W. A. CRAIG, INC.
Environmental Consulting and Contracting
P. O. Box 448
Napa, California 94559-0448
Contractor and Hazardous Substances License #455752
Cal/OSHA Statewide Annual Excavation Permit #559351
(800) 522-7244
Berkeley (510) 525-2780 Napa (707) 252-3353
Fax: (707) 252-3385

May 9, 1997

Mr. and Mrs. Casimero Damele
3750 Victor Avenue
Oakland, California 94619

Project No. 3365

Subject: **WORKPLAN - Soil and Groundwater Quality Investigation**
4401 Market Street
Oakland, California

Dear Mr. and Mrs. Damele:

W.A. Craig, Inc. (WAC) is pleased to submit this Workplan for a soil and groundwater quality investigation for 4401 Market Avenue (site), in Oakland, California (**Figure 1**). The scope of work proposed herein was requested by the Alameda County Department of Environmental Health (ACDEH) in a letter dated March 21, 1997. One additional monitoring well and four additional soil borings are proposed in this Workplan to further assess the extent of petroleum hydrocarbons in soil and groundwater at the site. Soil and groundwater samples will be collected from the soil borings to further characterize subsurface conditions and soil quality at the site. This investigation is intended to gather data to proceed with the Risk Based Corrective Action, previously proposed to the ACDEH.

BACKGROUND

The site is a former gasoline station, located on the northwest corner of 44th Street and Market Street in Oakland, California. One 1000-gallon and three 500-gallon, single-wall steel, underground storage tanks (USTs), which previously contained gasoline, were removed from the site on June 22, 1990. When the USTs were removed, they were reported to be rusted, pitted and contain one or more holes, and the seam near the fill end of the 1000-gallon UST was split. Additionally, petroleum odors and staining of the surrounding soil were reported in the UST excavation.

Soil obviously impacted by petroleum hydrocarbons was excavated from the former UST location at the time of UST removal. The depth of the excavations ranged from 7.5 feet below ground surface (bgs) to 15 feet bgs, or approximately 2 feet below the bottoms of the USTs. Soil samples were collected from beneath the removed USTs and from the stockpiled soils.

Up to 870 parts per million (ppm) total petroleum hydrocarbons as gasoline (TPH-g), 5 ppm benzene, 24 ppm toluene, 20 ppm ethylbenzene, and 110 ppm xylenes were detected in the six soil samples collected from the bottom of the UST excavation. The results of analytical testing of the composited soil samples from the stockpile, indicated a maximum of 130 ppm TPH-g. Based of the laboratory analytical results and the extension of the excavation under the sidewalks, the ACDEH agreed that the stockpiled soil could by placed back in the excavation.

In October of 1994, WAC advanced seven soil borings at the site and converted three of them to groundwater monitoring wells (MW-1, MW-2 and MW-3). A slight odor of petroleum was reported during the drilling of four of the soil borings and floating product was reported in boring SB-2. Soil samples collected at approximately 15 feet bgs from soil borings SB-2, SB-4 and the boring for monitoring well MW-2 reported concentrations of TPH-g ranging from 19 ppm the 220 ppm. Groundwater was encountered in an apparently confined water bearing zone at about 23 to 25 feet bgs. Following installation of the monitoring wells, the water levels were measured at approximately 11 to 12 feet bgs.

Groundwater samples have been collected on eight occasions between November 1994 and December 1996. Concentrations of TPH-g ranging from not detected to 540 micrograms per liter (μg/l) have been reported in samples collected from monitoring well MW-1, and concentrations of TPH-g ranging from 4100 μg/l to 20,000 μg/l in samples collected from monitoring well MW-2. Concentrations of TPH-g have not been reported in samples collected from monitoring well MW-3. Reported TPH-g concentrations in the groundwater samples have remained relatively stable during the monitoring period.

Benzene?

SOIL AND WATER INVESTIGATION

The scope of work proposed herein will be performed to obtain additional information on the site soil and groundwater quality. The proposed scope of work will include installation of one additional groundwater monitoring well and advancing five additional soil borings in order to fully delineate the extent of soil and groundwater contamination at the site. Two shallow soil borings (PB-1 and PB-2) will be advanced in the former pump island and trench areas. One soil boring (PB-3) will be advanced in the area of soil boring SB-2 to assess presence of free product, and one soil boring (PB-4) will be advance near the northwest corner of the street intersection to evaluate soil and groundwater conditions down-gradient of soil

?

What about a boring east of the site?

boring SB-2. These borings will be continuously cored. Another soil boring (PB-5) will be advanced near the northwest corner of the property to provide a background soil sample. One groundwater monitoring well will be installed on the south side of 44th Street to assess the extent of plume migration in the down-gradient direction.

Upon completion of the proposed scope of work, the soil and groundwater quality data will be reviewed and incorporated into an addendum to the previously submitted RBCA report. WAC's scope of services is based on our previous investigations of the site. The locations of the boreholes and wells proposed for this work are indicated on the attached **Figure 2**.

The scope of work proposed for this investigation includes the following:

- Preparation of this Workplan for submittal to the ACDEH;
- Obtaining appropriate permits and drilling four boreholes;
- Laboratory analysis of an estimated three soil samples per borehole;
- Constructing two groundwater monitoring wells;
- Developing and sampling the monitoring wells;
- Soil and groundwater samples will be analyzed for TPH-g using EPA Method 8015 (modified), BTEX and MTBE using EPA Method 8020, and TPH-d using EPA Method 3550. The background soil sample will be additionally analyzed for total organic carbon, bulk density, soil moisture content, and porosity; and
- Preparation of a soil and groundwater quality investigation report.

Standard procedures for the drilling, well installation, and sampling tasks are included herein as **Attachment A**.

We trust this provides the information you require at this time. If you have any questions or comments regarding the scope of services proposed in this Workplan, please contact us at (707) 252-3353.

Respectfully,

REGISTERED ENVIRONMENTAL ASSESSOR
WILLIAM A. CRAIG, II
No. 01414
Expires 6-97
STATE OF CALIFORNIA

W. A. Craig, Inc.
W.A. Craig, II, R.E.A
Principal

REGISTERED PROFESSIONAL GEOLOGIST
GEOFFERY A. FIEDLER
No. 6340
Exp. 9/30/97
STATE OF CALIFORNIA

Geoffery A. Fiedler, R.G.
Geologist

Copies: Addressee (1)
Attachments: A - Methods and Procedures
Figures 1 and 2

cc: ACDEH, Amy Leech

SITE LOCATION MAP
Damele Property
4401 Market Street
Oakland, CA

Project No. 3609-2
July 1996

Figure 1

W. A. CRAIG, INC.
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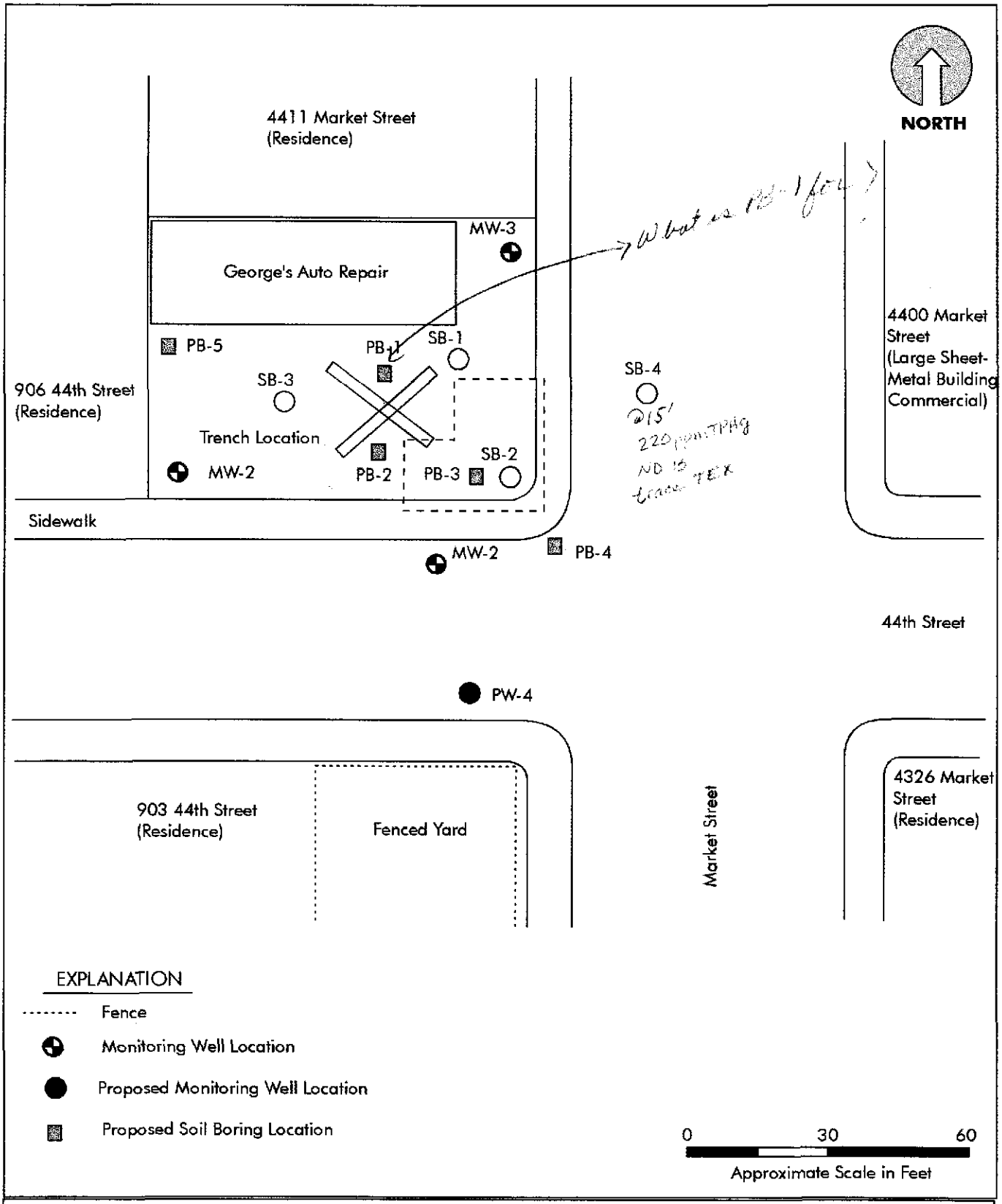

Project No. 3365

April 1997

LATERAL EXTENT OF TPHg IN SOIL

Damele Property
4401 Market Street
Oakland, CA

Figure 2

Checked by:

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ATTACHMENT A
METHODS AND PROCEDURES

Drilling and Soil Sampling

The exploratory soil borings and well installations will be permitted as required. WAC will obtain the services of a California Certified, C-57 licensed, drilling contractor for the drilling services. The soil borings will be drilled using a truck-mounted drill rig equipped with eight-inch outside-diameter hollow stem augers.

The boreholes will be logged in the field by a registered California geologist or by a WAC staff geologist under the direct supervision of a registered California geologist. Soil samples will be collected at a minimum of every five feet. A continuous log of the subsurface conditions will be prepared during drilling. Soils encountered during drilling will be logged in accordance with the Unified Soil Classification System. Soil samples obtained during drilling will be collected using a two-inch, inside-diameter, Modified California Sampler. The sampler will be lined with three, six-inch long, brass liners and driven eighteen-inches into undisturbed soil using a 140 pound hammer. The drilling and sampling equipment will be decontaminated prior to use by steam cleaning or using a laboratory grade detergent solution with a tap water or deionized water rinse.

Soil samples will be collected at five-foot intervals or when changes in lithology or impacted soil is observed or detected by photoionization detector (PID) screening or by visual or olfactory observations. Soil samples selected for analysis will be capped with teflon-lined plastic caps, labeled, sealed in a plastic bag, and stored in a container with ice. Samples retained for chemical analysis will be delivered, under chain of custody control, to a state certified analytical laboratory.

The exploratory boreholes to be converted to monitoring wells will be extended 10 to 15 feet past the first encountered water. The boreholes will be terminated at a shallower depth if a minimum of five-feet of impermeable soil, such as a clay, is penetrated. The boreholes will be drilled to groundwater or to a maximum depth of 50 feet, if groundwater is not encountered. If the water-bearing unit is found to be greater than 20 feet thick, drilling will be terminated 15 to 20 feet below the top of the aquifer. Borings not completed as monitoring wells will be drilled to the first encountered water and will be sealed by grouting to the ground surface.

All soil cuttings from the drilling operations will be stored on-site in 55-gallon, steel, DOT approved, drums.

Monitoring Well Construction

The groundwater monitoring wells will be constructed using two-inch, flush threaded, Schedule 40, PVC, well casing. The wells will be constructed through the hollow-stem augers, with materials placed from the bottom of the borehole to the ground surface. The screened interval of the well will be factory slotted and installed to approximately 10 to 15-feet below and five feet above, the first encountered groundwater. The screened section annulus will be packed with clean graded sand to a level approximately one foot above the screened interval. Approximately one foot of hydrated bentonite pellets will be placed above the sand as a sealing material. The well will be sealed from the bentonite seal to the ground surface using a portland cement/bentonite grout mixture. No glues or other solvents will be used in the construction of the wells. The wells have not been designed to provide optimum flow but should provide hydraulic connection between the water-bearing zone and the well.

The wellhead will be protected from vandalism using a locking expansion-plug cap and will be housed within a traffic-rated box to protect the well from traffic and surface water runoff. The grout will be allowed to set for a period of 72 hours. During that period no development or other work should be performed on the well.

Well Development

The wells will be developed by intermittent surging, bailing and/or pumping. Field parameters, including color, odor, free phase liquid, turbidity, specific conductance (EC), temperature, and pH will be intermittently monitored during the development of the wells. Development will continue until field parameters stabilize and the water is relatively clear and free of silt and sand.

Groundwater Sample Collection - Monitoring Wells

Water level measurements will be obtained from all of the site monitoring wells prior to development or sampling. The wells will be purged of a minimum of three well-casing volumes prior to sampling. The wells will be purged by pumping or by using a disposable polyethylene bailer. Should the well become completely evacuated during purging, samples will be collected after the well has recovered to 80 percent of its initial water level. Field parameters will be intermittently monitored during the purging of the well (as described in well development).

Groundwater samples will be decanted from the bailer into laboratory prepared containers. The samples will be immediately placed in refrigerated storage for delivery to the laboratory. The samples will be labeled in such a manner as to maintain client confidentiality. Samples will be delivered under chain of custody control to an analytical laboratory that is certified by the State of California to perform the requested analyses.

Laboratory Analyses

Soil and groundwater samples will be analyzed for TPH-g using EPA Method 8015 (modified), TPH-d using EPA Method 3550, and BTEX and MTBE using EPA Method 8020.

Purge and Decontamination Water Disposal

Purge water from the well development and sampling and decontamination rinsate from the drilling and sampling operations will be labeled and stored on-site in 55-gallon, steel, DOT approved, drums. The drums will be left on-site for subsequent disposal pending analytical results.