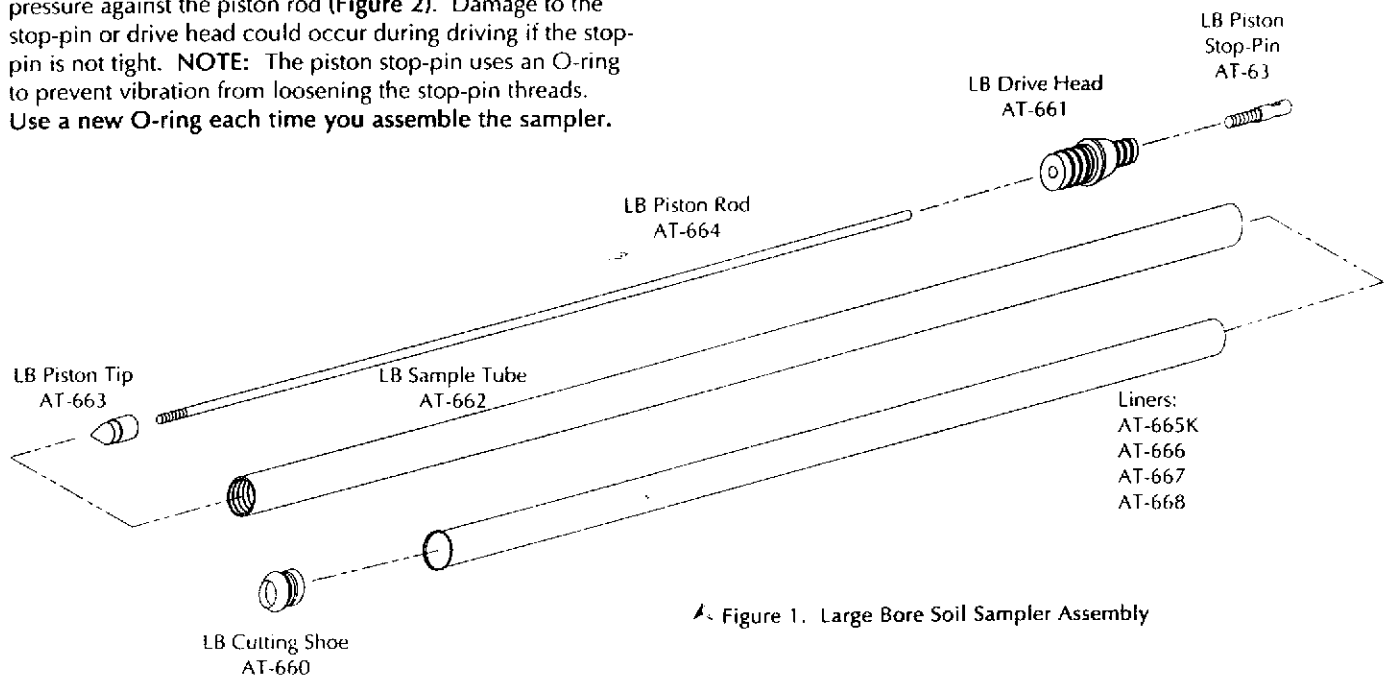
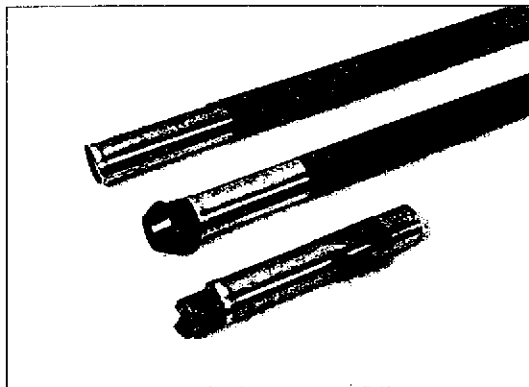


Figure 1. Large Bore Soil Sampler Assembly



Samples can be collected using Large Bore Brass Liners (AT-666) which separate into 6-in. (152 mm) sections.



Figure 2. Securely tighten the Piston Stop-Pin in the Large Bore Drive Head.



Large Bore Sampler – Operation

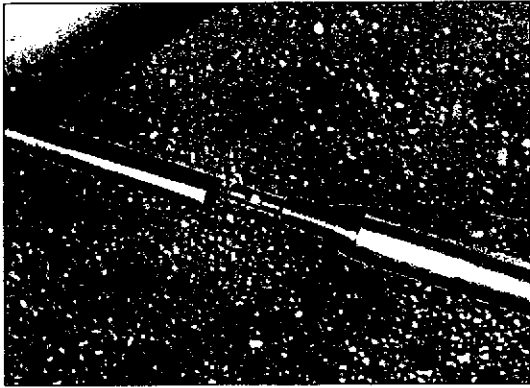


Figure 3. Attach assembled Large Bore Soil Sampler to probe rod.

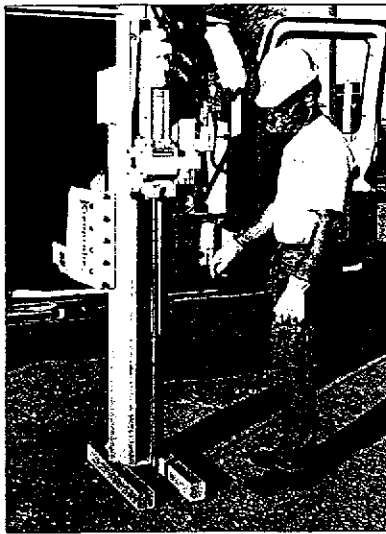


Figure 4. Drive sampler into ground.

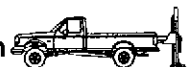


Figure 5. Retighten reverse-threaded Stop-Pin using a 3/8-in. wrench. Drive Head uses a 1-in. wrench.

Probing

1. Attach assembled sampler onto leading Geoprobe probe rod (Figure 3). A 12-in. (305 mm) probe rod is recommended to initially drive the Large Bore Sampler. Replace the 12-in. (305 mm) rod with a 24-in. (610 mm), 36-in. (914 mm), or 48-in. (1219 mm) probe rod as soon as the sampler is driven below the surface.
2. Drive the Large Bore Soil Sampler into the ground (Figure 4). The sampler remains sealed (closed) by a piston tip as it is being driven. The piston tip is held in place by a reverse-threaded stop-pin at the trailing end of the sampler. Stop when the drive head is just above the surface and re-tighten the stop-pin using a 3/8-in. wrench for the pin and a 1-in. or adjustable wrench for the drive head (Figure 5). Most vibration that could loosen the stop-pin occurs with the initial driving. Failure to tighten the stop-pin could result in damage.
3. Drive the sampler to the top of the desired sampling interval. Attach additional probe rods as necessary to reach depth.

IMPORTANT: Some soil conditions may warrant using a solid drive point to pre-probe the hole to the desired sampling depth. Information about the subsurface and depth to bedrock should be known before driving the sampler. Damage may occur if the sampler is driven into rock or other impenetrable layer.



Large Bore Sampler – Operation

Stop-Pin Removal

1. If using a Geoprobe machine, move the probe unit away from the top of the probe rods to allow for room to work.
2. Remove the drive cap. Lower a series of extension rods coupled together, sufficient to reach depth, down the inside diameter of the probe rods (Figure 1).
3. Attach the extension rod handle to the top extension rod and rotate the handle clockwise (Figure 2). The male threads on the leading end of the extension rods engage the female threads on the top end of the stop-pin. Some resistance will be felt when the stop-pin begins to disengage. Continue to rotate the handle until the resistance ends. Lift up on the handle to check if the threads are completely disengaged.
4. Remove the extension rods from the probe rods (Figure 3). The Stop-Pin should be attached to the end extension rod upon removal.

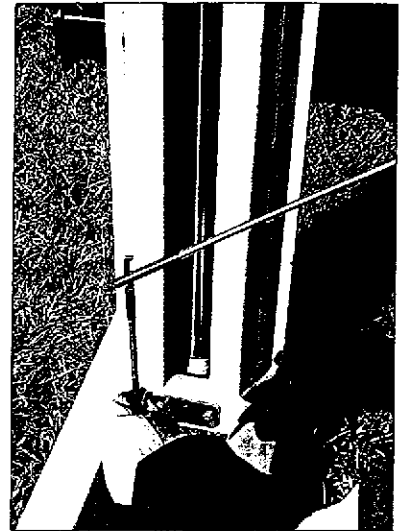


Figure 1. Join extension rods together with Extension Rod Quick Links and lower down inside diameter of probe rods.

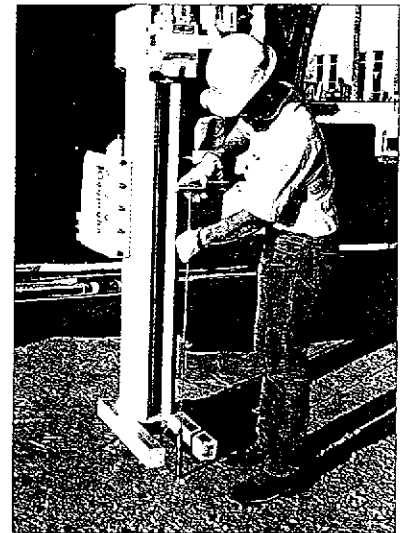


Figure 2. Rotate extension rod handle clockwise to disengage Stop-Pin.

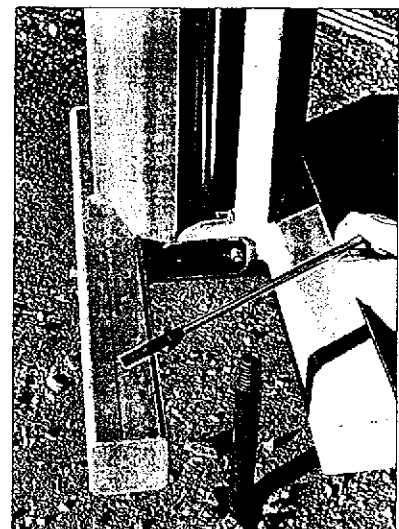


Figure 3. Stop-Pin should be attached to the end extension rod upon removal.

Large Bore Sampler – Operation

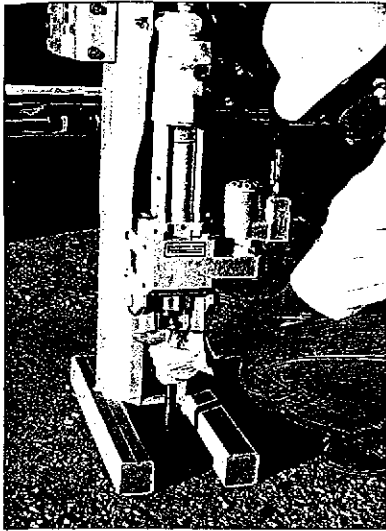


Figure 4. Replace drive head and attach pull cap to pull the sampler out the remaining distance.

Sampling

1. Replace drive cap onto top probe rod. If the top of the probe rod is already in the lowest driving position, it will be necessary to attach another probe rod before driving.
2. Mark the top probe rod with a marker or tape 24 in. (610 mm) above the ground surface.
3. Drive the sampler the designated distance. Be careful not to overdrive the sampler which could compact the soil sample making it difficult to extrude.
4. Retract the probe rods from the hole to recover the sampler. Remove the piston tip and piston rod when the sampler drive head has been pulled just above the surface. Replace the drive head and attach a pull cap to pull the sampler out the remaining distance (Figure 4).

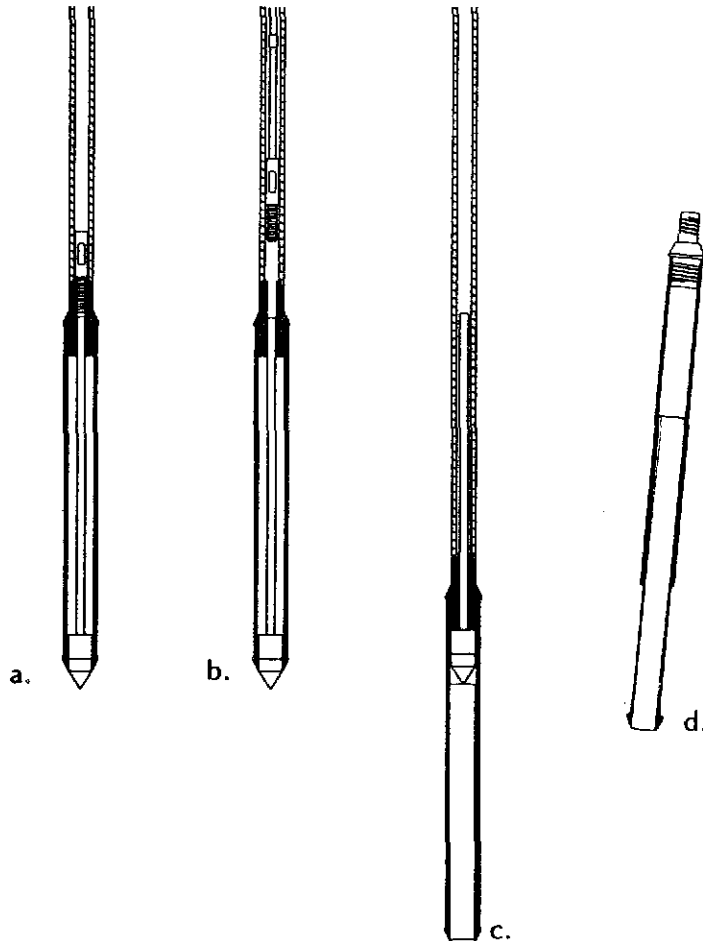


Figure 1. Driving and Sampling with the Large Bore Soil Sampler.

- a. Driving the Sealed Sampler
- b. Removing the Stop-pin
- c. Collecting a Sample
- d. Recovering Sample in Liner



Large Bore Sampler – Operation

Sample Extrusion

Large Bore liners are usually removed from the sample tube by simply unscrewing the cutting shoe, either by hand or with the LB Shoe Wrench (Figure 1), and pulling out the liner (Figure 2). In some cases, it may be necessary to remove the drive head and push the liner and sample out. Teflon and Plastic (PTFE and CAB) liners may be cut open lengthwise with a utility knife to recover the sample. Brass and Stainless Steel Liners come with plastic cladding on the outside of the liner to keep four 6-inch (152 mm) sections aligned. Remove the cladding and cut the sections apart with a knife. Sections may be extruded using the LB Manual Extruder (Figure 3).

CAUTION: Use extreme care when using the Large Bore Manual Extruder. Gradually apply down pressure on slow speed. Use of excessive force could result in injury to operator or damage of tools. Additional instructions may be found on page 6.7.

Figure 1. Loosen cutting shoe by hand or with LB Shoe Wrench to remove sample from Large Bore Sample Tube.

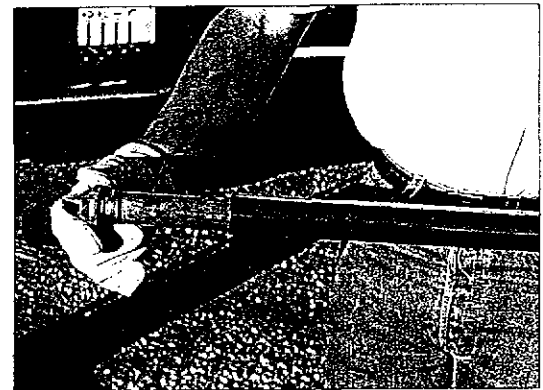


Figure 2. Remove sample liner from Large Bore Sample Tube.

Figure 3. Large Bore Manual Extruder may be used to remove soil from metal liners.

