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December 12, 2006

Jerry Wickham
Alameda County Health Care Services Agency
Environmental Health Services, Environmental Protection
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

**Subject: Fuel Leak Case No. RO0002900, Work Plan for Further Site Investigation,
700 Independent Road, Oakland, California**

Dear Mr. Wickham,

Attached is a workplan titled *Work Plan for Further Site Investigation, 700 Independent Road, Oakland, California*. The work plan was prepared by Kleinfelder Inc. on behalf of Equity Office Properties – Industrial Portfolio, LLC. This work plan is being submitted to Alameda Health Care Services Agency, Environmental Health Services pursuant to our request in a letter to Mr. Peter A. McGing dated October 6, 2006.

I declare, under penalty of perjury, that the information and / or recommendations contained in the attached document is true and correct to the best of my knowledge.

Sincerely,
Equity Office Properties – Industrial Portfolio, LLC.

A handwritten signature in black ink, appearing to read "Peter A. McGing".

Peter A. McGing, P.E.
Vice President – Investments Engineering

RECEIVED

By dehloptoxic at 10:14 am, Dec 14, 2006

**WORK PLAN FOR FURTHER SITE
INVESTIGATION
700 INDEPENDENT ROAD
OAKLAND, CALIFORNIA**

December 12, 2006

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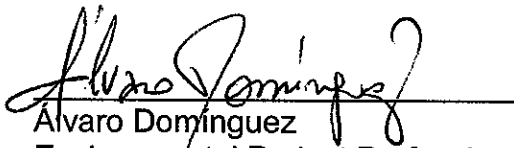
A Site Investigation Workplan Prepared for:
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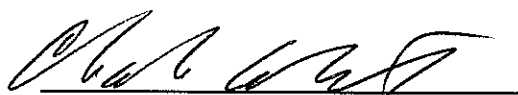
Mr. Peter A. McGing
EOP – Industrial Portfolio, L.L.C.
Two North Riverside Plaza, Suite 2100
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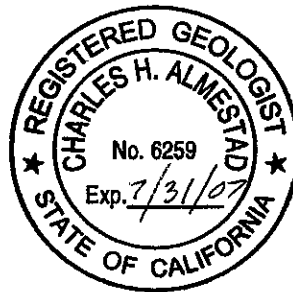
**WORKPLAN FOR FURTHER SITE INVESTIGATION
700 INDEPENDENT ROAD
OAKLAND, CALIFORNIA**

File No.: 54504/3

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December 12, 2006

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Site Vicinity Map

Plate 2

Proposed Sampling Locations

APPENDICES

Appendix A

TEG – Soil Vapor Survey Methodology

1.0 INTRODUCTION

Kleinfelder Inc. (Kleinfelder) prepared this work plan on behalf of Equity Office Properties – Industrial Portfolio, L.L.C. (EOP) to perform a subsurface investigation at 700 Independent Road in Oakland, California (the Site). Plate 1 presents a Site vicinity map.

This work plan was prepared in response to the Alameda County Health Care Services Agency (ACHCSA) letter, dated October 6, 2006. In the letter, the ACHCSA requests that additional subsurface investigations be performed to (1) assess the potential of indoor vapor intrusion, (2) further delineate the horizontal extent of petroleum hydrocarbons in soil and groundwater to the east and southeast of the former underground storage tank (UST), (3) further assess the vertical extent of petroleum hydrocarbons in ground water at the site, and (4) install monitoring wells to define the local hydraulic gradient at the Site and confirm that the petroleum hydrocarbon plume at the Site is stable or shrinking. In addition, the ACHCSA requested a 2,000-foot radius water-supply well survey be performed, and a plan map be prepared showing the location of underground utilities in the area of the former UST that may serve as preferential pathways for contaminate migration. This work plan describes the objectives, tasks and methods for performing the investigations requested by the ACHCSA.

1.1 OBJECTIVES AND SCOPE OF WORK

The objectives of this work plan are to meet requirements of the ACHCSA. The scope of work to meet these objectives includes:

- Assess the potential of indoor vapor intrusion by collecting and analyzing soil-vapor samples from five locations including two locations within the warehouse and three locations surrounding the block building (Plate 2);
- Further delineate the vertical extent of contamination by advancing three soil borings to the north, east and south of the former UST and collecting and analyzing soil samples (Plate 2);

- Further delineate the horizontal extent of contamination associated with the UST to the east and southeast by advancing four soil borings within the warehouse building and collecting and analyzing soil samples (Plate 2);
- Install three monitoring wells and collect and analyze soil and groundwater samples (Plate 2);
- Obtain information on the locations, status and construction of water wells within a 2,000 feet radius of the former UST;
- Prepare a location map showing the locations of underground utilities that may serve as potential pathways for petroleum hydrocarbons in groundwater in the former UST area; and
- Upload the Site's information into the GeoTracker database system.

The methods and results of the investigation will be described in a report that will include plan maps indicating the approximate borehole and well locations, boring logs describing the stratigraphy and subsurface conditions, and tables summarizing the analytical results.

2.0 BACKGROUND INFORMATION

This section presents a description of the Site and a summary of previous investigations.

2.1 SITE DESCRIPTION

The Site is located at 700 Independent Road, in an industrial area of Oakland, California, and comprises approximately five acres. The Site is situated approximately 2,000 feet northwest of the McAfee Stadium (Plates 1 and 2). A one-story warehouse/manufacturing building, a parking lot and a railroad spur occupy the Site. The facility has been used as a warehouse since the 1950's, and is currently occupied by the Eagle Bag Company, a manufacturer of plastic bags. Near surface soils have been found to be predominantly clay and silty-clay in texture with sandy interbeds; groundwater has been encountered at depths of approximately 8 to 10 feet below ground surface (bgs).

2.2 PREVIOUS INVESTIGATIONS

Previous work at the Site includes the discovery and removal of a UST, and a subsequent subsurface investigation.

2.2.1 UST Discovery and Removal

A prospective purchaser of the 700 Independent Road property discovered the presence of petroleum hydrocarbons in soil and groundwater near the loading dock on the Site. As a follow-up to this discovery, Kleinfelder searched regulatory agency records, performed a geophysical survey and identified the presence of a UST and associated piping in the vicinity of the loading dock. On August 17, 2005, Kleinfelder contracted for the removal and disposal of one 1,100-gallon UST, under permit with the City of Oakland.

A report, dated November 1, 2005, summarizing the UST removal and analytical results of soil samples collected from the excavation was submitted to the City of Oakland Fire Department. The analytical results of soil confirmation samples from the bottom of the

excavation pit indicated the presence of petroleum hydrocarbons at concentrations exceeding Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Environmental Screening Levels (ESLs). Because elevated concentrations of petroleum hydrocarbons were documented, the site investigation was referred to the ACHCSA as the lead government agency. The ACHCSA assigned the Site as Fuel Case Number RO0002900.

2.2.2 Subsequent Subsurface Investigation

Following up on the ACHCSA request for a subsurface investigation at the Site, Kleinfelder collected soil and groundwater samples in thirteen locations on the property on July 24, 25 and August 10, 2006. Analytical results of soil samples indicated the presence of Total Petroleum Hydrocarbons as gasoline (TPH-g), benzene (B) and xylenes (X) in soil, at concentrations up to 810 mg/Kg, 3,000 mg/Kg, and 33,000 mg/Kg, respectively, near the former location of the UST. Groundwater sample analysis indicated the presence of TPH-g and Total Petroleum Hydrocarbons as diesel (TPH-d) at concentrations as high as 42,000 micrograms per liter ($\mu\text{g/L}$) and 4,190 $\mu\text{g/L}$, respectively. Benzene, toluene, ethylbenzene, and xylenes (BTEX) in groundwater were detected at concentrations as high as 13,800 $\mu\text{g/L}$, 929 $\mu\text{g/L}$, 2,810 $\mu\text{g/L}$, and 3,140 $\mu\text{g/L}$, respectively. The results of the investigation were summarized in a September 27, 2006 report titled Site Field Investigation, 700 Independent Road Oakland, California.

On October 6, 2006, the ACHCSA issued a letter requesting that EOP prepare a work-plan to further delineate the horizontal and vertical extent of petroleum hydrocarbons associated with the UST, perform a soil vapor survey to assess the potential for indoor vapor intrusion; install groundwater monitoring wells within the impacted area; perform a 2,000-foot radius water well survey; identify subsurface utilities that may provide a pathway for hydrocarbon migration, and upload the Site's information into the GeoTracker system.

3.0 FIELD ACTIVITIES

This section describes pre-field and field activities associated with the proposed subsurface investigation, including:

- Acquiring the required permits;
- Verifying that utilities are not present in the proposed sampling locations;
- Collecting soil-vapor samples from approximately five feet bgs at five locations from inside the warehouse;
- Advancing six borings, three to 40 feet bgs and three to 25 feet bgs, collecting soil and grab-groundwater samples from each boring, and delivering the samples to a State-certified laboratory for analysis;
- Installing three groundwater monitoring wells, measure groundwater levels and collecting groundwater samples and delivering the samples to a State-certified laboratory for analysis; and
- Retaining a licensed surveyor to provide latitude and longitude coordinates of borings and monitoring well head elevations.

The proposed activities will be conducted under the supervision of a California Professional Geologist (P.G.) or Professional Engineer (P.E.). Kleinfelder will only contract with State-licensed drillers and certified analytical laboratories.

3.1 FIELD PREPARATION ACTIVITIES

Kleinfelder will prepare and submit a permit application to the Alameda County Public Works Agency for advancing the boreholes and installing the three wells. The application will include the number of the proposed borings and wells, including proposed depth and screening interval, a Site map showing the approximate location of the proposed borings and wells, a health and safety plan, and the corresponding fees. Kleinfelder will visit the site and mark the locations of the proposed borings with white paint. Underground Service Alert will be notified a minimum of 48 hours prior to the initiation of the drilling activities to provide member agencies notice and alert them to mark the location of their respective utilities. In addition, a private utility locator will be retained to identify onsite utilities and clear locations for drilling.

3.2 SOIL VAPOR SAMPLING

Kleinfelder will retain the services of TEG Incorporated (TEG) to perform the proposed soil-vapor sampling and analysis. The proposed soil-vapor sampling locations are presented in Plate 2. Prior to advancing the sampling probe, an approximately 4-inch diameter core will be cut through the concrete slab at the selected soil-vapor sampling locations. Soil vapor samples will be collected from approximately five feet bgs. TEG's sampling protocols are consistent with recent Department of Toxic Substances Control guidance (rev. February 2005) and are presented as Appendix A of this work plan.

3.3 SOIL BORING ADVANCEMENT AND WELL INSTALLATION

Kleinfelder will retain the services of a licensed driller to advance six soil borings and install three groundwater monitoring-wells.

The six borings will be advanced using direct-push technology. A truck-mounted hydraulic and percussion drive-point rig with dual-wall drilling capabilities will be used. Three of the borings will be advanced to a depth of 40 feet bgs and three to a depth of 25 feet bgs. The proposed locations of the soil borings are shown in Plate 2.

The soils encountered in each boring core will be logged according to Unified Soil Classification System. The soil in the cores will also be screened with a photo-ionization detector (PID).

Three two-inch groundwater monitoring-wells will be installed to a depth of approximately 20 feet. In order to obtain soil information and soil samples, the well borings will be advanced initially with direct push technology. The boreholes for the wells will subsequently be drilled with a hollow stem auger rig. Field observations and soil sampling will be performed as described for the soil borings. The borings for the wells will be advanced to approximately 20 feet bgs using 8-inch-diameter hollow stem augers. The wells will be constructed with up to 10 feet of 2-inch-diameter, schedule 40 polyvinyl chloride (PVC) flush threaded well screen with 0.020-inch slot. The annular space between the well screen and boring will be backfilled with No. 2/12 Lonestar sand-pack material to 2 feet above the well screen. Upon placement of the filter pack,

at a minimum a 2-foot-thick annular seal will be constructed using bentonite pellets hydrated in place with potable water. Cement/bentonite grout will be placed from the bentonite seal to within about one foot of the ground surface. The well will be completed below grade in a traffic-rated well box and fitted with a watertight locking cap.

After the concrete annular seal of the wells is allowed to cure for 24 to 48 hours, the wells will be developed to remove fine sediments from the well casing and the sand pack. Well-development will be performed by surging, bailing, and pumping water to remove sediment and turbid water from the well. During purging, measurements of temperature, conductivity, pH, and turbidity will be made at regular intervals. Field measurements and observations will be recorded on well development logs. Well development will continue until one of the following occurs: 1) at least three consecutive measurements of temperature, conductivity and pH are within 10 percent of each other; 2) groundwater appears relatively clear; or 3) a maximum of five well volumes are removed.

Soil cuttings generated during soil-boring advancement and subsurface drilling will be contained, separately, in U.S. Department of Transportation-approved, 55-gallon steel drums. The drums will be labeled and temporarily held at the Site pending disposal determination.

3.4 DECONTAMINATION OF SAMPLING EQUIPMENT

The rods used to advance the borings for soil-vapor and soil sampling will be steamed cleaned before being advanced into the subsurface. Rinsates will be stored in U.S. Department of Transportation-approved, 55-gallon steel drums.

3.5 SOIL SAMPLING AND ANALYSIS

Soil samples for chemical analysis will be collected in acetate liners from all borings at approximately 8 to 10 feet bgs, immediately above the top water table. Subsequent samples will be collected from depths where field observations, such as stains, odors and/or elevated PID readings, suggest the presence of contamination. Field

observations and sample collection depths will be recorded as part of the daily field notes.

At a minimum, three soil samples will be collected from each boring. The ends of the acetate liners with the soil samples will be covered with Teflon[®] sheets and capped with plastic end caps. The samples will be labeled and placed in a cooler with ice for transport to a State certified laboratory, following chain-of-custody protocols. Soil samples will be analyzed using the following Environmental Protection Agency (EPA) Methods:

- TPH-g, BTEX, methyl tert butyl ether (MtBE), using EPA Method 8260,
- 1,2-Dichloroethane (EDC) and 1,2-Dibromoethane (EDB) using EPA Method 8260
- TPH-d (with silica gel cleanup) using EPA Method 8015

3.6 GROUNDWATER SAMPLING AND ANALYSIS

Grab-groundwater samples will be collected from each of the six borings. The samples will be collected with disposable bailers, and stored in laboratory-supplied vials. The samples will be labeled and stored in a cooler with ice for transport to a State certified laboratory, following chain-of-custody protocol.

After the wells are developed, groundwater samples will be collected from each well using new PVC-disposable bailers. The samples will be collected after the wells are purged of a minimum three well volumes and when purge water temperature, conductivity, pH, and turbidity readings have stabilized or a maximum of five well volumes have been purged. Groundwater samples will be contained in laboratory-supplied vials, labeled, and stored in a cooler with ice for transport to a State-certified laboratory, following chain-of-custody protocol.

Groundwater samples collected from both, the borings and groundwater monitoring wells will be analyzed using the following EPA Methods:

- TPH-g, BTEX, MtBE, using EPA Method 8260,

- 1,2-Dichloroethane (EDC) and 1,2-Dibromoethane (EDB) using EPA Method 8260;
- TPH-d (with silica gel cleanup) using EPA Method 8015,

3.7 SOIL BORINGS AND WELLS SURVEYING

Kleinfelder will retain the services of a licensed land surveyor to survey the locations and elevations of the monitoring wells consistent with GeoTracker requirements. The elevations for the monitoring well heads will be determined to plus or minus 0.01 foot vertically.

3.8 INVESTIGATION-DERIVED WASTE MANAGEMENT

Investigation-derived waste (IDW), such as decontamination rinsate fluids and soil cuttings will be contained, separately, in U.S. Department of Transportation-approved, 55-gallon steel drums. The drums will be labeled and temporarily held at the Site. Kleinfelder will profile the waste and arrange for the disposal of the drums at a permitted facility.

4.0 NON FIELD ACTIVITIES

This section describes non-field activities to be performed as part of the proposed investigation.

4.1 UPLOAD THE SITE'S INFORMATION INTO THE GEOTRACKER SYSTEM

Kleinfelder will upload the Site's project information into the GeoTracker system, including the coordinates of soil borings and wells obtained by the land surveyor, and analytical results of the samples collected during this investigation.

4.2 POTENTIAL CONDUIT ASSESSMENT

Kleinfelder will obtain on the location of utility corridors located in the vicinity of the former UST from the City of Oakland Public Works Agency. In addition, we will request information on the location, status, and well construction data on water wells located within a 2,000-foot radius from the former UST location. Well information will be obtained from the California Department of Water Resources, and the Alameda County Public Works Agency.

5.0 QUALITY ASSURANCE/QUALITY CONTROL

5.1 FIELD PROCEDURES

Field quality assurance/quality control (QA/QC) procedures will be documented by two means: field documentation and QA/QC sample collection and analysis.

5.1.1 Field Documentation

The following five formats will be used for documenting field activities implementation:

- Daily field report;
- Field data sheets;
- Photo-documentation record;
- Sample labels; and
- Chain-of-custody form.

5.1.2 Daily Field Report

Field data will be recorded in the field in a logbook or daily field report forms. Recorded data will include date and weather conditions when fieldwork is being performed, as well as time of arrival and of relevant events, such as drilling starting and ending times, the arrival/departure and conversations with stakeholders, such as Site custodians and or government agency personnel.

Field notes will also include any anomalies observed in soil, such as stains, odors or high PID readings, and the time and depth samples are collected.

5.1.3 Field Data Sheets

The data sheets will be completed in the field and include: daily field reports and geologic boring logs.

5.1.4 Photo-documentation Record

Photographs of relevant events will be used to document field activities.

5.1.5 Sample Labels

Sample labels will be completed in waterproof ink before the sample is placed into the cooler. Sample labels will include the following information: sample identification, project number, sample collection date and time, sample location, preservative, and samplers' initials.

5.1.6 Chain-of-Custody

A chain-of-custody (COC) record will be completed as soil and groundwater samples are collected. The records will be checked for completeness at the end of each day samples are collected. The COC will be hand-delivered with the samples to the selected State-certified laboratory. Information on the COC record will include: sample date and time, sample ID and location, matrix, number of containers, required analyses, preservative, turnaround time, project manager's name, project number, project name and location, client and laboratory names, and sampler signatures.

5.1.7 Field QA/QC Sample Collection and Analysis

QA/QC samples will be collected during field sampling activities. QA/QC samples will include duplicate samples and trip blanks, as appropriate. One duplicate sample will be collected during grab groundwater sampling to provide a quantitative measure of the precision of the overall sampling and analysis process.

5.2 LABORATORY QUALITY ASSURANCE/QUALITY CONTROL

All analytical testing will be performed by a Cal/EPA ELAP-accredited hazardous-waste fixed-base laboratory. The laboratory will be responsible for maintaining custody of the samples, and for maintaining all associated records documenting that custody. Upon receipt of the samples, the laboratory will check the original chain-of-custody documents and compare them with the labeled contents of each sample container for accuracy and traceability. Kleinfelder will review laboratory QC documentation as provided with analytical results to look for any irregularities.

6.0 REPORT PREPARATION

A Site Investigation Report will be prepared to document field activities and observations, summarize the analytical results, and provide conclusions and recommendations based on field observations and analytical results. The report will include the following sections:

- Introduction, describing the purpose and objectives of the investigation;
- Background information; describing the knowledge of the Site's condition prior to the investigation proposed in this work-plan;
- Field Activities, summarizing the events that took place for this investigation;
- Analytical results, describing the constituents analyzed for and the methods used. Analytical results will be summarized in tables and compared to current regulatory guidelines.
- The analytical results summaries will be used to create plates describing:
 - The horizontal extent of petroleum hydrocarbons in soil-vapor
 - The horizontal extent of petroleum hydrocarbons in soil and groundwater at the Site;
 - The vertical extent of petroleum hydrocarbons in soil and groundwater.
- Conclusions based on field observations and analytical results, and recommendations for future action if necessary.

The following information will be included as Appendices in the Report:

- Certified laboratory analytical reports and chain-of-custody records;
- Description of field and laboratory QA/QC procedures; and
- Boring logs.

The investigation and the report preparation will be conducted under the direct supervision of and will be signed and stamped by a California P.G. or P.E.

7.0 SCHEDULE

Kleinfelder will begin implementing the activities described in this work-plan as soon as we receive approval from the ACHCSA. The field preparation activities will be completed first; including securing required permits and approvals from regulatory agencies and scheduling inspectors and contractor. Kleinfelder will then schedule the utility clearance and drilling subcontractors. The actual fieldwork is anticipated to take approximately 10 days, followed by one to two weeks for chemical analysis. The report will be prepared for submittal in approximately three weeks after receiving the analytical results. Collectively, we anticipate the work described herein will be completed in approximately nine to 12 weeks after approval of the work plan.

8.0 HEALTH AND SAFETY

A site specific Health and Safety Plan (HASP) will be prepared in general accordance with Federal OSHA and California Department of Safety and Health (DOSH) requirements outlined in 29 CFR Part 1910.120[jj]; Title 8, CCR, Section 5192.

The site-specific HASP provides general guidelines for decision points in site safety planning, and will establish personnel protection standards and mandatory safety practices and procedures. The HASP will cover the following subjects:

- Emergency contacts to be used in the event of an accident or exposure;
- Description of site hazards, both physical and chemical;
- On-site monitoring and personnel protection;
- Project team organization and responsibilities;
- Site control measures;
- Decontamination procedures; and
- Training and medical monitoring requirements for personnel..

The HASP will be prepared prior to initiation of field activities. The provisions of the HASP will be mandatory for onsite personnel.

During a field investigation kick-off meeting will be held on the first field day and the HASP will be reviewed with all site personnel. Also, a job safety analysis will be performed and subsequent meetings will be held daily to go over the work to be performed and health and safety planning for the day.

9.0 LIMITATIONS

The scope of services described herein is not intended to be inclusive, identify all potential concerns, or eliminate the possibility of environmental problems. Within current technology, no level of assessment can show conclusively that a property or its structures are completely free of contaminated and/or hazardous substances. Therefore, Kleinfelder cannot offer a certification that the recommendations made in this report will clear the property of environmental liability.

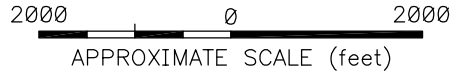
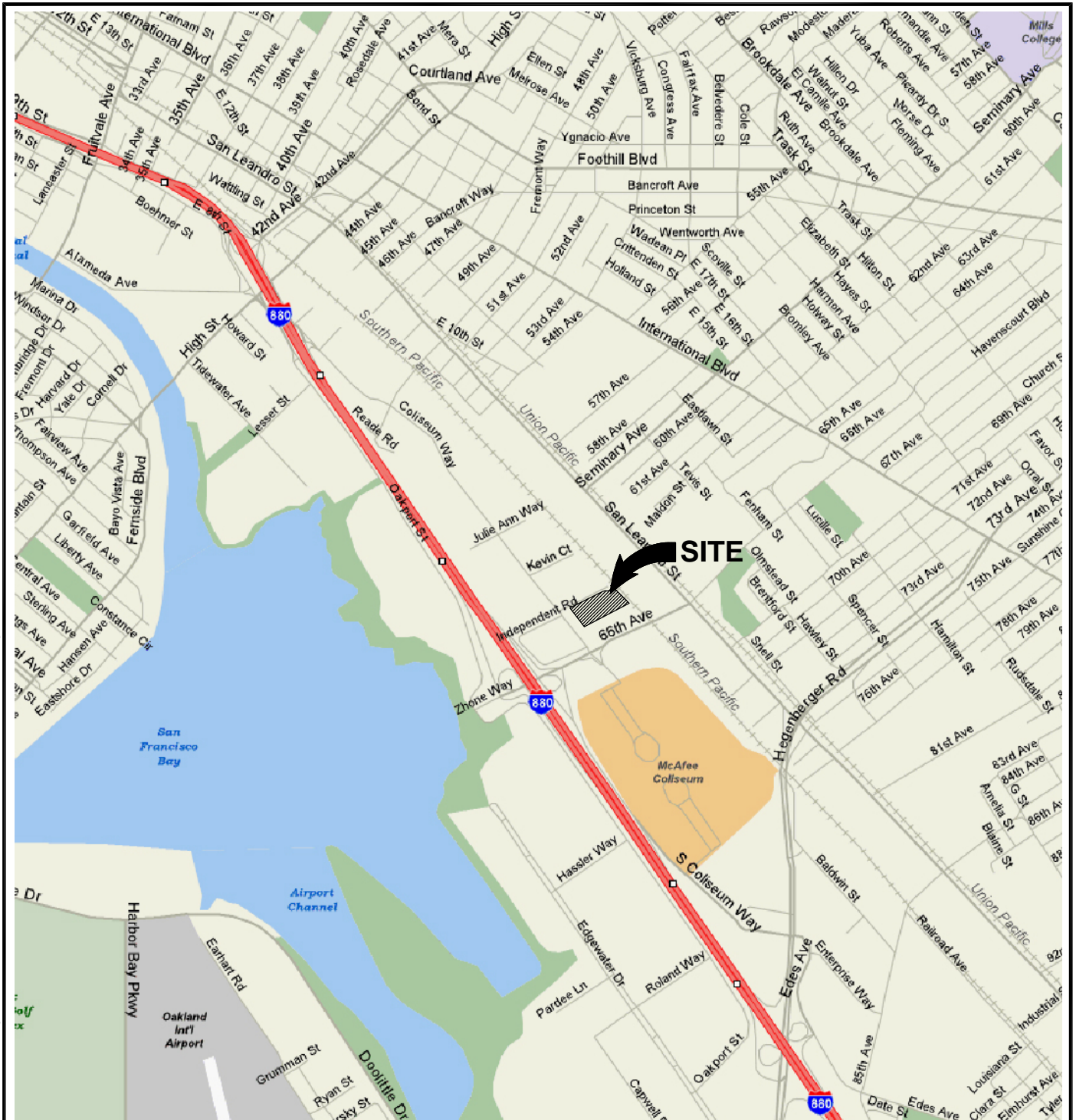
This work-plan was prepared following current accepted standards of practice existing in Northern California. It should be recognized that definition and evaluation of environmental conditions is difficult and inexact art. Judgments leading to conclusions and recommendations are generally made with incomplete knowledge of the conditions present. More extensive studies, including additional environmental investigations, may reduce the inherent uncertainties associated with such studies. If the Client wishes to reduce the uncertainty beyond the level associated with this study, Kleinfelder should be notified for additional consultation. Our firm has prepared this work-plan for EOP for this particular project and in accordance with generally accepted engineering practices within the area. No other representations, expressed or implied, and no warranty or guarantee is included or intended.

This work-plan may be used only by the client and only for the purposes stated, within a reasonable time from issuance. Non-commercial, educational and scientific use of this report by regulatory agencies is regarded as a "fair use" and not a violation of copyright. Regulatory agencies may make additional copies of this document for internal use. Copies may also be made available to the public as required by law. Any reprint must acknowledge the copyright and indicate that permission to reprint has been received. Land use, site conditions (both onsite and offsite) or other factors may change over time, and additional work may be required with the passage of time. Based on the intended use of the report, Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release Kleinfelder from any liability resulting from the use of this report by any unauthorized party.

PLATES

LAYOUT: Layout1

ATTACHED IMAGES: Images: VIC-MAP.jpg
 ATTACHED XREFS: XRef: TB_A-port
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SITE VICINITY MAP

700 INDEPENDENT ROAD
 OAKLAND, CALIFORNIA

DRAWN BY: J. Sala

REVISED BY:

CHECKED BY: A. Dominguez

PLATE

1

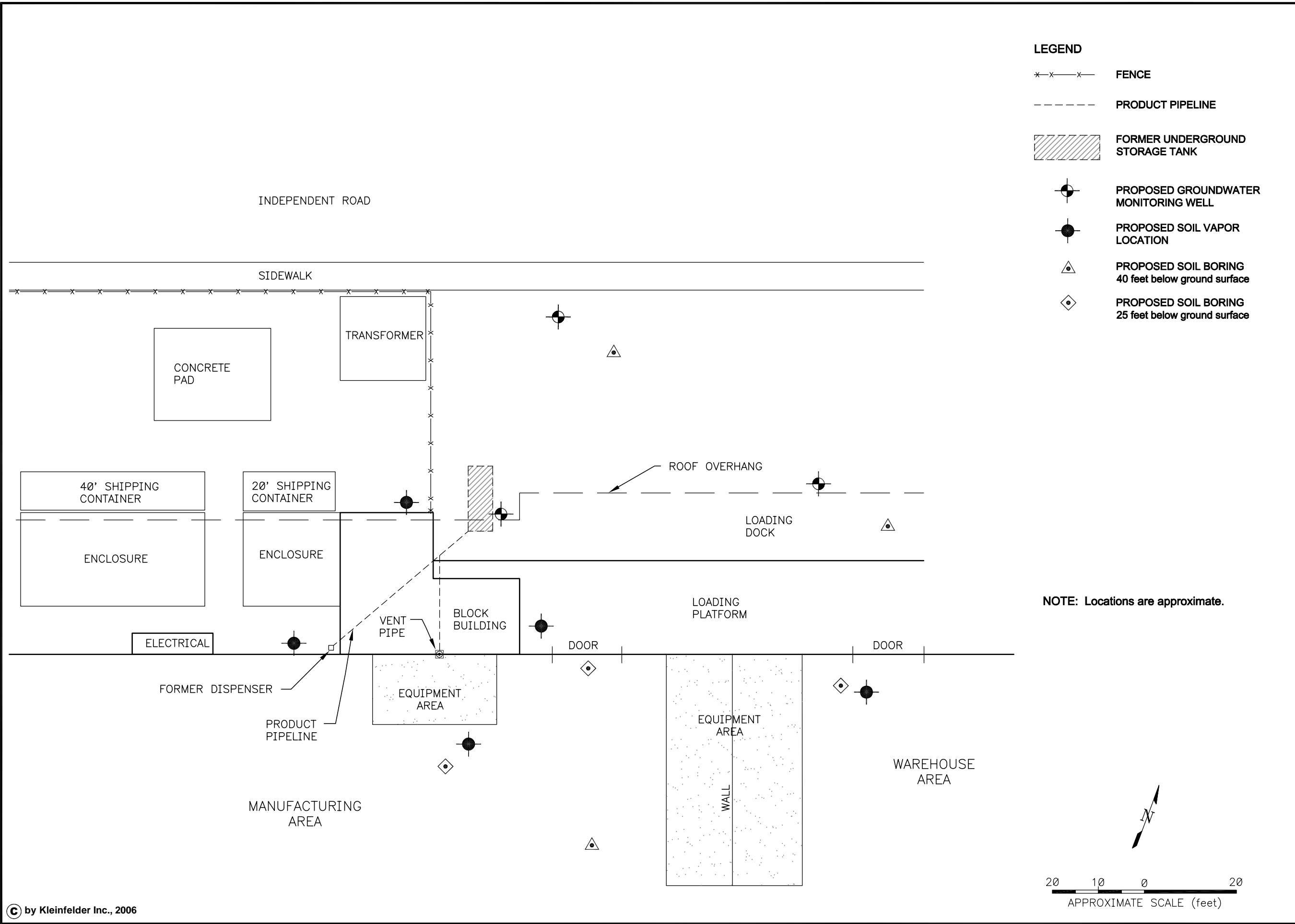
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APPROVED BY:

PROJECT NO. 54504-2

FILE NAMESITE-VIC.dwg

ATTACHED IMAGES: XRef: TB_B-size
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 File-L:\2005\05PROJ



- LEGEND**
- *-x-x-x- FENCE
 - PRODUCT PIPELINE
 - FORMER UNDERGROUND STORAGE TANK
 - PROPOSED GROUNDWATER MONITORING WELL
 - PROPOSED SOIL VAPOR LOCATION
 - PROPOSED SOIL BORING 40 feet below ground surface
 - PROPOSED SOIL BORING 25 feet below ground surface

NOTE: Locations are approximate.

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PLATE <h1 style="margin: 0;">2</h1>	
<h2 style="margin: 0;">KLEINFELDER</h2> <p style="font-size: small; margin: 0;">710 Broadway, Suite 710 Oakland, CA 94612-2212 PH. (510) 628-9000 FAX. (510) 628-9009 www.kleinfelder.com</p>	
<h3 style="margin: 0;">PROPOSED SAMPLING LOCATIONS</h3> <p style="font-size: x-small; margin: 0;">700 INDEPENDENT ROAD OAKLAND, CALIFORNIA</p>	
DRAWN BY: J. Sala REVISED BY: CHECKED BY: A. Dominguez DATE: DEC 2006	PROJECT NO. 54504-2 FILE NAME: PROP SAMPLING.dwg

APPENDIX A

SOIL VAPOR SURVEY METHODOLOGY

DTSC Protocols

Active Soil Vapor Sampling System

TEG's low-dead volume soil vapor sampling system has been inspected, endorsed, and is favored by all regulatory agencies who have seen it, including the EPA and CA DTSC. The design eliminates the risk of air leakage down the soil vapor probe, ensures sample collection from the tip, and greatly facilitates decontamination procedures.

Probe Construction

TEG's soil vapor probes are constructed of 1 inch outer diameter chrom-moly steel, equipped with a steel drop off tip. The Strataprobe can use a larger diameter probe if needed. Nominal lengths are 4 feet and additional lengths may be added to one another to achieve the required sampling depth. An inert 1/8 inch tube runs through the center of the probe and is attached to the sampling port with a stainless steel post run fitting.

Probe Insertion

The probe is driven into the ground with an electric rotary hammer, or with the Strataprobe. After inserted to the desired depth, the probe is retracted slightly, which opens the tip and exposes the vapor sampling port. This design prevents clogging of the sampling port and cross-contamination from soils during insertion. Once the probe rod is placed, the sample can be collected after waiting twenty minutes for equilibration.

Soil Gas Sampling

Soil vapor is withdrawn from the inert tubing using a calibrated syringe connected via an on-off valve. A purge volume test is conducted by sampling at the first soil vapor location three times after sequentially collecting and discarding one, three, and seven dead volumes of soil vapor gas to flush the sample tubing and fill it with in-situ soil vapor. The purge volume used prior to the sample yielding the highest analytical value is used for all subsequent sampling. After purging, the next 20cc to 50cc of soil vapor are withdrawn in the syringe, plugged, and immediately transferred to the mobile lab for analysis within the required holding time. During sampling, a leak check gas is used to confirm that the sample train and probe rod is tight and leak free. Additional soil vapor may be collected and stored in gas-tight containers (e.g. Summa canisters) as desired.

Flushing & Decontamination Procedures

To minimize the potential for cross-contamination between sites, all external probe parts are cleaned of excess dirt and moisture prior to insertion. The internal inert tubing and sampling syringes are flushed with large volumes of ambient air between samples or discarded as required. If water, dirt, or any material is observed in the tubing, the tubing is discarded and replaced with fresh tubing.

Health and Safety - Training and Medical Monitoring Programs

In order to reduce potential employee exposure to hazardous materials and reduce the risk of injury incurred during the normal performance of work, TEG maintains active participation of personnel in a Injury and Illness Prevention Program (IIPP). Each TEG employee that performs work in a laboratory or in the field, is required to have completed a 40-hour training session in accordance with 29 CFR 1910.120. The Health and Safety Officer coordinates all aspects of training and maintaining the Injury and Illness Prevention program, including, but not limited to:

- annual physical examination of field personnel (including an initial baseline exam upon hiring)
- health, safety and hazardous material training
- first aid and Cardio-Pulmonary Resuscitation (CPR) training
- safety equipment inventory and purchasing
- review of health and safety procedures, exposure limits, and plans for each project.

Work procedures and required safety conditions are determined on the basis of anticipated work, environmental conditions and levels of toxic chemicals at a given site. Consultation with client safety personnel or representatives is undertaken to determine potential health hazards to workers at that site. Each TEG employee participates in all pre-job safety meetings at each job site.