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Alameda County
Environmental Health

March 28, 2008

**WORK PLAN FOR SOIL VAPOR AND
GROUNDWATER SAMPLING**

625 Hegenberger Road
Oakland, California

AEI Project No. 277254
ACEH File No. RO 0000226 / GeoTracker Global ID TO600100990

Prepared On Behalf Of

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FIGURE 1 *SITE LOCATION MAP*
FIGURE 2 *SITE PLAN*

1.0 INTRODUCTION

AEI Consultants (AEI) has prepared this workplan on behalf of the Diversified Investment & Management Corporation (Diversified) for the property located at 625 Hegenberger Road in the City of Oakland, California (refer to Figures 1 and 2). AEI has been retained by Diversified to provide environmental engineering and consulting services related to the release of fuel hydrocarbons from the former underground storage tank (UST) system at the property. The Alameda County Environmental Health (ACEH) is the lead local oversight agency for this site, working under cooperative agreement with the San Francisco Bay Regional Water Quality Control Board (RWQCB), and providing regulatory guidance during the mitigation of the release.

In a letter dated March 12, 2008, the ACEH required several additional site assessment and reporting tasks in order to consider this site for closure, including:

- Soil vapor sampling to evaluate the potential for vapor intrusion;
- A minimum of one groundwater sampling event to assess current conditions and whether rebound has occurred since remedial activities;
- Reporting of these activities and results and upload of data to GeoTracker, including monitoring well survey data, analytical results, and electronic reports.

This workplan presents the scope of work for soil vapor sampling, groundwater sampling of existing groundwater monitoring wells, and associated activities and reporting to be performed.

2.0 SITE DESCRIPTION AND BACKGROUND SUMMARY

The site is located on the northwestern corner of Collins Drive and Hegenberger Road in a commercial and light industrial area of the City of Oakland. The site is currently vacant and unimproved but will be developed in the coming months with a commercial center.

The property was reportedly developed as a gasoline service station in the mid 1960s, which was subsequently abandoned in the mid 1970s. A release was discovered at the site and beginning in 1993, the fuel system and tanks were removed and site investigation, groundwater monitoring, and remedial action began. In 1996 soil was excavated and treated onsite and from 2000 to 2002 *in situ* bio-remediation conducted. A more detailed history of the site has been presented in several past reports, the most recent of which was the March 28, 2003 *Risk Evaluation and Closure Report* to which the reader is referred for additional information on previous analytical results, monitoring data, and site geology.

3.0 PROPOSED SCOPE OF WORK

As requested, groundwater monitoring will be performed at the site using the existing groundwater monitoring well network. The purpose of the monitoring is to evaluate current groundwater conditions and to confirm that natural attenuation of petroleum hydrocarbons has continued since the last monitoring event. Secondly, soil vapor samples will be collected from five (5) proposed locations from shallow temporary soil gas probes. The purpose of this sampling will be to assess

whether vapor phase volatile contaminants exist in the shallow soil that could potentially lead to concern over vapor intrusion into structures on the property.

The information obtained from this additional testing will be incorporated into an additional closure request document. In addition, data from this and previous sampling will be uploaded to the GeoTracker database as requested by ACEH.

Detailed specifications for these tasks are outlined in Sections 5 and 6 below.

4.0 SOIL VAPOR SAMPLING

Soil vapor sampling for consideration of possible vapor intrusion, including probe installation, purging, leak testing, sampling, and analyses will be performed in general accordance with the “*Advisory – Active Soil Gas Investigations*” (ASGI), dated January 28, 2003. Temporary soil gas probes will be installed in five (5) locations (labeled SG-1 to SG-5 on Figure 2) within and around the former release area.

4.1 Temporary Soil Gas Probe Installation

Soil vapor samples will be collected through temporary soil vapor sampling probes installed in the locations shown on Figure 2. Due to the shallow depth to groundwater at this site (approximately 6 feet bgs), the probes will be installed to a total depth of no deeper than 4 feet bgs, such that they are above the capillary fringe. The soil probes consist of 1 ¼-inch outside diameter (OD) Geoprobe[®] rods with a sacrificial tip and a soil vapor tip that allows for attachment of ¼ –inch OD, 1/8-inch inside diameter (ID) tubing through the inside of the rod for collection of the soil vapor sample. The rods will be manually driven using roto-hammer type of impact hammer.

Following emplacement of the rod at the desired depth, the rod will be pulled back approximately 6-inches creating a void space from which the soil vapor can be collected. The collection tube which has a threaded tip on the lower end and a valve on the top end is extended down through the inside of the tubing and screwed into the tip of the rod. The rod is then sealed at the surface with hydrated bentonite.

4.2 Sample Collection

Soil gas sampling will not be performed within three days of “measurable precipitation” (i.e., ½-inch or greater). Three (3) volumes of dead air will be purged from the sample tubing using a 30 to 60 milliliter (mL) plastic syringe before collecting a soil gas sample. This will ensure that a sufficient volume of ambient air will be removed from the sampling point and that samples collected will be representative of subsurface conditions. The purge volume will be calculated by summing the volume of the sample tubing and annular space around the probe tip. If no-flow conditions are present, this can be immediately seen during the purging using the syringe method. After the probe is purged, samples will be collected

into 1-liter laboratory prepared Summa™ canisters. If no-flow to low-flow conditions are encountered (flow rates are ≤ 10 mL/min or down-hole vacuum ≥ 10 inches of mercury or 136 inches of water) due to fine grained soil, clay, or otherwise saturated soils, soil gas sampling may not be possible. Soil gas sampling will immediately cease if moisture or other foreign material is detected in the sample tubing.

A soil gas sampling manifold will be provided by the laboratory. The sampling manifold will be equipped with a critical orifice flow regulator and down-hole pressure (vacuum) gage. The critical orifice device will maintain a sampling flow rate of between 100 to 200 milliliters per minute (mL/min) depending upon the down-hole vacuum (air permeability). The soil gas sampling manifold will be placed inline between the soil gas probe and Summa™ canister and used for both purging and sample collection.

4.3 Leak Test

All soil gas probes will be leak tested during the soil gas sampling. A leak test dome will be placed over the sampling probe at the surface. A rag moistened with isopropyl alcohol (2-propanol) will be placed under the dome as a leak test tracer substance. This tracer compound is not suspected to be present in gasoline. Appropriate methods will be used to analyze for 2-propanol tracer gas with a detection limit of ≤ 10 micrograms per liter of air ($\mu\text{g/L}$).

4.4 Sample Analyses

Soil gas samples collected in Summa™ canister will be delivered McCampbell Analytical, Inc. of Pittsburg, California (DHS No. 1644) under proper chain of custody protocol on the day of collection. The soil gas samples will be analyzed for TPH-g by EPA Method TO-3 and for MTBE, BTEX and leak check compound by EPA Method TO-15 with appropriate detection limits for evaluating vapor intrusion potential. The detection limit for 2-propanol will be $10 \mu\text{g/L}$. Laboratory procedures will include appropriate quality assurance and quality control protocols, including method blanks and use of surrogates during sample analyses.

5.0 GROUNDWATER SAMPLING

5.1 Redevelopment and Survey of Monitoring Wells

The groundwater monitoring wells have not been purged or sampled for several years. Each well will be developed by surging with a surge block or bailer for 5 minutes. Approximately 8 to 10 well volumes will then be pumped from each well to remove sediments and organic materials that may have accumulated in the well casings. Well development will occur no sooner than 3 days prior to sampling collection. Purge water will be stored onsite in 55-gallon, sealed, labeled drums pending offsite disposal.

Each of the wells will be surveyed in accordance with the requirements of the GeoTracker database GEO X_Y and GEO Z formats and data uploaded, as required.

5.2 Groundwater Sampling and Analyses

Prior to measurement of depth to groundwater, the well caps will be removed and the water levels allowed to equilibrate with the atmosphere for 15 minutes. The depth to groundwater from the top of the each well casing will then be measured with an electric water level indicator prior to sampling.

The wells will be purged and sampled by the same methods previously employed at the site. The wells will be purged with a submersible purge pump of at least three well volumes prior to sample collection. During purging the following water quality measurements will be measured using a flow-through cell and recorded: temperature, pH, specific conductivity, and dissolved oxygen (DO). A visual evaluation of turbidity will be made and noted. Groundwater measurements and field parameters will be recorded on the field sampling forms.

Following purging and recovery of water levels, groundwater samples will be collected with new, unused disposable bailers into appropriate laboratory-supplied containers: 40 milliliter volatile organic vials (VOAs) and 1-liter glass bottles. The VOAs will be capped with zero visible headspace. All samples will be labeled with at minimum, project number, sample number, time, date, and sampler's name. The samples will then be entered on an appropriate chain-of-custody form and placed on water ice in a pre-chilled cooler pending transportation under chain of custody protocols to McCampbell Analytical, Inc.

Groundwater samples will be analyzed for the following:

- Total Petroleum Hydrocarbons (TPH) as gasoline (TPH-g) by EPA method 8015Cm
- Benzene, toluene, ethyl benzene, and xylenes (BTEX) and methyl tertiary butyl ether (MTBE) by EPA method 8021
- The fuel additives t-butyl alcohol (TBA) and MTBE by EPA method 8260B.

6.0 REPORTING

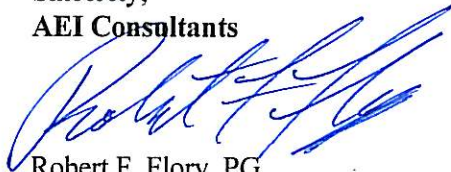
Following the completion of all field activities and receipt of analytical and survey data, AEI will prepare a technical report for ACEH documenting field activities, analytical methods and results, and conclusions. Copies of the report will be uploaded to GeoTracker and ACEH. Copies of past reports and related electronic data files will also be uploaded GeoTracker. The report conclusions and recommendations will consider the development of the property that will occur in the coming months and include recommendations for closure, as warranted by the findings.

7.0 ESTIMATED SCHEDULE

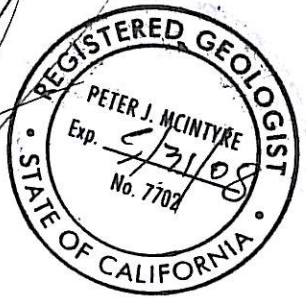
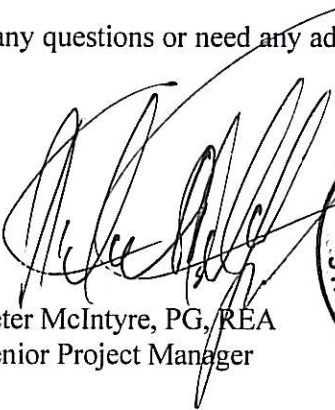
The field work for these activities will be scheduled immediately upon receipt of comment and concurrence by ACEH. Given the planned development of the property and other approval that are contingent upon resolving this environmental case with ACEH, the sampling are tentatively scheduled to occur within approximately 2 weeks. The ACEH will be given notification of the date of field work so that inspections can be coordinated if needed. The report will be issued within approximately one month of receipt of all necessary data.

Please contact the undersigned at (925) 944-2899 if you have any questions or need any additional information.

Sincerely,
AEI Consultants



Robert F. Flory, PG
Senior Project Geologist



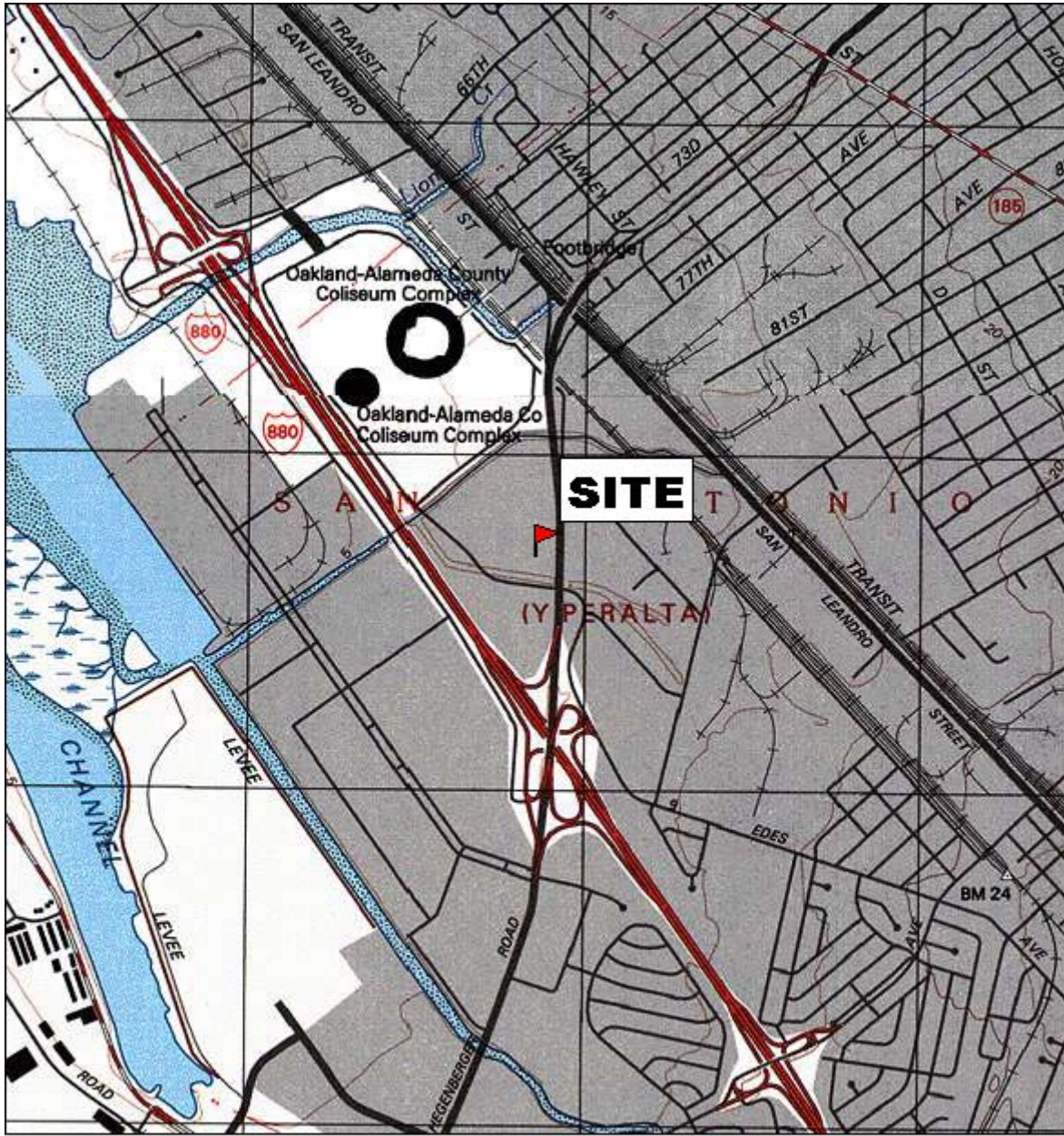
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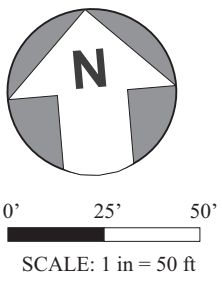
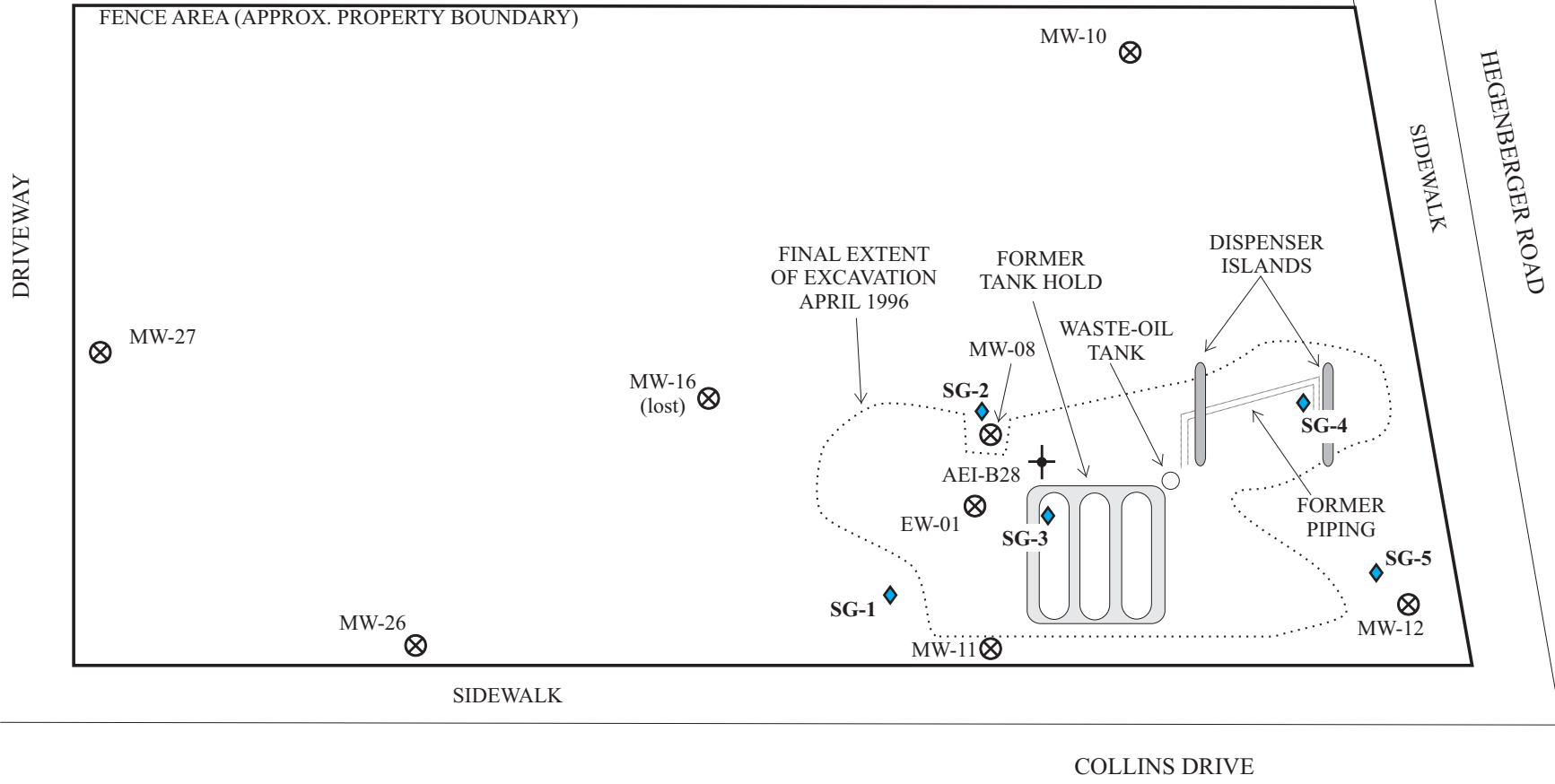
FIGURES



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AEI CONSULTANTS 2500 CAMINO DIABLO, WALNUT CREEK, CA	
SITE LOCATION MAP	
625 HEGENBERGER ROAD OAKLAND, CALIFORNIA	FIGURE 1 PROJECT NO. 277254

COMMERCIAL WAREHOUSE PROPERTY



KEY	
	Monitoring Well Locations
	Soil Boring (June 2000)
	Proposed Soil Vapor Sampling Location

AEI CONSULTANTS 2500 CAMINO DIABLO, WALNUT CREEK, CA	
SITE PLAN	
625 HEGEMBERGER ROAD OAKLAND, CALIFORNIA	FIGURE 2 AEI PROJECT NO 277254