A Work Plan Prepared

for

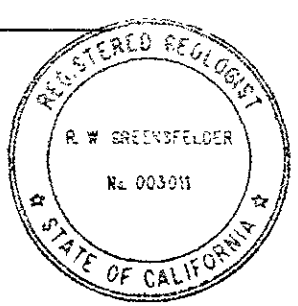
ALAMEDA FIRE STATION #2
635 PACIFIC STREET
ALAMEDA, CALIFORNIA

by

ZACCOR CORPORATION
Gary Zaccor
Project Manager

ENVIRONMENTAL TECHNICAL SERVICES
Helen Mawhinney
Senior Environmental Specialist

REGISTERED GEOLOGIST
Roger W. Greensfelder PhD
License #3011



March 29, 1992

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1.0 INTRODUCTION

The following work plan presents the assessment developed for the excavation of known petroleum hydrocarbons in soil and their impact, if any, on the first encountered groundwater beneath the site at Alameda Fire Station #2, 635 Pacific Street, Alameda, California.

2.0 HISTORY

On November 15, 1991, one 285-gallon gasoline underground storage tank (UST) was removed from the above referenced site. The tank had previously contained diesel.

One soil sample was collected from the native soil beneath the tank. The sample contained a detectable amount of toluene at 6.5 ppb and total xylenes at 4.4 ppb.

A soil sample collected was from stockpiled fill material removed from the tank pit. This had a detectable amount of Total Petroleum Hydrocarbons as diesel at 220 ppm and total xylenes at 52 ppb.

For the Tank, Stockpile, and Sample Location Map refer to Appendix A, Figure 2.

2.1 EXISTING MONITORING WELL

A monitoring well is located adjacent to and within 1.5' of the tank pit cavity.

The monitoring well was installed by Aqua Science Engineers on June 3, 1986. The well was constructed in compliance with Assembly Bill 1362 and the Groundwater Monitoring Guidelines for Hazardous Materials drafted by the Alameda County Water District in May, 1984.

Refer to Appendix C, for the Aqua Science Engineers Monitoring Well Construction Report, July 2, 1986.

Refer to Appendix A, Figure 3, for the Existing Monitoring Well - Location Map.

3.0 WORK PLAN

Based upon the above background information, the following work plan has been prepared for the excavation of contaminated soil and to determine the impact of contamination upon the first encountered groundwater.

3.1 EXCAVATION OF CONTAMINATED SOIL & SUBSEQUENT SOIL SAMPLE COLLECTION

Soil contaminated with toluene and total xylenes will be excavated by the Zaccor Corporation using heavy earth moving equipment.

Soil samples will be collected throughout the excavation progress and monitored using field analysis. (See Appendix A.)

Upon completion of the excavation, soil samples will be collected within the vadose/saturated capillary zone. The soil samples will be analyzed at a certified hazardous waste analytical laboratory to confirm that "non-detect" levels have been obtained.

3.2 STOCKPILE & STOCKPILE SAMPLE COLLECTION

Excavated soil will be stockpiled on asphalt or a hydrocarbon resistant liner and covered.

One composite stockpile soil sample will be collected for each fifty cubic yards of soil, as according to the Bay Area Air Quality, Regulation 8, Section 40 Guidelines.

This will be accomplished by dividing each fifty cubic yards of soil into four sections and collecting a discrete soil sample within each section. The four discrete soil samples will be composited at a certified laboratory to be analyzed as one sample.

Soil samples will be collected by removing 2.5' - 3' of soil overburden with a shovel, then six-inches of soil using a clean-gloved hand. A clean brass sleeve will then be hand driven into the remaining soil and packed full to eliminate head-space.

3.3 GROUNDWATER GRADIENT

Local regulatory agency files will be investigated to determine groundwater flow direction.

3.4 QUARTERLY GROUNDWATER MONITORING

Should groundwater gradient have been established on an adjacent site and the existing monitoring well prove to be down gradient, that well will be placed on a quarterly monitoring program.

4.0 MONITORING WELL INSTALLATION

Should insufficient data be available to determine groundwater gradient, two additional monitoring wells will be installed on site. The wells will be placed for proper triangulation.

The monitoring wells will be constructed according to state and local criteria via the LUFT Manual Guidelines.

REPORT

Upon completion of the above work plan a report will be developed documenting a description of task performed including but not limited to a description of methodologies used in insertion of soil borings, collection of samples, sample locations, quality assurance and quality control, monitoring well construction, soil boring logs and sample analytical results.

A copy of this Work Plan should be submitted to the Alameda County Department of Environmental Health services and the SFRWQCB.

The following address have been included for your convenience:

Alameda County
Department of Environmental Health
Hazardous Materials Division
80 Swan Way, Room 200
Oakland, CA 94621
ATTN: Brian P. Oliva

San Francisco Region
Water Quality Control Board
2101 Webster Street, Room 500
Oakland, California 94612

APPENDIX A

METHODOLOGIES

SOIL SAMPLE QA/QC

Immediately upon soil sample collection each end of the brass sleeve will be covered with a teflon sheet, fitted with plastic caps, sealed with duct tape, labeled with project number, name and time of sampling, and placed on blue ice, for transport to a certified hazardous waste laboratory, under chain of custody, for analysis.

SURVEY OF GROUNDWATER GRADIENT

Should local groundwater gradient need to be established groundwater within the three wells will be allowed to stabilize over a 48 hour period following well completion to assess static groundwater depths. Following stabilization groundwater depths will be measured. Groundwater elevations will be determined after top of casing elevations have been obtained by surveying.

FIELD MONITORING

Field monitoring will be performed using a GasTech model 1314 hydrocarbon survey instrument and/or PID and Thin Layer Chromatography with ultra violet light.

This field screening will be the criteria for determining samples to be analyzed.

GROUNDWATER DEVELOPMENT AND SAMPLING

To establish groundwater quality, the monitoring well(s) will be developed by removing 4 to 5 well volumes of water by pumping. Measurements of pH, temperature, and conductivity will be recorded at consistent intervals, and a sample of groundwater will be obtained only after these parameters have stabilized. A water sample will be obtained using a clean bailer. Water will be decanted to a positive meniscus into three 40-ml VOA vials and three one-liter bottles with teflon septum.

Containers will be labeled, placed on blue ice, under chain of custody, for transport to a Certified Department of Health Services Analytical Laboratory.

All groundwater developed during well purgings will be stored in 55 gallon capacity Department of Transportation Drums (DOT 17), sealed and labeled, pending laboratory analysis.

ANALYSIS

Soil and groundwater samples will be analyzed for Total Purgeable Petroleum Hydrocarbons as Gasoline with Benzene, Toluene, Total Xylenes, and Ethylbenzene, (TPH-G & BTEX), using EPA Method 5030/8020 or 602 and Total Petroleum Hydrocarbons as Diesel (TPH-D, using EPA Method 3550 or 3510).

DECONTAMINATION

Prior to arriving at site the drill rig and augers will be decontaminated using a hot high-pressure wash at a temperature of 248 degrees Fahrenheit. Augers will be cleaned in the same manner between borings. Sampling equipment will be decontaminated between samples using a trisodium phosphate wash, tap water rinse, followed by a deionized water rinse. All lubricated drill rig parts that may approach borings will be lubricated using PAM.

DRILL CUTTINGS

All drill cuttings generated during the monitoring well installation will be stored in 55 gallon capacity Department of Transportation Drums (DOT 17), sealed and labeled, pending laboratory analysis.

MONITORING WELL INSTALLATION

The drilling of the soil boring to be constructed as a monitoring well will be accomplished using a hydraulic driven truck/trailer-mounted drill rig, equipped with 8 1/4 inch outside diameter hollow-stem augers. Soil samples within these borings will be collected at 5', and at 5' intervals thereafter, at changing lithologies, or where indications of contamination are present and within the vadose/saturated capillary zone. A California Modified Split Spoon Sampler will be driven 18-inches into soil using a 140-pound hammer dropped a standard 30-inch fall into relatively undisturbed soils to collect samples. Three clean brass sleeves (2-inch diameter, 6-inch length), will be placed in the sampler. Immediately upon retrieval, the sampler will be opened and the bottom brass sleeve will be removed, each end covered with aluminum foil, fitted with plastic caps, sealed with duct tape, labeled with project number, name and time of sampling, and placed on dry ice, for transport to a certified hazardous waste laboratory, under chain of custody, for analysis. The remaining brass sleeves will be used in classifying soil.

UNIFIED SOIL CLASSIFICATION SYSTEM

During the placement of these soil borings information from the collected samples, will be obtained regarding subsurface soil lithologies and characteristics such as color, moisture, density, hydrocarbon content, and depth to groundwater. Collected samples will be classified by a Registered Geologist using the Unified Soil Classification System (USCS). Boring logs will include soil lithology according the USCS, data on soil color, moisture, density, hydrocarbon content, and miscellaneous characteristics such as organic content, blow counts at six-inch increments for 18-inch sampler drive. The monitoring well will be constructed according to local and state criteria via the LUFT Manual guidelines.

APPENDIX B

MAPS

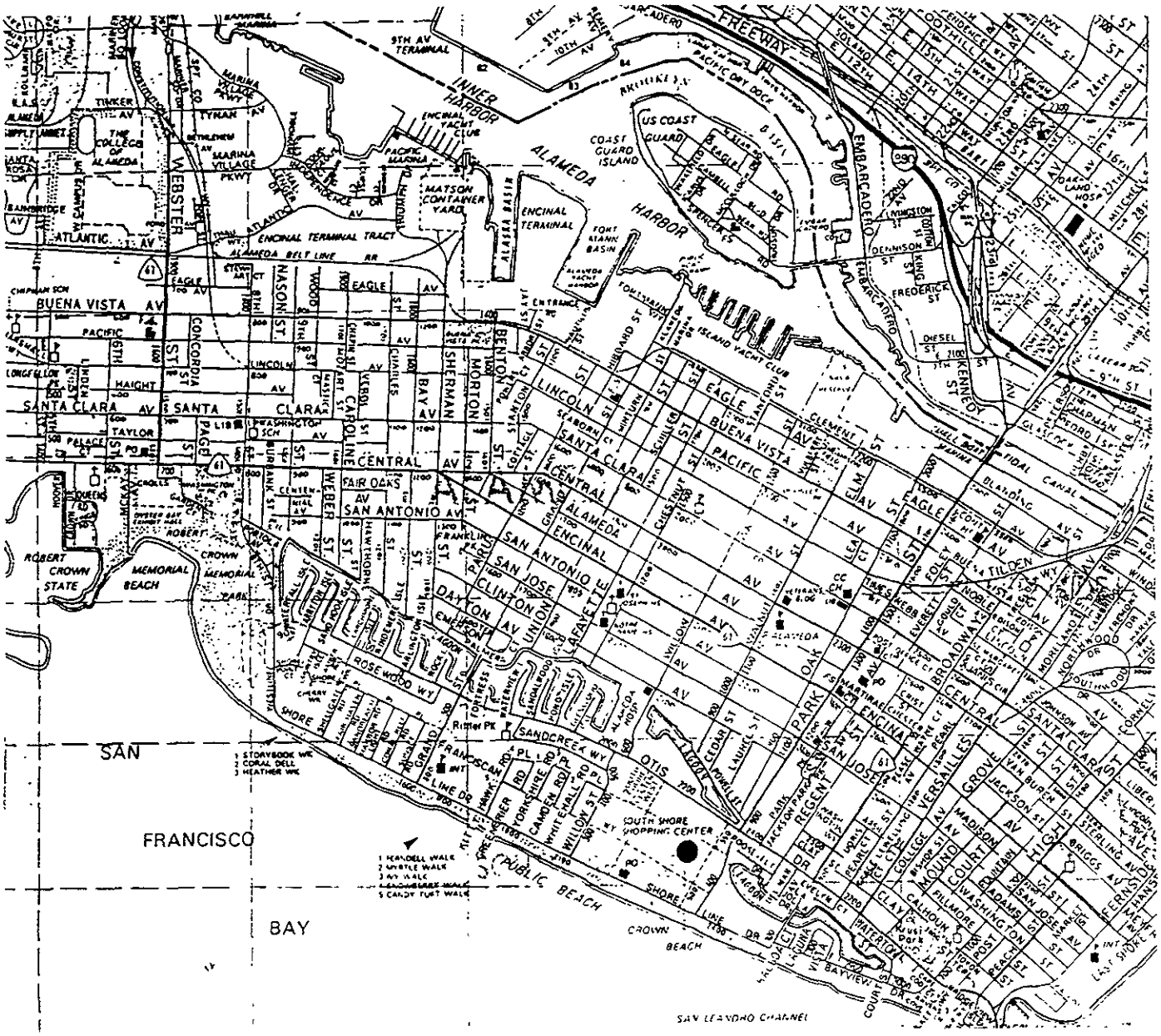
Figure 1. Site Location Map

Figure 2. Tank, Stockpile & Sample Location Map

Figure 3. Existing Monitoring Well Location Map

Figure 4. Proposed Monitoring Well Location Map

ALAMEDA FIRE DEPARTMENT #2



635 Pacific Avenue, Alameda, California

Figure 1. Site Location Map

ENVIRONMENTAL
TECHNICAL
SERVICES

at: ALAMEDA FIRE STN. #2. 11/15/91

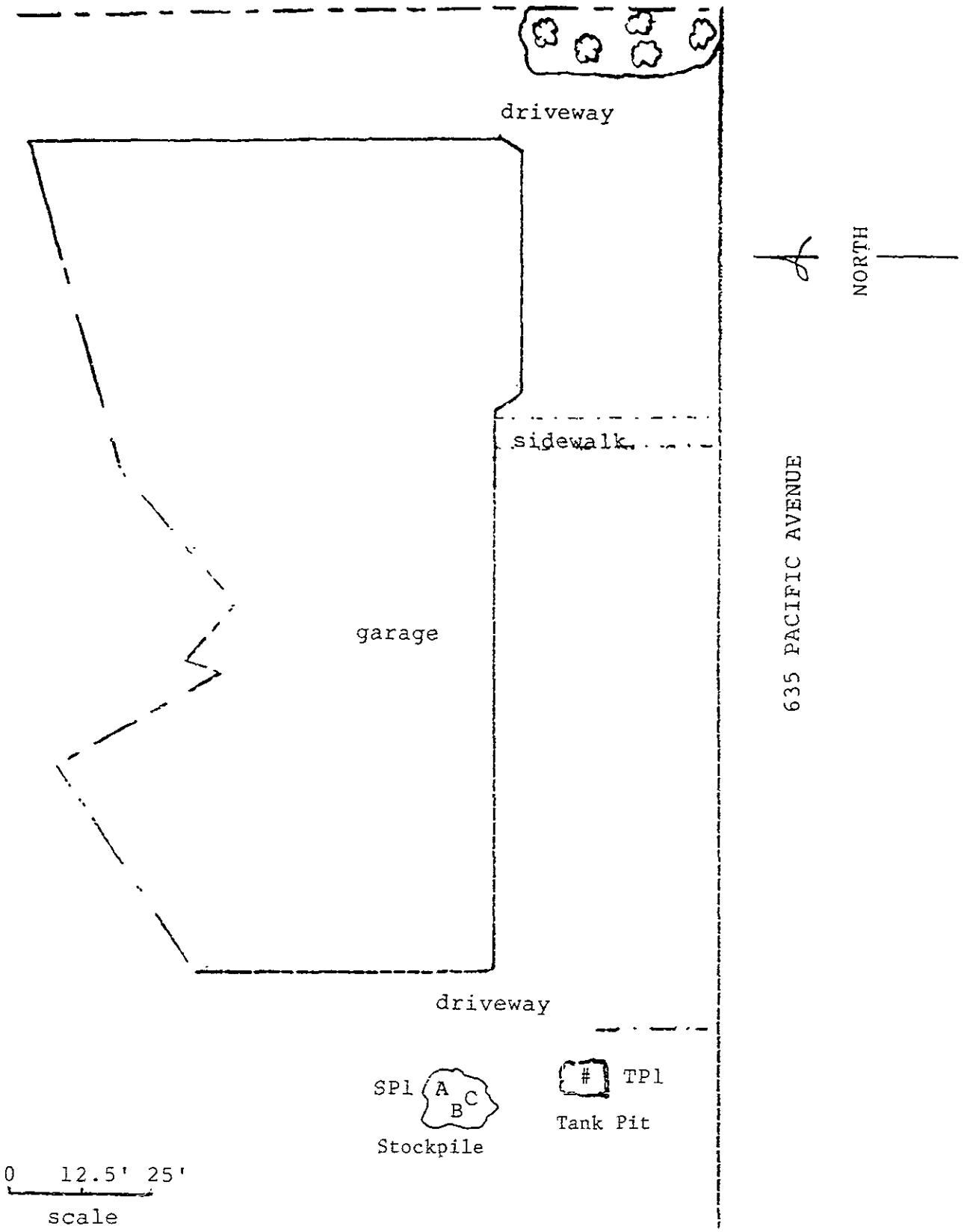


Figure 2. Tank Pit, Stockpile, and Sample Location Map

ENVIRONMENTAL
TECHNICAL
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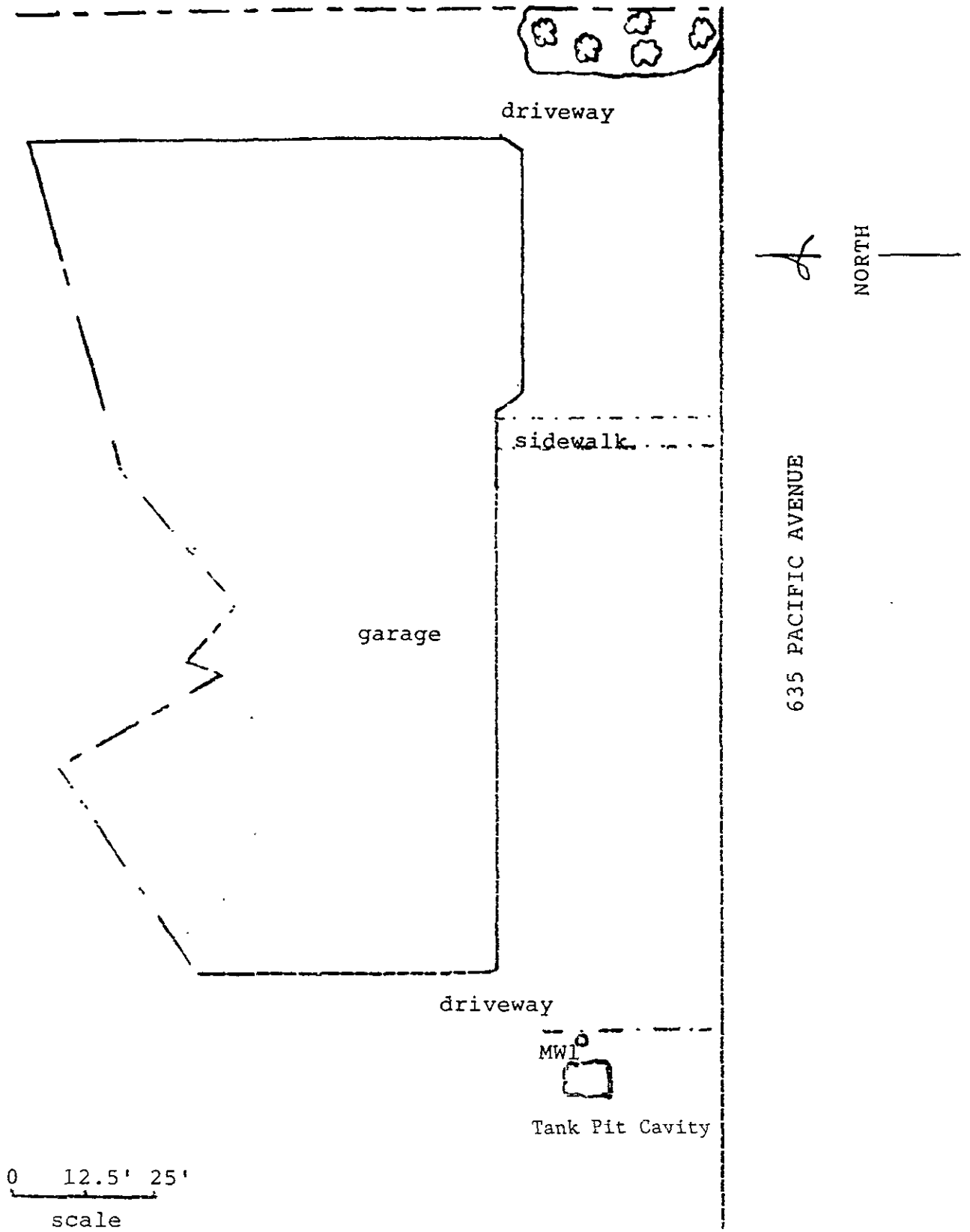
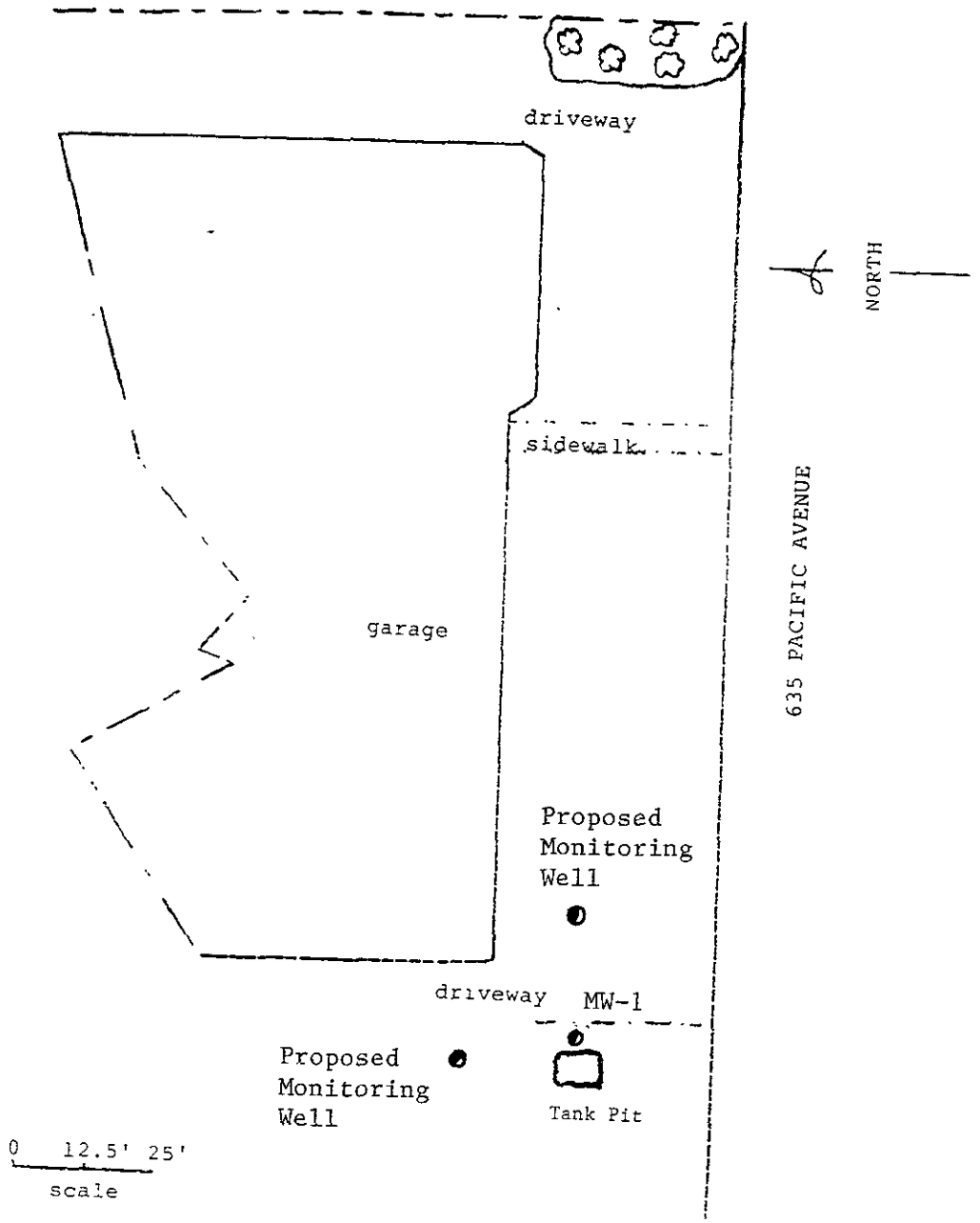


Figure 3. Existing Monitoring Well Location Map

ENVIRONMENTAL
TECHNICAL
SERVICES

at: ALAMEDA FIRE STN. #2.



● Monitoring Well

Actual Monitoring Well Locations Will Be Based Upon Local Gradient File Search

Figure 4. Proposed Monitoring Well Location Map

APPENDIX C

285 gallon Tank Removal Report
Zaccor Corporation November 20, 1991

November 20, 1991

City Hall of Alameda
Engineering Department
2263 Santa Clara at Oak Street
Room 207
Alameda, CA 94621
ATTN: Hank Wong

The following documentation concerns the initial tank removal and subsequent confirmatory sample collection, at:

ALAMEDA FIRE STATION #2
635 PACIFIC AVENUE
ALAMEDA, CALIFORNIA

On November 15, 1991, one 285 gallon underground storage tank was removed from the above referenced site. The tank recently contained diesel but had stored gasoline in past years.

Field Sampling was performed in accordance with state and local agency approved methodology, in the presence of Mr. Brian P. Oliva, Hazardous Materials Specialist for the Alameda County Department of Environmental Health.

See accompanying site diagram for the tank location, field sampling designations, and sampling depths.

UNDERGROUND STORAGE TANK INSPECTION

The tank condition was inspected upon removal. Rust and some pitting were noted. No holes were apparent. A slight hydrocarbon odor was present within the tank cavity backfill and native soil.

TANK PIT SAMPLING

A soil sample was collected from beneath the tank center. This was accomplished by the clearing of fill material and slough from the designated sample area. A backhoe bucket then obtained a sample from 12" to 18" into the native soil. The surface three inches of soil was removed from the backhoe bucket and a clean brass sleeve driven into the remaining soil.

TANK PIT SAMPLING-continued

The soil was packed into the brass sleeve to eliminate head space. Each sleeve end was immediately covered with a teflon sheet, fitted with plastic caps, sealed with duct tape, labeled, and placed under chain of custody, on blue ice for transport to a Certified Hazardous Waste Analytical Laboratory by laboratory personnel.

STOCKPILE SAMPLE COLLECTION

Approximately six cubic yards of soil was excavated from the tank pit cavity at the time of the tank removal. The excavated soil was stockpiled on asphalt and covered with Visqueen.

A composite soil sample was collected by dividing the stockpile into three sections. A brass sleeve was filled within each section by removing the surface two feet (2′) of soil. A clean brass sleeve was driven into the remaining soil. The three soil samples were composited at a certified laboratory to be analyzed as one sample.

SAMPLE DATA

Matrix	Sample #	Location	Depth
Soil	TP-1	Beneath Tank Center	9′
Soil	SP1A-C	Stockpile	2′

SOIL SAMPLE ANALYSIS

#TP-1 and #SP1A-1C were analyzed for Total Petroleum Hydrocarbons as diesel (TPH-D, using EPA Method 3550), benzene, toluene, ethylbenzene and total xylenes (BTEX, using EPA Method 8020).

SOIL ANALYTICAL RESULTS

Sample#	TPH-D (ppm)	B (ppb)	T (ppb)	E (ppb)	X (ppb)
TP #1	ND	ND	6.5	ND	44
SP1A-C	220	ND	ND	ND	52

Not Detected at the lower detection limit.

RECOMMENDATIONS & CONCLUSIONS

The State Water Resources Control Board Document, Leaking Underground Fuel Tank Field Manual (LUFT), supported by the San Francisco Regional Water Quality Control Board (SFRWQCB), defines acceptable limits and appropriate actions for addressing UST contamination.

Stockpile composite sample, SP1A-C, contained a detectable amount of Total Petroleum Hydrocarbons as diesel at 220 ppm and total xylenes at 52 ppb.

Sample #TP-1 contained a detectable amount of toluene at 6.5 ppb and total xylenes at 44 ppb.

REPORT

Copies of the sampling report, chain of custody, and certified analytical report should be submitted to both the SFRWQCB and the Alameda County Department of Environmental Health.

The following addresses have been listed for your convenience:

Water Quality Control Board
San Francisco Bay Region
2101 Webster St. Rm. 500
Oakland Ca. 94612
ATTN: Fuel Leaks Division

Alameda County
Department of Environmental Health
Hazardous Materials Division.
80 Swan Way, Room 200
Oakland, California 94621

It has been a pleasure working with you. If I can be of further service please call me at (415) 363-2181.

Sincerely,
ZACCOR CORPORATION

Gary Zaccor

ALAMEDA FIRE DEPARTMENT #2, 635 Pacific Ave, Alameda, California

11/15/91

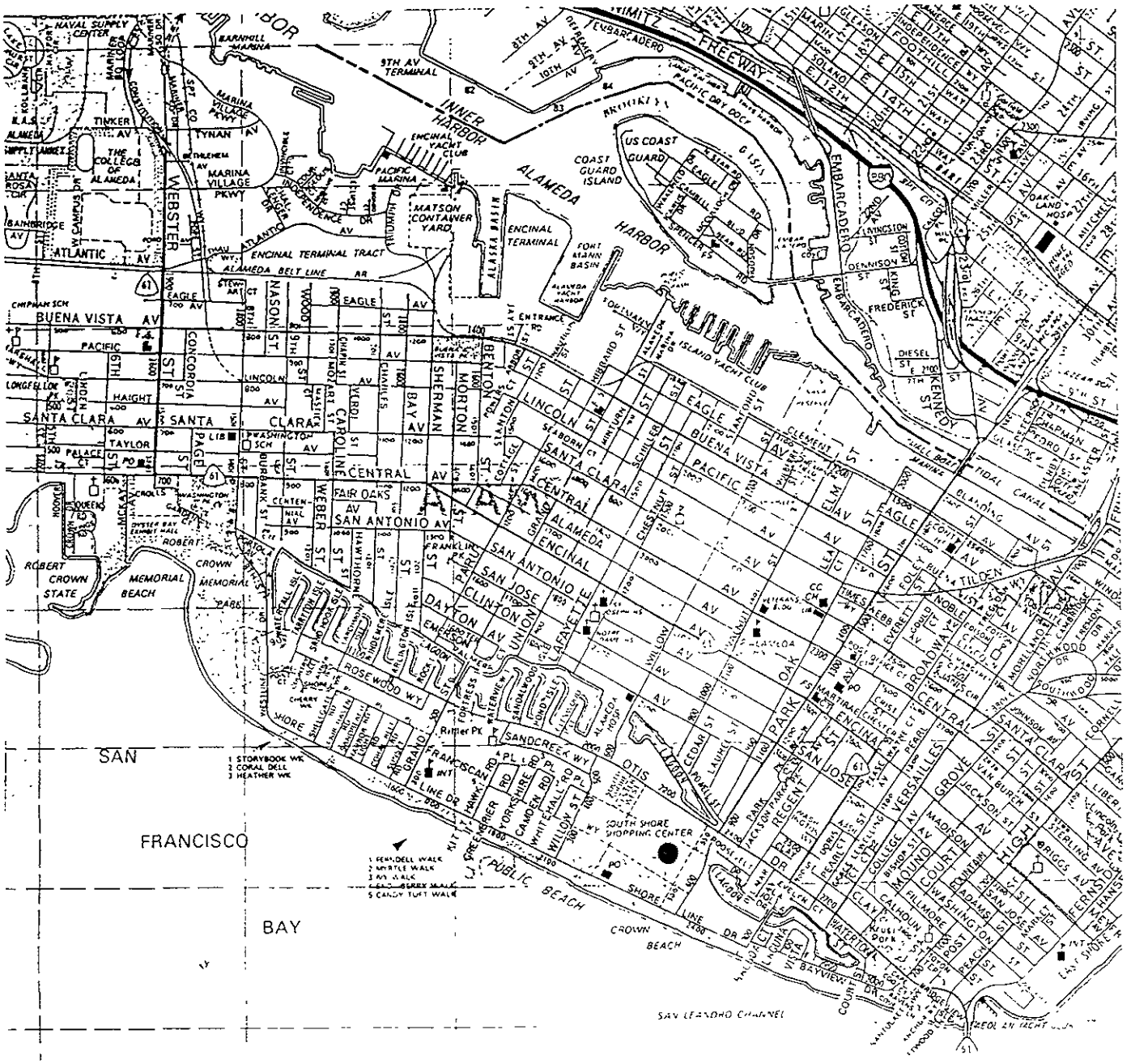
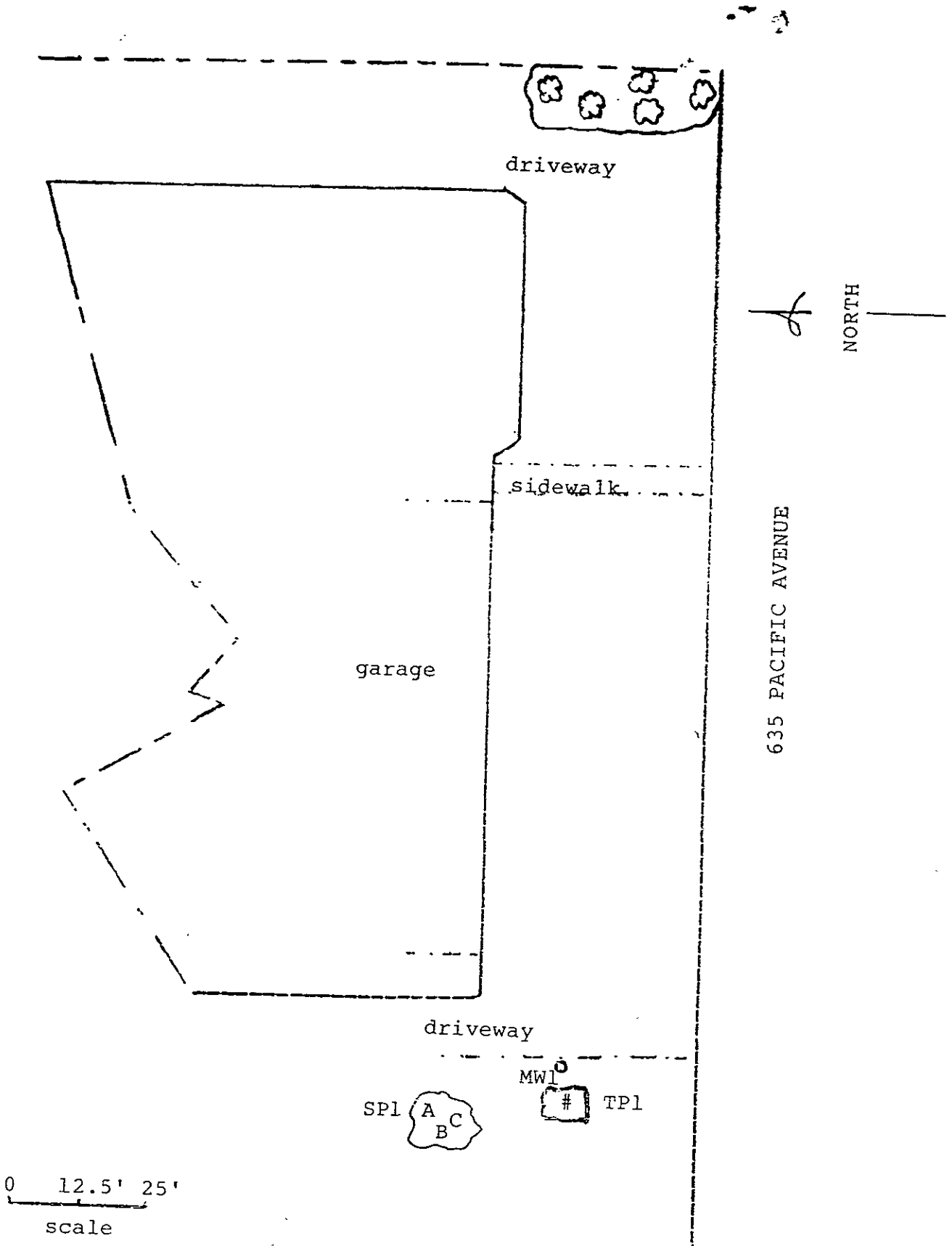


Fig.1 Site Location Map.

ENVIRONMENTAL
TECHNICAL
SERVICES

at: ALAMEDA FIRE STN. #2.

11/15/91



CHROMALAB, INC.

Analytical Laboratory (E694)

5 DAYS TURNAROUND

November 15, 1991 ChromaLab File No.: 1191152

ZACCOR CORPORATION

Attn: Gary Zaccor

RE: Two rush soil sample for BTEX and Diesel analysis

Project Name: ALAMEDA FIRE DEPT.
Project Number: ALM.FIRE
Date Sampled: Nov. 15, 1991 Date Submitted: Nov. 15, 1991
Date Extracted: Nov. 15, 1991 Date Analyzed: Nov. 15, 1991

RESULTS:

Sample I.D.	Diesel (mg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl Benzene (µg/kg)	Total Xylenes (µg/kg)
TP-1	N.D.	N.D.	6.5	N.D.	44
SP1A-1C	220	N.D.	N.D.	N.D.	52
LANK	N.D.	N.D.	N.D.	N.D.	N.D.
BLANK	N.D.	N.D.	N.D.	N.D.	N.D.
SPIKE RECOVERY	89.2%	85.7%	93.9%	100.8%	106.6%
DETECTION LIMIT	1.0	5.0	5.0	5.0	5.0
METHOD OF ANALYSIS	3550/ 8015	8020	8020	8020	8020

ChromaLab, Inc.

David Duong
Chief Chemist

Eric Tam
Laboratory Director

2239 Omega Road, #1 • San Ramon, California 94583
510/831-1788 • Facsimile 510/831-8798
Federal ID #68-0140157

ZACCOR COMPANIES, INCORPORATED Sampling by Environmental Technical Services

CLIENT CHAIN-OF-CUSTODY RECORD

PROJECT NUMBER	PROJECT NAME	Send Report Attention of:	Report Due	Verbal Due
ALM. FIRE	Alameda Fire Dept 635 Pacifica, Alameda	Menlo Park Ca GARY ZACCOR 791 Hamilton Ave,	/ /	/ /

CHROMALAB FILE # 1191152
PO # 4194

Sample Number	Date	Time	Comp	Grab	Station Location	Number of Cntnrs	Type of Containers	Type of Analysi: TPH as Diesel	BTEX	Samples	Initial
TP-1	11/15/91	9:05 AM		X	Beneath 9' Tank Center	1	BRASS SLEEVE	X	X		
SPIA-1C	11/15/91	9:10 AM	X		Stock pile 2'	3	BRASS SLEEVES	✓	✓		

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
Helen Wawrzyniec	11-15-91		
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time

Remarks: SAME DAY ANALYSIS

SAMPLE DISPOSAL:
Return to Client [ ]
Soil Disposal by Anametrix ($5.00 per container) [ ]

COMPANY: ZACCOR (0121)
ADDRESS: 791 Hamilton Ave Menlo Park, Ca
PHONE : 363-2181 FAX :

5025

APPENDIX D

Aqua Science Engineers, Inc
Monitoring Well construction Report
July 2, 1986

aqua science engineers inc.

July 2, 1986

PROJECT REPORT

FUEL TANK MONITORING WELL INSTALLATION

For The

City of Alameda
Room 204
Santa Clara and Oak Streets
Alameda, California 94501

Submitted
By

Aqua Science Engineers
P.O. Box 535
San Ramon, California 94583

to eight. The proposal and subsequent additions have been approved by the Alameda County Flood Control and Water Conservation District, Zone 7 and well drilling permits issued. The monitoring wells were installed during the period begining June 2 and ending June 4, 1986.

We certify that all licensing, credential and permit requirements under Chapter 3 of the GMG covering owner responsibility with regard to responsibility of performance (3.1), compliance with existing statutes (3.2), and well construction permits (3.3) have been satisfied. The hazardous materials classification used with reference to the Alameda County Water District GMG was that for commercial motor fuel (4.1).

The elements of the following report include monitoring well construction, figures depicting the site, tank configuration and monitoring well placement, well logs, soil and water sampling, analysis for hydrocarbons and recommendations for continued monitoring.

MONITORING WELL CONSTRUCTION

A 2-inch diameter PVC monitoring well was installed adjacent to each of the underground fuel tanks or tank configurations during the period 6/2 thru 6/4/86 (Figures 1 thru 6). The wells are located in the assumed direction of groundwater flow and satisfy the criteria within section 5.1.3. (GMG) concerning adequacy of monitoring coverage with respect to tank dimensions and spacing.

A Geo Space mobile drill with an 8-inch hollow stem auger was used and 2-inch PVC casing was installed in the borings. Screw caps were attached to the 2-inch PVC and 12-inch steel street boxes were grouted in to prevent surface contamination from entering the well. Eye bolt anchors were set in the street boxes to allow the placement of locks which will preclude tampering with the monitoring wells. A description of the well construction and findings is provided in the boring logs (Appendix).

The well screen used was 2 inch I.D. PVC tubing with 0.010 inch slots. The annular space outside each well screen was packed with washed No. 3 aquarium sand. The top of each well was sanitary sealed with neat portland cement to prevent surface contamination from entering the borings.

The well logs (see appendix) indicate layers of sand, and sandy clays of variable thickness were encountered at each of the borings with the exception of the golf course where the soils were mainly clays. Drilling was terminated after having penetrated at least five feet of saturated aquifer, the full depth of the primary aquifer to aquiclude, or at least five feet of aquiclude in the region of the water table. The engineer on site was careful to conduct the boring to a depth at which conclusive hydrogeolgic results were obtained without penetrating the bay muds of the region which protect underlying aquifers.

Saturated conditions were first encountered at depths between four and seven feet. Since, in all cases, groundwater was encountered at a depth of less than 20 feet, no vadose monitoring well was required within the tank backfill. Details of well construction in each case, including

final depth to water, are shown on the accompanying well logs.

Motor fuels are essentially non-miscible with water and are lighter than water; therefore, when present, they will be found floating on top. The important interval to monitor is at the motor fuel-water interface (GMC 5.2). For this reason well screen was installed in the appropriate region about this interface to allow for fluctuations in groundwater level. The boring from the bottom of the well screen to the bottom of boring was backfilled with bentonite to protect deeper aquifers against possible introduction of contaminants via the monitoring wells.

SOIL AND WATER SAMPLING

Alameda County Groundwater Monitoring Guidelines state that soils shall be sampled, starting at the bottom of the tank, every 5 feet to the water table (6.1). A modified California split spoon sampler, holding 4, 2-in x 4-in brass tubes was used to take undisturbed samples. The samples thus obtained were used for soil classification but, in all cases, were excluded from chemical analysis since groundwater levels were above the level of the tank bottoms. Water samples were taken from the newly installed and developed monitoring wells, sealed, refrigerated, and transported to the lab for analysis.

Chemical analysis of the samples was performed by Wesco Laboratories, Novato, CA. using Gas Chromatography/Flame Ionization Detection. The hydrocarbon concentration in the samples obtained adjacent to the Fire House #3 diesel tank and the Police Station diesel tank indicate low to moderate levels of contamination at these sites. Hydrocarbon concentrations of 5.4 ppm and 1.6 ppm respectively were recorded (see appendix). The RWQCB is to be notified directly concerning these findings. At the Golf Course, odors of old, decomposing fuel were detected but high levels of fuels were not detected in the chemical analysis.

At all of the other sites sampled and tested, the hydrocarbon concentration recorded in the test results indicate levels below which either the Department of Health Services or the Regional Water Quality Control Board would require further action. Additionally, these sites have no prior history of contamination. Drilling spoils were frequently checked for fuel odors throughout the drilling. None were found.

SCHEDULE FOR CONTINUED MONITORING

To assure early detection in the event of a fuel leak or spill, monthly monitoring is required (GMC 6.3.2). Groundwater monitoring wells for motor fuels are generally sampled using a clear plastic ball-valve bailer. The visual indication is the presence of sheen at the water surface which reflects rainbow colors when exposed to sunlight. Should positive results be found, you must notify hazardous materials officials at the California Regional Water Quality Control Board and the Alameda County Flood Control and Water Conservation District, Zone 7 as soon as possible.

Monitoring is also required of vadose wells, on a quarterly basis (GMC

6.3.2). The procedure recommended by ACWD is to pump vapor from the monitoring well through a portable field analyzer (CMC 6.4). Should you find positive results, you must notify the hazardous materials administrators as soon as possible.

If you wish we can set up a groundwater and/or vapor monitoring program and maintain a monthly log of the results. The fee for a water monitoring well is $45.00 per month for water monitoring wells and $50.00 per quarter for vapor monitoring wells.

William F. Rusk, PhD.
Director

Approved:

David M. Schultz, P.E.
C 38738

APPENDIX

CREDENTIALS

Engineer of Record

For Aqua Science Engineers:
David M. Schultz, Civil Engineer
Calif. State License P.E. C 38738
1280 C, Suite 144
Walnut Creek, CA 94596

Driller

ASE Drilling
P.O. Box 535
San Ramon, CA 94583
License #487000

Laboratory

Wesco Laboratories
State Certified Water Quality Lab
14 Galli Drive, Suite A
Novato, CA 94947

PRIMARY AUTHORITY FOR MONITORING WELL REQUIREMENTS

Alameda County Flood Control and Water Conservation District, Zone 7 as put forth in:

(GMG) Groundwater Monitoring Guidelines
for Hazardous Materials Storage. May 1984.
Alameda County Water District
38050 Fremont Boulevard
Fremont, CA 94537

WESCO LABORATORIES

RECEIVED
JUN 18 1986
AQUA SCIENCE ENG.

Date: June 17, 1986
Client: Aqua Science
Submitted by: E. Bratlien
Report to: Aqua Science
WESCO Job #: AQS 8648

Client Job/P.O. #: Alameda City
Date collected: 6-9-86
Date submitted: 6-10-86
& type of sample(s): 8 Water

Lab No.	Client ID	Motor Fuel (mg/l)	Benzene (mg/l)	Toluene (mg/l)	Xylene (mg/l)	Fuel Type	
4629	Fire House #2 635 Pacific Street	< 0.2	———	———	———	Diesel	
4630	Fire House #3 1703 Grand Street	5.4	———	———	———	Diesel	
4631	Police Dept. 1555 Oak Street	1.6	———	———	———	Diesel	
4632	Fire House #1 1300 Park Street	< 0.2	———	———	———	Diesel	
4633	City Hall #1 2263 Santa Clara	< 0.05	< 0.001	<.0.001	< 0.001	Gasoline	
4634	City Hall #2 2263 Santa Clara	< 0.05	< 0.001	< 0.001	< 0.001	Gasoline	
4635	Fire House #3 1703 Grand Street	< 0.05	< 0.001	< 0.001	< 0.001	Gasoline	
4636	Alameda Municipal Golf Course	< 0.05	< 0.001	< 0.001	< 0.001	Gasoline	
	METHOD: Note 1						

NOTES:
Note 1 - EPA method 5020/8015/8020.

Analytical Supervisor

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRIC

5997 PARKSIDE DRIVE, PLEASANTON, CALIFORNIA 94566 415-484-2600

GROUNDWATER PROTECTION ORDINANCE PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

(1) LOCATION OF PROJECT Firehouse #2
635 Pacific Street
Alameda, CA 9[illegible]

(2) CLIENT
Name City of Alameda
Address 2263 Santa Clara Phone (415) 522-4100
City Alameda, CA Zip 94501

(3) APPLICANT
Name Aqua Science Engineers *
Address 1 Crow Canyon Ct. Suite 100 Phone (415) 830-0391
City San Ramon, CA Zip 94583

(4) DESCRIPTION OF PROJECT
Water Well Construction X Geotechnical ___
Cathodic Protection ___ Well Destruction ___

(5) PROPOSED WATER WELL USE
Domestic ___ Industrial ___ Irrigation ___
Municipal ___ Monitoring X Other ___

(6) PROPOSED CONSTRUCTION
Drilling Method:
Mud Rotary ___ Air Rotary ___ Auger X
Cable ___ Other ___

WELL PROJECTS
Drill Hole Diameter 8 in. Depth 15 ft.
Casing Diameter 2 in. Number 1
Surface Seal Depth 5 ft.
Driller's License No. 483678

GEOTECHNICAL PROJECTS
Number ___
Diameter ___ in. Maximum Depth ___ ft.

(7) ESTIMATED STARTING DATE 6-2-86
ESTIMATED COMPLETION DATE 6-4-86

(8) I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE David Schultz 5-27-86

FOR OFFICE USE

PERMIT NUMBER 86137
LOCATION NUMBER

Approved Craig A. Mayfield Date 3 Jun
Craig A. Mayfield

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as t arrive at the Zone 7 office five days prior t proposed starting date.
2. Notify this office (443-9300) at least one da ~~prior to starting work on permitted work an~~ before placing well seals.
3. Submit to Zone 7 within 30 days after completio of permitted work the original Department o Water Resources Water Well Drillers Report or equivalent for well projects, or bore hole log and location sketch for geotechnical projects. Permitted work is completed when the last surface seal is placed or the last boring is completed.
4. Permit is void if project not begun within 90 days of approval date.

(B.) WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie, or equivalent.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic, irrigation, and monitoring wells unless a lesser depth is specially approved.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie, or equivalent.

E. WELL DESTRUCTION. See attached.

* Aqua Science Engineers Representative:
Mr David Schultz

AQUA SCIENCE ENGINEERS WELL LOG

Casing: 2" PVC
Well Depth: 18.0 ft.
Logged By: D. Schultz, P.E.
Water Depth: 5.0 ft.
Driller: ASE

Alameda Firehouse #2
635 Pacific Street
Alameda, CA
Boring # 1
Date: 6-3-86

DEPTH (ft.)	SOIL DESCRIPTION	WELL CONSTRUCTION DETAILS
0-	Brown Sand	
2-		
4-		
6-		
8-		
10-		
12-		
14-		
16-		
18-		
20-		
22-		
24-	Bottom of Boring 23.0 ft.	

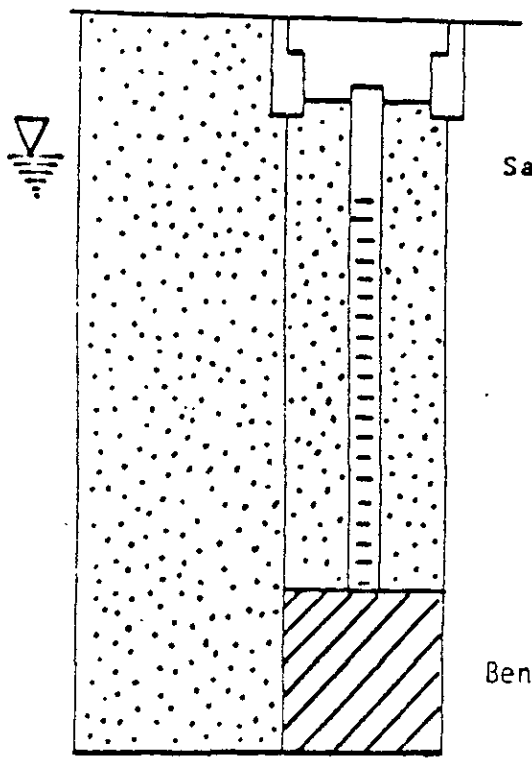


Figure 3

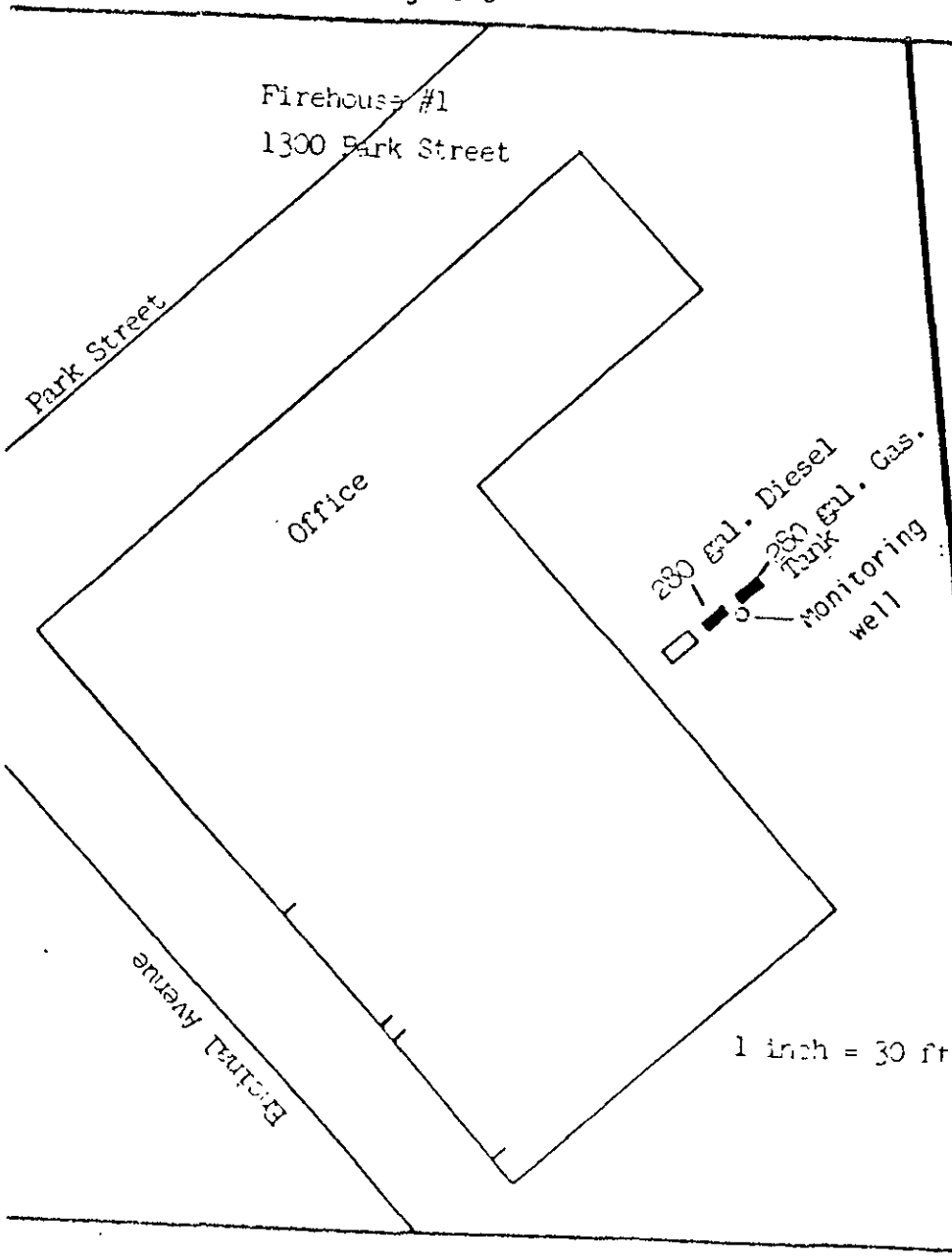
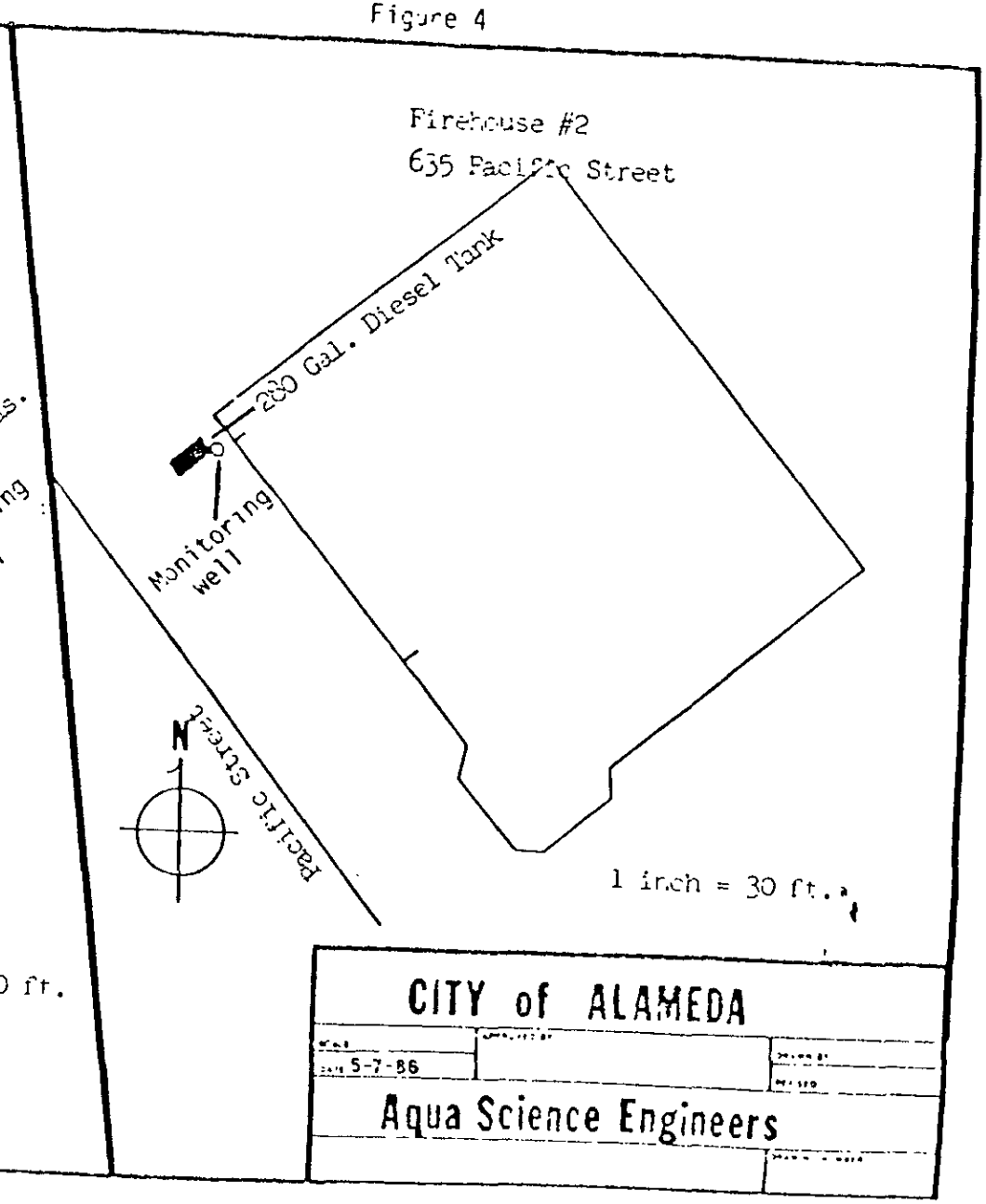


Figure 4



APPENDIX E

Unified Soil Classification System

Boring Log Examples

PRIMARY DIVISIONS			GROUP SYMBOL	SECONDARY DIVISIONS
COARSE GRAINED SOILS — MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS — MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS (LESS THAN 5% FINES)	GW	Well graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.
		GRAVEL WITH FINES	GM	Silty gravels, gravel-sand-silt mixtures, non-plastic fines.
			GC	Clayey gravels, gravel-sand-clay mixtures, plastic fines.
	SANDS — MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS (LESS THAN 5% FINES)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES	SM	Silty sands, sand-silt mixtures, non-plastic fines.
			SC	Clayey sands, sand-clay mixtures, plastic fines.
FINE GRAINED SOILS — MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS — LIQUID LIMIT IS LESS THAN 50%		ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS — LIQUID LIMIT IS GREATER THAN 50%		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Inorganic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

DEFINITION OF TERMS

U.S. STANDARD SERIES SIEVE				CLEAR SQUARE SIEVE OPENINGS			
200	40	10	4	3/4"	3"	12"	
SILTS AND CLAYS	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

GRAIN SIZES

SANDS AND GRAVELS	BLOWS/FOOT†
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

RELATIVE DENSITY

SILTS AND CLAYS	STRENGTH‡	BLOWS/FOOT†
VERY SOFT	0 - 1/4	0 - 2
SOFT	1/4 - 1/2	2 - 4
FIRM	1/2 - 1	4 - 8
STIFF	1 - 2	8 - 16
VERY STIFF	2 - 4	16 - 32
HARD	OVER 4	OVER 32

CONSISTENCY

†Number of blows of 140 pound hammer falling 30 inches to drive a 2 inch O.D. (1-3/8 inch I.D.) split spoon (ASTM D-1586).

‡Unconfined compressive strength in tons/sq. ft. as determined by laboratory testing or approximated by the standard penetration test (ASTM D-1586), pocket penetrometer, torvane, or visual observation.

UNIFIED SOIL CLASSIFICATION SYSTEM

(ASTM D-2487)

Soil Color derived from the MUNSELL Soil Color Charts

MONITORING WELL BORING LOGS

ENVIRONMENTAL TECHNICAL SERVICES
for: ZACCOR CORPORATION

AT:

MW-2

R.G. Roger Greensfelder PHD #3011

Drilling Method : Augers

Sample Method : Split Spoon

Project Manager: Gary Zaccor

2/21/91

DEPTH	SAMPLE COLLECTED: INT. SAMPLE#	Soil Description	USCS	LOG	BLOW COUNTS	WELL CONSTRUCTION
5'	MW-2 6'-6.5'	FINE - MEDIUM GRAIN SAND WITH LITTLE CLAY 10%, tan, moist, no odor.	SC		6,9,9	
10'	MW-2 11'-11.5'	FINE - MEDIUM GRAIN SAND WITH LITTLE CLAY 10%, tan mottled with dark brown sand, moist, no odor.	SC		17,18,20	
15'	MW-2 15'-15.5'	FINE - MEDIUM GRAIN SAND WITH A LITTLE MORE CLAY tan, no odor.	SC		22,31,X	
20'	MW-2 20.5'-21'	FINE - MEDIUM GRAIN SAND WITH LITTLE CLAY 2%, saturated, no odor.	SC			
25'						
30'						

WELL CONSTRUCTION: LOCKED CAP; BLANK CASING; PVC SCREEN 0.010" SLOT; BOTTOM PLUG; PVC CASING 2" ID SCHED 40; CHRISTY BOX; GROUT; BENTONITE SEAL; LONESTAR #3 SAND FILTER PACK

APPENDIX F

Site Safety Plan

ENVIRONMENTAL TECHNICAL SERVICES

SITE HEALTH AND SAFETY PLAN

SITE: FIRE STATION #2
635 PACIFIC STREET
ALAMEDA, CALIFORNIA

Site Safety Officer:
Gary Zaccor
Zaccor Corporation

Contractor:
Zaccor Corporation

Sub-contractor:
Environmental Technical Services

The excavation of contaminated soil and the advancement of two-monitoring wells.

ASSOCIATED HAZARDS INCLUDE:

Heat Exposure

Flammable and Explosive Vapors

Open Tank Pits and Trenches

Heavy Earth Moving Equipment

Tripping and Falling

Exposure to Total Petroleum Hydrocarbons
By Inhalation & Absorption

The TTV for gasoline has been established at 300 ppm. This may fluctuate with the gasoline octane content. The TTV for diesel has not been determined.

Site Safety

The following Site Safety Plan will be implemented prior to the commencement of work activities. All personnel involved in the investigation will be informed of the following safety requirements. It is the responsibility of Zaccor Corporation and Environmental Technical Services project managers to implement these procedures.

It is the responsibility of each individual to be aware of his own safety and to be alert to any safety hazard that may pose a threat, and to make a reasonable effort to remove the hazard. The project manager shall be made aware of the possible hazard.

The investigation may be stopped at any time safe working practices are not being observed and will not commence until the problem has been resolved.

The contractor is responsible for providing site security and safe conditions on site. Employees, customers, and pedestrians will be kept a safe distance from the working area during operations that may pose a health hazard.

Decontamination Procedures

All equipment in contact with hydrocarbon contaminated materials will be decontaminated prior to leaving the site. Water used for the decontamination process will be collected, then stored in Department of Transportation drums (DOT 17).

Safety Equipment

1. A minimum of one fire extinguisher on each piece of heavy equipment and service vehicle

2. A minimum of one first aid kit

3. A list of the nearest:

   urgent care clinic, hospital emergency room, fire department police department, and poison control center.

   This list with a map detailing the route to each emergency service will be given to each employee and will be present within the first aid kit. All personnel involved with the site investigation will be informed of this location.

4. GasTech Model 1314. Hydrocarbon Survey Instrument. Measures combustible vapor and oxygen concentrations.

Site Safety Meeting

A site safety meeting will be attended by all staff who will be working on the site including on-site business staff who may enter the work area.

Potential safety hazards, including the PEL/TLV of chemicals on site and measures to be taken to avoid such hazards will be reviewed.

The location of the fire extinguisher, first aid kit, site safety gear and list of emergency contacts will be given.

Safety Gear

The following gear will be used by each person working in the hazard area.

1. Hard Hats
2. Respirators or portable blowers should vapors within the working area exceed the TTV.
3. Steel toe boots

Alcohol or Drugs

Alcohol will not be consumed prior to commencing work or throughout the work day. The project manager will be made aware of any medications being used by personnel and informed of the possible side effects.

Smoking

Smoking will be prohibited within 50' of the work area.

A person who has spilled or otherwise acquired a flammable concentration of gasoline upon their clothing will not light a cigarette until all affected clothing has been removed.

Traffic

Vehicles, trailers, and earth moving equipment, will be parked in a courteous manner to not block fire hydrants, emergency vehicle pathways, walkways, building exits, or working areas unless prior arrangements have been made and no other working areas are available. Work is to be conducted in a manner to cause the least amount of disturbance to business.