Subsurface Consultants, Inc.

R. William Rudolph, P.E.
President

January 16, 1998
SCI 1039.006

Strough Family Trust of 1983
c/o Mr. Don Strough
Concord Honda/Pontiac
1300 Concord Avenue
Concord, California 94520

Work Plan
Investigation of Downgradient Extent of Groundwater Contamination
327 34th Street
Oakland, California

Dear Mr. Strough:

Subsurface Consultants, Inc. (SCI) has prepared this work plan to implement the recommended activities described in our recent quarterly monitoring report dated January 16, 1998, for the subject site. The site is owned by the Strough Family Trust of 1983 (Strough). The recommended services include removal of separate-phase product (free-product) from site wells, groundwater monitoring, and a subsurface investigation. The objectives of the recommended work are as follows:

- Monitor for the presence of free-product in site wells, and remove product if any is present,
- Monitor groundwater conditions to evaluate hydraulic gradient and the dissolved petroleum hydrocarbon concentrations in site wells, and
- Evaluate the extent of soil and groundwater impacts onsite, including the limits of free-product and dissolved-phase hydrocarbon plumes.

The overall goal of the proposed site activities is to evaluate the suitability of the site for low-risk closure in accordance with Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) and Alameda County Health Care Services Agency (ACHCSA) interim guidance on required cleanup at low-risk fuel sites. The scope of work described in this work plan corresponds to the anticipated activities for 1998.

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SITE LOCATION

The site is located at 327 34th Street, near the southwest corner of the intersection of Broadway and 34th Street (Plate 1). An automobile dealership currently operates at this location. The site is occupied by an L-shaped building that houses automobile repair, painting, and showroom facilities. An asphalt-paved parking lot is located on the eastern portion of the property. Two underground fuel storage tanks (USTs) were previously located along the sidewalk of 34th Street at the northwest corner of the building (Plate 2).

Surrounding land uses include another automobile dealership lot north of the site across 34th Street, an empty lot west of the site, and a multi-story office complex south of the site.

BACKGROUND

UST Closure and Preliminary Investigation

On March 4 and 5, 1993, one 1,000-gallon UST containing unleaded gasoline and one 1,000-gallon UST containing waste oil were removed by KTW & Associates/Subsurface Environmental Corporation under the direction of ACHCSA. Results of chemical analyses on soil samples collected beneath the ends of the gasoline UST indicated impacts by total petroleum hydrocarbons as gasoline (TPH-g) and toluene, ethylbenzene, and xylenes. Soil samples from the waste oil UST excavation showed only relatively low concentrations of TPH as diesel, ethylbenzene, and xylenes. A summary of soil analytical results is presented in Table 1.

A soil and groundwater investigation was conducted by GeoPlexus, Inc. to assess impacts of petroleum hydrocarbons to groundwater. This included the installation and sampling of three groundwater monitoring wells (MW-1 through MW-3) hydraulically downgradient from the former USTs (Plate 2). Analytical testing of soil and groundwater samples revealed impacts from gasoline hydrocarbons at two wells (MW-2 and MW-3) located downgradient of the former gasoline UST. Soil and groundwater analytical results are presented in Tables 2 and 3, respectively. One-quarter inch of free-product was reported to be present in well MW-3.

Recent SCI Monitoring

On August 1, 1997, SCI submitted a work plan to ACHCSA on behalf of Strough to conduct a groundwater monitoring event. In October 1997, ACHCSA approved the work plan and SCI conducted groundwater monitoring of the onsite wells. Results were presented in our report dated January 14, 1998. Monitoring results indicated the presence of free-product at thicknesses of a half-inch (MW-3) and five inches (MW-2). Data indicate that total volatile hydrocarbons (TVH), benzene, toluene, ethylbenzene, and xylenes (BTEX), and methyl tertiary butyl ether (MTBE) were not detected in groundwater from MW-1 located south of the former waste oil UST. A free-

product sample collected from MW-2 was found to resemble weathered gasoline through a fuel fingerprint analysis. Relatively high concentrations of TVH, BTEX, and MTBE were detected in MW-3. However, a comparison of the current data for MW-3 to the 1993 data indicates that concentrations of dissolved petroleum hydrocarbons have decreased by more than 50 percent since July of 1993.

PLANNED SCOPE OF WORK

The proposed activities outlined in this work plan are intended to characterize and evaluate the extent of free and dissolved-phase petroleum hydrocarbons beneath the site. SCI will also evaluate whether the site qualifies as a low-risk fuel case in accordance with RWQCB and ACHCSA guidance on required cleanup at low-risk fuel sites. In this regard, SCI proposes the following tasks:

- Task 1 - Monthly water level measurements and free-product removal
- Task 2 - Quarterly groundwater monitoring and reporting
- Task 3 - Additional soil and groundwater investigation
- Task 4 - Waste disposal
- Task 5 - Regulatory agency correspondence and meetings
- Task 6 - Fund reimbursement assistance

Task 1 - Monthly Water Level Measurements and Free-Product Removal

On a monthly basis, SCI will measure water levels and check for the presence of free-product in site wells. Product detected in any of the wells will be removed by hand-bailing on a monthly basis. Depending on the amount of free-product in site wells and the cost-effectiveness of hand-bailing, a passive skimmer may be installed in appropriate wells to collect product. Free-product collected in the skimmer(s), if installed, will be checked and removed on a monthly basis. Free-product removed from site wells will be decanted into a properly labeled 55-gallon drum and stored onsite for disposal at a later date.

SCI will tabulate the water level data and thickness of free-product measured in site wells, as well as the amount of product removed during each monthly field visit. The monthly data will be presented in Quarterly Technical Reports (QTRs) prepared as described in Task 2 below.

Task 2 - Quarterly Groundwater Monitoring and Reporting

SCI will collect and chemically analyze groundwater samples from site wells on a quarterly basis. The monitoring program will include existing wells, as well as any new wells installed

during Task 3. Initially, all wells will be purged prior to sampling until measurements of pH, temperature, and conductivity stabilize. To evaluate indications of biological degradation of the hydrocarbon plume, SCI will also measure dissolved-oxygen and carbon dioxide concentrations in the groundwater. Purged groundwater will be stored onsite in a labeled 55-gallon drum and disposed at a later date. Water samples will be retained in pre-cleaned containers supplied by the laboratory and transported in chilled ice-chests to a state-certified analytical laboratory under chain-of-custody. The samples will be analyzed for the following chemicals:

- TVH as gasoline, EPA Method 8015 modified;
- BTEX, EPA Method 8020; and
- MTBE, EPA Method 8020.

SCI will prepare a written QTR each quarter summarizing the results of the monthly water level measurements and free-product removal, as well as the results of the quarterly sampling and analyses. After the first QTR, SCI will evaluate the wells for potential application of no-purge sampling methodology, in accordance with criteria established by ACHCSA.

Task 3 - Additional Soil and Groundwater Investigation

SCI will conduct an additional soil and groundwater investigation to further evaluate the distribution of petroleum hydrocarbons in soil and/or groundwater onsite. In this task, SCI will also evaluate on a preliminary basis the apparent stability and natural attenuation potential of the hydrocarbon plume to assess whether the site is suitable for low-risk closure. This investigation will be completed in the subtasks described below.

Task 3.1 - Permits and Utility Screening. Prior to field investigation activities, a subsurface drilling application will be obtained from Alameda County Public Works Agency, as required for the drilling of test borings. Upon permit approval, SCI will mark the locations of proposed borings in the field. Underground Service Alert will be contacted to notify utility companies to check for the presence of underground utilities in the vicinity of the planned borings. SCI will also retain the services of an underground utility locating contractor to locate and mark buried utilities near the proposed boring locations. Planned boring locations may be moved, as necessary, away from any underground utilities and/or because of access restrictions related to the current site operations.

Task 3.2 - Soil Borings and Temporary Well Point. To investigate the extent of hydrocarbon-impacted soils and groundwater downgradient of the former USTs, SCI will drill and collect soil samples from three test borings to a depth of approximately 35 feet below ground surface (bgs) at the locations shown on Plate 3. As described in Task 3.3 below, two of these borings will be

converted to groundwater monitoring wells. Using temporary well casing installed in the third boring, SCI will collect a grab groundwater sample from that boring.

Borings will be drilled using truck-mounted, 8-inch-diameter, hollow-stem auger equipment. Soil will be sampled at 5-foot intervals and screened using a photoionization detector. Selected soil samples will be submitted for chemical analyses. SCI anticipates that for each boring location, at least three soil samples from the vadose zone and soil/groundwater interface will be retained for chemical analyses. SCI's field engineer/geologist will observe drilling operations and prepare detailed logs of the conditions encountered. All augers, drill rods, and sampling equipment placed in the borings will be cleaned before and after each use to reduce the likelihood of cross-contamination between sampling intervals and borings.

Groundwater is expected to occur at approximately 22 feet bgs. Upon completion of soil sampling at the boring closest to the former UST excavations (Plate 3), SCI will place a 2-inch-diameter temporary well point in the boring. The temporary well point will consist of solid and slotted PVC casing to facilitate the collection of a grab groundwater sample. One casing volume of groundwater will be purged from the temporary well point prior to sampling. Water samples will be collected using disposable bailers and retained in pre-cleaned containers supplied by the analytical laboratory. Following completion of sampling, the well casing will be removed and that boring will be backfilled with cement grout. As described below, monitoring wells will be constructed in the other two borings. Soil cuttings will be placed in 55-gallon drums and stored onsite for disposal at a later date (see Task 4).

Task 3.3 - Monitoring Well Installations. SCI will further evaluate the limits of hydrocarbon-impacted groundwater downgradient of the former UST excavations by converting two of the soil borings to groundwater monitoring wells (Plate 3). The monitoring wells will be constructed with 20 feet of 2-inch-diameter machine-slotted (0.020-inch) casing installed at the bottom of the boring, threaded to 15 feet of 2-inch-diameter blank Schedule 40 PVC casing. The annular space between the casing and the boring will be backfilled with No. 3 Lonestar sand to approximately 1.5 feet above the top of the well screen. A 1-foot layer of bentonite pellets will be placed on top of the sand pack, and the remainder of the annular space will be backfilled with cement. The top of the well will be secured with a water-tight locking cap, and housed within a flush-mounted traffic-rated well box.

The new wells will be developed by bailing, or by using a surge block, until the water is relatively free of turbidity. Groundwater samples will be obtained from the new well during the quarterly monitoring events.

Task 3.4 - Chemical and Biochemical Analyses. Soil and groundwater samples collected during the investigation will be transported to a state-certified analytical laboratory. Samples will be analyzed for the following chemical constituents:

- TVH, EPA Method 8015 Modified;
- BTEX, EPA Method 8020; and
- MTBE, EPA Method 8020

In addition to the above-listed parameters, three groundwater samples will also be tested for geochemical indicators and bacterial enumeration to further evaluation the potential for natural biodegradation of the hydrocarbon plume. These groundwater samples will be taken from MW-1, MW-3, and from one of the proposed downgradient wells. Specifically, the additional testing for geochemical parameters will include:

- Dissolved oxygen and pH,
- Dissolved iron (Fe^{3+}) and manganese (Mn), EPA Method 6010,
- Sulfate (SO_4^{2-}), EPA Method 375.2/300.0,
- Bacterial enumeration by plate count (colony forming units),
- Nitrogen as ammonia (NH_3), SMWW Method 4500-NH_3C,
- Nitrogen as nitrate (NO^{3-}), SMWW Method 4500-NO_3 B, and
- Ortho-phosphate (PO_4), SMWW Method 4500-P E.

Task 3.5 - Data Evaluation. SCI will review and evaluate existing chemical and geologic information and data gathered from the field investigation. In evaluating the data, SCI will focus on the following:

- Distribution of free-product and dissolved-phase hydrocarbons in soil and groundwater,
- Occurrence of permeable sand or gravel layers that may act as preferential pathways for migration of free-product or dissolved-phase hydrocarbons,
- Variations in hydrocarbon concentrations with time (plume stability), and
- Potential for natural bioattenuation.

SCI will also estimate the limits, concentrations, and quantities of hydrocarbon-impacted soils remaining onsite. On the basis of our evaluation of the available data, SCI will assess the suitability of the site for low-risk closure.

Task 3.6 - Report Preparation. SCI will incorporate the results of Tasks 3.1 through 3.5 in a QTR. In addition to the results, the QTR will also include the following information from the soil and groundwater investigation:

- Boring logs,
- Well construction details,
- Laboratory analysis reports and chain-of-custody documents,
- Data summary tables,
- Discussion and evaluation of the data, and
- SCI's conclusions and recommendations regarding the suitability of the site for low-risk closure.

Task 4 - Waste Disposal

Free-product and investigation-derived wastes, including soil cuttings, cleaning water, and excess groundwater generated during the well installation, purging, development, and sampling processes, will be temporarily stored onsite in steel 55-gallon drums until offsite disposal can be arranged. SCI will coordinate the services of a State of California certified hazardous waste transportation and disposal company to dispose of the wastes offsite.

Task 5 - Regulatory Agency Correspondence and Meetings

SCI will correspond with ACHCSA staff throughout the project duration. If necessary, we will attend meetings with the ACHCSA to discuss the case status.

Task 6 - Fund Reimbursement Assistance

If requested by Strough, SCI will assist with seeking reimbursement from the Fund for site activities. These tasks may include: providing required backup for reimbursement requests, assisting Strough with preparation of reimbursement requests and/or Fund pre-approval requests, and correspondence with the ACHCSA and the Fund to clarify the scope of required tasks, as necessary.

ANTICIPATED SCHEDULE

SCI's anticipated schedule for site activities in 1998 is presented on Table 4. We expect that these activities will be initiated upon receiving ACHCSA's approval of this work plan, the Fund's pre-approval of estimated costs, and Strough's authorization to proceed.

CONCLUDING REMARKS

SCI would be pleased to submit this work plan to ACHCSA on your behalf. To facilitate the pre-approval of estimated costs by the Fund, we will request ACHCSA's review and written approval of the proposed site activities described herein.

We trust that this provides the required information. If you have any questions, please call.

Yours very truly,

Subsurface Consultants, Inc.

Samuel C. Won, PE, REA
Project Engineer

Terence J. McManus, REA
Project Manager

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Attachments: Table 1 - Summary of Tank Removal Sampling
Table 2 - Summary of Soil Analytical Results
Table 3 - Summary of Contaminant Concentrations in Groundwater
Table 4 - Proposed Schedule of Activities
Plate 1 - Vicinity Map
Plate 2 - Site Plan
Plate 3 - Proposed Well Locations

cc: Mr. Jonathan Redding, Esq.
Fitzgerald, Abbott & Beardsley LLP
1221 Broadway, 21st Floor
Oakland, CA 94612

Ms. Madullah Logan
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, 2nd Floor
Alameda, CA 94502

Table 1
Summary of Tank Removal Sampling
327 34th Street, Oakland, CA
March 1993

Sample No.	Date	TPH-g (mg/kg)	B (mg/kg)	T (mg/kg)	E (mg/kg)	X (mg/kg)	TPH-d (mg/kg)	O&G (mg/kg)	HVOC (µg/kg)	Cd (mg/kg)	Cr (mg/kg)	Ni (mg/kg)	Pb (mg/kg)
TA001	3/4/93	5	<0.01	0.11	0.48	0.28	--	--	--	--	--	--	--
TA002	3/4/93	130	<0.08	0.2	4.9	7.8	--	--	--	--	--	--	--
TB003	3/5/93	<1	<0.005	<0.005	0.014	0.018	96	<50	ND	<0.3	49	75	8
TB004	3/5/93	<1	<5	<5	<5	<5	7	<50	ND	<0.3	39	65	<3

TPH-g:	Total petroleum hydrocarbons as gasoline
TPH-d:	Total petroleum hydrocarbons as diesel
B:	Benzene
T:	Toluene
E:	Ethylbenzene
X:	Total xylenes
O&G:	Oil and grease
HVOC:	Halogenated volatile organic compounds
Cd:	Cadmium
Cr:	Chromium
Ni:	Nickel
Pb:	Lead
ND:	Not detected at concentrations greater than detection limit
--:	Not Analyzed
mg/kg:	Milligrams per kilogram
µg/kg:	Micrograms per kilogram

Table 2
Summary of Soil Analytical Results
327 34th Street, Oakland, CA
July 1993

Sample ID	Depth (feet)	Date	TPH as Gasoline (mg/kg)	TPH as Diesel (mg/kg)	Benzene (mg/kg)	Toluene (mg/kg)	Ethyl-benzene (mg/kg)	Xylenes (mg/kg)	Oil & Grease (mg/kg)
MW1-S1	4.5 - 6	7/19/93	<1	<10	<0.005	<0.005	<0.005	<0.005	<50
MW1-S2	9.5 - 11	7/19/93	<1	<10	<0.005	<0.005	<0.005	<0.005	<50
MW1-S3	14.5 - 16	7/19/93	<1	<10	<0.005	<0.005	<0.005	<0.005	<50
MW1-S4	19.5 - 21	7/19/93	<1	<10	<0.005	<0.005	<0.005	<0.005	<50
MW1-S5	24.5 - 26	7/19/93	<1	<10	<0.005	<0.005	<0.005	<0.005	<50
MW2-S1	4.5 - 6	7/19/93	2,000	--	7.2	71	31	260	--
MW2-S2	9.5 - 11	7/19/93	1,700	--	5.7	54	24	210	--
MW2-S3	14.5 - 16	7/19/93	410	--	1.8	14	5.1	51	--
MW2-S4	19.5 - 21	7/19/93	10,000	--	100	780	260	1,700	--
MW2-S5	24.5 - 26	7/20/93	19	--	1.9	5.2	0.56	3.4	--
MW3-S1	4.5 - 6	7/20/93	<1	--	ND	0.009	<0.005	0.014	--
MW3-S2	9.5 - 11	7/20/93	<1	--	<0.005	<0.005	<0.005	0.009	--
MW3-S3	14.5 - 16	7/20/93	<1	--	0.079	0.009	0.010	0.023	--
MW3-S4	19.5 - 21	7/20/93	1,400	--	6.4	46	14	150	--
MW3-S5	24.5 - 26	7/20/93	19	--	1.4	2.6	0.38	2.1	--

mg/kg: Milligrams per kilogram
ND: Not detected at concentrations greater than detection limit
--: Not analyzed

TABLE 3
SUMMARY OF CONTAMINANT CONCENTRATIONS IN GROUNDWATER
327 34TH STREET
OAKLAND, CALIFORNIA

Location	Date	TVH (µg/l)	TEH (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethyl-benzene (µg/l)	Total Xylenes (µg/l)	MTBE (µg/l)	Oil & Grease (mg/l)
MW-1	7/27/93	<50	<50	<0.5	<0.5	<0.5	<0.5	--	<5
	10/2/97	**<50**	--	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<2**	**--**
MW-2	7/27/93	120,000	--	10,000	27,000	2,900	20,000	--	--
	10/2/97	*	--	*	*	*	*	*	*
MW-3	7/27/93	330,000	--	9,100	24,000	5,300	33,000	--	--
	10/2/97	**36,000**	--	**4,200**	**11,000**	**1,800**	**10,600**	**3,500**	**--**

TVH = Total volatile hydrocarbons as gasoline
TEH = Total extractable hydrocarbons as diesel
MTBE= Methyl tertiary butyl ether
-- = Not analyzed
mg/l = milligrams per liter
µg/l = micrograms per liter
ND = Not detected at concentrations above reporting limits
* = This sample contained free-product and was found to resemble weathered gasoline through the fuel fingerprint analysis.

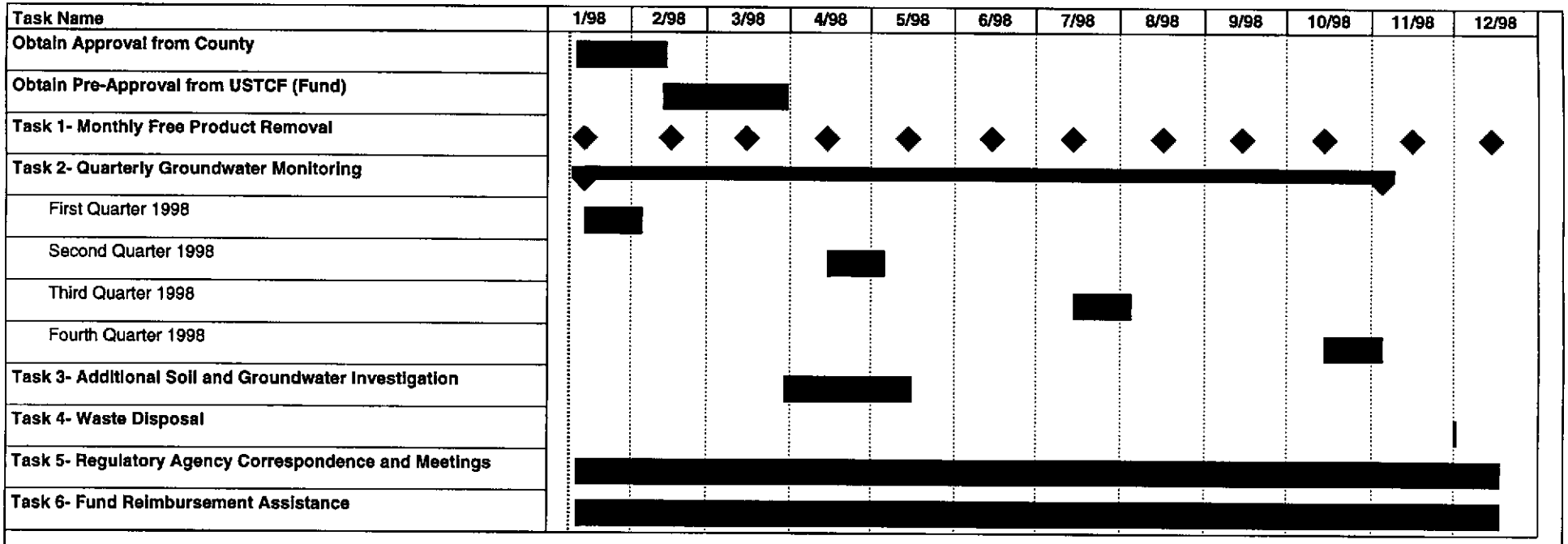
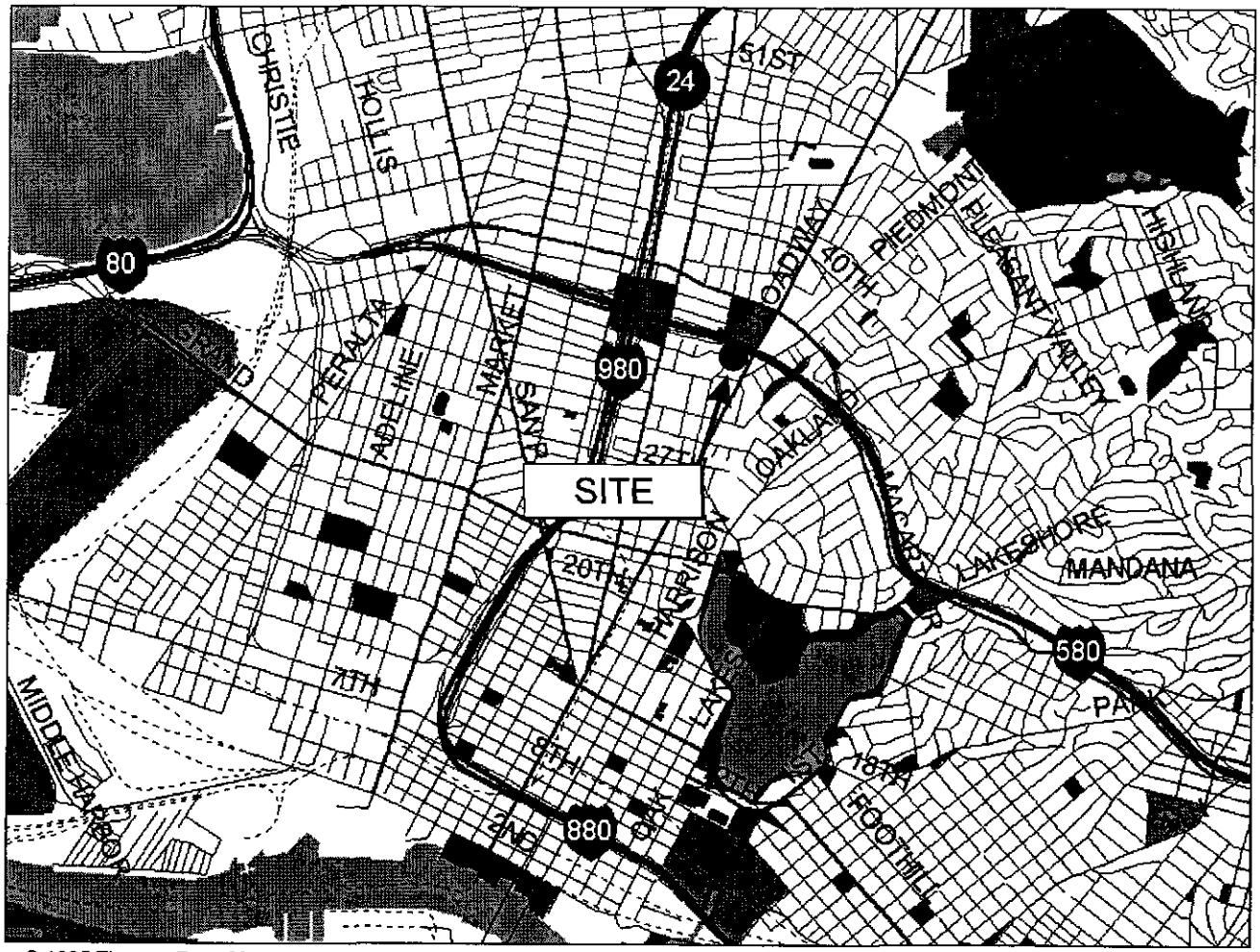


TABLE 4- PROPOSED SCHEDULE FOR SITE ACTIVITIES
327 34th Street, Oakland, CA
January 9, 1998

Task
Summary
Rolled Up Task



APPROXIMATE SCALE (feet)
0 2,000 4,000

N

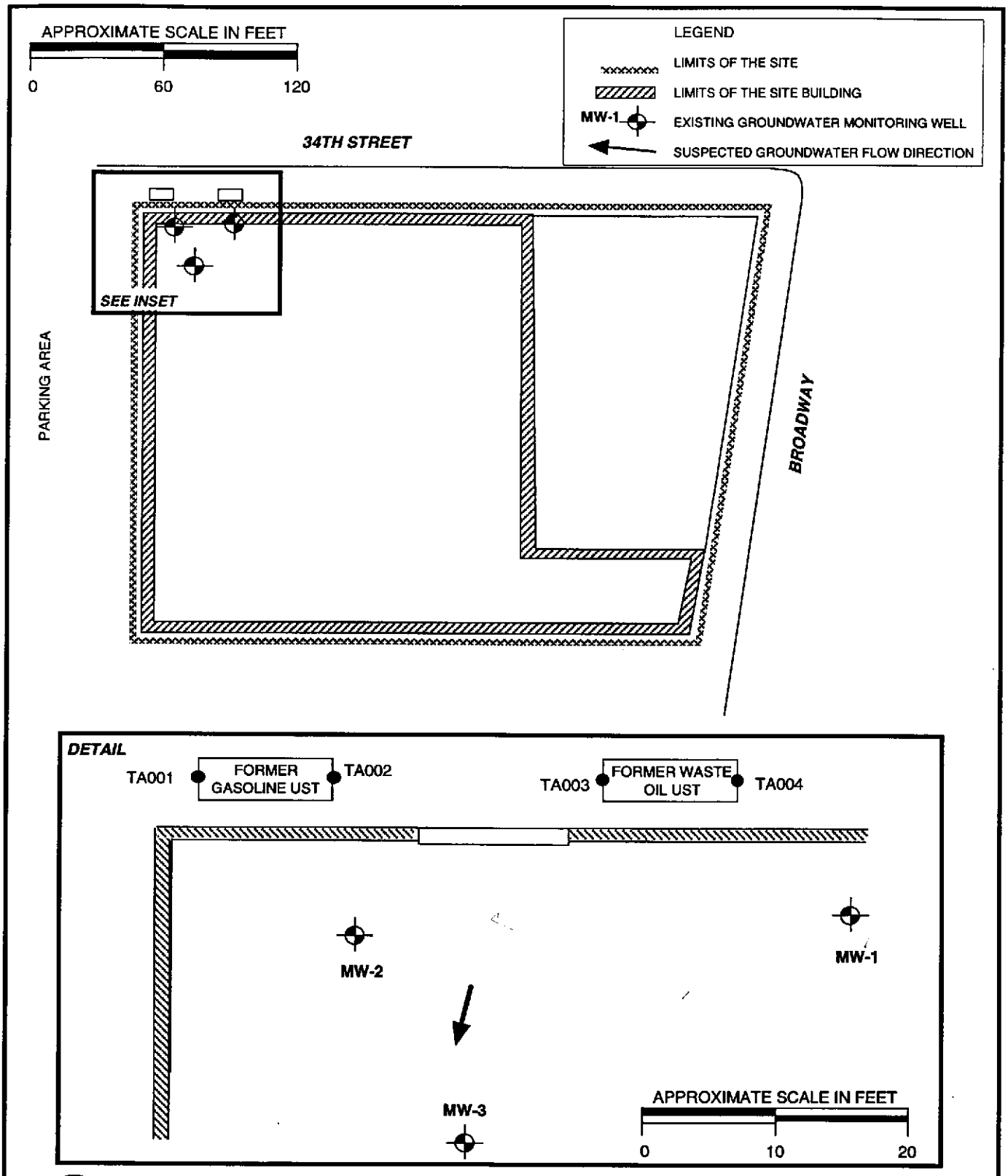
VICINITY MAP

SCI Subsurface Consultants, Inc.
Geotechnical & Environmental Engineers

VAL STROUGH CHEVEROLET
327 34TH STREET, OAKLAND, CALIFORNIA

JOB NUMBER	DATE	APPROVED
1039.006	5/20/97	TJM

PLATE 1



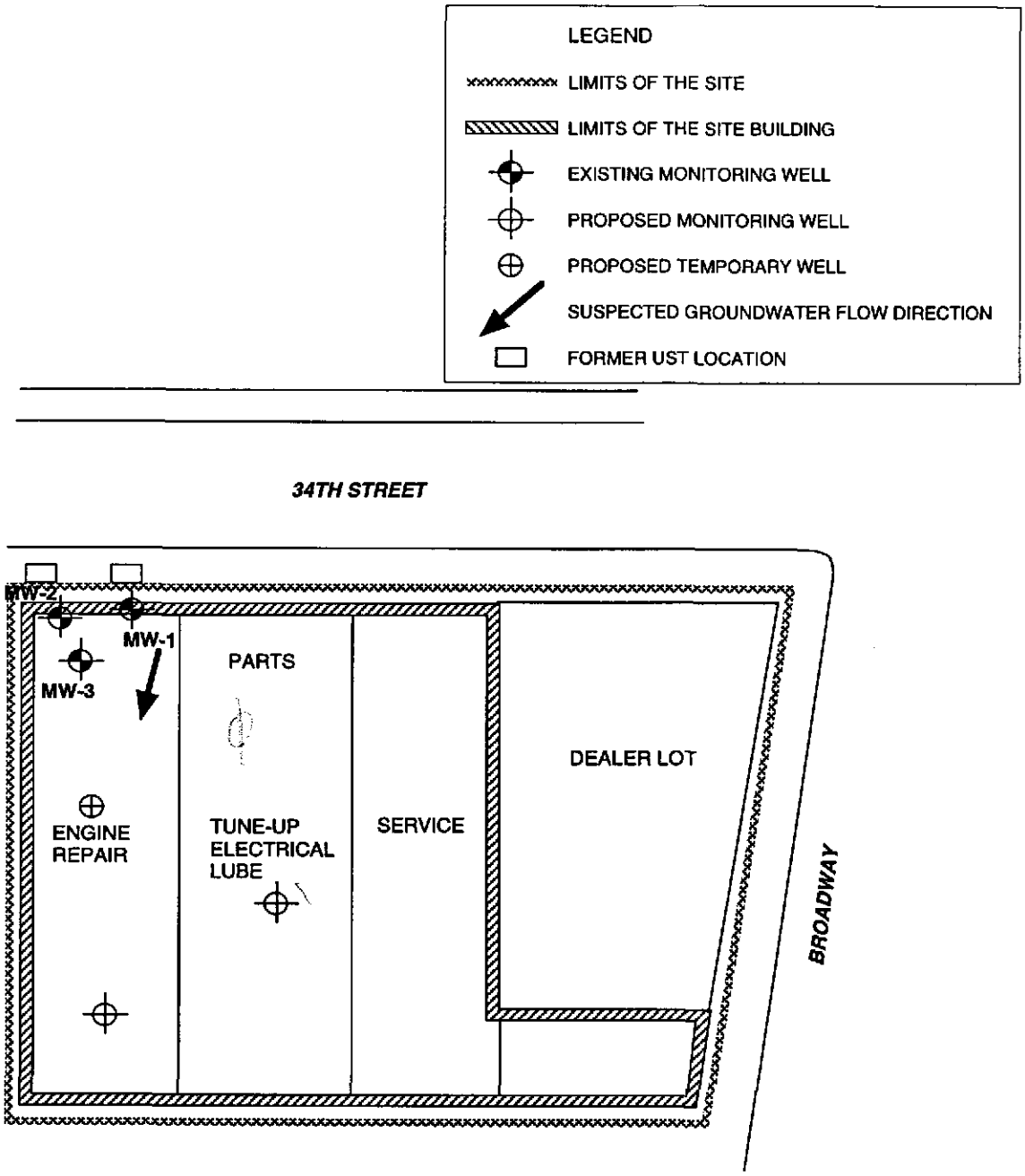
SITE PLAN

Subsurface Consultants, Inc.
Geotechnical & Environmental Engineers

VAL STROUGH CHEVROLET
327 34TH STREET, OAKLAND, CALIFORNIA

JOB NUMBER	DATE	APPROVED
1039.006	1/8/98	TJM

PLATE 2



PROPOSED WELL LOCATIONS

Subsurface Consultants, Inc.
Geotechnical & Environmental Engineers

VAL STROUGH CHEVROLET
327 34TH STREET, OAKLAND, CALIFORNIA

JOB NUMBER	DATE	APPROVED
1039.006	1/9/97	TJM

PLATE 3