5 5 6 9 6

SITE CONTAMINATION WORKPLAN

Cavanaugh Motors Facility
1700 Park Street
Alameda, California

Project Number 109001
April 15, 1991

prepared for

Mr. Dave Cavanaugh
Cavanaugh Motors
1700 Park Street
Alameda, California 94501

prepared by

TMC Environmental Inc.
13908 San Pablo Avenue, Suite 101
San Pablo, California 94806

TRANSMITTAL LETTER FROM RESPONSIBLE PARTY

Project name: Site Contamination Workplan
Cavanaugh Motors
1700 Park Street
Alameda, California 94501
April 15, 1991

Tank Owner Commitment - The enforcing agencies require a cover letter with a statement of commitment from the tank owner (or Responsible Party designated by the tank owner) to be submitted with all reports and workplans.

The Responsible Party states the following:

___ **I agree with the conclusions and recommendations in the workplan.**

___ **I disagree with the conclusions and recommendations in the workplan.**

The facts and findings in the workplan are accurate. The preparation of the workplan followed the guidelines of the Regional Water Quality Control Board and Local Implementing Agency.
I ___**do** ___**do not** request a meeting to discuss the options available to the Responsible Party for investigation or remediation.

_____ Date_____
Signature of Responsible Party

_____
Printed Name

_____
Company Name or Affiliation

TABLE OF CONTENTS
Site Contamination Workplan
Cavanaugh Motors
1700 Park Street, Alameda California

PLATES

SITE CONTAMINATION WORKPLAN
Cavanaugh Motors
1700 Park Street, Alameda California

1.0 GENERAL SITE INFORMATION

1.1 SITE LOCATION

The subject property, called the site in this workplan, is located at the following address and description:

Cavanaugh Motors
1700 Park Street
Alameda, California 94501
Alameda County
Appraisers parcel number: APN 70-192-21-1 and 24
Lots 1, 2, 3, portion of 4, 7 Block E of Alameda Station Homestead Tract (Book 17 page 60)

The site is at the northeast corner of the intersection of Park Street and Buena Vista Avenue. The corner lot is approximately 150 feet by 200 feet.

1.2 TANK OWNER

The current property owner is:

Mr. Dave Cavanaugh
1700 Park Street
Alameda, California 94501

Mr. Cavanaugh purchased the property in 1981 from Mr. William S. Bean

1.3 CONTACT PERSON

The contact person for this workplan is:

Mr. Tom Edwards, President
TMC Environmental Inc.
13908 San Pablo Avenue, Suite 101
San Pablo, California 94806
(415) 232-8366

TMC Environmental, Inc. is the environmental consultant that wrote this workplan.

1.4 SITE CONDITION

The site is presently being used for an automobile dealership. The site is in a commercial and retail neighborhood. Current activities on site include: new car showroom, sales offices, parts storage and distribution, outside car storage, vehicle repair shop with hydraulic hoists. Foot and vehicle traffic is heavy in this neighborhood and site. The site contains a large building with paved parking areas and driveways. Access to the dealership is from both Park Street that borders the property on the northwest and Buena Vista Avenue that borders the property on the southwest. Commercial and retail businesses border the property.

1.5 GEOLOGY

The site is about one half mile west of the Oakland Estuary and Inner Harbor Waterway. The Inner Harbor Waterway connects San Leandro Bay and San Francisco Bay. As suggested by U.S. Geological Survey geological publications, the site is on the Alameda Bay Plain that has an alluvial fan environment. The Merritt Sand Formation is the main stratigraphic unit in the upper aquifer. This unit usually has unconsolidated beach sand and near shore deposits. Borings on the site previously encountered sands and sandy clays. Groundwater in the Merritt Sand Formation is unconfined. Ground water is about eight feet below grade at the site. The direction of ground water flow as measured in four existing ground water monitoring wells on June 8, 1990 was approximately **north 23 degrees west** with a gradient of 0.007 ft/ft.

1.6 MAPS

Site Vicinity Map	Plate 1
Site Map	Plate 2
Sampling Map- Gasoline Tank	Plate 3
Sampling Map- Waste Oil Tank	Plate 4
Proposed Sampling Map	Plate 5

1.7 LEAD IMPLEMENTING AGENCY

As stated in a letter to Mr. Dave Cavanaugh dated January 31, 1990 from the Alameda County Health Care Services Agency; the lead implementing agency authorized by the Regional Water Quality Control Board to oversee this site is the:

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

The officer overseeing this case is:

Katherine A. Chesick
Senior Hazardous Materials Specialist
(415) 271-4320

Inquiries regarding this case should be referred to Ms. Chesick.

2.0 SITE HISTORY

2.1 BACKGROUND

The property developed in 1948 as a new automobile dealership, has remained an automobile dealership. Mr. William S. Bean, the first proprietor, owned the property from 1948 until 1981. In 1981, Mr. Bean sold the property to Dave Cavanaugh, the present owners. Mr. Cavanaugh reported to **TMC** that two underground tanks installed on the site by Mr. Bean in 1948 have the following capacities; a 550 gallon gasoline storage tank and a 300 gallon waste oil storage tank. Scott Corporation removed the 550 gallon gasoline tank, dispenser, and piping on December 15, 1989.

The six inch thick concrete floor overlaid the 300 gallon waste oil storage tank inside the vehicle repair shop. Next to the tank was a hydraulic lift and the north wall of the building. A fill pipe of approximately four feet in length connected the south end of the tank to a fill hole in the concrete floor. On

August 14, 1990, **TMC** and Gene L. Failing Company removed the 300 gallon waste oil tank and related lines. **TMC** summarized the tank removal procedures and results in an April 8, 1991 report submitted to Cavanaugh Motors called, Tank Removal and Soil Excavation Report.

2.2 TANK INFORMATION

Mr. Cavanaugh reports that only two underground storage tanks have existed on the site as follows:

Tank 1:
550 gallon metal gasoline tank
Installation date 1948
Removed December 15, 1989
One dispenser on top of the tank

Tank 2:
300 gallon metal waste oil tank
Installation date 1948
Removed August 14, 1990
No remote fills

2.3 CONTAMINATION INFORMATION

Tank 1: 550 gallon gasoline tank

The dealership recorded daily inventory records from 1948 until August 10, 1989 when the gasoline tank retired from service. A certified underground tank testing company tested the tank gasoline tank in August 1986, June 1988, and August 1989. The August 4, 1989 tank testing showed the filler tube was leaking, No estimate of product loss is available. The period of product loss is less than one year, between tank testing episodes. The tank was in good condition with no holes when removed on December 15, 1989. Approximately 10-15 cubic yards of soil was excavated during the tank removal.

TMC removed most of the accessible gasoline contaminated soil surrounding the former location of the underground tank in a

controlled excavation on April 26, 1990. **TMC** aerated the excavated soil on site, then disposed of the treated soil at Durham Landfill. The adjacent building prevented the complete excavation of the gasoline contaminated soil. Soil borings estimated the remaining extent of soil contamination. TMC installed and sampled four ground water monitoring wells. **TMC** reported the results of the 550 gallon gasoline tank investigation in a report dated July 11, 1990, titled "Preliminary Assessment Report" submitted to Cavanaugh Motors.

Tank 2: 300 gallon waste oil tank

During removal of the 300 gallon waste oil tank on August 4, 1990, many holes were in the metal tank. Stained soil surrounded the tank. The is no available estimate on the quantity of released waste oil. Soil borings and a controlled excavation removed 120 cubic yards of waste oil contaminated soil. **TMC** reported the results of the 300 gallon waste oil tank removal in a report dated April 8, 1991 titled "Tank Removal and Soil Excavation Report" submitted to Cavanaugh Motors. The 300 gallon waste oil tank is the subject of this workplan.

2.4 POTENTIAL SOURCES OF OFF SITE CONTAMINATION

There are four potential sites of contamination within a half mile of Cavanaugh Motors. Because two of the four sites are directly next to Cavanaugh Motors, there is a significant potential for adverse impact from off site contamination. Below is a brief description of the environmental problems associated with each site:

1. Alameda Collision, 1911 Park Street-
A gasoline tank was removed from this property in June, 1988. Gasoline contamination affects the soil and ground water. The maximum ground water total petroleum hydrocarbon (TPH) as gasoline concentration was 1.7 ppm. The site may be down gradient of Cavanaugh Motors.

2. Mobil Service Station, 1541 Park Street-
In October 1987, underground gasoline tanks were removed from the property. Gasoline affects the soil and ground water. The maximum TPH as gasoline concentration in tank removal soil samples was 3200 ppm. Subsequent ground water sampling shows a maximum TPH as gasoline concentration of 2000 ppb. This property may be up gradient of Cavanaugh Motors.

3. Good Chevrolet, 1630 Park Street-
Two tanks were removed from this site in October 1986. The maximum soil TPH as gasoline concentration collected beneath the tanks was 2500 ppm. Ground water contains as much as 7600 ppb TPH as gasoline. This site is less than one block west of Cavanaugh Motors and may be up gradient.

4. Regal Exxon Service Station, 1725 Park Street-
Removal and replacement of the tanks occurred in June 1988. Serious soil and ground water contamination was discovered during the installation of new tanks. Subsequent ground water sampling has shown TPH as gasoline concentrations as high as 110,000 ppb. No free product has been found on the ground water. This site is directly across Park street from Cavanaugh Motors.

3.0 SUMMARY OF PAST INVESTIGATIONS

3.1 SUMMARY OF... Preliminary Assessment Report ... prepared by TMC Environmental, Inc. dated July 11, 1990. The investigation concerned the former 550 gallon gasoline tank. The report used the results from sampling of the former gasoline tank excavation, four soil borings, and four ground water monitoring wells. Plate 3 shows the location of the borings and wells sampled in this study. The following tables summarize the results of soil and water sampling and analyses in the report:

Table 1
Summary of Laboratory Test Results for Soil Samples from Exploratory Borings and Initial Excavation

Date Sampled	Sample & Depth	TPHg (mg/Kg)	Benzene	Toluene (mg/Kg)	Ethylben	Xylenes
Selected soil samples from borings:						
05-19-90	EB-1,5'	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005
05-19-90	EB-2,5'	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005
05-19-90	EB-3,5'	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005
05-19-90	EB-4,5'	ND<1.0	ND<0.005	ND<0.005	ND<0.005	0.034
Selected soil samples from excavation:						
04-26-90	SOUTH-1	ND<0.5	ND<0.005	ND<0.005	ND<0.005	ND<0.005
04-26-90	WEST-1	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005

ND -- Not Detected above stated detection limit

Table 2
Summary of Laboratory Test Results for Soil Samples from Monitoring Wells

Date Sampled	Sample & Depth	TPHg (mg/Kg)	Benzene	Toluene (mg/Kg)	Ethylben	Xylenes
Selected soil samples from monitoring wells:						
05-17-90	MW-1,5'	3,500	ND<0.005	190	76	510
05-17-90	MW-2,5'	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005
05-17-90	MW-3,5'	ND<1.0	ND<0.005	ND<0.005	ND<0.005	ND<0.005
05-17-90	MW-4,5'	ND<1.0	nd<0.005	nd<0.005	ND<0.005	ND<0.005

ND -- Not Detected above stated detection limit

Table 3
Summary of Laboratory Test Results
for Water Samples from Monitoring Wells

Date Sampled	Well Number	TPHg (ug/ L)	Benzene	Toluene (ug/L)	Ethylben	Xylenes
Water samples from monitoring wells:						
06-08-90	MW-1	28000.	6200.	7000.	630.	6100
06-08-90	MW-2	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5
06-08-90	MW-3	ND<50	ND<0.5	ND<0.5	ND<0.5	0.9
06-08-90	MW-1	ND<50	ND<0.5	ND<0.5	ND<0.5	1.6

ND -- Not Detected above stated detection limit

3.2 SUMMARY OF... Soil Excavation and Tank Removal Report ... prepared by TMC Environmental, Inc. dated April 8, 1991. The report presents the procedures and results of the 300 gallon waste oil tank removal. Plate 4 shows the location of the tank and sampling locations. The laboratory analysis of the soil sample recovered from below the removed underground tank reported the following results:

> Soil sample SS1 recovered 18 inches below the center of the tank contained 730 mg/Kg total petroleum hydrocarbons (TPH) as gasoline with 0.70 mg/Kg benzene, 16 mg/Kg toluene, 6.6 mg/Kg ethylbenzene, and 39 mg/Kg total xylenes; 6400 mg/Kg TPH as diesel; 20000 mg/Kg total oil and grease by standard method 503D; 17000 mg/Kg total oil and grease by standard method 503E; 0.25 mg/Kg cadmium, 31.6 mg/Kg total chrome, 24.0 mg/Kg nickel, 1040 mg/Kg lead, 111 mg/Kg zinc; 1.6 mg/Kg naphthalene, 1.5 mg/Kg 2-methylnaphthalene, 0.3 mg/Kg phenanthrene; and 22.0 mg/Kg methylene chloride, 59.0 mg/Kg chlorobenzene.

Four soil samples from exploratory borings around the perimeter of the former tank location were analyzed for total petroleum hydrocarbons as diesel. The results of the chemical analysis are as follows:

Sample B-1 recovered from sand at a depth of 7 to 7.5 feet below grade in boring number B-1. Laboratory analysis shows no detectable total petroleum hydrocarbons as diesel. No staining or odor was noticeable in the sample.

Sample B-3 recovered from sand at a depth of 8 to 8.5 feet below grade in boring number B-3. Laboratory analysis shows no detectable total petroleum hydrocarbons as diesel. No staining or odor was noticeable in the sample.

Sample B-5 recovered from sand at a depth of 8 to 8.5 feet below grade in boring number B-5. Laboratory analysis shows no detectable total petroleum hydrocarbons as diesel. No staining or odor was noticeable in the sample.

Sample B-4 recovered from sand at a depth of 8 to 8.5 feet below grade in boring number B-4. Laboratory analysis shows 680 mg/Kg of total petroleum hydrocarbons as diesel. The certified analytical report indicates the concentration appears to represent a heavier petroleum product, possibly motor oil. No staining or odor was noticeable in the sample.

TMC excavated approximately 120 cubic yards of waste oil contaminated soil from surrounding the former tank location, then back filled and compacted the hole with clean fill.

4.0 ASSESSMENT AND OBJECTIVES

4.1 ESTIMATE OF SPILLED OR LEAKED PRODUCTS

No precise estimate of spilled or leaked product is available. Inventory records for the gasoline tank suggest leakage of less than one years duration. No inventory records for the waste oil tank are available.

4.2 LACKING INFORMATION

The extent of waste oil contamination surrounding the former location of the 300 gallon tank cannot be determined due to insufficient soil and ground water samples.

4.3 OBJECTIVES

The purpose of this investigation is to:

1) find the lateral and vertical extent of waste oil soil contamination in the subsurface soils beneath the site
2) detect the presence of waste oil contamination in the ground water

5.0 PROPOSED WORK AND SCHEDULE

5.1 RATIONAL FOR WORK

TMC Environmental Inc. (TMC) is presenting a work plan summarizing the tasks required for the investigation of the Cavanaugh Motors facility at 1700 Park Street in Alameda, California, herein called the site. Previous removal of the underground waste oil tank showed that an unauthorized discharge of waste oil had occurred. The work plan proposes the work necessary to begin estimating the impact of waste oil contamination upon the ground water resource.

The tasks presented agree with the recent guidelines published by the enforcing agency, the Alameda County Health Care Services Agency located in Oakland, California; and the chief state agency, the Bay Area Regional Water Quality Control Board located in Oakland, California. The investigation, reclamation, and reporting guidelines applicable to leaking underground fuel tanks, available through these agencies, apply to this discharge.

5.2 SCOPE OF WORK

This work plan will address the investigation of waste oil contaminated soils and potential groundwater contamination at the site. Following this investigation, a Preliminary Investigation Evaluation Report will be prepared providing the results and recommendations for further investigation or remediation. All work will be under the direct supervision of a California Certified Engineering Geologist.

The following tasks summarize the work proposed in the workplan:

1. Install two 20 foot deep monitoring wells each of 2 inch-diameter at the locations shown in Plate 5, Proposed Sampling Locations. The location of the wells will effectively detect the presence of waste oil contamination near and down gradient of the former waste oil tank location.

2. Collect a soil sample at 5 feet and the ground water interface in each well. Ground water is about eight feet below surface grade.

3. Analyze the soil samples for the target pollutants: total petroleum hydrocarbons (TPH) as diesel, benzene, toluene, ethylbenzene, total xylene (BTEX) and petroleum oil and grease following RWQCB guidelines. The samples will be analyzed by a California Certified Laboratory and transported under proper chain-of-custody to assure the authenticity of each sample. Written laboratory results require about 15 working days.

4. Develop each well by extracting a minimum of 10 well volumes of stale well water into barrels for temporary storage.

5. Collect ground water samples and analyze them for the target pollutants: total petroleum hydrocarbons (TPH) as gasoline and diesel with benzene, toluene, ethyl benzene and xylenes (BTEX) distinction, petroleum oil and grease, and volatile organic compounds EPA method 8010.

6. Drill two hand augured borings surrounding the former tank location as shown on Plate 5 to find the lateral and vertical extent of soil contamination. Recover selected soil samples for analysis of hydrocarbon constituents. Select samples for laboratory analysis by screening with a portable hydrocarbon detector.

7. Prepare a Preliminary Investigation Evaluation Report providing results of the work described herein. Recommendations will be made concerning additional soil or groundwater investigation, and required reclamation.

5.3 SCHEDULE OF WORK

Boring and well permitting can normally commence 3 working days after authorization requiring 1-2 weeks for agency permit review. Verbal laboratory results are available 15 working days after sampling. This workplan does not include arrangements for rush service. The final report is available no later than 90 days following receipt in our office of authorization to proceed.

Personnel is available to begin work upon receipt of authorization to proceed from the Client and the implementing local agency. A reasonable schedule for doing the investigation described above is as follows:

TASK	CUMULATIVE WEEKS
Authorization to Proceed	1
Agency Permitting	3
Mobilize for Drilling	3
Well Sampling	4
Laboratory Analysis	7
Final Report	12

We are confident that we can complete this project in an efficient and cost effective manner.

6.0 STANDARD OPERATING FIELD PROCEDURES

The following protocol of standard operating field procedures applies to all work done under this workplan:

6.1 BORING AND WELL DRILLING OPERATIONS

- Boring and well construction procedures will follow guidelines recommended by the California Regional Water Quality Control Board and the Alameda County Health Care Services Agency. The Health and Safety Plan will be enforced always during the drilling. Tailgate safety meetings will be held before beginning work each morning to update the safety plan with the results of the previous days work and investigation.

• Permits required for drilling of soil borings or installation of monitoring wells will be obtained before the start of work. A copy of the permit will be present on site during drilling operations.

• The soil borings will be drilled with a continuous-flight hollow-stem auger of at least 8 inches OD.

• The drilling contractor will posses a valid C-57 Water Well Contractor's License. The contractor will have a current Statement of Responsibility or Workmen's Compensation Certificate on file with the local permitting agency.

• A registered geologist, or certified engineering geologist, or a qualified field geologist assigned by either of the preceding, will be on site to direct drilling operations, supervise sampling procedures, and record information needed for bore hole and monitoring well logs, cross sectional charts, and site maps.

• Borings for soil investigation only will extend to the water table.

• Borings for new monitoring wells will extend 15 feet below the water table with the following exception. If an aquitard or clay layer ~~is~~ encountered beneath the water table the boring will continue a additional five feet. If the assessment of this five foot section shows that the aquitard was penetrated then drilling will continue to the planned depth. If the aquitard was not penetrated then a five foot grout plug will be placed in the bottom of the boring and the well will be constructed above.

6.2 SOILS SAMPLING

• The soils sampling will commence at a depth of five feet below surface grade. The samples will be taken at five-foot increments to the depth of the water-saturated zone estimated at 8 feet below grade. Soil sampling will follow the guidelines presented in ASTM Method D 1452-80, Standard Practice for Soil Investigations and Sampling by Auger Borings.

• A ground water interface zone sample is recovered for laboratory analysis from each soil boring or well installation.

- A modified California split spoon sampler fitted with three, 2 inch X 6 inch, brass liners will be driven ahead of the auger to collect the samples. The brass liners will be provided by the analytical laboratory and kept in a sealed container to assure cleanliness.

- Soil sampler casings will be disassembled, steam-cleaned or cleaned in soapy (TSP) water. The casing is then rinsed with clean tap water and with de-ionized water, then air-dried just before taking each sample. The cleaned casings will then be reassembled with similarly cleaned and dried brass, sample liners and carefully lowered into the hollow stem of the augers for the collection of the sample.

- The soil samples in the bottom of the three brass liners in the sampling casings (if in good condition) will be taken as the samples to be tested. The samples will be labeled and sealed in the field in their original liners. The ends of the sample liners will be capped with aluminum foil, and sealed in place by clean plastic caps and tape.

- The middle liners from the sampler casing will be extruded in the field and examined to help provide information for the boring logs. The cuttings from the borings will be examined during the drilling to provide a continuous log of the materials encountered using ASTM Method D-2488-84 for visual description and identification of soils.

- The middle liners from the sample casing will extruded in the field into a clear plastic ziplock bag and immediately sealed. The soil material will then be broken into small pieces. After approximately five minutes, the probe of the hydrocarbon vapor monitor will be inserted into the bag to the record the vapor level. Vapor levels will be recorded on the field boring log.

- A geologic drilling log will be maintained of the materials encountered and sample locations in the boring. The log will include field descriptions of the soil properties, lithologic variations, moisture conditions, well construction, and any unusual characteristics noted that may suggest the presence of chemical contamination.

• A bag of the aquifer material in each well will be recovered for laboratory sieve analysis as required by the local implementing agency.

• Based upon the results of the field screening, selected representative soil samples will be submitted to the environmental laboratory for chemical analyses. All samples retained for chemical analysis will be stored on ice in a clean, covered cooler-box for transport to the laboratory. Duplicate samples will be refrigerated.

• Excavation sampling is done by recovering representative soil in the bucket of the backhoe or excavator. Approximately three inches of soil is cleaned from the face of the soil in the bucket before hand driving a single, new and cleaned, 2x6 inch brass tube into the soil. The ends of the sample liner will be capped with aluminum foil, and sealed in place by clean plastic caps and tape.

6.3 WELL CONSTRUCTION

• The proper well or street permits will be obtained from the local regulating agencies. An inspector will be present to witness the installation of the annular seal as required. The licensed well driller will submit the required State Well Drillers Report to the California Department of Water Resources.

• The boring will be advanced until a saturated zone is encountered, the boring will end a maximum of 15 feet below the depth at which the saturated zone is encountered or 5 feet into a perching clay aquitard layer. Only one aquifer will be penetrated by the well. Separate borings will be used to sample different aquifers.

• The boring will be completed as a groundwater monitoring well within the saturated zone. A 2 or 4-inch ID, National Sanitation Foundation (NSF) specified, Schedule 40 PVC blank, well screen, and casing will be used. Well screen will be 0.010 or 0.020 inch continuous slot. Sections will be threaded and screwed together without the use of cement. A threaded end cap will be used at the bottom of the well. An optional one to five foot blank silt trap may be placed at the bottom of the well screen.

- The slotted pipe will extend five feet above the water surface to form a sensing zone. The annulus of the perforated section will be packed with clean no. 3 or finer Monterey sand, or equivalent, for the length of the saturated zone and 7 feet above. About one to two feet of bentonite slurry or pellets will be placed on top of the sand envelope pack, upon which will be placed a class-A cement or cement-bentonite annular seal to the surface.

- The top of the boring will finished with a sackrete surface pad to slope water away from the wellhead.

- The top of the well casing will be locked to prevent contamination and tampering. Above-grade or at-grade well completion will depend upon the final well location and traffic conditions. Above grade completion will require an eight (8)-inch diameter locking, steel protective casing set into a concrete pad. At-grade completion will require a Christy, or equivalent, traffic box and a concrete pad. The wellhead will be protected with a watertight cap.

6.4 WELL DEVELOPMENT

- Wells will not be developed until 72 hours following placement of the cement seal.

- Equipment inserted into the well during development will be decontaminated by washing or steam cleaning before and after its use.

- Wells will be developed until the water is visually free of fine-grained sediments or until field measurements of Ph, electrical conductivity, and temperature stabilize. Approximately ten well volumes of water will be removed during development of the well.

6.5 GROUND WATER SAMPLING

- Before purging, the water level elevation will be measured with a marked steel tape and a clear teflon bailer will used to observe the presence and thickness of free product present on the water surface.

- Approximately 4-10 well volumes of stale water will be purged from the well before the collection of the sample. No groundwater sampling will begin until 48 hours following well development.

- The ground water samples will be recovered from the borings using a Teflon bailer. A field log will be maintained of evacuation procedures.

- All water retained for chemical analysis will be placed in clean Teflon screw-cap 40 ml. VOC vials for the TPH as gasoline and BTEX samples, one-liter amber glass bottles for the TPH as gasoline samples, and one liter amber glass bottles for the petroleum oil and grease samples. The vials and bottles will be topped-off to avoid air space, and screw-cap sealed. All full 40 ml VOA vials will be inverted to look for air bubbles, and sampled again if air bubbles are observed in the vial.

- One trip blank or equipment blank will be taken for each set of water samples collected. The water sample blank will be provided by the environmental laboratory.

6.6 LABORATORY ANALYSIS

- All chemical sampling, handling, and storage will be conducted according to Environmental Protection Agency and Regional Water Quality Control Board guidelines for the investigation of suspected underground storage tank leaks.

- The sample will be delivered to the laboratory within one day of its acquisition. Samples will be kept on ice or refrigerated to 4 degrees Celsius or cooler continuously during transport to the laboratory.

- Unless otherwise requested by the laboratory, no preservatives will be added to the sample. The sealed sample will only be opened by laboratory personnel who will do the chemical analysis. The samples will analyzed within 7-14 days from their collection date depending on EPA quality control criteria appropriate for each analysis method.

6.7 SAMPLE RECORDS AND CHAIN OF CUSTODY

• All samples will be labeled with the following information using waterproof ink:

- site name
- specific sample location identifier
- date and time collected
- name of the sample collector and affiliation

• A field-data-sheet will be filled out for each group of samples. The data sheet will contain the following information:

- label information
- sampling method
- type of container
- physical characteristics (texture, color, odor, etc.)
- disposition (used for field analysis, stored, sent for laboratory analyses.

• A chain of positive, signature custody and transference will be strictly maintained always. The chain-of custody form will be included with any samples leaving the job site and will follow the samples until they are analyzed or disposed of. The chain-of custody form will contain the following information:

- sample number
- signature of collector
- date and time of collection
- sample type
- identification of well or boring
- number of containers
- parameters requested for analysis
- signature of person(s) involved in sample chain of possession
- inclusive dates of possession
- laboratory sample number

• When the samples arrive at the laboratory, the receiver will sign the chain of custody forms and enter a laboratory identification number onto the sample label and chain of custody form. The identification number will be used by the laboratory in its internal tracking system, thus the status of a particular sample can be determined at any time by referring to the laboratory log

books. Both the laboratory identification and field sample numbers will be cited when the analytical results are reported.

- A hard copy of the laboratory Certified Analytical Report and the completed chain of custody will be provided with the technical report.

6.8 DECONTAMINATION

- The drilling equipment will be steam-cleaned before arriving at the project site.

- Adequate clean auger will be available to complete all the well without reusing auger sections.

- Sufficient dedicated purging and sampling equipment will be available to sample each well independently.

- All equipment and bailers will be thoroughly steam-cleaned or cleaned in soapy water, rinsed with clean tap water, and finally rinsed with de-ionized water before the collection of each set of samples. Simple green, Alconox, or TSP soap will only be used to clean equipment.

6.9 STORAGE FOR DISPOSAL

- During the drilling operations, several 55-gallon labeled drums will be on site to contain potentially contaminated materials and drill cuttings. Alternately, the cuttings and materials are to be stockpiled on bermed plastic sheeting, then securely covered with plastic sheeting. Disposition or treatment will be done within 90 days when laboratory analysis results are available. The stockpile will be within a secure area unavailable to public access.

- Developed and purged water will be collected in clean 55-gallon liquid drums for disposition or treatment within 90 days once laboratory analysis results are available. Barrels will be labelled immediately upon use and stored in a secure area.

- The cuttings and the soil samples not retained for chemical analysis will be placed in 55-gallon drums until their chemical disposition is determined, and then appropriately disposed.

7.0 SITE SPECIFIC SAFETY PLAN

7.01 INTRODUCTION

This document describes the health and safety procedures for the activities planned in performing a preliminary site investigation at the **Cavanaugh Motors facility, 1700 Park Street, Alameda, California.** All personnel and subcontractors will follow this plan. Each company has the prime responsibility for it's own employee safety. It is expressly intended that all project work will comply with applicable sections of the California Occupational Health and Safety Code. All parties working on this project will maintain a general responsibility to identify and correct any health and safety hazards. All parties are responsible for working in a legally safe manner.

7.02 PROJECT DESCRIPTION

The project involves the excavation, drilling, sampling, and remediation of fuel and waste oil contaminated soil and the handling and remediation of groundwater contamination. The work to be done will include the all or part of the following: excavation and handling of contaminated soil, the sampling of contaminated soil, the drilling and sampling of soil borings, the drilling and installation of monitoring wells, the development and sampling of wells, the remediation of soil and ground water.

7.03 KEY PERSONNEL

The project personnel who will have complete responsibility for the safe operation of this project are:

Project Manager:	**Mark Youngkin**
	(415) 232-8366
Safety Officer:	**Tom Edwards**
	(415) 232-8366

7.04 PROJECT MANAGER AND SAFETY OFFICER RESPONSIBILITIES

The responsibilities of the Project Managers and Safety Officers are:

- To conduct initial site safety training for all project field team members as described in this document,
- To assure all field team personnel have read and understand the Health and Safety Plan,
- To assure all work done by field personnel is conducted according to safe practices outlined in this plan,
- To coordinate with safety personnel fire-watch, traffic control and site security,
- To monitor activities to assure the proper use of personal protective equipment such as hard hats, protective eye wear, gloves, coveralls, respirators, etc.,
- To monitor ambient hydrocarbon vapors,
- To make certain personnel safety equipment is in a usable condition, and
- To shut down or modify field work activity based on criteria presented in Section 7.93.

7.05 SUBCONTRACTOR RESPONSIBILITIES

The responsibilities of the subcontractor with respect to safety are:

- To read, understand and accept this Health and Safety Plan,
- To assure all members of its crew attend the safety training program,
- To make certain equipment and other machines are properly inspected and maintained and are complying with applicable sections of the California Health and Safety Code,
- To supply and maintain safety related protective equipment such as hard hats, safety boots, protective coveralls, gloves, safety eye wear, respirators, etc., as specified in this plan,
- To assure each employee working at this site read and comply with this Health and Safety Plan, and

- To enforce corrective action under the direction of the Site Safety Officer.

7.06 FIELD TEAM MEMBER RESPONSIBILITIES

The responsibilities of the field team members are:

- Read, understand and follow this plan,
- Do all work safety,
- Cooperate with safety personnel,
- Report any unsafe conditions to the immediate supervisor, and
- Be aware and alert for signs and symptoms of potential exposure to site contaminants and heat stress.

7.1 HAZARD EVALUATION

As air, water, soil and chemical substance monitoring data become available for all site work, the information will be evaluated by the Site Safety Officer. Appropriate action as Health and Safety modifications will be initiated by the Safety Officer if necessary.

The anticipated activities of this project include:

- Excavation, removal and disposal of a subsurface soil
- Drilling and installation of monitoring wells
- Drilling and sampling of soil borings
- Collection of soil and water samples
- Monitoring of ambient hydrocarbon concentrations during project activities
- The remediation of soil and ground water

The general types of hazards associated with this project are:

- Mechanical hazards: swinging objects, machinery, etc.,
- Electrical hazards: buried cables, overhead power lines,
- Chemical hazards: gasoline, diesel, waste oil
- Fire hazards: natural gas and product lines, flammable petroleum hydrocarbons, and motor driven equipment,

- Thermal hazards: heat stress,
- Acoustical hazards: excessive noise created by machinery.

Job hazard analyses associated with each major work activity are presented in the following sections.

7.11 HAZARD EVALUATION: SOIL EXCAVATION AND HANDLING

Excavating and handling fuel and waste oil contaminated soil will potentially expose field personnel to the following hazards:

- Chemical hazards:
  Exposure to various chemical substances, including but not limited to, petroleum hydrocarbon liquids and vapors, caustic and acidic mists, and liquid and solid chemically contaminated soil and construction material.

- Physical hazards:
  operating machinery,
  falling objects, and
  exposure to outside temperature extremes.

- Fire, Electrical and Noise Hazards:
  underground gas and product lines, and
  excessive machinery noise.

7.12 SOIL BORINGS AND MONITORING WELL INSTALLATION

The installation of soil borings and monitoring wells exposes field personnel to the same potential health hazards as listed above in soil excavation and handling. Due to nature of drilling, a greater risk for electrical shock from overhead and underground electrical lines does exist and physical injury from heavy equipment and materials. Explosive hazards exist when fuel concentrations in the bore hole reach explosive levels or when underground natural gas service lines rupture.

7.13 HAZARD EVALUATION: SOLID AND LIQUID MATERIALS SAMPLING

The sampling of soil and liquid exposes personnel to the same potential health hazards as listed above soil excavation. Soil will be collected for analyses in a backhoe bucket above ground or from a hollow-stem auger during drilling. Groundwater samples will be collected from PVC wells. Some samples may contain high levels of hazardous chemicals creating the potential for chemical exposure through inhalation and skin contact. Sample collecting may pose the greatest risks of chemical exposure for site workers.

7.14 HAZARD EVALUATION: PACKAGING AND SHIPMENT OF SAMPLES

The potential for overexposure to hazardous gasoline constituents still exists during the shipment of samples to the lab. After the samples have been collected in brass tubes or appropriate sample bottles, the containers will be properly packaged to protect shipping and laboratory personnel from exposure. The hazards associated with shipping samples are small provided the containers do not leak or break.

7.15 HAZARD EVALUATION: SOIL AND GROUND WATER REMEDIATION

The installation of soil and ground water remediation systems exposes field personnel to the same potential health hazards as listed above. Remediation systems have the potential to concentrate radioactive particulate from ground water in carbon canisters. The concentration of hydrocarbon vapors in and around carbon canisters, land farming, and air stripping towers requires air monitoring procedures.

7.2 HAZARD CRITERIA

7.21 HYDROCARBON VAPORS

Hydrocarbon vapors expected to be encountered consist of gasoline and diesel fuel and volatile solvents from waste oil. Exposure to elevated levels of hydrocarbon vapors presents potential health risks that need to be properly controlled. Work practices and methods will be started to limit exposures. When elevated exposures persist, respiratory protection will be the primary

control method to protect personnel from inhalation of hydrocarbon vapors. A variety of volatile refined petroleum chemicals comprise the hydrocarbon vapors expected to be encountered during project activities. Most these have limited toxicity requiring small control measures at the concentrations expected.

Petroleum fuel has hundreds of chemical compounds. There are certain compounds (for example benzene) that present significant hazards and must be properly controlled. To do so, a working limit of 100 ppmv total hydrocarbon is the maximum acceptable level of exposure without respiratory protection. In a typical situation with 1% of the hydrocarbon vapors being benzene, a 100 ppmv concentration of total hydrocarbon will result in a breathing zone of less than 1 ppmv benzene. This level is one tenth of the current occupational Permissible Exposure Limit (PEL) for an 8 hour exposure to benzene.

A hydrocarbon vapor analyzer will be used to measure real time breathing zone concentration for comparison with the 100 ppmv working limit. When a persistent level of 100 ppmv occurs, appropriate respirators will be donned and other vapor measurements will be made. If hydrocarbon vapors exceed 1000 ppmv, work will be stopped. The field crew will be instructed to stay up wind. Methods will be applied to subdue fugitive vapor emissions such as sprinkling soil with water, or the use of copus blower. The site Safety Officer will make such determinations.

7.22 HEAT STRESS AND NOISE

A hazard exists when individuals work in warm temperatures, particularly while wearing impervious protective clothing. When the ambient air temperature exceeds 65 degrees, heat stress may become a problem. If these conditions are encountered, the following precautions will be taken:

- During day-to-day field work, the on-site supervisor will be alert for the signs and symptoms of heat stress.

Field workers will be observed for the following signs and symptoms of heat stress.

- profuse sweating, or complete lack of sweating,
- skin color change,
- increased heart rate,
- body temperatures more than 100 degrees as measured by thermometers, and
- vision problems.

Any team member who exhibits any of these signs or symptoms will be removed immediately from field work. The team member will consume electrolyte fluid or cool water while resting in a shaded area. The individual will be instructed to rest until the symptoms are no longer recognizable. If the symptoms appear critical, persist or get worse, immediate medical attention will be sought.

When working around mechanical equipment the potential exists for exposure to excessive noise. To deal with the health hazards of excessive noise, ear plugs or ear protection will be provided.

7.3 PERSONAL PROTECTIVE EQUIPMENT REQUIREMENTS

This section specifies personal protective equipment required for the various tasks of this project.

7.31 SOIL EXCAVATION AND HANDLING

Respiratory Protection: all field personnel will be required to have available an air purifying respirator with organic vapor cartridges. The respirators will be required based on criteria listed in Section 7.21.

Protective Clothing: all field personnel who handle contaminated soil or liquid will wear impervious coveralls and butyl rubber gloves. Impervious coveralls will not be required if soil or water is not visibly contaminated, or if vapor measurements are below 500 ppmv.

Head Protection: Field personnel will wear non-metallic safety helmets always within the work zone.

Foot Protection: Field personnel will wear neoprene rubber boots with steel toes. Under non-liquid exposure conditions, leather boots with steel toes and shanks are permissible.

Ear Protection: Field personnel, based on noise levels, may be required to wear earplugs during soil excavation and drilling.

Eye Protection: Field personnel will wear chemical-resistant safety glasses with attached side shield where splashes of potentially hazardous liquid or particles are likely.

7.32 SOIL BORING AND MONITORING WELL INSTALLATION

Personnel who are likely to be exposed to contaminated soil or water will be required to wear the same personal protective equipment as outlined in section 7.31.

7.33 SOIL AND LIQUID SAMPLE COLLECTION

Personnel who are likely to be exposed to contaminated soil or water samples will be required to wear the same personal protective equipment as outlined in section 7.31.

7.34 PACKAGING AND SHIPMENT OF LIQUID AND SOLID SAMPLES

Eye Protection: Personnel will wear chemical resistant safety glasses with attached side shield while packaging samples.
Hand Protection: butyl rubber or nitrile gloves will be worn while packaging the samples.

Packaging and Shipping Requirements: all samples that are to be shipped for analysis must comply with Department of Transportation (DOT) regulations, as follows:

- Package the primary container to protect it from breaking,
- tape all lids with hydrocarbon resistant tape,
- wrap the primary container with absorbent brown paper (wadding), and
- place the primary container in a plastic (zip-loc) bag.

7.35 SOIL AND GROUND WATER REMEDIATION

Personnel who are likely to be exposed to contaminated soil or water will be required to wear the same personal protective equipment as outlined in section 7.31.

7.4 WORK ZONES

During all phases of the project work a work zone around the immediate vicinity of the project will be established and taped off if necessary to prevent entry. Only authorized personnel will be permitted to enter the work zone. Authorized personnel will include those who have duties requiring their presence in the work zone and have read this site safety plan. Work zones will be created to aid in the decontamination of equipment and personnel. The following describes the zones to be established at the discretion of the site safety officer:

Exclusion Zone: A 75 foot circle surrounding the work area will be defined before work starts. The area inside the circle is the "Exclusion Zone". The exclusion zone constitutes the area where potentially hazardous airborne contaminants and physical hazards to the workers exist. Full personal protection must be available to all personnel in this area. The size of the Exclusion Zone may be changed to fit site conditions and to ensure contaminant containment.

Contamination Reduction Zone: A formal decontamination zone should not be required during the preliminary investigation. But, an area will be designated in the event extreme gasoline contamination is encountered. The decontamination zone will be an area where personnel can clean protective equipment. A waste container will be placed outside the exclusion zone so contaminated equipment can be placed inside and covered.

Support Zone: A Support Zone, the outermost zone, must be defined for each field activity. Support equipment is in this uncontaminated or clean area. Normal work clothes are appropriate within this zone. The location of this zone depends on factors such as accessibility, wind direction (it

should be up wind of excavation), and resources (e.g., roads, utilities, shelter).

7.5 DECONTAMINATION PROCEDURES

Petroleum hydrocarbon liquids and vapors may occur. Due to the volatile nature of the hydrocarbons that may be encountered, decontamination of equipment and vehicles will be of least importance since the volatile hydrocarbons will rapidly vaporize. Therefore, no formal decontamination procedure will be followed except for general cleaning. No eating, drinking or smoking will be permitted in the exclusion zone. All personnel involved in work activities will be instructed to wash their hands, face, neck and forearms after the work day. Soap, water and towels will be provided at the site for this purpose. The field personnel will be instructed to shower at home after each work day.

As work progresses, the nature of materials handled and the extent of contamination may require formal decontamination procedures and delineated work/clean zones. But, we do not expect that such formal procedures will be necessary at this site and will only proceed at the Safety Officers discretion.

In the event extreme contamination is encountered, decontamination of personnel, equipment and vehicles will be important to insure that contamination does not spread to unsuspecting people and property. Personal decontamination mainly involves personal hygiene. Contamination should not be present on the skin if the proper protective methods specified in this plan are used. However all field personnel will be instructed to follow these guidelines to ensure that contamination does not remain on equipment, sample containers or in contact with their bodies.

The field team should remove their personal protective clothing in the following sequence:

Step 1: Move out of the exclusion zone and into the decontamination zone. Do not remove personal protective equipment.

Step 2: Obtain decontamination solutions and decontaminate the spades, shovels and other equipment by brushing them under a water rinse. A high-pressure steam cleaner may be used for decontamination. All wastes and spent decontamination liquids will be properly contained.

Step 3: Remove outer gloves and coveralls and place them inside a garbage bag. Keep the air purifying respirator on.

Step 4: Move to the support zone and remove the respirator.

7.6 MONITORING PROGRAM

Personal exposure to ambient airborne hazards will be monitored to assure that personnel exposures do not exceed acceptable limits and the appropriate selection of protective equipment items. Airborne hydrocarbon vapor concentrations will be measured primarily by a hydrocarbon vapor meter. If concentrations approach criteria levels, all personnel will be notified of possible site safety changes. Audits will be conducted by the Safety Officer to insure compliance with the Safety Plan and to provide additional support as required.

7.61 AMBIENT VAPOR READING

A hydrocarbon vapor monitor will be used during drilling and excavation activities. This instrument will be used to measure both excavation and breathing zone concentrations of hydrocarbon vapors. The instrument will be calibrated before and after field measurements each day using known calibration gases.
Readings will be taken in the area where the field team members are working and surrounding down-wind areas. Measurements will be taken every 30 minutes when hydrocarbon vapors show levels above 30 ppmv. All readings will be recorded in a field notebook.

7.7 SAFETY AND HEALTH TRAINING

This section summarizes the content of the health and safety training to be provided to the field team. It may be used as a

future reference for the field team concerning health and safety matters.

Each section of this safety plan provides information to ensure safety for all workers. It will be the responsibility of the Project Safety Officer to assure the field team has access to this plan, reads the safety procedures, and understands how to conduct work safely. It will be the individuals responsibility to bring to the attention of the Safety Officer any portion of this plan and related training they do not fully understand. Before beginning site work, the field team will discuss the contents of this plan. All members will be adequately informed in safe work practices.

All field team members will be instructed regarding potential health and safety hazards. Specifically, the following topics will be covered in the initial training session:

- Physical safety hazards, (e.g., muscular stress and strain, unguarded equipment, electrical shock, overhead hazards, etc.),
- Emergency procedures, (vapor controls, medical and fire emergencies, etc.),
- Explosive/flammability hazards,
- Hazardous materials that may be encountered and potential routes of exposures, (inhalation and skin contact with petroleum hydrocarbons),
- Physical hazards such as noise and heat stress,
- Hygienic practices, (washing up before lunch/coffee breaks, no eating/drinking/smoking allowed in taped off areas, etc.), and
- Types, proper use, limitations, maintenance, inspection, and storage of protective clothing and equipment.

Personal protective equipment includes:

- **eye protection**
- **gloves**
- **coveralls**
- **respirators**
- **hard hats, and**

- **hearing protection**

Special emphasis will be placed on the use and limitations of respiratory protection. Half-mask respirators equipped with air purifying organic vapor cartridges will be used. Half-mask respirators and eye goggles will be used if eye irritation or skin contact exposure potential exists. Each individual will be responsible for the limitations and maintenance of half-mask and full-face respirators including qualitative fit testing, routine inspection, replacement of parts, cleaning, disinfection, and storage requirements. Written instructions and procedures concerning respirators and criteria for use will be provided for each field worker by the Site Safety Officer if needed.

7.8 MEDICAL MONITORING PROGRAM

The work tasks in this workplan involve active physical work and potential exposure to petroleum hydrocarbons, heat stress, noise and physical safety hazards common to subsurface and construction operations. The work will require people of reasonable health with normal vision and hearing acuity. The companies involved with this project are responsible for assuring the health and fitness of their employees on this project. As a rule, each worker should have clearance from a physician dated by one year before start-up of the project. This documentation should show the employees' ability to do the required work while wearing an air purifying respirator.

7.9 EMERGENCY RESPONSE PLAN

Emergency procedures listed in this plan give the field team instruction on how to handle medical emergencies and fires and explosions. The emergency procedures will be carefully reviewed with the field team during the health and safety training session.

7.91 INJURIES

Medical problems occurring on site will be handled quickly. Emergency telephone numbers will be written down and posted in

the passenger compartment of the field vehicles. The local emergency numbers are:

Police, Fire and Rescue Dial 911

The field team will be instructed to seek immediate professional medical attention for all serious injuries. A first aid kit will be present at the work site for use in minor injuries. If anyone receives a splash or particle in the eye, the field team will be instructed to irrigate the eye for 15 minutes. Instruction will be provided to wash any skin areas with soap and water if direct contact with contaminants has occurred.

7.92 FIRE AND EXPLOSION HAZARDS

Fires on site are of particular concern during soil excavation and removal activities due to the possibility of encountering flammable petroleum hydrocarbon liquid or vapors. During these activities the Site Safety Officer will be present and equipped with an explosive vapor monitor for area monitoring and a multi-purpose (A, B, C,) fire extinguisher.

The local fire department will be notified of the location and anticipated activities to minimize the fire risk to the surrounding neighborhood. In addition, any flammable material will be cleared away from the site before the start of work. If a fire does occur, the local fire department will be contacted immediately.

7.93 OPERATION SHUTDOWN

Under extreme hazardous situations the on-site supervisor, Safety Officer, or Project Manager may temporarily suspend operations while controlling the hazard. If vapor measurements on the explosive vapor monitor show levels approaching explosive limits, operations will be stopped. During this activity, all personnel will be required to stand up wind to prevent exposure to fugitive vapor emissions. The Safety Officer will have ultimate authority for operations shutdown.

7.94 COMMUNITY PROTECTION

To assure the community protection from health and fire hazards, up wind and downwind monitoring with the hydrocarbon vapor monitor will be done if the general work area has hydrocarbon levels exceeding 100 ppmv. If down wind monitoring shows persistent levels above 30 ppmv at the perimeter of the work area, work will be shut down and vapor emission control efforts will begin until measurements show levels have dropped below 30 ppmv. An alternate approach of expanding the taped off area zone may be used to provide additional community protection.

7.95 RECORD KEEPING REQUIREMENT

The following record keeping requirements will be maintained in the program file indefinitely.

- **Copy of this Health and Safety Plan**
- **Health and Safety Training Certification Form for Site Safety Officer**
- **Any accident/illness report forms**
- **Personal sampling results**
- **Documentation of employees medical ability to do work and wear respirators**

Pertinent documentation will be provided to workers and agencies as required by Federal and State safety laws.

8.0 QUALITY ASSURANCE AND QUALITY CONTROL

8.1 OBJECTIVE

The objective of quality assurance and quality control is to provide environmental sampling and analysis data of known and acceptable quality. To meet this objective, field and laboratory quality control procedures will be done.

8.2 FIELD QUALITY ASSURANCE PROGRAM

Section 6.0 contains procedures for collecting field samples and decontaminating equipment. Various types of field blanks verify

that the sample collection and handling process have not effected the quality of the samples. An equipment blank is collected for each group of ten water samples collected in the field. The equipment blank is used for dedicated equipment. The equipment blank is to be analyzed for all the required monitoring parameters.

> **Equipment Blank** - To ensure that the sampling device has been effectively cleaned (in the laboratory or field), fill the device with deionized water or Type II reagent grade water, transfer to sample bottle(s), and return to the laboratory for analysis.

If required by the implementing local agency, a trip blank is prepared and analyzed for all the required monitoring parameters.

> **Trip Blank** - Fill one of each type of sample bottle with Type II reagent grade water, transport to the site, handle like a sample, and return to the laboratory for analysis. One trip blank per sampling event is recommended.

Any contaminants found in the blanks could be attributed to (1) interaction between the sample and the container, (2) contaminated rinse water, (3) a handling procedure that alters the sample analysis results, or (4) contaminated equipment. The concentration levels of any contaminants found in the blanks will not be used to correct the ground-water data. The wells will be sampled again if the contaminant levels are within an order of magnitude when compared to the field sample results.

8.3 LABORATORY QUALITY ASSURANCE PROGRAM

All samples collected during this project will be analyzed by a California Department of Health Services-certified laboratory for the selected parameters in accordance with standard U.S. Environmental Protection Agency-approved methods. All laboratory QA/QC information will be made available in a QA/QC Summary Report prepared by the laboratory. Laboratory quality control measures will include those required by the DHS under their Hazardous Waste Laboratory Certification Program.

The laboratory quality control and quality assurance program will provide for standards, laboratory blanks, duplicates, and spiked samples for calibration and identification of potential matrix interferences according to current EPA protocols. The extraction of volatile chemicals for analysis will strictly follow EPA guidelines for minimum time limits.

The following additional sample control may be used dependent upon the scope of work. Ten percent of the soil samples will be split and analyzed separately as duplicates. Two sets of water samples will be obtained from one well. One of these sets will be submitted to the laboratory as a blind duplicate. Data from QC samples will be used as a measure of performance or as an indicator of cross-contamination, but will not be used to alter or correct analytical data.

8.4 DATA VALIDATION AND REPORTING

Data collected and used in project reports will be appropriately identified and will be included in a separate appendix in the final report. All data will be reviewed and apparent abnormalities (e.g., unexpected order-of-magnitude difference among samples or instrument readings) will be investigated by reviewing procedures, field instrument procedures and calibrations, and laboratory QC results.

8.5 EVALUATION OF THE QUALITY OF DATA

All data reported is to be complete and fully documented. Laboratory detection limits are to meet California Department of Health Services standards for minimum verification detection limits. Data that is much different from most other values in a data set will be considered an outlier. Outlier will be investigated and corrected if determined to be due to:

- inconsistent sampling or analytical chemistry methodology
- errors in the transcription of data values
- a catastrophic unnatural occurrence such as a spill

Documentation and validation of the cause of an outlier will accompany any attempt to correct or delete data values. Statis-

tical methods will be used to evaluate data sets when sufficient sampling intervals are available.

9.0 STATEMENT OF QUALIFICATION OF LEAD PROFESSIONAL

9.1 GENERAL DESCRIPTION OF QUALIFICATION

TMC Environmental, Inc. (**TMC**) is an environmental consulting firm established to specialize in environmental consulting, engineering and project management. **TMC** serves a diverse group of clients with offices in California and Oregon. Our firm quickly responds to the full range of our clients' varying needs including the following:

* **Phase 1 & 2 Environmental Site Assessments**
* **Soil and Groundwater Sampling**
* **Tank Removal Management**
* **Soil and Groundwater Investigations**
* **Hazardous Materials Management**
* **Regulatory compliance and negotiation**
* **Soil and Groundwater Remediation**
* **Closure Reports**

TMC staff members excel in environmental remediation technologies such as groundwater recovery and treatment, vapor extraction, soil excavation, transportation and disposal.

Registered professionals manage all TMC's projects. **TMC** offers clients the seal of approval with registered geologists, engineering geologist, and environmental assessors. Our clients and the regulatory agencies can be assured that our work meets the State's environmental standards. Certified OSHA safety managers supervise all our projects.

9.2 KEY PERSONNEL

The following professionals will manage and conduct the environmental tasks and investigations outlined in the workplan:

Tom Edwards, President

Education:
A.A., Business Administration, Contra Costa College

Professional registration:
Registered Environmental Assessor, REA-02645
Oregon Registered UST Soil Cleanup Supervisor License No.1919
Oregon Registered Decommission Supervisor License No. 1918
Certified OSHA Safety/Training Manager

Mr. Edwards has worked as a manager in the environmental field for more than 12 years in almost every aspect of environmental consulting and construction. He manages underground tank removal and installation, site investigation, hazardous materials management, soil and groundwater remediation, and surface spill response and recovery. Mr. Edwards has also participated in the research and development of underground tank monitoring systems, surface skimmers, and groundwater recovery systems, which are now being used in most industries across the nation.

Mark Youngkin, Vice President

Education:
M.S., Geology, Colorado School of Mines
B.S., Geology, Southwest Missouri University

Professional registration:
California Registered Geologist, RG-3888
California Registered Engineering Geologist, EG-1380
Oregon Registered Engineering Geologist, No. E1182
General Engineering Contractor, A-556439
Hazardous Substance Removal and Remediation Certification
Registered Environmental Assessor, REA-00995

Mr. Youngkin has worked as a manager in the environmental field for over 13 years. His experience covers a wide range of skills including: hazardous materials management, soil and groundwater investigation, site remediation, real estate assessments, regulatory compliance and negotiation, fault and landslide investigations, engineering feasibility investigations for tunnel projects, rock mechanics analysis, and environmental hazard mitigation. At TMC, Mr. Youngkin oversees all projects requiring registration approval.

Christopher Nielson-Cerquone, Vice President

Education:
B.S., Biology, Cortland State University, New York
M.S., Environmental Science, University of Montana

Professional registeration:
Oregon Registered UST Supervisor, License No. 1509

Mr. Nielson-Cerquone brings a strong background in environmental science to TMC Environmental. He has participated in large-scale petroleum hydrocarbon cleanup from the initial investigation through site characterization, remedial design and implementation. Mr. Nielson-Cerquone is responsible for the design, implementation, and technical management of bioremediation, vapor extraction, and groundwater treatment systems.

Michael Princevalle, Project Geologist

Education:
B.S., Soil Science, California Polytechnic State University

Professional registration:
California Registered Environmental Assessor, REA-01022
Certified OSHA Safety/Training Manager

Mr. Princevalle has worked in many areas of environmental management. He specializes in environmental law, particularly SARA, RCRA, and CERCLA. He is especially knowledgeable of hazardous materials management and has trained personnel from several companies on the safe handling, storage, and disposal of hazardous materials. Mr. Princevalle also brings many years of experience in environmental site assessments and contaminated soil and groundwater investigation.

10.0 LIMITATIONS

The procedures and opinions in this workplan agree with professional practice as provided in the guidelines of the California Regional Water Quality Control Board for addressing fuel leaks from underground tanks. This workplan is only part of the ongoing work required by the lead implementing agency at this site. The lab test results rely on limited data collected at the sampling location only. Budget constraints restrict the amount of testing allowed. The lab test results do not apply to the general site as a whole. Therefore, TMC Environmental Inc. cannot have complete knowledge of the underlying conditions.

We provide the information in the resulting report to our client so he may make a more informed decision about site conditions. The professional opinion and judgement in the reports is subject to revisions in light of new information. We do not state or imply any guarantees or warranties that the subject property is or is not free of environmental impairment. Monitoring wells and soil venting wells are temporary sampling and remediation wells that eventually must be permitted and destroyed by a licensed driller at the clients expense.

11.0 CERTIFICATION

I supervised the preparation of the Site Contamination Workplan dated April 15, 1991 for the Cavanaugh Motors facility in the City of Alameda, Alameda County, California. The investigation used techniques and standards of care common to the consulting geologic profession in California. My certification as an engineering geologist by the State of California, Board of Registration for Geologists and Geophysicists, license number EG-1380, expires on June 30, 1992. This license is active and currently in good standing with the Board of Registration.

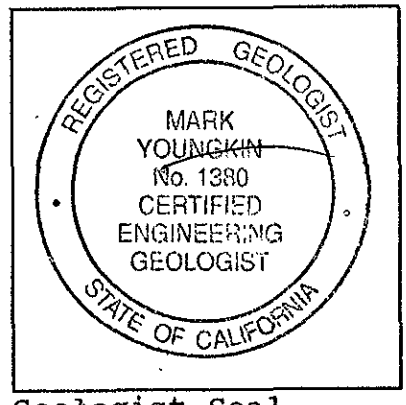
Certifying Professional:

TMC Environmental, Inc.
Vice President

Mark T. Youngkin

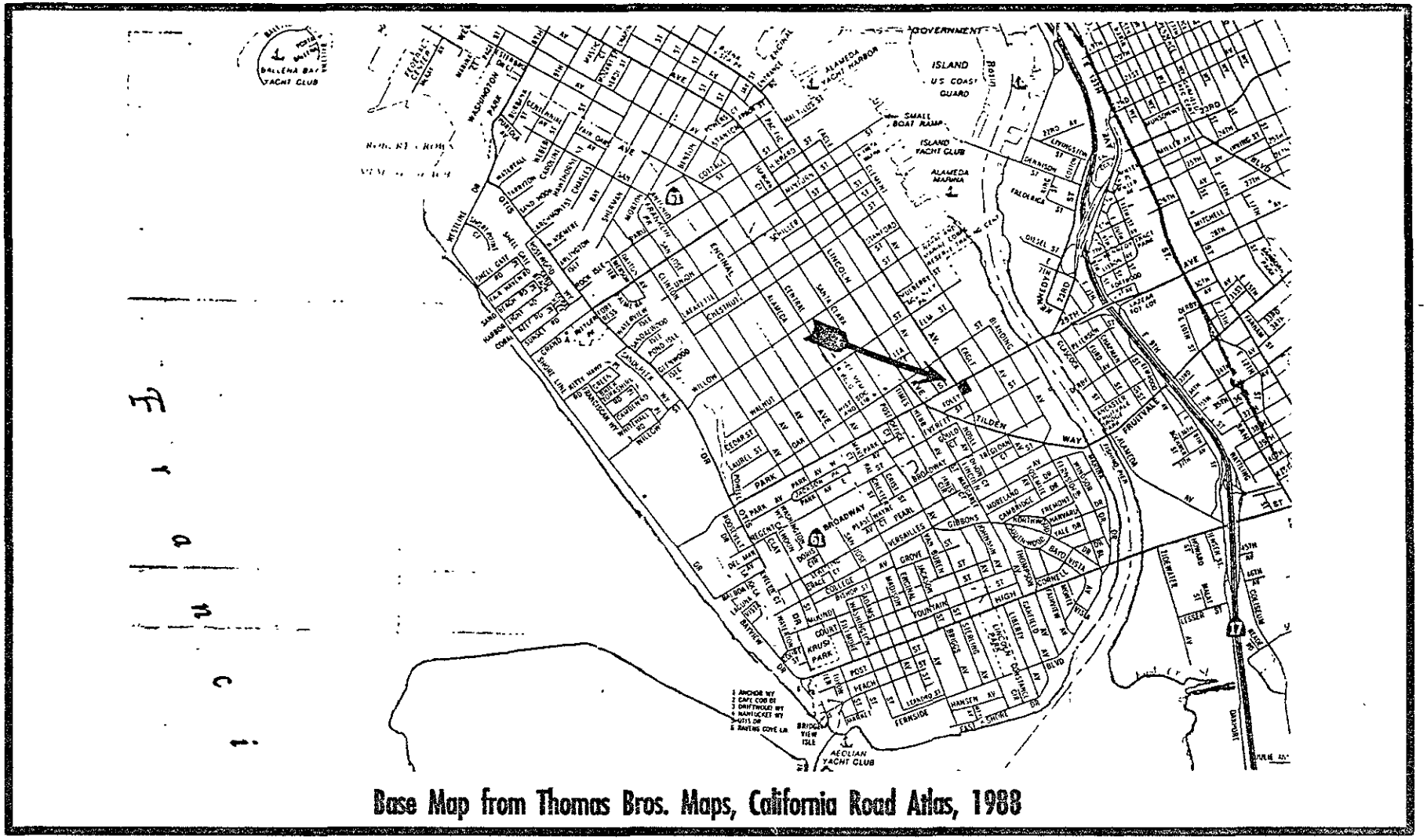
Mark T. Youngkin
Certified Engineering Geologist No. EG-1380

Dated April 22, 1991



Geologist Seal

This document, signed and stamped with seal, follows section 7835 of the Geologist and Geophysicists Act, Business and Professionals Code, State of California and the requirements of the California Regional Water Quality Control Board, Central Valley Region.



Base Map from Thomas Bros. Maps, California Road Atlas, 1988

LEGEND

N

Scale: 1 inch = 2200 feet

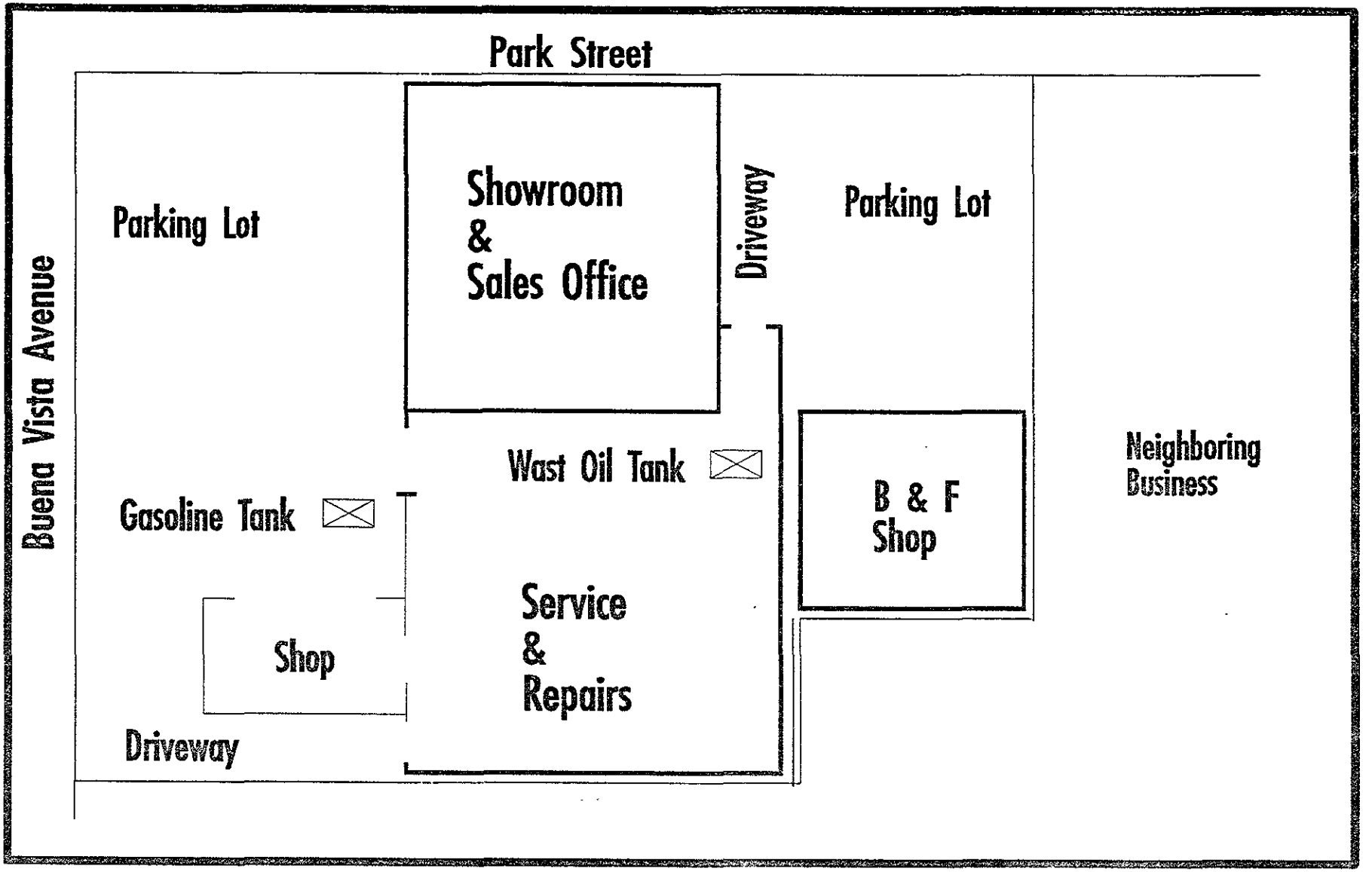
SITE VICINITY MAP

Cavanaugh Motors

1700 Park Street, Alameda, California

TMC ENVIRONMENTAL INC, SAN PABLO, CALIFORNIA

PLATE 1



LEGEND

Scale: 1 inch = 30 feet
Project No. 109001
April 15, 1991

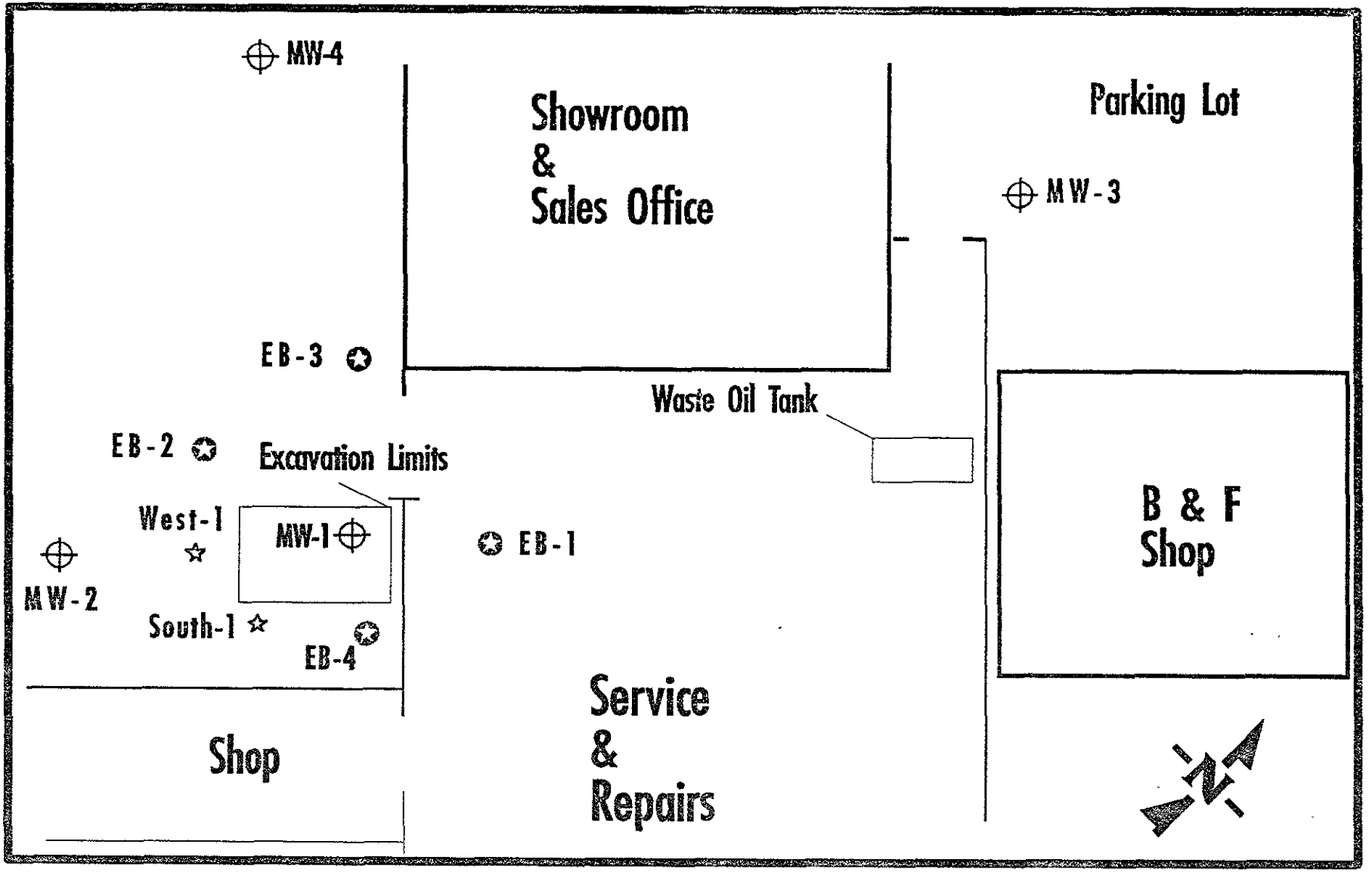
SITE MAP

Cavanaugh Motors

1700 Park Street, Alameda California

TMC ENVIRONMENTAL INC. SAN PABLO, CALIFORNIA

PLATE 2



LEGEND

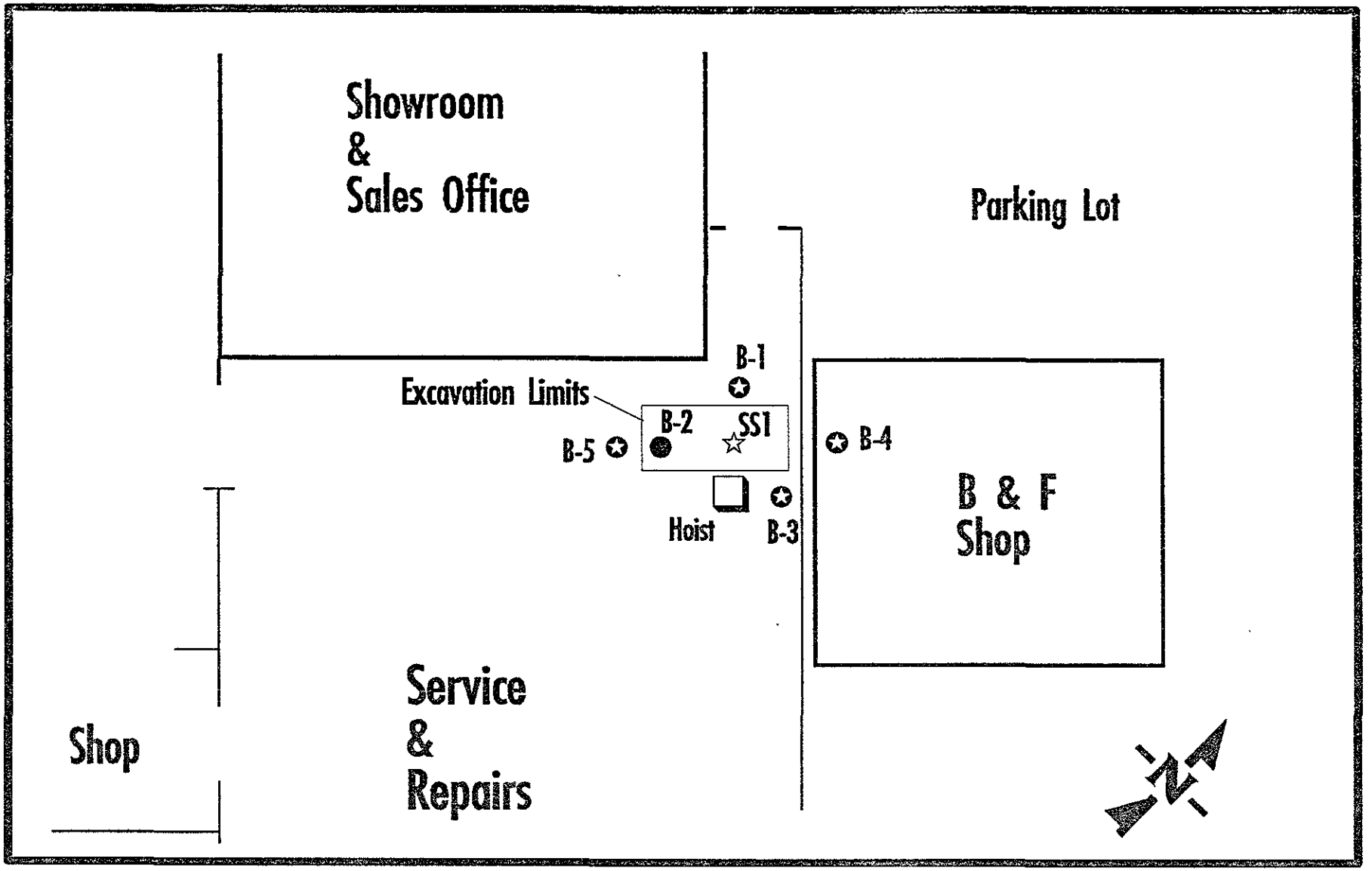
- Monitoring Well
- Boring without soil sample
- Boring with soil sample
- Soil sample

Project No. 109001
April 15, 1991
Scale 1 inch = 20 feet

SAMPLING MAP
GASOLINE TANK
Cavanaugh Motors
1700 Park Street, Alameda California

TMC ENVIRONMENTAL INC. SAN PABLO, CALIFORNIA

PLATE 3

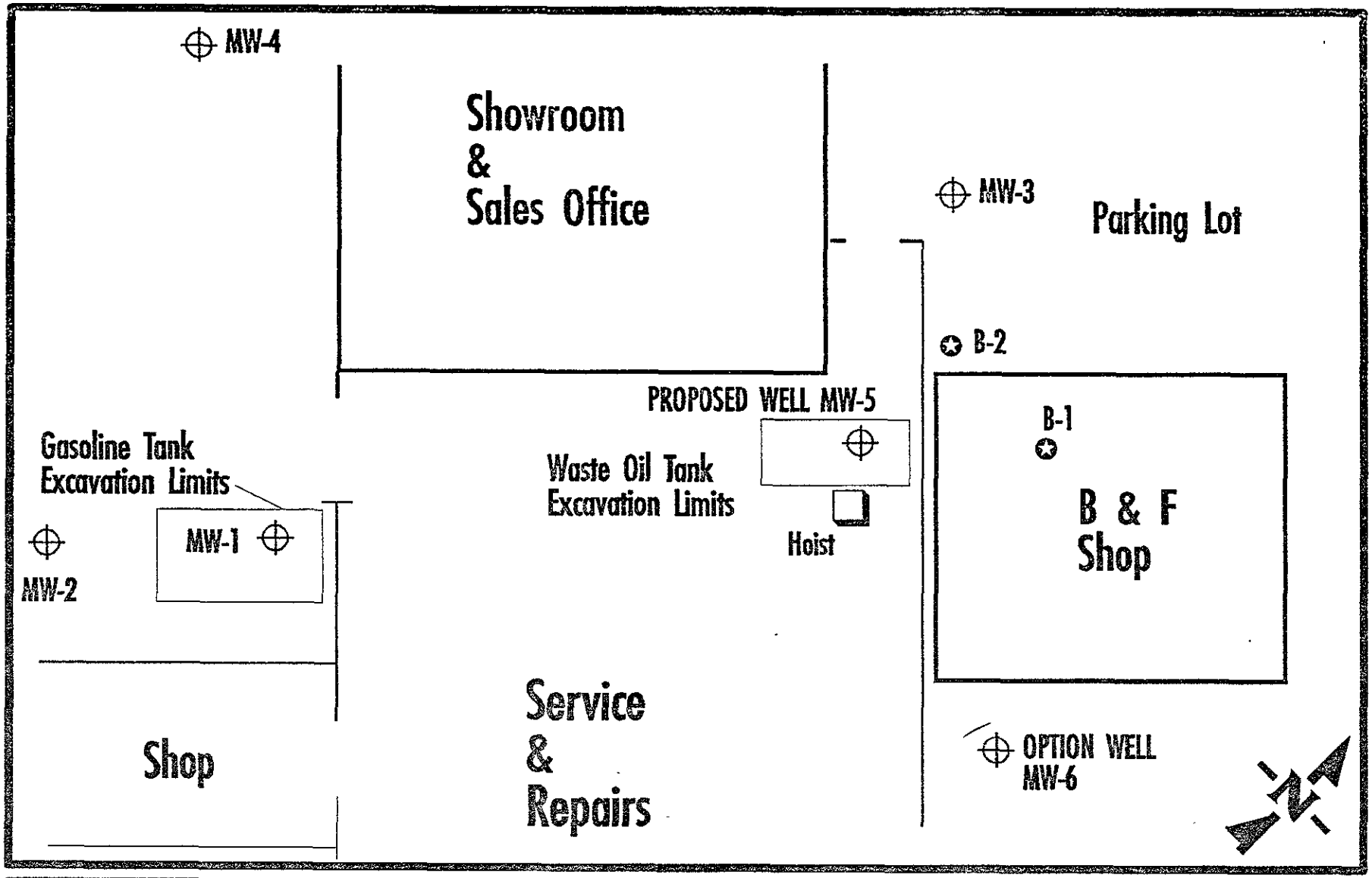


LEGEND

- Boring without soil sample
- Boring with soil sample
- Tank removal soil sample

Project No. 109001
April 15, 1991
Scale 1 inch = 20 feet

SAMPLING MAP
WASTE OIL TANK
Cavanaugh Motors
1700 Park Street, Alameda California



LEGEND

Monitoring Well

Boring with soil sample

Project No. 109001
April 15, 1991
Scale 1 inch = 20 feet

PROPOSED SAMPLING MAP

Cavanaugh Motors

1700 Park Street, Alameda California

TMC ENVIRONMENTAL INC. SAN PABLO, CALIFORNIA

PLATE 5