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Environmental Health

Draft Final Soil Removal Action Work Plan
Proposed Aspire Charter High School
1009 66th Avenue
Oakland, Alameda County, California
DTSC Site Code: 204147-11

003-09155-00-004
October 10, 2006

Prepared for
Aspire Public Schools
426 17th Street, Suite 200
Oakland, California 94612-2820

Prepared by
LFR Inc.
4190 Douglas Boulevard, Suite 200
Granite Bay, California 95746

LFR

LFR ENVIRONMENTAL MANAGEMENT & CONSULTING ENGINEERING

October 10, 2006

003-09155-00-004

Mr. Michael Hall
Department of Toxic Substances Control
School Property Evaluation and Cleanup Division
8800 Cal Center Drive
Sacramento, California 95826

Subject: Draft Final Soil Removal Action Work Plan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California
DTSC Site Code 204147-11

Dear Mr. Hall:

LFR Inc. (LFR) has prepared the attached Draft Final Soil Removal Action Work Plan (RAW) on behalf of Aspire Public Schools ("Aspire") for the Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California ("the Site"). The Site is located on the western side of 66th Avenue between East 14th Street to the north and San Leandro Street to the south.

A Preliminary Environmental Assessment (PEA) and an initial Supplemental Site Investigation (SSI) were performed at the Site by CSS Environmental, Inc. LFR conducted an additional SSI at the Site in December 2005 and January 2006. The PEA and SSIs revealed the presence of soil impacted with petroleum hydrocarbons, various semivolatile organic compounds, arsenic, lead, polychlorinated biphenyls (PCBs), and various volatile organic compounds (VOCs) at levels that pose an unacceptable risk for a proposed school site. LFR has developed Preliminary Cleanup Goals for use during remediation of soil at the Site. Groundwater impacted with petroleum hydrocarbons, PCBs, and VOCs has also been identified at the Site; additional investigation is proposed at the Site to delineate the extent of gasoline, PCBs, and VOCs in groundwater.

LFR received four sets of comments from the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) and have incorporated our responses in the Soil RAW. DTSC's comments and LFR's responses are presented in Appendix A.

If you have any questions or comments concerning this Soil RAW, please call either of the undersigned at (916) 786-0320.

Sincerely,

Lita D. Freeman, P.G., R.E.A. II
Senior Associate Geologist

Alan D. Gibbs, P.G., C.HG., R.E.A. II
Principal Hydrogeologist

cc: Charles Robitaille, Aspire Public Schools
John Dominguez, School Site Solutions, Inc.

4190 Douglas Boulevard, Suite 200
Granite Bay, California 95746-5964
Offices Nationwide

916.786.0320 m
916.786.0366 f
www.lfr.com

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ACRONYMS AND ABBREVIATIONS

μg/dl	micrograms per deciliter
μg/kg	micrograms per kilogram, equivalent to parts per billion
μg/l	micrograms per liter, equivalent to parts per billion
ACHCSA	Alameda County Health Care Services Agency
ACM	asbestos-containing material
APN	Assessor Parcel Number
ARAR	applicable or relevant and appropriate requirement
Aspire	Aspire Public Schools
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
BAAQMD	Bay Area Air Quality Management District
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
Cal/OSHA	California Occupational Safety and Health Administration
CAP	Corrective Action Plan
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CHHSL	California Human Health Screening Level
COC	compound of concern
COPC	compound of potential concern
CSF	cancer slope factor
CSM	conceptual site model
cy	cubic yards
DHS	California Department of Health Services
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
East Bay MUD	East Bay Municipal Utility District
EE/CA	Engineering Evaluation/Cost Analyses
EOA	Environmental Oversight Agreement
EPC	exposure point concentration
ESA	Environmental Site Assessment

ESL	Environmental Screening Level
H&SC	Health and Safety Code
HI	hazard index
HQ	hazard quotient
HSP	Health and Safety Plan
kg	kilogram
LBPs	lead-based paints
LFR	LFR Inc.
LUFT	leaking underground fuel tank
LUST	leaking underground storage tank
MCL	Maximum Contaminant Level
mg	milligrams
mg/kg	milligrams per kilogram, equivalent to parts per million
mg/l	milligrams per liter, equivalent to parts per million
mini-RAM	miniature real-time aerosol monitor
MSDS	material safety data sheet
msl	mean sea level
MTBE	methyl tertiary-butyl ether
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFA	no further action
ORC	oxygen-releasing compound
OSHA	Occupational Safety and Health Administration
PCBs	polychlorinated biphenyls
PCE	tetrachloroethene
PCG	Proposed Cleanup Goal
pCi/l	picoCuries per liter of air
PEA	Preliminary Environmental Assessment
PEM	Pacific Electric Motor
PM_{10}	respirable particulate
PVC	polyvinyl chloride
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RAOs	Remedial Action Objectives
RAW	Removal Action Work Plan
RCRA	Resource Conservation and Recovery Act
RfC	reference concentration

RfD	reference dose
RWQCB	California Regional Water Quality Control Board, San Francisco Region
SAP	Sampling and Analysis Plan
SSI	Supplemental Site Investigation
SVOCs	semivolatile organic compounds
SWPPP	Storm Water Pollution Prevention Plan
TPH	Total Petroleum Hydrocarbons
TSCA	Toxic Substances Control Act
TSDFs	Treatment, Storage, and Disposal Facilities
TSS	total suspended solids
U.S. EPA	United States Environmental Protection Agency
UCL	Upper Confidence Limit
USA	Underground Service Alert
USGS	United States Geological Survey
UST	underground storage tank
VOCs	volatile organic compounds

CERTIFICATION

LFR Inc. has prepared this Draft Final Soil Removal Action Work Plan (RAW) on behalf of Aspire Public Schools in a manner consistent with the level of care and skill ordinarily exercised by professional geologists and environmental scientists. This Soil RAW was prepared under the technical direction of the undersigned California Professional Geologists and Registered Environmental Assessors II.

10/10/06

Lita D. Freeman, P.G., R.E.A. II — Date
Senior Associate Geologist
California Professional Geologist No. 7368
California Registered Environmental Assessor II No. 20106

10/10/06

Alan Gibbs, P.G., R.E.A. II, C.HG. — Date
Principal Hydrogeologist
California Professional Geologist No. 4827
California Registered Environmental Assessor II No. 20009

* A professional geologist's or registered environmental assessor's certification of conditions comprises a declaration of his or her professional judgment. It does not constitute a warranty or guarantee, expressed or implied, nor does it relieve any other party of its responsibility to abide by contract documents, applicable codes, standards, regulations, and ordinances.

EXECUTIVE SUMMARY

LFR Inc. (LFR) has prepared this Soil Remedial Action Work Plan (RAW) on behalf of Aspire Public Schools ("Aspire") for a 2.51-acre property located at 1009 66th Avenue, in Oakland, Alameda County, California ("the Site"; Figure 1). The area around the Site is a mixture of commercial, industrial, government, and multifamily residential use. The Site is bounded by a residential development to the north, Oakland Fire Department Station Number 2 to the east across 66th Avenue, Fruitvale Business Center to the south, and Northstar International Container Freight and Container Consolidation Services to the west (Figure 2).

The Site has been used for industrial purposes (specifically electric motor manufacture/repair and metal refinishing) in the past. Aspire plans to construct a new charter high school on the Site.

LFR received four sets of comments from the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) and have incorporated our responses in this Soil RAW. DTSC's comments and LFR's responses are presented in Appendix A of this Soil RAW.

Background

Aspire retained LFR to prepare this Soil RAW using Phase I Environmental Site Assessments (ESAs) prepared by Environ Corporation and ACC Environmental Consultants, Inc.; a Preliminary Environmental Assessment (PEA) conducted by CSS Environmental Services, Inc. [CSS] for the California Environmental Protection Agency, Department of Toxic Substances Control [DTSC] in 2005; and Supplemental Site Investigations (SSI) conducted by CSS in 2005 and LFR in 2005 and 2006, and other selected documents prepared for the Site.

Pursuant to California Health and Safety Code Section 25355.5 (a)(1)(C), Aspire entered into an Environmental Oversight Agreement (EOA) with DTSC to receive proper regulatory oversight and meet Education Code requirements for this potential school site. Consistent with the requirements in the EOA, the PEA was conducted in accordance with the DTSC-approved PEA work plan and DTSC document entitled, "Preliminary Endangerment Assessment Guidance Manual" (DTSC 1999).

The purpose of the PEA was to establish whether a release or threatened release of hazardous substances posing a threat to human health or the environment exists at the Site. The PEA indicated that gasoline, diesel, motor oil, various semivolatile organic compounds/polynuclear aromatic hydrocarbons (SVOCs/PAHs), arsenic, lead, polychlorinated biphenyls (PCBs), and various volatile organic compounds (VOCs) were present in on-site soil at concentrations of concern. Gasoline, PCBs, and various VOCs were also detected in groundwater at concentrations of concern during the PEA. The SSIs were conducted to help delineate areas of impacted soil and groundwater.

Purpose

This Soil RAW was developed to identify and evaluate viable remedial alternatives for the remediation of soil impacted with gasoline, diesel, motor oil, SVOCs/PAHs, arsenic, lead, PCBs, VOCs, the elimination of exposure pathways, and source removal for impacted groundwater. The alternatives are evaluated in terms of effectiveness, implementability, and cost. The Soil RAW details a strategy for the implementation of the selected remedial alternative for the protection of human health and the environment and to obtain an unrestricted land-use classification. The remedial alternatives evaluated are (1) no further action, (2) capping and deed restriction, and (3) excavation and off-site disposal of impacted soil.

Preferred Alternative

Excavation of the impacted soil was the selected alternative based on the stated remedial goals, as well as the criteria of effectiveness, implementability, and cost. This alternative will be protective of human health and the environment, comply with regulatory criteria, avoid ongoing maintenance and administrative costs, achieve Aspire's goal of obtaining unrestricted land use, and meet the project schedule goals.

Implementation

LFR anticipates that up to 45 working days will be needed to complete the removal action. The initial steps in implementation will be receipt of DTSC's approval of this Soil RAW, followed by public notification and review, if required by DTSC.

Gasoline-, diesel-, motor oil-, SVOC/PAH-, arsenic-, lead-, PCB- and VOC-impacted soil identified during the PEA and SSIs will be excavated, sampled, and either temporarily stockpiled on the Site or loaded directly into dump trucks for transport to an appropriate disposal facility. Soil removal will be accomplished by use of conventional earthmoving equipment (e.g., backhoes, excavators, articulated loaders, dump trucks, water trucks). Prior to off-site disposal, the soil will be sampled for waste disposal characterization in accordance with the requirements of the selected waste disposal facility.

Excavation will extend from impacted areas both laterally and vertically until confirmation samples indicate that residual concentrations of gasoline, diesel, motor oil, SVOCs/PAHs, arsenic, lead, PCBs and VOCs, are less than their Preliminary Cleanup Goals as noted in this Soil RAW. Detailed plans for maintaining worker health and safety, collecting and analyzing soil samples, and documenting quality control have been prepared as part of this Soil RAW.

The data obtained during the removal action will be evaluated and a report will be prepared for submission to the DTSC. The report will include a description of field investigation methods, a tabular summary of analytical results, figures showing the site location and layout with pertinent analytical results, and copies of laboratory analytical reports and waste manifests. The DTSC will review the report and, if appropriate, issue a “No Further Action” letter, following successful remediation of soil and groundwater at the Site.

1.0 INTRODUCTION

This Soil Removal Action Work Plan (RAW) has been prepared by LFR Inc. (LFR) on behalf of Aspire Public Schools ("Aspire") for the Proposed Aspire Charter High School property located at 1009 66th Avenue in Oakland, Alameda County, California ("the Site"; Figure 1). The 2.51-acre site is located on the western side of 66th Avenue between East 14th Street to the north and San Leandro Street to the south.

The Site has been used for manufacturing and warehouse storage in the past. The Site is currently developed with two buildings referred to as the "Manufacturing/Office Building" and the "Warehouse" (see Figure 2). Landscaping areas and paved parking areas and driveways surround the on-site buildings. Aspire plans to develop a new charter high school on the Site.

This Soil RAW was developed to identify and evaluate viable remedial alternatives for the remediation of impacted soil, the elimination of exposure pathways, and source removal for impacted groundwater.

Aspire retained LFR to prepare this Soil RAW using data collected during site assessments performed at the Site. The following documents were reviewed by LFR:

- Phase I Environmental Site Assessment (ESA) report of the Site issued by Environ Corporation ("Environ") entitled, "Phase I Environmental Assessment, Pacific Electric Motor, Co., 1009-66th Avenue, Oakland, California," dated July 2, 1997
- Phase I ESA of the Site issued by ACC Environmental Consultants, Inc. ("ACC") entitled, "Phase I Environmental Assessment, 1009 66th Avenue, Oakland, California," dated November 22, 2000
- Preliminary Environmental Assessment (PEA) work plan for the Site, prepared by CSS Environmental Services, Inc. (CSS) for the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) entitled, "Preliminary Environmental Assessment Workplan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, California," dated March 4, 2005 (CSS 2005a)
- PEA report issued by CSS for the DTSC entitled, "Draft - Preliminary Endangerment Assessment Report, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, California," dated April 11, 2005 (CSS 2005b)
- Draft Supplemental Site Investigation (SSI) work plan entitled, "Draft - Supplemental Site Investigation (SSI) Workplan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, California," dated May 24, 2005 (CSS 2005c)
- Draft SSI report prepared by CSS entitled, "Draft - Supplemental Site Investigation (SSI) Summary Report, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, California," dated October 6, 2005 (CSS 2005d)

- "Additional Supplemental Site Investigation Work Plan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California," dated December 13, 2005 (LFR 2005)
- "Additional Supplemental Site Investigation Completion Report, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California," dated January 23, 2006 (LFR 2006a)

Pursuant to California Health and Safety Code (H&SC) Section 25355.5 (a)(1)(C), Aspire entered into an Environmental Oversight Agreement (EOA) with the DTSC to receive proper regulatory oversight and meet Education Code requirements for this potential new school site.

CSS performed the PEA in accordance with the DTSC-approved PEA work plan and the DTSC document entitled, "Preliminary Endangerment Assessment Guidance Manual" ("the PEA Guidance Manual"; DTSC 1999), which provides guidelines for the evaluation of hazardous substance release sites. Pursuant to Health and Safety Code (HSC) Section 25355.5 (a) (1) (C), activities conducted under the EOA were performed under the oversight of the DTSC. Based on the results of the PEA, the DTSC requested that an SSI be conducted, including advancing step-out borings at selected locations across the Site. CSS performed the SSI in accordance with the DTSC-approved SSI work plan.

The approximate sampling locations for the PEA and SSI performed by CSS and for the SSI performed by LFR are shown on Figure 3A. LFR retained Tronoff Associates to survey the PEA and SSI sampling locations (see Figure 3B); however, not all of CSS' sampling locations could be surveyed due to changes in site conditions since completion of field work by CSS.

No further soil investigation is being proposed at the Site. As with any real property, if previously unidentified contamination is discovered at the Site, additional soil assessment, investigation, and/or cleanup may be required by the DTSC. Additional investigation is proposed at the Site following implementation of this Soil RAW to delineate the extent of gasoline, PCBs and VOCs in groundwater.

This Soil RAW was prepared to address remediation of impacted soil located on the Site. The extent of impacted soil on the Site was documented during the PEA and SSIs and assessed during the human health risk screening evaluation. Previous work has provided sufficient data to support the removal action as proposed by this Soil RAW.

The proposed removal action will be:

- effective in reducing the mobility of the impacted soil
- effective in reducing levels of contamination at the Site to levels consistent with DTSC requirements
- cost effective

- effective in reducing environmental liability at the Site

The human health risk screening evaluation performed by LFR indicated that total petroleum hydrocarbons quantified as gasoline (gasoline or TPHg), TPH quantified as diesel (diesel or TPHd), TPH quantified as motor oil (motor oil or TPHmo), several semivolatile organic compounds/polynuclear aromatic hydrocarbons (SVOCs/PAHs), arsenic, lead, polychlorinated biphenyls (PCBs), and various volatile organic compounds (VOCs), were present at concentrations that presented an unacceptable health risk. Preliminary Cleanup Goals (PCGs) were established by LFR based on the data collected from the Site during the PEA and SSIs. As shown on Figure 4, LFR identified soil with concentrations above the PCGs in the following areas:

- gasoline-impacted soil in two locations, including beneath and south of the Warehouse and beneath the Manufacturing/Office Building at boring 4BS(20’) – as shown on Figure 5
- diesel-impacted soil at two locations, including beneath the Manufacturing/Office Building at boring 4BS(20’) and at the southeastern corner of the Site at borings 5C and 5CESE(20’) – as shown on Figure 6
- soil impacted with motor oil located east and south of the Warehouse, beneath the Manufacturing/Office Building at boring 4BS(20’), and at the southeastern corner of the Site at boring 5C – as shown on Figure 7
- soil impacted with various SVOCs/PAHs in the area east and south of the Warehouse and at boring 5C on the Site’s southeastern corner – as shown on Figure 8
- arsenic-impacted soil beneath the Warehouse, south of the Warehouse and at the western end of the Site at borings 1B and 1C – as shown on Figure 9
- lead-impacted soil on the eastern portion of the Site at borings 5A, 5C and 5ASE(10’) – as shown on Figure 10
- PCB-impacted soil centered on borings 1B and 1C (located on the western portion of the Site); at boring 2C (located at a storm-water collection sump and pump along the southern border); at boring 3B (located at a floor drain inside the Manufacturing/Office Building); and at boring 4B (located inside the Manufacturing/Office Building) – as shown on Figure 11
- soil impacted with VOCs, specifically benzene and methyl tertiary-butyl ether (MTBE), in the area south of the Warehouse; VOC-impacted soil is generally associated with gasoline-impacted soil – as shown on Figure 12

LFR prepared cross sections through the areas of impacted soil. The locations of the cross sections are shown on Figure 4. The cross sections are presented as Figures 13 through 20.

Groundwater impacted with gasoline and benzene, toluene, ethylbenzene, and total xylenes (BTEX) was encountered in the area south of the Warehouse. In addition, PCBs were detected in groundwater on the western portion of the Site.

1.1 Proposed Removal Action

This Soil RAW presents the proposed technical approach for the remediation of soil at the Site, and includes an Engineering Evaluation/Cost Analysis (EE/CA). The approach is based on the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) removal process and focuses on the physical removal and appropriate disposal of impacted soil, and on closing the Site based on an analysis of risk to human health. This Soil RAW was prepared in accordance with the United States Environmental Protection Agency (U.S. EPA) document, "Guidance on Conducting Non-Time-Critical Removal Actions Under CERCLA" (U.S. EPA 1993).

1.2 Remedial Action Objectives

Remedial action objectives (RAOs) are developed by evaluating the results of the site characterizations, risk assessment, and applicable or relevant and appropriate requirements (ARARs). RAOs describe the remedial actions needed to protect human health, environmental quality, or both. They are generally narrative statements; however, they can also include specific, quantitative concentrations of chemicals to be achieved.

The RAOs for the Site are to abate, prevent, minimize, stabilize, mitigate, or eliminate the release or potential release of a hazardous substance that may result in a threat to the public and/or environment. The overall remedial action goal for the Site is to obtain an unrestricted future land-use designation by preventing human exposure to impacted media containing compounds of concern (COCs) at concentrations presenting unacceptable human health risks and hazards. COCs are compounds that have been identified in on-site soil at concentrations that present a human health and/or ecological risk. Specific preliminary cleanup goals were developed to provide a health-protective concentration for each COC identified as a risk driver in the PEA.

2.0 SITE BACKGROUND

2.1 Site Location and Description

The 2.51-acre site is located on the western side of 66th Avenue between East 14th Street to the north and San Leandro Street to the south. The area around the Site is developed with a mixture of commercial, industrial, government, and multi-family residential buildings. The Site is bounded by a residential development to the north, Oakland Fire Department Station Number 2 to the east across 66th Avenue, Fruitvale Business Center to the south, and Northstar International Container Freight and Container Consolidation Services to the west.

Two structures are currently located on the Site. One two-story structure (denoted as the "Manufacturing/Office Building" on Figure 2) was used for office space and manufacturing proposes and encompasses approximately 27,000 square feet. The Manufacturing/Office Building is located on the eastern portion of the Site. The second structure (denoted as the "Warehouse") is located on the western portion of the Site and encompasses approximately 5,000 square feet.

The Site was previously used for manufacturing and warehousing. Past operations at the Site included manufacturing of specialty magnets, power supplies, and components used in high-energy physics and repairing and rebuilding of motors, generators, transformers and specialty magnets.

Eight groundwater monitoring wells are located on the Site. Five wells were installed during previous investigations for a former gasoline underground storage tank (UST). In addition, LFR installed three nested groundwater wells on the Site during the additional SSI. Each nested well consists of screened casing placed at three separate depths. A seal was placed between each of the screened casing intervals to allow sampling of groundwater at discrete depths.

No groundwater production wells are located on the Site. East Bay Municipal Utility District (East Bay MUD) provides drinking water and sanitary sewer services to the Site.

2.1.1 Site Name and Address

The Site is designated as the Proposed Aspire Charter High School project in Oakland, California. The Site is located at 1009 66th Avenue, Oakland, California.

2.1.2 Contact Persons, Mailing Addresses, and Telephone Numbers

Contact	Attention	Address	Telephone
Aspire Public Schools	Charles Robitaille, Director of Real Estate	426 17th Street, Suite 200 Oakland, CA 94612	(510) 251-1660
Department of Toxic Substances Control	Michael Hall, Project Manager	8800 Cal Center Drive Sacramento, CA 95826	(916) 255-6422

2.1.3 Environmental Protection Agency Identification Number and CalSites Database Number

According to information obtained by ACC during their Phase I ESA, the Site has not been issued a U.S. EPA Identification Number (ACC 2000).

The Site has been included on the CalSites database, according to the DTSC's website. The Site has been included in the DTSC's School Property Evaluation Program and assigned identification number 0139008. Aspire will enter a Voluntary Cleanup Program to allow the DTSC's oversight of the remediation work.

2.1.4 Assessor's Parcel Numbers and Maps

The Assessor's Parcel Number (APN) designated by the Alameda County Assessor's Office for the Site is 041-4056-003.

A site location map and a site plan have been provided as Figures 1 and 2, respectively. Aerial photographs for the Site may be found in ACC's Phase I ESA report (ACC 2000).

2.1.5 Ownership

The Site is currently owned by Mo Dad Properties, LLC.

2.1.6 Township, Range, Section, and Meridian

Based on the United States Geological Survey (USGS; 1980) Oakland East, California Quadrangle, 7.5-minute topographic map, the Site is located in Township 2 South, Range 3 West (Mt. Diablo Base and Meridian). The approximate geographic coordinates of the Site are latitude 37.758390° North and longitude 122.197595° West.

2.2 Operational History and Status

Information obtained by LFR from the Environ and ACC Phase I ESA reports indicate that the first documented land use was residential (Environ 1997 and ACC 2000). A 1947 aerial photograph shows a house and several out buildings present on the Site. The first industrial development of the property was in about 1948 when the two buildings currently present on the Site were constructed by Pacific Electric Motor (PEM). PEM occupied the Site from 1948 to 2001.

The Manufacturing/Office Building currently present on the Site was shown on the 1950 aerial photograph, according to Environ's Phase I ESA report (Environ 1997). Portions of the Site were paved and the area behind the building was vegetated in the 1950 aerial photograph.

The Warehouse initially appeared on the Site in the 1957 photograph (Environ 1997), and is still present on the western portion of the Site. A gasoline shed is visible on the Site in each of the aerial photographs reviewed by Environ from 1957 through the mid-1990s. Environ noted several square objects along the western border of the Site and on the property adjacent to the southwest in the 1957 aerial photograph, but drew no conclusions about these objects (Environ 1997).

Activities at the Site included manufacturing specialty magnets, power supplies, and components; and repairing motors, generators, transformers, and magnets. A 2,000-gallon gasoline UST was reportedly installed at the Site in 1975. In addition, the gasoline shed in the fueling area may have stored vehicle lubricants and oil for vehicle maintenance.

Following acquisition of the Site by Mo Dad Properties in 2001, the on-site buildings were occupied by Bay Area Powder Coatings. Bay Area Powder Coatings declared bankruptcy and ceased operations at the Site; however, some equipment belonging to this company was still present on the Site in 2005. There are no available details as to the specific processes of Bay Area Powder Coatings.

Landeros Iron Works, which subleased from Bay Area Powder Coatings, continues its operations in and around the Warehouse. Its operations appear to be primarily welding and metal structure fabrication.

Documented releases of hazardous materials at the Site by PEM include petroleum hydrocarbon compounds (from the former UST) and PCBs (presumably from repairing and servicing transformers and other electrical equipment).

By the time of the 1996 aerial photograph, the gasoline shed had been demolished and soil stockpiles were visible on the western portion of the Site (Environ 1997). An area of lighter paving is visible at the former location of the gasoline shed in this photograph.

The aerial photographs appear to depict several instances of staining on pavement across the Site, according to Environ's ESA (Environ 1997).

Housekeeping and hazardous materials and waste use, generation, and storage issues were identified from a review of the Phase I ESA reports prepared for the Site in 1997 (Environ) and 2000 (ACC) and during a site reconnaissance conducted by CSS, Aspire, and DTSC personnel on January 20, 2005 ("the 2005 site reconnaissance"). The following issues were identified:

- Bay Area Air Quality Management District (BAAQMD) permits indicate the past use by PEM of a varnish impregnator, two varnish dip tanks, a paint spray booth, two natural gas-fired, burn-out ovens, a paint spray booth, an abrasive blast machine, and a natural gas-fired bake oven (Environ 1997).
- Past wastewater discharges included sanitary wastewater, wastewater from steam-cleaning operations, drill press water, air compressor condensate, and boiler blow-down (Environ 1997).
- Two sumps containing oily water were observed on site (2005 site reconnaissance). In 1995, PEM was informed by East Bay MUD that a steam-cleaning sump had been found to contain trace concentrations of PCBs (Environ 1997).

- Various 55-gallon and 5-gallon drums are present; many of these drums are unlabeled (2005 site reconnaissance).
- Old equipment, vehicles, vehicle parts, pallets, and miscellaneous junk are present around the Site (2005 site reconnaissance).
- Stained surfaces are present inside the Manufacturing/Office Building and in the drum storage area (2005 site reconnaissance).

PEM conducted investigations and soil removal action for PCBs in 1992 and 1993 at the direction of the Alameda County Health Care Services Agency (ACHCSA). This work included removing and disposing of approximately 400 cy of PCB-impacted soil from the northwestern corner of the Site, and approximately 4 cy of PCB-impacted soil from an off-site area located adjacent to the Site's northwestern corner. Soils near the northwestern corner were reportedly impacted by the historical storage of transformers by PEM.

The maximum concentration of PCBs detected prior to soil removal from these two areas was reportedly 113,713 milligrams per kilogram (mg/kg), although this result is anecdotal. The highest documented concentration of PCBs was 45,470 mg/kg (as Aroclor-1260). The cleanup objective for this removal action was 1 mg/kg total PCBs. PCBs were not detected at concentrations at or above the laboratory reporting limit in a Hydropunch™ groundwater sample collected from the area. Following remediation activities, PEM received a "No Further Action" letter from the ACHCSA.

PEM removed the 2,000-gallon gasoline UST, and associated pump island, piping, storage shed, and appurtenances in 1995. The UST was reportedly in good condition with no holes evident; however, free-phase gasoline product was observed on the water surface in the tank excavation. The maximum detected concentrations of gasoline and benzene in soil samples were 10,000 mg/kg and 73 mg/kg, respectively, from the excavation stockpile. The maximum detected groundwater concentrations of gasoline and benzene in 1995 were 81,000 micrograms per liter (μg/l) and 3,100 μg/l, respectively.

PEM performed a number of subsequent investigations and removal actions for soil and groundwater under the lead of the ACHCSA. Subsequent investigations and removal actions included:

- 1995 – Approximately 1,500 cy of soil was removed in two excavation iterations and stockpiled on the northern portion of the Site. Approximately 116,000 gallons of petroleum hydrocarbon-impacted groundwater was pumped from the excavation. Site investigation work during this time also included the drilling of GeoProbe™ borings (between excavation iterations) in an attempt to define the lateral and vertical extent of gasoline constituents. A dewatering sump used during soil excavation was later converted to an 8-inch-diameter well (thought to be WAC-1) during backfilling operations. Backfill reportedly consisted of clean imported fill material. Reports indicate that the stockpiled excavated soils were disposed of in 1997 (W.A. Craig, various reports).

- June 1997 – A soil and groundwater investigation was completed and included the installation of groundwater monitoring wells MW-1 through MW-3 as shown on Figure 3A (Environ July 17, 1997).
- September 1998 – Additional soil and groundwater investigation was performed and included advancing two soil borings within the backfill of the former UST excavation area and installing groundwater monitoring well MW-4 (PES Environmental 1998).
- April 2002 – A 30-foot by 70-foot by 9-foot deep excavation for the remediation of petroleum hydrocarbon-impacted soils was completed to the south of the original UST remedial excavation (Decon Environmental Services 2002).
- May 2002 – Approximately 65,000 gallons of petroleum hydrocarbon-impacted groundwater was removed from the excavation. Additional over-excavation was performed southeast of the 30-foot by 70-foot excavation. During backfill operations, an 8-inch-diameter extraction well was installed (EW-1). The excavation was backfilled with an unspecified depth of drain rock. Approximately 250 pounds of oxygen-releasing compound (ORC) slurry was mixed into the gravel fill. Clean excavated native soil and imported Class II base rock comprised the balance of backfill. Approximately 219 tons of petroleum hydrocarbon-impacted soil was disposed of at an off-site facility (Decon Environmental Services 2002).
- June 2002 – A total of 25 soil borings were advanced to a depth of 13 feet bgs in the area of the former gasoline UST. Each of these borings was backfilled with 8 pounds of ORC followed by neat cement. ORC socks were also installed in wells MW-1 and WAC-1 (Decon Environmental Services 2002).

Periodic groundwater monitoring of wells MW-1 through MW-4 has been performed between June 1997 and May 2003. Groundwater samples were collected from well EW-1 between December 2002 and May 2003 (PES Environmental 2003). The maximum concentrations of gasoline, benzene, and MTBE reported for the most recent sampling event (May 2003) were detected in MW-4 at 530,000 μg/l, 24,000 μg/l and 42,000 μg/l, respectively. Over the four most recent monitoring events, the only petroleum hydrocarbon compound detected in samples collected from monitoring wells MW-2 and MW-3 has been MTBE (maximum concentration of 16 μg/l).

The Site is currently listed as an open Leaking UST (LUST) case with the ACHCSA.

2.3 Topography

Figures 1 and 2 present a site location map and a site plan, respectively. The Site is located approximately 15 feet above mean sea level (msl), according to the USGS Oakland East, California Quadrangle 7.5-minute topographic map (USGS 1980). The local topography is relatively flat.

2.4 Geology and Hydrogeology

2.4.1 Site Geology and Soil Types

The Site is located within the Coast Ranges Geomorphic Province, and in the basin that includes San Francisco Bay. The bedrock geology in the Oakland area is characterized by two highly deformed Mesozoic basement assemblages, the Great Valley Complex (to the east) and the Franciscan complex (to the west), that are overlain by younger sedimentary and volcanic rocks. The complexes are separated by the Hayward Fault, which trends north-northwest to the east of the Site, at the base of the Oakland Hills (Graymer 2000).

The Site is located within the East Bay Alluvial Plain near the shore of San Francisco Bay, where Quaternary alluvial fans from the East Bay Hills abut basin deposits associated with the flatland areas adjacent to San Francisco Bay. The Oakland Hills to the east are part of the Coast Range hills, trending north-northwest. The sediments, including those eroded from the hills to the east, slope gently westward from the Oakland-Berkeley Hills to beneath the San Francisco Bay.

Graymer (2000) maps the Site as being underlain by alluvial fan and fluvial deposits (Holocene) that are described as brown or tan, medium-dense to dense gravely sand or sandy gravel generally grading upward to sandy or silty clay. At the distal fan edge, Graymer describes the fluvial deposits as brown, never reddish, medium-dense sand with increasing silt and clay upward (higher and younger in this unit) to sandy or silty clay.

The Site lies in and is surrounded by a predominantly industrial area where the soil is mostly covered by asphalt pavement and buildings. Borings advanced during the PEA and SSI by CSS revealed a layer of aggregate based fill below the asphalt pavement and buildings (CSS 2005b). This fill material has been described as reddish-brown, brown or dark gray silty sand containing angular gravel up to ¾ inch in diameter in some locations.

The native soil and lithology is consistent with alluvial fan deposits. Soil layers typically consist of irregularly bedded layers of low permeability material of silt and clay with lenses and thin layers of sand (CSS 2005b).

2.4.2 Site Hydrogeologic Setting

The Site is located within the East Bay Plain Groundwater Basin ("the Basin"). The Basin is located on the eastern shore of San Francisco Bay and is approximately 25 miles long and approximately 2 to 7 miles wide. The Basin is underlain by a broad Franciscan bedrock depression. The core of this bedrock depression is roughly centered under San Francisco Bay and is bounded to the east by the Hayward Fault and to the west by the San Andreas Fault.

Two separate smaller basins, known as the San Francisco Basin and the San Pablo Basin, are located within the Basin. These smaller basins are separated by a well-defined bedrock ridge. The San Francisco Basin, within which the Site is located, extends north from the Dumbarton Bridge to the shoreline south of Richmond and the San Pablo Basin extends from Richmond north to the Petaluma area.

Lion Creek, a tidal slough, is mapped as terminating approximately 250 feet south of the Site. The nearest significant surface-water body is San Leandro Bay, a much larger body of water located approximately 4,500 feet southwest of the Site. No surface waters were observed on the Site.

Shallow groundwater has been encountered at depths of approximately 5 to 6 feet below ground surface (bgs) during past investigations with a permeable gravel zone present at a depth of approximately 21 to 25 feet bgs (ACC 2000). Perched shallow groundwater was encountered in borings advanced during the PEA and SSI at depths of 3 feet bgs to 5 feet bgs. Groundwater was encountered at a depth of 24 feet bgs in boring 2B (CSS 2005b).

Five groundwater monitoring wells have been installed on the Site during past investigations by other consultants. During the PEA field work, depth-to-groundwater measurements were approximately 5 feet bgs (CSS 2005b). Three nested wells were installed and sampled by LFR in December 2005. Depth-to-groundwater measurements for the nested wells at the time of sampling ranged from approximately 1 foot bgs to approximately 3 feet bgs.

According to the Additional SSI Completion Report (LFR 2006a), historical and recent groundwater monitoring data indicate that the direction of groundwater flow beneath the Site has been consistently and predominantly toward the west-southwest, in the general direction of San Francisco Bay. This local flow direction is consistent with groundwater flow directions recorded at two other properties in the immediate vicinity of the Site; the Oakland Fire Station, located at 1016 66th Avenue, and the Acts Full Gospel Church, formerly located at 1034 66th Avenue. Both of these properties are located to the east of the Site across 66th Avenue.

2.5 Surrounding Land Use and Sensitive Ecosystems

2.5.1 Surrounding Land Use

The area around the Site is a mixture of commercial, industrial, government, and multifamily residential use. The Site is bounded by a residential development to the north, Oakland Fire Department Station Number 2 to the east across 66th Avenue, Fruitvale Business Center to the south, and Northstar International Container Freight and Container Consolidation Services to the west.

2.5.2 Sensitive Ecosystems

The Site is located in an urban area and will be developed with a school campus. The anticipated human receptors are adult workers (teaching staff, administrative staff, and maintenance staff) and students.

The objective of this Soil RAW is to address impacted soil at the Site. Because the Site was used for light-industrial purposes, it is unlikely that sensitive ecosystems will be impacted by remedial activities at the Site.

A detailed ecological screening evaluation was not performed because the Site is located within a highly developed commercial and residential urban setting. Natural wildlife habitat areas have not been observed on the Site during site work.

The Site is located at an elevation of approximately 15 feet msl and the surface topography in the site vicinity slopes gradually toward the south-southwest. The nearest body of surface water is Lion Creek, located approximately 250 feet south of the Site. San Leandro Bay, connected to San Francisco Bay, is located approximately 4,500 feet southwest of the Site. The compounds detected in the Site's soil and groundwater would not be likely to affect ecological resources in Lion Creek or San Francisco Bay due to the relatively flat gradient of groundwater beneath the Site and site vicinity, the distances from the Site to these surface-water bodies, and natural attenuation that is expected to occur for the petroleum hydrocarbons detected in soil and groundwater.

2.6 Meteorology

Meteorological information for the Oakland area was obtained from various sources, including http://www.city-data.com.

Marine air intrusion through the Golden Gate, across the San Francisco Bay, and through the San Bruno Gap is a dominant weather factor in the Site area throughout the year. The Oakland-Berkeley Hills cause a bifurcation of westerly flow in the vicinity of Oakland, with southerly winds observed over the San Francisco Bay north of the Golden Gate and northwesterly flow over the San Francisco Bay south of the Golden Gate Bridge. This divergent wind field results in diminished speed on the eastern side of the San Francisco Bay, with a higher frequency of near calm conditions than in areas on the western side of the San Francisco Bay. Temperatures in the San Francisco Bay Area generally have a relatively narrow range due to the moderating marine air.

In the Oakland area, the average annual mean temperatures (in degrees Fahrenheit) range from the low 50s to the mid-60s. Maximum summer temperatures average in the mid- to high 70s, with minimums in the low to mid-50s. Winter temperature highs are in the mid- to high 50s with lows in the mid- to low 40s.

The average annual precipitation in the Oakland area is approximately 26 inches per year with the majority of the rainfall (approximately 23.5 inches) occurring in January, February, March, November, and December. The monthly average precipitation for Oakland ranges from a high of 5.2 inches in January to a low of 0.06 inch in July.

2.7 Regional Radon and Asbestos Information

2.7.1 Regional Radon Information

The U.S. EPA considers long-term exposure to radon concentrations exceeding 4.0 picoCuries per liter of air (pCi/l) to be unhealthful. The Site is not located in an area reported by the California Department of Health Services (DHS) as being at high risk for radon gas (DHS 2002). The potential for elevated radon levels at the Site appears to be low, based on the available data.

Radon is a naturally occurring, colorless, odorless, tasteless gas produced by the radioactive decay of the element uranium. Radon decays into a number of daughter elements, including polonium, bismuth, and lead. Polonium is of special concern because it causes damage to lung tissue, which can result in lung cancer. Radioactivity is commonly measured in pCi/l.

The radon potential for an area is dependent on the subsurface geology, including such factors as the amount of uranium in the underlying soil and bedrock, the presence of clays and silts which can act as barriers, the presence of shallow groundwater, and the amount of radon released during the decay process (USGS 1993). The speed at which radon moves through soil is controlled by the amount of water present in the pore space (the soil moisture content), the percentage of pore space in the soil (the porosity), and the “interconnectiveness” of the pore spaces (the permeability). Radon moves more readily through permeable soils, such as coarse sand and gravel, than through impermeable soils, such as clays. Radon moves more quickly through soils and rock that are fractured than through competent material and more slowly through water than through air.

The western portion of Alameda County is predominantly covered by alluvial materials derived from the highlands to the east. These alluvial materials consist primarily of silts and clays, which are generally impermeable. In addition, groundwater beneath this area of the county is typically encountered at shallow depths (less than 25 to 30 feet bgs). Based on these conditions, the radon potential for the area is expected to be low.

During a study completed by the DHS in 1991, 80 radon tests were performed in Alameda County (DHS 1991). Radon was not detected in 53 of the tests at concentrations at or above the laboratory reporting limits, while two of the tests revealed radon concentrations of 4 and 5 pCi/l. The remaining test results were between 1.0 and 3.4 pCi/l.

In 2002, DHS produced a study presenting the results of radon tests throughout California (DHS 2002). Of the 369 tests performed in Alameda County, only 18 revealed radon concentrations of 4 pCi/l or more. Of the 11 tests performed in the

Oakland area (zip code 94619), none of the tests revealed radon concentrations of 4.0 pCi/l or more.

Based on the subsurface geology of the area and the results of the DHS studies, the potential for elevated radon levels at the Site appears to be low.

2.7.2 Regional Asbestos Information

The Site and vicinity are underlain by alluvial material. Some occurrences of ultramafic rock have been mapped in the Oakland Hills along and adjacent to the east of Interstate 580 (California Department of Conservation, Division of Mines and Geology [CDMG] 2000). Drainages from the area containing ultramafic rock do not appear to cross the Site. Outcrops of serpentinite have not been mapped in the lowland areas of the City of Oakland (California Department of Natural Resources, Division of Mines 1951).

Based on the geology of the site vicinity and our observations at the Site, the potential for naturally occurring asbestos to be present on the Site appears to be low.

Asbestos deposits, which are located in many parts of California, are commonly associated with serpentine and can be either asbestiform (fibrous) or non-asbestiform (platy). Chrysotile, crocidolite, amosite, tremolite, actinolite, and anthophyllite are the principal forms of asbestos. Chrysotile breaks into curly fibers, while the remaining types tend to have a thin needle-like appearance.

Serpentinite is rock composed almost entirely of serpentine and is the most common host rock for chrysotile. Generally, chrysotile and amphibole asbestos varieties occur in areas where the original rock has metamorphosed under elevated temperatures and pressures. Serpentinite and its parent material, ultramafic rock, are abundant in California. Typically, the asbestos content of these rocks ranges from less than 1% to about 25%, with higher concentrations sometimes found.

Disturbance of asbestos-containing rock and soil can result in a release of asbestos fibers to the air. This disturbance can be caused by vehicles driving over roads or driveways surfaced with these materials; by construction activities (e.g., ripping of outcrops and bedrock); and/or by weathering and erosion processes. Once released into the air, asbestos fibers are relatively stable and can remain airborne for long periods of time.

Asbestos fibers that have become airborne can be inhaled deep into the lungs where they can remain for extended periods of time or be translocated to other parts of the body. Once inhaled, asbestos fibers can result in health problems. The potential for developing health problems from asbestos exposure depends on the length and intensity of the exposure. Asbestos is classified as a known human carcinogen by state and federal agencies. Diseases related to asbestos exposure include asbestosis, lung cancer, and mesothelioma.

2.8 Previous Site Actions

The objectives of this Soil RAW were developed based on the results of previous environmental assessments and remediation performed at the Site. These documents include the remediation report prepared by Applied Remedial Services (ARS 1992), the Phase I ESA report prepared by Environ (1997), the Phase I ESA report prepared by ACC (2000), and the PEA and SSI conducted by CSS (2005a, 2005b, 2005c, 2005d). A brief summary of the purpose and results of these assessments is presented below. Additional information regarding operational history and previous site actions is presented in Section 2.2 of this Soil RAW.

2.8.1 Remediation Report by Applied Remedial Services

Applied Remedial Services (ARS) completed a report in 1992 on remedial activities at the request of PEM (ARS 1992). The report indicates that soil samples were collected for PCB analysis in October 1991. This represents the earliest investigation activity documented in reports reviewed by LFR. Analytical results indicated elevated concentrations of PCBs in soil at concentrations up to 113,713 mg/kg in soil samples collected from within 6 inches of the existing ground surface.

The scope of ARS' activities in 1992 was to remove PCB-impacted soil in the northern unpaved portion of the Site. A cleanup goal of 1.0 mg/kg was established for total PCBs in soil by the ACHCSA. Excavation and disposal of approximately 400 cy of soil from the northwestern corner of the Site occurred on September 28 and 29, 1992. The report presents analytical results of confirmation samples for verification. Stockpiled soil was removed from the Site for off-site disposal on October 8 and 9, 1992.

PCB-impacted soil (approximately 4 cy) was excavated by ARS from the parcel located adjacent to the Site's northwestern corner in 1993. The soil was disposal of at an off-site facility. Additional information on the removal of PCB-impacted soil from the Site is presented in Section 2.2 of this Soil RAW.

2.8.2 Phase I Environmental Site Assessment by Environ

In 1997, Environ completed a Phase I ESA of the Site at the request of PEM. Environ conducted a site reconnaissance on April 18, 1997, to assess evidence of potential hazardous materials releases. Additionally, Environ conducted an evaluation of land use in the vicinity of the Site and a review of regulatory files of reported nearby release cases.

According to information contained in Environ's Phase I ESA report, a single-family residence and a few small buildings, possibly sheds, appeared on the Site in the 1947 aerial photograph (Environ 1997). The Manufacturing/Office Building was present on the Site as early as 1950. Portions of the Site were paved and the area behind the building was vegetated. The Warehouse, a gasoline shed, and a number of square objects (purpose unknown) appear on the Site in the 1957 photograph. No surface water was reported on site.

As part of Environ's Phase I ESA, an environmental database report prepared by Vista Information Solutions, Inc. ("Vista") was reviewed for local, state, and federal listings for the Site and properties within the site vicinity (Environ 1997). Regulatory database lists were reviewed for cases pertaining to leaking aboveground storage tanks (ASTs), leaking USTs, hazardous waste sites, and abandoned sites within the specified radii of standards established by the American Society for Testing and Materials (ASTM).

Vista reported 31 leaking underground fuel tank (LUFT) cases within a ½-mile radius. The closest LUFT case was located 0.08 mile northeast and cross to upgradient from the Site. Of the 31 cases, only 2 were not hydrologically crossgradient or downgradient from the Site. The two upgradient cases would be unlikely to affect the groundwater beneath the Site based on their distances from the Site of more than 400 feet.

The conclusions and recommendations section of Environ's report included the following concerns:

- Several soil stockpiles located on the Site were associated with the removal of the former gasoline UST on February 16, 1995, by W.A. Craig, Inc.
- ACHCSA requested that PEM submit a work plan for additional soil and groundwater investigations related to the former gasoline UST. A work plan was submitted to install three additional groundwater monitoring wells and sample an existing well.
- Additional investigation was recommended in the vicinity of the wastewater sump in the steam-cleaning area.
- Additional investigation was recommended to assess the potential presence of PCBs within the steam-cleaning sump and underlying soils.
- Because the facility was constructed in 1948, sampling of building materials and analysis for asbestos was recommended.
- Environ recommended that PEM review current practices of disposal of dried paint, cured resins, and floor sweepings to establish if these substances require management as hazardous wastes.
- A recommendation was made to PEM that they discontinue on-site burning of waste oil from the steam cleaning sump, and that the waste oil be properly managed in accordance with applicable regulations.
- It was recommended that PEM review Occupational Safety and Health Administration (OSHA) issues and implement programs to address Environ's concerns. It appeared that PEM did not meet requirements for hearing conservation, blood-borne pathogens, and confined space entry programs.
- Environ recommended that PEM review material safety data sheets (MSDSs) and provide Proposition 65 warning signs as necessary.

2.8.3 Phase I Environmental Site Assessment by ACC

In 2000, ACC completed a Phase I ESA of the Site at the request of Mo Dad Properties, LLC. As part of the Phase I ESA, ACC conducted a reconnaissance-level visit of the Site to assess evidence of potential hazardous materials releases, evaluate land use in the site vicinity, and review regulatory files regarding reported nearby release cases.

As part of ACC's Phase I ESA (2000), an environmental database report prepared by Vista was reviewed for local, state, and federal listings for the Site and properties within the site vicinity (ACC 2000). Vista reported 22 LUFT cases within a ½-mile radius of the Site. Of the 22 cases, only 3 LUFT cases were close enough to potentially affect the soil and groundwater beneath the Site. Each of these three nearby cases had been granted closure by the ACHCSA and therefore did not appear to present a significant environmental concern.

Sanborn Fire Insurance Maps were located for the vicinity of the Site. Based on these maps and aerial photographs, a similar timeline was reconstructed for the site history as noted by Environ.

The conclusions and recommendations section of ACC's report included the following concerns:

- ACC recommended removal and proper disposal of rusty, unlabeled 55-gallon drums; propane cylinders; and other miscellaneous objects stored on the unpaved portion of the Site.
- ACC observed and recommended removal of an oil/water mixture in a catch basin on a piece of equipment stored at the Site.
- ACC observed several unlabeled 55-gallon waste oil drums to the rear of the Manufacturing/Office Building. One of the drums appeared to have leaked onto the concrete floor due to rusting.
- The ACHCSA issued a "No Further Action" letter dated November 24, 1993, with the understanding that PCB-impacted soil and groundwater at the Site had been remediated to the cleanup goal of 1.0 mg/kg.
- In June 1997, four shallow groundwater monitoring wells were installed in the vicinity of the former UST location at the request of the ACHCSA. Elevated concentrations of petroleum hydrocarbons were detected in soil and groundwater samples in one of the well borings.
- Analysis of a soil sample collected from 8.5 to 9.0 feet below the oil and grease separator sump in the steam cleaning area in July 1997 revealed the PCB Arochlor 1260 at a concentration of 0.510 mg/kg.
- In December 1999, PES Environmental submitted a Corrective Action Plan (CAP) to the ACHCSA. The CAP included in situ bioremediation enhanced with ORC injection into selected on-site wells.

- ACC noted that no ORC had evidently been injected into any of the on-site wells, because petroleum hydrocarbon concentrations in groundwater remained high; ACC recommended that a more active remedial approach be implemented.

2.8.4 Building Materials Survey

LFR conducted a preliminary building materials survey that included collecting and analyzing samples for asbestos and lead (LFR 2005a). Asbestos-containing materials (ACMs) and lead-based paints (LBPs) were identified in the on-site buildings. LFR recommended that the ACMs and LBPs be properly abated prior to demolition of the buildings.

Wipe samples were also collected from the surface of walls and floors in the manufacturing area of the Manufacturing/Office Building. Analysis of these samples revealed the presence of PCBs. Building materials with PCBs will require proper abatement prior to demolition of the building.

2.8.5 Preliminary Environmental Assessment and Initial Supplemental Site Investigation

CSS performed site investigations in 2005. The investigations consisted of collecting and analyzing soil-vapor, soil, and groundwater samples for various compounds of potential concern (COPCs). COPCs are compounds that may be present in on-site soil that could potentially present a human health and/or ecological risk. The results of the investigations by CSS are summarized below.

LFR performed an additional SSI in December 2005 and January 2006 to help further delineate the amount and extent of chemically impacted soil and groundwater on the Site and provide information to aid in making a decision about any further action, if any, which may be necessary. The additional SSI was performed in accordance with the additional SSI work plan prepared by LFR (LFR 2005b). The results of the additional SSI are presented in the Additional SSI Completion Report (LFR 2006a), and are discussed in detail in Section 2.8.6 of this RAW.

The following discussions of the PEA and SSI findings refer to tables and figures presented in the Additional SSI Completion Report (LFR 2006a). Copies of the analytical results tables from the Additional SSI Completion Report (LFR 2006a) are presented in Appendix B.

Soil Vapor

In accordance with the PEA work plan, probes were advanced to a maximum depth of 5 feet bgs at 17 locations to allow collection of soil-vapor samples from target depths of 3 to 5 feet bgs. A soil-vapor sample was not collected from location 2C due to shallow groundwater in the probe.

The soil-vapor samples were analyzed for VOCs by modified EPA Method 8260B. Methane and hydrogen sulfide were measured in the field using hand-held instruments.

Analysis of the soil-vapor samples revealed tetrachloroethene (PCE) in one sample (at the 3-foot-bgs-depth sample from probe 4B) at a concentration of 1.1 μg/l. This probe was advanced in the former pressure wash equipment area inside the Manufacturing/Office Building.

Benzene was detected at concentrations of 9.3 μg/l in the sample collected from boring 2B at 4 feet bgs; 0.14 μg/l in the sample from location 2A2 collected at 5 feet bgs; and 0.23 μg/l in the sample from location 2B2 collected at 5 feet bgs. These sample locations are within the central portion of the Site. Toluene was detected at 1.7 μg/l, ethylbenzene at 1.6 μg/l, total xylenes at 6.7 μg/l, and MTBE at 1.3 μg/l in the sample from location 2B. MTBE was detected at 1.3 μg/l in the soil-vapor sample collected from location 2B2.

Methane was detected, by handheld field instruments, in sample 2A2 at 0.32 percent by volume and at 0.25 percent by volume in sample 2B2. No methane was detected at the other soil-vapor sampling locations. Methane is considered hazardous based solely on its explosive property (i.e., it is nontoxic). The concentrations of methane detected at the Site were far below the lower explosive limit of 5%.

Hydrogen sulfide was not detected in any of the soil-vapor samples.

Soil

The soil investigation consisted of advancing probes across the Site to allow collection of soil samples. Soil samples were collected for chemical analysis from depths of 24 feet bgs or less.

Chemicals detected in soil samples included petroleum hydrocarbons, various SVOCs/PAHs, various metals, PCBs, various VOCs and dioxins. Tables 1 and 2 of the Additional SSI Completion Report (LFR 2006a) present the analytical results of the compounds detected in soil samples collected from the Site (see Appendix B). Duplicate soil samples were collected from locations noted as 6A-0.5’ (duplicate sample for 1A-0.5’), 6B-0.5’ (duplicate sample for 1B-0.5’), 6C-0.5’ (duplicate sample for 1C-0.5’), 7B-3.5’ (duplicate sample for 2B-3.5’), 7B-5’ (duplicate sample for 2B-5’), and 7B2-3.5’ (duplicate sample for 2B2-3.5’). Compounds detected in on-site soil are noted below.

In accordance with convention, petroleum hydrocarbons, PCBs, SVOCs/PAHs and metals detected in soil and identified as COCs are presented in units of mg/kg, while VOCs in soil are presented in units of micrograms per kilogram (μg/kg). Petroleum hydrocarbons, PCBs, SVOCs/PAHs and metals detected in groundwater and identified as COCs are presented in units of milligrams per liter (mg/l), while VOCs in groundwater are presented in units of μg/l.

The discussion below highlights COCs in soil at concentrations at or above proposed PCGs. Development of the PCGs is discussed in Section 4.0 of this Soil RAW.

Petroleum Hydrocarbons

Gasoline (carbon range C4-C12) was detected in soil at concentrations ranging up to 2,780 mg/kg (maximum concentration present in the sample from the 10-foot-bgs depth at boring 2BN(37') below and south of the Warehouse). Diesel (carbon range C13-C22) was detected in one soil sample at a concentration of 639 mg/kg. This sample was collected at the 5-foot-bgs depth from boring 5C, located near the storm-water collection sump near the southeastern corner of the Site. Motor oil (carbon range C23-C40) was detected at concentrations ranging up to 22,524 mg/kg. The highest motor oil concentration was detected in the 0.5-foot-bgs depth sample from boring 2B2N(20'). Additional information on distribution of petroleum hydrocarbons is presented below.

Gasoline. Gasoline-impacted soil was identified at various sampling locations across the Site as shown on Figures 5, 13, and 14 included in this report and the following figures in the Additional SSI Completion Report (LFR 2006a):

- upper 1 foot bgs as shown on Figure 4A
- 1- to 5-foot-bgs depth as shown on Figure 4B and 4C
- 5- to 15-foot-bgs depth as shown on Figure 4D and 4E
- 15- to 24-foot-bgs depth as shown on Figure 4F

Gasoline was detected at concentrations at or greater than 100 mg/kg at depths of 5 to 15 feet bgs in the area adjacent to the south-southeastern corner of the Warehouse and at a depth of 5 feet bgs in boring 4BS(20') located inside the Manufacturing/Office Building.

Diesel. Diesel-impacted soil was identified at one location, near the storm-water collection sump, as noted above and shown on Figures 6, 18, and 20 and Figures 5A and 5B of the Additional SSI Completion Report (LFR 2006a).

The concentration of diesel (639 mg/kg) in this sample (5C at 5 feet bgs) was greater than 500 mg/kg. Diesel was not detected in the borings advanced around boring 5C.

Motor Oil. Motor oil-impacted soil was identified at several locations on the Site as shown on Figures 7, 13, 14, 18 and 20 of this report and the following figures in the Additional SSI Completion Report (LFR 2006a):

- upper 1 foot bgs as shown on Figure 6A and 6B
- 1- to 5-foot-bgs depth as shown on Figure 6C
- 5- to 24-foot-bgs depth as shown on Figure 6D

Motor oil was detected in three on-site locations at concentrations greater than 500 mg/kg as follows:

- upper 2 feet bgs across the central portion of the Site and the 2- to 5-foot-bgs depth in the area of borings 2B and 2B2 near the center of the Site
- the 2- to 5-foot-bgs depth below the concrete floor of the Manufacturing/Office Building in the area of boring 4BS(20')
- at the 5-foot-bgs depth in boring 5C (near the sump at the southeastern corner of the Site)

SVOCs/PAHs

SVOCs/PAHs were detected in soil at a number of locations as presented in Table 2 of the Additional SSI Completion Report (LFR 2006a). The SVOCs/PAHs benzo(a)pyrene, benzo(a)anthracene and benzo(k)fluoranthene were detected in the former UST soil excavation area (location 2B-2), immediately outside the previous excavation limits (at location 2B) and near the storm-water collection sump near 66th Avenue (at location 5C). Additional information on distribution of SVOCs/PAHs in soil is presented below.

SVOC/PAH-impacted soil was identified at several locations on the Site as shown on Figures 8, 13, 14, and 20 of this report the following figures in the Additional SSI Completion Report (LFR 2006a):

- upper 1 foot bgs as shown on Figure 7A
- 1- to 6-foot-bgs depth as shown on Figure 7B
- 6- to 24-foot-bgs depth as shown on Figure 7C

SVOCs/PAHs were detected in shallow soil (surface to 2 feet bgs) across the central portion of the Site at concentrations that pose a health risk to future occupants of the proposed school campus. The SVOCs/PAHs are associated with the motor oil identified in these areas.

Metals

Metals detected in on-site soil include arsenic, barium, chromium, cobalt, copper, hexavalent chromium, lead, nickel, vanadium, and zinc.

Antimony, beryllium, cadmium, mercury, molybdenum, selenium, silver, and thallium were not detected in any of the samples analyzed for metals.

Metals detected at concentrations of concern were limited to arsenic and lead, as discussed below.

Arsenic. Arsenic-impacted soil was identified at several locations on the Site. The maximum concentration of arsenic was 117 mg/kg detected in the shallow soil sample (0.5-foot-bgs depth) from boring 2AS(20') located inside the Warehouse. Arsenic concentrations were generally less than 50 mg/kg. Arsenic distribution across the Site is shown on Figures 9, 13, 14, and 16 of this report and the following figures in the Additional SSI Completion Report (LFR 2006a):

- upper 1 foot bgs as shown on Figure 8A
- 1 foot to 5-foot-bgs depth as shown on Figure 8B
- 5-foot to 15-foot-bgs depth as shown on Figure 8C
- 15-foot to 24-foot-bgs depth as shown on Figure 8D

Arsenic was detected in shallow soil (surface to 2 feet bgs) at several locations above the background level of 7 mg/kg, including:

- in the upper 2 feet beneath the concrete floor of the Warehouse, below the pavement in the area northwest of the Warehouse, in the central portion of the Site in the area of boring 2B (motor oil-impacted soil and SVOC-impacted soil were also present at this location), and in the area of borings 2CN, 2CN(10'), and 2CE, located near the center of the Site's southern border
- at the 5-foot-bgs depth beneath the concrete floor of the Warehouse in the area of boring 2A

Lead. Lead-impacted soil was identified at several locations on the Site as noted below and as shown on Figures 10, 19, and 20 of this report and the following figures in the Additional SSI Completion Report (LFR 2006a); the maximum concentration of lead detected in soil at the Site was 398 mg/kg (at 0.5 foot in boring 5C):

- upper 1 foot bgs as shown on Figure 9A
- 1- to 5-foot-bgs depth as shown on Figure 9B
- 5- to 10-foot-bgs depth as shown on Figure 9C
- 10- to 24-foot-bgs depth as shown on Figure 9D

Lead was detected at concentrations of greater than 255 mg/kg in shallow soil (surface to 2 feet bgs) beneath the pavement at the eastern end of Site (borings 5A and 5C).

Organic Compounds (PCBs, VOCs and Dioxins)

Various PCBs, VOCs and dioxins were detected in on-site soils as noted below.

PCBs. PCBs (as Arochlor 1260) were detected at eight locations with concentrations ranging up to 69.7 mg/kg. The highest concentration was detected in the soil sample collected at the 0.5-foot-bgs depth in boring 4B, located immediately adjacent to the former equipment pressure wash room. The next highest concentration of PCBs was 21.3 mg/kg present in the soil sample collected at the 0.5-foot-bgs depth from boring 1C near the northwestern corner of the Site.

The distribution of PCBs in soil is shown on Figures 11, 13, 16, 17, and 18 and the following figures in the Additional SSI Completion Report (LFR 2006a):

- upper 1 foot bgs as shown on Figure 10A
- 1- to 5-foot-bgs depth as shown on Figure 10B
- 5- to 24-foot-bgs depth as shown on Figure 10C
- inside the manufacturing/office building as shown on Figure 10D
- at and around boring 2C as shown on Figure 10E

PCBs were detected in shallow soil (surface to 2 feet bgs) at several locations above the proposed action level of 0.13 mg/kg, including:

- upper 1 foot bgs beneath concrete floor of Manufacturing/Office Building in area of soil boring 4BS(10')
- upper 2 feet bgs beneath the concrete floor of the Manufacturing/Office Building in areas of borings 4B, 4BE(10'), and 3BW(10')
- upper 2 feet bgs and at 5 feet bgs in area of the sump located at the center of the Site's southern border near boring 2C
- upper 2 feet bgs at the northwestern end of the Site at borings 1B and 1C

In addition, PCBs were detected in soil in the upper 6 feet bgs at boring 1A.

VOCs. VOC detections were limited to BTEX compounds and the fuel oxygenates MTBE and tert butyl alcohol (TBA). No other VOCs were above the laboratories reporting limit by EPA Method 8260. BTEX compounds, MTBE and TBA were found at locations 2B and 2B3.

The distribution of benzene and MTBE in soil is shown on Figures 12, 13, and 14 of this report and the following figures in the Additional SSI Completion Report (LFR 2006a):

- The distribution of benzene in soil is shown on the following figures:
    - upper 6 feet as shown on Figures 11A and 11B

- o 6 feet to 24 feet depth as shown on Figures 11C and 11D

- MTBE was detected in soil at several locations, including:

  - o upper 6 feet as shown on Figures 12A and 12B

  - o 6 feet to 24 feet depth as shown on Figures 12C and 12D

Dioxins. Dibenzodioxins and dibenzofurans were detected in the soil samples collected at the 0.5-foot-bgs depth from boring 4B2 and 4C.

Duplicate Samples. According to information provided by CSS, the soil sample designated 6A-0.5’ is a duplicate of soil sample 1A-0.5’; 6B-0.5’ is a duplicate of 1B-0.5’; 6C-0.5’ is a duplicate for 1C-0.5’; 7B-3.5’ is a duplicate for 2B-3.5’; 7B-5’ is a duplicate for 2B-5’; and 7B-2-3.5’ is duplicate for 2B-2-3.5’.

Groundwater

The groundwater investigation consisted of collecting water samples from soil borings and the five on-site groundwater monitoring wells.

Chemicals detected in groundwater samples included petroleum hydrocarbons, various SVOCs/PAHs, various metals, PCBs, and various VOCs, as shown in the tables prepared by CSS and included in Appendix A of the Additional SSI Completion Report (LFR 2006a). In addition, tables showing analytical results for groundwater samples collected during routine groundwater sampling events are included in Appendix A of the Additional SSI Completion Report (LFR 2006a). Selected compounds detected in groundwater at the Site during the PEA are shown on Figure 13 in the Additional SSI Completion Report (LFR 2006a) and compounds detected in groundwater samples collected from the Site are summarized below.

Petroleum Hydrocarbons

Gasoline and motor oil were detected in groundwater samples collected from the Site; however, diesel was not detected in the groundwater samples at concentrations at or above the laboratory reporting limits.

Gasoline was detected in groundwater samples collected from three of the on-site groundwater monitoring wells with the highest concentration reported as 152.2 mg/l in well MW-4. Gasoline was not detected in “grab” groundwater samples collected from soil borings advanced on the Site during the PEA and initial SSI.

Motor oil was detected at one location (2C) with a concentration of 2.2 mg/l. This location is near the storm-water collection and pumping sump.

SVOCs/PAHs

SVOCs/PAHs were detected in the sample collected from monitoring well MW-4 and in the duplicate sample (designated MW-5) collected from well MW-4. Well MW-4, located adjacent to the former UST soil excavation area, has historically had the highest contaminant concentrations in groundwater. The SVOCs detected in the groundwater samples collected from MW-4 were naphthalene at 382 μg/l and 1-methylnaphthalene at 44 μg/l.

Metals

Arsenic, barium, cobalt, chromium, molybdenum, nickel, vanadium, and zinc were detected in groundwater samples collected from the Site. Antimony, beryllium, cadmium, mercury, selenium, silver, and thallium were not detected in any of the samples analyzed for metals.

Organic Compounds (PCBs and VOCs)

Various PCBs and VOCs were detected in groundwater samples collected from the Site as noted below.

PCBs. PCBs (as Arochlor 1260) were detected in groundwater samples collected at two locations: 1A at a concentration of 2.0 μg/l and 1C at a concentration of 1.7 μg/l. Boring 1A was located in the former PCB remediation area. Boring 1C is located approximately 150 feet west of boring 1A.

VOCs. VOC detections were limited to BTEX compounds and the fuel oxygenate MTBE. No other VOCs were above the laboratories reporting limit by EPA Method 8260. BTEX compounds were detected at MW-4. MTBE was also detected in the sample collected from well MW-2 at 12 μg/l and in the sample from well EW-1 at 8 μg/l. EW-1 is the 8-inch-diameter polyvinyl chloride (PVC) conduit used to dewater the former UST tank pit soil excavation.

2.8.6 Additional Supplemental Site Investigation

LFR performed an additional SSI in December 2005 and January 2006 to help further delineate the amount and extent of chemically impacted soil and groundwater on the Site and provide information to aid in making a decision about further actions, if any, which may be necessary. Borings advanced by LFR during the additional SSI are designated with an "SB" prefix (e.g., SB-3) on the figures included in the Additional SSI Completion Report (LFR 2006a).

Three nested wells were installed and sampled by LFR in December 2005. Subsequently, groundwater samples were collected from monitoring well MW-2 and nested well NW-3 in February 2006.

Tables 1, 2, and 3 of the Additional SSI Completion Report (LFR 2006a) present the soil and groundwater results from LFR's investigation. Table 4 of the Additional SSI

Completion Report (LFR 2006a) presents the results of groundwater samples collected from the on-site groundwater monitoring wells and nested wells since their installation. These tables are included in Appendix B of this Soil RAW.

The results of LFR's investigation are summarized below.

Soil

The soil investigation consisted of advancing probes at selected locations on the Site to allow collection of soil samples. Soil samples were collected for chemical analysis from depths of 20 feet bgs or less.

Chemicals detected in soil samples included petroleum hydrocarbons, various SVOCs and PAHs, various metals, PCBs, various VOCs, and dioxins. Tables 1 and 2 in the Additional SSI Completion Report (LFR 2006a) present the analytical results of the compounds detected in soil samples collected from the Site. Duplicate soil samples were collected by LFR from the following locations:

- SB-4 (1 – 1.5')
- SB-7 (5.25 – 5.55')
- SB-17 (10 - 10.5')
- SB-20 (1 – 1.5')
- SB-20 (5 – 5.5')
- SB-22 (15 – 15.5')
- SB-24 (1 – 1.5')
- SB-31 (14 – 14.5')
- SB-32 (10 – 10.5')
- SB-38 (10 – 10.5')
- SB-47 (5 – 5.5')
- SB-49 (5 – 5.5')

Petroleum Hydrocarbons

Gasoline, diesel and motor oil were detected in soil samples collected by LFR, as discussed below.

Gasoline. Gasoline (carbon range C4-C12) was detected in soil at concentrations ranging up to 4,900 mg/kg (maximum concentration present in the sample from the 10-foot-bgs depth at boring SB-11). Gasoline was detected at a concentration of 1,700 mg/kg in the sample collected from the 15-foot-bgs depth from boring SB-11 with no deeper samples collected from this boring. However, concentrations of gasoline were less than 100 mg/kg in soil samples collected during the additional SSI from nearby borings (SB-6, SB-8, and SB-9) at depths of 15 and/or 20 feet bgs.

Gasoline-impacted soil was identified at various sampling locations across the Site as noted below and as shown on Figures 5, 13, and 14 of this report and the following figures in the Additional SSI Completion Report (LFR 2006a).

- upper 1 foot bgs as shown on Figure 4A
- 1- to 5-foot-bgs depth as shown on Figures 4B and 4C
- 5- to 15-foot-bgs depth as shown on Figures 4D and 4E
- 15- to 24-foot-bgs depth as shown on Figure 4F

Diesel. Diesel (carbon range C10-C24) was detected in 15 soil samples collected during the additional SSI. The diesel concentrations were below 500 mg/kg (with highest concentration reported at 170 mg/kg) except for the sample collected at the 15-foot-bgs depth from boring 4BS(20').

Diesel-impacted soil was identified at the locations shown on Figures 6, 18, and 20 of this report and Figures 5A and 5B of the Additional SSI Completion Report (LFR 2006a).

Diesel was detected at a concentration of 1,200 mg/kg at the 15-foot-bgs depth from boring 4BS(20'), located inside the Manufacturing/Office Building. Diesel concentrations were less than 79 mg/kg in the shallow soil samples (collected at depths of 10 feet bgs and less) from this boring; deeper soil samples were not collected from this boring during the additional SSI. These data were submitted informally to the DTSC on January 13, 2006, with the recommendation that additional (confirmation) sampling be performed in this area, as appropriate, during the removal action to address motor oil-impacted soil in this area. The DTSC concurred with LFR's assessment in an e-mail sent on January 17, 2006.

Motor Oil. Motor oil (carbon range C23-C40) was detected at concentrations ranging up to 5,500 mg/kg. The highest motor oil concentration was detected in the 0.5- to 1-foot-bgs depth sample from boring SB-28.

Motor oil-impacted soil was identified at several locations on the Site as shown on Figures 7, 13, 14, 18, and 20 of this report and the following figures in the Additional SSI Completion Report (LFR 2006a):

- upper 1 foot bgs as shown on Figure 6A and 6B
- 1- to 5-foot-bgs depth as shown on Figure 6C
- 5- to 24-foot-bgs depth as shown on Figure 6D

SVOCs/PAHs

The SVOCs/PAHs benzo(a)pyrene, benzo(a)anthracene, and benzo(k)fluoranthene were detected in SB-27 and SB-29 with maximum concentrations of 110 μg/kg for benzo(a)pyrene, 95 μg/kg for benzo(a)anthracene, and 140 μg/kg for benzo(k)fluoranthene.

SVOC/PAH-impacted soil was identified at several locations on the Site as shown on Figures 8, 13, 14, and 20 of this report and the following figures in the Additional SSI Completion Report (LFR 2006a):

- upper 1 foot bgs as shown on Figure 7A
- 1- to 6-foot-bgs depth as shown on Figure 7B
- 6- to 24-foot-bgs depth as shown on Figure 7C

Metals

Soil samples collected from the Site during the additional SSI were analyzed for arsenic and lead, as discussed below.

Arsenic. Arsenic was detected in a number of soil samples analyzed during the additional SSI with the maximum concentration detected at 140 mg/kg in the shallow samples (0.5- to 1-foot-bgs depth) from borings SB-18 and SB-19. Arsenic distribution across the Site is shown on Figures 9, 13, 14, and 16 of this report and the following figures in the Additional SSI Completion Report (LFR 2006a):

- upper 1 foot bgs as shown on Figure 8A
- 1- to 5-foot-bgs depth as shown on Figure 8B
- 5- to 15-foot-bgs depth as shown on Figure 8C
- 15- to 24-foot-bgs depth as shown on Figure 8D

Lead. Two soil samples were collected from the 5-foot-bgs depth from borings 5ASE(10’) and 5CESE(20’) during the PEA and initial SSI by CSS and placed on hold at the laboratory. LFR arranged for lead analysis of these two samples to evaluate the vertical extent of lead. Lead was detected in both of these samples at a concentration of 6 mg/kg.

Lead-impacted soils were identified on the Site as shown on Figures 10, 19, and 20 of this report and the following figures in the Additional SSI Completion Report (LFR 2006a):

- upper 1 foot bgs as shown on Figure 9A
- 1- to 5-foot-bgs depth as shown on Figure 9B
- 5- to 10-foot-bgs depth as shown on Figure 9C
- 10- to 24-foot-bgs depth as shown on Figure 9D

PCBs. PCBs (as Arochlor 1260) were detected in a number of soil samples collected during the additional SSI. The highest concentration was detected in the soil sample collected at the 0.5- to 1-foot-bgs depth in boring SB-49, located west of boring 2C and the storm-water collection sump.

The distribution of PCBs in soil is shown on Figures 11, 13, 15, 16, 17, and 18 of this report and the following figures in the Additional SSI Completion Report (LFR 2006a):

- upper 1 foot bgs as shown on Figure 10A
- 1- to 5-foot-bgs depth as shown on Figure 10B
- 5- to 24-foot-bgs depth as shown on Figure 10C
- inside the Manufacturing/Office Building as shown on Figure 10D
- at and around boring 2C as shown on Figure 10E

VOCs. Soil samples collected from various borings during the additional SSI were analyzed for VOCs, including BTEX and MTBE. The maximum concentrations were: benzene at 36,000 μg/kg, toluene at 170,000 μg/kg, ethylbenzene at 110,000 μg/kg, xylenes at 400,000 μg/kg, and MTBE at 32,000 μg/kg.

The distribution of benzene in soil is shown on Figures 12, 13, and 14 of this report and the following figures in the Additional SSI Completion Report (LFR 2006a):

- upper 6 feet bgs as shown on Figures 11A and 11B
- 6- to 24-foot-bgs depth as shown on Figures 11C and 11D

MTBE was detected in soil at several locations, as shown on Figures 12, 13, and 14 and the following figures in the Additional SSI Completion Report (LFR 2006a):

- upper 6 feet bgs as shown on Figures 12A and 12B
- 6- to 24-foot-bgs depth as shown on Figures 12C and 12D

Groundwater

Groundwater impacted with petroleum hydrocarbons and VOCs was identified in the area of the former UST. Additional borings were advanced by LFR to further delineate the extent of impacted groundwater. “Reconnaissance” groundwater samples were collected from borings SB-19, SB-22, SB-33 and SB-35. Duplicate groundwater samples were collected from borings SB-19, SB-22, SB-33 and SB-35.

In addition, LFR installed three nested groundwater monitoring wells (designated NW-1, NW-2, and NW-3 on Figure 14 in the Additional SSI Completion Report [LFR 2006a]) with screened casings placed at three separate depths to establish depths of free groundwater and zones of impacted groundwater. Well construction details are shown on the cross section and well construction logs presented in Appendix B of this Soil RAW.

The purpose of collecting the groundwater samples from the soil borings and nested groundwater monitoring wells was to evaluate the extent of the petroleum hydrocarbons in groundwater. The results of the groundwater investigation are summarized below.

Gasoline

Gasoline (carbon range C5-C12) was detected in "reconnaissance" groundwater samples at a maximum concentration of 2.2 mg/l (in boring SB-19), and in the groundwater samples from the nested groundwater monitoring wells at a maximum concentration of 120 mg/l (in the intermediate zone of well NW-2).

Diesel

The maximum concentration of diesel (carbon range C10-C24) detected in the "reconnaissance" groundwater samples was 0.680 mg/l (in boring SB-19) and the maximum concentration of diesel detected in the groundwater samples from the nested groundwater monitoring wells was 7.3 mg/l (in the shallow zone of well NW-2).

Motor Oil

The "reconnaissance" groundwater sample from boring SB-22 contained the highest concentration of motor oil (carbon range C24-C36) at 1.8 mg/l and the groundwater sample from the shallow zone of nested well NW-2 contained the highest concentration of motor oil (2.6 mg/l).

SVOCs/PAHs

Naphthalene was detected in only one of the "reconnaissance" groundwater samples. This sample, collected from boring SB-19, contained naphthalene at a concentration of 13 μg/l.

VOCs

The highest concentrations of BTEX and MTBE detected in "reconnaissance" groundwater samples were present in the sample from boring SB-19. Analysis of the groundwater sample from this boring detected benzene at 25 μg/l, toluene at 120 μg/l, ethylbenzene at 69 μg/l, xylenes at 410 μg/l, and MTBE at 1,100 μg/l.

The highest concentrations of BTEX and MTBE detected in the groundwater samples collected from the nested wells was present in the sample from the intermediate zone of nested well NW-2. Analysis of groundwater samples from this zone detected benzene at 2,200 μg/l, toluene at 24,000 μg/l, ethylbenzene at 2,100 μg/l, xylenes at 8,600 μg/l, and MTBE at 120,000 μg/l.

Review and Evaluation of Potential Off-Site Sources

LFR researched reported releases in the Site vicinity to evaluate potential off-Site sources for the petroleum hydrocarbons detected in groundwater at the Site and presented the results in our letter report entitled "Addendum to Supplemental Site Investigation Completion Report, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California," dated February 7, 2006 (LFR 2006b). A copy of this report is presented in Appendix B of this Soil RAW.

A potential off-site source was suspected because of detections of petroleum hydrocarbons in the upgradient groundwater monitoring well MW-1 in the past. Our research included obtaining a database report from Environmental Data Resources, Inc. (EDR) of Milford, Connecticut, and reviewing the California Regional Water Quality Control Board, San Francisco Bay Region (RWQCB) Geotracker database. Based on the available information from EDR and the RWQCB, several facilities with reported releases are present in the Site vicinity. These releases would be unlikely to impact groundwater beneath the Site because of the distances of these releases from the Site, impacts were limited to soil only at these facilities or case closure was granted by the oversight agency.

LFR also obtained Sanborn Fire Insurance Maps (Sanborn Maps) from EDR for the Site and Site vicinity. According to information obtained from the available maps (dated 1912 through 1969), the Site was vacant land in 1912 and occupied by residential structures in 1925. Commercial development of the Site was shown on the 1950 through 1969 Sanborn Maps. A gasoline UST is present to the east of the warehouse in the 1950 through 1969 maps. The area adjacent to the north of the Site was vacant land or residential land in all of the Sanborn Maps reviewed by LFR.

Aerial photographs were obtained by LFR for the Site and Site vicinity. According to the information obtained from the available photographs (dated 1939 through 1998), the Site was occupied by residential structures in 1939 and 1946 with commercial development of the Site shown on the 1958 through 1998 aerial photographs. A small structure is present on the 1958 aerial photograph in the area noted as having a gasoline UST on the 1950 Sanborn Map. The manufacturing/office building and warehouse structure currently present on the Site are shown on the 1958 through 1998 aerial photographs. The area adjacent to the north of the Site was vacant land or residential land in all of the photographs reviewed by LFR.

2.8.7 Human Health Screening Evaluation

A health risk evaluation was first performed following the guidance presented in the "Preliminary Endangerment Assessment Guidance Manual" (DTSC 1999) using the data collected as part of the site characterization. These sampling events were conducted at the Site in March, August, and December 2005 and in January 2006.

The risk evaluation process included assessing exposure and toxicity assessment considering the maximum concentration of each selected COPC and quantifying estimates of potential health risks, assuming residential conditions. Consistent with DTSC and U.S. EPA risk assessment policy, the potential for exposures to produce carcinogenic and noncarcinogenic health effects were each characterized.

After the initial site characterization during the PEA, additional soil samples were collected and analyzed during the initial and additional SSIs. The risk evaluation was updated incorporating the additional data. The following presents a summary of the initial and updated risk evaluation. Tables presenting the pre-SSI and post-SSI risk evaluation data are presented in Appendix J of the Additional SSI Completion Report (LFR 2006a). Revised risk evaluation tables and the arsenic probability plot are presented in Appendix B of this Soil RAW.

2.8.7.1 Pre-SSI Risk Evaluation and Endangerment Determination

The data from the initial evaluation was evaluated considering maximum detected concentrations in soil, groundwater and soil vapor. Each detected compound was evaluated with the exception of metals, which occur naturally and were evaluated only if detected above background concentrations.

Carcinogenic Effects

An estimate of the potential excess incremental cancer risk associated with exposure to a carcinogen (i.e., the incremental probability that an individual will develop cancer over the course of a lifetime) is obtained by multiplying the estimated chronic daily intake of the carcinogen by the chemical-specific cancer slope factor (CSF) for the appropriate exposure route. The estimated excess cancer risks for each chemical and exposure route are then summed to estimate the total excess cancer risk for the exposed individual.

As indicated, the total excess cancer risk posed by the presence of chemicals in soil is 3 x 10^{-3}. The majority of this total risk is attributable to the presence of arsenic, chromium IV, benzene, PAHs, and PCBs at the Site.

Noncarcinogenic Effects

To assess the noncarcinogenic effects of chemicals, the estimated chronic daily intake of a chemical is divided by the oral or inhalation reference doses (RfDs). The resulting ratio, referred to as the Hazard Quotient (HQ) is an estimate of the likelihood that noncarcinogenic effects will occur as a result of that specific chemical exposure. A hazard quotient less than or equal to 1 indicates that the predicted exposure to that chemical should not result in an adverse noncarcinogenic health effects (U.S. EPA 1989). Consistent with DTSC risk assessment guidance, the chemical-specific HQs are added together, to provide the Hazard Index (HI). A total, multichemical, multipathway HI of less than or equal to 1 indicates that potential noncancer health effects are not likely to occur.

Table J-6 in the Additional SSI Completion Report (LFR 2006a) presents the estimated noncancer HIs for future on-site residents, both children and adults. As indicated, the total HI is 117. The majority of the total noncancer hazard is attributable to PCBs. Other chemicals that contribute to the noncancer hazard include arsenic and vanadium.

Health Effects of Lead in Soil

As previously described, the RfD approach, which is used for assessing potential noncarcinogenic effects, is not used to evaluate exposure to lead. Rather, the DTSC has developed specific guidance for evaluating exposure and the potential for adverse health effects resulting from exposure to lead in the environment using a model based on absorbed doses and estimated blood-lead concentrations. The guidance is implemented using a spreadsheet, obtained from the DTSC, in which a multipathway algorithm is used for estimating blood-lead concentrations in children and adults.

Potential health affects associated with lead exposure was evaluated using LEADSPREAD™. The maximum concentration of lead detected in soil (398 mg/kg) was used to represent lead exposure. The 99th percentile blood lead level associated with exposure to lead from both the Site and background sources in air, food, and drinking water was 12.9 μg/dl for children (the most sensitive receptors), a level that is above the target concentration of 10 μg/dl. Therefore, the 99th percentile blood lead level associated with exposure to lead from both the Site and background sources in air, food, and drinking water is at a level that above the target concentration of 10 μg/dl.

2.8.7.2 Post-SSI Risk Assessment

The risk evaluation was updated incorporating the revised maximum detected COPCs, and per DTSC comments, included a TPH risk evaluation. The data was first evaluated to select revised maximum concentrations and new COPCs if applicable. No additional COPCs were identified at the Site. However, the following COPCs had revised maximum concentrations in soil: benzene, ethylbenzene, xylenes, toluene, acenaphthylene, and arsenic. The risks and hazards for these compounds were revised. The maximum lead concentration did not change and the lead evaluation was not revised.

In addition to revising the risk and HI estimates, a TPH risk evaluation was performed. The TPH evaluation followed the methodology presented by the Massachusetts Department of Environmental Protection (MADEP, October 2002). TPH is evaluated for its noncarcinogenic adverse health affects considering carbon chain length fractions and presence of saturated bonds within the carbon chains. Gasoline is assumed to be represented by fractions containing 4 to 12 saturated carbon molecules. Diesel is assumed to be represented by 40% 12- to 22-saturated-carbon-molecule fractions and 60% 12- to 22-aromatic-carbon-molecule fractions. The maximum detected gasoline concentration was 4,900 mg/kg and the maximum detected diesel concentration was 1,200 mg/kg. The maximum diesel concentration was assumed to be 720 mg/kg aromatic and 480 mg/kg saturated or aliphatic carbon fractions. The results of the noncarcinogenic risk evaluation with the revised data and TPH evaluation are presented in the tables in Appendix J of the Additional SSI Completion Report (LFR 2006a).

The total estimated risk using the post-SSI data is greater than the pre-SSI estimates. The revised cancer risk is 9×10^{-3}. As with the pre-SSI risk, the majority of this total risk is attributable to the presence of arsenic, chromium IV, benzene, PAHs, and PCBs at the Site. The increase in the risk estimate is primarily due to the increase in the maximum detected arsenic concentration.

The revised HI is 128 (see Table J-13 of the Additional SSI Completion Report [LFR 2006a]). The gasoline estimated hazard was 3, which is greater than the target of 1. The diesel hazard estimate, considering both the saturated and aromatic fractions, is 1.

Based on the results of both the pre- and post-SSI risk evaluations, maximum concentrations of both carcinogenic and noncarcinogenic COCs are present at levels that could be a health concern.

3.0 NATURE, SOURCE, AND EXTENT OF CONTAMINANTS IN SOIL

The data collected during the site investigations indicates that soil impacted with gasoline, diesel, motor oil, SVOCs/PAHs, arsenic, lead, PCBs, and VOCs is present on the Site. Information on the nature, source, and extent of contaminants is presented in the following sections.

3.1 Type, Source and Location of Contaminants

The results of the PEA and SSI revealed concentrations of gasoline, diesel, motor oil, various SVOCs/PAHs, arsenic, lead, PCBs, and various VOCs above the preliminary cleanup goals (as discussed in Section 4.0 of this RAW). Table 1 presents the COCs, their locations and possible sources based on the distribution of these compounds in site soils.

3.2 Extent and Volume of Contamination

The extent and volume of impacted soil, as discussed below, are based on data collected during the on-site investigations. Table 2 presents information on the areas with impacted soil and estimated volumes of impacted soil. Figures 5 through 12 present plan views showing areas of impacted soil by COC and Figures 13 through 20 present cross sections through the areas of impacted soil.

3.2.1 Extent of Impacted Soil

3.2.1.1 Gasoline

Gasoline was not detected at concentrations above 100 mg/kg in soil samples collected from the Site at depths of less than 4.5 feet bgs. Soil with gasoline detected at concentrations at or above 100 mg/kg is present at two on-site locations, as noted below:

- **inside the Manufacturing/Office Building** in the soil samples collected at the 5-foot-bgs depth from boring 4BS(20'), at the 4.5- to 5-foot-bgs depth from boring SB-32, and at the 4.5- to 5-foot-bgs depth and the 9.5- to 10-foot-bgs depth from boring SB-34 as shown on Figures 4A through 4D in the Additional SSI Completion Report (LFR 2006a)

  The lateral and vertical extent of gasoline-impacted soil in this area appears to be defined by the following soil samples:

  - the 4.5- to 5-foot soil samples from borings SB-33, SB-35, and SB-37
  - the 9.5- to 10-foot soil samples from borings SB-33, SB-35, and SB-37
  - the 14.5- to 15-foot soil samples from borings SB-33, SB-35, and SB-37

- **in the central area of the Site** (in the area around and south of the former UST); generally, the impacted soil extended from a depth of approximately 5 feet bgs to a depth of approximately 10 feet bgs, with one soil sample (taken at a depth of 15 feet bgs from boring 2B) that also contained gasoline at a concentration above 100 mg/kg (Figures 4E and 4F of the Additional SSI Completion Report [LFR 2006a])

  The lateral extent of gasoline-impacted soil in this area appears to be defined by soil samples collected from the following borings:

  - northern edge: boring 2A
  - eastern edge: borings 2B2S(20'), 2B2E(20'), 2A2S(20'), and 2A2W(20')
  - southern edge: borings 2CN(20'), 2CE(10'), and 2CE(20')
  - western edge: borings 2B3, SB-41, and SB-22

  The vertical extent of gasoline-impacted soil in this area appears to be defined by soil samples collected at the 15-foot-bgs depth from borings SB-7, SB-17, SB-19, SB-20, SB-21, SB-22 and SB-24 and at the 20-foot-bgs depth from borings 2B, SB-8, and SB-9.

3.2.1.2 Diesel

Diesel-impacted soil (with concentrations detected at or above 500 mg/kg) was identified in two on-site locations, as noted below:

- **the southeastern corner of the Site** in the soil sample collected at the 5-foot-bgs depth from boring 5C, as shown on Figure 5A in the Additional SSI Completion Report (LFR 2006a):

  The lateral extent of diesel-impacted soil in this area appears to be defined by soil samples collected from the following borings:

  - northeastern edge: boring 5CNE(4')
  - southeastern edge: boring 5CSE(10')
  - western edge: boring 5CW(10')

  The vertical extent appears to be defined by the soil sample collected at the 10-foot-bgs depth from boring SB-38.

- **inside the Manufacturing/Office Building** in the soil samples collected at the 14.5 to 15-foot-bgs depth from boring 4BS(20') as shown on Figures 5A and 5B in the Additional SSI Completion Report (LFR 2006a); diesel was not detected in shallower soil samples collected from this boring with the exception of the 9.5- to 10-foot-bgs depth (where diesel was detected at a concentration of 79 mg/kg); deeper soil samples were not collected from this boring

  The lateral and vertical extent to the southwest appears to be defined by soil samples collected from boring SB-32, located approximately 10 feet from boring 4BS(20'), at the 9.5- to 10-foot-bgs depth and the 14.5- to 15-foot-bgs depth.

3.2.1.3 Motor Oil

Motor oil was detected at concentrations at or above 500 mg/kg in the areas noted below:

- **in the central portion of the Site**, in shallow soil (5 feet bgs and less) (in the area west of the Manufacturing/Office Building and south of the Warehouse) as shown on Figures 6A, 6B, 6C, and 6D in the Additional SSI Completion Report (LFR 2006a)

  The lateral extent of motor oil-impacted soil in this area appears to be defined by soil samples collected from the following borings:

  - northern edge: borings 2BN(37') and SB-10
  - eastern edge: borings SB-4, SB-45 and SB-46
  - southern edge: borings 2CE(20'), 2CN(20') and SB-24
  - western edge: borings 2B3, SB-19, SB-20, SB-21, SB-22

  The vertical extent appears to be generally defined by the soil sample collected at the 5-foot-bgs depth from borings located within the central portion of the Site.

- **the soil at the 3.5-foot-bgs depth from boring 2B2** in the central portion of the Site as shown on Figure 6C in the Additional SSI Completion Report (LFR 2006a)

  The lateral extent of motor oil-impacted soil in this area appears to be defined by soil samples collected from the following borings:

  - northern edge: boring 2B2N(20')
  - eastern edge: boring 2B2E(20')
  - southern edge: boring SB-27
  - western edge: boring 2BW(20')

  The vertical extent appears to be generally defined by the soil samples collected at the 5-foot-bgs depth from surrounding borings (2B2N(20'), 2B2E(20'), SB-27, and 2BW(20').

- **the soil at the 5-foot-bgs depth from boring 2B** in the central portion of the Site as shown on Figures 6A, 6B, 6C and 6D in the Additional SSI Completion Report (LFR 2006a)

  The lateral extent of motor oil-impacted soil in this area appears to be defined by soil samples collected from the following borings:

  - northern edge: boring 2BN(20')
  - southern edge: boring 2BS(20')
  - western edge: boring 2BW(20')

  The vertical extent appears to be defined by the deeper soil samples collected from boring 2B (at the 10-, 15-, 20-, and 24-foot-bgs depths).

- **inside the Manufacturing/Office Building** at boring 4BS(20') at 3.5- and 4-foot-bgs as shown on Figure 6C in the Additional SSI Completion Report (LFR 2006a)

  The lateral extent of motor oil-impacted soil in this area appears to be generally defined by soil samples collected from the following borings:

  - northeastern edge: boring SB-33
  - southeastern edge: borings SB-34 and SB-37
  - southwestern edge: boring SB-32 and SB-35

  The vertical extent appears to be defined by the deeper soil samples collected from this boring at the 10- and 15-foot-bgs depths.

- **at the southeastern corner of the Site** at boring 5C (the 5-foot-bgs depth) as shown on Figure 6D in the Additional SSI Completion Report (LFR 2006a)

The lateral extent of motor oil-impacted soil in this area appears to be generally defined by soil samples collected from the following borings:

- northeastern edge: boring 5CNE(4')
- southeastern edge: boring 5CSE(10')
- western edge: boring 5CW(10')

The vertical extent appears to be defined by the soil samples collected at the 10- and 15-foot-bgs depths from boring SB-38.

3.2.1.4 SVOCs/PAHs

SVOCs/PAHs, including benzo(a)pyrene, benzo(a)anthracene and benzo(k)fluoranthene, were primarily detected in the following two on-site locations:

- **in the central portion of the Site**, in shallow soil (5 feet bgs and less); SVOCs/PAHs are apparently associated with the petroleum hydrocarbons detected in this area, as shown on Figures 7A, 7B, and 7C in the Additional SSI Completion Report (LFR 2006a)

  The lateral extent of SVOC/PAH-impacted soil in this area appears to be defined by soil samples collected from the following borings:

  - northern edge: borings 2BN(37') and SB-11
  - eastern edge: borings SB-3, SB-4, SB-13, SB-14 and SB-27
  - southern edge: borings SB-24, SB-29 and 2C
  - western edge: borings SB-20, SB-21 and 2BN(20')

  The vertical extent of SVOC/PAH-impacted soil appears to be defined by deeper soil samples collected from the borings within the central portion of the Site.

- **in the southeastern corner of the Site**, in the shallow soil (5 feet bgs and less) as shown on Figures 7A, 7B, and 7C in the Additional SSI Completion Report (LFR 2006a)

  The lateral extent of SVOC/PAH-impacted soil in this area appears to be defined by soil samples collected from the following borings:

  - northern edge: boring 5CNE(4')
  - southeastern edge: boring 5CSE(10')
  - southwestern edge: boring 5CW(10')

  The vertical extent of SVOC/PAH-impacted soil at this location is defined by the 10- and 15-foot-bgs-depth soil samples collected from this boring.

3.2.1.5 Metals

Metals detected at concentrations of concern were limited to arsenic (background level at 7 mg/kg) and lead (cleanup goal for school sites at 255 mg/kg), as discussed below.

Arsenic

The majority of the soil samples in which arsenic was detected at concentrations greater than 7 mg/kg were collected from the 1-foot-bgs depth at the following locations:

- **within the footprint of the Warehouse** as shown on Figures 8A, 8B, and 8C in the Additional SSI Completion Report (LFR 2006a)
    - the lateral extent is generally within the perimeter of the Warehouse (arsenic-impacted soil extends slightly west of the Warehouse)
    - the vertical extent of arsenic-impacted soil appears to be limited to the fill material/native soil interface, because samples of native soil collected at the approximately 4- to 5-feet-bgs depth generally contained arsenic at concentrations less than 7 mg/kg, except at 2A, where the sample from the 5-foot-bgs depth contained arsenic at 66 mg/kg (no deeper samples were collected from this boring)
- **in the central portion of the Site**, in shallow soil (less than 4.5 to 5 feet bgs) (outside the footprints of the on-site buildings) as shown on Figures 8A through 8D in the Additional SSI Completion Report (LFR 2006a)

  The lateral extent of arsenic-impacted soil appears to be defined by soil samples collected from the following borings:

    - northern edge: boring 2BN(20')
    - eastern edge: boring SB-4
    - southern edge: extends to southern border of the Site
    - western edge: borings 2B3 and SB-40

  The vertical extent of arsenic-impacted soil is generally defined by the 4.5- to 5-foot-bgs depth soil samples from this area, except at boring 2C, where the sample from the 5-foot-bgs depth contained arsenic at 31 mg/kg (no deeper samples were collected from this boring).
- **in the western portion of the Site**, in shallow soil (less than 4.5 feet to 5 feet bgs) at boring 1BS(10') as shown on Figures 8A and 8C in the Additional SSI Completion Report (LFR 2006a)

  The lateral extent of arsenic-impacted soil appears to be defined to the north by soil samples collected from boring 1B.

The vertical extent of arsenic-impacted soil is defined by the 5-foot soil sample collected from boring 1BS(10').

- **in the western portion of the Site**, in shallow soil (less than 4.5 feet to 5 feet bgs) at boring 1C, as shown on Figures 8A and 8C in the Additional SSI Completion Report (LFR 2006a)

  The lateral extent of arsenic-impacted soil appears to be defined by the following borings:

  - northern edge: boring 1CN(10')
  - southeastern edge: boring 1CSE(10')
  - southwestern edge: boring 1CSW(10')

  The vertical extent of arsenic-impacted soil is defined by the 5-foot soil sample collected from boring 1C.

Lead

Lead-impacted soil was identified at the following two locations:

- **at the northeastern corner of the Site** at borings 5A and 5ASE(10') as shown on Figures 9A and 9C in the Additional SSI Completion Report (LFR 2006a):

  The lateral extent is defined by the following borings:

  - northern edge: boring 5AN(10')
  - southeastern edge: boring 5ASE(20')
  - southwestern edge: boring 5ASW(10')

  The vertical extent of lead-impacted soil appears to be limited to the upper 5 feet at this location based on soil samples collected at the 5-foot-bgs depth from borings 5A and 5ASE(10').

- **at the southeastern corner of the Site** at borings 5C and 5CESE(20') as shown on Figures 9A and 9C in the Additional SSI Completion Report (LFR 2006a)

  The lateral extent is defined by the following borings:

  - northern edge: boring 5CNE(4')
  - southeastern edge: boring 5CSE(10')
  - southwestern edge: boring 5CW(10')

The vertical extent of lead-impacted soil appears to be limited to the upper 5 feet at this location based on soil samples collected at the 5-foot-bgs depth from borings 5C and 5CESE(20').

3.2.1.6 Polychlorinated Biphenyls

PCBs were detected at concentrations greater than 0.13 mg/kg (total PCBs) at several locations as noted below:

- **in the western portion of the Site,** in shallow soil (6 feet bgs and less) at boring 1A as shown on Figures 10A and 10C in the Additional SSI Completion Report (LFR 2006a)

  The lateral extent of PCB-impacted soil in this area appears defined by the following borings:

  - northern edge: boring 1AN(10')
  - southeastern edge: boring 1ASE(10')
  - southwestern edge: boring 1ASW(10')

  The vertical extent of PCB-impacted soil at this location appears to be defined by the 5-foot-bgs-depth sample collected from boring 1A.

- **in the western portion of the Site**, in shallow soil (5 feet bgs and less) at boring 1B as shown on Figures 10A and 10C in the Additional SSI Completion Report (LFR 2006a)

  The lateral extent of PCB-impacted soil in this area appears to be defined by soil samples collected from the following borings:

  - northeastern edge: boring 1BNE(10')
  - southern edge: boring 1BS(10')
  - northwestern edge: boring 1BNW(10')

  The vertical extent of PCB-impacted soil at this location appears to be defined by the 5-foot-bgs-depth sample collected from boring 1B.

- **in the western portion of the Site**, in shallow soil (5 feet bgs and less) at boring 1C, as shown on Figures 10A and 10C in the Additional SSI Completion Report (LFR 2006a)

  The lateral extent of PCB-impacted soil in this area appears to be defined by soil samples collected from the following borings:

  - northern edge: boring 1CN(10')
  - southeastern edge: boring 1CSE(10')
  - southwestern edge: boring 1CSW(10')

  The vertical extent of PCB-impacted soil at this location appears to be defined by the 5-foot-bgs-depth soil sample collected from boring 1C.

- **inside the Manufacturing/Office Building**, in shallow soil (5 feet bgs and less) at boring 3B, as shown on Figures 10A and 10C in the Additional SSI Completion Report (LFR 2006a)

  The lateral and vertical extent of PCB-impacted soil in this area appears to be defined by soil samples collected from the following borings:

  - northern edge: boring 3BN(10')
  - eastern edge: borings 3BE(10') and 3BE(20')
  - southern edge: borings 3BS(10') and 3BS(20')
  - western edge: boring 3BW(10')

- **inside the Manufacturing/Office Building**, the shallow soil (5 feet bgs and less) at boring 4B, as shown on Figure 10D in the Additional SSI Completion Report (LFR 2006a)

  The lateral and vertical extent of PCB-impacted soil in this area appears to be defined by soil samples collected from the following borings:

  - northern edge: borings 4BN(10'), 4BE(10') and 4BE(20')
  - eastern edge: boring SB-36
  - southern edge: borings 4BS(10') and 4BS(20')
  - western edge: boring 4BW(10')

  The vertical extent of PCB-impacted soil at this location appears to be defined by the 5-foot-bgs-depth sample collected from boring 4B.

- **inside the Manufacturing/Office Building,** in shallow soil (1 foot bgs and less) at boring 4BS(10'), as shown on Figures 10A and 10C in the Additional SSI Completion Report (LFR 2006a)

  The lateral extent of PCB-impacted soil in this area appears to be defined by soil samples collected from borings 4BS(20') and SB-36.

  The vertical extent of PCB-impacted soil at this location appears to be defined by the 0.5 foot-bgs-depth sample collected from boring 4BS(10').

- **on the southern border of the Site**, in shallow soil (5 feet bgs and less) at boring 2C, at a storm-water collection sump as shown on Figure 10E in the Additional SSI Completion Report (LFR 2006a)

  The lateral and vertical extent of PCB-impacted soil in this area appears to be defined by soil samples collected from the following borings:

  - northern edge: boring 2CN(10')
  - eastern edge: boring 2CE(10')

- southern edge: southern border of the Site
- western edge: not defined

The vertical extent of PCB-impacted soil at this location appears to be between 5 feet bgs and 14 feet bgs, because a 10-foot sample was not recovered from this location due to poor soil conditions.

3.2.1.7 Volatile Organic Compounds

The VOCs benzene and MTBE were detected in the central portion of the Site and appeared to be associated with the petroleum hydrocarbons detected in this area (generally benzene and MTBE were detected in soil samples that also contained gasoline). The distribution of benzene is shown on Figures 11A through 11D in the Additional SSI Completion Report (LFR 2006a) and the distribution of MTBE is shown on Figures 12A through 12D in the Additional SSI Completion Report (LFR 2006a).

3.2.2 Volume of Impacted Soil

Soil impacted with one or more COCs were identified at the following on-site areas during site characterization activities:

- around boring 1A
- around boring 1B
- around boring 1BS(10’)
- around boring 1C
- beneath the Warehouse
- south and east of the Warehouse
- along the southern border at and west of boring 2C
- beneath the Manufacturing/Office Building at boring 3B
- beneath the Manufacturing/Office Building at boring 4B
- beneath the Manufacturing/Office Building at boring 4BS(10’)
- beneath the Manufacturing/Office Building at boring 4BS(20’)
- around borings 5A and 5ASE(10’)
- around borings 5C and 5CESE(20’)

The soil volume of the excavations is estimated to be approximately 8,194 in-place cy as discussed in Section 5.2 of this Soil RAW. The locations of these areas and COCs in each area are shown on Figure 4 of this Soil RAW; plan views of areas of impacted soil are shown on Figures 5 through 12; and cross sections through these locations are shown on Figures 13 through 20. Table 2 presents information on the locations of impacted soil, the COCs, and the estimated volume of impacted soil identified on the Site.

3.3 Health Effect of Contaminants

Health effects of COCs identified on the Site are presented in Table 3.

3.4 Targets Potentially Impacted by the Site

The Human Health Screening Risk Assessment conducted as part of the PEA and SSI included preparing a Conceptual Site Model (CSM) that identified the receptors that may come into contact with impacted soil and dust and indicates potential exposure pathways. The CSM was based on the following conditions and assumptions:

- gasoline, diesel, motor oil, various SVOCs/PAHs (benzo(a)pyrene, benzo(a)anthracene, benzo(k)fluoranthene, chrysene, and naphthalene), arsenic, lead, PCBs, and various VOCs (benzene and MTBE) are the compounds of concern at the Site
- residential exposure conditions were assumed, as directed by the DTSC; this is the most sensitive exposure scenario used to characterize properties without land restrictions
- exposure to soils during and following implementation of this Soil RAW considered ingestion, inhalation, and dermal contact pathways from shallow soils at the Site
- during implementation of this Soil RAW, receptors will be site workers and occupants of neighboring properties
- following development of the Site, receptors will be students, faculty, administrative staff, maintenance workers, and janitorial workers

As described in Section 7.0, dust suppression methods will be employed during site work.

3.5 Additional Site Investigation

The extent of PCBs was not fully delineated to the west of the sump (at boring 2C) during the past site investigations. No additional site investigation is planned to further delineate the PCB-impacted soil in this area at this time; however, confirmation soil sampling will be performed during implementation of this Soil RAW to verify that the PCB-impacted soil in this area has been removed.

Additional site investigations to delineate the extent of VOCs and PCBs in groundwater will be performed following implementation of this Soil RAW and the results will be presented in a Supplemental Site Investigation report.

Based on the available data, it appears that petroleum hydrocarbons are leaching from the petroleum hydrocarbon-impacted soil on the Site into the groundwater. LFR anticipates that removal of petroleum hydrocarbon-impacted soil (source removal) and extraction of petroleum hydrocarbon-impacted groundwater (dewatering of the excavation) during implementation of this Soil RAW will result in a reduction of the concentrations of petroleum hydrocarbons in soil and groundwater at the Site.

A total of eight groundwater monitoring wells are located on the Site, including five wells installed during previous investigations and three nested wells installed by LFR during the additional SSI. Each of these wells will be sampled and properly destroyed prior to implementation of this Soil RAW in accordance with the groundwater monitoring well sampling and destruction plan presented in Appendix B of this Soil RAW.

Following development of the Site with a school campus, a minimum of three groundwater monitoring wells will be installed on the Site to document the concentrations of petroleum hydrocarbons in groundwater. DTSC's approval of the locations and screen intervals for the wells will be obtained prior to installation of the wells.

Additional groundwater remedial actions will be proposed in the future if petroleum hydrocarbon concentrations in groundwater are present at unacceptable levels.

4.0 RISK EVALUATION AND PRELIMINARY CLEANUP GOALS

In accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), the following threats must be considered in evaluating the appropriateness of a non-time-critical removal action under 40 Code of Federal Regulations (CFR) Section 300.415(b)(2):

- actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances, pollutants, or contaminants
- actual or potential contamination of drinking water supplies or sensitive ecosystems
- hazardous substances, pollutants, or contaminants in drums, barrels, tanks, or other bulk storage containers that may pose a threat of release
- high levels of hazardous substances, pollutants, or contaminants in soils largely at or near the surface, which may migrate
- weather conditions that may cause hazardous substance, pollutants, or contaminants to migrate or be released
- threat of fire or explosion
- the availability of other appropriate federal or state response mechanisms to respond to the release

- other situations or factors that may pose threats to public health or welfare, or the environment

The first item primarily applies to current conditions at the area of impact. Arsenic in surface and shallow soil poses potential health risks through several exposure pathways, including inadvertent ingestion of soil, dermal contact with soil, and inhalation of airborne particulates.

4.1 Risk Evaluation

A human health risk screen was performed as part of the PEA. The estimated cancer risk and hazard index were revised after additional data were collected at the Site. Only COCs previously identified were considered as target analytes during the additional investigation. The differences between the first and revised cancer estimates were due to higher concentrations and the inclusion of gasoline and diesel. In addition, the revised risk evaluation considered the highest detected concentration from either the previous investigations or the additional SSI.

Both carcinogenic and noncarcinogenic risks were estimated using the methodology presented in the DTSC PEA guidance (DTSC 1999). Per the direction of DTSC toxicologist Dr. Thomas Booze, the Massachusetts Department of Environmental Protection (MDEP) TPH risk evaluation was incorporated into the risk screen following receipt of data from the additional SSI. The MEDP method assesses TPH health risk considering carbon-chain length and aromatic verses aliphatic carbon bonds. MEDP provides percent assumptions or the various carbon fractions for both gasoline and diesel. MEDP does not provide the same information for motor oil. For TPH as motor oil to be included in TPH evaluation, the necessary carbon-chain identification is needed. The appropriate carbon-chain break down was not available, and the motor oil evaluation was not performed.

The purpose of the Human Health Screening Evaluation is to evaluate whether historical activities at the Site have resulted in releases of chemicals that could adversely affect the health of school children and/or adult school staff (including teachers, administrators, janitors, and landscapers) who will be present at the proposed Aspire Charter High School. Consistent with standard risk assessment guidance, a human health risk assessment consists of five major steps:

- Identification of Potentially Exposed Populations and Exposure Pathways
- Chemical Selection and Quantification of Exposure
- Toxicity Assessment
- Risk Characterization
- Uncertainty Analysis

The first step in this screening evaluation is to identify the populations who may be exposed to chemicals detected on site, and describe the complete pathways through which the exposures may occur. The second step is to identify the chemicals to be included in the risk assessment, and quantify the amount of chemical exposure that the populations may incur. The third step involves the selection of the appropriate toxicity values for each of the COPCs. COPCs are compounds that have been identified in on-site soil that could potentially present a human health and/or ecological risk and warrant further evaluation to establish if they are COCs.

The fourth step integrates the exposure components and the toxicity information to calculate the risk and hazard for each chemical included in this assessment. The final step summarizes the basic assumptions and uncertainties of the human health screening evaluation.

4.1.1 Identification of Potentially Exposed Populations and Exposure Pathways

To assess whether the levels of chemicals present at the Site would pose a risk to human populations, it is necessary to identify both the populations that may be present at the Site and the pathways through which the potential exposures may occur. The identification of the potentially exposed populations is traditionally based on the human activities and land use patterns at and around the Site. For screening risk evaluations, the conservative default assumption that is typically used is that the land will be used for residential purposes.

Once the potentially exposed populations are identified, the complete exposure pathways by which the individuals may be exposed to chemicals present in the environmental media must be determined. An exposure pathway is defined as “the course a chemical or pollutant takes from the source to the organism exposed” (U.S. EPA 1988). An exposure route is defined as “the way a chemical or pollutant enters an organism after contact” (U.S. EPA 1988).

A complete exposure pathway for chemicals on a property requires four elements: chemical sources, migration routes (i.e., environmental transport), an exposure point for contact (i.e., soil, air or water; or collectively, “media”), and human exposure routes (i.e. oral, dermal, inhalation). A pathway is not considered to be complete unless all four elements are present. A CSM is used to show the relationship between chemical sources, exposure pathways, and potential receptors for a property. The source-pathway-receptor relationships provide the basis for the quantitative exposure assessment. Only complete source-pathway-receptor relationships are included in this risk assessment.

4.1.1.1 Chemical Sources and Potential Transport Mechanisms

The Site comprises 2.51 acres occupying the area bounded by a residential development to the north, Oakland Fire Department Station Number 2 to the east across 66^{th} Avenue, Fruitvale Business Center to the south, and Northstar International Container Freight and Container Consolidation Services to the west.

The first industrial development of the property was in about 1948 when the currently existing buildings were constructed by PEM, which occupied the Site from 1948 to 2001. Activities at the Site manufacturing specialty magnets, power supplies, and components; and repairing motors, generators, transformers, and magnets. A 2,000-gallon gasoline UST was reportedly installed at the Site in 1975. In addition, a former gasoline shed in the fueling area is thought to have stored vehicle lubricants and oil for vehicle maintenance.

Following the sale of the Site to Mo Dad Properties in 2001, the on-site facilities were operated by Bay Area Powder Coatings, which recently declared bankruptcy. Bay Area Powder Coatings still has equipment, but is not conducting operations, at the Site. There are no details as to the specific processes of Bay Area Powder Coatings. Landeros Iron Works, which subleased from Bay Area Powder Coatings, continues its operations in the outdoor area southwest of the Warehouse. Its operations appear to be primarily welding and metal structure fabrication.

Documented releases of hazardous materials at the Site by PEM include petroleum hydrocarbon compounds (from the former UST) and PCBs (presumably from their manufacture and service of transformers and other electrical equipment).

Based on the historical and current uses of the Site as well as sampling data, petroleum hydrocarbons, SVOCs/PAHs, metals, PCBs, and VOCs are COCs at the Site.

Once chemicals are released into the surface or subsurface soils, the potential secondary release mechanisms include the following:

- volatilization of chemicals in soil and groundwater into ambient or indoor air
- wind erosion of surface soils and atmospheric dispersion of dusts
- migration of constituents from the subsurface soils into the groundwater
- off-site transport of chemicals in soil through surface-water runoff

The mechanisms listed above represent the theoretically complete mechanisms through which chemicals at the Site can be released and be transported from one environmental medium to another. Discussions of each of these transport mechanisms, including those that are considered to be incomplete, are incorporated into the following subsections. The CSM schematic is presented in Appendix J of the Additional SSI Completion Report (LFR 2006a).

4.1.1.2 Potentially Exposed Populations

The Site is the proposed location for the Aspire Charter High School. As such, the populations who will be present on the Site, and who could become exposed to chemicals present in either the soil or groundwater, include future students, teachers, and other school staff and workers. However, in according with the PEA Guidance Manual (DTSC 1999), the screening-level risk evaluation assumes that the Site will be used for residential purposes, and that both children and adults could become exposed to chemicals present at the Site. Because residential populations are assumed to live at the Site for an extended (30–year) period, they will incur greater exposures than children, faculty, staff, and workers who will either attend or work at the high school. Accordingly, a determination that the Site is appropriate and safe for future on-site residential use conservatively assumes that use of the Site for the high school will not adversely affect the health of future students and faculty.

4.1.1.3 Exposure Pathways

The following section identifies the potentially complete exposure pathways through which the on-site residents could be exposed to chemicals detected at the Site. The section also provides the rationale for excluding certain pathways from further consideration. The exposure pathways included in the risk evaluation are identified in the CSM, presented in Appendix J of the Additional SSI Completion Report (LFR 2006a); tables showing the revised health risk calculations are presented in Appendix B of this Soil RAW.

Complete Exposure Pathways

As indicated in the CSM schematic, the complete pathways through which future on-site residents may be exposed to chemicals detected at the Site include the following:

- inhalation of vapors (from soil and groundwater) and particulates (from soil)
- soil ingestion
- dermal absorption from soil

These are the pathways that have been included in the risk assessment. These pathways are consistent with the relevant pathways described in the PEA Guidance Manual (DTSC 1999). A detailed description of each pathway follows.

Inhalation of Vapors and Particulates. The inhalation of vapors from soil and groundwater and particulates from soil are potentially complete exposure pathways at the Site. Metals, petroleum hydrocarbons, SVOCs/PAHs, and VOCs have been detected in the soil. The possible exposure routes for these compounds include inhalation of nonvolatile chemicals that are adsorbed onto soil particles, and the inhalation of petroleum hydrocarbons, some SVOCs/PAHs, and VOCs as vapors from soil.

The inhalation of soil particulates was evaluated considering outdoor exposure only, as the level of soil particles indoors is lower than that of outdoors due to greater surface area for particulate settling provided by indoor environments. Accordingly, conclusions developed for an outdoor exposure to particulates would be considered protective of indoor exposure to particulates.

The inhalation of vapors was evaluated for outdoor air in accordance with the PEA Guidance Manual (DTSC 1999). The inhalation of vapors was also evaluated considering indoor exposure, as concentrations indoors resulting from volatile migration are much higher than those outdoors because vapors emitted from soil and groundwater will be trapped and concentrated in the indoor environment compared to their dispersion and dilution in the outdoor. For human health risk assessment purposes, inhalation of vapors in indoor air was evaluated using soil-vapor data and groundwater data. If chemicals were detected in both soil vapor and groundwater, the data for soil vapor were used in the assessment. If volatile chemicals were detected in groundwater only and not in soil vapor (e.g., naphthalene and 1-methylnaphthalene), the data for groundwater were used in the assessment. If a volatile chemical was detected in soil, but not in either groundwater or soil vapor, it was not evaluated in the indoor air pathway. However, cleanup goals for the Site were developed considering the inhalation pathway to VOCs in both soil vapor and groundwater.

Soil Ingestion. In accordance with the PEA Guidance Manual (DTSC 1999), future on-site residents, both children and adults, could be exposed to chemicals at the Site through the ingestion of soil. Accordingly, soil ingestion represents a complete exposure pathway at the Site, and is included in the risk evaluation.

Dermal Absorption. In accordance with the PEA Guidance Manual (DTSC 1999), future on-site residents, both children and adults, could be exposed to chemicals at the Site through dermal contact with soil, and the subsequent absorption of chemicals present in the soil. Accordingly, dermal contact with soil represents a complete exposure pathway at the Site and is included in the risk evaluation.

Theoretically Complete But Insignificant Pathways

The theoretically complete but insignificant exposure pathways identified in this assessment are represented graphically in the CSM (see Appendix B of this Soil RAW). As indicated on the CSM, the following pathways are considered theoretically complete but insignificant at the Site:

- inhalation and ingestion of surface water
- ingestion of groundwater

Rationales for Theoretically Complete But Insignificant Pathways

The rationales for establishing that these pathways are theoretically complete, but insignificant, are provided below.

Surface Water. The erosion and transport of chemicals in soil to surface water is a theoretically complete but practically insignificant pathway at the Site. The nearest surface-water body downgradient from the Site is Lion Creek, located to the south of the Site. The runoff from the Site is collected by storm drains located on the western side of the Site. Given that runoff from the Site is expected to be minimal, due to the fact that the development of the Site will result in much of the Site being covered by asphalt or buildings, and considering that the runoff from the Site would be further diluted by the combined runoff of the storm-water system, the impact of surface-water runoff on either human health or the environment is believed to be insignificant and is therefore not considered further in the risk assessment.

Groundwater. Groundwater at the Site occurs between approximately 3 and 6 feet bgs (a value of 5 feet bgs was assumed for modeling purposes). Existing wells at the Site are used for monitoring purposes. The RWQCB has maintained the Site's status as an open LUFT case. A number of petroleum hydrocarbon compounds have been detected in samples collected from on-site wells at concentrations that exceed their respective environmental screening levels (ESLs) developed by the RWQCB, and, where applicable, state and federal maximum concentration limits (MCLs) for drinking water. It is our understanding that this groundwater is not currently used for potable purposes; therefore, household uses (e.g., drinking, showering) do not constitute viable exposure pathways.

It is possible that chemicals in the groundwater can volatilize and migrate to areas above the ground surface. However, based on the DTSC's recent Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air (DTSC 2005), this pathway can be evaluated using soil-vapor data. Therefore, inhalation of volatile chemicals emanating from the groundwater is indirectly evaluated in this assessment. It should be noted that two chemicals, naphthalene and 1-methylnapthalene, were detected in groundwater but not in soil vapor. Vapor intrusion into indoor air was evaluated using the groundwater data for these chemicals. Other pathways related to the groundwater at the Site are not believed to be significant, and are therefore not evaluated further.

4.1.1.4 Exposure Assumptions

Intake of a chemical is dependent of various exposure assumptions, including exposure duration, inhalation rate, soil ingestion range, dermal contact rate, body weight, and averaging time. The route-specific exposure assumptions used to estimate exposure to the chemicals detected in the soil at the Site are presented in Table J-9 of the Additional SSI Completion Report (LFR 2006a). As shown, these specific exposure assumptions are used in the calculation of the intake of a chemical. Exposure assumptions used in this risk evaluation correspond directly to those recommended by the DTSC (DTSC 1999) with some modifications as suggested by the DTSC (DTSC 2005a).

4.1.2 Chemical Selection and Estimation of Exposure Concentrations

The purposes of this section are to identify those COPCs to be included in the risk assessment; and to present the method for estimating the exposure concentrations for each of the COPCs.

4.1.2.1 Chemical Selection Criteria

The selection of COPCs to be included in this evaluation was based on a review of the data collected during the recent site investigation. The data review process involved two steps: data evaluation and grouping of chemicals. First, an evaluation of soil, soil-vapor, and groundwater data collected during the investigation was performed. Samples were analyzed for metals, VOCs, SVOCs (including PAHs), and petroleum hydrocarbons. Chemicals were then divided into groups according to similar properties and according to guidelines presented in the PEA Guidance Manual (DTSC 1999).

All chemicals detected during the site investigation were included on the initial list of chemicals to be included in the risk assessment. Consistent with DTSC policy (DTSC 1997), the only chemicals that can be eliminated as COPCs include the following:

- metals that are present at naturally occurring levels
- chemicals established to be laboratory artifacts

The determination as to whether metals are present at naturally occurring levels follows the methodology recommended by the DTSC (DTSC 1997). Specifically, only metals whose maximum detected concentrations are lower than local background levels may be eliminated from this HRA. Consistent with DTSC policy, when few data are available to describe the ambient conditions, the point of comparison for determining whether on-site concentrations are elevated above background is an estimate of the mean background concentration. As recommended by the DTSC, metals can be eliminated from the risk assessment if the maximum detected on-site concentration is lower than the 95% upper confidence limit (UCL) of the arithmetic mean background concentration. All metals detected at the Site were included in the evaluation.

4.1.2.2 Chemicals Included in the Risk Assessment

Soil samples collected during the site investigation were analyzed for a comprehensive suite of chemicals including metals, petroleum hydrocarbons, PCBs, SVOCs/PAHs, VOCs, and dioxins. Groundwater samples collected during the site investigation were analyzed for metals, petroleum hydrocarbons, PCBs, SVOCs/PAHs, and VOCs. Further, a soil-vapor survey was conducted to screen those areas that were thought to have the greatest potential to be impacted by VOCs. The maximum concentrations for each compound are presented in Table J-8 of the Additional SSI Completion Report (LFR 2006a). All data from the site investigation are presented in Tables 1 to 3 of the Additional SSI Completion Report (LFR 2006a). The chemicals included in this assessment are discussed below.

The following paragraphs present a summary of those chemicals included in the risk assessment.

Metals

Table J-8 of the Additional SSI Completion Report (LFR 2006a) presents the maximum concentrations of metals detected at the Site. As indicated in Table J-8, metals detected in soil at the Site included arsenic, barium, chromium, hexavalent chromium, cobalt, copper, lead, nickel, vanadium, and zinc. Barium, chromium, cobalt, nickel, and zinc were detected in groundwater. These metals are included in the quantitative risk assessment. Metals that were not detected at the Site are assigned a value of zero for purposes of this assessment.

Petroleum Hydrocarbons

As indicated in Table J-8 of the Additional SSI Completion Report (LFR 2006a), gasoline- and motor oil-range petroleum hydrocarbons were detected in soil and groundwater samples collected from the Site. In addition, diesel was detected in soil samples collected from the Site. Consistent with the PEA Guidance Manual, individual chemical constituents have been used to evaluate the significance of the petroleum hydrocarbons. As each of these samples where petroleum hydrocarbons were detected was analyzed for SVOCs/PAHs and VOCs, the chemical-specific results for each of these constituents were used in the risk assessment to evaluate the significance of the petroleum hydrocarbons detections.

SVOCs/PAHS

As indicated in Table J-8 of the Additional SSI Completion Report (LFR 2006a), SVOCs and PAHs were detected in soil at the Site. These chemicals included naphthalene, 1-methylnaphthalene, acenaphthene, acenaphthylene, dibenzofuran, carbazole, phenanthrene, fluoroanthene, fluorene, anthracene, pyrene, benzo(a)anthracene, chrysene, benzo(k)fluoroanthene, and benzo(a)pyrene. SVOCs detected in groundwater included naphthalene and 1-methylnaphthalene. These SVOCs/PAHs are included in the risk assessment.

PCBs and Dioxins

Soil samples were analyzed for the presence of PCBs and dioxins. Chemicals detected in soil included Arochlor 1260, 1,2,3,4,6,7,8 HpCDD (heptachlorodibenzodioxin), OCDD (octachlorodibenzodioxin), 2,3,7,8 TCDF (tetrachlorodibenzofuran), 1,2,3,4,6,7,8 HpCDF (heptachlorodibenzofuran), OCDF (octachlorodibenzofuran), 1,2,3,7,8,9 HxCDD (hexachlorodibenzodioxin), and 1,2,3,7,8,9 HxCDF (hexachlorodibenzofuran). These chemicals are included in the risk assessment.

VOCs

As indicated in Table J-8 of the Additional SSI Completion Report (LFR 2006a), soil-vapor samples, soil samples, and groundwater samples were analyzed for the presence of VOCs. Chemicals detected in soil vapor included BTEX, PCE, and MTBE. VOCs detected in groundwater included BTEX and MTBE. VOCs detected in soil samples included BTEX, MTBE, 1,4-dichlorobenzene, chlorobenzene, and isopropylbenzene. In general, the VOCs were detected at the greatest concentrations toward the center of the Site, near MW-4 (south of the Warehouse). VOCs detected during the investigation are included in the risk assessment.

4.1.2.3 Estimation of Representative Exposure Concentrations

The following sections present the methods used to estimate the representative exposure point concentrations (EPCs) of the COPCs in the soil, air, and groundwater to which future on-site residential populations could be exposed. As previously discussed, because vapors from groundwater can be represented by the soil-vapor data, chemical concentrations in groundwater are used in this assessment only if the chemicals were not detected in soil vapor. In this manner, all detected VOCs in groundwater are accounted for in the assessment via the use of either soil-vapor or groundwater data.

Estimation of COPC Concentrations in Soil and Groundwater

The estimation of the exposure point concentration of each COPC in soil was determined using the analytical results. Because this is a screening-level evaluation, the maximum detected concentration has been used to estimate the exposure point concentration, with the exception of arsenic. Additional soil sampling analytical results were available for arsenic. As a result of this additional arsenic site characterization, the 95% UCL of the mean, as determined by the EPA software ProUCL, was used as the arsenic EPC.

Use of the maximum concentration as the exposure point concentration for the other COPCs is extremely conservative, and results in estimates of long term 30-year exposure that are much greater than would actually occur at the Site. In accordance with standard California (DTSC 1992) and U.S. EPA (U.S. EPA 1989) risk assessment guidance, exposures and risks should be based on an estimate of the 95% UCL of the average concentration to which an individual could be exposed over the given exposure period. However, for screening purposes only, and in accordance with the PEA Guidance Manual (DTSC 1999), use of the maximum concentration will provide a baseline for determining whether there are particular areas of the Site that may warrant further evaluation.

The maximum concentrations of each chemical in soil, soil vapor, and groundwater detected across the Site are presented in Table J-8 of the Additional SSI Completion Report (LFR 2006a).

Estimation of Indoor Air Concentrations

The DTSC models “DTSC SG-Screen (Version 2.0)” (DTSC 2005b) and “DTSC GW Screen (Version 3.0)” (DTSC 2005c), were used to estimate indoor air concentrations from the chemical detected in soil vapor. These models are modified versions of the Johnson and Ettinger (1991) model (the “Model”), which estimates chemical concentrations in indoor air from soil vapor and groundwater. The development of the Model is described in detail in the user’s guide (U.S. EPA 1997). The user’s guide presents a sensitivity analysis indicating that the most important factors affecting the average long-term building concentrations are the soil water-filled porosity, source-building separation, soil-building pressure differential, and soil permeability to VOC flux. U.S. EPA-approved conservative default input parameters are used in this risk assessment.

Following guidance provided by the DTSC, only VOCs as defined by the DTSC (DTSC 1999) are modeled. The DTSC defines a VOC as "a chemical with a vapor pressure of 0.001 mm Hg or higher and a Henry's Law constant of 1 x 10^{-5} or higher." In addition, based on this definition, the only PAHs detected in soil vapor and/or groundwater that would be considered "volatile" include naphthalene and 1-methylnaphthalene. Accordingly, indoor air concentrations for these PAHs, in addition to the VOCs, were modeled using the Johnson and Ettinger Model.

Estimation of Outdoor Particulate Concentrations

The estimation of the ambient air concentration of nonvolatile chemicals in soil particulates requires the determination of the quantitative relationship between chemical concentrations in the soil (mg/kg) and the concentration of respirable particulates (PM_{10}) in the air due to fugitive dust emissions. Particulate emissions are due to wind erosion and, therefore, depend on the erodibility of the surface material. For the fugitive dust inhalation pathway, inhalation of chemicals adsorbed to PM_{10} were assessed using the method described in the PEA Guidance Manual (concentration in soil multiplied by 5 x 10^{-8} kg/m^3), which relates the chemical concentration in the soil with the concentration of respirable particles in the air due to fugitive dust emissions from contaminated soils.

Estimation of Outdoor Volatile Concentrations

To estimate outdoor air concentrations, the emission model and box model and input parameters provided by the PEA Guidance Manual (DTSC 1999) are used. The VOC emission model is recommended by U.S. EPA. Emission rates are calculated over the minimum dimensions of a residential lot in California, 5,000 square feet or 484 m^2. The box model is used to provide an estimate of ambient air concentration using the total emission rate calculated by the emission model. Calculations and results for the maximum concentration are provided in Appendix C of the Additional SSI Completion Report (LFR 2006a).

4.1.3 Toxicity Values for COPCs

The toxicity assessment characterizes the relationship between the magnitude of exposure to a chemical and the potential adverse health effects. More specifically, the toxicity assessment identifies or derives toxicity values that can be used to estimate the likelihood that the predicted exposures will result in adverse health effects.

Chemicals are evaluated for their potential health effects in two categories, carcinogenic and noncarcinogenic. This section presents the carcinogenic and noncarcinogenic toxicity values for each of the COPCs. The hierarchy of sources for the toxicity criteria used for this analysis generally corresponds to the hierarchy outlined in the PEA Guidance Manual (DTSC 1999).

4.1.3.1 Chronic Toxicity Assessment for Carcinogenic Effects

Current health risk assessment practice for carcinogens is based on the assumption that there is no threshold dose below which carcinogenic effects do not occur. This approach has generally been adopted by the regulatory agencies as a conservative practice to protect public health, and the "no-threshold" assumption has been used in the agency-derived cancer slope factors (CSFs) used in this risk assessment. Although the magnitude of risk declines with decreasing exposure, the risks are believed to be zero only at zero exposure.

CSFs are used to quantify the response potency of a potential carcinogen. The CSF represents the excess lifetime cancer risk due to a continuous, constant lifetime exposure to a specified level of a carcinogen. CSFs are generally reported as excess incremental cancer risk per milligram of chemical per kilogram of body weight per day $(mg/kg\text{-}day)^{-1}$. In accordance with the PEA Guidance Manual (DTSC 1999), promulgated California CSFs are given priority over U.S. EPA or other values. All CalEPA CSFs are now available on line (DTSC 2005). Table J-10 of the Additional SSI Completion Report (LFR 2006a) presents the CSFs used in this risk assessment.

4.1.3.2 Chronic Toxicity Assessment for Noncarcinogenic Effects

The toxicity assessment for noncarcinogenic effects requires the estimation of an exposure level below which no adverse health effects in humans are expected to occur. U.S. EPA refers to these levels as RfDs for oral exposures and reference concentrations (RfCs) for inhalation exposures (U.S. EPA 1989). When available, U.S. EPA-derived oral RfDs and CalEPA-derived inhalation RfCs are used to evaluate the noncarcinogenic effects of exposure to chemicals via the oral and inhalation routes, respectively. Both RfDs and RfCs are obtained from applicable on-line databases. Table J-11 of the Additional SSI Completion Report (LFR 2006a) presents the RfDs used in this evaluation.

4.1.3.3 Lead

The traditional RfD approach for the evaluation of chemicals is not applied to lead because most human health effects data are based on blood lead concentrations, rather than external dose (DTSC 1992). Blood lead concentration is an integrated measure of internal dose, reflecting total exposure from site-related and background sources. A clear no observed effects level (NOEL) has not been established for such lead-related endpoints as birth weight, gestation period, heme synthesis, and neurobehavioral development in children and fetuses, and blood pressure in middle-aged men. Dose-response curves for these endpoints appear to extend down to 10 micrograms/deciliter (μg/dl) or less (ATSDR 1993). The CalEPA has developed a methodology for evaluating exposure and the potential for adverse health effects resulting from exposure to lead in the environment (DTSC 1992). The methodology presents an algorithm for estimating blood lead concentrations in children and adults based on a multi-pathway exposure analysis.

CalEPA has provided a spreadsheet (LEADSPREAD) based on its guidance for evaluating lead toxicity (DTSC 1993). Consistent with that recommended by the PEA Guidance Manual (DTSC 1999), the updated version spreadsheet model, LEADSPREAD Version 7, has been used in this assessment. As recommended by CalEPA, the spreadsheet is used in this evaluation to estimate the 99th percentile blood lead concentration in future residential populations that would result from multi-pathway exposures to lead, both from the Site and from background sources. As recommended by the DTSC, a predicted total blood-lead concentration of 10 μg/dl is the target concentration of concern. The printout of the LEADSPREAD evaluation for the Site is presented in Appendix J of the Additional SSI Completion Report (LFR 2006a). The estimated blood lead concentration to the most sensitive child receptor is 12.9 μg/dl.

4.1.3.4 Risk Characterization

This section presents the results and conclusions of the health risk evaluation under the assumptions of residential exposure, as designated in the PEA Guidance Manual (DTSC 1999). The risk characterization represents the final step in the risk assessment process. In this step, the results of the exposure and toxicity assessment are integrated into quantitative estimates of potential health risks. Consistent with Cal/EPA and U.S. EPA risk assessment policy, the potential for exposures to produce carcinogenic and noncarcinogenic health effects are characterized separately.

For carcinogens, risk is defined as “the theoretical probability of developing cancer from that chemical upon exposure to that medium” (DTSC 1999). The HI, calculated for both carcinogens and noncarcinogens, is a measure of the potential for the exposures to produce adverse noncarcinogenic health effects, and is expressed as a ratio of the estimated dose to a dose that is believed to produce no adverse health effects. U.S. EPA has established acceptable incremental cancer risk levels to be within the risk range of 1 in 10,000 (1×10^{-4}) and 1 in 1 million (1×10^{-6}); risks greater than 1×10^{-4} are generally considered unacceptable, whereas risks within the range (i.e., risks that fall between 1×10^{-4} and 1×10^{-6}) are typically deemed to be acceptable. However, in accordance with DTSC guidance, calculated risks were compared to the value of one in one million (1×10^{-6}). The chronic noncancer health hazard risks were compared to an acceptable noncancer risk threshold corresponding to an HI of 1.

An estimated cancer risk equal to or below 1×10^{-6} or an HI equal to or below 1 is considered acceptable for the Site.

The recommended screening-level residential intake assumptions (DTSC 1992, 1999) were used to calculate the chronic daily intake (CDI) of each chemical included in the risk assessment. Per DTSC guidance, daily intakes are calculated separately for each relevant route of exposure (i.e., soil ingestion, dermal contact, inhalation of vapors, and inhalation of particulates). The specific equations used to calculate the chronic daily intakes are presented in Table J-12 of the Additional SSI Completion Report (LFR 2006a), and correspond to the equations presented in the PEA Guidance Manual (DTSC 1999). The calculated chronic daily intakes for each chemical and each route of exposure are presented in Tables J-12 and J-13 of the Additional SSI Completion Report (LFR 2006a), for carcinogens and noncarcinogens, respectively. The estimated cancer risks and noncancer hazard indices are discussed below.

Carcinogenic Effects

An estimate of the potential excess incremental cancer risk associated with exposure to a carcinogen (i.e., the incremental probability that an individual will develop cancer over the course of a lifetime) is obtained by multiplying the estimated chronic daily intake of the carcinogen by the chemical-specific CSF for the appropriate exposure route. The estimated excess cancer risks for each chemical and exposure route are then summed to estimate the total excess cancer risk for the exposed individual.

Table J-12 of the Additional SSI Completion Report (LFR 2006a) presents the estimated excess lifetime cancer risk for future on-site residents at the Site. As indicated, the total excess cancer risk posed by the presence of chemicals in soil is 9×10^{-3}. The majority of this total risk is attributable to the presence of arsenic, chromium IV, benzene, PAHs, and PCBs at the Site. The contribution of dioxin risk is insignificant.

Noncarcinogenic Effects

To assess the noncarcinogenic effects of chemicals, the estimated chronic daily intake of a chemical is divided by the oral or inhalation RfDs. The resulting ratio, referred to as the HQ, is an estimate of the likelihood that noncarcinogenic effects will occur as a result of that specific chemical exposure. An HQ less than or equal to 1 indicates that the predicted exposure to that chemical should not result in an adverse noncarcinogenic health effects (U.S. EPA 1989). Consistent with CalEPA risk assessment guidance, the chemical-specific HQs are added together to provide the HI. A total, multichemical, multipathway HI of less than or equal to 1 indicates that potential noncancer health effects are not likely to occur.

Table J-13 of the Additional SSI Completion Report (LFR 2006a) presents the estimated noncancer HIs for future on-site residents, both children and adults. As indicated, the total HI is 128. The majority of the total noncancer hazard is attributable to PCBs. Other chemicals that contribute to the noncancer hazard include arsenic and vanadium.

Health Effects of Lead in Soil

As previously described, the RfD approach, which is used for assessing potential noncarcinogenic effects, is not used to evaluate exposure to lead. Rather, the DTSC has developed specific guidance for evaluating exposure and the potential for adverse health effects resulting from exposure to lead in the environment using a model based on absorbed doses and estimated blood-lead concentrations. The guidance is implemented using a spreadsheet obtained from the DTSC, in which a multipathway algorithm is used for estimating blood-lead concentrations in children and adults.

Appendix J of the Additional SSI Completion Report (LFR 2006a), presents the output from LEADSPREAD. Using the maximum concentration of lead detected in soil (398 mg/kg), the 99^{th} percentile blood lead level associated with exposure to lead from both the Site and background sources in air, food, and drinking water is 12.9 μg/dl for children (the most sensitive receptors), a level that is above the target concentration of 10 μg/dl, which was developed to be protective of children's health (DTSC 1992). Therefore, the 99^{th} percentile blood lead level associated with exposure to lead from both the Site and background sources in air, food, and drinking water is at a level above the target concentration of 10 μg/dl (printout from LEADSPREAD presented in Appendix J of the Additional SSI Completion Report [LFR 2006a]).

4.1.3.5 Uncertainty Analysis

Risk assessments include several uncertainties that warrant discussion. Many of the assumptions used in this risk assessment, regarding the representativeness of the sampling data, human exposures, and chemical toxicity, are conservative, follow agency guidance, and reflect a 95% or greater percentile, rather than a typical or average value (a 50% percentile) for a given parameter. The use of conservative exposure and toxicity assumptions can introduce considerable uncertainty into the risk assessment. By using conservative exposure or toxicity estimates, the assessment can develop significant conservative bias that may result in the calculation of significantly higher cancer risk or noncancer HI than is actually posed by the chemicals present in on-site soils.

Some of the assumptions made in the risk assessment that contribute to the overall uncertainty in the evaluation are briefly outlined below.

Risks presented in this screening-level evaluation are based on the assumption that the resident would be exposed to the maximum detected concentration continuously, for a 30 year exposure period. However, consistent with standard risk assessment guidance (DTSC 1992, U.S. EPA 1989), exposures and risks should be based on an estimate of the average concentration to which an individual could be exposed over the given exposure period. The average concentration is typically used because 1) carcinogenic and chronic noncarcinogenic toxicity criteria are based on lifetime average exposures; and 2) the average concentration is most representative of the concentration that would be contacted over a lifetime (U.S. EPA 1992). Because the maximum concentrations likely significantly overestimate an individual's average exposure, the actual risks posed by the chemicals present at the Site would be expected to be significantly lower than those presented here, and may be lower than the de minimis level of 1×10^{-6}.

Risks presented in this screening-level evaluation are completely driven by the conservative assumption that a house is built directly over the areas of greatest contamination, and that vapors migrate upward from the groundwater and soil, through the soil column, and accumulate in the indoor air environment. It is important to realize that risks associated with the inhalation of vapors that have migrated up from the groundwater and soil and through the soil column and have dispersed in the ambient (outdoor) air can be more than 1,000 times LOWER than those predicted under the assumption used in this evaluation, wherein the house is built directly over the source area. Thus, these risks should not be construed to define risks associated with inhalation of ambient air. In fact, as long as a structure was not built directly over the source area, risks from the inhalation pathway may be considered acceptable.

Cancer risks presented in this screening-level evaluation are based on residential land-use assumptions, under the assumption that a child is born on the Site, resides at the Site for a continuous 30-year period, and is directly exposed to chemicals in soil on a daily basis. However, given the proposed use of the Site as a high school, students would actually only be exposed to chemicals on the Site for a fraction of the total time assumed in this analysis. Further, given that the construction of a school on the Site will likely result in most of the soils at the Site either being paved or covered with landscaping materials or buildings, actual exposures would be significantly less than assumed in this analysis. Accordingly, the required residential land use scenario as the basis for evaluating whether the Site is safe for use as a high school is extremely conservative, and results in estimates of risks and noncancer hazards that are much greater than would actually be incurred were the Site to be used for its intended purpose.

One factor not taken into account is the bioavailability of chemicals in soil. Recent studies have shown that certain organic chemicals, particularly highly lipophilic compounds such as the PAHs, tend to be tightly bound to soil (Kelsey et al. 1997). This phenomenon can substantially lower the bioavailability of chemicals to human expose to soil. A reduction in the bioavailability of the chemicals adsorbed would reduce any health risk associated with exposure to these soils. Low bioavailability could substantially reduce estimated cancer risks below levels calculated using the default assumption that all chemicals are 100% bioavailable.

The CalEPA-recommended Model is based on the assumption that there is convective transport of chemicals into the indoor environment. Convective transport into a building results from temperature differences between indoors and outdoors (the “stack or chimney effect”), and is most significant during the winter heating season. Due to the more moderate climate in California, the stack effect is less significant than in other, colder parts of the country. If this transport pathway were not to occur, the actual long-term exposures that may occur at the Site are likely to be lower than assumed in the development of the indoor air concentrations.

Risk assessments assume that adverse effects observed in animal toxicity experiments would also be observed in humans (animal-to-human extrapolation), and that the toxic effect observed after exposure by one route would occur following exposure by a different route (route-to-route extrapolation).

In order to adjust for uncertainties that arise from the use of animal data, regulatory agencies often base the RfD for noncarcinogenic effects on the most sensitive animal species (i.e., the species that experiences adverse effects at the lowest dose) and adjust the dose via the use of safety or uncertainty factors. The adjustment compensates for the lack of knowledge regarding interspecies extrapolation and possibility that humans are more sensitive than the most sensitive experimental animal species tested. The use of uncertainty factors is considered to be health protective.

Second, when route-specific toxicity data were unavailable, data were derived by route-to-route extrapolation, as described above, and equal absorption rates for both routes were assumed (i.e., oral to inhalation and inhalation to oral).

Finally, for dermal exposure to soil, chemical-specific absorption data generally were not available. Instead, dermal absorption rates, which were based on the default assumptions provided by the DTSC (DTSC 1999), were assumed.

4.2 Preliminary Cleanup Goals

Compounds were selected for cleanup goal development if they were identified in the PEA and SSIs with greater than a one in a million risk or a hazard quotient greater than 1. The following chemicals were selected for PCG development in soil:

• benzene (soil and groundwater)	• benzo(a)pyrene
• benzo(a)anthracene	• benzo(k)fluoranthene
• PCBs	• arsenic
• lead	• chromium VI
• gasoline	• diesel
• motor oil	• chrysene
• naphthalene	

The PCGs for the COCs at the Site are presented in Table 4.

4.2.1 PCG for Arsenic

Arsenic is naturally occurring in soil. The methods used to develop a cleanup goal for arsenic differ than the methods for the other COCs. Background concentrations are calculated using the probability plot method with the on-site analytical data. The method is described below.

Log-transformed data (arsenic concentrations) are plotted against probability distribution that is expressed as standard deviation from the mean distribution. The probability of each data point is based on the rank order of the data and assumes the data is log-normally distributed. Best-fit lines are drawn, based on the scatter plot. Each discernible line represents a distinct population. The lower concentration population is assumed to represent background, and the early line slope change is assumed to represent the separation between background concentration and an anthropogenic concentration. If the background concentrations included all the data and fit a lognormal distribution, this line would plot as a straight line with no inflection point. Therefore, the inflection point indicates a change in the distribution of the data.

This analysis is similar to the analysis performed at Lawrence Berkeley National Laboratory to evaluate the maximum background concentrations of metals in soil samples (LBNL 1995). Based on the probability plot method, background arsenic at the Site was estimated to be 7 mg/kg.

The arsenic probability plot is included in Appendix B of this Soil RAW.

4.2.2 PCG for Lead

Lead is evaluated by estimating blood lead levels of the receptors with biokinetic models. CalEPA uses the LEADSPREAD model for this purpose. Based on the LEADSPREAD modeling results under a school exposure scenario, 255 mg/kg has been established as the state guideline for lead in soil. Therefore, 255 mg/kg has been selected as the PCG for lead in soil at the Site.

4.2.3 PCGs for Chromium VI

Only five soil samples collected from the Site during the PEA and Initial SSI were analyzed for Cr+6, therefore, a sufficient data set was not available to evaluate the background level of Cr+6. Analysis of the soil samples revealed Cr+6 at the following concentrations: 2A-0.5: 3.02 mg/kg; 2A2N(20')0.5: 3.0 mg/kg; 2B-3S(0.5)0.5: 1.14 mg/kg; 3C-0.5: 1.77 mg/kg; and 5A-0.5:<0.5 mg/kg. Based on the site history and the data collected from the Site, Cr+6 does not appear to be an issue. LFR proposes to use the residential ESL of 17 mg/kg (direct exposure screening level for residential land use assuming carcinogenic affect, Table K-1) as a cleanup goal for the Site.

4.2.4 PCGs for Remaining COCs

The approach and methods used to develop the clean-up goals at the Site were derived from guidelines and parameters developed by the U.S. EPA in "Risk Assessment Guidance for Superfund, Human Health Evaluation Manual, Part A, Interim Final," dated December 29, 1989 (U.S. EPA 1989), "Supplemental Guidance for Human

Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities Manual," dated July 1996 (DTSC 1996).

The risk based clean-up goal development emphasized health protection by incorporating conservative assumptions used in the risk based calculations. The standard human health risk assessment equations were algebraically transformed to solve for a concentration given a target risk of 1 x 10^{-6}. The following assumptions were used in clean-up goal development:

- Per DTSC request, the PCG were developed for unrestricted future land use. The goals considered both a child and adult residential receptor models using standard DTSC default exposure assumptions.
- Chemical concentrations will remain constant throughout the exposure duration (up to 30 years). Environmental processes such as biodegradation, and, adsorption, which reduce concentrations over time were not considered.
- Toxicity criteria used to estimate potential human health risks are often derived from animal studies, which are usually very conservative to account for the uncertainties of inter- and intra-species differences, and the extrapolation of exposure dose and duration from animals to humans.

The site-specific PCGs based on protection of the both the adult and child receptor are presented in Table 4 of this Soil RAW. The calculations are presented in Appendix B of this Soil RAW.

4.2.5 PCGs of VOCs in Groundwater

Domestic water at the Site will be municipally supplied, eliminating direct contact between humans and on-site groundwater. However, VOCs in groundwater could volatilize, and migrate upward through the soil column and into structures. To evaluate the vapor intrusion pathway, VOCs in groundwater were modeled to estimate indoor air concentrations. The Model was used to evaluate indoor air, and the results were presented in the PEA report (CSS 2005b). Benzene was the only COC in groundwater with an identified vapor-intrusion concern. The proposed cleanup goal for benzene in groundwater is 20 μg/l.

4.3 Environmental Screening Risk Evaluation

A detailed ecological screening evaluation was not performed during the PEA because the Site is located within a highly developed urban setting. Natural wildlife habitat areas were not noted on the Site during the PEA.

The Site is located at an elevation of approximately 15 feet msl and the surface topography in the site vicinity slopes gradually toward the south-southwest. The nearest body of surface water is Lion Creek, located approximately 250 feet south of the Site. San Leandro Bay, connected to San Francisco Bay, is located approximately 4,500 feet southwest of the Site. The compounds detected in the Site's soil and groundwater would not be likely to affect ecological resources in Lion Creek or San Francisco Bay due to the relatively flat gradient of groundwater beneath the Site and site vicinity, the distances from the Site to these surface-water bodies, and natural attenuation that is expected to occur for the petroleum hydrocarbons detected in soil and groundwater.

Based on the available information, there does not appear to be a significant pathway of exposure to nonhuman, sensitive ecological species.

4.4 Endangerment Determination

The results of the risk assessment performed for the Site indicate that soil and groundwater poses a potential threat to human health under the residential exposure scenario. Inhalation of VOCs present at the Site is included as a complete exposure pathway for the risk evaluation. The nearest sensitive receptors are residents of the homes located adjacent to the north of the Site. Additional receptors at risk in the area include workers at nearby facilities and future hypothetical students.

There have been no documented instances of human exposure to the COCs detected at the Site. However, disturbance of the COC-impacted soil and groundwater may result in direct routes of exposure including ingestion of soil, dermal contact with soil, and inhalation of airborne soil particles and VOCs.

5.0 ENGINEERING EVALUATION/COST ANALYSIS

The EE/CA described in this section is based on the "Guidance on Conducting Non-Time-Critical Removal Under CERCLA" (U.S. EPA 1993).

RAOs are specific goals for protecting human health and the environment. The NCP, 40 CFR Section 300, specifies that RAOs must be developed that address the following site-specific elements:

- compounds of concern
- media of concern
- receptors of concern
- complete or potentially complete exposure pathways

RAOs are developed by evaluating the results of the site characterizations, risk assessment results, and ARARs. RAOs describe the remedial actions needed to protect human health, environmental quality, or both. They are generally narrative statements; however, they can also include specific, quantitative concentrations of chemicals to be achieved.

For the Site, the COCs are gasoline, diesel, motor oil, various SVOCs/PAHs (benzo(a)pyrene, benzo(a)anthracene, benzo(k)fluoranthene, chrysene, and naphthalene), arsenic, lead, PCBs, and various VOCs (benzene and MTBE) in soil.

Under existing conditions, site workers are the receptors of greatest concern. Currently, no more than four workers are present on the Site for up to 8 hours Monday through Friday. Aspire plans to develop the Site as a high school and under this land use school children and adult school staff (including teachers, administrators, janitors, and landscapers) would be of concern. The DTSC considers this a sensitive land use and makes risk management decisions for a school site assuming a residential land use. Consequently, for this EE/CA, residential adults and children have been assumed to be the future receptors of concern.

The exposure pathways of concern for receptors (including student and school staff) are:

- incidental soil ingestion
- dermal (soil-to-skin) contact
- inhalation of airborne particulates

The RAOs for this project are:

- eliminate or minimize potential residential human contact with the COCs resulting from direct contact and wind erosion
- minimize or eliminate the need for future maintenance of a remediation system (e.g., a cap) due to the arsenic being present in the soil
- obtain unrestricted future land use designation

5.1 Removal Action Scope

The goal of a removal action is to abate, prevent, minimize, stabilize, mitigate, or eliminate the release or potential release of a hazardous substance that may result in a threat to the public and/or environment. The overall remedial action goal for the Site is to obtain an unrestricted future land-use designation by preventing human exposure to soil containing COCs at concentrations presenting unacceptable human health risks and hazards. Remediation of impacted soil is expected to remove the source for COCs detected in groundwater and thereby reduce the concentrations of COCs in groundwater to levels acceptable to the DTSC.

5.2 Evaluation of Removal Action Alternatives

In this section, remedial action alternatives are identified, individually analyzed, and comparatively evaluated to provide a basis for the selection of a preferred alternative. Table 5a summarizes each of the alternatives and presents the results of the comparative evaluation. Section 7.0 describes the implementation of the preferred alternative.

This section presents remedial alternatives and a detailed analysis of each alternative to address the presence of gasoline, diesel, motor oil, various SVOCs/PAHs (benzo(a)pyrene, benzo(a)anthracene, and benzo(k)fluoranthene), arsenic, lead, PCBs, and various VOCs (benzene and MTBE) in soil.

The detailed analysis was conducted to provide sufficient information to compare the alternatives, select an appropriate removal action for the Site, and demonstrate to the satisfaction of the DTSC and other concerned parties that the recommended action does not pose unacceptable health hazards following implementation. The extent to which actions are assessed during the detailed analysis is influenced by the available data.

The following remedial alternatives were considered for the Site:

Alternative 1: No Further Action (NFA)

Alternative 2: Capping and Deed Restriction ("Capping")

Alternative 3: Excavation and Off-Site Disposal of Impacted Soil ("Removal")

Alternative 1: No Further Action

Under this option, the Site would be left in its existing condition. Consequently, there would be no reduction in the volume of impacted soil. Although readily implementable and inexpensive, this alternative would not be effective in meeting the remedial goals for the Site.

Alternative 2: Capping and Deed Restriction

Under this option, a low-permeability surface cap (e.g., clay and/or asphalt) would be placed over impacted soil at the Site. The cap would reduce the potential for human exposure to and leaching of contaminants from impacted soil. To ensure that the potential for future exposure to contaminants is minimized, the cap would require periodic maintenance. Because impacted soil would not be removed from the Site under this alternative, a deed restriction would be required to restrict future use of the Site. The land use covenant would be recorded with the Alameda County Assessor's Office before the DTSC grants approval of the completion of the final removal action.

Prior to placement of the cap, the area would be graded or filled to provide proper drainage and topography. It is anticipated that a 2% grade would be used. Following grading, a 6-inch layer of base rock would be placed across the area. A 2-inch layer of asphalt would be placed over the base rock to form the cap.

This alternative provides for 30 years of site maintenance to ensure the continuous integrity of the cap. Site maintenance would consist of an annual inspection of the cover, maintenance of the drainage structures, and biannual resurfacing of the cap.

Institutional controls would be needed under this alternative to protect the cap. The institutional controls are likely to preclude reuse of the Site as a residence, day care center for children, long-term care hospital, or public or private school for persons less than 21 years of age.

The areas that would require capping are the western portion of the Site (all of the area west of the Manufacturing/Office Building), two areas beneath the Manufacturing/Office Building (at boring 3B and borings 4B and 4BS[20']), and two areas on the eastern end of the Site (at borings 5A/5ASE(10') and at borings 5C/5CESE[20']). Capital expenditure for this alternative, based on a calculated area of approximately 44,000 square feet, is estimated to be approximately $600,000 for initial construction, $375,000 for replacement in 30 years, and $12,000 for annual maintenance and reporting.

Although the capping technology is readily implementable and could be completed in a matter of weeks, the alternative would require an ongoing maintenance and monitoring program. Maintenance and reporting costs (including submission of five-year reviews) are estimated to be $12,000 per year. Additionally, the cap would require complete replacement at a cost of approximately $375,000 every 30 years.

Capping combined with institutional controls would be an effective method to reduce contaminant exposure, but would not meet Aspire's goal of obtaining an unrestricted land-use designation for the Site. Furthermore, the necessary maintenance activities and reporting requirements would represent an ongoing operations and maintenance cost for Aspire.

Alternative 3: Excavation and Off-Site Disposal of Impacted Soil

This alternative would involve excavation of impacted soil identified on the Site with COC concentrations above the PCGs using conventional earthmoving equipment (e.g., backhoes, excavators, articulated loaders, dump trucks, water trucks).

The initial steps for implementing this alternative would be identifying underground utilities on the Site, destroying the existing groundwater monitoring wells, abating asbestos-containing materials and lead-based paints in the on-site structures, followed by demolishing the on-site buildings, removal of pavement and concrete slabs, and clearing and grubbing of the area to remove vegetation. The vegetation would be managed as green waste and would be stockpiled on a portion of the Site outside the work area. The green waste would be managed with other green waste generated during construction of the school campus.

Earthmoving equipment would then be used to excavate the impacted soil, which would be either temporarily stockpiled on site or directly loaded into dump trucks for off-site disposal pending determination of an appropriate disposal facility.

The apparent boundaries of impacted soil are shown on Figure 4. LFR assumes that the excavations will not extend beyond these boundaries. The dimensions of these areas are based on data collected during the PEA and SSIs (also see Table 2).

A water truck would be used to keep the excavation and surrounding area moist to minimize dust emissions. Monitoring equipment would be used to measure dust emissions and additional watering or other dust suppression methods would be conducted if airborne levels exceed action levels. Loaded dump trucks would be checked for mud and dirt and cleaned, if necessary, prior to leaving the Site. The loaded trucks would be covered with a tarp to minimize wind erosion of the soil during transport. Prior to disposal, waste characterization samples would be collected and analyzed to establish an appropriate landfill for disposal.

Confirmation samples will be collected from each sidewall and from the floor of the excavations. The proposed sampling strategy for this alternative would be to collect one sample for every 25 linear feet along each sidewall, and approximately one confirmation sample from the floor of each excavation for every 625 square feet. Confirmation samples will also be collected from various locations as requested by DTSC and noted below. The sidewall samples may be collected from varying depths along the sidewalls or at depths where COCs were detected in the past at concentrations above the PCG.

During implementation of this Soil RAW, LFR will discuss use of existing soil analytical data for confirmation purposes with DTSC. In addition, LFR will discuss omitting collection of floor confirmation samples in those areas where saturated soils are present in the excavations with DTSC.

Based on the proposed sampling strategy for confirmation samples, LFR assumes that the following number of sidewall and floor confirmation samples will be collected (as noted above some samples may not be collected from these areas based on existing analytical data and site conditions during implementation of this Soil RAW; confirmation sampling locations will be discussed with and approved by DTSC):

- **Around boring 1A:** Four sidewall samples and one floor sample analyzed for PCBs using EPA Method 8082A
- **Around boring 1B:** Three sidewall samples and one floor sample analyzed for PCBs using EPA Method 8082A
- **Around boring 1BS(10'):** Three sidewall samples and one floor sample analyzed for arsenic using EPA Method 6010B
- **Around boring 1C:** Four sidewall samples and one floor sample analyzed for PCBs using EPA Method 8082A and arsenic using EPA Method 6010B

- **Beneath the Warehouse**: Eight sidewall samples (along northern sidewall and western sidewall, including the area west of borings 2AW(40'), 2AW(50'), 2ANW(50'), and SB-5) and six floor samples analyzed for arsenic using EPA Method 6010B
- **Beneath and south of the Warehouse:** Eight sidewall samples (along western sidewall and eastern sidewall) and 12 floor samples analyzed for gasoline and motor oil using EPA Method 8015 Modified, BTEX and MTBE using EPA Method 8260 (collected using EPA Method 5035), and arsenic using EPA Method 6010B
- **South and east of the Warehouse:** Twelve sidewall samples (two sidewall samples on the southwestern sidewall to the west of borings 2CN(20') and SB-22, six sidewall samples along southeastern and eastern sidewalls, and four sidewall samples along northern sidewall) and 16 floor samples analyzed for motor oil using EPA Method 8015 Modified, BTEX and MTBE using EPA Method 8260 (collected using EPA Method 5035), arsenic using EPA Method 6010B, and SVOCs/PAHs using EPA Method 8270C
- **Along southern border at and west of boring 2C:** Nine sidewall samples and three floor samples analyzed for PCBs using EPA Method 8082A
- **Beneath the Manufacturing/Office Building at boring 3B:** Four sidewall samples and one floor sample analyzed for PCBs using EPA Method 8082A
- **Beneath the Manufacturing/Office Building at boring 4B:** Four sidewall samples and one floor sample analyzed for PCBs using EPA Method 8082A and PCE using EPA Method 8260 (PCE was detected in the soil gas sample collected from boring 4B during the PEA but has not been detected in soil samples – PCE analysis of confirmation soil samples from this area will be performed to confirm that PCE is not present in soil at this location)
- **Beneath the Manufacturing/Office Building at boring 4BS(10'):** Three sidewall samples and one floor sample analyzed for PCBs using EPA Method 8082A
- **Beneath the Manufacturing/Office Building at boring 4BS(20'):** Four sidewall samples and one floor sample analyzed for gasoline, diesel, and motor oil using EPA Method 8015 Modified
- **Around borings 5A and 5ASE(10'):** Four sidewall samples and one floor sample analyzed for lead using EPA Method 6010B
- **Around borings 5C and 5CESE(20'):** Six sidewall samples and one floor sample analyzed for lead using EPA Method 6010B, diesel and motor oil using EPA Method 8015 Modified, and SVOCs/PAHs using EPA Method 8270C

The excavations at borings 1B and 1BS(10') will merge; therefore, a fourth sidewall sample will not be collected from either of these excavations. The excavations at borings 4BS(10') and 4BS(20') will merge; therefore, a fourth sidewall sample will not be collected on the eastern wall of the excavation at 4BS(10'). Likewise, LFR anticipates that removal of impacted soil in the central portion of the Site will result in one large excavation. Therefore, sidewall samples will not be collected along the eastern wall of the Warehouse for arsenic, motor oil, SVOCs/PAHs, BTEX, or MTBE analyses. Sidewall samples will be collected along the eastern wall of the gasoline/motor oil/BTEX/MTBE/arsenic-impacted area [i.e., east of boring SB-11, east of nested well NW-2, east of boring 2BS(10'), and south of boring SB-24].

As requested by the DTSC, targeted confirmation soil samples will be collected at the following locations due to identified data gaps:

- Gasoline and VOCs (BTEX and MTBE) in the following areas:
    - Around and below boring 2B2N(20'), including to the northeast, east, and southeast of this boring at depths of 10 feet and 15 feet bgs
    - Below boring SB-10 (from a depth of 25 feet bgs) and boring SB-11 (from a depth of 20 feet bgs)
    - Around and below boring SB-3, including to the northwest, west, and southwest of this boring from a depth of 15 feet bgs
- Motor oil and diesel in the following areas:
    - Diesel below boring 4BS, starting at a depth of 20 feet bgs; soil samples from this area will be analyzed for PAHs in addition to diesel
    - Motor oil below and around borings SB-43 and SB-44, including to the southwest, south, southeast, and east of these borings
- SVOCs/PAHs around boring 2B2S(20'), including to the northeast, east, and southeast of this boring
- Lead west of boring 5A at the surface
- PCBs in the following areas:
    - West of boring 1C, east of boring 1B, and north and east of boring SB-50
    - Below 5 feet bgs at borings 2C and 2CW(10') and below 10 feet bgs at boring SB-50
    - Below and around borings 6B and 6C
    - Below and around boring SB-44, including to the west, north and east and at a depth of more than 5 feet bgs
- VOCs (BTEX and MTBE) in the following areas (step-outs may be required):
    - Below 10 feet bgs at and around borings 2B, 2BN(20'), 2BW(20'), and 2B2N(20')
    - Below 15 feet bgs at and around borings 2BN(37'), SB-6, SB-7, SB-11, SB-17, SB-24, and 2B3
    - Below 20 feet bgs at borings SB-9 and SB-10

Additional soil will be removed, if necessary, until confirmation sample results indicate that residual concentrations of COCs are less than the PCGs.

Confirmation samples will be collected in 2-inch-diameter brass or stainless steel liners, Encore samplers, or glass jars, as appropriate, using hand-sampling equipment or hand-pressure at the excavation sidewalls and floors or in excavations deeper than 4 feet, a backhoe will be used to remove soil from the excavation sidewalls and floors and collect the soil samples directly from the backhoe bucket.

The samples will be placed in an ice-chilled cooler, for transport to a California state-certified laboratory for analysis under standard chain-of-custody protocol. The samples will be analyzed on a 24-hour rush turnaround schedule, as necessary, to minimize excavation downtime.

Under this option, the volume, toxicity, and mobility of contaminants at the Site would be considerably reduced. Additionally, Aspire's goal of obtaining unrestricted land use would be met.

The soil volume of the excavations is estimated to be approximately 8,194 in-place cy. This volume estimate is based on the following assumptions:

- PCB-impacted soil around boring 1A:
  15 feet length X 15 feet width X 6 feet depth = 50 cy
- PCB-impacted soil around boring 1B:
  15 feet length X 15 feet width X 4 feet depth = 34 cy
- arsenic-impacted soil around boring 1BS(10'):
  15 feet length X 15 feet width X 4 feet depth = 34 cy
- PCB- and arsenic-impacted soil around boring 1C:
  15 feet length X 15 feet width X 4 feet depth = 34 cy
- arsenic-impacted soil beneath the Warehouse:
  (105 feet length X 60 feet width X 4 feet depth) + (1/2[35 feet base X 60 feet height] X 4 feet depth) = 1,100 cy
- gasoline-, motor oil-, BTEX- and MTBE-impacted soil beneath Warehouse and south of the Warehouse:
  (102 feet length X 30 feet width X 13 feet depth) + (90 feet length X 55 feet width X 16 feet depth) = 4,410 cy
- motor oil-, SVOC/PAH-, arsenic-, BTEX- and MTBE-impacted soil south and east of the Warehouse:
  (75 feet length X 45 feet width X 5 feet depth) + (1/2[75 feet base X 105 feet height] X 5 feet depth) + (40 feet length X 30 feet width X 5 feet depth) = 1,580 cy
- PCB-impacted soil along the southern border at and west of boring 2C:
  (90 feet length X 18 feet width X 6 feet depth) + (42 feet length X 8 feet width X 4 feet depth) = 410 cy

Note: It is anticipated that the eastern end of the excavation will be approximately 15 feet east of boring 2CE(10') and that the excavation will extend 90 feet along the Site's southern border to a depth of 6 feet; the excavation will be deepened an additional 4 feet (total depth of approximately 10 feet) for 42 feet between borings SB-31 and SB-50 for a width of 8 feet from the Site's southern border.

- PCB-impacted soil beneath the Manufacturing/Office Building at boring 3B:
  17 feet length X 15 feet width X 6 feet depth = 57 cy
- PCB-impacted soil beneath the Manufacturing/Office Building at boring 4B:
  20 feet length X 25 feet width X 3 feet depth = 56 cy
- PCB-impacted soil beneath the Manufacturing/Office Building at boring 4BS(10'):
  5 feet length X 5 feet width X 1 feet depth = 1 cy
- gasoline-, diesel- and motor oil-impacted soil beneath the Manufacturing/Office Building at boring 4BS(20'):
  25 feet length X 15 feet width X 18 feet depth = 250 cy
- lead-impacted soil around borings 5A and 5ASE(10'):
  20 feet length X 20 feet width X 3 feet depth = 45 cy
- lead-, diesel-, motor oil-, and SVOC/PAHs-impacted soil around borings 5C and 5CESE(20'):
  30 feet length X 17 feet width X 7 feet depth = 133 cy

A probable range of costs for removal and disposal of the impacted soil (Alternative 3) was calculated based on a range of impacted soil quantity present at the Site. The estimated cubic yards (based on current data) to be removed at each location are presented in Table 2. LFR estimates that a total of 8,194 in-place cy of impacted soil will be removed from the Site. This quantity was converted to tons using a 1.3 tons/cy conversion factor for a total of 10,652 tons (Scenario 1 in Table 5b).

For a conservative estimate, the amount of impacted soil at each location was increased by 10 percent (10%). For the conservative estimate, LFR assumed that a total of 9,009 in-place cy of impacted soil will be removed from the Site. This quantity was converted to tons using a 1.7 tons/cy conversion factor for a total of 15,315 tons (Scenario 2 in Table 5b).

For cost estimating purposes, LFR assumes that the impacted soil will be disposed of as follows:

- 70% of the impacted soil will be transported to a Class II disposal facility such as West County or Altamont (acceptance of total VOCs up to 50 mg/kg in soil)
- 20% of the impacted soil will be transported to a Class II disposal facility such as Forward (acceptance of total VOCs up to 100 mg/kg in soil)
- 10% of the impacted soil will be transported to a Class I disposal facility such as Kettleman Hills or Buttonwillow (assuming some PCB-impacted soil will be

disposed of as Toxic Substances Control Act [TSCA] hazardous waste with concentrations greater than 50 mg/kg)

Based on the concentrations of COCs detected in soil samples collected from the Site to date, the excavated soils can be disposed of at one or more of the California landfills identified in this Soil RAW. Characterization of the waste will be performed prior to loading of the trucks to allow selection of the appropriate disposal facility and proper dispatch of the trucks. Acceptance criteria at each landfill will be met.

Table 5b presents the range of estimated costs for implementation of the preferred remedial alternative. The following assumptions were used by LFR for estimating cost to implement this alternative:

- Destruction of Monitoring and Nested Groundwater Wells
  (assumes 8 wells on the Site)
- Shoring cost including design and installation
  (assumes shoring only needed along southern border at boring 2C)
- Excavation cost - $5/ton
- Transport and Disposal
  (assuming 10% at $40/ton to Altamont;20% at $60/ton to Forward; and 70% at $85/ton to Kettleman Hills or Buttonwillow)
- Backfill Material - $15/ton
- Backfill Material Compaction- $13/ton
- Consultant Oversight
  (assumes $2,315/day for field staff and equipment for 45 days)
- Waste Characterization Sample Analyses
- Dewatering of Excavation
  (assumes $18,000 for equipment including storage tanks and pumps, $220 for permit fee, $1,000 permit application preparation, trucking fee of $0.05/gallon, tipping of $0.03/gallon, for 200,000 gallons and characterization analyses of $3,000)
- Fencing and Miscellaneous Materials
- Confirmation Sample Analyses
- Air Monitoring and Sample Analyses
- Consultant Project Management
- Remedial Action Completion Report
- Installation of Vapor Barrier Beneath School Buildings

Based on the estimated soil volume and assumptions noted above, it is anticipated that cost for implementation of this remedial alternative would range from approximately

$1,520,813 to $1,931,179 to implement (see Table 5b). LFR anticipates that completion of this alternative would require approximately 30 to 45 working days. Once the removal action has been completed and regulatory approval has been received, Aspire would begin construction of the school campus.

No maintenance or ongoing reporting costs related to this Soil RAW are anticipated. However, Aspire anticipates that construction of the school campus will include placement of a vapor barrier (e.g., a spray-on membrane such as Liquid Boot™ or an 80-mil liner) beneath the school buildings and inclusion of an air ventilation system with sampling ports in the design and construction of the school buildings. Ongoing monitoring of groundwater is anticipated as part of the future work at the Site.

Inclusion of an impermeable membrane (vapor barrier) beneath the building slab is a common practice in the design of buildings constructed on properties where intrusion of soil vapor into occupied spaces could occur. A soil vapor mitigation system frequently includes a vent system consisting of a series of perforated pipes placed in trenches beneath the membrane that are backfilled with permeable materials. A permeable layer beneath the membrane facilitates the migration of gases to the nearest vent pipe. Sub-membrane vents are connected to vent risers that extend above structure rooflines. This vent system provides a “path of least resistance” that allows soil vapors to be safely vented to the atmosphere, where applicable, or to a treatment phase for Air Quality Management District-regulated compounds.

Materials used for impermeable membranes generally fall into two categories; manufactured membrane materials (such as HDPE) and spray-applied membranes (such as Liquid Boot™). Membrane selection is based on compatibility of the material with the constituents of the soil gas, local regulatory requirements, and economic factors related to the size of the building, the complexity of building footings, and the number of membrane penetrations that will be required.

Regardless of the material selected for use as impermeable membranes, gas mitigation systems will require that any utility piping or conduits entering the building from below grade that penetrate the membrane be fitted with sealing ‘boots’ to maintain the integrity of the membrane. Utility pipes and conduits within the building footprint are placed above the membrane to minimize penetrations where possible. “Dry” utility conduits (electricity, phone, cable TV) are also fitted with conduit seals to prevent gases from entering the structure through those conduits.

Exterior sub-surface gas monitoring wells and/or interior gas monitoring methods may be used to verify that interior air meets all health and safety requirements. Gas mitigation systems generally include a contingency plan to be implemented if gases are detected at specified concentrations in specified locations. Based on the results of periodic monitoring or real-time gas monitoring, contingency plans may include requirements for further monitoring or investigation, and they may also require modification of the existing system in certain circumstances. As an example, passive vent systems may be converted to active systems with the addition of external explosion proof blowers and associated controls, should this be required to protect occupied spaces.

While these methods are commonplace when dealing with methane gas, other compounds may require additional mitigation measures based on chemical composition and concentration, material compatibility, the intended use of the structure, and regulatory requirements. LFR will work with the architect and structural engineer for Aspire to design an effective barrier for this Site.

Evaluation Criteria

The criteria of effectiveness, implementability, and estimated cost are used below to comparatively evaluate the alternatives and provide a basis for the selection of a preferred option as required by the "Guidance on Conducting Non-Time Critical Removals under CERCLA" (U.S. EPA 1993).

Table 5a summarizes the results of the analysis.

Effectiveness. Effectiveness is the primary criterion that a removal action must meet. The effectiveness of an alternative depends on its ability to (1) protect human health and the environment, (2) comply with ARARs, and (3) fulfill PCGs. A removal action is considered protective if it adequately eliminates, reduces, or controls current and potential risks posed through each exposure pathway at the Site.

To fully assess an alternative's efficacy, both short- and long-term protection of human health and the environment should be considered. This is done by analyzing the alternative's ability to eliminate, reduce, or control exposures to COCs. Particular factors to consider include the following:

- **Overall Protection of Human Health and the Environment.** Each alternative should be evaluated on whether or not it protects the environmental, community, and worker health during implementation and how risk posed through each exposure pathway is eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.
- **Compliance with ARARs.** Each alternative should be evaluated on whether or not it meets appropriate federal, state, and local environmental laws, regulations, and guidelines.
- **Short-Term Effectiveness.** Each alternative should be evaluated on whether or not it can be completed within the project's time frame, and what, if any, adverse impacts on human health and the environmental may be posed during the construction and implementation period until the PCGs are achieved.
- **Long-Term Effectiveness.** Each alternative should be evaluated on whether or not it can continue to offer reliable protection of human health and environment over time after PCGs have been met.

- **Reduction of Toxicity, Mobility, and Volume through Treatment.** Each alternative should be evaluated on whether or not it can reduce the toxicity, mobility, and volume of COCs present at the Site.
- **Protection of Workers.** Each alternative should be evaluated on whether or not it protects the site workers and the effectiveness and reliability of protective measures.
- **Environmental Impacts.** Each alternative should be evaluated on whether or not its implementation would adversely affect the environment as well as the reliability of mitigation measures in preventing or reducing the potential impacts.
- **Time Until Response Objectives are Achieved.** Each alternative should be evaluated on the length of time needed for implementation to achieve protection for the Site or for individual elements or threats associated with the Site.

Based on the above definition, various options have been evaluated (see Table 5a). Alternative 1 (NFA) would not be effective. Alternative 2 (capping) would be effective in protecting human health and the environment and complying with ARARs, but would not be effective in meeting Aspire's goal of obtaining unrestricted land use for the Site. The removal option (Alternative 3) would be the most effective of those evaluated in terms of cost and time effectiveness.

Implementability. Implementability addresses the technical and administrative feasibility of executing an alternative and the availability of various services and materials required for its execution. The following factors should be evaluated:

- **Technical Feasibility,** including the ease of construction and operation of the alternative; the adaptation of the alternative to the environmental conditions at the Site; the reliability (maturity) of the technologies composing the alternative; prior use under similar conditions for similar wastes; the ease of undertaking additional removal action, if needed; and the ability to monitor the effectiveness of the remedy
- **Administrative Feasibility,** such as obtaining operating permits/approvals; the ease of implementation of institutional controls; and coordination needed with other agencies for implementation of each alternative
- **Availability of Services and Materials,** including the availability of personnel and technology; off-site treatment, storage, and disposal capacity and services; and availability of necessary services, equipment, materials, and specialists to implement an alternative within the time frame of the removal schedule
- **State and Community Acceptance,** including acceptability of the alternatives by the applicable regulatory agencies based on their review of the available information and evaluating/addressing community concerns (e.g., does community prefer one alternative over another and are community concerns addressed by the alternative)

The evaluated alternatives are readily implementable with regard to technical, administrative, and availability considerations as noted in Table 5a. However, Alternative 1 (NFA) and, perhaps to a lesser degree, Alternative 2 (capping) are not readily implementable because of anticipated difficulties obtaining state and community acceptance. Overall, Alternative 3 (removal) would be the most implementable of the options evaluated.

Cost. Removal action alternatives should be comparatively evaluated based on cost estimates, including total cost and capital costs, that reduce risk in the most cost-effective manner and achieve the RAOs. In accordance with U.S. EPA guidance, the cost estimates have an accuracy of –30% to +50%. The accuracy of each cost estimate depends on the assumptions made and the availability of costing information.

The total cost is presented as the 30-year present worth and evaluates the direct capital cost, indirect capital cost, and operations and maintenance expenses. Capital costs consist of direct and indirect expenditures, which are typically derived from literature sources and vendor quotes. Direct costs include expenses incurred for construction, equipment, materials, buildings, services, treatment, and operational costs, while indirect costs include nonconstruction and overhead costs including engineering and design expenses, construction supervision, legal fees, license fees, permit costs, start-up expenses, and other services that are not part of the actual alternative but are required to complete and/or maintain it.

Estimated costs for the proposed alternatives are presented in Tables 5a and 5b. No capital or indirect costs would be associated with Alternative 1 (NFA). Direct costs for Alternative 2 (capping) would be about $600,000 and annual costs associated with annual maintenance and reporting would be roughly $12,000. Additionally, about $375,000 would be needed every 30 years for cap replacement. Indirect costs for Alternative 2 would increase the initial cost for capping to about $650,000 (total cost) and the cost for replacement every 30 years to about $400,000 (total cost). Alternative 3 (removal) has an estimated direct cost of $1,520,813 to $1,931,179; no maintenance or ongoing reporting costs are anticipated.

5.3 Description of Selected Remedy

Based on effectiveness, implementability, and cost, Alternative 3 (removal) has been selected as the preferred removal action alternative for the Site. This alternative to address impacted soil will be protective of human health and the environment, comply with regulatory criteria, avoid ongoing maintenance and administrative costs, and achieve Aspire’s goal of obtaining unrestricted land use. In addition, this alternative is anticipated to have community and state acceptance and would allow the Site to be developed as a school.

Implementation of this alternative would involve removal of impacted soil with concentrations exceeding the PCGs (Section 4.2).

Impacted soil will be excavated to the approximate depths shown on the cross sections (Figures 13 through 20). Confirmation samples will be collected during excavation activities until analytical results indicate that residual concentrations of compounds of concern are less than the PCGs. LFR will use existing soil analytical data for confirmation purposes whenever possible. Confirmation samples will be transported to a California state-certified laboratory for analysis under standard chain-of-custody protocol. An estimated 8,194 in-place cy of soil will be excavated.

Dust suppression measures (such as spraying the area with water or covering stockpiled soil with plastic) will be implemented during excavation activities. These suppression measures will continue until background level concentrations for the COCs have been obtained.

A miniature real-time aerosol monitor (mini-RAM) will be used to monitor exposure to total dusts. If dust in excess of background is observed for a sustained period of time (greater than 5 minutes), appropriate dust suppression measures (e.g., spraying soil with water) will be undertaken. If during excavation activities dust is observed in the area being excavated, appropriate dust suppression measures (e.g., spraying soil with water) will be undertaken.

A fence with dust-control fabric will be maintained around the property, if dust emissions indicate that a wind screen is necessary, to control access to the Site throughout the excavation and subsequent backfilling of the Site.

Noise may result primarily from the operation of excavating equipment, drill rigs, and other mechanical equipment. For this reason, noise monitoring will be conducted at the fence line. If noise production exceeds 80 decibels at the fence line, appropriate mitigation measures will be undertaken.

Additional details on implementation of this alternative are presented in Section 7.0.

6.0 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

To select a feasible and effective remedial alternative for the Site, LFR evaluated ARARs. In simple terms, ARARs are regulations or guidelines that apply to the assessment, cleanup, and/or monitoring of contamination at a particular site.

Federal, state, and local ARARs, which have been identified as either applicable or relevant to the Site, are presented in Tables 6, 7, and 8, respectively. Three types of ARARs are identified in the NCP: chemical specific, location specific, and action specific. A summary of these ARARs is presented below.

Chemical-specific ARARs. These ARARs are health- or risk-based concentrations limits, numerical values, or methodologies for various environmental media (e.g., groundwater, surface water, air, and soil) that are established for a specific chemical that may be present in a specific medium at a property or that may be discharged to the property during remedial activities. Limits on concentrations of specific hazardous substances, pollutants, and contaminants that may be found in or discharged to the environment are set by these ARARs.

Action-specific ARARs. These ARARs are technology- or activity-based requirements that are triggered by the type of remedial activities under consideration for a site. Action-specific requirements do not establish the remedial alternative but do indicate how a selected alternative is to be achieved. Resource Conservation and Recovery Act (RCRA) regulations for waste treatment, storage, and disposal are examples of action-specific ARARs.

Location-specific ARARs. These ARARs set restrictions on certain types of activities based on site characteristics. Federal and state location-specific ARARs are restrictions placed on the concentration of a contaminant or the activities to be conducted because they are in a specific location such as a floodplain, wetland, historic place, or sensitive habitat.

6.1 Public Participation

There are several public participation requirements established by the DTSC. Aspire and its consultant, School Site Solutions, Inc., have worked with the DTSC to implement a public participation program for the Site. Elements of the public participation program are described in the following sections.

6.1.1 Community Concerns

Information provided by Aspire indicates that the community supports this project, which includes construction of a new charter high school on the Site. No specific concerns were brought to the attention of Aspire by the community following distribution of notices regarding the proposed PEA fieldwork, during the public comment period, or at the public hearing for the PEA.

6.1.2 Public Participation Plan Implementation

Community members and residents were informed of the environmental investigation at the Site through publication of notices in local newspapers, public hearings and comment periods, and neighborhood postings. Past and future community involvement actions are described below:

- A notification letter was distributed to residences in the surrounding community before the PEA fieldwork began. The letter included information on the environmental investigation (soil-vapor, soil, and groundwater sampling) and dates of fieldwork.
- The Oakland Unified School District Board of Education published a notice about a public hearing and comment period for the PEA in "The Oakland Tribune" on May

24, 2005. The notice gave the public 30 days to submit written comments on the documents. The public hearing was held at the Oakland Unified School District offices on June 29, 2005.

- A public notice will be published in local newspapers to inform the community of this proposed soil removal (cleanup) action. The public notice will state that the administrative record file is available for public review at two established Information Repositories. Copies of the PEA report, the SSI reports, and this Soil RAW will be placed in the Information Repositories for access by community members.
- A community profile is being prepared on behalf of Aspire by School Site Solutions, Inc., and DTSC's Public Participation Department. This community profile will describe the community and addresses potential community concerns with the DTSC's investigation of environmental conditions at the Site.

6.2 California Environmental Quality Act

CCR, Title 14, Sections 15000 through 15387 mandates the environmental impact review of actions regulated by California governmental agencies. As such, the remedial alternatives for this Site may be subject to California Environmental Quality Act (CEQA) review. This is considered an action-specific ARAR.

Aspire complied with the requirements of CEQA by preparing a Negative Declaration of Environmental Impact. The Negative Declaration was accepted by Aspire and submitted to the State Clearing House.

According to California Education Code Section 17213.2 (e), if a previously unidentified environmental concern is discovered at any time during the school construction process, the school district shall cease construction activities at the Site, notify the DTSC, and take necessary response actions as required by the DTSC. For the purposes of this proposed remedial action at the Site, the DTSC has assumed the lead agency status.

The proposed soil remedial project will not have a significant effect on public health or the environment because of the relatively small volume, short project duration, and the controlled manner in which contaminated soils will be excavated, loaded onto trucks, and taken off-site for disposal and/or treatment. The Site is not on the Hazardous Waste and Substances Sites List; however, the Site is an active LUST case with the ACHCSA.

6.3 Hazardous Waste Management

Based on the analytical data obtained for the Site to date, LFR anticipates that nonhazardous wastes and possibly hazardous wastes will be produced during excavation activities. Hazardous waste management, if hazardous waste is produced during implementation of this Soil RAW, will include several potential action-specific ARARs, as discussed in the following paragraphs.

RCRA establishes requirements for the management and disposal of hazardous wastes. In lieu of the RCRA program, the State of California is authorized to enforce the Hazardous Waste Control Act, and implement regulations (CCR, Title 22, Division 4.5, Chapter 14) subject to the authority retained by the U.S. EPA in accordance with the Hazardous and Solid Waste Amendments of 1984. This regulation specifies the design, construction, operation, and closure of RCRA-permitted treatment, storage, and disposal facilities (TSDFs) within California. TSDF requirements may be ARARs if the selected remedy involves the treatment, storage, or disposal of wastes that are sufficiently similar to RCRA hazardous wastes (CERCLA Compliance With Other Laws Manual, OSWER Directive 9234.1-01, August 8, 1988, pp. 2-6). Because lead is present in on-site soil, the excavated soil could be classified as RCRA hazardous waste. TSDF requirements may be ARARs for any off-site facility used for treatment/disposal of lead-impacted soil from the Site.

CCR, Title 22, Section 66264.18 establishes location standards for TSDFs. Subsection 66264.18 (a) prohibits the placement of TSDFs within 200 feet of a fault displaced during the Holocene Epoch. Subsection 66264.18 (b) requires that TSDFs located within a 100-year floodplain be capable of withstanding a 100-year flood. Soil excavated as part of the remedial action will be transported to appropriate off-site facilities.

CCR, Title 22 establishes requirements applicable to generators of hazardous waste. Implementation of the proposed removal alternative may result in the generation of potentially hazardous waste such as impacted soil, decontamination rinse water, used personal protective equipment, etc. If excavated soil is classified as hazardous, Aspire (as the hazardous waste generator) will secure a U.S. EPA identification number from the DTSC for proper management of the hazardous waste. Compliance with the DTSC requirements for hazardous waste generation, temporary on-site storage, transportation, and disposal is required for hazardous waste. Containers or stockpiles used for on-site storage of hazardous waste will be properly labeled with hazardous waste labels. Within 90 days after its generation, the hazardous waste will be transported off-site for disposal. The hazardous waste will be transported by a registered hazardous waste hauler under a uniform hazardous waste manifest. Land ban requirements will be followed as appropriate.

CCR, Title 22, Section 66261.20 defines waste as hazardous if it meets one of the following four criteria: ignitability, corrosivity, reactivity, or toxicity. Soil to be excavated as part of this remedial action will be tested to assess its hazardous properties, if any, as required by the disposal facilities.

CCR, Title 22, Chapter 18, Article 3 identifies specific hazardous wastes that are restricted from land disposal without treatment. Soil designated for landfill disposal will be tested to assess disposal requirements as required by the disposal facilities.

H&SC Section 25157.8 prohibits land disposal of any waste containing total lead in excess of 350 mg/kg in California to other than to a Class I disposal facility. Based on the results of the site investigations, lead-impacted soil is present on the Site. The lead-impacted soil will be properly characterized for disposal at an appropriate facility.

Excavation, management, and disposal of impacted soil will be performed in accordance with these ARARs and this Soil RAW. Final determination of the landfill used for disposal will be based on the results of the stockpile soil analyses and approval from the landfill. Once the disposal facility is selected, copies of waste profile reports used to secure disposal permission from the landfill will be provided to the DTSC. In addition, compliance with the land disposal restrictions and land ban requirements for hazardous wastes will be documented and provided to the DTSC.

Wastewater will be temporarily stored on the Site in tanks (i.e., 21,000-gallon Baker tanks) that will be brought to the Site and removed from the Site by truck for proper disposal at a licensed facility.

6.4 Air Quality Management District

Dust emissions during the potential remedial action are regulated by the California Air Resources Board, which implements the federal Clean Air Act as well as the HSC through local air-quality management districts. The local air district for the Site is the BAAQMD. BAAQMD Regulation 6, which limits the quantity of particulate matter and visible emissions from any general operations, may be applicable during the implementation of remedial action. Regulation 8, Rule 40-402 requires written notice to the Air Pollution Control Officer of the intention to excavate.

The BAAQMD regulations are considered chemical-specific ARARs and would be applicable to the Site since removal and off-site disposal is selected as the remedial alternative.

6.5 Health and Safety Plan

Action-specific ARARs include those in local, state and federal health and safety codes.

Activities conducted during implementation of this Soil RAW will be in compliance with applicable California Occupational Safety and Health Administration (Cal/OSHA) regulations, particularly those in Title 8 of the CCR, Section 5192, 29 CFR 1910.120, and other applicable federal, state, and local laws, regulations, and statutes. The Health and Safety Plan (HSP) prepared by LFR for use during the additional SSI fieldwork will be modified for use during implementation of this Soil RAW.

H&SC, Division 20, Chapter 6.8, Section 25356.1, requires that DTSC review and approve of RAWs for existing or proposed schools.

The Safe Drinking Water and Toxics Enforcement Act of 1986 (Proposition 65) requires that warnings be posted with information on exposure to listed chemicals above specified concentrations or risk levels. If appropriate, a posting will be made for the Site.

H&SC Section 25123.3 allows for the temporary accumulation of non-RCRA contaminated soil for 90 days or less, as long as specific requirements are met. Soil excavated from the Site as part of the removal action will not remain at the Site for more than 90 days.

6.6 Quality Assurance Project Plan

Preparation of a Quality Assurance Project Plan (QAPP) satisfies action-specific ARARs. A QAPP that details procedures for collection of representative data and appropriate completion of the remedial activities at the Site has been prepared using information from the following U.S. EPA documents:

- "Methods for Chemical Analyses of Water and Waste," EPA 600/4-79-020, revised November 1986
- "Interim Guidelines and Specifications for Preparing Quality-Assurance Project Plans," QAMS-005/80, January 1986
- "Guidance for Preparation of Combined Work/Quality-Assurance Project Plans for Environmental Monitoring," OWRS QA-1, May 1984
- "Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses," February 1988 (Draft)
- "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses," July 1988 (Draft)
- "Data-Quality Objectives for Remedial Response Activities," EPA 540/G-87/003A, March 1987
- "Test Methods for Evaluating Solid Waste," EPA SW-846, Third Edition, November 1986

7.0 REMOVAL ACTION IMPLEMENTATION

This section provides the work plan for the implementation of the selected remedial alternative (excavation and off-site disposal). Implementation of this Soil RAW will begin upon Aspire's and LFR's receipt of the DTSC's written approval. This Soil RAW will be implemented using the guidelines presented herein and those presented in the Activities Coordination Plan (Appendix C), the Sampling and Analysis Plan (SAP; Appendix D), the Well Sampling and Destruction Plan (Appendix E), the HSP (Appendix F), the QAPP (Appendix G), and the Transportation Plan (Appendix H).

The proposed work methods and schedule are discussed in the Activities Coordination Plan presented in Appendix C of this Soil RAW. Typically, impacted soil nearest the Site's ingress point would be excavated first with work progressing towards the farthest area on the Site. This activities plan would reduce the likelihood of vehicles traveling across impacted soil and thereby transporting impacted soil from one area to another. However, due to Aspire's schedule, LFR proposes to begin excavation of the impacted soil located farthest from the Site's ingress point (around borings 1B, 1BS(10') and 1C). The presence of asphalt pavement and concrete floor slabs across the Site (except at the western end) will prevent the transporting impacted soil from one area to another. The asphalt pavement and concrete floor slabs will be removed as work progressed eastward across the Site.

A storm-water pollution prevention plan (SWPPP) will be prepared by the construction contractor or other party as designated by Aspire for use during this project.

Work hours at the Site will be between 7:00 A.M. and 5:00 P.M., Monday through Friday.

A removal action completion report will be submitted to the DTSC after execution of the removal action.

7.1 Site Preparation and Security Measures

Prior to implementation of this Soil Raw, asbestos-containing materials, lead-based paints, and materials with PCBs (e.g., concrete and metal) identified in the on-site buildings will be abated, the buildings will be demolished, the pavement will be removed, and the existing groundwater wells will be destroyed.

7.1.1 Delineation of Excavation Area

Before the commencement of excavation activities, LFR personnel will clearly delineate the extent of the initial excavation using either stakes or marking paint. Based on the results of confirmation sampling, the excavation boundaries may be expanded. Excavation expansion areas, if any, will be clearly marked by LFR personnel, using either stakes or marking paint, before the commencement of excavation in these areas.

7.1.2 Underground Utility Clearance

LFR will notify the Underground Service Alert (USA) a minimum of 48 hours before the start of excavation activities. In addition, LFR will contract a private, underground-utility clearance contractor to locate potential underground utilities within the site boundaries prior to the commencement of excavation activities.

7.1.3 Security Measures

The work exclusion zone will be the area surrounding the proposed excavations (see Figure 4).

Chain-link fencing is currently present around the Site's perimeter. The fencing will be maintained during excavation activities so that the Site will be accessible only through gates that will be closed and locked at the end of each workday and/or when Aspire's representatives/contractors are not present on the Site.

A visitor log will be maintained by LFR on-site personnel. Only authorized visitors with the appropriate level of health and safety training and subject to the requirements of the site-specific HSP will be allowed on site.

7.1.4 Contaminant Control

The impacted soil will be controlled during implementation of this Soil RAW as described in the Dust Control Plan, Section 7.5.

7.1.5 Permits and Plans

The excavation contractor will obtain all necessary permits. These may include, but are not necessarily limited to, excavation permits and hazardous waste handling and transportation permits.

7.2 Field Documentation

7.2.1 Field Logbooks

A field activities logbook or appropriate daily field reporting form will be used to record daily field notes. Section 5.2 of the QAPP provides the minimum requirements for daily field entries.

7.2.2 Chain-of-Custody Forms

Chain-of-custody forms will be prepared for groups of samples collected at a given location on a given day. Each chain-of-custody form will be prepared in triplicate. Two of the three copies will accompany each shipment of samples to the laboratory. One copy will be kept in LFR's project file. The chain-of-custody form documents the identity of all personnel involved in sample transfer. Section 5.2 of the QAPP provides the minimum information required on each chain-of-custody form.

7.2.3 Photographic Record

A photographic record will be maintained, as necessary, throughout the implementation of this Soil RAW to record progress of the excavation work. The action represented by each photograph will be described, and the date and time the image was recorded will be noted, as will the location and the direction of view for each photograph.

7.3 Excavation Plan

7.3.1 Excavation Entry

Workers will not enter excavations that exceed 4 feet in depth without appropriate protective systems such as benching, sloping, or shoring as described in the HSP (Appendix F). Access to the excavation by on-site personnel will be limited and strictly monitored. No confined space entry is anticipated for this project.

7.3.2 Temporary Storage Operations/Stockpile Management

Excavated soil will either be stockpiled in an on-site staging area or directly loaded into trucks for transport to the off-site disposal facility. Figure 5 of the Activities Coordination Plan (see Appendix C of this Soil RAW) shows the proposed storage, stockpile, staging, loading, and decontamination areas to be used during this project. Prior to off-site disposal, stockpiled soil will be sampled for waste disposal characterization in accordance with the requirements of the selected waste disposal facility.

Excavated soil requiring temporary on-site storage will be stockpiled in a suitable location within the fenced-in work area. The stockpiled soil will be placed on plastic sheeting for temporary storage. Soil stockpiles will be spaced to allow continued site access as needed. The soil stockpiles will be sloped so as not to exceed a ratio of one to one and will be covered with plastic sheeting at the end of each work day or upon completion of excavation activities within a designated work area. The plastic sheeting will be secured with sandbags or other suitable method. If the soil is sufficiently moist that water may flow from the stockpile, a berm will be constructed around the stockpile and also covered with plastic sheeting.

Excavated soil potentially containing PCBs at concentrations greater than 50 mg/kg (e.g. from the area of boring 4B, located immediately adjacent to the former equipment pressure wash room) will be stockpiled separately. If waste characterization sampling reveals the presence of PCBs in the stockpiled soil at concentrations greater than 50 mg/kg, this soil will be disposed of at an appropriately licensed disposal facility (e.g. Kettleman Hills) as TSCA hazardous waste.

Wastewater will be temporarily stored on the Site in tanks (i.e., 21,000-gallon Baker tanks) that will be brought to the Site and removed from the Site by truck for proper disposal at a licensed facility. LFR anticipates the use of one on-site 21,000-gallon Baker tank to manage the dewatering effluent. The dimensions of a 21,000-gallon Baker tank are approximately 35 feet x 13 feet 3 inches x 8 feet.

7.3.3 Waste Segregation Operations

As noted in Section 7.3.2, impacted soil requiring temporary on-site storage will be stockpiled in a suitable location on the Site. The stockpiled soil will be placed on plastic sheeting and covered with plastic sheeting, as appropriate, for temporary storage.

Excavated soil that has concentrations of COCs below the PCGs will be placed on plastic sheeting for temporary storage in a suitable location on the Site. This material will be reused on the Site to backfill the excavation or removed from the Site for appropriate disposal.

7.3.4 Decontamination Area

A suitable location on the Site will be reserved for use as a decontamination area. Figure 5 of the Activities Coordination Plan (Appendix C of this Soil RAW) shows the proposed location for the decontamination area. The vehicles will be equipped with dust covers and other required equipment, as appropriate, to prevent releases of material. Before vehicles exit the Site, their wheels will be brushed, if necessary, to remove excess dust and soil. Additional details are provided in the Transportation Plan (Appendix G).

7.3.5 Excavation Design, Process, and Equipment

The areas to be excavated are shown on Figure 4 and include the following:

- **Around boring 1A:** 50 in-place cy of soil impacted with PCBs
- **Around boring 1B:** 34 in-place cy of soil impacted with PCBs
- **Around boring 1BS(10'):** 34 in-place cy of soil impacted with arsenic
- **Around boring 1C:** 34 in-place cy of soil impacted with PCBs and arsenic
- **Beneath the Warehouse:** 1,100 in-place cy of soil impacted with arsenic and 1,475 in-place cy of soil impacted with arsenic, gasoline, motor oil, BTEX, and MTBE
- **South of the Warehouse:** 2,935 in-place cy of soil impacted with arsenic, gasoline, motor oil, BTEX, and MTBE
- **South and east of the Warehouse:** 1,580 in-place cy of soil impacted with motor oil, SVOCS/PAHs, arsenic, BTEX, and MTBE

- **Along southern border at and west of boring 2C**: 410 in-place cy of soil impacted with PCBs
- **Beneath Manufacturing/Office Building at boring 3B:** 57 in-place cy of soil impacted with PCBs
- **Beneath Manufacturing/Office Building at boring 4B**: 56 in-place cy of soil impacted with PCBs
- **Beneath Manufacturing/Office Building at boring 4BS(10')**: 1 in-place cy of soil impacted with PCBs
- **Beneath Manufacturing/Office Building at boring 4BS(20'):** 250 in-place cy of soil impacted with gasoline, diesel, and motor oil
- **Around borings 5A and 5ASE(10'):** 45 in-place cy of soil impacted with lead
- **Around borings 5C and 5CESE(20'):** 133 in-place cy of soil impacted with lead, diesel, motor oil, and SVOCs/PAHs

Excavations less than 4 feet in depth will not be shored, sloped, or banked. If the results of confirmation samples require additional excavation, the need for shoring, sloping or banking of the excavation can be reevaluated at that time.

Excavations greater than 4 feet in depth may be shored, sloped, or banked, as necessary. LFR anticipates that shoring will be placed along the southern border of the Site during excavation of PCB-impacted soil in the area around and west of Boring 2C due to the presence of a commercial/industrial building adjacent to the south of the Site's southern border.

LFR will discuss the depth of the excavation for removal of gasoline-impacted soil in the central portion of the Site with DTSC during implementation of this Soil RAW. The depth of the excavation in this area may be limited by the shallow groundwater table and/or soil types (excavation will likely not extend below the bottom of the clay/silt layer present at a depth of approximately 18 to 20 feet bgs.

Soil removal will be accomplished by use of conventional earthmoving equipment (e.g., backhoes, excavators, articulated loaders, dump trucks, water trucks). Excavated soil will either be stockpiled on site or loaded directly into dump trucks for off-site disposal. Excavation of impacted soil will continue until confirmation sample results indicate that the removal action goal has been achieved. The excavation will be backfilled using on-site soil with COCs below the action levels and/or "clean" imported fill material as described in Section 7.8. If drain rock or gravel is used as a backfill material, a geotextile fabric will be placed on top of the rock/gravel prior to placing finer-grained fill material in the excavation. Fill material will be compacted using appropriate vibratory or drum roller compaction equipment.

As noted previously, LFR will use existing soil analytical data for confirmation sampling purposes whenever possible.

7.3.6 Excavation Dewatering

It is anticipated that groundwater may be encountered in each of the excavations due to shallow depth to groundwater (generally 3 feet bgs). The excavation area dewatering system and associated treatment system will be designed by the excavation contractor in accordance with the specifications detailed in the Caltrans Field Guide to Construction Site Dewatering.

At a minimum, dewatering effluent will be contained in storage tanks (e.g., 21,000-gallon Baker tanks) prior to discharge to allow the sediment to settle out. Filtration will be utilized as necessary, to ensure that clear water is discharged to the storm or sanitary sewer system.

Based on the historical land uses at the Site and groundwater sampling of the existing network of monitoring wells, groundwater underlying the Site has been impacted by chemical releases. Impacted groundwater pumped from the excavation will be placed into storage tanks (i.e., 21,000-gallon Baker tanks) that will be brought to the Site. The proposed location for the wastewater storage tanks is shown on Figure 5 of the Activities Coordination Plan (see Appendix C of this Soil RAW). Upon our receipt and review of analytical data for the groundwater in the storage tanks, the groundwater will be discharged to the storm or sanitary sewer system or transferred into vacuum trucks for transport to an appropriate disposal facility, as discussed below.

Representative samples of dewatering effluent will be analyzed by a state-certified laboratory, as required by the disposal facility, for the suspected pollutants (at minimum, petroleum hydrocarbons, selected SVOCs/PAHs, arsenic, lead, PCBs and selected VOCs) prior to discharge to the storm or sanitary sewer system or removal from the Site by truck. Based on the results of the analytical testing and the concentrations of pollutants identified, if any, the applicant will dispose of the dewatering effluent and impacted water in one (or more) of the following ways:

- discharging to the storm drain under permit from the RWQCB; it is unlikely that the RWQCB would allow discharge of any untreated dewatering effluent that contains detectable concentrations of chemical pollutants and that for these types of discharges, alternative disposal options may be required
- discharging to the sanitary sewer system under permit from East Bay MUD if the concentrations of chemical pollutants meet its acceptance criteria
- containerizing and transporting to a licensed off-site disposal facility for treatment and disposal under appropriate manifest; East Bay MUD accepts dewatering effluent transported to its facility via truck if the concentrations of chemical pollutants meet its acceptance criteria; an appropriate disposal facility will be utilized for disposal of the impacted groundwater if the concentrations of chemical pollutants in the wastewater do not meet East Bay MUD's acceptance criteria

During excavation and construction activities, the Site will be graded to drain storm water into the open excavations. Groundwater and commingled storm water that accumulates in the excavations, will be collected, treated, as necessary, and discharged to either the sanitary sewer or storm drain system based on specified East Bay MUD or RWQCB (National Pollutant Discharge Elimination System) discharge permit requirements or stored in tanks and transported from the Site for off-site disposal (whichever form of disposal is the most economically feasible).

Accumulated precipitation collected on the Site in areas where COPCs were not identified will be discharged to the local storm drain system under the State's General Permit for Stormwater Discharge Associated with Construction Activity. However, the discharge is required to be contaminant free and low in suspended sediment concentrations in order to meet Basin Plan objectives (total suspended solids [TSS] less than 30 mg/l). Appropriate design of sumps in each excavation area will be conducted to minimize collection of sediment in discharge water. In addition, a series of weir tanks, settling tanks, and a supplemental filtration system will be used as appropriate for water treatment prior to discharge to ensure that the discharge is contaminant free and meets the clear water objective (TSS less than 30 mg/l). As noted above, the excavation area dewatering system and associated treatment system will be designed by the excavation contractor in accordance with the specifications detailed in the Caltrans Field Guide to Construction Site Dewatering.

7.4 Air and Meteorological Monitoring

7.4.1 Air Monitoring

A miniature real-time aerosol monitor (mini-RAM) will be used to monitor total dusts generated during site work. Background dust levels will be established by monitoring dust levels at the Site for several days during the two weeks prior to implementation of this Soil RAW. Background dust levels will be documented at air monitoring stations established at approximately 100 foot intervals along the Site's perimeters (a total of 16 stations including seven stations each of the northern and southern borders and one station each on the eastern and western borders).

If dust in excess of background levels (greater than 0.25 milligrams per cubic meter [mg/m^3] above background levels) is observed for a sustained period of time (greater than 5 minutes), appropriate dust suppression measures (e.g., spraying soil with water) will be undertaken. As noted in the HSP (Appendix F of this Soil RAW), a total dust reading of 1.36 mg/m^3 would result in an exceedance of the Acute Reference Exposure Level of 0.00019 mg/m^3 established for arsenic by the California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA). A total dust action level of 0.25 mg/m^3 above background levels would be conservative for the various COCs detected on the Site that would be likely to adhere to windblown dust and protective of the on-site workers and members of the surrounding community.

If during excavation activities dust is observed in the area being excavated, appropriate dust suppression measures (e.g., spraying soil with water) will be undertaken.

Field staff will obtain and document total dust readings from the mini-RAM throughout each work day when impacted soil excavation activities are occurring on the Site. These readings will be obtained from air monitoring stations established at approximately 100 foot intervals along the Site's perimeters (a total of 16 stations including seven stations each of the northern and southern borders and one station each on the eastern and western borders) and various points (upwind, downwind, etc.) around each active excavation area.

In addition to monitoring for total dust using a mini-RAM, Personal Air Monitors (PAMs) to record total dust and fixed air monitors with cassettes that can be submitted to a laboratory for analysis will be used each work day when impacted soil excavation activities are occurring on the Site. A PAM will be worn by at least one worker operating earth moving equipment (backhoe, excavator, etc.). At least four fixed air monitoring stations will be established on the Site during each work day when impacted soil excavation activities are occurring on the Site. One air monitoring station will be located on the northern border of the Site to document conditions by the adjacent residences. Locations for all air monitoring stations will be selected prior to implementation of this Soil RAW and may be changed during the course of work at the Site. The cassettes will be submitted to a laboratory and analyzed, at a minimum, for total dust, total lead, total arsenic, and PCBs.

On-site worker exposure to airborne contaminants (VOCs) will be monitored during intrusive site activities. A calibrated photoionization detector (PID) with a lamp strength of 10.6 eV or flame ionization detector (FID) will be used to monitor changes in exposure to volatile organic compounds (VOCs). Personnel will perform routine monitoring during site operations to evaluate concentrations of VOCs in employee breathing zones. If VOCs are detected above predetermined action levels specified in Section 10 of the HSP, the procedures found in Section 7 of the HSP will be followed.

7.4.2 Meteorological Monitoring

Weather forecasts will be monitored during excavation work. If storms expected to result in significant rainfalls are forecast for the site vicinity, the excavations will be covered with plastic sheeting, if appropriate, to reduce the amount of storm water entering the excavations. In addition, the stockpiles will be covered with plastic sheeting to reduce runoff from the stockpiles.

7.5 Dust Control Plan

The primary means of transport for COCs at the Site is dispersion in dust. Dust suppression measures and contaminant control will be implemented during excavation activities as described below.

7.5.1 Dust Control

Dust control measures, such as spraying the area with water or covering stockpiled soil with plastic, will be employed during excavation and soil disposal activities to prevent the release of visible dust emissions beyond the immediate work zone.

Open excavations will continually be wetted as the excavation progresses to minimize fugitive dust emissions. Excavation activities will be suspended when winds exceed 25 miles per hour.

A mini-RAM will be used to monitor airborne total dusts. If dust levels greater than 0.25 mg/m^3 above background are measured at the fence line for a sustained period of time (greater than 5 minutes), appropriate dust suppression measures (e.g., spraying soil with water) will be undertaken. If during excavation activities dust is observed in the area being excavated, appropriate dust suppression measures (e.g., spraying soil with water) will be undertaken.

A fence with dust-control fabric will be maintained around the work area to act as a wind screen, if dust emissions indicate that a wind screen is necessary, throughout the excavation and subsequent backfilling activities.

Stockpiled soil will be placed on plastic sheeting for temporary storage and covered with plastic sheeting as described in Section 7.3.2 to minimize wind erosion.

The vehicles will be equipped with dust covers and other required equipment to prevent releases of material. Before exiting the Site, the vehicles will be moved to the decontamination area and their wheels will be brushed to remove excess dust and soil. Additional details are provided in the Transportation Plan (Appendix H).

7.5.2 Dust Monitoring

Monitoring at the Site will include observation for visible dust and documentation of dust levels using a mini-RAM. If dust levels greater than 0.25 mg/m^3 above background levels are measured for a sustained period of time (greater than 5 minutes) at the fence line, appropriate dust suppression measures (e.g., spraying soil with water) will be undertaken. If dust is observed in the area being excavated during remedial activities, appropriate dust suppression measures (e.g., spraying soil with water) will be undertaken.

7.6 Confirmation Sampling

As noted previously, LFR will use existing soil analytical data for confirmation sampling purposes whenever possible.

Confirmation samples will be collected from the sidewalls and floor of the excavations. One sample will be collected for every 25 linear feet along each sidewall, and one sample will be collected for every 625 square feet of excavation floor and as requested by DTSC, as discussed in Section 5.2, Alternative 3. The sidewall samples may be collected from varying depths along the sidewall or at depths where COCs were detected in the past at concentrations above the PCGs.

For QA/QC purposes, LFR will also collect one blind field duplicate soil sample for every 10 confirmation soil samples. The duplicate sampling program represents greater than 10% of the total number of samples proposed for analysis. Field blanks, equipment blanks, and trip blanks will be collected as noted in the SAP (Appendix D).

Sampling equipment that comes into contact with potentially impacted soil will be decontaminated consistently to ensure the quality of samples collected. As appropriate, disposable equipment intended for one-time use may be used and will not be decontaminated, but will be packaged for appropriate disposal. Additional information is provided in the SAP (Appendix D).

7.7 Off-Site Disposal of Waste

The purpose of this Soil RAW is to safely remove and dispose of impacted soils from the Site, to reduce the threat to human health, and to provide a permanent solution that eliminates or significantly reduces the toxicity, mobility, and volume of impacted soil at the Site. LFR has developed a Transportation Plan (Appendix H), which describes the volume and process for removing impacted soil and groundwater from the Site, waste characterization requirements for the facilities, hazardous classification and waste facility selection, and the route to the potential regional disposal facilities. The final disposal facility will be selected by Aspire and the excavation contractor submitting the winning bid, based on the waste characterization results.

Based on a quantity of 8,194 cubic yards of impacted soil to be removed from the Site, LFR estimates that approximately 15 trucks will leave the Site each day enroute to appropriate disposal facilities for the impacted soil.

LFR contacted the Oakland Fire Department Station 29 located to the east of the Site across 66th Avenue at 1016 66th Avenue, to discuss potential impact to emergency responses by the proposed remedial work at the Site. According to the Oakland Fire Department dispatchers, trucks may operate on 66th Avenue providing the trucks do not park along 66th Avenue and/or within the painted "no parking" section directly in front of Fire Station 29. No additional activities or coordination are required by LFR with the Oakland Fire Department for using 66th Avenue as an access road between the Site and Interstate 880.

Groundwater entering the excavation south, southeast and east of the Warehouse will be pumped into an on-site 21,000-gallon Baker tank located along the Site's southern border. Samples of the water will be collected for analysis and the water will be discharged to the sanitary sewer under a permit from East Bay MUD if contaminants are within East Bay MUD's acceptance criteria. If East Bay MUD's acceptance criteria cannot be met based on the analytical results of the water, then the water will be transferred from the on-site Baker tank to vacuum trucks. Each vacuum truck transports approximately 5,000 gallons per trip. LFR anticipates approximately 45 truck loads to dispose of dewatering effluent. A total of 45 truck trips over a one month period represents approximately one to two trucks per day to adequately dispose of effluent. LFR anticipates the increased number of transport trucks will not affect the traffic congestion along 66th Avenue based on the industrial nature of the site vicinity, the truck traffic normally present in the site vicinity, and the short distance (approximately 3 city blocks) between the Site and Interstate 880. Figure 5 of the Activities Coordination Plan (Appendix C of this Soil RAW) shows the proposed location for the Baker tank.

A minimum sampling frequency of one 4-point composite sample per 500 cy of excavated soil will be used. Based on this sampling frequency, a total of 18 4-point composite samples will be collected for waste characterization. These samples will be analyzed for the following compounds:

- gasoline, diesel, and motor oil using modified EPA Method 8015
- SVOCs/PAHs, using EPA Method 8270C
- Title 26 metals, specifically arsenic and lead, using EPA Method 6010B/7000 Series
- PCBs, using EPA Method 8082A
- VOCs, using EPA Method 8260B as appropriate, and combined with collection by EPA Method 5035

LFR anticipates that one or more of the following disposal facilities may be used for disposal of waste from the Site:

- Kettleman Hills Landfill in Kettleman City, California
- Buttonwillow Landfill in Buttonwillow, California
- Altamont Landfill in Livermore, California
- Forward Landfill in Manteca, California
- West Contra Costa County Landfill in Richmond, California

General demolition debris and asbestos waste from abatement activities will be transported to West Contra Costa County Landfill, Altamont Landfill, or another appropriately licensed disposal facility. Based on a quantity of 8,194 cubic yards of impacted soil to be removed from the Site, LFR estimates that approximately 15 trucks will leave the Site each day enroute to appropriate disposal facilities for the impacted soil.

In addition, East Bay MUD's Oakland Wastewater Treatment Plant may be used for the disposal of impacted water. East Bay MUD accepts dewatering effluent, including impacted groundwater, transported to its facility via truck if the concentrations of chemical pollutants meet its acceptance criteria; an appropriate disposal facility will be utilized for disposal of the dewatering effluent if the concentrations of chemical pollutants in the water do not meet East Bay MUD's acceptance criteria.

LFR requested audit packages from each of the above noted facilities describing the types of waste that they are licensed to accept and a letter stating that their facility would be able to accept waste (within the limits of their license) from the Site during the fall of 2006 when implementation of this Soil RAW is expected to occur. Audit packages and/or letters were not provided by some of the facilities due to legal concerns by their operators. Copies of audit packages and letters that were provided by the disposal facilities are presented in the Transportation Plan in Appendix H.

7.8 Excavation Backfilling and Site Restoration

The excavations will be backfilled using on-site soils with COCs less than the PCGs and/or clean imported fill material following the guidelines described in the DTSC fact sheet entitled, "Information Advisory – Clean Imported Fill Material" (DTSC 2001), as discussed in Section 7.8.1.

To minimize the number of truck operating along 66th Avenue during this project, trucks hauling impacted soil to disposal facilities will return to the Site with clean imported fill material, when possible.

The excavations will be backfilled in accordance with the specifications required by the geotechnical engineer for the project. If drain rock or gravel is used as a backfill material, a geotextile fabric will be placed on top of the rock/gravel, if appropriate, prior to placing finer-grained fill material in the excavation. Backfill material will be compacted using appropriate vibratory or drum roller compaction equipment. Compaction testing of the engineering fill will be performed and documented by LFR personnel or Aspire's contractor.

The backfilled areas will be rough graded to minimize ponding of water and to direct surface-water flow away from the Site in preparation for construction activities. Additional site restoration will not be performed as the construction of the school campus will begin after completion of the removal action.

7.8.1 Borrow Source Evaluation

The borrow source for material to be used for backfilling the excavation will be evaluated in accordance with the guidelines described in DTSC's advisory (DTSC 2001).

If evaluation of the borrow source is not possible, available analytical results of samples collected from the borrow source will be reviewed or samples will be collected for analyses as described in DTSC's advisory (DTSC 2001). This fact sheet specifies the sampling frequency and required analyses for use of clean imported fill based on potential source areas for the material. Fill material will not be obtained from an industrial site or from a site undergoing environmental cleanup. Nonindustrial sites include previously undeveloped sites, residential sites, or agricultural sites. Fill material used on site will be obtained from an undeveloped or a residential area and submitted to a California-certified analytical laboratory for analysis.

A minimum sampling frequency of one sample per 250 cy of fill material will be used. Samples of the fill material will be analyzed using the following analytical methodology:

- VOCs, using EPA Method 8260, and combined with collection by EPA Method 5035
- SVOCs, using EPA Method 8270C
- gasoline, diesel, and motor oil using modified EPA Method 8015
- PCBs, using EPA Method 8082A
- Title 26 metals using EPA Method 6010B/7000 Series
- asbestos, using Polarized Light Microscopy with a laboratory reporting limit of less than 0.25 percent (0.25%) by weight

Before using the fill material on site, LFR will submit results of the analyses to the DTSC for review and approval. In addition, on-site LFR personnel will check for signs of staining, discoloration, or odors during emplacement of the import fill material.

7.8.2 Load Checking

Loaded dump trucks will be checked for mud and dirt and cleaned, if necessary, before leaving the Site. The loaded trucks will be covered with a tarp to minimize wind erosion of the soil during transport.

Weight tickets and/or waste manifests will be completed for each load and maintained by the transportation contractor. Copies of these documents or a summary of the volume of soil disposed of at each facility will be presented in the removal action completion report.

7.8.3 Diversion of Unacceptable Borrow

Material proposed for use as backfill will be evaluated as noted in Section 7.8.1 prior to transport of the material to the Site. The material will be rejected if it does not meet the DTSC's requirements for clean imported fill material.

7.8.4 Documentation of Rejected Loads

A log documenting material proposed for use as backfill at the Site will be maintained during the project. Entries will note information about the material, including the borrow source, analytical results, soil type, and whether the load is rejected or accepted.

7.8.5 Site Restoration

The excavation will be backfilled in accordance with the specifications required by the geotechnical engineer for the project. Additional site restoration will not be performed, because construction of the school campus will begin after completion of the removal action.

8.0 PROJECT SCHEDULE AND REPORT OF COMPLETION

The information obtained during the removal action will be evaluated and a report will be prepared for submission to the DTSC. The report will include the following elements:

- a summary of relevant information obtained
- a description of field investigation methods
- copies of daily field reports
- a tabular summary of analytical results
- figures showing the site location and layout with pertinent analytical results
- copies of laboratory analytical reports
- copies of waste manifests and other relevant shipping documents

Note: Daily field reports will include a list of team members and their responsibilities, arrival and departure times, summary of on-site meetings, descriptions of deviations from the HSP or RAW, and equipment calibration readings.

9.0 LIMITATIONS

The opinions and recommendations presented in this report are based upon the scope of services, information obtained through the performance of the services, and the schedule as agreed upon by LFR and the party for whom this report was originally prepared. This report is an instrument of professional service and was prepared in accordance with the generally accepted standards and level of skill and care under similar conditions and circumstances established by the environmental consulting industry. No representation, warranty, or guarantee, express or implied, is intended or given. To the extent that LFR relied upon any information prepared by other parties not under contract to LFR, LFR makes no representation as to the accuracy or completeness of such information. This report is expressly for the sole and exclusive use of the party for whom this report was originally prepared for a particular purpose. Only the party for whom this report was originally prepared and/or other specifically named parties have the right to make use of and rely upon this report. Reuse of this report or any portion thereof for other than its intended purpose, or if modified, or if used by third parties, shall be at the user's sole risk.

Results of any investigations or testing and any findings presented in this report apply solely to conditions existing at the time when LFR's investigative work was performed. It must be recognized that any such investigative or testing activities are inherently limited and do not represent a conclusive or complete characterization. Conditions in other parts of the project site may vary from those at the locations where data were collected. LFR's ability to interpret investigation results is related to the availability of the data and the extent of the investigation activities. As such, 100% confidence in environmental investigation conclusions cannot reasonably be achieved.

LFR, therefore, does not provide any guarantees, certifications, or warranties regarding any conclusions regarding environmental contamination of any such property. Furthermore, nothing contained in this document shall relieve any other party of its responsibility to abide by contract documents and applicable laws, codes, regulations, or standards.

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Table 1: Compounds of Concern, Locations and Possible Sources
Aspire Charter High School
1009 66th Avenue
Oakland, California

Compound of Concern	Location	Possible Source
Gasoline	Beneath the Warehouse, south and east of the Warehouse, beneath the Manufacturing/ Office Building at boring 4BS(20')	Former UST
Diesel	Beneath the Manufacturing/ Office Building at boring 4BS(20'), on southeastern corner of Site at boring 5C	Former UST
Motor Oil	East and south of the Warehouse, beneath the Manufacturing/Office Building at boring 4BS(20'), on southeastern corner of Site at boring 5C	Former UST
Benzo(a)Pyrene	South and east of the Warehouse, on southeastern corner of Site at boring 5C	Former UST
Benzo(a)Anthracene	South and east of the Warehouse, on southeastern corner of Site at boring 5C	Former UST
Benzo(k)Fluoranthene	South and east of the Warehouse, on southeastern corner of Site at boring 5C	Former UST
Arsenic	Beneath the Warehouse, south and east of the Warehouse, western end of Site at borings 1B and 1C	Imported fill material
Lead	Eastern side of Site at borings 5A, 5AS(10'), 5C, and 5CESE(20')	Imported fill material

Table 1 (continued): Compounds of Concern, Locations and Possible Sources
Aspire Charter High School
1009 66th Avenue
Oakland, California

PCBs	Southern side of Site at and west of boring 2C, western end of Site at borings 1A, 1B and 1C, beneath Manufacturing/ Office Building at borings 3B, 4B, and 4BS(10')	Waste coolant oil from electrical equipment repairs and storage
Benzene	Beneath the Warehouse and south of the Warehouse	Former UST
MTBE	Beneath the Warehouse and south of the Warehouse	Former UST

Table 2: Areas and Volumes of Impacted Soil
Aspire Charter High School
1009 66th Avenue
Oakland, California

Area	Compound(s) of Concern	Volume (cubic yards)	Basis
Western end of Site at boring 1A	PCBs	50	1A, 1AN(10'), 1ASE(10'), 1ASW(10')
Western end of Site at boring 1B	PCBs	34	1B, 1BNE(10'), 1BS(10'), 1BNW(10')
Western end of Site at boring 1BS(10')	Arsenic	34	1B, 1BS(10')
Western end of Site at Boring 1C	Arsenic and PCBs	34	1CN(10'), 1CSW(10'), 1CSE(10')
Beneath Warehouse	Arsenic	1,100	appears associated with fill material beneath slab on grade
Beneath and south of Warehouse	Arsenic, Gasoline, Motor Oil, VOCs	4,410	2B3, 2BN(37'), 2CN(20'), 2CE(10'), 2CE(20'), 2B2S(20'), 2B2E(20'), 2A2S(20'), 2A2W(20'), 2A2E(20'), SB-4, SB-10, SB-19, SB-20, SB-21, SB-22, SB-24, SB-40, SB-41, SB-45, SB-46
Along southern border at and west of boring 2C	PCBs	410	2CN(10'), 2CE(10'), SB-47
South and east of Warehouse	Arsenic, Motor Oil, SVOCs/PAHs, VOCs	1,580	2A, 2B, 2A2S(20'), 2B2S(20'), 2A2W(20'), 2B3, 2CN(20'), 2CS(20'), 2CE(10'), 2CE(20'), 2CW(10'), 2B2E(20'), SB-3, SB-4, SB-7, SB-8, SB-9, SB-13, SB-14, SB-17, SB-19, SB-20, SB-21, SB-22, SB-23, SB-24, SB-27, SB-29, SB-31, SB-41, SB-45, SB-46,
Beneath Manufacturing/ Office Building at boring 3B	PCBs	57	3BN(10'), 3BE(10'), 3BE(20'), 3BS(10'), 3BS(20'), 3BW(10')

Table 2 (continued): Areas and Volumes of Impacted Soil
Aspire Charter High School
1009 66th Avenue
Oakland, California

Beneath Manufacturing/ Office Building at boring 4B	PCBs	56	4B, 4BE(20’), 4A, 4BS(10’), 4BS(20’), 4BW(10’), 4BW(20’), 4BN(10’), 4BE(10’), 4BE(20’), SB-36
Beneath Manufacturing/ Office Building at boring 4BS(10’)	PCBs	1	4BS(20’), SB-36
Beneath Manufacturing/ Office Building at boring 4BS(20’)	Gasoline, Diesel, Motor Oil	250	SB-32, SB-33, SB-35, SB-37
Eastern end of Site at borings 5A and 5AS(10’)	Lead	45	5AN(10’), 5ASE(20’), 5ASW(10’)
Eastern end of Site at borings 5C and 5CESE(20’)	Lead, Diesel, Motor Oil, SVOCs/PAHs	133	5CNE(4’), 5CW(10’), 5CSE(10’), SB-38

Table 3: Health Effects of Compounds of Concern
Aspire Charter High School
1009 66th Avenue
Oakland, California

Compound of Concern	Health Effect
Gasoline	Gasoline is produced from the light distillates during petroleum fractionation. Its major components include paraffins, olefins, naphthenes, aromatics, and recently ethanol. Gasoline also contains various functional additives as required for different uses, such as antiknock fluids, antioxidants, metal deactivators, corrosion inhibitors, anti-icing agents, preignition preventers, upper-cylinder lubricants, dyes, and decolorizers. Lead additives in particular were widely used in gasoline until the introduction of vehicle catalytic converters. Mild cases of gasoline ingestion can cause inebriation, vomiting, vertigo, drowsiness, confusion, and fever. Aspiration into the lungs and secondary pneumonia may occur unless prevented. Gasoline can cause hyperemia of the conjunctiva and other eye disturbances. Gasoline is a skin irritant and a possible allergen. Repeated or chronic dermal contact can result in drying of the skin, lesions, and other dermatologic conditions.
Diesel	Diesel fuel is a gas oil fraction available in various grades as required by different engines. Composition of diesel varies in ratios of predominantly aliphatic, olefinic, cycloparaffinic, aromatic hydrocarbons, and additives. It is a severe skin irritant and ingestion of diesel can lead to systemic effects such as gastrointestinal irritation, vomiting, diarrhea, and, in severe cases, drowsiness and central nervous system depression, progressing to coma and death. Absorption of diesel fuel can cause hemorrhaging and pulmonary edema, progressing to pneumonitis and renal involvement. It is combustible when exposed to heat or flame, and can react with strong oxidizing materials.
Motor Oil	Motor oil is a dark viscous liquid. It is composed of aliphatic, olefinic, naphthenic (cycloparaffinic), and aromatic hydrocarbons, as well as additives depending on specific uses. Motor oil has a burning lubricating oil odor. Short-term exposure via dermal contact with motor oil can cause irritation to the skin and dermatitis. Inhalation of motor oil can cause aspiration. Target organs are the upper respiratory system and the skin.
SVOCs/PAHs (including Benzo(a)Pyrene, Benzo(a)Anthracene, and Benzo(k)Fluoranthene)	SVOCs/PAHs constitute a class of materials of which benzo[a]pyrene (BaP) is one of the most common and also the most hazardous. In general, SVOCs/PAHs can be formed in any hydrocarbon combustion process. The less efficient the combustion process, the higher the SVOC/PAH emission factor is likely to be. The major sources are stationary sources, such as heat and power generation, refuse burning, industrial activity, such as coke ovens, and coal refuse heaps. SVOCs/PAHs may also be released from oil spills. Because of the large number of sources, people are exposed to very low levels of SVOCs/PAHs every day.

Table 3 (continued): Health Effects of Compounds of Concern
Aspire Charter High School
1009 66th Avenue
Oakland, California

SVOCs/PAHs, including Benzo(a)Pyrene, Benzo(a)Anthracene, and Benzo(k)Fluoranthene (continued)	Certain SVOCs/PAHs, such as the more common BaP, have been demonstrated to be carcinogenic at relatively high exposure levels in laboratory animals. BaP is a yellowish crystalline solid that consists of five benzene rings joined together. It is highly soluble in fat tissue and has been shown to produce tumors in the stomachs of laboratory mice. In addition, skin cancers have been induced in a variety of animals at very low levels and unspecified lengths of application. It is important to recognize the SVOCs'/PAHs' ability to adhere to soil and other particulates. Therefore, good particulate emission controls and the use of air purifying respirators with particulate filters are required for protection against airborne SVOC/PAH hazards.
Arsenic	Metallic arsenic is most commonly a gray, brittle, crystalline solid. It can also be in a black or yellow amorphous form. Arsenic is also commonly found in its volatile white trioxide form. Arsenic is used in several insecticides, herbicides, defoliants, desiccants, and rodenticides and appears in a variety of forms. It is also used in tanning, pigment production, glass manufacturing, wood preservation, and anti-fouling coatings. Arsenic is classified as a known carcinogen. Short-term exposure to arsenic can cause marked irritation of the stomach and intestines with nausea, vomiting, and diarrhea. In severe cases the vomiting and stools are bloody and the exposed individual goes into collapse and shock with weak, rapid pulse, cold sweats, coma, and death. Inorganic arsenicals are more toxic than organic arsenicals, and the trivalent form is more toxic than the pentavalent form. Acute arsenic poisoning usually results from ingestion exposures. Blood cell changes, blood vessel damage, and impaired nerve function can also result from chronic arsenic ingestion. Other effects include skin changes, irritation of the throat, increased risk of cancer of the liver, bladder, kidney, and lung.
Lead	Lead (inorganic) is a bluish-white, silver or gray odorless solid. Short-term exposure to lead can cause decreased appetite, insomnia, headache, muscle and joint pain, colic, and constipation. Considerable data exist on the effects of lead exposure in humans. It is a poison by ingestion and a suspected human carcinogen of the lungs and kidneys. There are data to suggest that lead is a mutagen and can cause reproductive effects. Human systemic effects by ingestion and inhalation (the two routes of absorption) include loss of appetite, anemia, malaise, insomnia, headache, irritability, muscle and joint pains, tremors, flaccid paralysis without anesthesia, hallucinations and distorted perceptions, muscle weakness, gastritis, and liver changes. Recent experimental evidence suggests that blood levels of lead below 10 μg/dl (micrograms per deciliter) can have the effect of diminishing the IQ scores of children.

Table 3 (continued): Health Effects of Compounds of Concern
Aspire Charter High School
1009 66th Avenue
Oakland, California

Chromium VI	Chromium is a greenish-blue, odorless solid. Chromic acid and its salts have a corrosive action on the skin and mucous membranes. The lesions are confined to the exposed parts, affecting chiefly the skin of the hands and forearms and the mucous membranes of the nasal septum. Chromate salts are human and experimental carcinogens of the lungs, nasal cavity, and paranasal sinus, and are also experimental carcinogens of the stomach and larynx. Hexavalent compounds are more toxic than trivalent. Exposure to chromium has been associated with lung changes in workers exposed to chromium alloys. Chromium dust exposure may cause minor lung changes.
PCBs	PCBs are a series of technical mixtures consisting of many isomers and compounds that vary from mobile oil liquids to white crystalline solids and hard non-crystalline resins. Technical products vary in composition, in the degree of chlorination, and possibly according to batch. Generally, they are moderately toxic by ingestion, and some are poisons by other routes. Most are suspect human carcinogens and experimental tumorigens, and exhibit experimental reproductive effects. They have two distinct actions on the body: a skin effect (chloracne) and a toxic action on the liver. The higher the chlorine content, the more toxic the PCBs tend to be.
Benzene	Benzene is a clear, volatile liquid. It is colorless, highly flammable, and toxic, with a characteristic odor. It is a severe eye and moderate skin irritant. Human effects by inhalation and ingestion include euphoria, changes in sleep and motor activity, nausea and vomiting, other blood effects, dermatitis, and fever. In industry, inhalation is the primary route of chronic benzene poisoning. If the liquid is aspirated into the lung it may cause pulmonary edema. Poisoning by skin contact has also been reported. Exposure to high concentrations (3,000 ppm) may result in acute poisoning, which is characterized by the narcotic action of benzene on the central nervous system. Chronic poisoning occurs most commonly through inhalation and dermal absorption. Benzene is a known human carcinogen that can cause leukemia.
MTBE	MTBE is a clear liquid with a distinct ether-like odor. It is primarily used in the formulation of gasoline as an octane enhancer and oxygenator. Little exposure data are available for MTBE, but it has been reported to cause headaches, nausea, dizziness, and irritation of the nose, throat, and eyes. Current carcinogenicity data indicate that it is a possible weak carcinogen at most.

Table 4: Proposed Cleanup Goals for Compounds of Concern
Residential Exposure
Aspire Charter High School
1009 66th Avenue
Oakland, California

Compound of Concern	Proposed Cleanup Goal (mg/kg)
Gasoline	100
Diesel	500
Motor Oil	500
Benzo(a)Pyrene	0.05
Benzo(a)Anthracene	0.51
Benzo(k)Fluoranthene	0.51
Chrysene	0.51
Naphthalene	4.06
Benzene (soil)	4.96
Arsenic	7 [1]
Lead	255 [2]
Chromium VI	17[3]
PCBs	0.13
Benzene (groundwater)	20 μg/l

Notes:
Proposed cleanup goals are based on 95% upper confidence levels except as noted below. VOCs based on direct contact to a hypothetical residential receptor. Vapor intrusion evaluation will be addressed with soil vapor data.

1. Proposed cleanup goal for arsenic represents estimated background.
2. Proposed cleanup goal for lead based on DTSC's school guidelines.
3. Proposed chromium VI clean-up goal based on Residential CHHSL

Clean Up Value = (0.000001/((0.00000157*oralCSF)+(0.00000371*dermalabsorption*oralCSF)+(0.000000000149*inhalationCSF)))

Table 5a
Evaluation of Remedial Action Alternatives
Aspire Charter High School
1009 66th Avenue
Oakland, California

Alternative	Description	Protection of Human Health and the Environment	Compliance with ARARs	Reduction of Toxicity, Mobility, and Volume	Implementability	Short Term Effectiveness	Long Term Effectiveness and Permanence	Regulatory Agency Acceptance	Community Acceptance	Cost	
										Direct	Indirect
1: No Further Action	Impacted soil would be left in-place and not disturbed.	POOR Alternative provides no reduction in toxicity, volume, or mobility of contaminants. Pathways of human exposure would remain unmitigated.	INADEQUATE Some concentrations of COCs are greater than their PCG and this alternative would not comply with the remedial criteria.	POOR Alternative does not result in unrestricted land use or the reduction of the toxicity, volume, or mobility of the COCs Pathways of human exposure would remain unmitigated.	EXCELLENT Alternative involves no technology, is administratively feasible, and requires no services or materials.	GOOD No anticipated short term impacts on human health or environment during implementation.	POOR This alternative does not provide permanent mitigation of COCs.	LIMITED Alternative does not include COC remediation so would not be acceptable to regulatory agency. In addition, COC-exposure risks would remain unmitigated.	LIMITED Alternative does not include COC remediation, therefore, would likely not be acceptable to community. In addition, COC-exposure risks would remain unmitigated.	$0	$0
2: Capping and Deed Restriction	A low-permeability cap would be placed over impacted soil. A deed restriction would be necessary to limit activities that may reduce the effectiveness of the cap.	ADEQUATE Although alternative provides no reduction in the toxicity or volume of COCs it limits their mobility and potential for direct exposure as long as the cap is maintained.	ADEQUATE ARARs would be met by capping the impacted soil.	MODERATE Alternative reduces COC mobility, but does not reduce toxicity or volume. Risks from COC exposure would be minimized or eliminated.	MODERATE Alternative is technically feasible but somewhat administratively challenging; in addition to short-term administrative obstacles, periodic inspection and maintenance would be required in the long term. Services and materials are readily available.	GOOD Alternative may result in some short term impacts (construction dust and asphalt vapor emissions/odors) during cap construction.	GOOD Alternative would be effected in the long term by reducing access to contaminant and can be permanently maintained.	LIMITED Alternative does not include COC remediation, therefore, would not be acceptable to regulatory agency. In addition, it limits land use and requires ongoing regulatory oversight.	LIMITED Alternative does not include COC remediation. In addition, it limits land use and requires ongoing regulatory oversight.	$600,000 * for initial capping, $6,000/year for cap maintenance, $375,000 for replacement of cap	$50,000 for indirect cost for initial capping $6,000/year (maintenance and reporting) *plus* $25,000 for indirect cost for replacing cap (replacement in 30 years)
	*Initial direct and indirect cost for contractor and consultants for initial capping: $650,000; direct and indirect cost for contractor and consultant for maintenance and reporting: $12,000/year; direct and indirect cost for contractor and consultant for replacement of capping: $400,000. Does not include regulatory agency fees.										
3: Excavation and Off-site Disposal of Affected Soil	Impacted soil would be removed and disposed of at an appropriate off-site location.	SUPERIOR Although alternative provides no reduction in the toxicity or mobility of COCs it significantly reduces their volume at the Site. Pathways of human exposure would be minimized or eliminated.	GOOD ARARs would be met by removing impacted soil.	SUPERIOR Alternative results in COC volume being reduced and results in unrestricted land use. Risks from COC exposure would be minimized or eliminated.	EXCELLENT Alternative is both technically and administratively feasible. Services and materials are readily available.	GOOD Alternative may result in some short term impacts such as dust generation during excavation work.	EXCELLENT This alternative provides a permanent solution since the impacted soil with COCs above PCGs will be removed from the Site.	EXCELLENT Alternative results in COC removal from Site and unrestricted land use of Site. COC-exposure risks would be minimized or eliminated. Regulatory agencies have approved this approach on other projects.	EXCELLENT Alternative results in COC removal from soil and unrestricted land use. COC-exposure risks would be minimized or eliminated. This approach would likely be acceptable to the community.	$1,516,655 to $1,924,901*	$0
	*See detailed cost breakdown in Section 5.2 of Soil RAW and Table 5b.										

Notes:
COC = Compound of Concern
PCG = Preliminary Cleanup Goal
ARAR = Applicable or Relevant and Appropriate Requirement
EPA = United States Environmental Protection Agency
RAO = Remedial Action Objective

Table 5b
Estimated Cost for Preferred Remedial Alternative
Aspire Charter High School Site
1009 66th Avenue
Oakland, California

TASK	Scenario 1 [1] - Remedial Cost Estimate with No Contingency					Scenario 2 [2] - Remedial Cost Estimate with Contingency				
Excavation/ Stockpile		10,652	ton	$5	$53,260		15,315	ton	$5	$76,575
Disposal	85% of excavated soil to West County Landfill	9,064	ton	$30	$271,920	70% of excavated soil to Altamont Landfill	10,747	ton	$40	$429,880
	10% of excavated soil to Forward Landfill	1,059	ton	$60	$63,540	20% of excavated soil to Forward Landfill	3,046	ton	$60	$182,760
	5% of excavated soil to Kettleman or Buttonwillow	529	ton	$85	$44,965	10% of excavated soil to Kettleman or Buttonwillow	1,522	ton	$85	$129,370
Backfill (Import and Placement)		10,652	ton	$15	$159,780		15,315	ton	$15	$229,725
Compaction Testing of Backfill		10,652	ton	$13	$138,476		15,315	ton	$13	$199,095
Waste Characterization Sample Analyses	8,194 cy/500 cy = 17 4-pt composites	17	4-pt	$625	$10,625	9,009 cy/500 cy = 18 4-pt composites	18	4-pt	$625	$11,250
Groundwater Pumping and Disposal					$38,220	200,000 gallons				$38,220
Confirmation Sample Analyses					$93,129					$93,129
Shoring					$50,000					$50,000
Vapor Barrier					$90,000					$90,000
Fencing, Misc.					$50,000					$50,000
Destruction of 8 Wells					$15,000					$15,000
Air Monitoring					$27,000					$27,000
Consultant Oversight		45	day	$2,315	$104,175		45	day	$2,315	$104,175
Consultant Project Management					$125,000					$165,000
Consultant Expenses (10% markup on subcontractors and 2.4% communication fee on all charges)					$145,723	included in above noted charges				
Removal Action Completion Report					$40,000					$40,000
				Total:	$1,520,813				Total:	$1,931,179

Notes:
1. Cost presented in Scenario 1 is based on existing site data with no contingency and provides less conservative remedial cost with 8,143 cubic yards of so to be excavated multiplied by 1.3 cy/ton = 10,586 tons
2. Cost presented in Scenario 2 is based on existing site data with added contingency and provides conservative remedial cost with 8,143 cubic yards of soil to be excavated plus 10% contingency = 8,958 cy; multiply by 1.7 cy/ton = 15,229 tons

LFR

Table 6
Potential Federal ARARs

Requirement	Citation	Description	Applicable/ Relevant and Appropriate	Comments	ARAR Will Be Met For Project
Potential Federal Chemical-Specific ARARs					
TSCA	15 U.S.C. Section 2601 to 2692	Establishes management standards for toxic substances including PCBs.			
PCB Remediation Waste	40 C.F.R. Section 761.61	Established self-implementing cleanup standards for PCB remediation waste under specified conditions	No/Yes	Cleanup levels for unrestricted use may be relevant and appropriate if PCBs greater than 50 mg/kg are removed from the Site for off site disposal during remedial actions.	Yes
Potential Federal Action-Specific ARARs					
RCRA as amended by the HSWA	42 U.S.C. Sections 6901-6992k	Establishes standards for management of hazardous waste.			
Identification and Listing of Hazardous Waste	40 C.F.R. Part 261	Criteria defining hazardous waste.	Yes/No	Investigation-derived residuals meeting these criteria must be managed as a hazardous waste.	Yes
Hazardous Waste Generator Standards	40 C.F.R. Part 262	Requirements for waste identification; obtaining an EPA identification number; use of the hazardous waste manifest; packaging, marking, and labeling; accumulation time; recordkeeping and reporting.	Yes/No	Applicable to site activities involving generation of hazardous waste, such as generation of some investigation-derived residuals.	Yes

LFR

Table 6
Potential Federal ARARs

Requirement	Citation	Description	Applicable/ Relevant and Appropriate	Comments	ARAR Will Be Met For Project
Hazardous Waste Generator Standards	40 C.F.R. Part 265 Subpart C	Preparedness and prevention requirements.	Yes/No	Applicable to site activities involving generation of hazardous waste, such as generation of some investigation-derived residuals.	Yes
Hazardous Waste Generator Standards	40 C.F.R. Part 265.16	Training requirements.	Yes/No	Applicable to site activities involving generation of hazardous waste, such as generation of some investigation-derived residuals.	Yes
Hazardous Waste Generator Standards	40 C.F.R. Part 265 Subpart I	Container management requirements.	Yes/No	Applicable to on-site accumulation of hazardous waste, such as some investigation-derived residuals, in containers for less than 90 days.	Yes
Land Disposal Restrictions	40 C.F.R. Part 268	Prohibits land disposal of restricted hazardous waste without meeting treatment standards; recordkeeping requirements.	Yes/No	Hazardous waste sent off site for disposal, including investigation-derived residuals, just meet appropriate treatment standards before being disposed to land.	Yes
Hazardous Waste Transportation Requirements	40 C.F.R. Part 263	Requirements for hazardous waste transporters.	Yes/No	Applicable for transportation of hazardous waste off site.	Yes

Table 6
Potential Federal ARARs

Requirement	Citation	Description	Applicable/ Relevant and Appropriate	Comments	ARAR Will Be Met For Project
OSHA	29 U.S.C. Sections 651-678	Establishes workplace health and safety standards.			
OSHA Hazardous Waste Operations and Emergency Response Regulations	29 C.F.R. Section 1910.120	Standards for employee safety during specified hazardous waste operations.	Yes/No	Worker protection standards applicable to cleanup operations.	Yes
OSHA Safety and Health Standards for Construction	29 C.F.R. Part 1926	Standards for construction and excavation.	Yes/No	Applicable to specified construction and excavation activities.	Yes
DOT Requirements for Hazardous Materials Transportation	40 C.F.R. Parts 171-177	Standards for transportation of hazardous materials.	Yes/No	Applicable to off-site transportation of specified hazardous materials, including hazardous waste.	Yes
Potential Federal Location-Specific ARARs					
No potential Federal location-specific ARARs have been identified for this Site.					

Table 7
Potential State ARARs

Requirement	Agency	Citation	Description	Applicable/ Relevant and Appropriate	Comments	ARAR Will Be Met For Project
Potential State Chemical-Specific ARARs						
Visible Emissions	BAAQMD	Air Quality Management District Regulations, Regulation 6	Prohibits the emission of visible air contaminants into the atmosphere.	Yes/No	Applies to sources which emit or may emit air contaminants that are as dark or darker in shade than No. 1 on the Ringelman Chart for more than three (3) minutes in any one hour. Potentially applicable if investigation or remediation activities have the potential to produce visible emissions.	Yes
Nuisance	BAAQMD	Air Quality Management District Regulations, Rule 1-301	Prohibits the creation of a nuisance by emission of air contaminants.	Yes/No	Applies to source operations which emits or may emit air contaminants or other materials. Potentially applicable if investigation or remediation activities have the potential to generate air emissions.	Yes
Handling of Stockpiled Soil	BAAQMD	Air Quality Management District Regulation 8, Rule 40	Provides the requirements for maintaining, covering, and stockpiling excavated soil.	Yes/No	Applies to excavated soil which stockpiled on site for any length of time.	Yes
Risk Based Screening Levels	RWQCB	Application of Risk-Based Screening Levels and Decision Making to Sites With Impacted Soil and Groundwater	Requires minimum acceptable levels of chemicals in soil and groundwater be met to achieve closure	Yes/No	Applies specifically to remediation and cleanup of school sites. Directly applicable to remediation activities at the Site.	Yes

Table 7
Potential State ARARs

Requirement	Agency	Citation	Description	Applicable/ Relevant and Appropriate	Comments	ARAR Will Be Met For Project
Potential State Action-Specific ARARs						
Safe Drinking Water and Toxics Enforcement Act of 1986 (Proposition 65)	OEHHA	Cal. Health & Safety Code, Division 20, Chapter 6.6, Section 25249.5	Requires warnings of exposure to listed chemicals above specified concentrations or risk levels.	Yes/No	Investigation and remediation activities will consider warning requirements if they result in exposures above specified levels of "No significant risk".	Yes
VOC emissions from decontamination of contaminated soil	BAAQMD	Air Quality Management District Regulations, Rule 8-40	Limits VOC emissions from handling of contaminated soil by requiring specified management practices including covering stockpiles and trucks.	Yes/No	Potentially applicable to excavation of VOC-affected soil	Yes
California Hazardous Waste Control Law	DTSC	Cal. Health & Safety Code, Division 20, Chapter 6.5	Establishes standards for management of hazardous waste.			
Remediation Waste Staging	DTSC	Cal. Health & Safety Code, Section 25123.3	Establishes standards for management of remediation waste in staging piles	Yes/No	Applicable if excavated soil is temporarily managed in on-site staging piles	Yes
Criteria for identification of hazardous and extremely hazardous waste	DTSC	22 Cal. Code Regs. Division 4.5, Chapter 11	Establishes numerical criteria for identification of hazardous and extremely hazardous waste.	Yes/No	Investigation-derived residuals meeting these criteria must be managed as a hazardous waste.	Yes

Table 7
Potential State ARARs

Requirement	Agency	Citation	Description	Applicable/ Relevant and Appropriate	Comments	ARAR Will Be Met For Project
Hazardous waste generator standards	DTSC	22 Cal. Code Regs. Division 4.5, Chapter 12	Requirements for waste identification; obtaining an EPA identification number; use of the hazardous waste manifest; packaging, marking and labeling; accumulation time; recordkeeping and reporting.	Yes/No	Applicable to site activities involving generation of hazardous waste, such as generation of IDR.	Yes
Hazardous waste generator standards	DTSC	22 Cal. Code Regs. Division 4.5, Chapter 15, Article 3	Preparedness and prevention requirements.	Yes/No	Applicable to site activities involving generation of hazardous waste, such as generation of IDR.	Yes
Hazardous waste generator standards	DTSC	22 Cal. Code Regs. Division 4.5, Chapter 15, Article 4	Contingency Plan requirements.	Yes/No	Applicable to site activities involving generation of hazardous waste, such as generation of IDR.	Yes
Hazardous waste generator standards	DTSC	22 Cal. Code Regs. Section 66265.16	Training requirements.	Yes/No	Applicable to site activities involving generation of hazardous waste, such as generation of IDR.	Yes
Hazardous waste generator standards	DTSC	22 Cal. Code Regs. Division 4.5, Chapter 15, Article 9	Container management requirements.	Yes/No	Applicable to on-site accumulation of hazardous waste, such as some IDR, in containers for less than 90 days.	Yes

Table 7
Potential State ARARs

Requirement	Agency	Citation	Description	Applicable/ Relevant and Appropriate	Comments	ARAR Will Be Met For Project
Land disposal restrictions	DTSC	22 Cal. Code Regs. Division 4.5, Chapter 18	Prohibits land disposal of restricted hazardous waste without meeting treatment standards; recordkeeping requirements.	Yes/No	Applicable to restricted hazardous waste disposed off site.	Yes
Hazardous waste transportation requirements	DTSC	22 Cal. Code Regs. Division 4.5, Chapter 13	Requirements for hazardous waste transporters.	Yes/No	Applies to transportation of hazardous waste off site.	Yes
Removal Action Work Plan Oversight Requirements	DTSC	Cal Health and Safety Code, Division 20, Chapter 6.8, Section 25356.1	Requirements for review and approval of Removal Action Work Plan as part of School Property Evaluation and Cleanup	Yes/No	Requires DTSC to review and approve any Removal Action Work Plan for a school site.	Yes
California Occupational Safety and Health Act	Cal/OSHA	Cal. Labor Code, Division 5	Establishes workplace health and safety standards.			
Construction Safety Orders	Cal/OSHA	8 Cal. Code Regs. Chapter 4, Subchapter 4	Detailed construction safety requirements.	Yes/No	Applicable to on-site construction activities.	Yes
Electrical safety orders	Cal/OSHA	8 Cal. Code Regs. Chapter 4, Subchapter 5	Detailed electrical safety requirements.	Yes/No	Applicable to on-site investigation and remediation activities involving electrical wiring and equipment.	Yes
General Industry Safety Orders	Cal/OSHA	8 Cal. Code Regs. Chapter 4, Subchapter 7	Detailed safety requirements of general applicability.	Yes/No	Applicable to specific on site investigation and remediation activities.	Yes

Table 7
Potential State ARARs

Requirement	Agency	Citation	Description	Applicable/ Relevant and Appropriate	Comments	ARAR Will Be Met For Project
Hazardous Waste Operations and Emergency Response regulations	Cal/OSHA	8 Cal. Code Regs. Section 5192	Standards for employee safety during specified hazardous waste operations.	Yes/No	Worker protection standards applicable to cleanup operations.	Yes
Storm-Water Pollution Prevention Plan	SWRCB	Order No. 99-08-DWQ	Discharges of storm-water runoff associated with construction activities	Yes/No	Applicable to on-site construction activities.	Yes
Potential State Location-Specific ARARs						
No potential State location-specific ARARs have been identified for this Site.						

LFR

Table 8
Potential Local ARARs

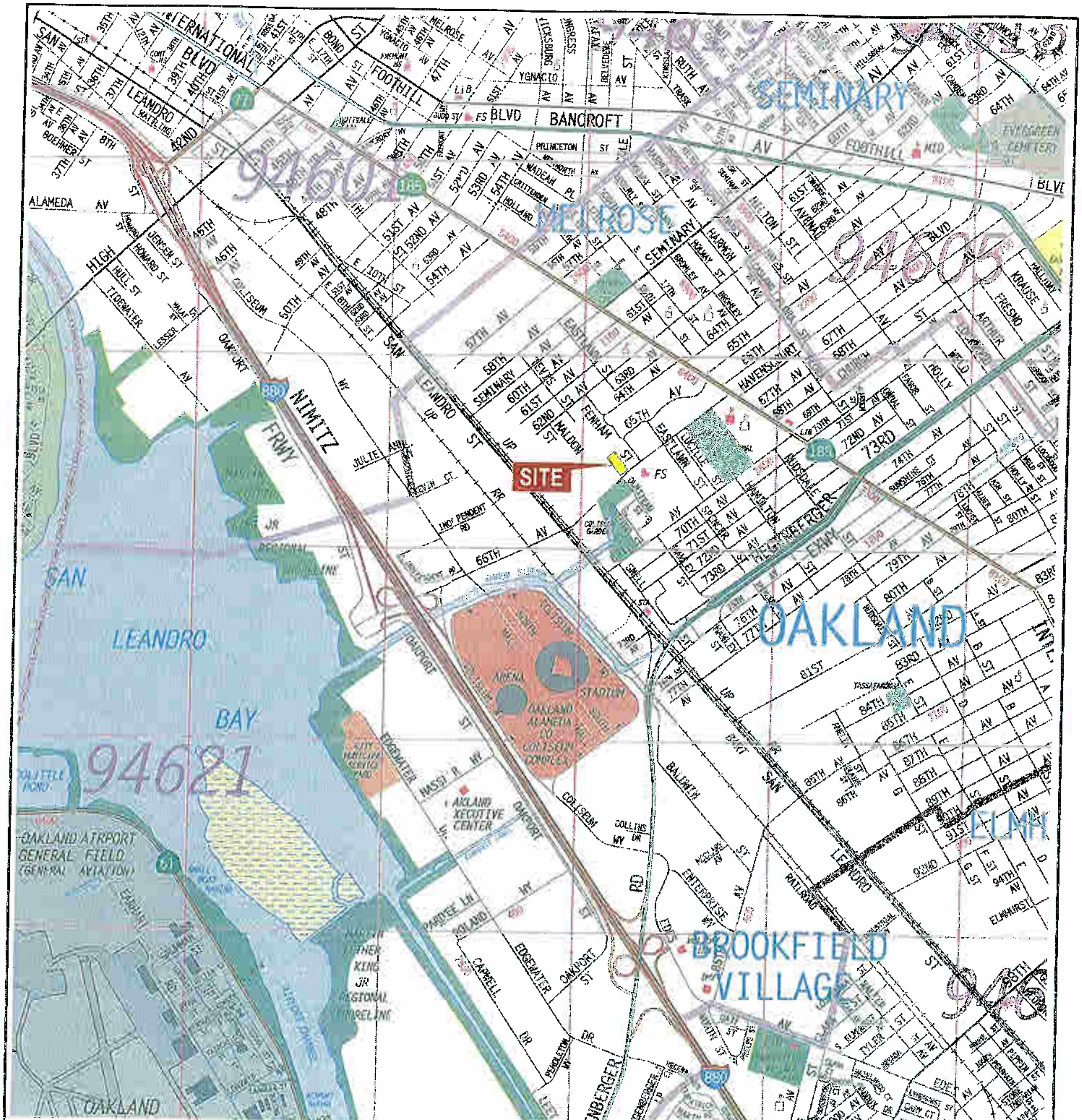
Requirement	Agency	Citation	Description	Applicable/ Relevant and Appropriate	Comments	ARAR Will Be Met For Project
Potential Local Action-Specific ARARs						
Excavation	City of Oakland Engineering Department	Chapter 12, Section 12 of the City of Oakland Municipal Code	Requires permit for excavation	No/No	Permits are required for excavation activities in public areas such as streets and sidewalks. Not applicable for the Site as excavation activities will be entirely within private property boundaries and do not involve sidewalks or other public rights of way.	No
Burn permit	City of Oakland Fire Department	Unknown	Requires permit for any open flame including cutting torches.	No/No	Unable to confirm requirement but is a standard requirement in most areas but no open flames will be present during remediation.	No
Potential Local Chemical-Specific ARARs						
Risk Based Corrective Action Program for sites with impacted soil	City of Oakland Department of Public Works, Urban Land Redevelopment Program	Oakland Urban Land Redevelopment Program Guidance Document	Requires minimum chemical levels in soil to be met before closure is granted	Yes/No	Applicable for remediation activities at the Site as final chemical levels should conform to the levels designated in the Oakland Urban Land Redevelopment Program Guidance Document	Yes
Conditional Use Permit for Remedial Action	City of Oakland Planning Department	Oakland Planning Code (Ordinance 12054, Section 2) 1998, Chapter 17.70.081	Requires a conditional use permit for a Hazardous Waste Management Activity on properties zoned M-30	Yes/Yes	Applicable for planned site remediation activities as the Site is zoned M-30 and soil with hazardous chemical levels will be excavated for off site disposal.	Yes

LFR

Table 8
Potential Local ARARs

Requirement	Agency	Citation	Description	Applicable/ Relevant and Appropriate	Comments	ARAR Will Be Met For Project
Potential Local Action-Specific ARARs						
Excavation	City of Oakland Engineering Department	Chapter 12, Section 12 of the City of Oakland Municipal Code	Requires permit for excavation	No/No	Permits are required for excavation activities in public areas such as streets and sidewalks. Not applicable for the Site as excavation activities will be entirely within private property boundaries and do not involve sidewalks or other public rights of way.	No
Burn permit	City of Oakland Fire Department	Unknown	Requires permit for any open flame including cutting torches.	No/No	Unable to confirm requirement but is a standard requirement in most areas but no open flames will be present during remediation.	No
Potential Local Chemical-Specific ARARs						
Risk Based Corrective Action Program for sites with impacted soil	City of Oakland Department of Public Works, Urban Land Redevelopment Program	Oakland Urban Land Redevelopment Program Guidance Document	Requires minimum chemical levels in soil to be met before closure is granted	Yes/No	Applicable for remediation activities at the Site as final chemical levels should conform to the levels designated in the Oakland Urban Land Redevelopment Program Guidance Document	Yes
Conditional Use Permit for Remedial Action	City of Oakland Planning Department	Oakland Planning Code (Ordinance 12054, Section 2) 1998, Chapter 17.70.081	Requires a conditional use permit for a Hazardous Waste Management Activity on properties zoned M-30	Yes/Yes	Applicable for planned site remediation activities as the Site is zoned M-30 and soil with hazardous chemical levels will be excavated for off site disposal.	Yes

Figures



MAP SOURCE:

ALAMEDA COUNTY
2002 Edition

N

0 2,000 4,000 FEET

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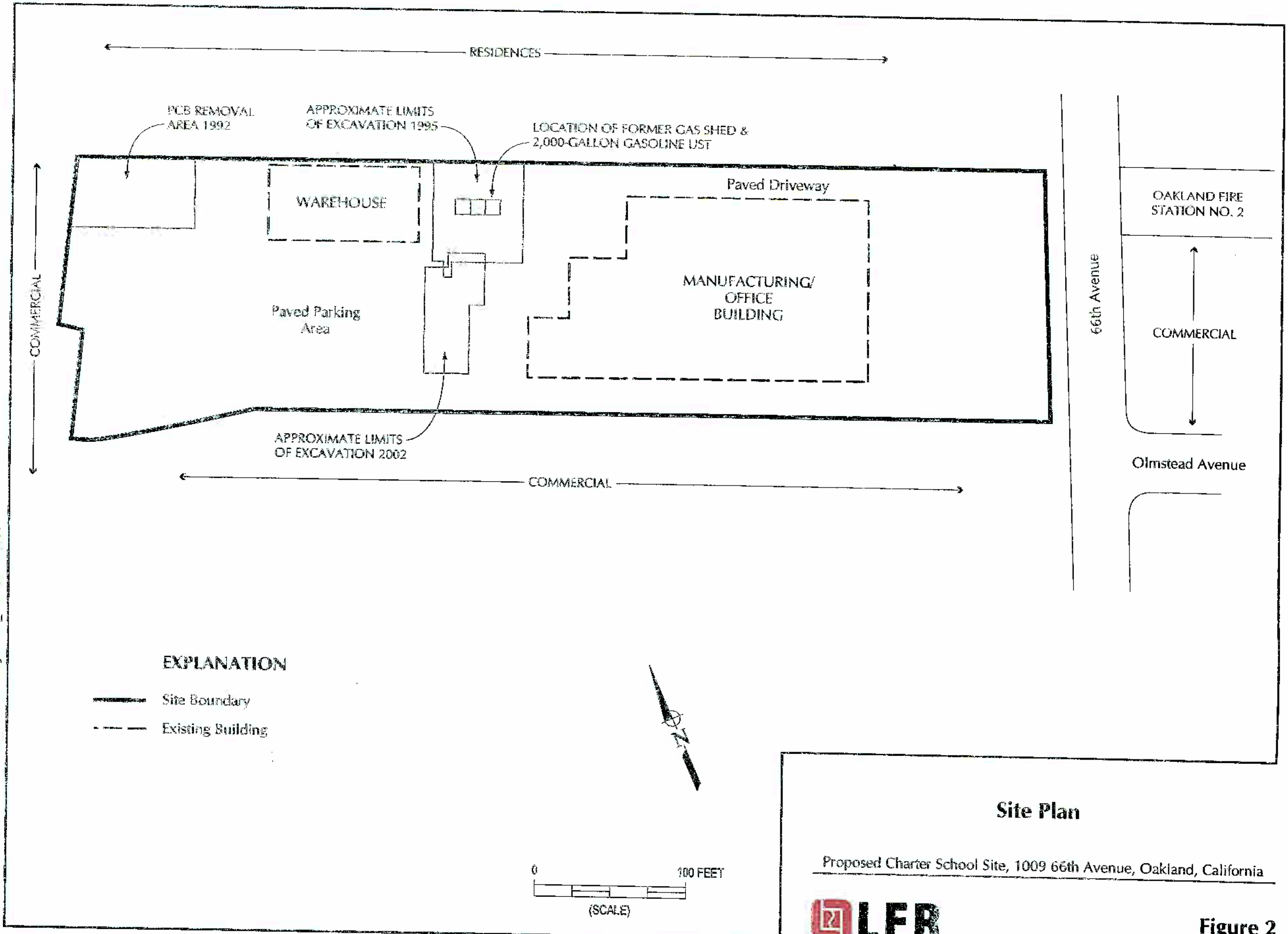
Site Vicinity

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 1

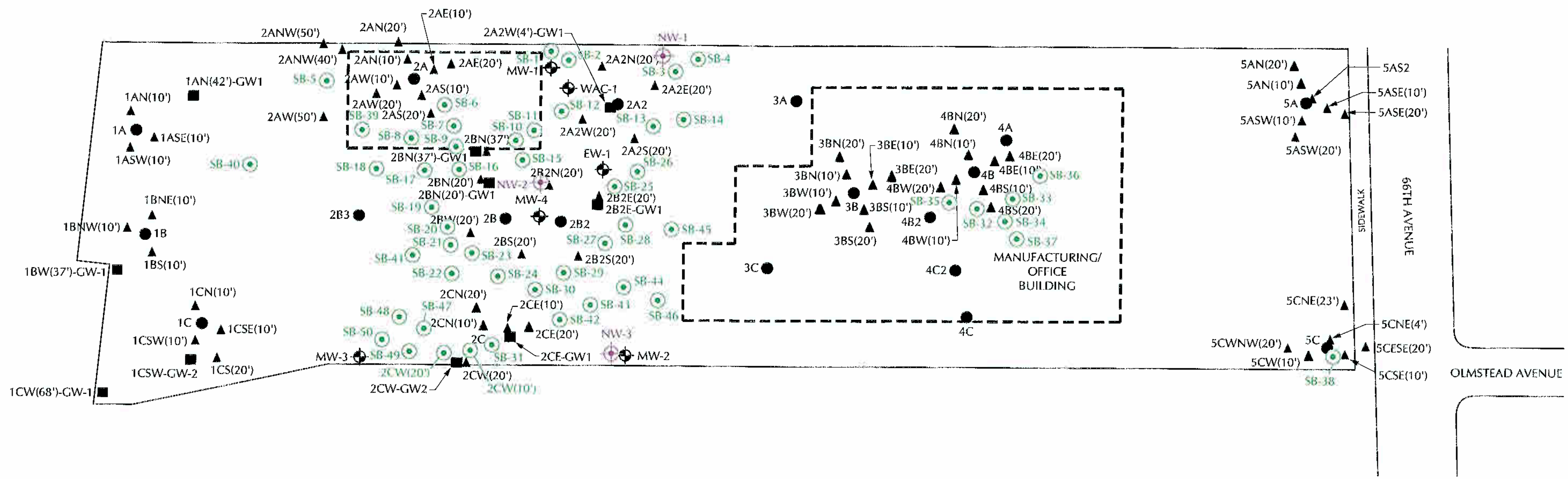


Site Plan

Proposed Charter School Site, 1009 66th Avenue, Oakland, California

LFR

Figure 2



N

0 55 FEET

(APPROXIMATE SCALE: 1" = 55')

LEGEND

- MW-1 MONITORING WELLS
- 1B PEA SAMPLE LOCATIONS - MARCH 2005
- 1C1 SSI SOIL SAMPLE LOCATIONS - AUG/SEPT 2005
- 1AN-GW SSI GW SAMPLE LOCATIONS - AUG 2005
- SB-1 LFR SSI SAMPLE LOCATIONS - DEC 2005/JAN 2006
- NW-1 NESTED MONITORING WELL

NOTE: BUILDINGS NOT TO SCALE; LOCATIONS ARE APPROXIMATE

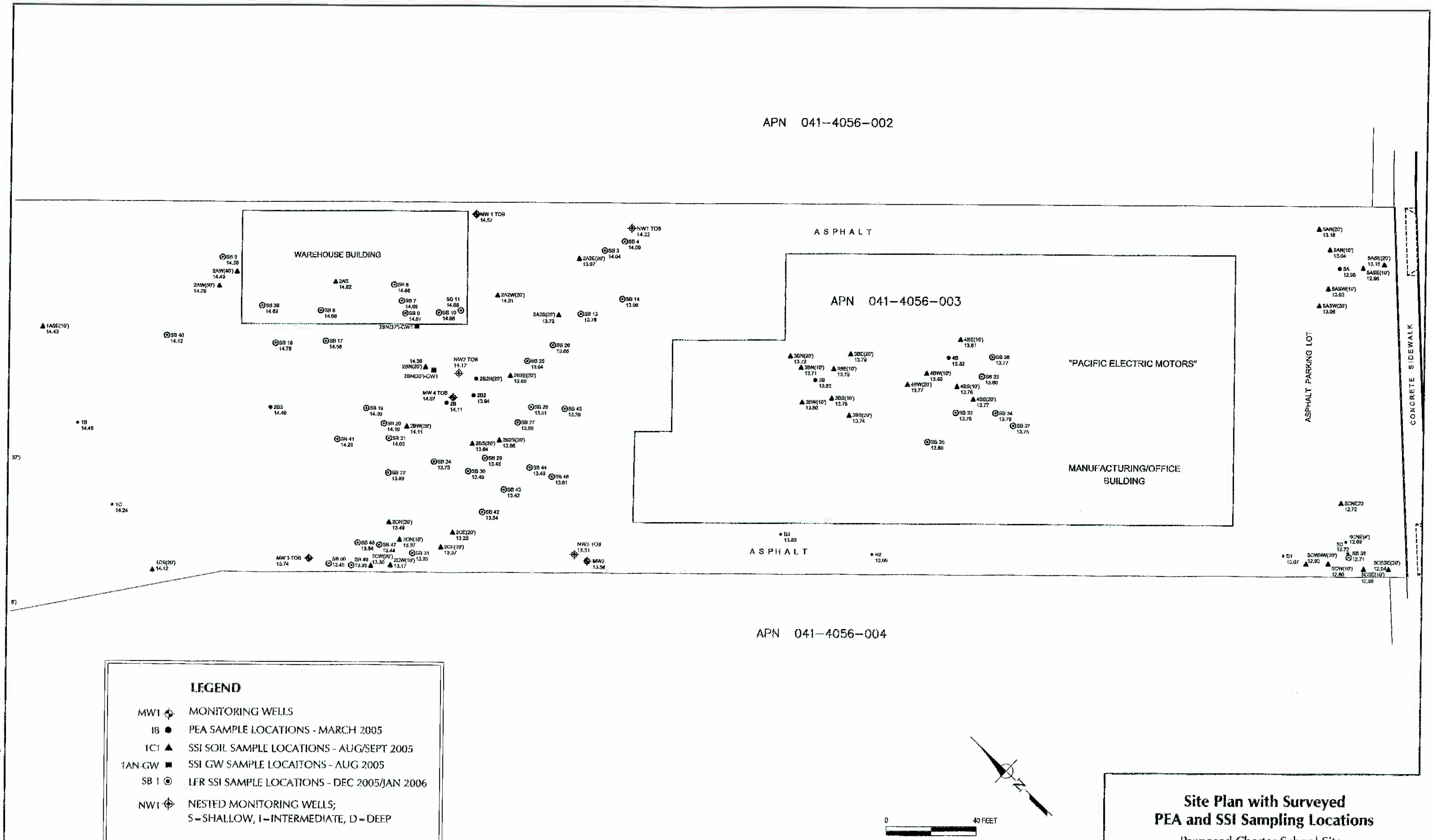
Site Plan with Approximate PEA and SSI Sampling Locations

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 3A

003-09155.00.006_F3A.AI 031406|sc:LDF



SOURCE: TRONOFF ASSOCIATES

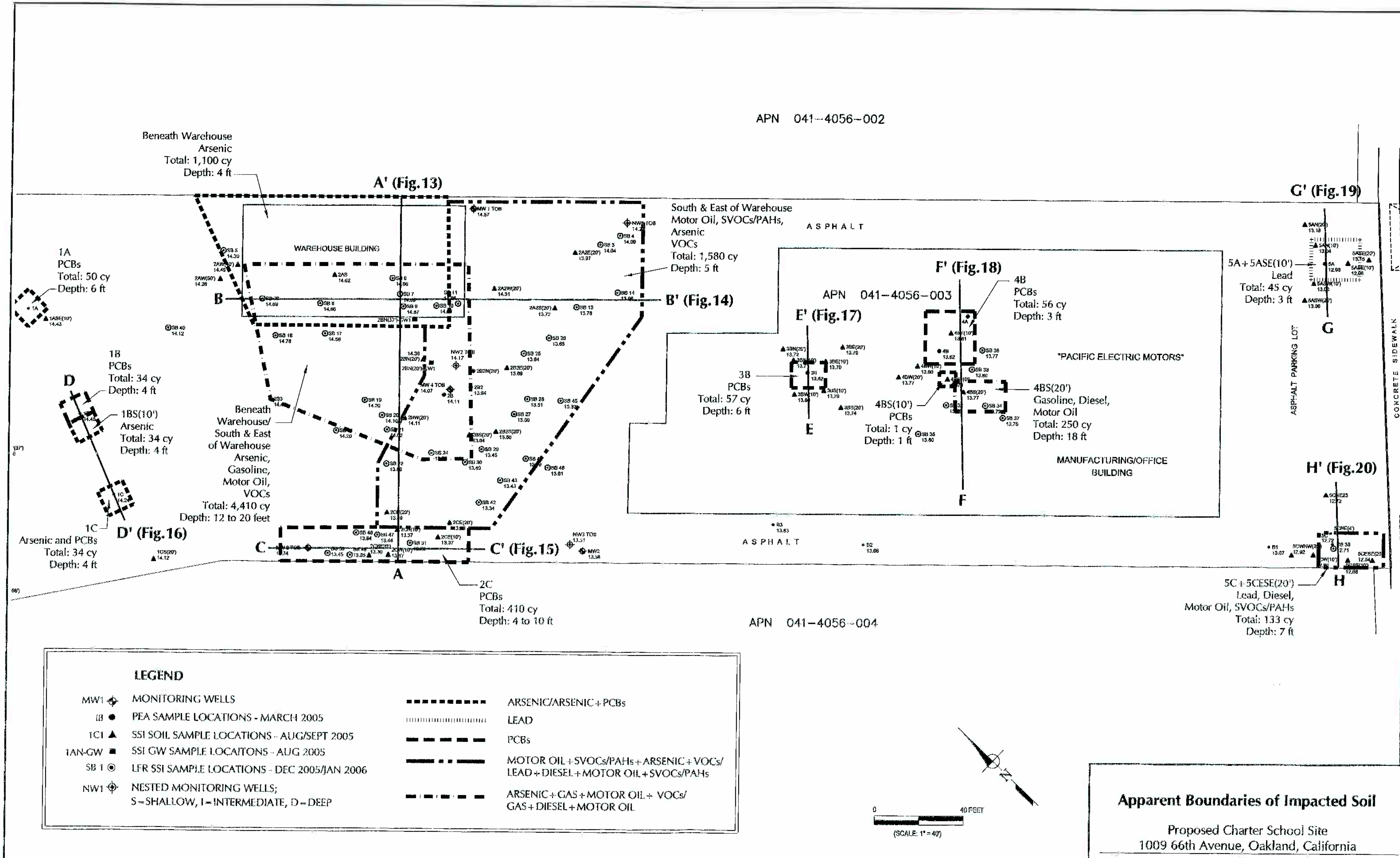
003-09155.00.004_F3B.DWG 031406jsc LDF

Site Plan with Surveyed PEA and SSI Sampling Locations

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 3B



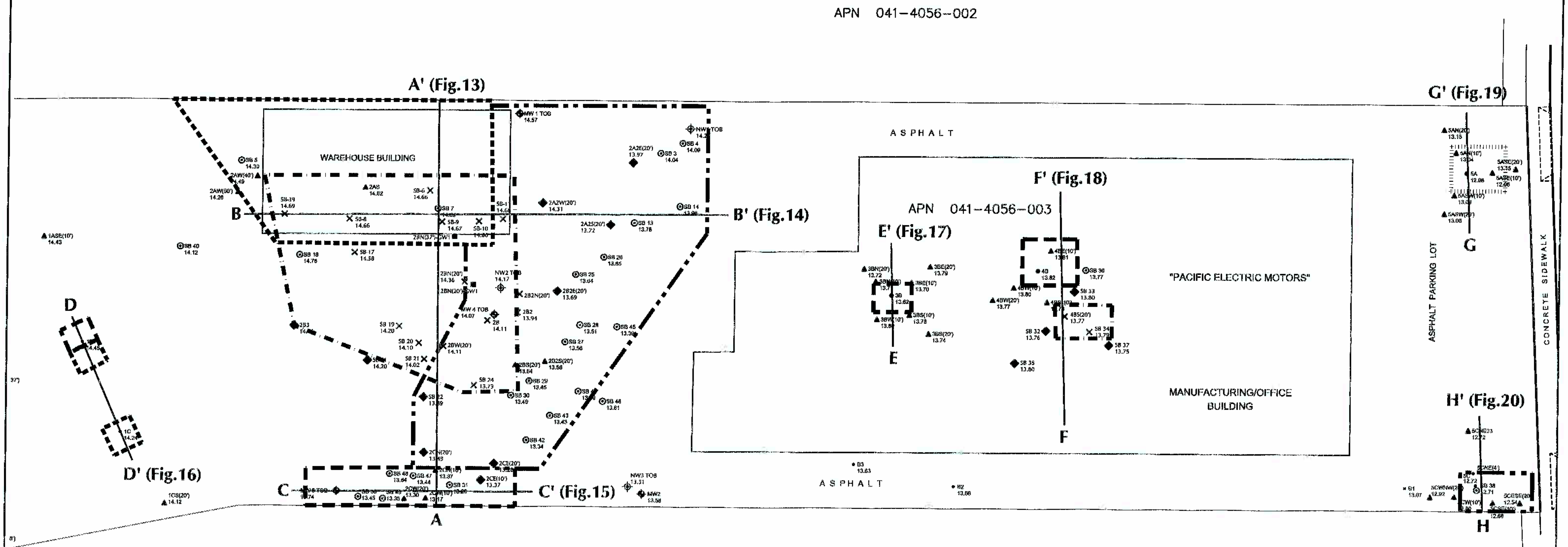
SOURCE: TRONOFF ASSOCIATES

Apparent Boundaries of Impacted Soil

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 4



LEGEND

MW1	MONITORING WELLS		ARSENIC/ARSENIC+PCBs
1B	PEA SAMPLE LOCATIONS - MARCH 2005		LEAD
1C1	SSI SOIL SAMPLE LOCATIONS - AUG/SEPT 2005		PCBs
1AN-GW	SSI GW SAMPLE LOCAITONS - AUG 2005		MOTOR OIL+SVOCs/PAHs+ARSENIC+VOCs/ LEAD+DIESEL+MOTOR OIL+SVOCs/PAHs
SB 1	LFR SSI SAMPLE LOCATIONS - DEC 2005/JAN 2006		ARSENIC+GAS+MOTOR OIL+ VOCs/ GAS+DIESEL+MOTOR OIL
NW1	NESTED MONITORING WELLS; S=SHALLOW, I=INTERMEDIATE, D=DEEP		
SB 8 ✕	GASOLINE AT CONCENTRATIONS ABOVE ACTION LEVEL (100 MG/KG)		
2CE(20') ◆	GASOLINE AT CONCENTRATION BELOW ACTION LEVEL (100 MG/KG)		

0 40 FEET
(SCALE: 1" = 40')

SOURCE: TRONOFF ASSOCIATES

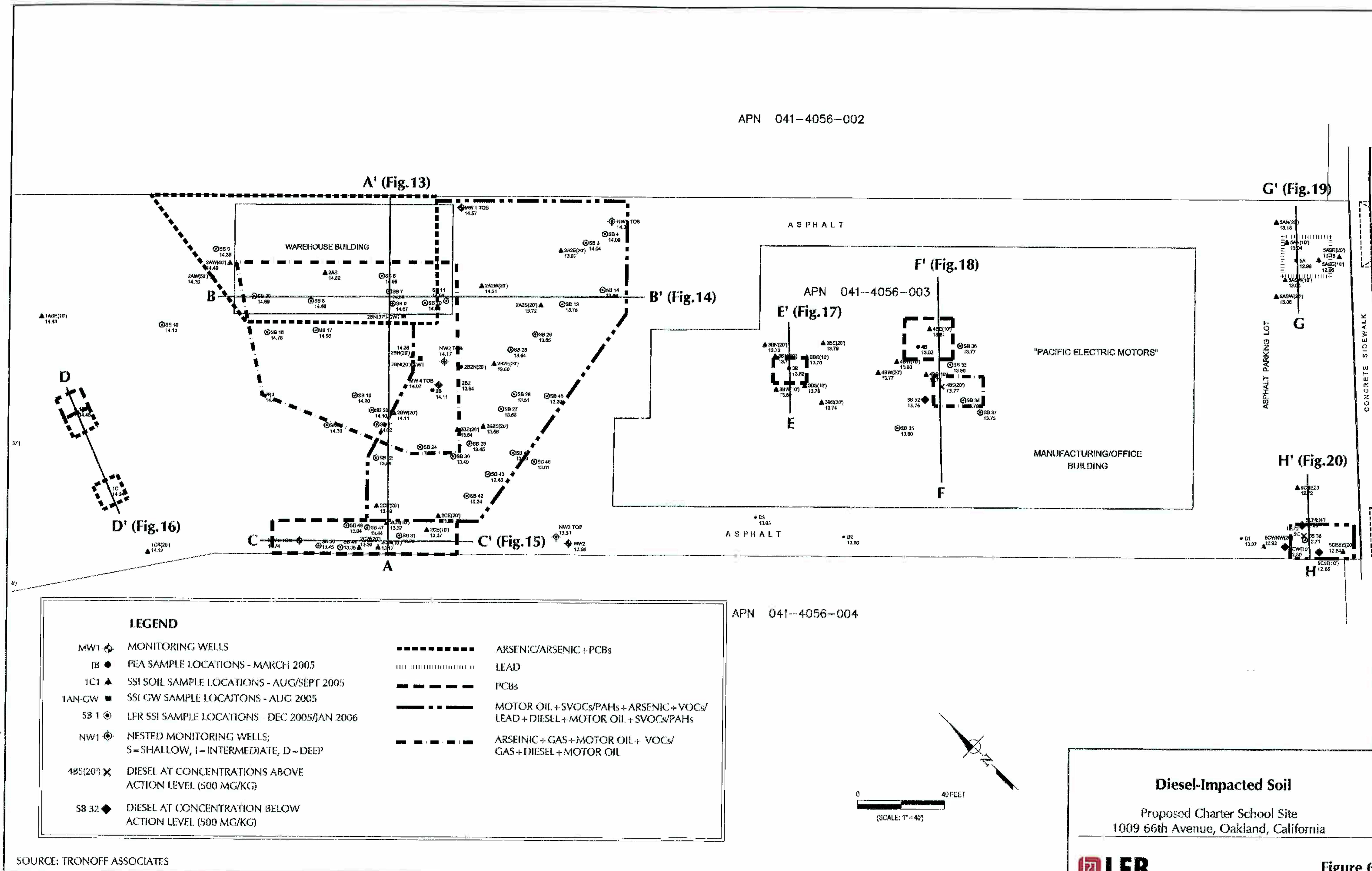
003-09155.00.004_F3.DWG 030206|sc:LDF

Gasoline-Impacted Soil

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 5

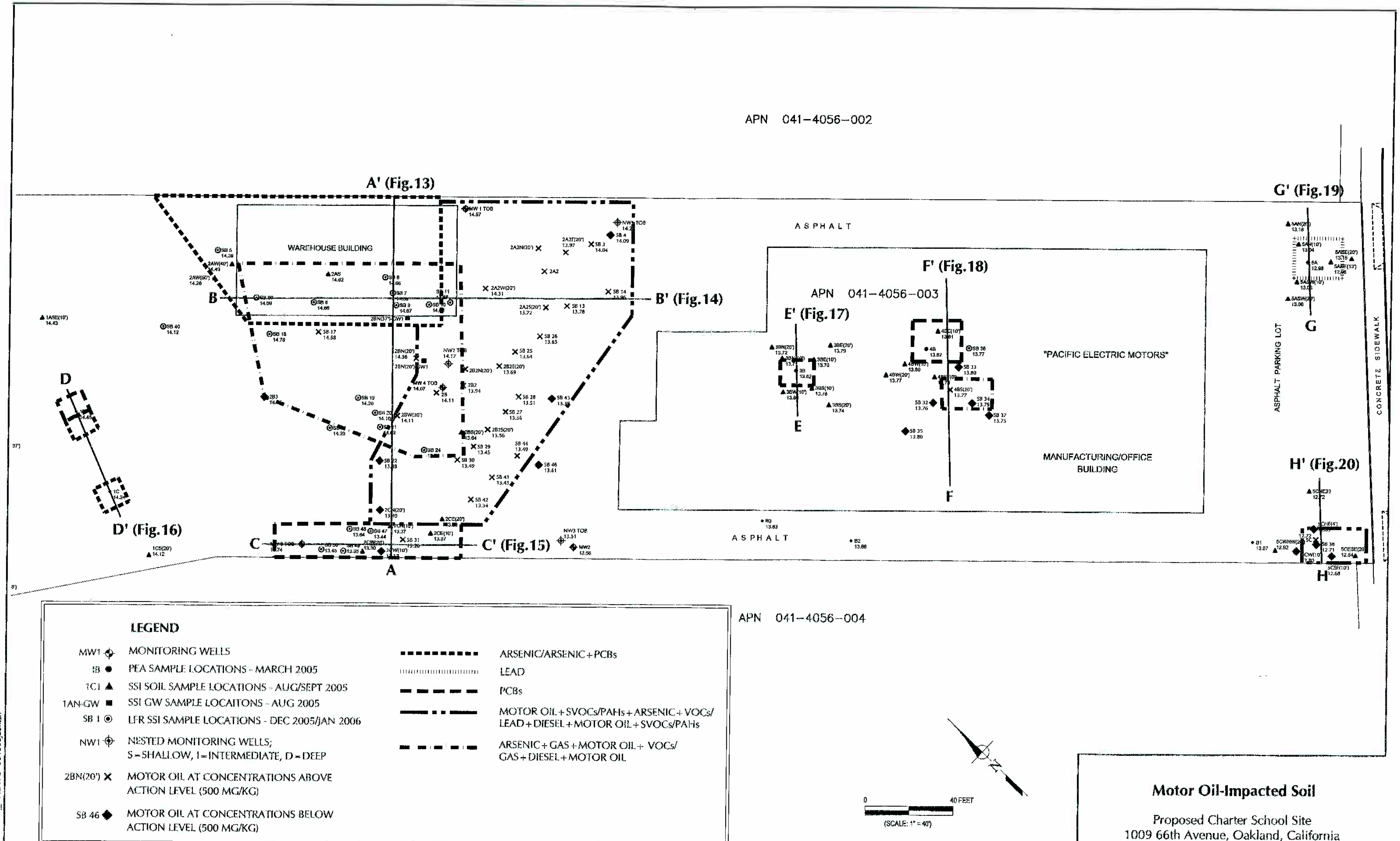


Diesel-Impacted Soil

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 6



SOURCE: TRONOFF ASSOCIATES

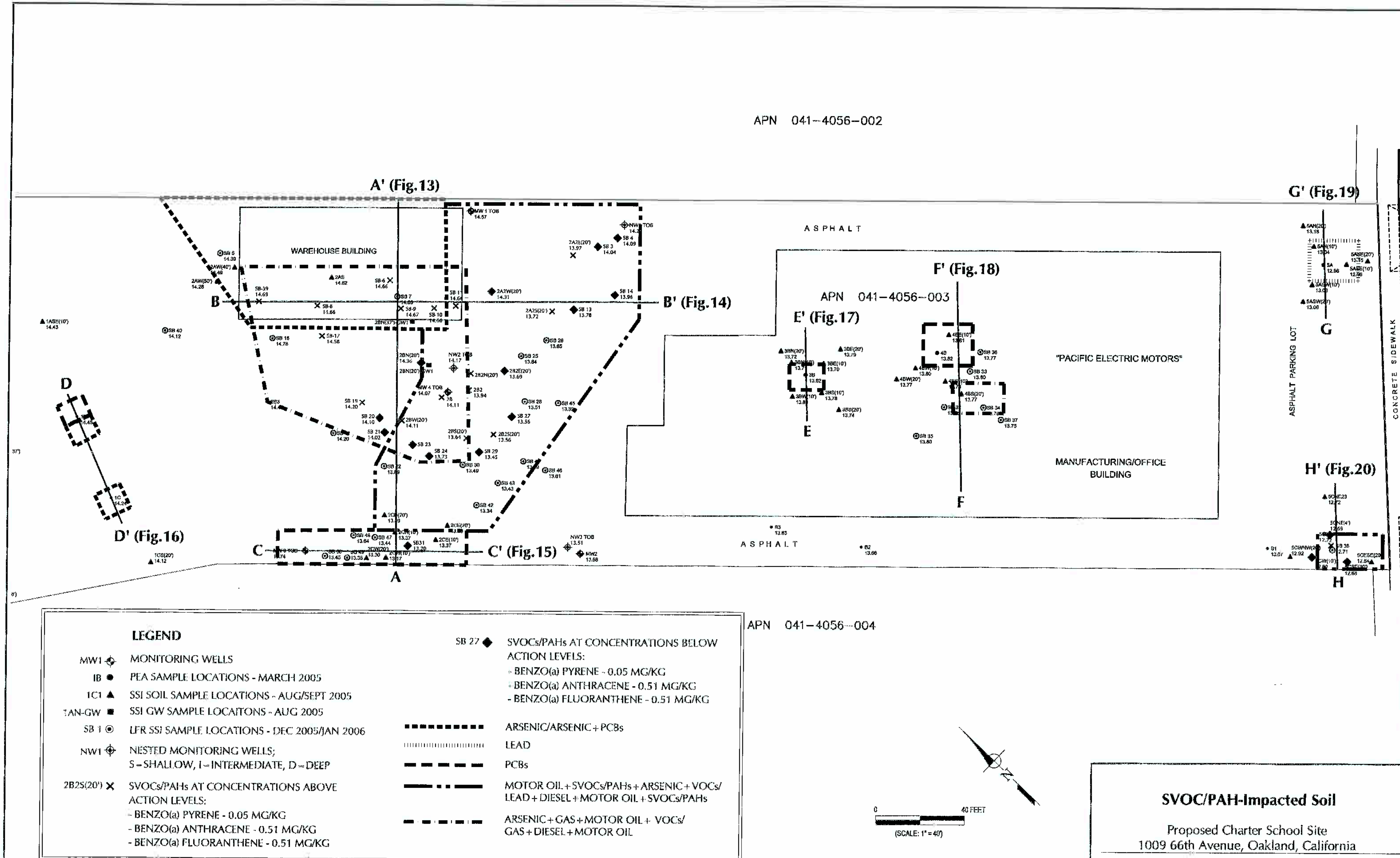
003-09155.00.004_F7.DWG 031506jsc:LDF

Motor Oil-Impacted Soil

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 7

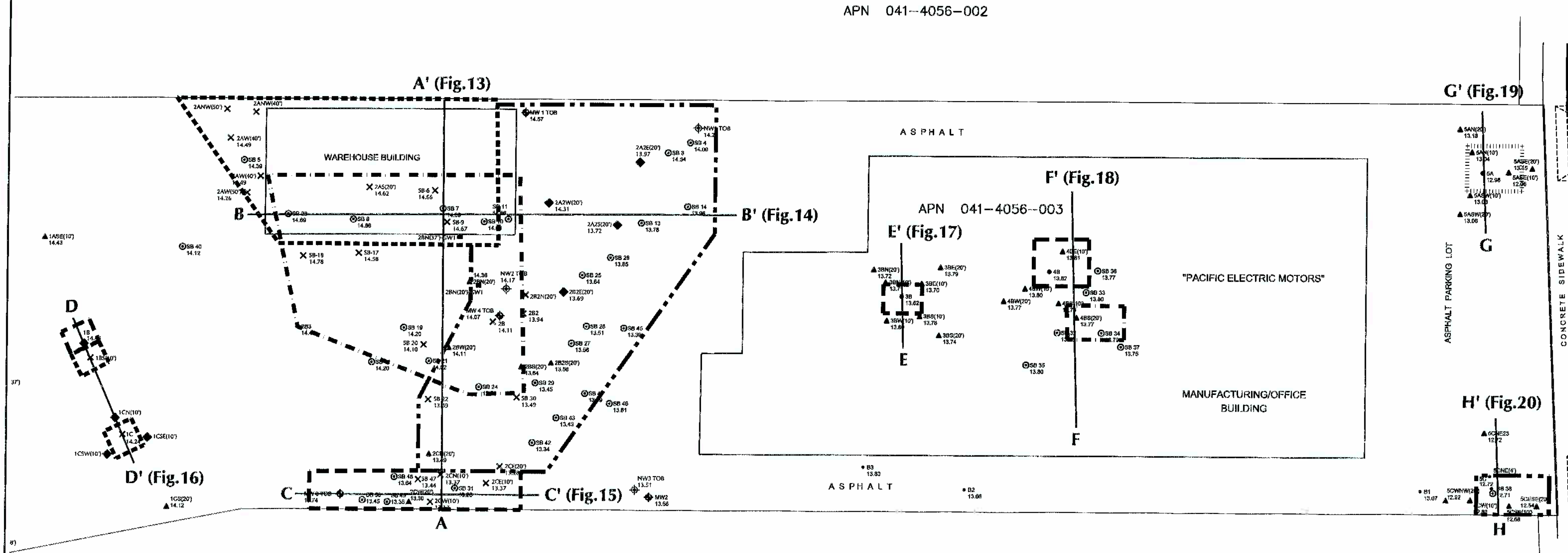


SVOC/PAH-Impacted Soil

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 8



LEGEND

MW1 ⊕	MONITORING WELLS
1B ●	PEA SAMPLE LOCATIONS - MARCH 2005
1C1 ▲	SSI SOIL SAMPLE LOCATIONS - AUG/SEPT 2005
1AN-GW ■	SSI GW SAMPLE LOCAITONS - AUG 2005
SB 1 ◎	LFR SSI SAMPLE LOCATIONS - DEC 2005/JAN 2006
NW1 ⊕	NESTED MONITORING WELLS; S=SHALLOW, I=INTERMEDIATE, D=DEEP
SB 8 ✕	ARSENIC AT CONCENTRATIONS ABOVE ACTION LEVEL (7 MG/KG)
2CE(20') ◆	ARSENIC AT CONCENTRATIONS BELOW ACTION LEVEL (7 MG/KG)
(dotted heavy line)	ARSENIC/ARSENIC+PCBs
(hatched line)	LEAD
(dashed line)	PCBs
(dash-dot line)	MOTOR OIL+SVOCs/PAHs+ARSENIC+VOCs/ LEAD+DIESEL+MOTOR OIL+SVOCs/PAHs
(dash-dot line)	ARSENIC+GAS+MOTOR OIL+ VOCs/ GAS+DIESEL+MOTOR OIL

0 40 FEET
(SCALE: 1" = 40')

SOURCE: TRONOFF ASSOCIATES

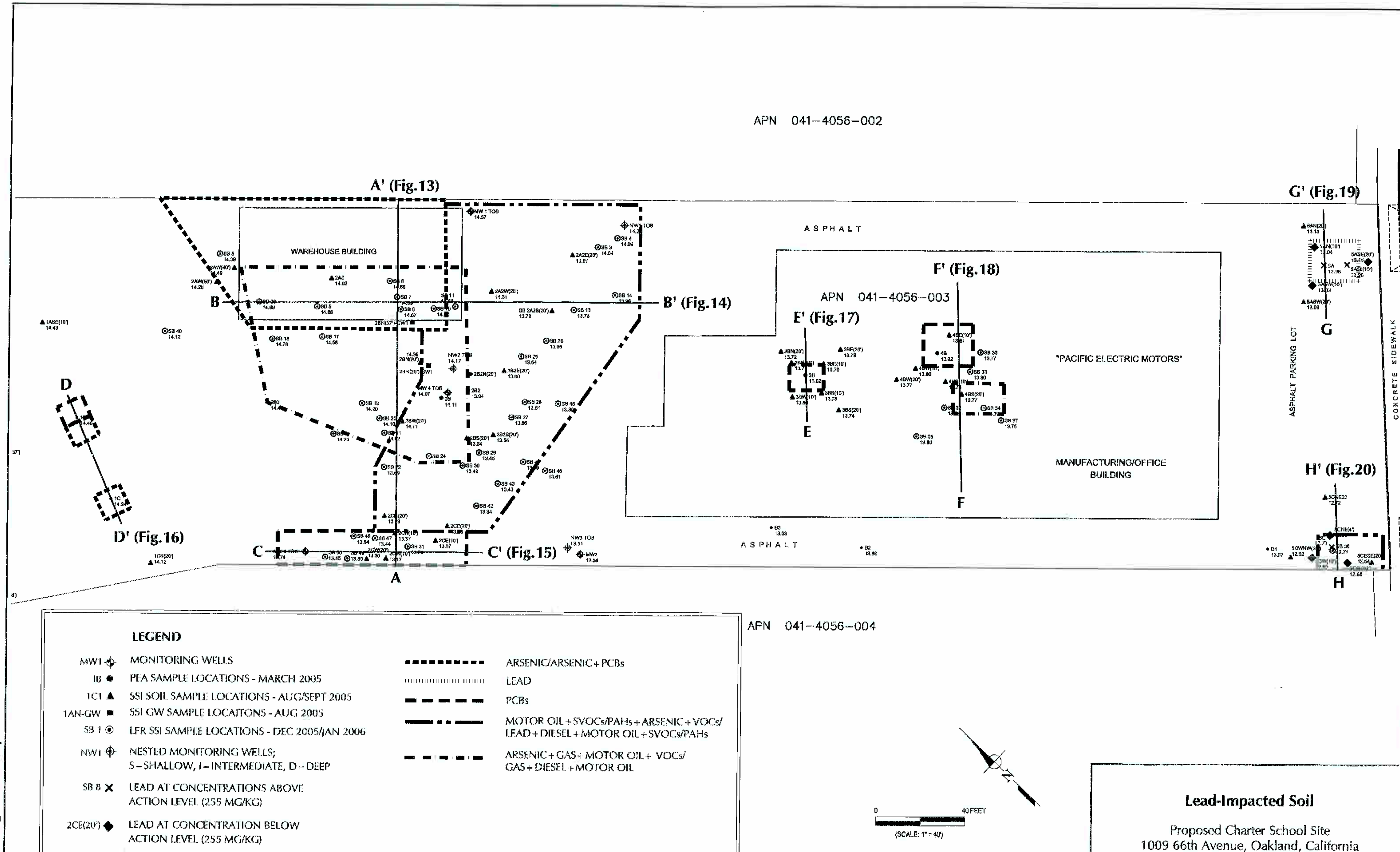
003.09155.00.004_F9.DWG 031506|sc:LDF

Arsenic-Impacted Soil

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 9



SOURCE: TRONOFF ASSOCIATES

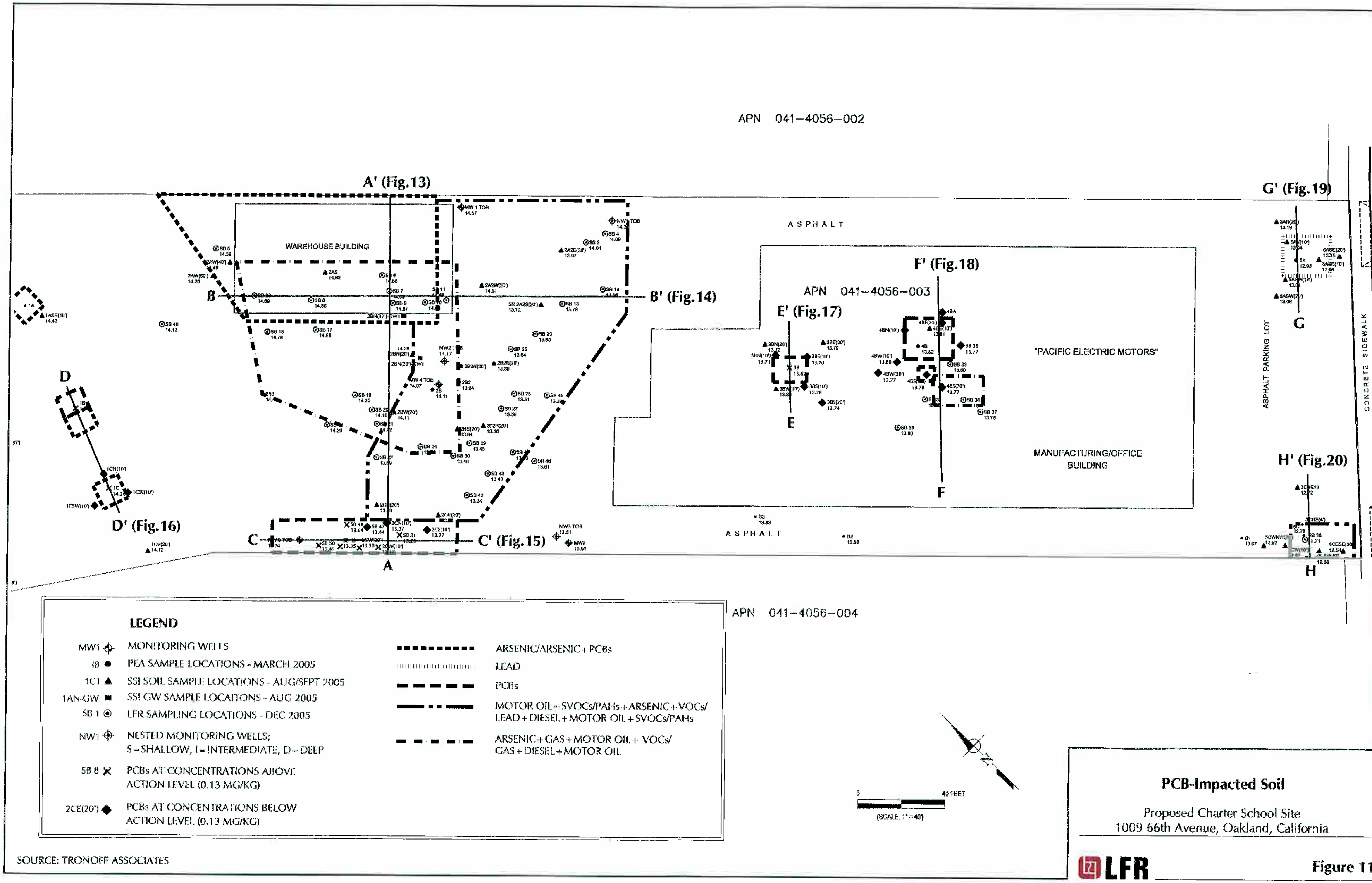
003-09155.00.004_F10.DWG 03/14/06sc:LDF

Lead-Impacted Soil

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 10

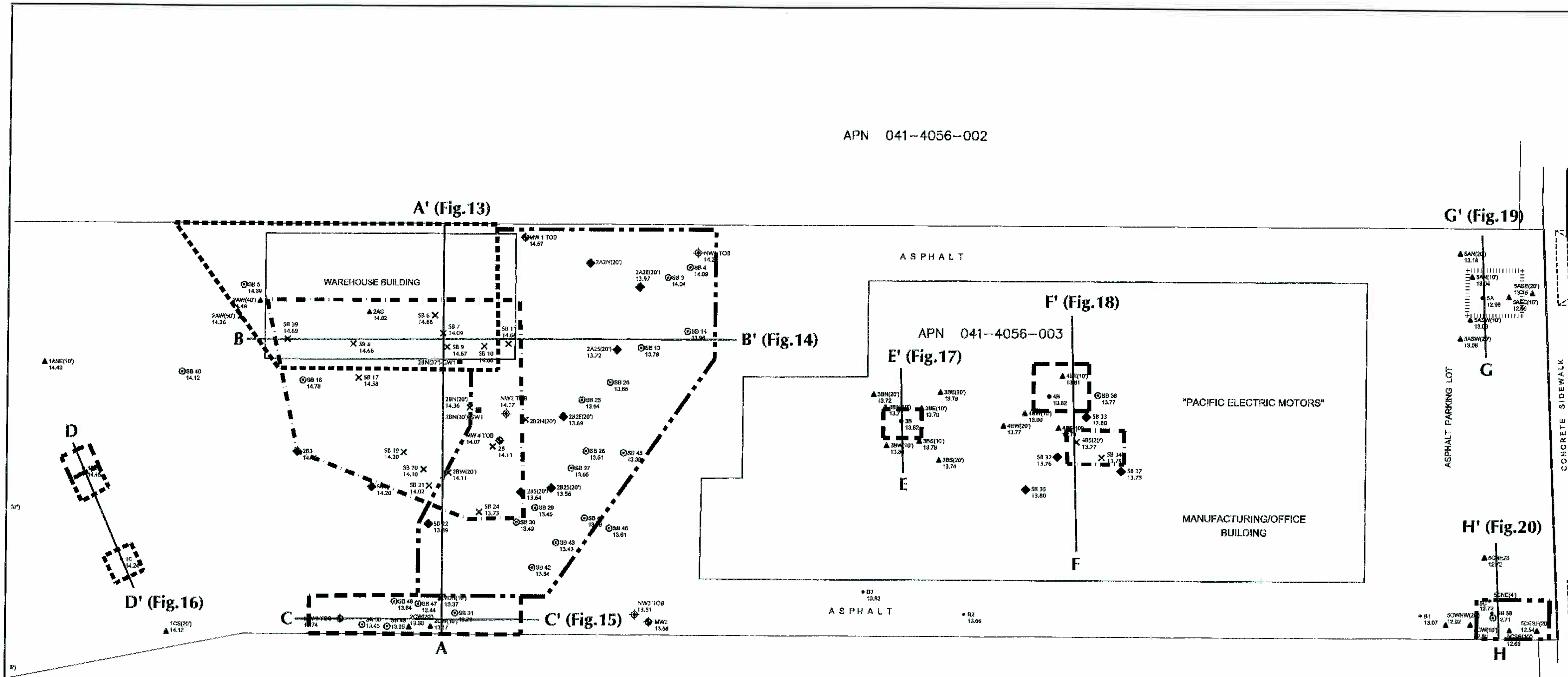


PCB-Impacted Soil

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 11



LEGEND

MW1	MONITORING WELLS
1B	PEA SAMPLE LOCATIONS - MARCH 2005
1C1	SSI SOIL SAMPLE LOCATIONS - AUG/SEPT 2005
1AN-GW	SSI GW SAMPLE LOCAITONS - AUG 2005
SB 1	LFR SSI SAMPLE LOCATIONS - DEC 2005/JAN 2006
NW1	NESTED MONITORING WELLS; S=SHALLOW, I=INTERMEDIATE, D=DEEP
SB 19	SAMPLING LOCATIONS WITH DETECTIONS OF BENZENE AND MTBE
2B3	SAMPLING LOCATIONS WITHOUT DETECTIONS OF BENZENE AND MTBE

ARSENIC/ARSENIC+PCBs
LEAD
PCBs
MOTOR OIL+SVOCs/PAHs+ARSENIC+VOCs/LEAD+DIESEL+MOTOR OIL+SVOCs/PAHs
ARSENIC+GAS+MOTOR OIL+VOCs/GAS+DIESEL+MOTOR OIL

0 40 FEET
(SCALE: 1" = 40')

N

SOURCE: TRONOFF ASSOCIATES

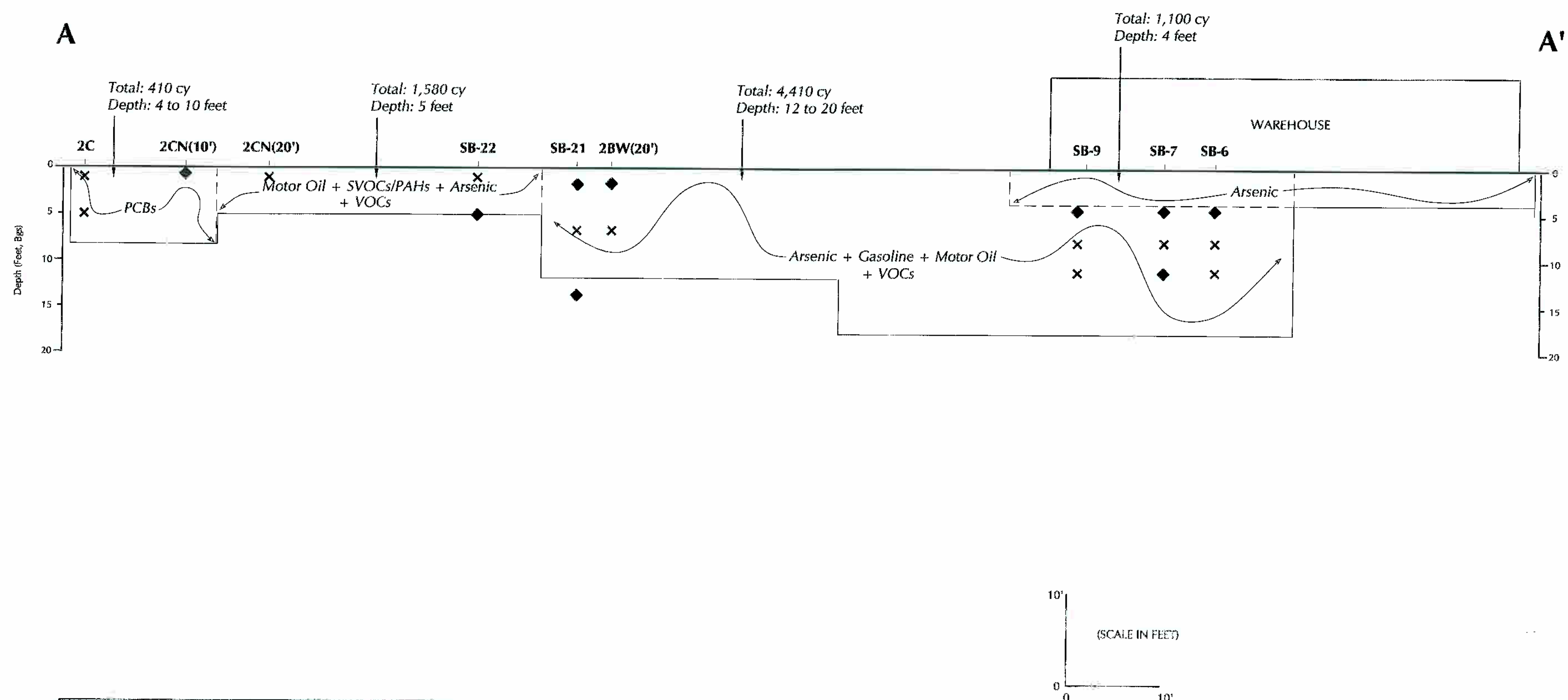
003.09155.00.004_F12.DWG 031406/sc:LDF

Benzene- and MTBE-Impacted Soil

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 12



LEGEND

× COMPOUNDS OF CONCERN AT CONCENTRATIONS ABOVE ACTION LEVELS

◆ COMPOUNDS OF CONCERN AT CONCENTRATIONS BELOW ACTION LEVELS

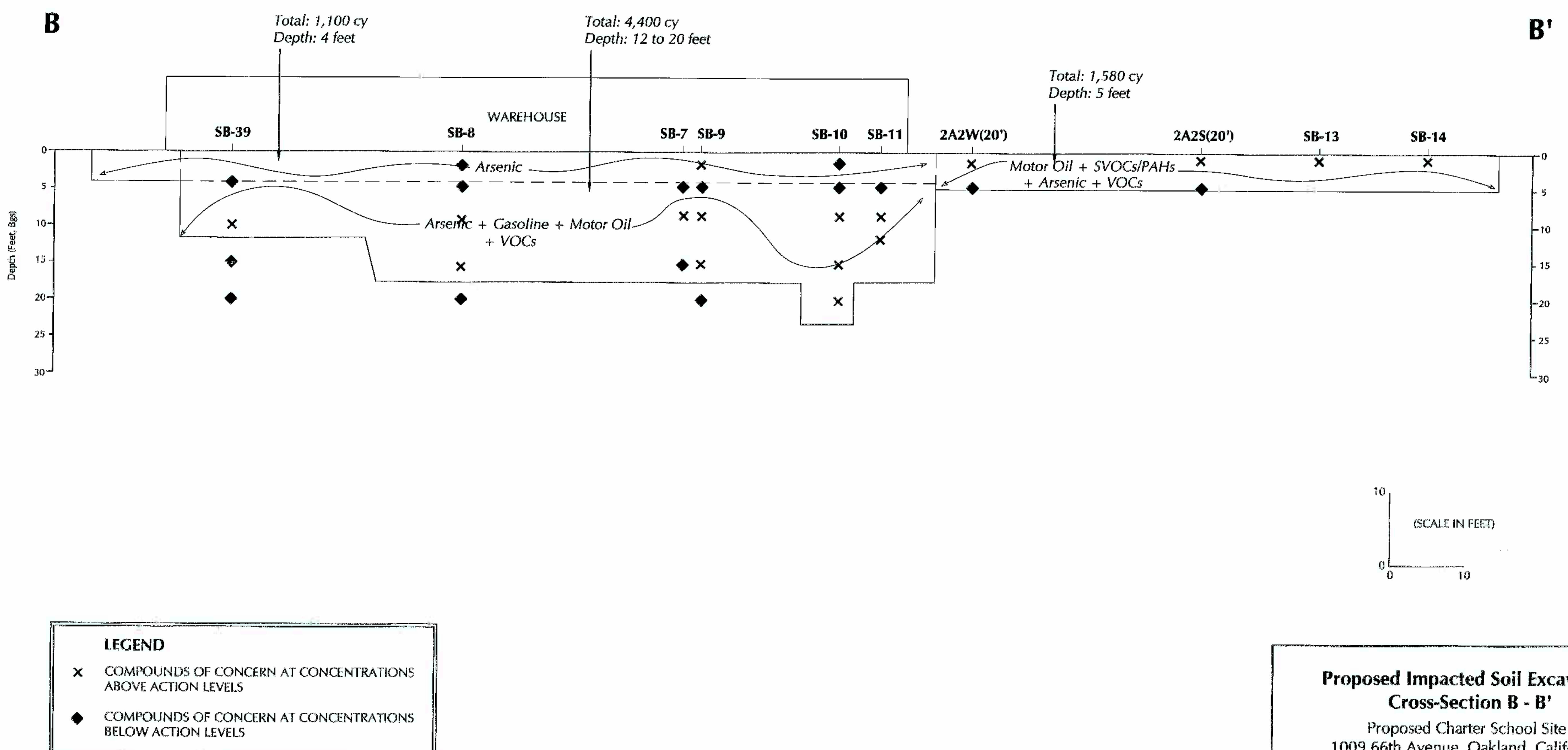
Proposed Impacted Soil Excavation Cross Section A - A'

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 13

003.09155.00.005_F13.DWG 031406jec:LDF



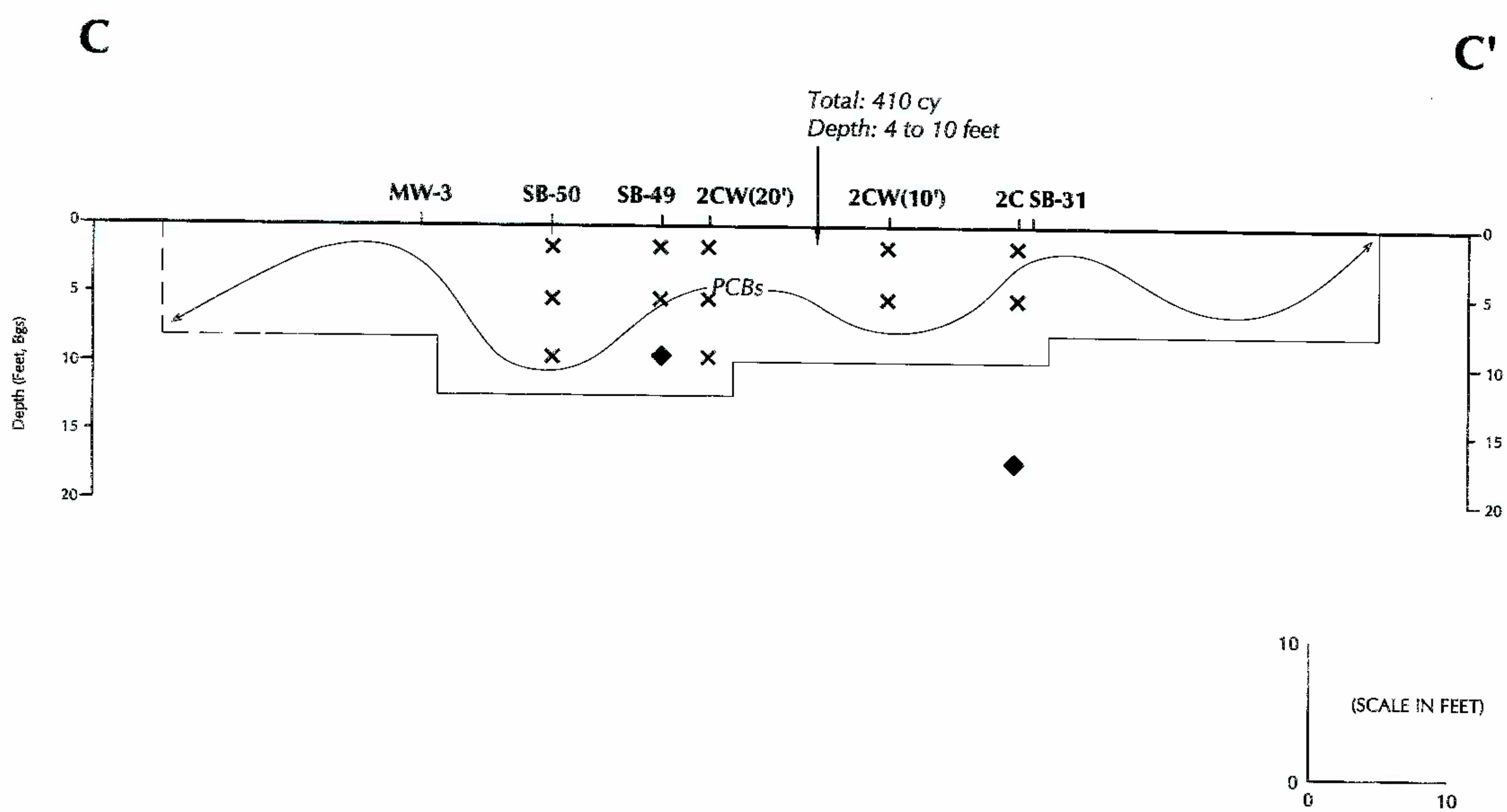
Proposed Impacted Soil Excavation
Cross-Section B - B'

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 14

003.09155.00.005_F14.DWG 031506jsc:LDF



LEGEND

× COMPOUNDS OF CONCERN AT CONCENTRATIONS ABOVE ACTION LEVELS

◆ COMPOUNDS OF CONCERN AT CONCENTRATIONS BELOW ACTION LEVELS

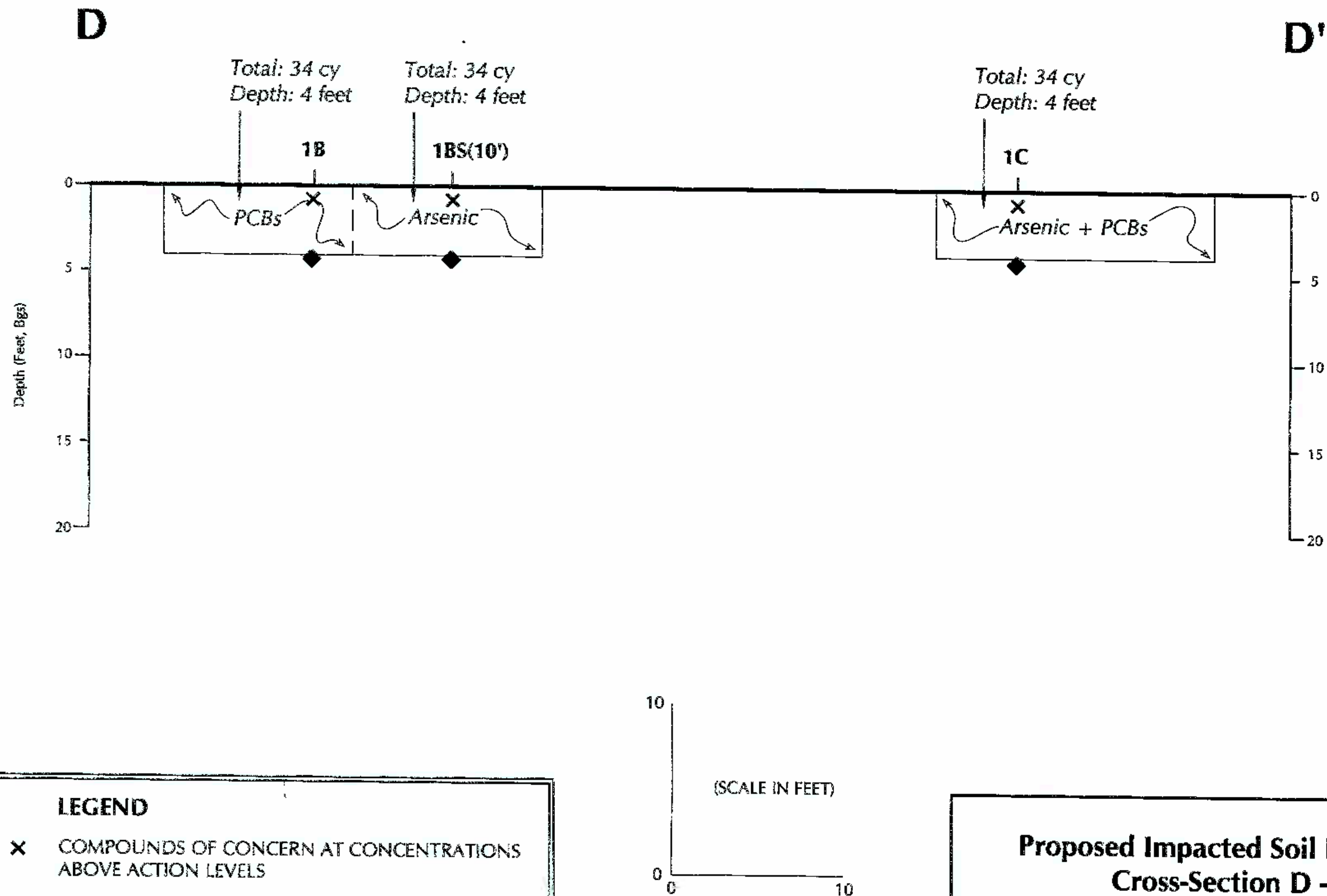
Proposed Impacted Soil Excavation
Cross-Section C - C'

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 15

003.09155.00.005_F15.DWG 031406jsc:LDF



LEGEND

× COMPOUNDS OF CONCERN AT CONCENTRATIONS ABOVE ACTION LEVELS

◆ COMPOUNDS OF CONCERN AT CONCENTRATIONS BELOW ACTION LEVELS

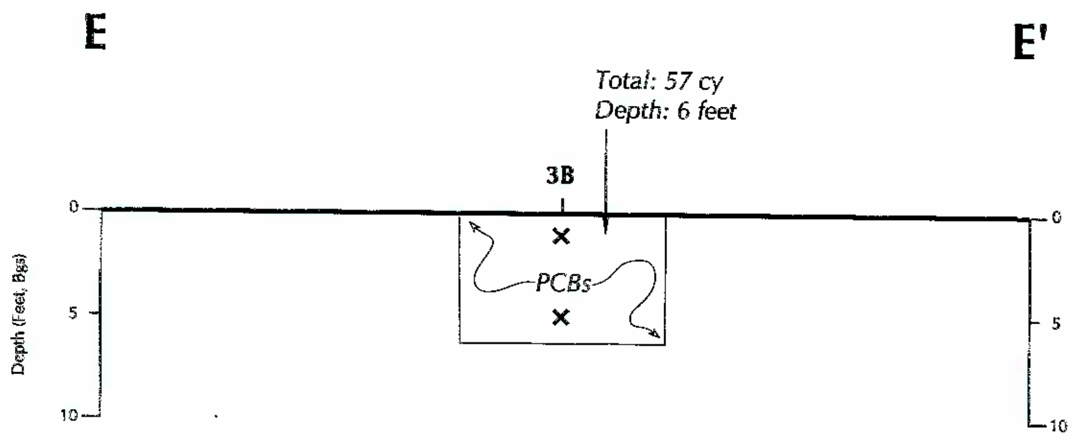
Proposed Impacted Soil Excavation Cross-Section D - D'

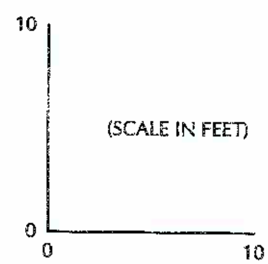
Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 16

003.09155.00.005_F16.DWG 031406jsc:LDF





LEGEND

- × COMPOUNDS OF CONCERN AT CONCENTRATIONS ABOVE ACTION LEVELS
- ◆ COMPOUNDS OF CONCERN AT CONCENTRATIONS BELOW ACTION LEVELS

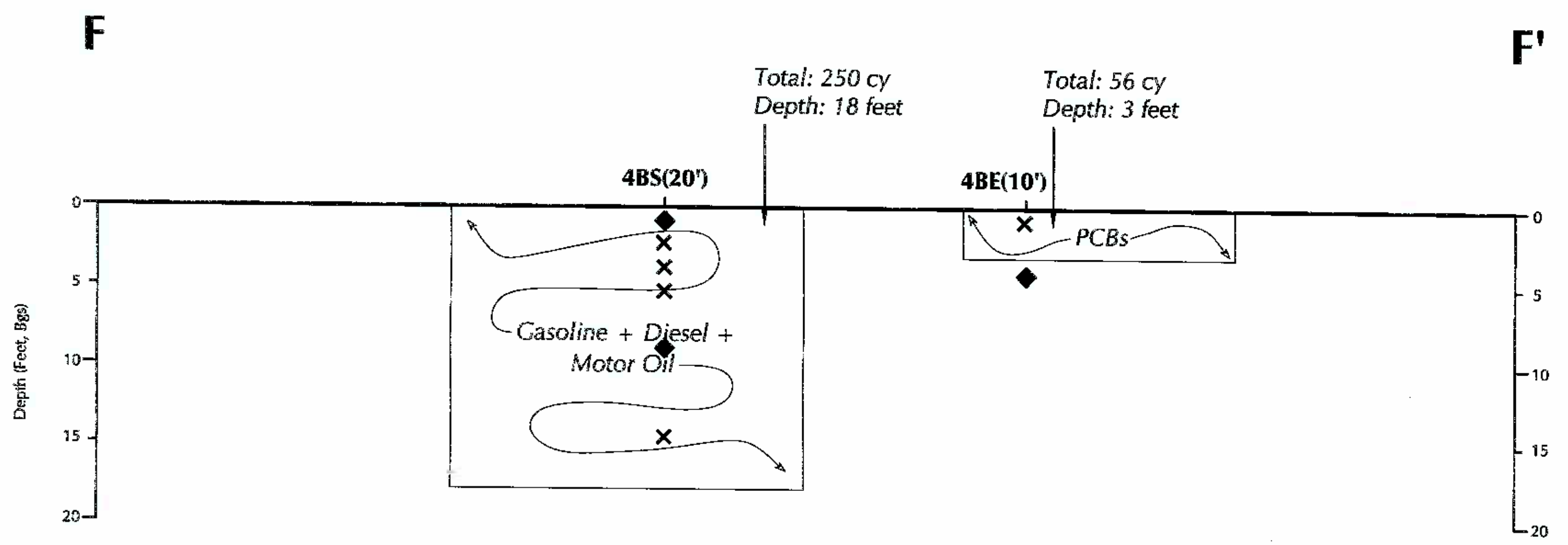
Proposed Impacted Soil Excavation Cross-Section E - E'

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 17

003.09155.00.005_F17.DWG 031406jsc:LDF



LEGEND

× COMPOUNDS OF CONCERN AT CONCENTRATIONS ABOVE ACTION LEVELS

◆ COMPOUNDS OF CONCERN AT CONCENTRATIONS BELOW ACTION LEVELS

10

0

0 10

(SCALE IN FEET)

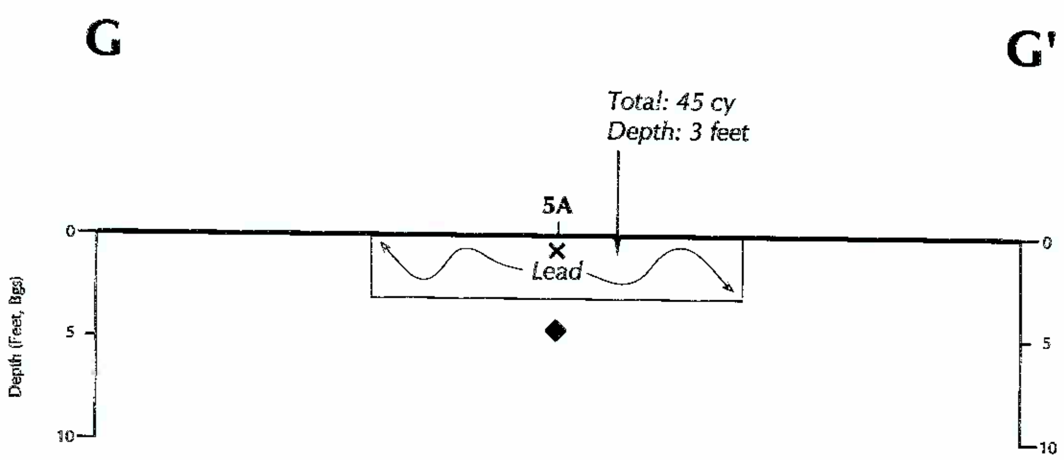
Proposed Impacted Soil Excavation
Cross-Section F - F'

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 18

003.09155.00.005_F18.DWG 031406jsc:LDF



LEGEND

× COMPOUNDS OF CONCERN AT CONCENTRATIONS ABOVE ACTION LEVELS

◆ COMPOUNDS OF CONCERN AT CONCENTRATIONS BELOW ACTION LEVELS

(SCALE IN FEET)

0 10

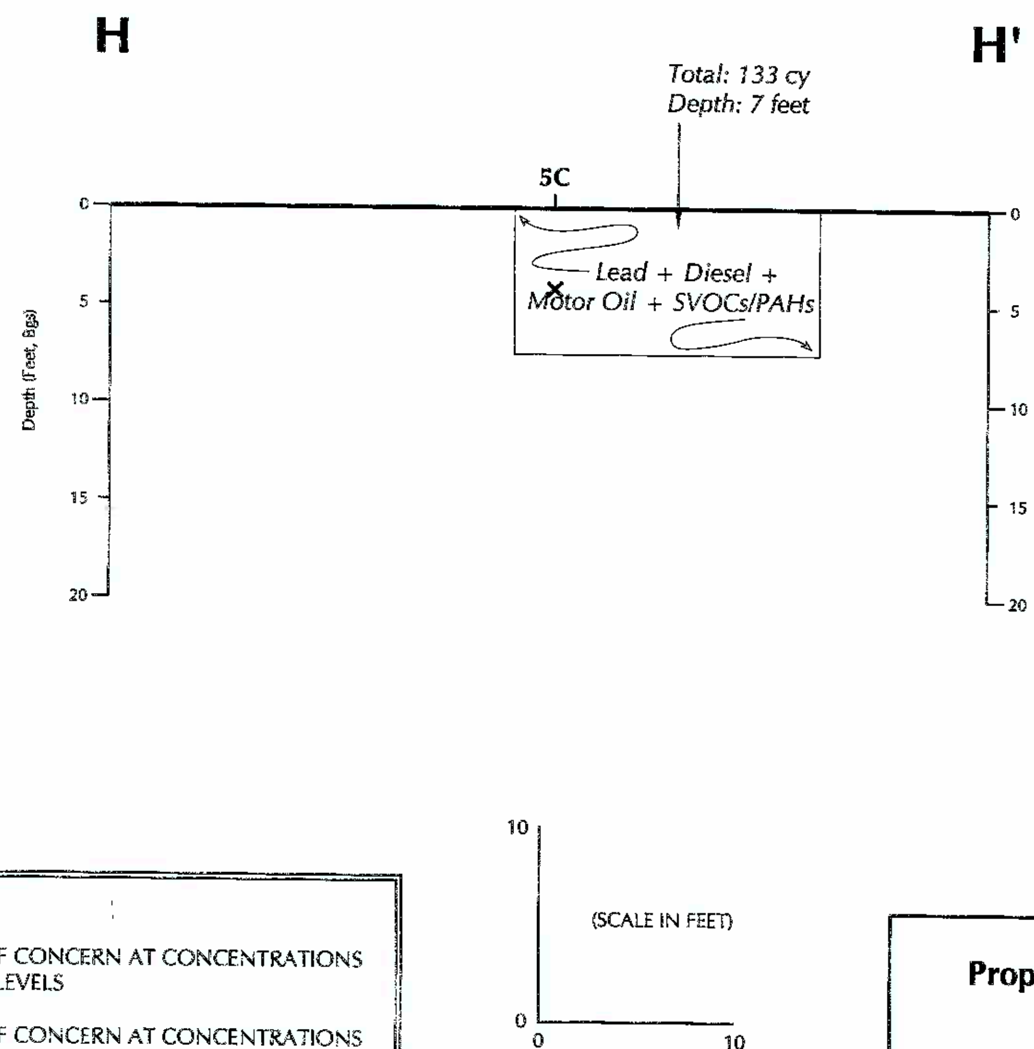
Proposed Impacted Soil Excavation
Cross-Section G - G'

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 19

003.09155.00.005_F19.DWG 031406jsc:LDF



LEGEND

× COMPOUNDS OF CONCERN AT CONCENTRATIONS ABOVE ACTION LEVELS

◆ COMPOUNDS OF CONCERN AT CONCENTRATIONS BELOW ACTION LEVELS

Proposed Impacted Soil Excavation Cross-Section H - H'

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 20

003.09155.00.005_F20.DWG 031406jsc:LDF

APPENDIX A

DTSC Comments and LFR Responses

Response to Comments on
Revised Removal Action Work Plan
Proposed Aspire Charter High School
1009 66th Avenue
Oakland, Alameda County, California
DTSC Site Code: 204147-11

LFR Inc. (LFR) submitted to the DTSC the report "Draft Removal Action Workplan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County (Site Code 204147) dated March 14, 2006. The DTSC identified discrepancies in the RAW that require clarification and/or modification. Comments identifying these discrepancies are presented in the DTSC letter dated April 14, 2006 from Mark Malinowski, Chief Schools Unit, Sacramento Branch addressed to Mr. Charles Robitaille, Director of Real Estate, Aspire Public Schools. LFR responses to these comments are presented below.

DTSC Comments:	*LFR Response:*
General Comments:	
1. Modify the Purpose to include: elimination of exposure pathways; and source removal for groundwater contamination. This modification will help identify and develop the relationship between the soil RAW and future groundwater investigation. The relationship needs to be maintained throughout the document. Additional specific comments regarding the soil RAW relationship to groundwater are provided below.	Purpose section of Executive Summary has been altered to include, "This Soil RAW was developed to identify and evaluate viable remedial alternatives for the remediation of soil impacted with gasoline, diesel, motor oil, SVOCs/PAHs, arsenic, lead, PCBs, VOCs, the elimination of exposure pathways, and source removal for impacted groundwater." Section 1.0 has been changed to include, "This Soil RAW was developed to identify and evaluate viable remedial alternatives for the remediation of impacted soil, the elimination of exposure pathways, and source removal for impacted groundwater."
2. Additional characterization as part of confirmation sampling will be required in areas where bounding data locations are uncertain or absent. Examples include arsenic in soil northwest of the warehouse and PCBs in soil west of the warehouse. Revise the RAW text and figures to reflect likely soil excavation boundaries and additional confirmation sampling where extent is uncertain.	Alternative 3 in Section 5.2 has been updated to include, "Beneath the Warehouse: Eight sidewall samples (along northern sidewall and western sidewall, including the area west of borings 2AW(40'), 2AW(50'), 2ANW(50'), and SB-5) and six floor samples analyzed for arsenic using EPA Method 6010B."

DTSC Comments:	*LFR Response:*
Specific Comments:	
1. Section 3.5 (Additional Site Investigation): This section states that delineation of PCBs and VOCs in groundwater will occur prior to implementation of the soil RAW and the results are to be presented in a separate groundwater RAW. Modify this section to indicate that the groundwater investigation is to follow implementation of the soil RAW, and the results will be presented in a SSI report. A groundwater RAW is not required at this time.	Section 3.5 has been updated to include, "Additional site investigations to delineate the extent of VOCs and PCBs in groundwater will be performed following implementation of the Soil RAW and the results will be presented in a Supplemental Site Investigation report."
2. Section 3.5 (Additional Site Investigation): Include a plan for the sampling and abandonment of onsite groundwater monitoring wells prior to implementation of the soil RAW. This section also needs to describe the relationship of the soil RAW to the future groundwater investigation (i.e., source removal and dewatering affecting the groundwater concentrations).	Section 3.5 has been updated to include text given in Attachment A. LFR prepared a "Well Sampling and Destruction Plan" to describe the sampling and abandonment of the on-site wells. This plan has been included as Appendix E of the Soil RAW.
3. Please Section 4.2.1 (PCG for Arsenic): This section provides a description of how the comparison was made but doesn't have any of the data or probability plots mentioned in the description. Provide the data and charts for the determination of arsenic described.	Section 4.2.1 has been changed to include, "The arsenic probability plot is presented in Appendix B of this Soil RAW."
4. Section 4.2.3. (PCGs for Remaining COCs): Provide the algorithms and assumptions used to develop the cleanup levels described. The references and some exposure assumptions should also be provided. HERD recommends that OEHHA's *Guidance for Assessing Exposures and Health Risks at Existing and Proposed School Sites, Feburary 2004, available on line at:* http://www.oehha.ca.gov/public_info/public/kids/pdf/SchoolscreenFinal.pdf be used for some of the school specific exposure assumptions used to develop proposed cleanup values. If clarification is needed, please contact Thomas Booze.	Section 4.2.4 has been updated to include, "The calculations are presented in Appendix B of this Soil RAW."
5. Section 4.4 (Endangerment Determination): Please revise this section to mention the other potential receptors such as nearby workers and potential students. The second sentence of the second paragraph should also mention inhalation of volatized organic compounds.	Section 4.4 has been altered to include: "The nearest sensitive receptors are residents of the homes located adjacent to the north of the Site. Additional receptors at risk in the area include workers at nearby facilities and future hypothetical students."

LFR

DTSC Comments:	*LFR Response:*
6. Include documentation from the selected disposal facilities indicating the future acceptance of the building debris, soil, and groundwater waste to be generated during the removal actions.	Section 7.7 has been updated to include text given in Attachment B.
7. Section 7.3.6 (Excavation Dewatering): This section describes three alternatives for the disposal of groundwater waste to be generated during the soil RAW implementation. To insure proper waste handling, provide the project specific plan that will be implemented for waste water storage, transportation, and disposal, including documentation as described in comment #7.	Section 7.3.6 has been changed to include the information presented in Attachment C.
8. Section 7.4 (Air and Meteorological Monitoring): How will "background" dust levels be established? What is the basis for 0.25 mg/m^3 above background as an action level for dust suppression measures? Also, include numbers and frequencies of monitoring samples.	Section 7.4.1 has been updated to include text given in Attachment D.
9. Section 7.8.1 (Borrow Source Evaluation): Bullet #6 states that OSHA Method ID-191 will be used to evaluate fill material for asbestos. The fill material must be analyzed by polarized light microscopy (PLM) with a detection limit of <0.25% by weight for asbestos. Modify the bullet item to reflect the required analysis.	Bullet #6 in Section 7.8.1 has been changed to, "asbestos, using Polarized Light Microscopy with a laboratory reporting limit of less than 0.25 percent (0.25%) by weight."
10. Section 7.8.3 (Diversion of Unacceptable Borrow): Remove the words "when possible".	Section 7.8.3 has been updated to read, "Material proposed for use as backfill will be evaluated as noted in Section 7.8.1 prior to transport of the material to the Site. The material will be rejected if it does not meet the DTSC's requirements for clean imported fill material."

DTSC Comments:	*LFR Response:*
11. The Health and Safety Plan (Appendix F): This section should contain Community Action Levels for the most significant COPCs to ensure that members of the community around the site are not exposed to significant concentrations of COPCs in the dust. Example calculations for lead and arsenic at this site are available upon request.	Section 10.0 of the Health and Safety Plan (HSP) included in Appendix F of the Soil RAW has been revised as follows "If dust in excess of background levels (greater than 0.25 mg/m^3 above background levels) is observed for a sustained period of time (greater than 5 minutes), appropriate dust suppression measures (e.g., spraying soil with water) will be undertaken. A total dust reading of 1.36 mg/m^3 would result in an exceedance of the Acute Reference Exposure Level of 0.00019 mg/m^3 established for arsenic by the California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA). A total dust action level of 0.25 mg/m^3 above background levels would be conservative for the various COCs detected on the Site that would be likely to adhere to windblown dust and protective of the on-site workers and members of the surrounding community. Calculations for airborne arsenic and lead concentrations are presented in Appendix C."
12. The Health and Safety Plan (Appendix F): Section 10.0 presents an Action Level for VOCs in onsite air measured by photoionization detector of 5 parts per million (ppm). The OSHA permissible exposure limit (PEL) for benzene is 1 ppm. Based on the known high concentrations of benzene in groundwater in the area of the proposed excavations, the Action Level of 5 ppm may not be adequate to protect onsite workers from potential exposures to benzene vapors. Propose activities to ensure OSHA limits are met.	Note 1. of Section 10.0 of the HSP included in Appendix F of the Soil RAW has been added and includes, "LFR will perform specific monitoring for benzene using detector tubes in order to document that site workers have not been exposed above the PEL for benzene."
13. The Health and Safety Plan (Appendix F): Section 6.7 describes air monitoring within the proposed excavations using a flame-ionization detector (FID). Ventilation is proposed when the FID indicates contaminant levels at or above 10% of the lower explosive limit (LEL). Propose activities to ensure OSHA limits are met.	Section 6.7 of the HSP has been updated to include, "LFR will control dust and volatile levels at the excavations by use of a water spray/mist and engineering controls (ventilation equipment, etc.) so that OSHA limits are met."

DTSC Comments:	*LFR Response:*
14. Transportation Plan (Appendix H): The transportation plan estimates the number of truckloads (24 ton maximum capacity) of impacted soil to be removed from the site during RAW implementation at 577 truckloads based on 13, 843 tons of soil. The main text of the RAW estimates a total of 15,229 tons of soil are to be removed during excavation. The higher tonnage would result in approximately 58 additional truckloads of soil. Modify Appendix E to reflect the higher number of truckloads.	Section 6.0 of the Transportation Plan (presented as Appendix H of the Soil RAW) has been updated to include, "The waste will be transported by dump trucks with a 24 ton maximum capacity. It is anticipated that between 8,194 cy (approximately 10,652 tons using 1.3 cy/ton) and 9,009 cy (approximately 15,315 tons using 1.7 cy/ton) of impacted soil will be removed from the Site for disposal. Approximately 444 truckloads (based on 10,652 tons) to 638 truckloads (based on 15,315 tons) will be necessary to remove the impacted soil from the Site."
15. Transportation Plan (Appendix H): Section 7.0 describes the proposed routes to be used by waste transportation vehicles carrying soil and groundwater. Include a map that clearly identifies the described routes of transport.	The street maps to facilities have been updated and are included in the Transportation Plan (see Appendix H of the Soil RAW).
16. Include a site map showing proposed storage, stockpile, staging and loading areas for soil, groundwater and onsite vehicles, as well as the decontamination areas.	The Activities Coordination Plan for the Soil Removal Action Work Plan has been prepared and is included in Appendix C of the Soil RAW.
17. Provide a cost estimate for the recommended remedial alternative (Alternative 3) including a probable range of costs based on potential deviations from the assumptions used in the estimate.	Alternative 3 of Section 5.2 of the Soil RAW has been changed to include, "A probable range of costs for removal and disposal of the impacted soil (Alternative 3) was calculated based on a range of impacted soil quantity present at the Site. The estimated cubic yards (based on current data) to be removed at each location are presented in Table 2. LFR estimates that a total of 8,194 in-place cy of impacted soil will be removed from the Site. This quantity was converted to tons using a 1.3 tons/cy conversion factor for a total of 10,652 tons (Scenario 1). For a conservative estimate, the amount of impacted soil at each location was increased by 10 percent (10%). For the conservative estimate, LFR assumed that a total of 9,009 in-place cy of impacted soil will be removed from the Site. This quantity was converted to tons using a 1.7 tons/cy conversion factor for a total of 15,315 tons (Scenario 2)," and, "Table 5b presents the range of estimated costs for implementation of the preferred remedial alternative."

Attachment A

"Based on the available data, it appears that petroleum hydrocarbons are leaching from the petroleum hydrocarbon-impacted soil on the Site into the groundwater. LFR anticipates that removal of petroleum hydrocarbon-impacted soil (source removal) and extraction of petroleum hydrocarbon-impacted groundwater (dewatering of the excavation) during implementation of the Soil RAW will result in a reduction of the concentrations of petroleum hydrocarbons in soil and groundwater at the Site."

"A total of eight groundwater monitoring wells are located on the Site, including five wells installed during a previous investigations and three nested wells installed by LFR during the additional SSI. Each of these wells will be sampled and abandoned prior to implementation of the Soil RAW in accordance with the groundwater sampling and monitoring well abandonment plan presented in Appendix E of this Soil RAW."

"Following development of the Site with a school campus, a minimum of three groundwater monitoring wells will be installed on the Site to document the concentrations of petroleum hydrocarbons in groundwater. DTSC's approval of the locations and screen intervals for the wells will be obtained prior to installation of the wells."

"Additional groundwater remedial actions will be proposed in the future if petroleum hydrocarbon concentrations in groundwater are present at unacceptable levels."

Attachment B

"LFR anticipates that one or more of the following disposal facilities may be used for disposal of waste from the Site:

- Kettleman Hills Landfill in Kettleman City, California
- Buttonwillow Landfill in Buttonwillow, California
- Altamont Landfill in Livermore, California
- Forward Landfill in Manteca, California
- West Contra Costa County Landfill in Richmond, California

General demolition debris and asbestos waste from abatement activities will be transported to West Contra Costa County Landfill, Altamont Landfill, or another appropriately licensed disposal facility.

In addition, East Bay MUD's Oakland Wastewater Treatment Plant may be used for the disposal of impacted water. East Bay MUD accepts dewatering effluent, including impacted groundwater, transported to its facility via truck if the concentrations of chemical pollutants meet its acceptance criteria; an appropriate disposal facility will be utilized for disposal of the dewatering effluent if the concentrations of chemical pollutants in the water do not meet East Bay MUD's acceptance criteria.

LFR requested audit packages from each of the above noted facilities describing the types of waste that they are licensed to accept and a letter stating that their facility would be able to accept waste (within the limits of their license) from the Site during the fall of 2006 when implementation of the Soil RAW is expected to occur. Audit packages and/or letters were not provided by some of the facilities due to legal concerns by their operators. Copies of audit packages and letters that were provided by the disposal facilities are presented in the Transportation Plan in Appendix H."

Attachment C

"At a minimum, dewatering effluent will be contained in storage tanks (e.g., 21,000-gallon Baker tanks) prior to discharge to allow the sediment to settle out. Filtration will be utilized as necessary, to ensure that clear water is discharged to the storm or sanitary sewer system.

Based on the historical land uses at the Site and groundwater sampling of the existing network of monitoring wells, groundwater underlying the Site has been impacted by chemical releases. Impacted groundwater pumped from the excavation will be placed into storage tanks (i.e., 21,000-gallon Baker tanks) that will be brought to the Site. The proposed location for the wastewater storage tanks is shown on Figure 5 of the Activities Coordination Plan (see Appendix C of this Soil RAW). Upon our receipt and review of analytical data for the groundwater in the storage tanks, the groundwater will be discharged to the storm or sanitary sewer system or transferred into vacuum trucks for transport to an appropriate disposal facility, as discussed below.

Representative samples of dewatering effluent will be analyzed by a state-certified laboratory, as required by the disposal facility, for the suspected pollutants (at minimum, petroleum hydrocarbons, selected SVOCs/PAHs, arsenic, lead, PCBs and selected VOCs) prior to discharge to the storm or sanitary sewer system or removal from the Site by truck. Based on the results of the analytical testing and the concentrations of pollutants identified, if any, the applicant will dispose of the dewatering effluent and impacted water in one (or more) of the following ways:

- discharging to the storm drain under permit from the RWQCB; it is unlikely that the RWQCB would allow discharge of any untreated dewatering effluent that contains detectable concentrations of chemical pollutants and that for these types of discharges, alternative disposal options may be required
- discharging to the sanitary sewer system under permit from East Bay MUD if the concentrations of chemical pollutants meet its acceptance criteria
- containerizing and transporting to a licensed off-site disposal facility for treatment and disposal under appropriate manifest; East Bay MUD accepts dewatering effluent transported to its facility via truck if the concentrations of chemical pollutants meet its acceptance criteria; an appropriate disposal facility will be utilized for disposal of the impacted groundwater if the concentrations of chemical pollutants in the wastewater do not meet East Bay MUD's acceptance criteria"

Attachment D

"A miniature real-time aerosol monitor (mini-RAM) will be used to monitor total dusts generated during site work. Background dust levels will be established by monitoring dust levels at the Site for several days during the two weeks prior to implementation of the Soil RAW. Background dust levels will be documented at air monitoring stations established at approximately 100 foot intervals along the Site's perimeters (a total of 16 stations including seven stations each of the northern and southern borders and one station each on the eastern and western borders).

If dust in excess of background levels (greater than 0.25 milligrams per cubic meter [mg/m^3] above background levels) is observed for a sustained period of time (greater than 5 minutes), appropriate dust suppression measures (e.g., spraying soil with water) will be undertaken. As noted in the HSP (Appendix F of this Soil RAW), a total dust reading of 1.36 mg/m^3 would result in an exceedance of the Acute Reference Exposure Level of 0.00019 mg/m^3 established for arsenic by the California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA). A total dust action level of 0.25 mg/m^3 above background levels would be conservative for the various COCs detected on the Site that would be likely to adhere to windblown dust and protective of the on-site workers and members of the surrounding community.

If during excavation activities dust is observed in the area being excavated, appropriate dust suppression measures (e.g., spraying soil with water) will be undertaken."

Response to Comments on
Revised Removal Action Work Plan
Proposed Aspire Charter High School
1009 66th Avenue
Oakland, Alameda County, California
DTSC Site Code: 204147-11

LFR Inc. (LFR) prepared a draft Removal Action Work Plan (RAW) for the property located at 1009 66th Avenue in Oakland, Alameda County, California ("the Site") to address affected soil present on the Site. The draft RAW was entitled "Draft Soil Removal Action Work Plan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California, DTSC Site Code: 204147," dated March 14, 2006. The RAW was revised based on comments received from the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) in their letter dated April 14, 2006.

LFR submitted the "Revised Draft Soil Removal Action Workplan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California, DTSC Site Code: 204147," dated May 12, 2006 to address DTSC's comments. DTSC requested further clarification and/or modification to the revised RAW in their letter dated June 15, 2006. This table presents DTSC's comments and LFR's responses that will be incorporated into the final RAW for the Site.

DTSC Comments:	***LFR Response***
Specific Comments:	
1. A soil cleanup value for benzene is needed.	A direct contact to benzene in soil was added to our evaluation. Soil gas data has been used to evaluate potential vapor intrusion issues; soil data was not used in the vapor intrusion evaluation. This change was incorporated into Table 4 of the Soil RAW which presents the cleanup goals for the Site. The proposed soil cleanup goal for benzene does not change the estimated quantity of soil to be removed from the Site since benzene is associated with the gasoline-affected soil.
2. Table J-12 of the risk assessment shows that concentrations of chrysene, naphthalene, and PCE in the soil have estimated cancer risks in the range of 10^{-5}, yet none are listed in the Revised Draft RAW as needing cleanup. Why is this?	Cleanup goals for chrysene, naphthalene, and tetrachloroethene (PCE) were added to Table 4 of the Soil RAW. Addition of these compounds to the proposed soil cleanup goals does not change the estimated quantity of soil to be removed from the Site since chrysene and naphthalene are associated with the SVOC-affected soil and PCE was detected in soil-vapor samples but not soil samples collected at the Site.

DTSC Comments:	*LFR Response*
3. The adult staff receptor should be used for developing cleanup levels for carcinogens. They are exposed longer and so will need values that are more protective than those given for school-age kids in the spreadsheet titled "Aspire-PRG – Car" that was sent to HERD.	Our evaluation was revised to consider the adult school staff member receptor as well as the student receptor as noted in Section 4.0 of the Soil RAW plus on the risk evaluation spread sheets in Appendix B. The cleanup goals presented in Table 4 were revised accordingly. The revisions to the soil cleanup goals do not change the estimated quantity of soil to be removed from the Site since the concentrations of COCs were above both the old and new proposed cleanup goals with the exception of benzo(a)anthracene in two soil samples (2A2N(20')-0.5 and 2A2W(20')-0.5), PCBs in one soil sample (3BE(10')-0.5), chrysene in a number of shallow soil samples, and naphthalene in a number of shallow soil samples. Soil samples with COCs above the new cleanup goals were located in areas where soil excavation and off-site disposal has been planned.
4. If the plan is to use background concentrations for metals then please provide the background data for Cr^{+6}. The SSI says that background concentrations will be used to produce cleanup levels for metals. Table 4 (Proposed Cleanup Goals for Compounds of Concern) has a cleanup level of 17 mg/kg for Cr^{+6}. Where did this come from? It appears to be significantly above what HERD has seen as background CR^{+6} in other areas.	As noted in Section 4.2.3 of the Soil RAW, "Only five soil samples collected from the Site during the PEA and Initial SSI were analyzed for Cr^{+6}, therefore, a sufficient data set was not available to evaluate the background level of Cr^{+6}. Analysis of the soil samples revealed Cr^{+6} at the following concentrations: 2A-0.5: 3.02 mg/kg; 2A2N(20')0.5: 3.0 mg/kg; 2B-3S(0.5)0.5: 1.14 mg/kg; 3C-0.5: 1.77 mg/kg; and 5A-0.5: <0.5 mg/kg. Based on the site history and the data collected from the Site, Cr^{+6} does not appear to be an issue. LFR proposes to use the residential ESL of 17 mg/kg (direct exposure screening level for residential land use assuming carcinogenic affect, Table K-1) as a cleanup goal for the Site."

DTSC Comments:	*LFR Response*
5. The proposed cleanup values for benzo(a)pyrene, benzo(a)anthracene, benzo(k)fluoranthene, PCBs, Cr^{+6}, and Pb are above the San Francisco Bay Regional Water Quality Control Board's ESLs for soil. Because the ESLs are ARARs, please provide justification for cleanup values greater than the ESL.	ESLs were developed considering many factors, including soil leaching and protection of ecological receptors. LFR developed cleanup goals considering direct contact to soil by potential school site receptors. The LFR direct contact cleanup goals are comparable to the commercial/industrial direct contact ESLs (Table K-2). The LFR developed cleanup goals should be compared to ESLs developed with similar exposure assumptions.
6. Please provide a project specific analysis of all potential ARARs. Include with the analysis a final table indicating which ARARs will be met. One example is the City of Oakland requires a "Conditional Use Permit" for remedial actions in portions of the City zoned as "M-30" (industrial).	Tables 6, 7 and 8 have been revised to show the ARARs that will be met for this project. Table 8 has been revised to include the City of Oakland's requirement for a "Conditional Use Permit" for the proposed remedial work based on the Site's M-30 zoning.
7. Please provide an estimate of the daily maximum number of dump trucks anticipated to mobilize to and from this site.	Section 7.7 of the Soil RAW has been revised to include the following paragraph. "Based on a quantity of 8,194 cubic yards of impacted soil to be removed from the Site, LFR estimates that approximately 15 trucks will leave the Site each day enroute to appropriate disposal facilities for the impacted soil."

Revised Table 4: Proposed Cleanup Goals for Compounds of Concern
Aspire Charter High School
1009 66th Avenue
Oakland, California

Compound of Concern	Proposed Cleanup Goal (mg/kg)
Gasoline	100
Diesel	500
Motor Oil	500
Benzo(a)Pyrene	0.15
Benzo(a)Anthracene	1.5
Benzo(k)Fluoranthene	1.5
Chrysene	15
Naphthalene	15
Tetrachloroethene	3.4
Benzene (soil)	19
Arsenic	7 [1]
Lead	255 [2]
Chromium VI	17 [3]
PCBs	0.31
Benzene	20 $\mu g/l$ (groundwater)

Notes:

Proposed cleanup goals are based on 95% upper confidence levels except as noted below. VOCs based on direct contact to a school worker receptor. Vapor intrusion evaluation will be addressed with soil vapor data.

1. Proposed cleanup goal for arsenic represents estimated background.
2. Proposed cleanup goal for lead based on DTSC's school guidelines.
3. Proposed cleanup goal for Chromium VI based on residential ESL.

Table 4: Proposed Cleanup Goals for Compounds of Concern
Residential Exposure
Aspire Charter High School
1009 66th Avenue
Oakland, California

Compound of Concern	Proposed Cleanup Goal (mg/kg)
Gasoline	100
Diesel	500
Motor Oil	500
Benzo(a)Pyrene	0.05
Benzo(a)Anthracene	0.51
Benzo(k)Fluoranthene	0.51
Chrysene	0.51
Naphthalene	4.06
Tetrachloroethene	1.12
Benzene (soil)	4.96
Arsenic	7 [1]
Lead	255 [2]
Chromium VI	17[3]
PCBs	0.13
Benzene (groundwater)	20 μg/l

Notes:

Proposed cleanup goals are based on 95% upper confidence levels except as noted below. VOCs based on direct contact to a hypothetical residential receptor. Vapor intrusion evaluation will be addressed with soil vapor data.

1. Proposed cleanup goal for arsenic represents estimated background.
2. Proposed cleanup goal for lead based on DTSC's school guidelines.
3. Proposed chromium VI clean-up goal based on Residential CHHSL

Clean Up Value = (0.000001/((0.00000157*oralCSF)+(0.00000371*dermalabsorption*oralCSF)+(0.000000000149*inhalationCSF)))

Site Specific Clean-Up Goals
Residential Exposure Assumption
Aspire Public High School

CARCINOGEN

Exposure Input Variables	Acronym	Units	Adult Value	Child Value	Naphthalene	PCE	Benzene	Chrysene	PCBs	Benzo(a) Pyrene	Benzo(a) anthracene	Benzo(b) fluoranthene
Target Risk	TR		1.00E-06	1.00E-06								
Skin surface area (1)	SA	cm2/day	5700	2900								
Mass conversion factor	MCF	mg/Kg	1.0E+06	1.0E+06								
Soil to skin adherence factor (1)	AD	mg/cm2	0.1	0.2								
Bioavailability factor	BF	unitless			0.13	0.1	0.1	0.13	0.14	0.13	0.13	0.13
Soil Ingestion (1)	SI	mg/day	100	200								
Inhalation Rate (1)	IR	m3/day	20	10								
Particulate Emission Factor (2)	PEF	m3/kg	N/A	N/A								
Exposure frequency (1)	EF	days/yr	350	350								
Exposure duration	ED	yr	24	6								
Body weight (1)	BW	kg	70	15								
Exposure extrapolation factor (1)	EEF	yr	70	70								
	CF	days/yr	365	365								
Cancer Slope Factor-Oral	CSF	1/mg/kg/day			0.12	5.40E-01	0.1	0.12	5.00E+00	1.20E+01	1.20E+00	1.20E+00
Cancer Slope Factor-Inhalation	CSF	1/mg/kg/day			0.12	2.10E-02	1.00E-01	3.90E-02	2.00E+00	3.90E+00	3.90E-01	3.90E-01
EPA Carcinogenic Classification					C	--	A	B2	B2	B2	B2	B2
Clean-Up Value		mg/kg			4.06	1.12	4.96	4.06	0.13	0.05	0.51	0.51

Data Entered by____Date_______
Data Checked by____Date_______

Clean-up Value = (0.000001/((0.00000157*oralCSF)+(0.00000371*dermalabsorption*oralCSF)+(0.000000000149*inhalationCSF)))

Responses to LFR Responses to DTSC RAW Comments
Revised Removal Action Work Plan
Proposed Aspire Charter High School
1009 66th Avenue
Oakland, Alameda County, California
DTSC Site Code: 204147-11

LFR Inc. (LFR) prepared a draft Removal Action Work Plan (RAW) for the property located at 1009 66th Avenue in Oakland, Alameda County, California ("the Site") to address affected soil present on the Site. The draft RAW was entitled "Draft Soil Removal Action Work Plan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California, DTSC Site Code: 204147," dated March 14, 2006. The RAW was revised based on comments received from the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) in their letter dated April 14, 2006.

LFR submitted the "Revised Draft Soil Removal Action Workplan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California, DTSC Site Code: 204147," dated May 12, 2006 to address DTSC's comments. DTSC requested further clarification and/or modification to the revised RAW in their letter dated June 15, 2006. LFR prepared a table presenting DTSC's comments and our responses that will be incorporated into the final RAW for the Site. Following receipt of LFR's responses to their comments, DTSC forwarded the following responses to LFR's responses on DTSC's comments dated June 15, 2006.

LFR developed new cleanup goals for selected compounds to address DTSC's comments. The cleanup goals proposed for use at the Site and the supporting calculations are attached and are presented in the Soil RAW.

Responses to LFR Responses to DTSC RAW Comments

1) DTSC comment - A soil cleanup value for benzene is needed.

LFR's response – A direct contact to benzene was added to our evaluation. Soil gas data has been used to evaluate potential vapor intrusion issues; soil data was not used in the vapor intrusion evaluation. This change was incorporated into Table 4 of the RAW which presents the cleanup goals for the Site. The proposed soil cleanup goal for benzene does not change the estimated quantity of soil to be removed from the Site since benzene is associated with the gasoline-affected soil.

HERD's response – See attached information on developing cleanup values in soil. All cleanup values (soil, groundwater, and soil gas) for VOCs should be low enough to ensure that there isn't a significant risk due to indoor vapor intrusion.

2) Table J-12 of the risk assessment shows that concentrations of chrysene, naphthalene, and PCE in the soil have estimated cancer risks in the range of 10^{-5}, yet none are listed in the Revised Draft RAW as needing cleanup. Why is this?

LFR's response – Cleanup goals for chrysene, naphthalene, and tetrachloroethene (PCE) were added to Table 4 of the RAW. Addition of these compounds to the proposed soil cleanup goals does not change the estimated quantity of soil to be removed from the Site since chrysene and naphthalene are associated with the SVOC-affected soil and PCE was detected in soil-vapor samples but not soil samples collected at the site.

HERD's response – See attached information on developing cleanup values in soil. Also, Table J-12 of the risk assessment/RAW (Carcinogenic Risk Estimate for Chemicals of Potential Concern) lists a cancer risk from benzene in soil. The concentration is given as 36 mg/kg.

3) The adult staff receptor should be used for developing cleanup levels for carcinogens. They are exposed longer and so will need values that are more protective for school-aged kids in the spreadsheet titled "Aspire-PRG-Car" that was sent to HERD.

LFR's response -- Our evaluation…has been planned.

HERD's response - See attached information on developing cleanup values in soil.

4) If the plan is to use background concentrations for metals then please provide the background data for Cr^{+6}. The SSI says that background concentrations will be used to produce cleanup levels for metals. Table 4 (Proposed Cleanup Goals for Compounds of Concern) has a cleanup level of 17 mg/kg for Cr^{+6}. Where did this come from? It appears to be significantly above what HERD has seen as background Cr^{+6} in other areas.

LFR's response – Only five soil samples…as a cleanup goal for the site.

HERD's response – HERD does not object to using a risk-based cleanup goal in lieu of background data.

Site Specific Clean-Up Goals
Residential Exposure Assumption
Aspire Public High School

CARCINOGEN

Exposure Input Variables	Acronym	Units	Adult Value	Child Value	Naphthalene	PCE	Benzene	Chrysene	PCBs	Benzo(a) Pyrene	Benzo(a) anthracene	Benzo(b) fluoranthene
Target Risk	TR		1.00E-06	1.00E-06								
Skin surface area (1)	SA	cm2/day	5700	2900								
Mass conversion factor	MCF	mg/Kg	1.0E+06	1.0E+06								
Soil to skin adherence factor (1)	AD	mg/cm2	0.1	0.2								
Bioavailability factor	BF	unitless			0.13	0.1	0.1	0.13	0.14	0.13	0.13	0.13
Soil ingestion (1)	SI	mg/day	100	200								
Inhalation Rate (1)	IR	m3/day	20	10								
Particulate Emission Factor (2)	PEF	m3/kg	N/A	N/A								
Exposure frequency (1)	EF	days/yr	350	350								
Exposure duration	ED	yr	24	6								
Body weight (1)	BW	kg	70	15								
Exposure extrapolation factor (1)	EEF	yr	70	70								
	CF	days/yr	365	365								
Cancer Slope Factor-Oral	CSF	1/mg/kg/day			0.12	5.40E-01	0.1	0.12	5.00E+00	1.20E+01	1.20E+00	1.20E+00
Cancer Slope Factor-Inhalation	CSF	1/mg/kg/day			0.12	2.10E-02	1.00E-01	3.90E-02	2.00E+00	3.90E+00	3.90E-01	3.90E-01
EPA Carcinogenic Classification					C	--	A	B2	B2	B2	B2	B2
Clean-Up Value		mg/kg			4.06	1.12	4.96	4.06	0.13	0.05	0.51	0.51

Data Entered by_____Date_______
Data Checked by_____Date_______

Clean-up Value = (0.000001/((0.00000157*oralCSF)+(0.00000371*dermalabsorption*oralCSF)+(0.000000000149*inhalationCSF)))

Site Specific Clean-Up Goals
Residential Exposure Assumption
Aspire Public High School

CARCINOGEN

Exposure Input Variables	Acronym	Units	Adult Value	Child Value	Naphthalene	PCE	Benzene	Chrysene	PCBs	Benzo(a) Pyrene	Benzo(a) anthracene	Benzo(b) fluoranthene
Target Risk	TR		1.00E-06	1.00E-06								
Skin surface area (1)	SA	cm2/day	5700	2900								
Mass conversion factor	MCF	mg/Kg	1.0E+06	1.0E+06								
Soil to skin adherence factor (1)	AD	mg/cm2	0.1	0.2								
Bioavailability factor	BF	unitless			0.13	0.1	0.1	0.13	0.14	0.13	0.13	0.13
Soil Ingestion (1)	SI	mg/day	100	200								
Inhalation Rate (1)	IR	m3/day	20	10								
Particulate Emission Factor (2)	PEF	m3/kg	N/A	N/A	5.00E+08	5.00E+08	5.00E+08	5.0E+08	5.0E+08	5.0E+08	5.0E+08	5.0E+08
Exposure frequency (1)	EF	days/yr	350	350								
Exposure duration	ED	yr	24	6								
Body weight (1)	BW	kg	70	15								
Exposure extrapolation factor (1)	EEF	yr	70	70								
	CF	days/yr	365	365								
		mg/kg/day										
Adult					1.17E+01	2.82E+00	1.52E+01	1.17E+01	2.73E-01	1.17E-01	1.17E+00	1.17E+00
Child					5.52E+00	1.31E+00	7.07E+00	5.52E+00	1.30E-01	5.52E-02	5.52E-01	5.52E-01
Cancer Slope Factor-Oral	CSF	1/mg/kg/day			0.12	5.40E-01	0.1	0.12	5.00E+00	1.20E+01	1.20E+00	1.20E+00
Cancer Slope Factor-Inhalation	CSF				0.12	2.10E-02	1.00E-01	3.90E-02	2.00E+00	3.90E+00	3.90E-01	3.90E-01
EPA Carcinogenic Classification					C	–	A	B2	B2	B2	B2	B2
PRG		mg/kg			**1.1E+01**	**1.3E+00**	**7.1E+00**	**5.5E+00**	**1.3E-01**	**5.5E-02**	**5.5E-01**	**5.5E-01**
Direct Contact Residential PRG		mg/kg			**1.7E+00**	**4.3E-01**	**1.8E-01**	**3.8E+00**	**2.2E-01**	**3.8E-02**	**3.8E-01**	**3.8E-01**

Data Entered by_____Date_______
Data Checked by_____Date_______

$$CDI = \frac{(C)\,(SA)\,(MCF)\,(AD)\,(BF)\,(EF)\,(ED)}{(BW)\,(EEF)\,(CF)}$$

RISK = (CDI) (CSF)

Site Specific Clean-Up Goals
Aspire Public High School
PATHWAY -- SOIL -- PRG -- CARCINOGEN

Exposure Input Variables	Acronym	Units	Child Value	PCBs	Benzo(a) Pyrene	Benzo(a) anthracene	Benzo(b) fluoranthene
Target Risk	TR		1.00E-06				
Skin surface area (1)	SA	cm2/day	8565				
Mass conversion factor	MCF	mg/Kg	1.0E+06				
Soil to skin adherence factor (1)	AD	mg/cm2	0.5				
Bioavailability factor	BF	unitless		0.14	0.10	0.10	0.10
Soil Ingestion (1)	SI	mg/day	100				
Inhalation Rate (1)	IR	m3/school day	4				
Particulate Emission Factor (2)	PEF	m3/kg	N/A	5.0E+08	5.0E+08	5.0E+08	5.0E+08
Exposure frequency (1)	EF	days/yr	180				
Exposure duration	ED	yr	6				
Body weight (1)	BW	kg	57.1				
Exposure extrapolation factor (1)	EEF	yr	70				
	CF	days/yr	365				
Adult		mg/kg/day		3.86E-01	2.13E-01	2.13E+00	2.13E+00
Cancer Slope Factor-Oral	CSF	1/mg/kg/day		5.00E+00	1.20E+01	1.20E+00	1.20E+00
Cancer Slope Factor-Inhalation	CSF			2.00E+00	3.90E+00	3.90E-01	3.90E-01
EPA Carcinogenic Classification				B2	B2	B2	B2
PRG		mg/kg		**3.9E-01**	**2.1E-01**	**2.1E+00**	**2.1E+00**

Data Checked by_____Date_______

(1) Skin surface area for an average male and female high school-aged receptor dreassed for warm weather, 180 school days per year (OEHHA, 2004).
(2) Preliminary Endangerment Assessment (Cal-EPA, 1999).

$$CDI = \frac{(C)(SA)(MCF)(AD)(BF)(EF)(ED)}{(BW)(EEF)(CF)}$$

RISK = (CDI) (CSF)

LFR

Table 6
Potential Federal ARARs

Requirement	Citation	Description	Applicable/ Relevant and Appropriate	Comments	ARAR Will Be Met For Project
Potential Federal Chemical-Specific ARARs					
TSCA	15 U.S.C. Section 2601 to 2692	Establishes management standards for toxic substances including PCBs.			
PCB Remediation Waste	40 C.F.R. Section 761.61	Established self-implementing cleanup standards for PCB remediation waste under specified conditions	No/Yes	Cleanup levels for unrestricted use may be relevant and appropriate if PCBs greater than 50 mg/kg are removed from the Site for off site disposal during remedial actions.	Yes
Potential Federal Action-Specific ARARs					
RCRA as amended by the HSWA	42 U.S.C. Sections 6901-6992k	Establishes standards for management of hazardous waste.			
Identification and Listing of Hazardous Waste	40 C.F.R. Part 261	Criteria defining hazardous waste.	Yes/No	Investigation-derived residuals meeting these criteria must be managed as a hazardous waste.	Yes
Hazardous Waste Generator Standards	40 C.F.R. Part 262	Requirements for waste identification; obtaining an EPA identification number; use of the hazardous waste manifest; packaging, marking, and labeling; accumulation time; recordkeeping and reporting.	Yes/No	Applicable to site activities involving generation of hazardous waste, such as generation of some investigation-derived residuals.	Yes

Table 6
Potential Federal ARARs

Requirement	Citation	Description	Applicable/ Relevant and Appropriate	Comments	ARAR Will Be Met For Project
Hazardous Waste Generator Standards	40 C.F.R. Part 265 Subpart C	Preparedness and prevention requirements.	Yes/No	Applicable to site activities involving generation of hazardous waste, such as generation of some investigation-derived residuals.	Yes
Hazardous Waste Generator Standards	40 C.F.R. Part 265.16	Training requirements.	Yes/No	Applicable to site activities involving generation of hazardous waste, such as generation of some investigation-derived residuals.	Yes
Hazardous Waste Generator Standards	40 C.F.R. Part 265 Subpart I	Container management requirements.	Yes/No	Applicable to on-site accumulation of hazardous waste, such as some investigation-derived residuals, in containers for less than 90 days.	Yes
Land Disposal Restrictions	40 C.F.R. Part 268	Prohibits land disposal of restricted hazardous waste without meeting treatment standards; recordkeeping requirements.	Yes/No	Hazardous waste sent off site for disposal, including investigation-derived residuals, just meet appropriate treatment standards before being disposed to land.	Yes
Hazardous Waste Transportation Requirements	40 C.F.R. Part 263	Requirements for hazardous waste transporters.	Yes/No	Applicable for transportation of hazardous waste off site.	Yes

LFR

Table 6
Potential Federal ARARs

Requirement	Citation	Description	Applicable/ Relevant and Appropriate	Comments	ARAR Will Be Met For Project
OSHA	29 U.S.C. Sections 651-678	Establishes workplace health and safety standards.			
OSHA Hazardous Waste Operations and Emergency Response Regulations	29 C.F.R. Section 1910.120	Standards for employee safety during specified hazardous waste operations.	Yes/No	Worker protection standards applicable to cleanup operations.	Yes
OSHA Safety and Health Standards for Construction	29 C.F.R. Part 1926	Standards for construction and excavation.	Yes/No	Applicable to specified construction and excavation activities.	Yes
DOT Requirements for Hazardous Materials Transportation	40 C.F.R. Parts 171-177	Standards for transportation of hazardous materials.	Yes/No	Applicable to off-site transportation of specified hazardous materials, including hazardous waste.	Yes
Potential Federal Location-Specific ARARs					
No potential Federal location-specific ARARs have been identified for this Site.					

Table 7
Potential State ARARs

Requirement	Agency	Citation	Description	Applicable/ Relevant and Appropriate	Comments	ARAR Will Be Met For Project
Potential State Chemical-Specific ARARs						
Visible Emissions	BAAQMD	Air Quality Management District Regulations, Regulation 6	Prohibits the emission of visible air contaminants into the atmosphere.	Yes/No	Applies to sources which emit or may emit air contaminants that are as dark or darker in shade than No. 1 on the Ringelman Chart for more than three (3) minutes in any one hour. Potentially applicable if investigation or remediation activities have the potential to produce visible emissions.	Yes
Nuisance	BAAQMD	Air Quality Management District Regulations, Rule 1-301	Prohibits the creation of a nuisance by emission of air contaminants.	Yes/No	Applies to source operations which emits or may emit air contaminants or other materials. Potentially applicable if investigation or remediation activities have the potential to generate air emissions.	Yes
Handling of Stockpiled Soil	BAAQMD	Air Quality Management District Regulation 8, Rule 40	Provides the requirements for maintaining, covering, and stockpiling excavated soil.	Yes/No	Applies to excavated soil which stockpiled on site for any length of time.	Yes
Risk Based Screening Levels	RWQCB	Application of Risk-Based Screening Levels and Decision Making to Sites With Impacted Soil and Groundwater	Requires minimum acceptable levels of chemicals in soil and groundwater be met to achieve closure	Yes/No	Applies specifically to remediation and cleanup of school sites. Directly applicable to remediation activities at the Site.	Yes

LFR

Table 7
Potential State ARARs

Requirement	Agency	Citation	Description	Applicable/ Relevant and Appropriate	Comments	ARAR Will Be Met For Project
Potential State Action-Specific ARARs						
Safe Drinking Water and Toxics Enforcement Act of 1986 (Proposition 65)	OEHHA	Cal. Health & Safety Code, Division 20, Chapter 6.6, Section 25249.5	Requires warnings of exposure to listed chemicals above specified concentrations or risk levels.	Yes/No	Investigation and remediation activities will consider warning requirements if they result in exposures above specified levels of "No significant risk".	Yes
VOC emissions from decontamination of contaminated soil	BAAQMD	Air Quality Management District Regulations, Rule 8-40	Limits VOC emissions from handling of contaminated soil by requiring specified management practices including covering stockpiles and trucks.	Yes/No	Potentially applicable to excavation of VOC-affected soil	Yes
California Hazardous Waste Control Law	DTSC	Cal. Health & Safety Code, Division 20, Chapter 6.5	Establishes standards for management of hazardous waste.			
Remediation Waste Staging	DTSC	Cal. Health & Safety Code, Section 25123.3	Establishes standards for management of remediation waste in staging piles	Yes/No	Applicable if excavated soil is temporarily managed in on-site staging piles	Yes
Criteria for identification of hazardous and extremely hazardous waste	DTSC	22 Cal. Code Regs. Division 4.5, Chapter 11	Establishes numerical criteria for identification of hazardous and extremely hazardous waste.	Yes/No	Investigation-derived residuals meeting these criteria must be managed as a hazardous waste.	Yes

Table 7
Potential State ARARs

Requirement	Agency	Citation	Description	Applicable/ Relevant and Appropriate	Comments	ARAR Will Be Met For Project
Hazardous waste generator standards	DTSC	22 Cal. Code Regs. Division 4.5, Chapter 12	Requirements for waste identification; obtaining an EPA identification number; use of the hazardous waste manifest; packaging, marking and labeling; accumulation time; recordkeeping and reporting.	Yes/No	Applicable to site activities involving generation of hazardous waste, such as generation of IDR.	Yes
Hazardous waste generator standards	DTSC	22 Cal. Code Regs. Division 4.5, Chapter 15, Article 3	Preparedness and prevention requirements.	Yes/No	Applicable to site activities involving generation of hazardous waste, such as generation of IDR.	Yes
Hazardous waste generator standards	DTSC	22 Cal. Code Regs. Division 4.5, Chapter 15, Article 4	Contingency Plan requirements.	Yes/No	Applicable to site activities involving generation of hazardous waste, such as generation of IDR.	Yes
Hazardous waste generator standards	DTSC	22 Cal. Code Regs. Section 66265.16	Training requirements.	Yes/No	Applicable to site activities involving generation of hazardous waste, such as generation of IDR.	Yes
Hazardous waste generator standards	DTSC	22 Cal. Code Regs. Division 4.5, Chapter 15, Article 9	Container management requirements.	Yes/No	Applicable to on-site accumulation of hazardous waste, such as some IDR, in containers for less than 90 days.	Yes

LFR

Table 7
Potential State ARARs

Requirement	Agency	Citation	Description	Applicable/ Relevant and Appropriate	Comments	ARAR Will Be Met For Project
Land disposal restrictions	DTSC	22 Cal. Code Regs. Division 4.5, Chapter 18	Prohibits land disposal of restricted hazardous waste without meeting treatment standards; recordkeeping requirements.	Yes/No	Applicable to restricted hazardous waste disposed off site.	Yes
Hazardous waste transportation requirements	DTSC	22 Cal. Code Regs. Division 4.5, Chapter 13	Requirements for hazardous waste transporters.	Yes/No	Applies to transportation of hazardous waste off site.	Yes
Removal Action Work Plan Oversight Requirements	DTSC	Cal Health and Safety Code, Division 20, Chapter 6.8, Section 25356.1	Requirements for review and approval of Removal Action Work Plan as part of School Property Evaluation and Cleanup	Yes/No	Requires DTSC to review and approve any Removal Action Work Plan for a school site.	Yes
California Occupational Safety and Health Act	Cal/OSHA	Cal. Labor Code, Division 5	Establishes workplace health and safety standards.			
Construction Safety Orders	Cal/OSHA	8 Cal. Code Regs. Chapter 4, Subchapter 4	Detailed construction safety requirements.	Yes/No	Applicable to on-site construction activities.	Yes
Electrical safety orders	Cal/OSHA	8 Cal. Code Regs. Chapter 4, Subchapter 5	Detailed electrical safety requirements.	Yes/No	Applicable to on-site investigation and remediation activities involving electrical wiring and equipment.	Yes
General Industry Safety Orders	Cal/OSHA	8 Cal. Code Regs. Chapter 4, Subchapter 7	Detailed safety requirements of general applicability.	Yes/No	Applicable to specific on site investigation and remediation activities.	Yes

Table 7
Potential State ARARs

Requirement	Agency	Citation	Description	Applicable/ Relevant and Appropriate	Comments	ARAR Will Be Met For Project
Hazardous Waste Operations and Emergency Response regulations	Cal/OSHA	8 Cal. Code Regs. Section 5192	Standards for employee safety during specified hazardous waste operations.	Yes/No	Worker protection standards applicable to cleanup operations.	Yes
Storm-Water Pollution Prevention Plan	SWRCB	Order No. 99-08-DWQ	Discharges of storm-water runoff associated with construction activities	Yes/No	Applicable to on-site construction activities.	Yes
Potential State Location-Specific ARARs						
No potential State location-specific ARARs have been identified for this Site.						

LFR

Table 8
Potential Local ARARs

Requirement	Agency	Citation	Description	Applicable/ Relevant and Appropriate	Comments	ARAR Will Be Met For Project
Potential Local Action-Specific ARARs						
Excavation	City of Oakland Engineering Department	Chapter 12, Section 12 of the City of Oakland Municipal Code	Requires permit for excavation	No/No	Permits are required for excavation activities in public areas such as streets and sidewalks. Not applicable for the Site as excavation activities will be entirely within private property boundaries and do not involve sidewalks or other public rights of way.	No
Burn permit	City of Oakland Fire Department	Unknown	Requires permit for any open flame including cutting torches.	No/No	Unable to confirm requirement but is a standard requirement in most areas but no open flames will be present during remediation.	No
Potential Local Chemical-Specific ARARs						
Risk Based Corrective Action Program for sites with impacted soil	City of Oakland Department of Public Works, Urban Land Redevelopment Program	Oakland Urban Land Redevelopment Program Guidance Document	Requires minimum chemical levels in soil to be met before closure is granted	Yes/No	Applicable for remediation activities at the Site as final chemical levels should conform to the levels designated in the Oakland Urban Land Redevelopment Program Guidance Document	Yes
Conditional Use Permit for Remedial Action	City of Oakland Planning Department	Oakland Planning Code (Ordinance 12054, Section 2) 1998, Chapter 17.70.081	Requires a conditional use permit for a Hazardous Waste Management Activity on properties zoned M-30	Yes/Yes	Applicable for planned site remediation activities as the Site is zoned M-30 and soil with hazardous chemical levels will be excavated for off site disposal.	Yes

LFR

Response to Comments on
Revised Removal Action Work Plan
Proposed Aspire Charter High School
1009 66th Avenue
Oakland, Alameda County, California
DTSC Site Code: 204147-11

LFR Inc. (LFR) prepared a draft Removal Action Work Plan (RAW) for the property located at 1009 66th Avenue in Oakland, Alameda County, California ("the Site") to address affected soil present on the Site. The draft RAW was entitled "Draft Soil Removal Action Work Plan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California, DTSC Site Code: 204147," dated March 14, 2006. The RAW was revised based on comments received from the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) in their letter dated April 14, 2006.

LFR submitted the "Revised Draft Soil Removal Action Workplan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California, DTSC Site Code: 204147," dated May 12, 2006 to address DTSC's comments. DTSC requested further clarification and/or modification to the revised RAW in their e-mail dated July 13, 2006. This table presents DTSC's comments and LFR's responses that will be incorporated into the final RAW for the Site.

DTSC Comments:	*LFR Response*
Specific Comments:	
1. Soil cleanup levels should be re-calculated to residential clean-up levels.	Unrestricted land use CHHSL equations for student and adult receptors algorithms were used to re-calculate the clean up goals for the Site. Two additional areas with PCB-impacted soil will require excavation that was not previously included in the Soil RAW. 1) Soil at boring 1A will require an excavation approximately 15 feet x 15 feet x 6 feet deep. 2) Soil at boring 4BS(10') will require an excavation approximately 5 feet x 5 feet x 1 foot deep. Sections 2.8.5, 3.2.1.6, 5.2 (Alternative 3) and 7.3.5 of the Soil RAW and the Activities Coordination Plan (Appendix C of the Soil RAW) were changed to include a discussion of these two additional areas with PCB-impacted soil. A direct contact to benzene in soil was added to our evaluation. Soil gas data has been used to evaluate potential vapor intrusion issues; soil data was not used in the vapor intrusion evaluation. This change was incorporated into Table 4 of the Soil RAW which presents the cleanup goals for the Site. The proposed soil cleanup goal for benzene does not change the estimated quantity of soil to be removed from the Site since benzene is associated with the gasoline-affected soil.

Freeman, Lita

From: Freeman, Lita
Sent: Tuesday, July 18, 2006 10:25 AM
To: 'MHall@dtsc.ca.gov'
Cc: Charles. Robitaille@Aspirepublicschools. Org (charles.robitaille@aspirepublicschools.org); John Dominguez (john@schoolsitesolutions.com); Gibbs, Alan; Goldberg Day, Amy
Subject: revised cleanup goals for Aspire Oakland
Attachments: rev-Table 4-Proposed PCGsRes.doc; rev-PRG-residential--Car.xls

Mike

Amy, our toxicologist, revised the cleanup goals per your email last Thursday (July 13, 2006) using the scenario that Tom asked for (residential land use approach rather that school site approach we have used at other school sites). I am attaching revised Table 4 showing our proposed cleanup goals for the Site using the residential land use approach and the spread sheets with backup calculations.

I reviewed the analytical data using the revised cleanup goals and find that there are only 2 changes – that is 2 areas where soil will require removal that were not previously included in our excavation work

1. the soil sample at boring 1A at a depth of 5 feet had PCBs reported at 0.203 mg/kg which was below the previously cleanup goal of 0.31 mg/kg but is above the revised cleanup goal for PCBs of 0.13 mg/kg – I am assuming that the area affected will be similar to the PCB-affected area at boring 1B and that the excavation at 1A will measure about 15 feet X 15 feet X 6 feet deep or about 50 cubic yards

2. the soil sample at boring 4BS(10') at a depth of 0.5 feet had PCBs reported at 0.23 mg/kg which was below the previous cleanup goal of 0.31 mg/kg but is above the revised cleanup goal for PCBs of 0.13 mg/kg – we are excavating a large area at 4BS(20') and 4BS(10') is just on the northern corner of that excavation so I am assuming that we can extend the planned excavation to include the PCB-affected soil at boring 4BS(10') which will likely add about 1 cubic yard of affected soil (assuming the area affected at 4BS(10') will measure about 5 feet X 5 feet X 1 foot deep)

The cost to excavate and dispose of soil from these two areas will be negligible based on the assumed quantities.

If these cleanup goals and the changes to the RAW that have been submitted are acceptable can we issue the RAW as final so we can get the public comment period started?

Thanks

Lita

Lita D. Freeman, P.G., R.E.A. II, C.A.C.
Senior Associate Geologist
LFR Inc.
4190 Douglas Boulevard, Suite 200
Granite Bay, CA 95746

LFR

Response to Comments on
Revised Removal Action Work Plan
Proposed Aspire Charter High School
1009 66th Avenue
Oakland, Alameda County, California
DTSC Site Code: 204147-11

LFR Inc. (LFR) prepared a draft Removal Action Work Plan (RAW) for the property located at 1009 66th Avenue in Oakland, Alameda County, California ("the Site") to address affected soil present on the Site. The draft RAW was entitled "Draft Soil Removal Action Work Plan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California, DTSC Site Code: 204147," dated March 14, 2006. The RAW was revised based on comments received from the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC) in their letter dated April 14, 2006.

LFR submitted the "Revised Draft Soil Removal Action Workplan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California, DTSC Site Code: 204147," dated May 12, 2006 to address DTSC's comments. DTSC requested further clarification and/or modification to the revised RAW in their e-mail letter dated July 28, 2006. This table presents DTSC's comments and LFR's responses that will be incorporated into the final RAW for the Site.

DTSC Comments:	***LFR Response***
Specific Comments:	
1. Evaluate the potential effects of the vehicle traffic to and from this site on the Emergency Response routes used by the Fire Station located near the site. If the emergency response routes will be significantly affected, proposed an alternate route for vehicles between the freeway and the site, or propose a coordination plan with the Fire Station to avoid interference with emergency response.	Section 7.7 of the Soil RAW has been changed to include the following: "LFR contacted the Oakland Fire Department Station 29 located to the east of the Site across 66th Avenue at 1016 66th Avenue, to discuss potential impact to emergency responses by the proposed remedial work at the Site. According to the Oakland Fire Department dispatchers, trucks may operate on 66th Avenue providing the trucks do not park along 66th Avenue and/or within the painted "no parking" section directly in front of Fire Station 29. No additional activities or coordination are required by LFR with the Oakland Fire Department for using 66th Avenue as an access road between the Site and Interstate 880." In addition, the Activities Coordination Plan (included in Appendix C of the Soil RAW) and the Transportation Plan (included in Appendix H of the Soil RAW) were updated.

DTSC Comments:	*LFR Response*
2. Include detailed descriptions of how the dewatering effluent will be managed. Include: 1) Numbers and sizes of water tanks to be onsite. 2) If and how water will be transferred to transportation vehicles. 3) How much water will be transported per vehicle. 4) The effects of additional water transport on the daily number of vehicles entering and exiting the site.	Section 7.7 of the Soil RAW was updated to address the DTSC concerns on how to manage the dewatering effluent. In addition, the Activities Coordination Plan included in Appendix C of the Soil RAW was updated.
3. Evaluate whether or not all COPCs at all known onsite concentrations can be accepted by the proposed disposal facilities. Include the acceptance criteria for each facility.	LFR contacted the disposal facilities that may be used during this project and confirmed that each facility accepts the known on-site COCs (gasoline, diesel, motor oil, SVOCs/ PAHs, arsenic, lead, PCBs, and VOCs). Characterization of the waste will be performed prior to loading of trucks to allow selection of the appropriate disposal facility and proper dispatch of the trucks. LFR updated text in Section 5.2 of the RAW as follows; "Based on the concentrations of COCs detected in soil samples collected from the Site to date, the excavated soils can be disposed of at one or more of the California landfills identified in the Soil RAW. Characterization of the waste will be performed prior to loading of the trucks to allow selection of the appropriate disposal facility and proper dispatch of the trucks. Acceptance criteria at each landfill will be met."
4. Describe the extent of vanadium at the site, and evaluate whether or not the vanadium will be mitigated due to it's co-location with other contaminants.	Vanadium was detected in four samples collected from the Site during the PEA at concentrations above the 95% UCL of 35.1 mg/kg. These samples included the 0.5-foot depth sample from boring 2A beneath the Warehouse (at a concentration of 41 mg/kg), the 0.5-foot depth sample from boring 2B3 located south of the Warehouse (at a concentration of 86 mg/kg), the 0.5-foot depth sample from boring 4A beneath the Manufacturing/Office Building (at a concentration of 42 mg/kg), and the 0.5-foot depth sample from boring 5A on the eastern end of the Site (at a concentration of 36 mg/kg). The soil in each of these areas will be excavated as previously described in the Soil RAW due to the presence of other compounds of concern.

DTSC Comments:	*LFR Response*
5. Provide greater detail in the Activities Coordination Plan regarding the following: a) How will the soil be stockpiled, characterized and managed prior to offsite transport for disposal - will an onsite lab be used? b) Will the soil be loaded directly onto trucks (direct haul)? c) Where will trucks waiting to be loaded be staged? Will they be parked on the street (hopefully not)? d) The estimated number of truck loads of soil to be removed is in the range of 600+. This does not account for the clean fill that will be used to backfill excavations. Will the trucks be returning empty after disposing of contaminated soil, or will they return with a load of clean fill? Please clarify, and modify the Transportation Plan accordingly.	Additional information has been provided in the Activities Coordination Plan (presented as Appendix C of the Soil RAW) to address DTSC's comments, as follows: "Soil stockpiles will be placed on plastic sheeting and covered with plastic sheeting pending removal from the Site. LFR will be in radio contact or telephone contact with disposal truck drivers to coordinate trips between the Site and disposal facilities so that trucks do not park along 66th Avenue between the Site and Interstate 880. Trucks waiting to be loaded may park along San Leandro Street or other legally permissible locations. When possible, trucks will return to the Site with clean fill material to be used for backfilling excavations." Figure 5 of the Activities Coordination Plan shows the locations where excavated soil will be stockpiled pending receipt of waste characterization analytical results (analysis by a fixed laboratory). The following has been added to Section 7.8 of the Soil RAW, the Activities Coordination Plan (Appendix C of the Soil RAW), and the Transportation Plan (Appendix H of the Soil RAW): "To minimize the number of truck operating along 66th Avenue during this project, trucks hauling impacted soil to disposal facilities will return to the Site with clean imported fill material, when possible."
6. Evaluate the effects of the site vehicle traffic on the surrounding neighborhood. Will the number of trucks have any effect on intersections, onramps, or significantly affect the community's normal traffic enroute to and from the site.	LFR anticipates the increased number of transport trucks will not affect the traffic congestion along 66th Avenue based on the industrial nature of the site vicinity, the truck traffic normally present in the site vicinity, and the short distance (approximately 3 city blocks) between the Site and Interstate 880.

LFR
LEVINE • FRICKE

Date: August 15, 2006

TELEPHONE MEMORANDUM
003-09155-00-004

Call To: Oakland Fire Station 29

Phone Number: 510-238-3856

From: Scott Hackman

Subject: 66th Ave Traffic Access

Oakland Fire Station #29
1016 66th Avenue
Oakland, CA 94621

Talked with Station 29 captain and he directed me to contact the Oakland Fire Department admin. To discuss any sort of needed permits or access agreements to do work near Fire Station #29

8/3/2006 @ 1300 – Left Message with Deputy Chief James Williams (Fire Marshall) asking the proper items which need to be addressed prior to the start of work.

8/3/2006 @ 1503 – Left message with dispatch center @510-238-4036 regarding using 66th avenue for Site access. According to the dispatch personnel, no additional coordination is needed as long as no trucks will be blocking any part of 66th avenue and limit the access of the fire personnel.

LFR
LEVINE•FRICKE

Date: August 3, 2006

TELEPHONE MEMORANDUM
003-09155-00-004

Call To: Disposal Facilities

Phone Number:

From: Scott Hackman

Subject: COPCs Accepted

West Contra Costa Landfill – Joel Bonderant – 510-231-4150 (main office) or 510-233-4330 (scale house). – They accept

Altamont Landfill – Melissa St. John – 925-455-7323 (office) or mstjohn@wm.com
-They accept

Forward Landfill – Joe Griffith – (209) 466-4482 (office)
- They accept

Kettleman Hills – Edward (profiler) – 559-386-9711 (direct) – Kettleman accepts all COC's I mentioned from the Oakland Site. The only problem occurs when a specific concentration is too high and requires treatment. Kettleman accepts the product, but may sub out treatment to a different facility. They do NOT however accept radiological material.

Buttonwillow Landfill – Kern County Waste Management Department – (661) 862-8900
- They accept

LFR LEVINE•FRICKE

Date: August 3, 2006

TELEPHONE MEMORANDUM
003-09155-00-004

Call To: Dave Dellosso

Phone Number: 510-749-4137

From: Scott Hackman

Subject: Wastewater Removal

NRC Dave – 510-749-4137 – East Bay MUD is the water district 866-403-2683

If want direct to sewer: Need two discharge permits. 1) City of Oakland 2) East Bay MUD. First go from excavation to Baker Tank via trash pump. Then from Baker tank to (5,000-gallon) vacuum truck to be transported to East Bay MUD facility.

ECI Penny Ash – 916-417-9366 – 8/3/06 @ 1540 – Contact the water district and double check if we can discharge to sewer and what they require?

If they do not allow you there, East Bay Mudd will take the water and ECI will happily transport the water to East Bay MUD. East Bay MUD will dispose for approx. 0.05/gallon.

Baker Tanks of Pittsburgh, CA

10,000-gallon Baker tank dimension 30'x6'4"x8'

21,000-gallon Baker tank dimension 35'x13'3"x8'

APPENDIX B

Tables from Preliminary Environmental Assessment and Supplemental Site Investigation, Revised Risk Evaluation Tables, Arsenic Probability Plot, Conceptual Site Model, Cross-Section, Nested Wells Logs, and Supplemental Site Investigation Addendum

Tables from Preliminary Environmental Assessment and Supplemental Site Investigation

Table 1
SSI Analytical Results for Selected Compounds in Soil
Proposed Charter School Site
1009 66th Avenue, Oakland, California

Sample ID & Location	Date Sampled	TPH (gasoline range) C4-C12 RL=0.1-10 mg/Kg	TPH (diesel range) C22-C24 RL=5 mg/Kg	TPH (oil range) C23-C40 RL=50 mg/Kg	PCB RL=0.002-0.050 mg/Kg	Arsenic RL=0.97-5 mg/Kg	Lead RL=5 mg/Kg	Nickel RL=1 mg/Kg	Hexavalent Chromium RL=0.5 mg/Kg
1A @ 0.5 PEA	March-05	ND	ND	84	ND	ND	ND	8	
1A @ 5 PEA	March-05	ND	ND	ND	0.203	ND	ND	37	
1A-N(10') 0.5'	August 12, 2005				ND				
1A-N(10') 5'	August 12, 2005				ND				
1A-SE(10') 0.5'	August 12, 2005				ND				
1A-SE(10') 5'	August 12, 2005				ND				
1A-SW(10') 0.5'	August 12, 2005				ND				
1A-SW(10') 5'	August 12, 2005				ND				
1B @ 0.5 PEA	March-05	ND	ND	ND	0.716	ND	2	ND	
1B @ 5 PEA	March-05	ND	ND	ND	ND	5	ND	51	
1B-NE(10') 0.5'	August 12, 2005				ND	<5			
1B-NE(10') 5'	August 12, 2005				ND	<5			
1B-NW(10') 0.5'	August 12, 2005				ND	7			
1B-NW(10') 5'	August 12, 2005				ND	<5			
1B-S(10') 0.5'	August 12, 2005				ND	11			
1B-S(10') 5'	August 12, 2005				ND	<5			
1C @ 0.5 PEA	March-05	ND	ND	133	21.34	8	2	ND	
1C @ 5 PEA	March-05	ND	ND	ND	ND	ND	3	32	
1C-N(10') 0.5'	August 12, 2005				ND	<5			
1C-N(10') 5'	August 12, 2005				ND	<5			
1C-SE(10') 0.5'	August 12, 2005				ND	<5			
1C-SE(10') 5'	August 12, 2005				ND	<5			
1C-SW(10') 0.5'	August 12, 2005				ND	<5			
1C-SW(10') 5'	August 12, 2005				ND	<5			
1C-S(20') 0.5'	August 11, 2005					<5			
1C-S(20') 5'	August 11, 2005					<5			
2A @ 0.5' PEA	March-05	ND	ND	ND	ND	12	3	24	3.02
2A @ 5' PEA	March-05	0.4	ND	ND	ND	66	3	21	
2A-N(10') 0.5'	August 11, 2005					11			
2A-N(10') 5'	August 11, 2005					ND			
2A-S(10') 0.5'	August 11, 2005					22			
2A-S(10') 3'	August 11, 2005					ND			
2A-E(10') 0.5'	August 11, 2005					27			
2A-E(10') 3'	August 11, 2005					ND			
2A-W(10') 0.5'	August 11, 2005					47			
2A-W(10') 5'	August 11, 2005					ND			
2A-N(20') 0.5'	August 11, 2005					37			
2A-N(20') 5'	August 11, 2005					<5			
2A-S(20') 0.5'	August 11, 2005					117			
2A-S(20') 5'	August 11, 2005					<5			
2A-E(20') 0.5'	August 11, 2005					10			
2A-E(20') 5'	August 11, 2005					<5			
2A-W(20') 0.5'	August 11, 2005					88			
2A-W(20') 5'	August 11, 2005					<5			
2AW(40') 0.5'	March-05					35			
2AW(40') 4.0'	March-05					3.7			
2ANW(40') 0.5'	March-05					31			
2ANW(40') 4.0'	March-05					3.1			
2AN(50') HOLD	March-05								
2AW(50') 0.5'	March-05					13			
2ANW(50') 0.5'	March-05					73			
2A-2 @ 0.5 PEA	March-05	ND	ND	1,307	ND	5	30	17	
2A-2 @ 5 PEA	March-05	ND	ND	ND	ND	ND	ND	ND	
2A-2N(20') 0.5'	August 25, 2005	ND	ND	1,110					
2A-2N(20') 5'	August 25, 2005	ND	ND	ND					
2A-2N(20') 7.5'	August 25, 2005	ND	ND	ND					
2A-2S(20') 0.5'	August 25, 2005	ND	ND	893					
2A-2S(20') 5'	August 25, 2005	ND	ND	ND					
2A-2S(20') 7.5'	August 25, 2005	ND	ND	ND					
2A-2E(20') 0.5'	August 25, 2005	ND	ND	386					
2A-2E(20') 5'	August 25, 2005	ND	ND	ND					
2A-2E(20') 7.5'	August 25, 2005	ND	ND	ND					
2A-2W(20') 0.5'	August 25, 2005	ND	ND	1,212					
2A-2W(20') 5'	August 25, 2005	ND	ND	ND					
2A-2W(20') 7.5'	August 25, 2005	ND	ND	ND					

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2B @ 0.5 PEA	March-05	ND	ND	1,560	ND	19	18	7	
2B @ 5 PEA	March-05	1.2	ND	847	ND	5	4	28	
2B @ 10 PEA	March-05	943.0	ND	ND	ND	6	2	81	
2B @ 15 PEA	March-05	544.0	ND	ND	ND	ND	ND	80	
2B @ 20 PEA	March-05	4.5	ND	ND	ND	ND	ND		
2B @ 24 PEA	March-05	12.0	ND	ND	0.068	ND	2	43	
2B-N(20') 0.5'	August 11, 2005	ND	ND	545		ND			
2B-N(20') 5'	August 11, 2005	0.6	ND	ND					
2B-N(20') 7.5'	August 11, 2005	1,040.8	ND	ND					
2B-N(20') 10'	August 11, 2005	877.4	ND	ND					
2B-S(20') 0.5'	August 25, 2005	ND	ND	798		ND			
2B-S(20') 5'	August 25, 2005	ND	ND	ND					
2B-S(20') 7.5'	August 25, 2005	ND	ND	ND					
2B-W(20') 0.5'	August 25, 2005	ND	ND	7,415		6			
2B-W(20') 5'	August 25, 2005	ND	ND	ND					
2B-W(20') 7.5'	August 25, 2005	2.8	ND	ND					
2B-W(20') 10'	August 25, 2005	926.6	ND	ND					
2B-N(37') 0.5'	August 24, 2005	ND	ND	ND		13			
2B-N(37') 5'	August 24, 2005	7.1	ND	ND					
2B-N(37') 7.5'	August 24, 2005	2,019.0	ND	ND					
2B-N(37') 10'	August 24, 2005	2,780.8	ND	ND					
2B-N(37') 15'	August 24, 2005	7.5	ND	ND					
2B2 @ 0.5 PEA	March-05	ND	ND	1,319	0.1	5	14	18	
2B2 @ 3.5 PEA	March-05	ND	ND	1,467	ND	5	10	21	
2B2-N(20') 0.5'	August 25, 2005	0.3	ND	22,524		ND			
2B2-N(20') 5'	August 25, 2005	979.5	ND	446					
2B2-N(20') 7.5'	August 25, 2005	2,507.4	ND	ND					
2B2-N(20') 10'	August 25, 2005	907.1	ND	ND					
2B2-S(20') 0.5'	August 25, 2005	ND	ND	1,139					
2B2-S(20') 5'	August 25, 2005	ND	ND	ND					
2B2-S(20') 7.5'	August 25, 2005	ND	ND	ND					
2B2-E(20') 0.5'	August 11, 2005	0.1	ND	1,386					
2B2-E(20') 5'	August 11, 2005	ND	ND	ND					
2B2-E(20') 7.5'	August 11, 2005	ND	ND	ND					
2B-3S(0.5') 0.5'	August 12, 2005								1
2B3 @ 0.5 PEA	March-05	ND		ND	0.051	4	ND	43	
2B3 @ 5 PEA	March-05	ND		614	ND	8	2	18	
2B3 @ 15 PEA	March-05	125.0		ND					
2C @ 0.5 PEA	March-05	ND	ND	1,346	0.428	17	24	8	
2C @ 5 PEA	March-05	ND	ND	491	2.1	31	10	13	
2C-N(10') 0.5'	August 25, 2005				0.19	17			
2C-N(10') 5'	August 25, 2005				ND	ND			
2C-N(10') 7.5'HOLD	August 25, 2005								
2C-N(10') 10'HOLD	August 25, 2005								
2C-E(10') 0.5'	August 11, 2005	ND	45	ND	ND	67			
2C-E(10') 5'	August 11, 2005	ND	ND	ND	ND	ND			
2C-E(10') 7.5'	August 11, 2005	ND	ND	ND					
2C-E(10') 10'	August 11, 2005	21.3	ND	ND					
2C-N(20') 0.5'	August 25, 2005	ND	ND	ND		21			
2C-N(20') 5'	August 25, 2005	ND	ND	ND					
2C-N(20') 7.5'	August 25, 2005	ND	ND	ND					
2C-N(20') 10'	August 25, 2005	11.2	ND	ND					
2CW(10') 0.5-1.0	December 13, 2005				4.2				
2CW(10') 4.5-5.0	December 13, 2005				3.2				
2CS(10') 9.5-10.0	January 5, 2006				0.089				
2C-W(20') 0.5'	August 25, 2005	ND	ND	ND	8.1	16			
2CW(20') 4.5-5.0	December 13, 2005				2.9	<5			
2CW(20') 9.5-10.0	January 5, 2006				6.2				
2C-W(20') 5'	August 25, 2005	ND	ND	ND					
2C-E(20') 0.5'	August 24, 2005	ND	93	ND		63			
2C-E(20') 5'	August 24, 2005	ND	ND	ND		<5			
2C-E(20') 10'	August 24, 2005	ND	ND	ND					
3A @ 0.5 PEA	March-05	ND				ND	ND	24	
3A @ 5 PEA	March-05	ND			0.063	ND	2	113	
3B @ 0.5 PEA	March-05	ND	ND	ND	0.987	3	5	26	
3B @ 5 PEA	March-05	ND	ND	ND	0.720	ND	2	32	

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3B-N(10') 0.5'	August 12, 2005				ND				
3B-N(10') 5'	August 12, 2005				ND				
3B-S(10') 0.5'	August 12, 2005				ND				
3B-S(10') 5'	August 12, 2005				ND				
3B-E(10') 0.5'	August 12, 2005				0.340				
3B-E(10') 5'	August 12, 2005				ND				
3B-W(10') 0.5'	August 12, 2005				ND				
3B-W(10') 5'	August 12, 2005				ND				
3B-N(20') 0.5'	August 23, 2005					ND			
3B-N(20') 5'HOLD	August 23, 2005								
3B-S(20') 0.5'HOLD	August 23, 2005								
3B-S(20') 2'HOLD	August 23, 2005								
3B-E(20') 0.5'	August 23, 2005				ND				
3B-E(20') 5'HOLD	August 23, 2005								
3B-W(20') 0.5'HOLD	August 23, 2005								
3B-W(20') 5'HOLD	August 23, 2005								
3C @ 0.5 PEA	March-05	ND	ND	ND		ND	9	ND	1.77
3C @ 5 PEA	March-05	ND	ND	ND	ND	ND	51	29	
4A @ 0.5 PEA	March-05	ND	ND	ND	ND	5	9	16	
4A @ 5 PEA	March-05	ND	ND	ND	ND	ND	ND	42	
4B @ 0.5 PEA	March-05	ND	ND	ND	69.68	ND	2	ND	
4B @ 5 PEA	March-05	ND	ND	ND	0.108	5	ND	23	
4B-N(10') 0.5'	August 12, 2005				ND				
4B-N(10') 5'	August 12, 2005				ND				
4B-S(10') 0.5'	August 12, 2005				0.230				
4B-S(10') 5'	August 12, 2005				ND				
4B-E(10') 0.5'	August 12, 2005				0.840				
4B-E(10') 4.5'-5.0'	December 13, 2005				<0.0097/<0.019				
4B-W(10') 0.5'	August 12, 2005				0.040				
4B-W(10') 5'	August 12, 2005				ND				
4B-N(20') 0.5'HOLD	August 23, 2005								
4B-N(20') 5'HOLD	August 23, 2005								
4B-S(20') 0.5'	August 23, 2005	ND	ND	64	0.002				
4B-S(20') 3.5'	August 23, 2005	23.5	ND	2,679	0.0022				
4B-S(20') 4'	August 23, 2005	12.6	ND	890	0.0002				
4B-S(20') 5'	August 23, 2005	99.6	ND	2,499	0.0002				
4BS(20') 9.5-10.0'	January 5, 2006		79 H	17 LY					
4BS(20') 14.5-15.0	January 5, 2006		1,200 H	160 LY					
4B-E(20') 0.5'	August 23, 2005				ND				
4B-E(20') 5'HOLD	August 23, 2005								
4B-W(20') 0.5'	August 23, 2005				0.0001				
4B-W(20') 5'HOLD	August 23, 2005								
4C @ 0.5 PEA	March-05	ND	ND	ND	ND	ND	11	14	
4C @ 5 PEA	March-05	ND	ND	ND	ND	ND	ND	26	
5A @ 0.5 PEA	March-05	ND	ND	ND	ND	7	320	170	
5A @ 5 PEA	March-05	ND	ND	ND	ND	ND	3	44	
5A-N(10') 0.5'	August 24, 2005						90	178	
5A-N(10') 5' HOLD	August 24, 2005								
5A-S2 0.5'	August 24, 2005								ND
5A-SE(10') 0.5'	August 24, 2005						301	184	
5A-SE(10') 5'	August 24, 2005						6		
5A-SE(20') 0.5'	August 24, 2005						154		
5A-SE(20') 5' HOLD	August 24, 2005								
5A-SW(10') 0.5'	August 24, 2005						159	176	
5A-SW(10') 5' HOLD	August 24, 2005								
5A-N(20') 0.5'HOLD	August 24, 2005								
5A-N(20') 5' HOLD	August 24, 2005								
5A-SW(20') 0.5'HOLD	August 24, 2005								
5A-SW(20') 5' HOLD	August 24, 2005								
5C @ 0.5 PEA	March-05	ND	ND	ND	ND	4	398	179	
5C @ 5 PEA	March-05	ND	639	1,556	ND	ND	4	42	

Table 1
SSI Analytical Results for Selected Compounds in Soil
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1009 66th Avenue, Oakland, California

Sample ID & Location	Date Sampled	TPH (gasoline range) C4-C12 RL=0.1-10 mg/Kg	TPH (diesel range) C22-C24 RL=5 mg/Kg	TPH (oil range) C23-C40 RL=50 mg/Kg	PCB RL=0.002-0.050 mg/Kg	Arsenic RL=0.97-5 mg/Kg	Lead RL=5 mg/Kg	Nickel RL=1 mg/Kg	Hexavalent Chromium RL=0.5 mg/Kg
5C-NE(4') 0.5'	August 24, 2005	ND	ND	ND			81	75	
5C-NE(4') 5'	August 24, 2005	ND	ND	ND					
5C-SE(10') 0.5'	August 24, 2005	ND	ND	ND			28	124	
5C-SE(10') 5'	August 24, 2005	ND	ND	ND					
5C-ESE(20') 0.5'HOLD	August 24, 2005						271		
5C-ESE(20') 5'	August 24, 2005						6		
5C-W(10') 0.5'	August 24, 2005	ND	ND	ND			191	227	
5C-W(10') 5'	August 24, 2005	ND	ND	ND					
5C-WNW(20') 0.5'HOLD	August 24, 2005								
5C-WNW(20') 5'HOLD	August 24, 2005								
5C-NE(23') 0.5'HOLD	August 24, 2005								
5C-NE(23') 5'HOLD	August 24, 2005								
6A @ 0.5 PEA	March-05	ND	ND	ND	ND	16	19	18	
6B @ 0.5 PEA	March-05	ND	ND	ND	0.825	ND	12	ND	
6C @ 0.5 PEA	March-05	ND	ND	ND	1.51	ND	ND	ND	
7B @ 5 PEA	March-05	1.8	ND	135	ND	3	2	24	
7B-2 @ 3.5 PEA	March-05	ND	ND	924	0.087	3	84	24	
7B-3 @ 5 PEA	March-05	ND	ND	ND	ND	ND	ND	17	
Blank 12/12/05 (TEG)	December 12, 2005	<1.0	--	<50		<0.25			
Blank 12/13/05 (TEG)	December 13, 2005	<1.0	--	<50		<0.25			
Blank 12/13/05 (C&T)	December 13, 2005	<0.20			<0.0095/<0.019				
Blank 12/14/05 (TEG)	December 14, 2005	<1.0	<10	<50		<0.25			
Blank 12/15/05 (TEG)	December 15, 2005	<1.0		<50					
SB-3-0.5-1.0	December 12, 2005		--	3,400					
SB-3-4.5-5.0	December 12, 2005		3.2 Hyb	15 b					
SB-4-0.5-1.0	December 12, 2005		--	<50		4.8			
SB-4-1.0-1.5 dup	December 12, 2005		--	<50		3.5			
SB-4-4.5-5.0	December 12, 2005		--	<50		3.6			
SB-5-0.5-1.0	December 13, 2015					69			
SB-5-4.5-5.0	December 13, 2005					4.6			
SB-6-0.0-0.5	December 13, 2005					60			
SB-6-4.5-5.0	December 12, 2005	12							
SB-6-9.5-10.0	December 12, 2005	450							
SB-6-14.5-15.0	December 12, 2005	180							
SB-7-5.0-5.25	December 12, 2005	<1.0							
SB-7-dup-5.25-5.55	December 12, 2005	<1.0							
SB-7-9.5-10.0	December 12, 2005	1,000							
SB-7-14.5-15.0	December 12, 2005	49							
SB-8-0.0-0.5	December 13, 2005					3.9			
SB-8-4.5-5.0	December 12, 2005	<1.0							
SB-8-9.5-10.0	December 12, 2005	210							
SB-8-14.5-15.0	December 12, 2005	2,300	--						
SB-8-19.5-20.0	December 12, 2005	<1.0							
SB-9-0.5-1.0	December 12, 2005					130			
SB-9-4.5-5.0	December 12, 2005	84							
SB-9-9.5-10.0	December 12, 2005	3,700							
SB-9-14.5-15.0	December 12, 2005	370							
SB-9-19.5-20.0	December 12, 2005	11							
SB-10-0.0-0.5	December 13, 2005					7.3			
SB-10-0.5-1.0	December 12, 2005		--	180					
SB-10-4.5-5.0	December 12, 2005	55							
SB-10-9.5-10.0	December 12, 2005	3,200							
SB-10-14.5-15.0	December 12, 2005	2,300							
SB-10-19.5-20.0	December 12, 2005	1,500							
SB-11-5.0-5.5	December 12, 2005	54	--	70					
SB-11-9.5-10.0	December 12, 2005	4,900							
SB-11-14.5-15.0	December 12, 2005	1,700							
SB-13-0.5-1.0	December 12, 2005		--	1,700					
SB-13 4.5-5.0	December 12, 2005		2.4 Hyb	16 b					
SB-14 0.5-1.0	December 12, 2005			1,800					
SB-14 4.5-5.0	December 12, 2005		<1.0	<5.0					
SB-17-0.5-1.0	December 13, 2005		--	590		71			
SB-17-4.5-5.0	December 13, 2005	<0.19	<1.0	<5.0		3.9			
SB-17 9.5-10.0	December 13, 2005	200							
SB-17dup-10.0-10.5	December 13, 2005	150							
SB-17 14.5-15.0	December 13, 2005	68							
SB-18-0.5-1.0	December 13, 2005					140			
SB-18-4.5-5.0	December 13, 2005					5.5			
SB-19-0.5-1.0	December 13, 2005		--	81		140			
SB-19-4.5-5.0	December 13, 2005	<1.0				6.9			
SB-19-9.5-10.0	December 13, 2005	3,100							
SB-19-14.5-15.0	December 13, 2005	<1.0							
SB-20-0.5-1.0	December 14, 2005		--	160		110			
SB-20dup-1.0-1.5	December 14, 2005		--	<50		11			
SB-20-4.5-5.0	December 14, 2005	<1.0				5.0			

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SB-20dup-5.0-5.5	December 14, 2005	<1.0				5.2			
SB-20-9.5-10.0	December 14, 2005	600							
SB-20-14.5-15.0	December 14, 2005	<1.0							
SB-21-0.5-1.0	December 14, 2005		--	61					
SB-21-4.5-5.0	December 14, 2005	<1.0							
SB-21-9.5-10.0	December 14, 2005	1,200							
SB-21-14.5-15.0	December 14, 2005	<1.0							
SB-22-0.5-1.0	December 14, 2005		--	<50		98			
SB-22-4.5-5.0	December 14, 2005	<1.0				6.0			
SB-22-9.5-10.0	December 14, 2005	<1.0							
SB-22-14.5-15.0	December 14, 2005	<1.0							
SB-22dup-15.0-15.5	December 14, 2005	<1.0							
SB-24-0.5-1.0	December 12, 2005		--	80		4.9			
SB-24dup-1.0-1.5	December 12, 2005					3.4			
SB-24-4.5-5.0	December 12, 2005	<0.17				5.8			
SB-24-9.5-10.0	December 12, 2005	590.0							
SB-24-14.5-15.0	December 12, 2005	0.82							
SB-25-0.5-1.0	December 12, 2005		--	1,800					
SB-26-0.5-1.0	December 12, 2005		--	820		110			
SB-26-4.5-5.0	December 12, 2005		9.9 Hyb	7.0 Lb		5.7			
SB-27-0.5-1.0	December 12, 2005		--	3,100					
SB-27-4.5-5.0	December 12, 2005		12 Hyb	60 b					
SB-28-0.5-1.0	December 12, 2005		--	5,500					
SB-29-0.5-1.0	December 12, 2005		--	2,300					
SB-29-4.5-5.0	December 12, 2005		85 Hyb	140 Lb					
SB-30-0.5-1.0	December 12, 2005		--	3,700		3.5			
SB-30-4.5-5.0	December 12, 2005		33 Hyb	96 Lb		19			
SB-31-14.5-15.0	December 13, 2005	<1.0			<0.0095/<0.019 J				
SB-31dup-14.0-14.5	December 13, 2005				<0.0096/<0.019 J				
SB-32-4.5-5.0	December 14, 2005	140 H Y							
SB-32-9.5-10.0 (TEG)	December 14, 2005	31 H Y							
SB-32-9.5-10.0 (C&T)	December 14, 2005	31 H Y	160 H L	52 L					
SB-32dup-10.0-10.5	December 14, 2005	30 H Y	100 H L	37 L					
SB-32-14.5-15.0	December 14, 2005	3.9 H Y	53 H L	22 L					
SB-33-4.5-5.0	December 15, 2005	<1.0							
SB-33-9.5-10.0	December 15, 2005	<1.0		<50					
SB-33-14.5-15.0	December 15, 2005	<1.0		<50					
SB-34-4.5-5.0	December 14, 2005	250							
SB-34-9.5-10.0	December 14, 2005	210	--	<50					
SB-34-14.5-15.0	December 14, 2005	27	--	<50					
SB-35-4.5-5.0	December 14, 2005	<1.1							
SB-35-9.5-10.0	December 14, 2005	<1.0	--	<50					
SB-35-14.5-15.0	December 14, 2005	<0.92	--	<50					
SB-36-0.5-1.0	December 15, 2005				0.022				
SB-36-4.5-5.0	December 15, 2005				<0.012/<0.024				
SB-37-4.5-5.0	December 15, 2005	<1.0							
SB-37-9.5-10.0	December 15, 2005	<1.0	--	<50					
SB-37-14.5-15.0	December 15, 2005	<1.0	--	<50					
SB-38-9.5-10.0 (TEG)	December 14, 2005		<10	58					
SB-38-9.5-10.0 (C&T)	December 14, 2005		<0.99	<4.9					
SB-38dup-10.0-10.5	December 14, 2005		<10	<50					
SB-38-14.5-15.0 (TEG)	December 14, 2005		11	<50					
SB-38-14.5-15.0 (C&T)	December 14, 2005		<1.0	<5.0					
SB-39-4.5-5.0	December 12, 2005	21							
SB-39-9.5-10.0	December 12, 2005	1,400							
SB-39-14.5-15.0	December 12, 2005	8.8							
SB-39-19.5-20.0	December 12, 2005	<1.0							
SB-40-0.5-1.0	December 13, 2005					1.9			
SB-40-4.5-5.0	December 13, 2005					5.7			
SB-41-9.5-10.0	December 15, 2005	<1.0							
SB-41-14.5-15.0	December 15, 2005	<1.0							
SB-42-0.5-1.0	December 15, 2005		--	910					
SB-42-4.5-5.0	December 15, 2005		--	78					
SB-43-0.5-1.0	December 15, 2005		--	1,600					
SB-43-4.5-5.0	December 15, 2005		--	<50					
SB-44-0.5-1.0 (01/01/06)	December 15, 2005		170 Hyb	1200 b					
SB-44-0.5-1.0 (12/22/06)	December 15, 2005		560 HY	3300 V					
SB-44-4.5-5.0	December 15, 2005		27 Hyb	58 LJ					
SB-45-0.5-1.0	December 15, 2005		39 Hyb	170 Hyb					
SB-45-4.5-5.0	December 15, 2005		<1.3 HY	<5.0					
SB-46-0.5-1.0	December 15, 2005		<1.0	7					
SB-46-4.5-5.0	December 15, 2005		<1.0	<5.0					
SB-47-0.5-1.0	January 5, 2006				<0.0097/<0.019				
SB-47-4.5-5.0	January 5, 2006				0.021				
SB-47-5.0-5.5DUP	January 5, 2006				0.070				

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SB-47-9.5-10.0	January 5, 2006				0.017				
SB-48-0.5-1.0	January 5, 2006				<9.5/<19				
SB-48-4.5-5.0	January 5, 2006				1.1				
SB-48-9.5-10.0	January 5, 2006				0.057				
SB-49-0.5-1.0	January 5, 2006				15 q				
SB-49-4.5-5.0	January 5, 2006				1.3				
SB-49-5.0-5.5DUB	January 5, 2006				1.3				
SB-49-9.5-10.0	January 5, 2006				0.190				
SB-50-0.5-1.0	January 5, 2006				9				
SB-50-4.5-5.0	January 5, 2006				1.4				
SB-50-9.5-10.0	January 5, 2006				0.49				

Notes:
mg/Kg - milligrams per kilogram
μg/Kg - micrograms per kilogram
NA - Not analyzed for constituent
ND - Not detected at the indicated reporting limit
PCB - Polychlorinated Biphenyls
PEA - Preliminary Environmental Assessment
RL - Reporting limit
TPH - Total Petroleum Hydrocarbons
-- = Analysis not requested
H = Heavier hydrocarbons contributed to the quantitation
Y = Sample exhibits chromatographic pattern which does not resemble standard
L = Lighter hydrocarbons contributed to the quantitation
J = Estimated concentration
q = draft result - ending instrument QC not yet analyzed

Table 2
SSI Analytical Results for Volatile and Semi-Volatile Organic Compounds in Soil
Proposed Charter School Site
1009 66th Avenue, Oakland, California

		VOCs								SVOCs												
Sample ID & Location	Date Sampled	Benzene RL = 2-200 µg/Kg	Toluene RL = 2 µg/Kg	Ethylbenzene RL = 2-200 µg/Kg	Xylene RL = 2-200 µg/Kg	MTBE RL = 2 µg/Kg	Isopropylbenzene RL = 2 µg/Kg	Chlorobenzene RL = 2 µg/Kg	1,4-Dichlorobenzene RL = 2 µg/Kg	Naphthalene RL = 250-2500 µg/Kg	1-Methylnaphthalene RL = 250-2500 µg/Kg	Acenaphthylene RL = 250-2500 µg/Kg	Acenaphthene RL = 250-2500 µg/Kg	Fluorene RL = 250-2500 µg/Kg	Phenanthrene RL = 250-2500 µg/Kg	Anthracene RL = 250-2500 µg/Kg	Fluoranthene RL = 250-2500 µg/Kg	Pyrene RL = 250-2500 µg/Kg	Benzo(a)Anthracene RL =0.25-2.5 mg/Kg	Chrysene RL = 250-2500 µg/Kg	Benzo(k)Fluoranthene RL = 0.25-2.5 mg/Kg	Benzo(a)Pyrene RL = 0.25-2.5 mg/Kg
1A @ 0.5 PEA	March-05								ND	ND	ND	ND	ND	ND	924	ND	492	442	ND	ND	ND	ND
1A @ 5 PEA	March-05								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1B @ 0.5 PEA	March-05								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1B @ 5 PEA	March-05								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1C @ 0.5 PEA	March-05								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1C @ 5 PEA	March-05								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2A @ 0.5 PEA	March-05								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2A @ 5 PEA	March-05								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2A-2 @ 0.5 PEA	March-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2A-2 @ 5 PEA	March-05	0.14	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2A-2N(20') 0.5'	August 11, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,901	3,666	2.05	2,812	3.978	3.623
2A-2N(20') 5'	August 11, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2A-2N(20') 7.5'	August 11, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2A-2S(20') 0.5'	August 11, 2005	ND	ND	ND	10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,944	2,360	0.885	1,058	2.729	3.556
2A-2S(20') 5'	August 11, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2A-2S(20') 7.5'	August 11, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2A-2E(20') 0.5'	August 11, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	629	ND	507	0.711	0.865
2A-2E(20') 5'	August 11, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2A-2E(20') 7.5'	August 11, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2A-2W(20') 0.5'	August 11, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,228	3,105	1.799	2,330	4.71	4.184
2A-2W(20') 5'	August 11, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2A-2W(20') 7.5'	August 11, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2B @ 0.5 PEA	March-05	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.647	4.534
2B @ 5 PEA	March-05	139	13	31	101	19	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	428 J	744	ND	404 J	3.982	3.160
2B @ 10 PEA	March-05	7,622	37,378	14,044	52,141	206	ND	ND	ND	5,357	2,762	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2B @ 15 PEA	March-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2B @ 20 PEA	March-05	ND	ND	ND	ND	22	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2B @ 24 PEA	March-05	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2B-N(20') 0.5'	August 11, 2005	ND	ND	6	70	ND	ND	ND	ND	2,925	2,049	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2B-N(20') 5'	August 11, 2005	80	2	ND	43	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2B-N(20') 7.5'	August 11, 2005	15,989	131,071	50,655	178,481	ND	5,630	ND	ND	13,279	11,123	338	58	274	ND	ND	ND	ND	ND	ND	ND	ND
2B-N(20') 10'	August 11, 2005	21,332	124,917	36,934	131,524	ND	3,644	ND	ND	3,699	4,290	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2B-S(20') 0.5'	August 25, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3,106	5,758	1.074	1,185	4.3	6.163
2B-S(20') 5'	August 25, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2B-S(20') 7.5'	August 25, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2B-W(20') 0.5'	August 25, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4,784	ND	21,940	30,450	16.162	20,080	35.126	48.390
2B-W(20') 5'	August 25, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2B-W(20') 7.5'	August 25, 2005	ND	ND	22	4	ND	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2B-W(20') 10'	August 25, 2005	6,897	36,448	20,217	75,610	ND	1,993	ND	ND	3,035	1,880	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2B-N(37') 0.5'	August 25, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 2
SSI Analytical Results for Volatile and Semi-Volatile Organic Compounds in Soil
Proposed Charter School Site
1009 66th Avenue, Oakland, California

		VOCs								SVOCs												
Sample ID & Location	Date Sampled	Benzene RL = 2-200 µg/Kg	Toluene RL = 2 µg/Kg	Ethylbenzene RL = 2-200 µg/Kg	Xylene RL = 2-200 µg/Kg	MTBE RL = 2 µg/Kg	Isopropylbenzene RL = 2 µg/Kg	Chlorobenzene RL = 2 µg/Kg	1,4-Dichlorobenzene RL = 2 µg/Kg	Naphthalene RL = 250-2500 µg/Kg	1-Methylnaphthalene RL = 250-2500 µg/Kg	Acenaphthylene RL = 250-2500 µg/Kg	Acenaphthene RL = 250-2500 µg/Kg	Fluorene RL = 250-2500 µg/Kg	Phenanthrene RL = 250-2500 µg/Kg	Anthracene RL = 250-2500 µg/Kg	Fluoranthene RL = 250-2500 µg/Kg	Pyrene RL = 250-2500 µg/Kg	Benzo(a)Anthracene RL =0.25-2.5 mg/Kg	Chrysene RL = 250-2500 µg/Kg	Benzo(k)Fluoranthene RL = 0.25-2.5 mg/Kg	Benzo(a)Pyrene RL = 0.25-2.5 mg/Kg
2B-N(37') 5'	August 25, 2005	338	248	103	258	369	4	ND	ND													
2B-N(37') 7.5'	August 25, 2005	4,491	56,239	32,215	114,565	10,928	4,035	ND	ND	9,124	4,420	ND	ND	ND	2,967	2,713	ND	5,390	ND	ND	ND	ND
2B-N(37') 10'	August 25, 2005	21,876	114,263	40,696	137,722	5,422	4,495	ND	ND	10,175	6,886	ND	ND	ND	3,815	3,566	ND	7,161	ND	ND	ND	ND
2B-N(37') 15'	August 25, 2005	1,306	813	235	762	4,439	13	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2B2 @ 0.5 PEA	March-05	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	377 J	ND	4,485	9,455	2.5	3,902	15.919	9.525
2B2 @ 3.5 PEA	March-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	666	ND	584	1,844	ND	602	ND	ND
2B2-N(20') 0.5'	August 25, 2005	2	7	ND	6	15	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	46,416	59,680	32.864	46,152	63.542	66.928
2B2-N(20') 5'	August 25, 2005	7,682	49,063	19,817	73,228	3,357	1,851	ND	ND	2,430	1,556	ND	ND	ND	ND	ND	550	798	ND	631	0.504	0.729
2B2-N(20') 7.5'	August 25, 2005	22,361	130,173	51,813	175,229	12,897	5,550	ND	ND	5,656	4,008	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2B2-N(20') 10'	August 25, 2005	9,106	45,812	19,519	77,800	7,679	1,786	ND	ND	1,332	1,060	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2B2-S(20') 0.5'	August 25, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	597	ND	2,734	6,890	2.122	3,458	7.05	8.341
2B2-S(20') 5'	August 25, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2B2-S(20') 7.5'	August 25, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2B2-E(20') 0.5'	August 11, 2005	29	94	13	47	ND	ND	ND	ND	5,017	3,230	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2B2-E(20') 5'	August 11, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2B2-E(20') 7.5'	August 11, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2B-3 @ 5 PEA	March-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	318 J	ND	ND	ND	ND	ND	ND	ND
2B-3 @ 15 PEA	March-05	ND	1,770	1,772	5,937	ND	ND	ND	ND													
2C @ 0.5 PEA	March-05								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2C @ 5 PEA	March-05								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3A @ 0.5 PEA	March-05	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3A @ 5 PEA	March-05	ND						ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3B @ 0.5 PEA	March-05								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3B @ 5 PEA	March-05								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3C @ 0.5 PEA	March-05								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3C @ 5 PEA	March-05								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4B @ 0.5 PEA	March-05								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4B @ 5 PEA	March-05								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4B-S(20') 5'	August 23, 2005	ND	ND	ND	ND	ND	ND	12	128													
4C @ 0.5 PEA	March-05								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4C @ 5 PEA	March-05								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5A @ 0.5 PEA	March-05	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5A @ 5 PEA	March-05	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5C @ 0.5 PEA	March-05	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5C @ 5 PEA	March-05	NA	NA	NA	NA	NA	ND	ND	ND	1,146	ND	4,702	ND	6,474	55,310	10,046	28,320	26,074	10.21	9,572	4.868	3.316
5C-NE(4') 5'	August 24, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5C-SE(10') 5'	August 24, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
5C-W(10') 5'	August 24, 2005	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

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Proposed Charter School Site
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		VOCs								SVOCs												
Sample ID & Location	Date Sampled	Benzene RL = 2-200 µg/Kg	Toluene RL = 2 µg/Kg	Ethylbenzene RL = 2-200 µg/Kg	Xylene RL = 2-200 µg/Kg	MTBE RL = 2 µg/Kg	Isopropylbenzene RL = 2 µg/Kg	Chlorobenzene RL = 2 µg/Kg	1,4-Dichlorobenzene RL = 2 µg/Kg	Naphthalene RL = 250-2500 µg/Kg	1-Methylnaphthalene RL = 250-2500 µg/Kg	Acenaphthylene RL = 250-2500 µg/Kg	Acenaphthene RL = 250-2500 µg/Kg	Fluorene RL = 250-2500 µg/Kg	Phenanthrene RL = 250-2500 µg/Kg	Anthracene RL = 250-2500 µg/Kg	Fluoranthene RL = 250-2500 µg/Kg	Pyrene RL = 250-2500 µg/Kg	Benzo(a)Anthracene RL = 0.25-2.5 mg/Kg	Chrysene RL = 250-2500 µg/Kg	Benzo(k)Fluoranthene RL = 0.25-2.5 mg/Kg	Benzo(a)Pyrene RL = 0.25-2.5 mg/Kg
6A @ 0.5 PEA	March-05								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6B @ 0.5 PEA	March-05								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6C @ 0.5 PEA	March-05								ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
7B @ 5 PEA	March-05	143	19	41	122	19	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	282 J	480 J	ND	ND	3.561	2.531
7B-2 @ 3.5 PEA	March-05								ND	ND	ND	ND	ND	ND	382 J	ND	4,690	6,492	2.345	256 J	2.415	2.080
7B-3 @ 5 PEA	March-05									ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Blank 12/12/05 (TEG)	December 12, 2005	<5.0	<5.0	<5.0	<5.0	<5.0																
Blank 12/13/05 (TEG)	December 13, 2005	<5.0	<5.0	<5.0	<5.0	<5.0																
Blank 12/13/05 (C&T)	December 13, 2005	<1.0	<1.0	<1.0	<1.0	<4.0																
Blank 12/14/05 (TEG)	December 14, 2005	<5.0	<5.0	<5.0	<5.0	<5.0			<340	<67		<67	<67	<67	<67	<67	<67	<67	<0.067	<67	<0.067	<0.067
Blank 12/15/05 (TEG)	December 15, 2005	<5.0	<5.0	<5.0	<5.0	<5.0			<340	<67		<67	<67	<67	<67	<67	<67	<67	<0.067	<67	<0.067	<0.067
SB-3-0.5-1.0	December 12, 2005								<17,000	<3,400		<3,400	<3,400	<3,400	<3,400	<3,400	<3,400	<3,400	<3.4	<3,400	<3.4	<3.4
SB-3-4.5-5.0	December 12, 2005								<330	<67		<67	<67	<67	<67	<67	<67	<67	<0.067	<67	<0.067	<0.067
SB-4-0.5-1.0	December 12, 2005								<660	<130		<130	<130	<130	<130	<130	<130	<130	<0.130	<130	<0.130	<0.130
SB-4-0.5-1.0 dup	December 12, 2005								<340	<68		<68	<68	<68	<68	<68	<68	<68	<0.068	<68	<0.068	<0.068
SB-4-4.5-5.0	December 12, 2005								<330	<67		<67	<67	<67	<67	<67	<67	<67	<0.067	<67	<0.067	<0.067
SB-6-4.5-5.0	December 13, 1995	<5.0	<5.0	<5.0	440	<5.0																
SB-6-9.5-10.0	December 12, 2005	<5.0	<5.0	1,000	45,000	<5.0																
SB-6-14.5-15.0	December 12, 2005	4,600	1,300	3,900	20,000	<5.0																
SB-7-5.0-5.25	December 12, 2005	20	<5.0	14	43	37																
SB-7-dup-5.25-5.55	December 12, 2005	18	<5.0	13	48	28																
SB-7-9.5-10.0	December 12, 2005	1,600	14,000	22,000	110,000	<5.0																
SB-7-14.5-15.0	December 12, 2005	3,000	420	990	5,100	<5.0																
SB-8-4.5-5.0	December 12, 2005	<5.0	89	81	320	<5.0																
SB-8-9.5-10.0	December 12, 2005	230	<5.0	2,100	2,700	<5.0																
SB-8-14.5-15.0	December 12, 2005	10,000	89,000	44,000	225,000	<5.0																
SB-8-19.5-20.0	December 12, 2005	<5.0	<5.0	<5.0	190	<5.0																
SB-9-4.5-5.0	December 12, 2005	2,300	<5.0	2,900	5,000	14,000																
SB-9-9.5-10.0	December 12, 2005	23,000	170,000	63,000	370,000	<5.0																
SB-9-14.5-15.0	December 12, 2005	5,400	19,000	6,200	36,000	2,600																
SB-9-19.5-20.0	December 12, 2005	<5.0	290	130	620	1,100																
SB-10-4.5-5.0	December 12, 2005	3,400	1,700	1,500	5,000	7,500																
SB-10-9.5-10.0	December 12, 2005	5,800	72,000	59,000	370,000	3,200																
SB-10-14.5-15.0	December 12, 2005	9,500	85,000	42,000	250,000	1,600																
SB-10-19.5-20.0	December 12, 2005	9,200	50,000	27,000	140,000	7,900																
SB-11-5.0-5.5	December 12, 2005	500	1,300	1,100	4,600	1,300			<330	<67		<67	<67	<67	<67	<67	<67	<67	<67	<67	<67	<67
SB-11-9.5-10.0	December 12, 2005	36,000	140,000	110,000	400,000	32,000																
SB-11-14.5-15.0	December 12, 2005	12,000	54,000	31,000	190,000	51,000																
SB-13-0.5-1.0	December 12, 2005								<670	<130		<130	<130	<130	<130	<130	<130	<130	<130	<130	<130	<130

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		VOCs								SVOCs												
Sample ID & Location	Date Sampled	Benzene RL = 2-200 µg/Kg	Toluene RL = 2 µg/Kg	Ethylbenzene RL = 2-200 µg/Kg	Xylene RL = 2-200 µg/Kg	MTBE RL = 2 µg/Kg	Isopropylbenzene RL = 2 µg/Kg	Chlorobenzene RL = 2 µg/Kg	1,4-Dichlorobenzene RL = 2 µg/Kg	Naphthalene RL = 250-2500 µg/Kg	1-Methylnaphthalene RL = 250-2500 µg/Kg	Acenaphthylene RL = 250-2500 µg/Kg	Acenaphthene RL = 250-2500 µg/Kg	Fluorene RL = 250-2500 µg/Kg	Phenanthrene RL = 250-2500 µg/Kg	Anthracene RL = 250-2500 µg/Kg	Fluoranthene RL = 250-2500 µg/Kg	Pyrene RL = 250-2500 µg/Kg	Benzo(a)Anthracene RL =0.25-2.5 mg/Kg	Chrysene RL = 250-2500 µg/Kg	Benzo(k)Fluoranthene RL = 0.25-2.5 mg/Kg	Benzo(a)Pyrene RL = 0.25-2.5 mg/Kg
SB-13-4.5-5.0	December 12, 2005								<330	<66		<66	<66	<66	<66	<66	<66	<66	<66	<66	<66	<66
SB-14-0.5-1.0	December 12, 2005								<67,000	<13,000		<13,000	<13,000	<13,000	<13,000	<13,000	<13,000	<13,000	<13,000	<13,000	<13,000	<13,000
SB-14-4.5-5.0	December 12, 2005								<330	<66		<66	<66	<66	<66	<66	<66	<66	<66	<66	<66	<66
SB-17-4.5-5.0	December 13, 2005	1.5	<0.94	<0.94	22.7	<3.8																
SB-17dup-10.0-10.5	December 13, 2005	1,200 C	6,600	4,600	25,600	<500																
SB-17-9.5-10.0	December 13, 2005	1500 C	4,500	5,900	28,200	<500																
SB-17-14.5-15.0	December 13, 2005	800	4,200	1,300	8,700	<500																
SB-19-4.5-5.0	December 13, 2005	<5.0	53	41	140	<5.0																
SB-19-9.5-10.0	December 13, 2005	6,500	61,000	58,000	340,000	<5.0																
SB-19-14.5-15.0	December 13, 2005	<5.0	<5.0	<5.0	110	<5.0																
SB-20-0.5-1.0	December 14, 2005								<340	<67		<67	<67	<67	<67	<67	<67	<67	<67	<67	<67	<67
SB-20dup-1.0-1.5	December 14, 2005								<340	<68		<68	<68	<68	<68	<68	<68	<68	<68	<68	<68	<68
SB-20-4.5-5.0	December 14, 2005	<5.0	27	27	59	<5.0			<330	<67		<67	<67	<67	<67	<67	<67	<67	<67	<67	<67	<67
SB-20dup-5.0-5.5	December 14, 2005	<5.0	<5.0	<5.0	52	<5.0																
SB-20-9.5-10.0	December 14, 2005	4,300	7,700	11,000	65,000	<5.0																
SB-20-14.5-15.0	December 14, 2005	<5.0	29	29	60	<5.0																
SB-21-0.5-1.0	December 14, 2005								<330	<66		<66	<66	<66	<66	<66	<66	<66	<66	<66	<66	<66
SB-21-4.5-5.0	December 14, 2005	<5.0	25	69	300	<5.0			<340	<67		<67	<67	<67	<67	<67	<67	<67	<67	<67	<67	<67
SB-21-9.5-10.0	December 14, 2005	4,600	<5.0	24,000	140,000	<5.0																
SB-21-14.5-15.0	December 14, 2005	<5.0	<5.0	<5.0	250	<5.0																
SB-22-4.5-5.0	December 14, 2005	<5.0	<5.0	<5.0	41	<5.0																
SB-22-9.5-10.0	December 14, 2005	<5.0	88	<5.0	250	<5.0																
SB-22-14.5-15.0	December 14, 2005	<5.0	<5.0	<5.0	36	<5.0																
SB-22dup-15.0-15.5	December 14, 2005	<5.0	<5.0	<5.0	37	<5.0																
SB-24-0.5-1.0	December 12, 2005								<330	<66		<66	<66	<66	<66	<66	<66	<66	<66	<66	<66	<66
SB-24-4.5-5.0	December 12, 2005	<0.85	<0.85	<0.85	<0.85	<3.4			<330	<67		<67	<67	<67	<67	<67	<67	<67	<67	<67	<67	<67
SB-24-9.5-10.0	December 12, 2005	2,400 CJ	<250	22,000	55,700	<1,000																
SB-24-14.5-15.0	December 12, 2005	370	11	5.3	29.8	<3.1																
SB-27-0.5-1.0	December 12, 2005								<8,300	<1,700		<1,700	<1,700	<1,700	<1,700	<1,700	<1,700	<1,700	<1,700	<1,700	<1,700	<1,700
SB-27dup-1.0-1.5	December 12, 2005								<6,700	<1,300		<1,300	<1,300	<1,300	<1,300	<1,300	<1,300	<1,300	<1,300	<1,300	<1,300	<1,300
SB-27-4.5-5.0	December 12, 2005								<340	<67		<67	<67	<67	<67	<67	160	170	<67	100	86	69
SB-29-0.5-1.0	December 12, 2005								<8,300	<1,700		<1,700	<1,700	<1,700	<1,700	<1,700	<1,700	<1,700	<1,700	<1,700	<1,700	<1,700
SB-29-4.5-5.0	December 12, 2005								<330	<66		<66	<66	<66	<66	<66	190	190	95	150	140	110
SB-32-4.5-5.0	December 14, 2005	<100	<100	<100	<100	<400																
SB-32-9.5-10.0	December 14, 2005	<25	<25	<25	<25	<100				<66		<66	<66	<66	<66	<66	<66	<66	<66	<66	<66	<66
SB-32dup-10.0-10.5	December 14, 2005	<25	<25	<25	<25	<100																
SB-32-14.5-15.0	December 14, 2005	<0.97	<0.97	<0.97	<0.97	<3.9																
SB-33-4.5-5.0	December 15, 2005	<5.0	<5.0	<5.0	<5.0	<5.0																
SB-33-9.5-10.0	December 15, 2005	<5.0	<5.0	<5.0	32	<5.0			<340	<68		<68	<68	<68	<68	<68	<68	<68	<68	<68	<68	<68

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1009 66th Avenue, Oakland, California

		VOCs								SVOCs														
Sample ID & Location	Date Sampled	Benzene RL = 2-200 µg/Kg	Toluene RL = 2 µg/Kg	Ethylbenzene RL = 2-200 µg/Kg	Xylene RL = 2-200 µg/Kg	MTBE RL = 2 µg/Kg	Isopropylbenzene RL = 2 µg/Kg	Chlorobenzene RL = 2 µg/Kg	1,4-Dichlorobenzene RL = 2 µg/Kg	Naphthalene RL = 250-2500 µg/Kg	1-Methylnaphthalene RL = 250-2500 µg/Kg	Acenaphthylene RL = 250-2500 µg/Kg	Acenaphthene RL = 250-2500 µg/Kg	Fluorene RL = 250-2500 µg/Kg	Phenanthrene RL = 250-2500 µg/Kg	Anthracene RL = 250-2500 µg/Kg	Fluoranthene RL = 250-2500 µg/Kg	Pyrene RL = 250-2500 µg/Kg	Benzo(a)Anthracene RL =0.25-2.5 mg/Kg	Chrysene RL = 250-2500 µg/Kg	Benzo(k)Fluoranthene RL = 0.25-2.5 mg/Kg	Benzo(a)Pyrene RL = 0.25-2.5 mg/Kg		
SB-33-14.5-15.0	December 15, 2005	<5.0	<5.0	<5.0	<5.0	<5.0																		
SB-34-4.5-5.0	December 14, 2005	<5.0	<5.0	<5.0	130	<5.0																		
SB-34-9.5-10.0	December 14, 2005	<5.0	<5.0	<5.0	54	<5.0																		
SB-34-14.5-15.0	December 14, 2005	<5.0	28	<5.0	42	<5.0																		
SB-35-4.5-5.0	December 14, 2005	<5.3	<5.3	<5.3	<5.3	<21																		
SB-35-9.5-10	December 14, 2005	<5.2	<5.2	<5.2	<5.2	<21																		
SB-35-14.5-15.0	December 14, 2005	<4.6	<4.6	<4.6	<4.6	<18																		
SB-37-4.5-5.0	December 15, 2005	<5.0	<5.0	<5.0	<5.0	<5.0																		
SB-37-9.5-10.0	December 15, 2005	<5.0	<5.0	<5.0	<5.0	<5.0																		
SB-37-14.5-15.0	December 15, 2005	<5.0	<5.0	<5.0	<5.0	<5.0																		
SB-38-9.5-10.0	December 14, 2005								<340	<67		<67	<67	<67	<67	<67	<67	<67	<67	<67	<67	<67		
SB-38-14.5-15.0	December 14, 2005								<330	<67		<67	<67	<67	<67	<67	<67	<67	<67	<67	<67	<67		
SB-39-4.5-5.0	December 12, 2005	120	610	330	1,700	97																		
SB-39-9.5-10.0	December 12, 2005	1,100	50,000	23,000	150,000	<5.0																		
SB-39-14.5-15.0	December 12, 2005	<5.0	110	<5.0	300	<5.0																		
SB-39-19.5-20.0	December 12, 2005	<5.0	47	37	120	<5.0																		
SB-41-9.5-10.0	December 15, 2005	<5.0	<5.0	<5.0	<5.0	<5.0																		
SB-41-14.5-15.0	December 15, 2005	<5.0	<5.0	<5.0	<5.0	<5.0																		

NOTES:
mg/Kg - milligrams per kilogram
µg/Kg - micrograms per kilogram
NA - Not analyzed for constituent
ND - Not detected at the indicated reporting limit
PEA - Preliminary Environmental Assessment
RL - Reporting limit
C = Presence confirmed, but RPD between columns exceeds 40%
q = draft result - ending instrument QC not yet analyzed

Table 3
SSI Analytical Results
for Selected Compounds in Groundwater
Proposed Charter School Site
1009 66th Avenue, Oakland, California

		VOCs						TPH			PCBs	SVOCs[2]					Arsenic
Sample ID & Location	Date Sampled	VOCs RL = 0.010-0.100 mg/L	Benzene RL = 0.5-130 μg/L	Toluene RL = 0.5-0.130 μg/L	Ethylbenzene RL = 0.5-130 μg/L	Xylene RL = 0.5-130 μg/L	MTBE RL = 2.0-500 μg/L	TPH (gasoline range) C7-C12 RL = 0.05-0.1mg/L	TPH (diesel range) C10-C24 RL = 0.05-0.3 mg/L	TPH (oil range) C24-C40 RL = 0.24-0.38 mg/L	PCBs RL = 0.0005 - 0.0098 mg/L	Naphthalene RL = 0.010-0.100 mg/L	1-Methylnaphthalene RL = 0.010-0.100 mg/L	Acenaphthylene RL = 0.010 mg/L	Acenaphthene RL = 0.010 mg/L	Fluorene RL = 10 μg/L	
1A-N(42') GW1	August 11, 2005										0.0045						
1B-W(37') GW1	August 11, 2005										0.0071						
1C-W(68') GW1	August 11, 2005										ND						
1C-SW(20') GW2	August 24, 2005										ND						
2A-2W(4') GW1	August 12, 2005	ND	ND	ND	ND	ND		ND	ND	ND		ND	ND	ND	ND	ND	
2B-N(20') GW1	August 12, 2005	ND	28,496	29,456	4,719	15,529	ND	221.13	ND	ND		2.365	487	ND	ND	ND	
2B-N(37') GW1	August 25, 2005	ND[1]	10,754	13.534	3.428	9.903	7.007	146.57	ND	ND		0.293	57	ND	ND	ND	
2B-2E(20') GW1	August 12, 2005	ND	ND	ND	ND	ND		ND	ND	ND		ND	ND	ND	ND	ND	
2C-E(10') GW1	August 12, 2005	ND	ND	4	5	14		0.160	ND	ND		ND	ND	ND	ND	ND	
2C-W(20') GW2	August 24, 2005	ND	ND	ND	ND	ND		ND	ND	ND		ND	ND	ND	ND	ND	
SB-19-GW	December 14, 2005		25	120	69	410	1,100	2.2	0.680 LY	<0.3		0.013					
SB-19-GWDUP	December 14, 2005		34	150	88	480	1,100	2.7	0.860 HLY	0.43							
SB-22-GW	December 15, 2005		<0.5	<0.5	<0.5	<0.5	<2.0	<0.050	0.420 HY	1.8		<0.0098					
SB-22-GWDUP	December 15, 2005		<0.5	<0.5	<0.5	<0.5	<2.0	<0.050	0.260 HY	0.3		<0.0099					
SB-33-GW	December 15, 2005		<0.5	<0.5	<0.5	<0.5	<2.0	<0.050	0.560 HY	0.570 Y		<0.017					
SB-35-GW	December 15, 2005		<0.5	0.59	<0.5	1.1	<2.0	<0.050	0.570 HY	<0.33		<0.010					
SB-35-GWDUP	December 15, 2005		<0.5	<0.5	<0.5	<0.5	<2.0	<0.050	0.6 HY	<0.3							
NW-1 S	December 27, 2005		<0.5	<0.5	<0.5	<0.5	<2.0	<0.050	0.32 HY	0.420							
NW-1 I	December 27, 2005		<0.5	<0.5	<0.5	<0.5	8.0	<0.050	0.089 Y	<0.3							
NW-1 D	December 27, 2005		<0.5	<0.5	<0.5	<0.5	37	<0.050	<0.050	<0.3							
NW-2 S	December 27, 2005		570	570	62	1,530	1,600	7.1	7.3 HLY	2.6 LY							
NW-2 I	December 27, 2005		22,000	24,000	2,100	12,800	120,000	120	7.2 HLY	1.6 LY							
NW-2 D	December 27, 2005		300	13	<2.5	178	1,600	1.4	0.820 HY	0.530 LY							
NW-3 S	December 27, 2005		<0.5	<0.5	<0.5	<0.5	<2.0	<0.050	0.970 HY	0.870 LY							

Table 3
SSI Analytical Results
for Selected Compounds in Groundwater
Proposed Charter School Site
1009 66th Avenue, Oakland, California

Sample ID & Location	Date Sampled	VOCs						TPH			PCBs	SVOCs[2]					Arsenic
		VOCs RL = 0.010-0.100 mg/L	Benzene RL = 0.5-130 μg/L	Toluene RL = 0.5-0.130 μg/L	Ethylbenzene RL = 0.5-130 μg/L	Xylene RL = 0.5-130 μg/L	MTBE RL = 2.0-500 μg/L	TPH (gasoline range) C7-C12 RL = 0.05-0.1mg/L	TPH (diesel range) C10-C24 RL = 0.05-0.3 mg/L	TPH (oil range) C24-C40 RL = 0.24-0.38 mg/L	PCBs RL = 0.0005 - 0.0098 mg/L	Naphthalene RL = 0.010-0.100 mg/L	1-Methylnaphthalene RL = 0.010-0.100 mg/L	Acenaphthylene RL = 0.010 mg/L	Acenaphthene RL = 0.010 mg/L	Fluorene RL = 10 μg/L	
NW-3 I	December 27, 2005		<0.5	<0.5	<0.5	<0.5	<2.0	<0.050	0.095 Y	<0.3							
NW-3 D	December 27, 2005		<0.5	<0.5	<0.5	<0.5	<2.0	<0.050	0.910 HY	0.780 LY							
DUP-1 (NW-2D)	December 27, 2005		320	11	<2.5	218	1,500	1.6	0.820 HLY	0.46 LY							
MW-1	March-05		<0.5	<0.5	<0.5	<0.5	<200*	0.2			<0.0005	<0.010	<0.010	<0.010	<0.010	<10	
MW-2	March-05		<0.5	<0.5	<0.5	<0.5	15	<0.050			<0.0005	<0.010	<0.010	<0.010	<0.010	<10	
MW-3	March-05		<0.5	<0.5	<0.5	<0.5	<2.0	<0.050			<0.0005	<0.010	<0.010	<0.010	<0.010	<10	
MW-4	March-05		22,053	17,310	3980.7	13,969	5,841	162.8			<0.0005	0.382	0.044	<0.010	<0.010	<10	
EW-1	March-05		<0.5	<0.5	<0.5	<0.5	8	0.105			<0.0005	<0.010	<0.010	<0.010	<0.010	<10	

NOTES:

1. VOC Isopropylbenzene detected at 166.9 μg/L
2. Only SVOCs with detections are reported in this table; all other SVOCs ND.

mg/kg - milligrams per kilogram
μg/kg - micrograms per kilogram
ND - Not detected at the indicated reporting limit
PCB - Polychlorinated Biphenyls
PEA - Preliminary Environmental Assessment
RL - Reporting limit

SVOC - Semivolatile Organic Compound
TPH - Total Petroleum Hydrocarbons
VOC - Volatile Organic Compound
Y = Sample exhibits chromatographic pattern which does not resemble standard
L = Lighter hydrocarbons contributed to the quantitation
H = Heavier hydrocarbons contributed to the quantitation
J = Estimated concentration

Table 4
SSI Analytical Results for
Field Blanks, Equipment Blanks, and Trip Blanks
Proposed Charter School Site
1009 66th Avenue, Oakland, California

							VOCs					SVOCs											
Sample ID & Location	Date Sampled	TPH (gasoline range) C7-C12 RL = 0.1 ug/L	TPH (diesel range) C10-C24 RL = 0.5 ug/L	TPH (oil range) C24-C40 RL = 1.0 ug/L	PCBs RL = 0.2 - 0.0098 mg/L	Arsenic RL = 5.0 ug/L	Benzene RL = 2-200 µg/Kg	Toluene RL = 2 µg/Kg	Ethylbenzene RL = 2-200 µg/Kg	Xylene RL = 2-200 µg/Kg	MTBE RL = 2 µg/Kg	Naphthalene RL = 250-2500 µg/Kg	Acenaphthylene RL = 250-2500 µg/Kg	Acenaphthene RL = 250-2500 µg/Kg	Fluorene RL = 250-2500 µg/Kg	Phenanthrene RL = 250-2500 µg/Kg	Anthracene RL = 250-2500 µg/Kg	Fluoranthene RL = 250-2500 µg/Kg	Pyrene RL = 250-2500 µg/Kg	Benzo(a)Anthracene RL = 250-2500 mg/Kg	Chrysene RL = 250-2500 µg/Kg	Benzo(k)Fluoranthene RL = 250-2500 mg/Kg	Benzo(a)Pyrene RL = 250-2500 mg/Kg
FB121205	December 12, 2005	<50			<5.0		<.50	<.50	<.50	<.50	<2.0	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12	<12
EB121205	December 12, 2005	<50			<5.0		<.50	<.50	<.50	<.50	<2.0	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6
TB121205	December 12, 2005	<50					<.50	<.50	<.50	<.50	<2.0												
FB121305	December 13, 2005	<50	75 Y	<300	<.49/<.98	<5.0	<.50	<.50	<.50	<.50	<2.0												
EB121305	December 13, 2005		<50	<300	<.5/<1.0	<5.0	<.50	<.50	<.50	<.50	<2.0												
TB121305	December 13, 2005						<.50	<.50	<.50	<.50	<2.0												
FB121405	December 14, 2005	<50	<50	<300		<5.0	<.50	<.50	<.50	<.50	<2.0	<9.5	<9.5	<9.5	<9.5	<9.5	<9.5	<9.5	<9.5	<9.5	<9.5	<9.5	<9.5
EB121505	December 14, 2005	<50	<50	<300		<5.0	<.50	<.50	<.50	<.50	<2.0	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6	<9.6
TB121405	December 14, 2005	<50					<.50	<.50	<.50	<.50	<2.0												
FB121505	December 15, 2005	<50	53 HY	<300	<.48/<.96		<.50	<.50	<.50	<.50	<2.0	<9.7	<9.7	<9.7	<9.7	<9.7	<9.7	<9.7	<9.7	<9.7	<9.7	<9.7	<9.7
EB121505	December 15, 2005	<50	52 HY	<300	<.48/<.96		<.50	<.50	<.50	<.50	<2.0	<9.7	<9.7	<9.7	<9.7	<9.7	<9.7	<9.7	<9.7	<9.7	<9.7	<9.7	<9.7
TB121505	December 15, 2005	<50					<.50	<.50	<.50	<.50	<2.0												
FB122705	December 27, 2005	<50	<50	<300			<.50	<.50	<.50	<.50	<2.0												
EB122705	December 27, 2005	<50	<50	<300			<.50	<.50	<.50	<.50	<2.0												
TB122705	December 27, 2005	<50					<.50	<.50	<.50	<.50	<2.0												
TB2 122705	December 27, 2005	<50					<.50	<.50	<.50	<.50	<2.0												
FB010506	January 3, 2006	<50		<300	<0.47/<0.94																		
EB010506	January 3, 2006	<50		<300	<0.47/<0.94																		
TRIP	February 15, 2006	<50					<.50	<.50	<.50	<.50	<2.0												
EQ021506	February 15, 2006	<50					<.50	<.50	<.50	<.50	<2.0												
FB021506	February 15, 2006	<50					<.50	<.50	<.50	<.50	<2.0												

NOTES:
mg/Kg - milligrams per kilogram
µg/Kg - micrograms per kilogram
NA - Not analyzed for constituent
RL - Reporting limit
H = Heavier hydrocarbons contributed to the quantitation
Y = Sample exhibits chromatographic pattern which does not resemble standard

Revised Risk Evaluation Tables

Table J-12
Carcinogenic Risk Estimate for Chemicals of Potential Concern

Chemical	Oral Cancer Slope Factor (Sfo) $(mg/kg\text{-}day)^{-1}$	Inhalation Cancer Slope Factor (Sfi) $(mg/kg\text{-}day)^{-1}$	Dermal Absorption Fraction (ABS) (dimensionless)	Concentration in Soil[1] (Cs) (mg/kg)	Concentration in Air (Ca) (mg/m^3)	RISK for Soil Pathway	RISK for Air Pathway
Metals							
Arsenic	9.5E+00	1.2E+01	0.03	140.0	7.0E-06	**3.E-03**	**1.E-05**
Chromium IV	--	5.1E+02	0.03	3.2	1.6E-07	**NA**	**1.E-05**
PCBs, SVOCs, and Furans							
Aroclor 1260	5	2.0E+00	0.15	69.7	3.5E-06	**2.E-03**	**1.E-06**
Polynuclear Aromatic Hydrocarbons (PAHs)							
Benzo(a)anthracene	1.2E+00	3.9E-01	0.15	32.9	1.6E-06	**2.E-04**	**1.E-07**
Benzo(a)pyrene	1.2E+01	3.9E+00	0.15	66.9	3.3E-06	**4.E-03**	**2.E-06**
Benzo(k)fluoranthene	1.2E+00	3.9E-01	0.15	63.5	3.2E-06	**3.E-04**	**2.E-07**
Chrysene	1.2E-01	3.9E-02	0.15	46.2	2.3E-06	**2.E-05**	**1.E-08**
Naphthalene	1.2E-01	1.2E-01	0.15	13.3	9.9E-04	**7.E-06**	**2.E-05**
Volatile Organic Compounds (VOCs)							
Benzene	1.00E-01	1.00E-01	0.1	36.0	8.6E-03	**1.E-05**	**1.E-04**
1,4-Dichlorobenzene	5.4E-03	5.0E-02	0.1	0.1	NA	**2.E-09**	**--**
MTBE	1.8E-03	9.1E-04	0.1	ND	1.3E-03	**--**	**2.E-07**
Tetrachloroethene	0.54	0.021	0.1	5.6	8.9E-04	**1.E-05**	**3.E-06**
TOTAL RISK (across all chemicals and exposure routes):			**9.E-03**				

Notes:

1 Maximum detected concentration in soil
mg/kg = Milligrams per kilogram
mg/kg-day = Milligrams per kilogram per day
cm/hr = Centimeters per hour
mg/l = Milligrams per liter
mg/m^3 = Milligrams per cubic meter
VOCs = Volatile organic compounds

For Soil Pathway (equation shown on Figure 2.3; Cal-EPA 1999):
RISK = ((Cs x SFo) x (1.57 x 10^{-6})) + ((Cs x SFo) x (1.87 x 10^{-5}) x ABS)

For Air Pathway (equation shown on Figure 2.4; Cal-EPA 1999):
RISK = (Ca x SFi) x 0.149
where for non-VOCs (equation shown on Figure 2.8, Cal-EPA 1999):
Ca = Cs x (5.0 x 10^{-8} kg/m^3)
VOC Air concentration calculated using Department of Toxic Substances Control Johnson & Ettinger's vapor model

Table J-13
Noncarcinogenic Hazard Index Estimate for Chemicals of Potential Concern

Chemical	Oral Reference Dose (RfDo) (mg/kg-day)	Inhalation Reference Dose (RfDi) (mg/kg-day)	Dermal Absorption Fraction (ABS) (dimensionless)	Concentration in Soil[1] (Cs) (mg/kg)	Concentration in Air (Ca) (mg/m^3)	HAZARD QUOTIENT for Soil Pathway	HAZARD QUOTIENT for Air Pathway
Metals							
Arsenic	3.0E-04	3.0E-04	0.03	140.0	7.0E-06	**8.E+00**	**1.E-02**
Barium	7.0E-02	1.4E-04	0.03	246.0	1.2E-05	**6.E-02**	**6.E-02**
Chromium	1.5E+00	1.5E+00	0.03	101.0	5.1E-06	**1.E-03**	**2.E-06**
Chromium IV	3.0E-03	2.2E-06	0.03	3.0	1.5E-07	**2.E-02**	**4.E-02**
Cobalt	2.0E-02	5.7E-06	0.03	92.0	4.6E-06	**8.E-02**	**5.E-01**
Copper	4.0E-02	4.0E-02	0.03	61.0	3.1E-06	**3.E-02**	**5.E-05**
Nickel	2.0E-02	2.0E-02	0.03	227.0	1.1E-05	**2.E-01**	**4.E-04**
Vanadium	1.0E-03	1.0E-03	0.03	86.0	4.3E-06	**1.E+00**	**3.E-03**
Zinc	3.0E-01	3.0E-01	0.03	221.0	1.1E-05	**1.E-02**	**2.E-05**
PCBs, SVOCs, and Furans							
Carbazole	0.02	2.0E-02	0.1	5.8	2.9E-07	**7.E-03**	**9.E-06**
Aroclor 1260	2.00E-05	2.0E-05	0.15	69.7	3.5E-06	**1.E+02**	**1.E-01**
TPHd aliphatic	1.00E-01	1.0E-01	0.15	480.0	2.4E-05	**2.E-01**	**2.E-04**
TPHd aromatic	3.00E-02	3.0E-02	0.15	720.0	3.6E-05	**8.E-01**	**8.E-04**
Polynuclear Aromatic Hydrocarbons (PAHs)							
Acenaphthene	6.00E-02	6.00E-02	0.15	7.8	3.9E-07	**4.E-03**	**4.E-06**
Anthracene	3.00E-01	3.00E-01	0.15	10.0	5.0E-07	**1.E-03**	**1.E-06**
Benzo(a)anthracene	3.00E-01	3.00E-01	0.15	32.9	1.6E-06	**4.E-03**	**4.E-06**
Benzo(a)pyrene	3.00E-02	3.00E-02	0.15	66.9	3.3E-06	**7.E-02**	**7.E-05**
Benzo(k)fluoranthene	4.00E-02	4.00E-02	0.15	63.5	3.2E-06	**5.E-02**	**5.E-05**
Chrysene	7.30E-03	7.30E-03	0.15	46.2	2.3E-06	**2.E-01**	**2.E-04**
Fluoranthene	4.00E-02	4.00E-02	0.15	46.4	2.3E-06	**4.E-02**	**4.E-05**
Fluorene	4.00E-02	4.00E-02	0.15	6.5	3.3E-07	**5.E-03**	**5.E-06**
Methylnaphthalene	2.00E-02	3.00E-03	0.15	11.1	5.6E-07	**2.E-02**	**1.E-04**
Naphthalene	2.00E-02	3.00E-03	0.15	13.1	9.9E-04	**2.E-02**	**2.E-01**
Phenanthrene	3.00E+00	3.00E+00	0.15	55.3	2.8E-06	**6.E-04**	**6.E-07**
Pyrene	3.00E-02	3.00E-02	0.15	59.7	3.0E-06	**6.E-02**	**6.E-05**
Volatile Organic Compounds (VOCs)							
Benzene	4.00E-03	8.60E-03	0.1	36.0	8.6E-03	**2.E-01**	**6.E-01**
Chlorobenzene	2.0E-02	1.7E-02	0.1	0.01	NA	**2.E-05**	--
Ethylbenzene	1.0E-01	2.9E-01	0.1	110.0	1.3E-03	**3.E-02**	**3.E-03**
1,4-Dichlorobenzene	3.0E-02	2.3E-01	0.1	0.1	NA	**1.E-04**	--
Isopropylbenzene	1.0E-01	1.0E-01	0.1	5.6	NA	**1.E-03**	--
mp-Xylenes	2.0E-01	2.9E-01	0.1	400.0	4.8E-03	**5.E-02**	**1.E-02**
o-Xylene	2.0E-01	2.9E-02	0.1	ND	9.2E-04	--	**2.E-02**
MTBE	8.6E-01	8.6E-01	0.1	32.0	1.3E-03	**1.E-03**	**1.E-03**
Tetrachloroethene	0.01	0.021	0.1	5.6	8.9E-04	**1.E-02**	**3.E-02**
TPHg	0.04	0.04	0.1	4900.0	2.5E-04	**3.E+00**	**4.E-03**
Toluene	2.0E-01	1.1E-01	0.1	170.0	1.6E-03	**2.E-02**	**9.E-03**
Hazard Index for Pathway						**1.E+02**	
TOTAL HAZARD INDEX (across all chemicals and expc	**127.66**						

Table J-13
Noncarcinogenic Hazard Index Estimate for Chemicals of Potential Concern

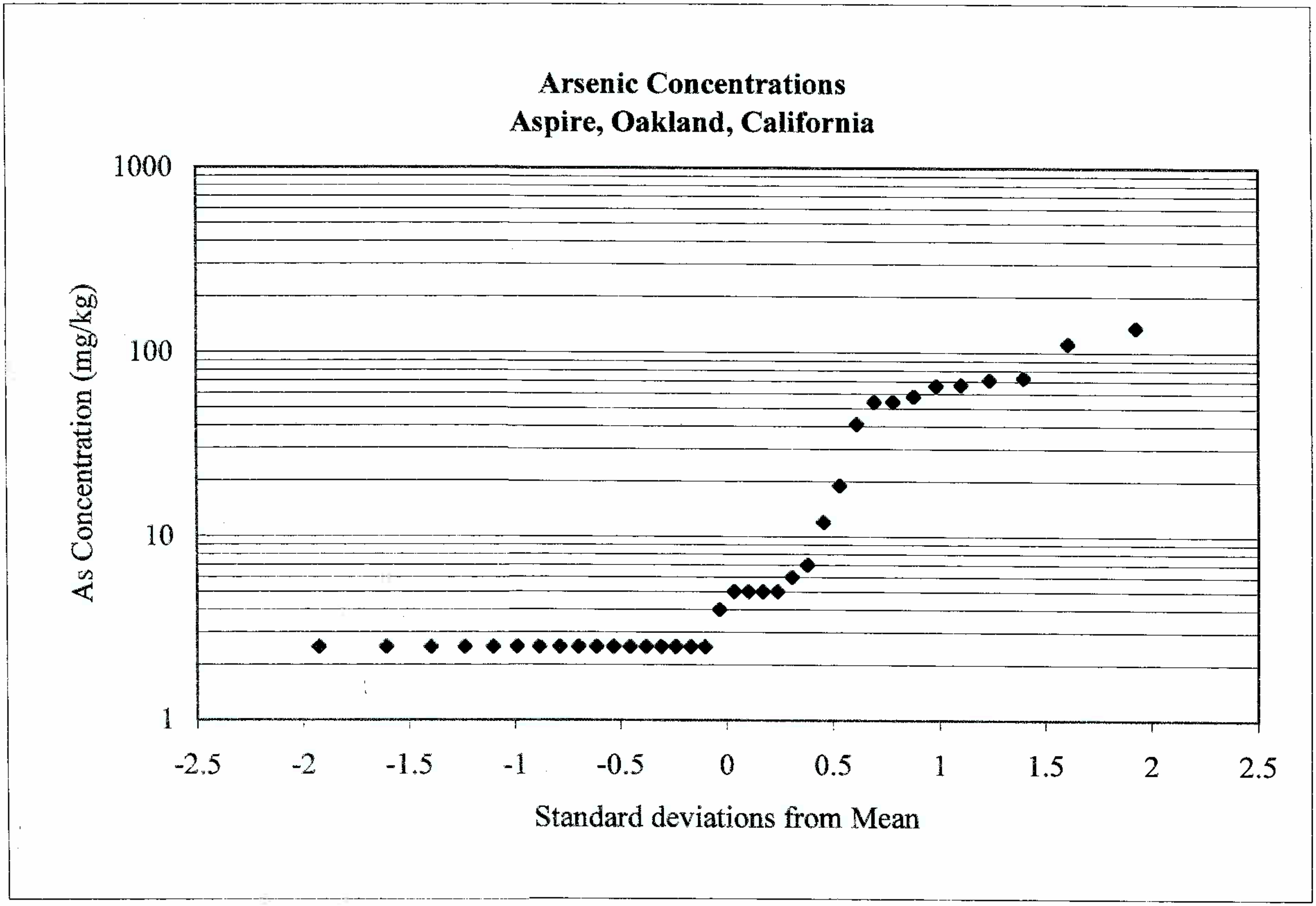
Notes:

[1] Maximum detected concentration in soil or as the soil vapor source
mg/kg = Milligrams per kilogram
mg/kg-day = Milligrams per kilogram per day
mg/l = Milligrams per liter
cm/hr = Centimeters per hour
mg/m^3 = Milligrams per cubic meter
NA = Not applicable
VOCs = Volatile organic compounds
TPH = total petroleum hydrocarbon

For Soil Pathway (equation shown on Figure 2.3; Cal-EPA 1999):
HAZARD = ((Cs/RfDo) x (1.28 x 10-5)) + ((Cs/RfDo) x (1.28 x 10-4) x ABS)

For Air Pathway (equation shown on Figure 2.4; Cal-EPA 1999):
HAZARD = (Ca/RfDi) x 0.639
where for non-VOCs (equation shown on Figure 2.8, Cal-EPA 1999):
$Ca = Cs \times (5.0 \times 10^{-8}\ kg/m^3)$
VOC Air concentration calculated using Department of Toxic Substances Control Johnson & Ettinger's vapor model

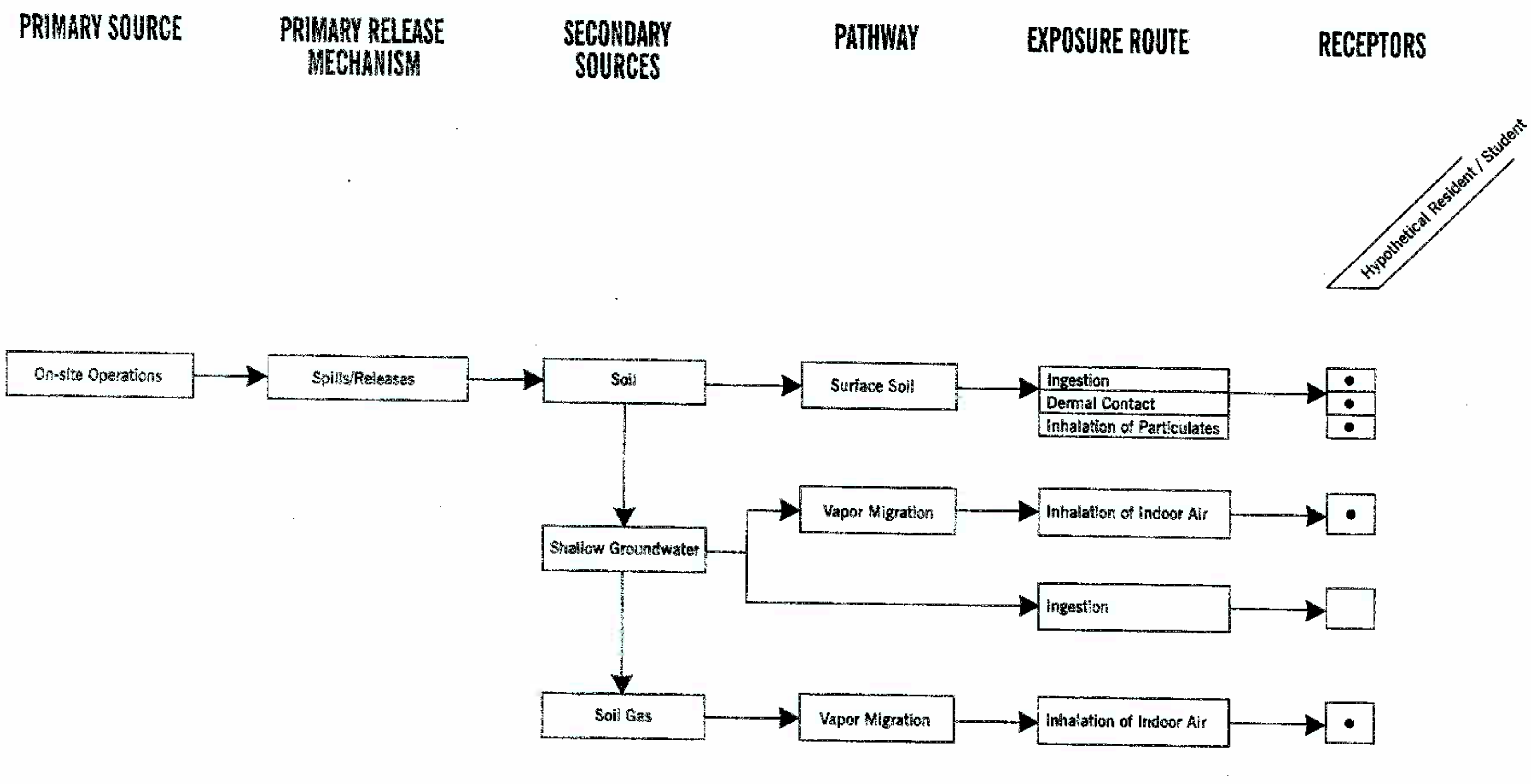
Arsenic Probability Plot


Arsenic Concentrations
Aspire, Oakland, California
1000
100
10
1
As Concentration (mg/kg)
-2.5
-2
-1.5
-1
-0.5
0
0.5
1
1.5
2
2.5
Standard deviations from Mean

n 36

Rank			mg/kg
1.00	0.027027	-1.926403	2.5
2.00	0.054054	-1.606755	2.5
3.00	0.081081	-1.397837	2.5
4.00	0.108108	-1.236652	2.5
5.00	0.135135	-1.10244	2.5
6.00	0.162162	-0.98561	2.5
7.00	0.189189	-0.880888	2.5
8.00	0.216216	-0.785036	2.5
9.00	0.243243	-0.695908	2.5
10.00	0.27027	-0.611996	2.5
11.00	0.297297	-0.53219	2.5
12.00	0.324324	-0.45564	2.5
13.00	0.351351	-0.381675	2.5
14.00	0.378378	-0.309743	2.5
15.00	0.405405	-0.23938	2.5
16.00	0.432432	-0.170185	2.5
17.00	0.459459	-0.101796	2.5
18.00	0.486486	-0.03388	4
19.00	0.513514	0.03388	5
20.00	0.540541	0.101796	5
21.00	0.567568	0.170185	5
22.00	0.594595	0.23938	5
23.00	0.621622	0.309743	6
24.00	0.648649	0.381675	7
25.00	0.675676	0.45564	12
26.00	0.702703	0.53219	19
27.00	0.72973	0.611996	41
28.00	0.756757	0.695908	54
29.00	0.783784	0.785036	54
30.00	0.810811	0.880888	58
31.00	0.837838	0.98561	66
32.00	0.864865	1.10244	67
33.00	0.891892	1.236652	71
34.00	0.918919	1.397837	73
35.00	0.945946	1.606755	111
36.00	0.972973	1.926403	136

Conceptual Site Model



Legend

- ● Complete exposure pathway, quantitative evaluation
- ☐ Incomplete exposure pathway, quantitatively evaluated

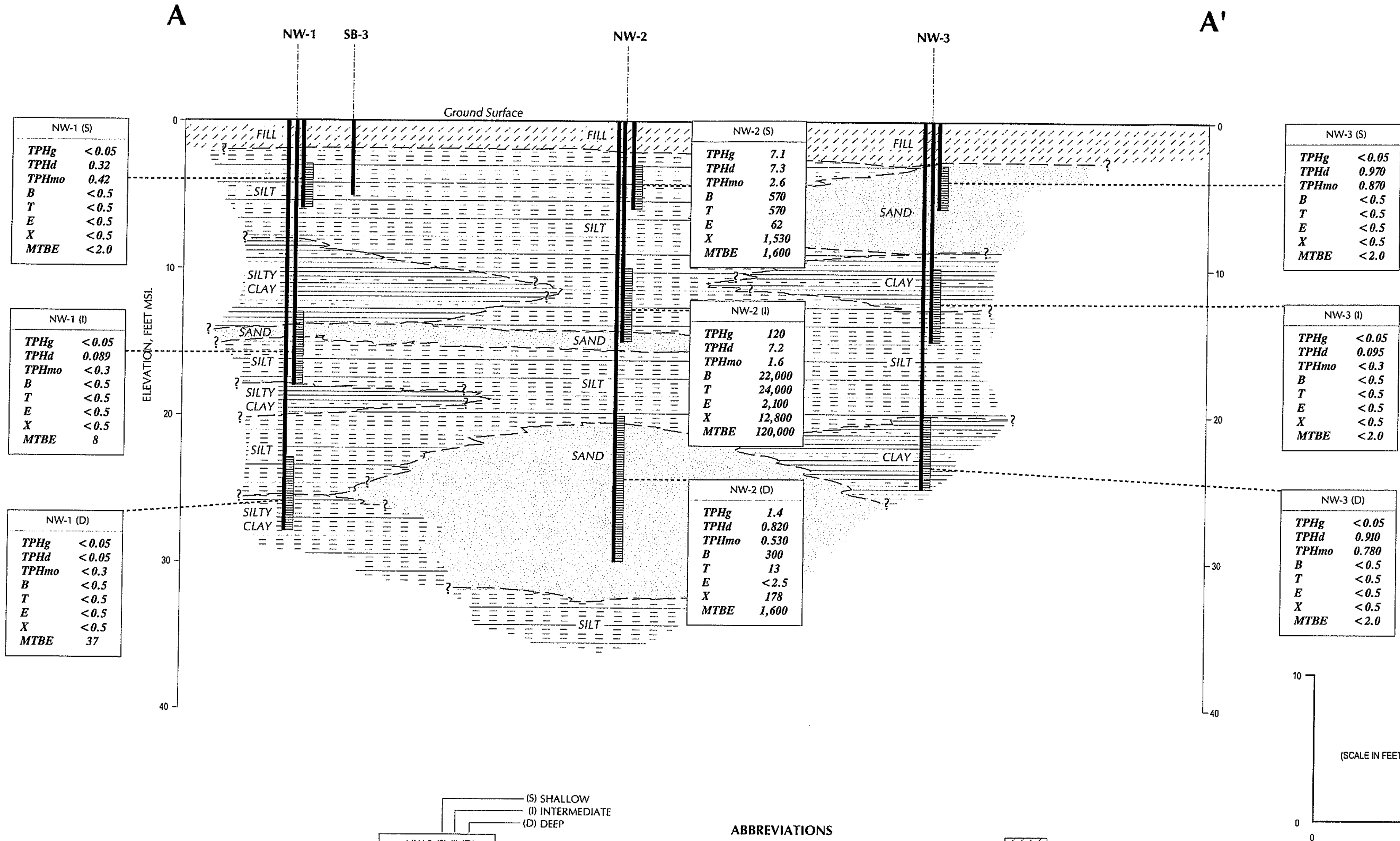
Conceptual Site Model for Complete Exposure Pathways Proposed Aspire Charter High School Site

1009 66th Avenue, Oakland, California

LFR LEVINE·FRICKE

DESIGN\0031\15500\Proposed Aspire Charter High School_Conceptual.ai

Cross-Section and Nested Wells Logs



LEGEND

NW-1 —— WELL IDENTIFICATION

SCREENED INTERVAL

SB-3 —— BORING IDENTIFICATION

(S) SHALLOW
(I) INTERMEDIATE
(D) DEEP

NW-2 (S) (I) (D) —— WELL IDENTIFICATION

TPHg	7.1
TPHd	7.3
TPHmo	2.6
B	570
T	570
E	62
X	1,530
MTBE	1,600

TPHg, TPHd, TPHmo: REPORTED IN MILLIGRAMS PER LITER (mg/l)

B, T, E, X, MTBE: REPORTED IN MICROGRAMS PER LITER (µg/l)

ABBREVIATIONS

TPHg = TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
TPHd = TOTAL PETROLEUM HYDROCARBONS AS DIESEL
TPHmo = TOTAL PETROLEUM HYDROCARBONS AS MOTOR OIL
B = BENZENE
T = TOLUENE
E = ETHYLBENZENE
X = TOTAL XYLENES
MTBE = METHYL TERTIARY BUTYL ETHER

FILL MATERIAL
SILT/CLAY
CLAY/SILT
FINE SAND

Geologic Cross-Section A-A' with Groundwater Analytical Results

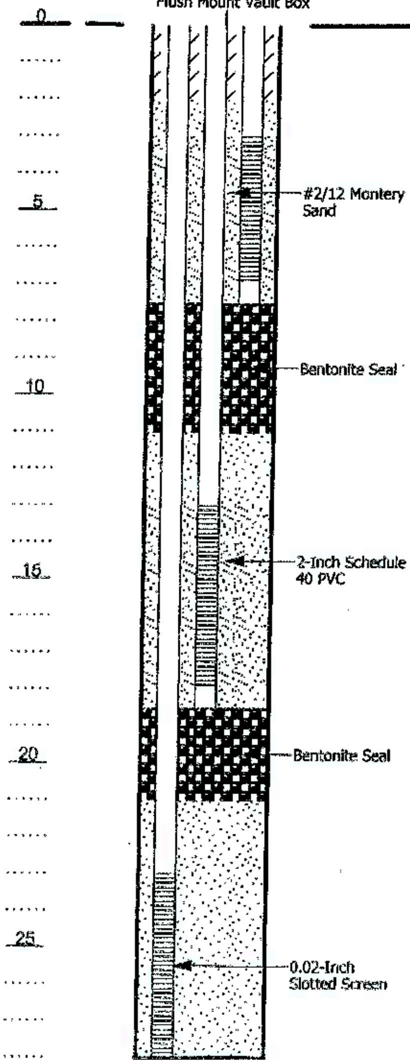
Proposed Charter School Site, 1009 66th Avenue, Oakland, California

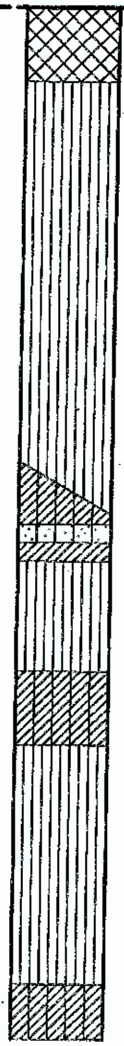
LFR

Figure 15

J:\ILLUSTRATOR\09155\003.09155.00.004\Fig:15 Cross_Sec A-A'.ai 081506

WELL CONSTRUCTION	LITHOLOGY	SAMPLING DATA





Visual Description	Recovery	Blows per 6 in.	PID (ppm)
Fill, sand, gravel, hard, moist			
Silt (ML), Olive Gray (5Y 5/2), moist, stiff, little sand, clay, and gravel			
Grades Wet		32	0.0
		28	
Grades Moist		16	0.0
Trace organics		17	0.0
Grades Fine~Decreasing Gravel		14	0.0
Silty Clay (CLM), Light Olive Brown (2.5Y 5/3), wet, little sand and gravel		17	0.0
Silty Sand (SM), Light Olive Brown 92.5Y 5/3), wet, fine to coarse grained			
Silty Clay (CL), Light Olive Brown (2.5Y 5/3), wet, little sand and gravel		18	0.1
Silt (ML), Light Olive Brown (2.5Y 5/3), moist/wet, little sand, trace gravel		28	0.0
Silty Clay (CL), Light Olive Brown (2.5Y 5/3), moist, stiff, trace sand		19	
Silt (ML), Light Olive Brown (2.5Y 5/3), wet, stiff, little clay and sand, trace organics		18	0.0
		18	
		13	
		18	
Silty Clay (CLM), Light Olive Brown (2.5Y 5/3), wet, stiff, trace gravel		10	0.0

Bottom of bore hole approximately 28 feet bgs

Well Permit Number:
Date Well Drilled: 12/19/05
Drilling Company: BC2
Driller:
Sampling Method:
LFR Geologist: Lee McIlvaine

Casing Elevation: Flush Mount Vault Box

EXPLANATION

- Clay (CL/CH)
- Silt (ML/MH)
- Sand (SP/SW)
- Gravel (GP/GW)
- Grab Groundwater Sample
- Soil Sample
- ∇ Depth GW Encountered During Drilling
- ▼ Static Water Level

Visual description based on Unified Soil Classification System

WELL CONSTRUCTION AND LITHOLOGY FOR WELL NW-1

ENVR SOIL+ WELL OCT 05 003-09155-00 ASPIRE.GPJ 5/11/06

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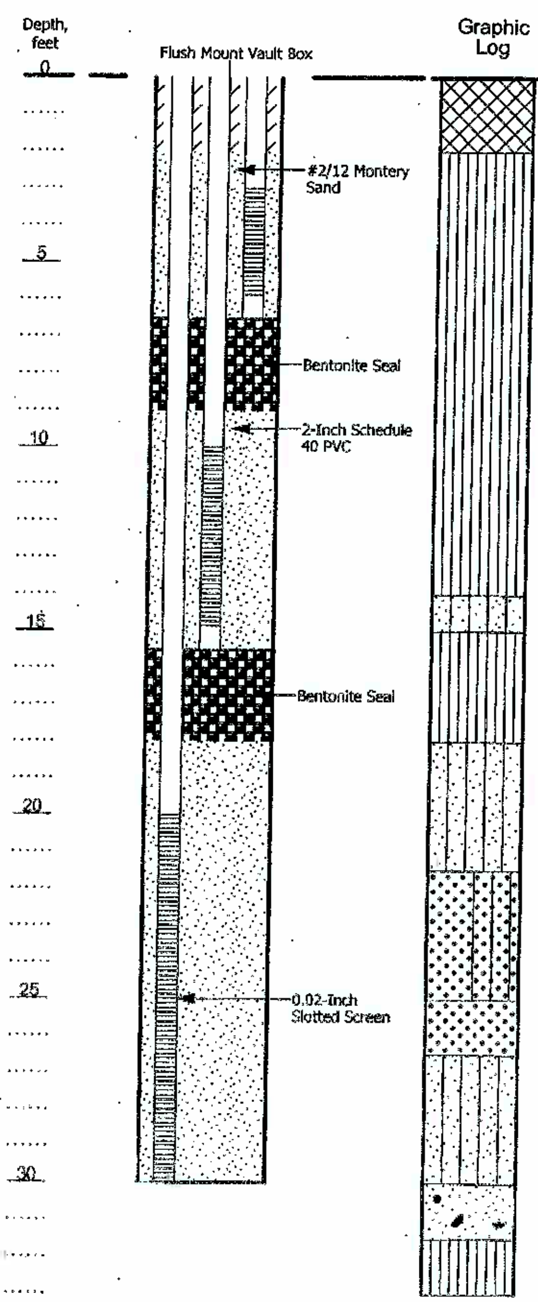
003-09155-00

Aspire Charter High School

1/20/2006 CLM/DLB

WELL CONSTRUCTION	LITHOLOGY	SAMPLING DATA



Visual Description	Recovery	Blows per 6 in.	PID (ppm)
Fill, Yellowish Brown (10YR 5/4), moist, loose, sand, gravel, silt			
Silt (ML), Dark Olive Gray (5Y 3/2), moist, stiff, some clay, little sand and gravel			
Same as above, petroleum odor noted (5)		25	23.5
		18	210
		17	214
Same as above, trace organics (10)		13	476
		11	1035
sheen observed on outside of core		18	878
Silty Sand (SM), olive Gray to Light Olive (5Y 5/2), moist, trace organics and gravel, slight petroleum odor			
Silt (ML), Light Olive Brown (2.5Y 5/3), moist, stiff, little sand and gravel, trace clay (15)		15	88.3
		12	12.1
Silty Sand (SM), Light Olive Brown (2.5Y 5/3), moist/wet, little gravel		10	11.6
(20)		15	14.5
Sand (SW-SM), Light Olive Brown (2.5Y 5/3), wet, little silt, trace gravel		16	5.5
Same as above, grades moist			
Sand (SW), wet, 3" Olive Gray Clay layer, sand and gravel (25)			
Silty Sand (SM), Olive Gray (5Y 5/2), wet, loose, little fine sand, trace gravel			
Sand and Gravel (SPG), Olive Gray (5Y 5/2), wet, loose, bottom 8" silt, little sand and clay, trace gravel (30)			
Silt (ML), wet, stiff, little clay, trace gravel		14.3	5.2

Bottom of Bore Hole approximately 33 feet bgs

Well Permit Number:
Date Well Drilled: 12/26/05
Drilling Company: BC2
Driller:
Sampling Method:
LFR Geologist: Lee McIlvaine

EXPLANATION

- Clay (CL/CH)
- Silt (ML/MH)
- Sand (SP/SW)
- Gravel (GP/GW)
- Grab Groundwater Sample
- Soil Sample
- Depth GW Encountered During Drilling
- Static Water Level

Visual description based on Unified Soil Classification System

WELL CONSTRUCTION AND LITHOLOGY FOR WELL NW-2

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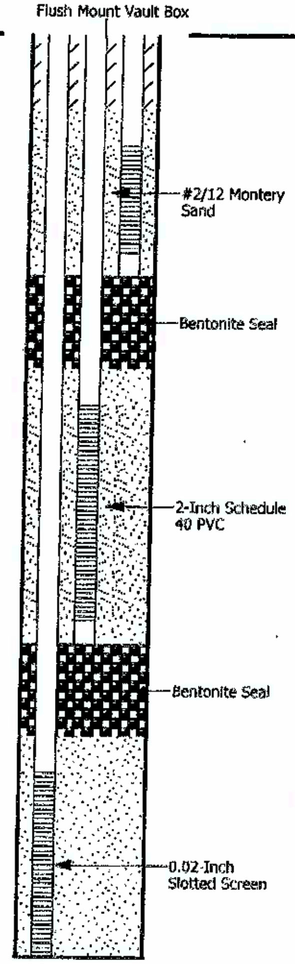
003-09155-00

Aspire Charter High School

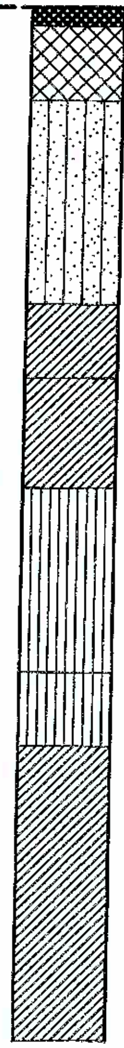
1/23/2006 CLM/DLB

WELL CONSTRUCTION	LITHOLOGY	SAMPLING DATA

Depth, feet: 0, 5, 10, 15, 20, 25



Graphic Log



Visual Description

- Asphalt
- Fill, Yellowish Brown (10YR 5/4), wet/moist, sand, gravel, silt, tree branch1-2" in diameter at 2.5 feet
- Silty Sand (SM), Light Olive Brown ( ), wet/moist, some silt, little gravel (angular)
- Clay (CL), some silt, trace sand and gravel
- Clay (CL), Ligh Olive Brown with little Olive Gray (2.5Y 5/3), moist, stiff, some silt, trace sand
- Same as above, grades wet
- Silt (ML), Olive Gray (5Y 5/2), wet, stiff, some clay, trace sand and gravel
- Clayey Silt (ML) Olive Gray and Light Olive Brown (5Y 5/2), wet, stiff, trace sand and gravel
- Clay (CL), Light Olive Brown (2.5Y 5/3), wet, stiff, little silt, trace organics (roots)

Bottom of Bore Hole at approximately 28 feet bgs

Recovery	Blows per 6 in.	PID (ppm)
	30	0.0
	30	0.0
	25	0.0
	24	0.0
	20	0.0
	28	0.0
	22	0.0
	26	0.0
	29	0.0
	24	0.0
	18	0.0
	20	0.0
	23	0.0
	22	0.0

Well Permit Number:
Date Well Drilled: 12/19/05
Drilling Company: BC2
Driller:
Sampling Method:
LFR Geologist: Lee McIlvaine

EXPLANATION

- Clay (CL/CH)
- Silt (ML/MH)
- Sand (SP/SW)
- Gravel (GP/GW)
- Grab Groundwater Sample
- Soil Sample
- Depth GW Encountered During Drilling
- Static Water Level

Visual description based on Unified Soil Classification System

WELL CONSTRUCTION AND LITHOLOGY FOR WELL NW-3

Supplemental Site Investigation Addendum

LFR
LEVINE • FRICKE

February 7, 2006 003-09155-00

Mr. Michael Hall
California Environmental Protection Agency
Department of Toxic Substances Control
School Property Evaluation and Cleanup Division
5796 Corporate Avenue
Cypress, California 90630

Subject: Addendum to Supplemental Site Investigation Completion Report, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California
DTSC Site Code: 204147-11

Dear Mr. Hall:

This addendum presents the results of a supplemental evaluation of groundwater conditions beneath the Proposed Aspire Charter High School Site, located at 1009 66th Avenue, Oakland, Alameda County, California ("the Site"; Figure 1). LFR Inc. (LFR) has prepared this addendum on behalf of the Aspire Public Schools (Aspire) for submittal to the California Environmental Protection Agency, Department of Toxic Substance Control (DTSC).

LFR presented the results of several phases of previous investigations and an assessment of potential risks associated with this Site in the report "Additional Supplemental Site Investigation Completion Report, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California," dated January 23, 2006 ("the January 2006 report"). The January 2006 report presented the delineation of chemicals of potential concern (COPCs) beneath the site, concluded that the current site conditions pose a potential health risk for unrestricted land use, and recommended the preparation of a removal action work plan. The proposed remedy includes excavation and removal of soil that has been affected by COPCs to a maximum depth of 15 to 18 feet below the ground surface (bgs), and installation of a vapor barrier and passive ventilation system designed to intercept vapors that may migrate off of soil or groundwater that could potentially contain residual concentrations of volatile COPCs.

During a recent meeting regarding this Site, DTSC expressed concerns regarding groundwater conditions beneath the central portion of the Site, including a concern regarding the potential for petroleum hydrocarbons in groundwater to migrate onto and off of the Site, and other potential risks associated with COPCs in groundwater. To address these concerns, LFR conducted additional evaluations of groundwater conditions at the Site, including an assessment of historic and current groundwater flow, concentrations of COPCs, inorganic groundwater quality, and the vertical extent of COPCs in groundwater.

structures in 1925. Commercial development of the Site was shown on the 1950 through 1969 Sanborn Maps. A gasoline UST is present to the east of the warehouse in the 1950 through 1969 maps. The area adjacent to the north of the Site was vacant land or residential land in all of the Sanborn Maps reviewed by LFR.

Aerial photographs were obtained by LFR for the Site and Site vicinity. A summary of the information obtained from the available photographs (dated 1939 through 1998) is presented in Table 3. The Site was occupied by residential structures in 1939 and 1946 with commercial development of the Site shown on the 1958 through 1998 aerial photographs. A small structure is present on the 1958 aerial photograph in the area noted as having a gasoline UST on the 1950 Sanborn Map. The manufacturing/office building and warehouse structure currently present on the Site are shown on the 1958 through 1998 aerial photographs. The area adjacent to the north of the Site was vacant land or residential land in all of the photographs reviewed by LFR.

Removal of UST and Excavation of Petroleum Hydrocarbon-Affected Soil

Pacific Electric Motor (PEM), a former occupant of the Site, removed the gasoline UST, the associated pump island, piping, storage shed and appurtenances in 1995 (Environ 1997). The UST was reportedly in good condition with no holes evident. However, free phase gasoline product was observed on the water surface in the tank excavation. Gasoline at a maximum concentration of 10,000 milligrams per kilogram (mg/kg) and benzene at a maximum concentration of 73 mg/kg were detected in soil samples collected from the excavation stockpile. Analysis of groundwater samples collected in 1995 revealed the presence of gasoline at concentrations up to 81 milligrams per liter (mg/L) and benzene at a maximum concentration of 3,100 μg/L.

Soil was excavated from the central portion of the Site in 1995 and 2002 and transported to an off-Site facility for disposal (W.A. Craig, various reports; Decon Environmental Services 2002a). The approximate extents of these excavations are shown on Figure 2.

In June 2002, 25 soil borings were advanced to a depth of 13 feet in the area of the former gasoline UST. Each of these borings was backfilled with 8 pounds of Oxygen Release Compound (ORC) followed by neat cement (Decon Environmental Services 2002a and 2002b). ORC socks were installed in two on-Site wells, MW-1 and WAC-1, in 2002 (Decon Environmental Services 2002a and 2002b).

Results of these and subsequent soil investigations (as presented in the January 2006 report) are consistent with the presence of a single source area for petroleum hydrocarbons that was located near the former gas shed shown on Figure 2.

Groundwater Conditions

The current groundwater monitoring well network at this Site includes 13 groundwater monitoring wells (MW-1 through MW-4, and NW-1 [S/I/D] through NW-3 [S/I/D]; Figure 3), as described below.

The magnitude of the hydraulic gradient across this Site is very small. The calculated gradient using the February 2002 data is 0.01 foot/foot. A review of historical groundwater elevation data indicate that the total head drop across this Site is typically less than 1 foot.

Groundwater Quality

Several phases of groundwater quality investigation have been conducted at this Site as follows:

- Groundwater samples were collected from wells MW-1 through MW-4 on a periodic basis between June 1997 and May 2003 and from well EW-1 between December 2002 and May 2003 (PES 2003). In addition, samples were collected from these wells in March 2005 by CSS Environmental (CSS) during the PEA.
- Groundwater samples were collected by LFR from wells NW-1, NW-2 and NW-3 in December 2005.
- Reconnaissance groundwater samples were collected by CSS in March and August 2005 and by LFR in December 2005.
- The groundwater samples collected from the Site by CSS and LFR were analyzed for gasoline using U.S. Environmental Protection Agency (EPA) Method 8015 Modified and benzene and MTBE using U.S. EPA Method 8260.

A summary of groundwater quality data from the investigations is presented in Table 4; the data are discussed below.

Extent of COPCs

Isoconcentration maps for total petroleum hydrocarbons quantified as gasoline (TPHg), benzene, and MTBE are presented on Figures 5, 6, and 7 using the analytical data collected from the Site in 2005.

Figure 5 shows that the highest concentration of TPHg in groundwater is present in the immediate vicinity of MW-4 and that concentrations of gasoline greater than 100 mg/L are limited to the area immediately south of the warehouse and southwest of the former UST location. TPHg was not detected at concentrations at or above the laboratory reporting limits in the wells located downgradient of the former UST location (MW-2, MW-3 and NW-3).

Similarly, the highest concentration of benzene in groundwater is present at MW-4, as shown on Figure 6. Concentrations of benzene greater than 10,000 μg/L are limited to the area immediately south of the warehouse and southwest of the former UST location. Benzene was not detected at concentrations at or above the laboratory reporting limits in the wells located downgradient of the former UST location (MW-2, MW-3 and NW-3).

Figure 7 shows that MTBE was detected at the highest concentrations around NW-2 (intermediate interval) with concentrations greater than 5,000 μg/L limited to the area immediately south of the warehouse and southwest of the former UST location. MTBE was not detected at concentrations at

DO concentrations were measured in December 2002 and February and May 2003 in MW-1 through MW-4 with the following results (in mg/L):

	MW-1	MW-2	MW-3	MW-4
12/11/02	0.7	1.4	1.9	0.8
2/26/03	2.2*	0.8	1.9	0.1
5/16/03	0.2	2.7	1.9	0.4

*: DO measurement taken following purging of well

DO concentrations are relatively depressed in wells MW-1 and MW-4, located near the source area, when compared with downgradient wells MW-2 and MW-3. The depletion of DO in the source area is indicative of microbial utilization of DO during aerobic respiration of dissolved petroleum hydrocarbons.

Risk Evaluation

Human health risk calculated for this Site is driven by the vapor intrusion pathway associated with the potential for vapors to migrate from residual COPCs in soil and groundwater into buildings constructed over affected areas. Aspire proposes to address this risk by removing the source material through excavation, and by blocking this pathway using a vapor barrier that would be constructed under the buildings, as described below.

Inclusion of an impermeable membrane (vapor barrier) beneath the building slab is a common practice in the design of buildings constructed on properties where intrusion of soil vapor into occupied spaces could occur. A soil vapor mitigation system frequently includes a vent system consisting of a series of perforated pipes placed in trenches beneath the membrane that are backfilled with permeable materials. A permeable layer beneath the membrane facilitates the migration of gases to the nearest vent pipe. Sub-membrane vents are connected to vent risers that extend above structure rooflines. This vent system provides a "path of least resistance" that allows soil vapors to be safely vented to the atmosphere, where applicable, or to a treatment phase for Air Quality Management District-regulated compounds.

Materials used for impermeable membranes generally fall into two categories; manufactured membrane materials (such as HDPE) and spray-applied membranes (such as Liquid Boot™). Membrane selection is based on compatibility of the material with the constituents of the soil gas, local regulatory requirements, and economic factors related to the size of the building, the complexity of building footings, and the number of membrane penetrations that will be required. Regardless of the material selected, gas mitigation systems will require that any utility piping or conduits entering the building from below grade that penetrate the membrane be fitted with sealing 'boots' to maintain the integrity of the membrane. Utility pipes and conduits within the building footprint are placed above the membrane to minimize penetrations where possible. "Dry" utility conduits (electricity, phone, cable TV) are also fitted with conduit seals to prevent gases from entering the structure through those conduits.

- Based on the data collected at the Site to date, it appears that the lateral extent of COPCs has remained limited to the vicinity of the source area, with very limited migration away from the source area.

- Aspire plans to excavate petroleum hydrocarbon-impacted soil in the central portion of the Site prior to construction of the school campus. Based on the data obtained during the PEA and SSIs, this excavation will extend to depths of 15 to 18 feet bgs.

- Historic removal activities appear to have been successful in reducing the concentrations of COPCs in adjacent groundwater at MW-1. Following removal of the impacted soil and dewatering of the excavation during the removal action, the concentrations of TPHg, benzene and MTBE in groundwater are expected to decrease to levels acceptable to the DTSC and Alameda County Health Care Services Agency (ACHCSA).

- Based on our experience with similar Sites and conditions, LFR anticipates that the proposed vapor barrier and passive ventilation system will be sufficient to reduce human health risk to levels acceptable to the DTSC.

To document that natural attenuation is occurring, groundwater monitoring wells will be installed on the Site following construction and a groundwater monitoring and analysis program will be implemented. To document that vapors with compounds of concern are not entering the buildings, a monitoring program will be implemented that will include collecting vapor samples from inside the buildings for chemical analysis. Reports presenting the results of the groundwater and vapor monitoring will be prepared and forwarded to the DTSC and ACHCSA.

The level of site characterization is more than adequate to support the recommendation to proceed with remedial action at the Site.

If you have any questions or comments concerning the information presented in this letter, please call either of the undersigned at (916) 786-0320.

Sincerely,

Lita D. Freeman, P.G., R.E.A. II
Senior Associate Geologist

Alan Gibbs, P.G., C.HG., R.E.A. II
Principal Hydrogeologist

cc: Charles Robitalle, Aspire Public Schools
John Dominguez, School Site Solutions
Patty Jeffery, Placemakers
Dave Hawke, California Department of Education

Attachments:

Tables:

1 Regulated Facilities Within a 1,000-Foot Radius of the Site

2 Sanborn Fire Insurance Map's Summary

3 Aerial Photographs Summary

4 Groundwater Elevation and Analytical Data

Figures:

1 Site Vicinity

2 Site Plan

3 Western Portion of Site with Groundwater Sampling Locations

4 Groundwater Elevation Contour Map – February 2002

5 TPHg Isoconcentration Contours

6 Benzene Isoconcentration Contours

7 MTBE Isoconcentration Contours

8 TPHg Trend Analysis for MW-1

9 Benzene Trend Analysis for MW-1

10 MTBE Trend Analysis for MW-1

11 MTBE Trend Analysis for MW-2

12 MTBE Trend Analysis for MW-3

13 TPHg Trend Analysis for MW-4

14 Benzene Trend Analysis for MW-4

15 MTBE Trend Analysis for MW-4

Table 1
Regulated Facilities Within a 1,000-Foot Radius of the Site
Proposed Charter School Site
1009 66th Avenue
Oakland, California

EDR Map ID No.	Facility Name and Address	Distance and Direction from Site	Lists/Databases and Case Summary
5	Oakland Fire Station 1016 66th Avenue	Approximately 100 feet to the east and upgradient	LUST, Cortese, CS - A release of diesel was reported in May 1990. This soil-only diesel release was granted case closure in September 1997.
B6/B7	Acts Full Gospel Church and General Electric Wire & Cable 1034 66th Avenue	Approximately 100 feet to the east and upgradient	HAZNET, LUST, Cortese, CS, RCRIS-SQG, FINDS - General Electric Wire & Cable is listed as a small quantity hazardous waste generator. A release of heater fuel was reported in November 1994. This heater fuel release was granted case closure in April 1997. In addtion, this facility is reported to have properly disposed of polychlorinated biphenyls (PCBs) and materials containing PCBs, and asbestos-containing waste.
C8/C10	AA Johnson & Son, Inc. 1164 66th Avenue	Approximately 500 feet to the northeast and crossgradient to upgradient	LUST, Cortese, HIST UST - A release was reprted in September 1991. According to the EDR report this gasoline case remains open is preliminary site assessment is underway. Although according to Geotracker, a geographic information system database run by the State of California that provides online access to environmental data, the LUST case at this facility was closed in February 2005. According the EDR report, several USTs were located at this facility in the past.
9	Liquid Sugar 1275 65th Avenue	Approximately 500 feet to the north and crossgradient	LUST, Cortese - A release of diesel that affected groundwater was reported at this facility in 1991. According to information in the Geotracker database, the RWQCB granted case closure in 2001.
11	Capitol Waste Recycling 928 66th Avenue	Approximately 800 feet to the south and downgradient	SWF/LF - This facility is listed on the solid waste information system (SWIS) database which records an inventory of active, inactive, or closed solid waste disposal facilities and landfills.

Table 2
Sanborn Fire Insurance Maps Summary
Proposed Charter School Site
1009 66th Avenue
Oakland, California

Year	Site Description	Description of Adjacent Properties
1912	No coverage was available for the Site at the time of this map.	Coast Manufacturing and Supply Company, which manufactured fuses, is located east of the Site (across 66th Avenue) at 1000-1028 66th Avenue. Offices, warehouses, a starch rack, fuse houses, a finishing room, machine shop and a wash room are visible within the Coast Manufacturing and Supply Company boundaries. No USTs, ASTs or chemical storage areas were noted on the western portion of this property (adjacent to 66th Avenue).
1925	A residential structure and two smaller structures are visible.	There are two residential structures visible on the northeast adjacent property (1035 66th Avenue). No USTs, ASTs or chemical storage areas were noted on this property.
1950	Pacific Electric Motor Company is visible on the Site. A gasoline and oil storage shed on the northern portion of the Site (in the area where the UST was removed from the Site in 1995), offices, storage areas and a paint spray booth are visible.	Lockwood Gardens, a federal public housing authority housing project, is located adjacent to the north and northeast of the Site. The housing project contains several multi-family residential structures, and a small laundry and storage structure is located adjacent to the Site's northeastern boundary. Springfield Cedar, which appears to be a lumber yard, is visible northwest of the Site and California Concrete Products Company is visible west of the Site. No USTs, ASTs or chemical storage areas were noted on these properties.
1952	The Site appears as it did on the 1950 map.	The adjacent properties appear as they did on the 1950 map. No USTs, ASTs or chemical storage areas were noted on these properties.
1959	The Site appears as it did on the 1952 map with the exception of a oil drum storage rack and parts warehouse located in the central area of the Site.	The northeast adjacent property Lockwood Gardens) and the northwest adjacent (Springfield Cedar) appear as they did in the 1952 map. The property located west-southwest adjacent of the Site has been redeveloped with Fruitvale Canning Company. No USTs, ASTs or chemical storage areas were noted on these properties.
1960	The Site appears as it did on the 1959 map.	The properties located adjacent to the Site appear as they did in the 1959 map. No USTs, ASTs or chemical storage areas were noted on the adjacent properties.
1966	The Site appears as it did on the 1960 map.	The properties located adjacent to the Site appear as they did in the 1960 map with the exception of the property located northwest adjacent (Springfield Cedar) is vacant and used for old bus storage. In addition, a 97 unit apartment complex is visible north of the Site. No USTs, ASTs or chemical storage areas were noted on the adjacent properties.
1968	The Site appears as it did on the 1959 map.	The properties located adjacent to the Site appear as they did in the 1966 map. No USTs, ASTs or chemical storage areas were noted on the adjacent properties.
1969	The Site appears as it did on the 1968 map.	The properties located adjacent to the Site appear as they did in the 1968 map. No USTs, ASTs or chemical storage areas were noted on the adjacent properties.

Table 3
Aerial Photographs Summary
Proposed Charter School Site
1009 66th Avenue
Oakland, California

Year	Source	Scale	Site Description	Description of Adjacent Properties
1939	Fairchild	1 inch = 700 feet	A residential structure is visible in the southeastern portion of the Site. The north portion of the Site is covered with dense grove of trees.	The areas immediately north and northeast adjacent of the Site are vacant undeveloped land. The areas surrounding the adjacent vacant land and the adjacent areas to the south and west are developed with residential structures.
1946	USGS	1 inch = 700 feet	The Site appears as it did in the 1939 photograph.	The site vicinity appears as it did in the 1939 photograph with the exception of the construction of housing project located north and northeast adjacent to the Site.
1958	ASCS-USDA	1 inch = 700 feet	A large building covers the majority of the southeastern portion of the Site and a smaller building is visible on the western portion of the Site.	The site vicinity appears as it did in the 1946 photograph with the exception that the southwestern adjacent property, which was developed with a residential structure, now appears vacant and undeveloped.
1965	Cartwright Aerial Surveys	1 inch = 700 feet	The Site appears as it did in the 1958 photograph.	The site vicinity appears as it did in the 1958 photograph with the exception that two large buildings and a dirt parking area appear on the southwestern adjacent property, and an apartment complex appears adjacent to the northwest of the Site.
1982	USGS	1 inch = 700 feet	The Site appears as it did in the 1965 photograph.	The site vicinity appears as it did in the 1965 photograph with the exception it appears one of the building located on the southwestern adjacent property has been enlarged.
1987	USGS	1 inch = 700 feet	The Site appears as it did in the 1982 photograph.	The site vicinity appears as it did in the 1982 photograph.
1993	USGS	1 inch = 700 feet	The Site appears as it did in the 1987 photograph.	The site vicinity appears as it did in the 1987 photograph.
1998	USGS	1 inch = 700 feet	The Site appears as it did in the 1993 photograph.	The site vicinity appears as it did in the 1993 photograph.

Table 4
Groundwater Elevation and Analytical Data
Proposed Charter School Site
1009 66th Avenue
Oakland California

Sample ID	GW Elevations (ft, MSL)	Date Sampled	Benzene (µg/L)	MTBE (µg/L)	TPHg (mg/L)
MW-1	8.32	Jun-97	3,300	<250	18.0
	8.31	Jul-97	NA	NA	NA
	7.74	Sep-97	4,800	<250	29.0
	10.77	Dec-97	1.3	<5	<0.050
	11.13	Mar-98	2.0	<5	0.190
	7.83	Oct-98	NA	NA	NA
	8.86	Jan-99	40	8.3	1.0
	10.96	Apr-99	0.92	<5	<0.050
	9.83	May-99	NA	NA	NA
	8.70	Jul-99	60	13	1.4
	7.89	Nov-99	120	<5	3.6
	10.72	Mar-00	<0.5	<5	<0.050
	9.85	May-00	10	8.6	1.3
	8.91	Jul-00	100	<5	6.4
	8.51	Oct-00	130	<100	6.0
	8.66	Nov-00	NA	NA	NA
	8.67	Jul-01	13	13	1.2
	8.88	Nov-01	27	<5	1.8
	10.50	Feb-02	18	<25	2.4
	8.48	Dec-02	83	<0.5	8.4
	10.29	Feb-03	12	<10	8.3
	10.58	May-03	22	<5	5.6
	NM	Mar-05	<0.5	<200*	0.230
MW-2	8.01	Jun-97	<0.5	<5	<50
	7.94	Jul-97	NA	NA	NA
	7.26	Sep-97	<0.5	<5	<50
	9.50	Dec-97	<0.5	<5	<50
	10.42	Mar-98	<0.5	<5	<50
	7.48	Oct-98	NA	NA	NA
	8.05	Jan-99	<0.5	<5	<50
	10.12	Apr-99	0.75	<5	<50
	9.40	May-99	NA	NA	NA
	8.52	Jul-99	<0.5	<5	<50
	7.39	Nov-99	<0.5	<5	<50
	9.76	Mar-00	<0.5	<5	<50
	9.27	May-00	<0.5	<5	<50
	8.46	Jul-00	<0.5	<5	<50
	8.00	Oct-00	<0.5	<5	<50
	8.17	Nov-00	NA	NA	NA
	8.19	Jul-01	<0.5	7.6	<50
	8.16	Nov-01	<0.5	<5	<50
	9.58	Feb-02	<0.5	<5	<50

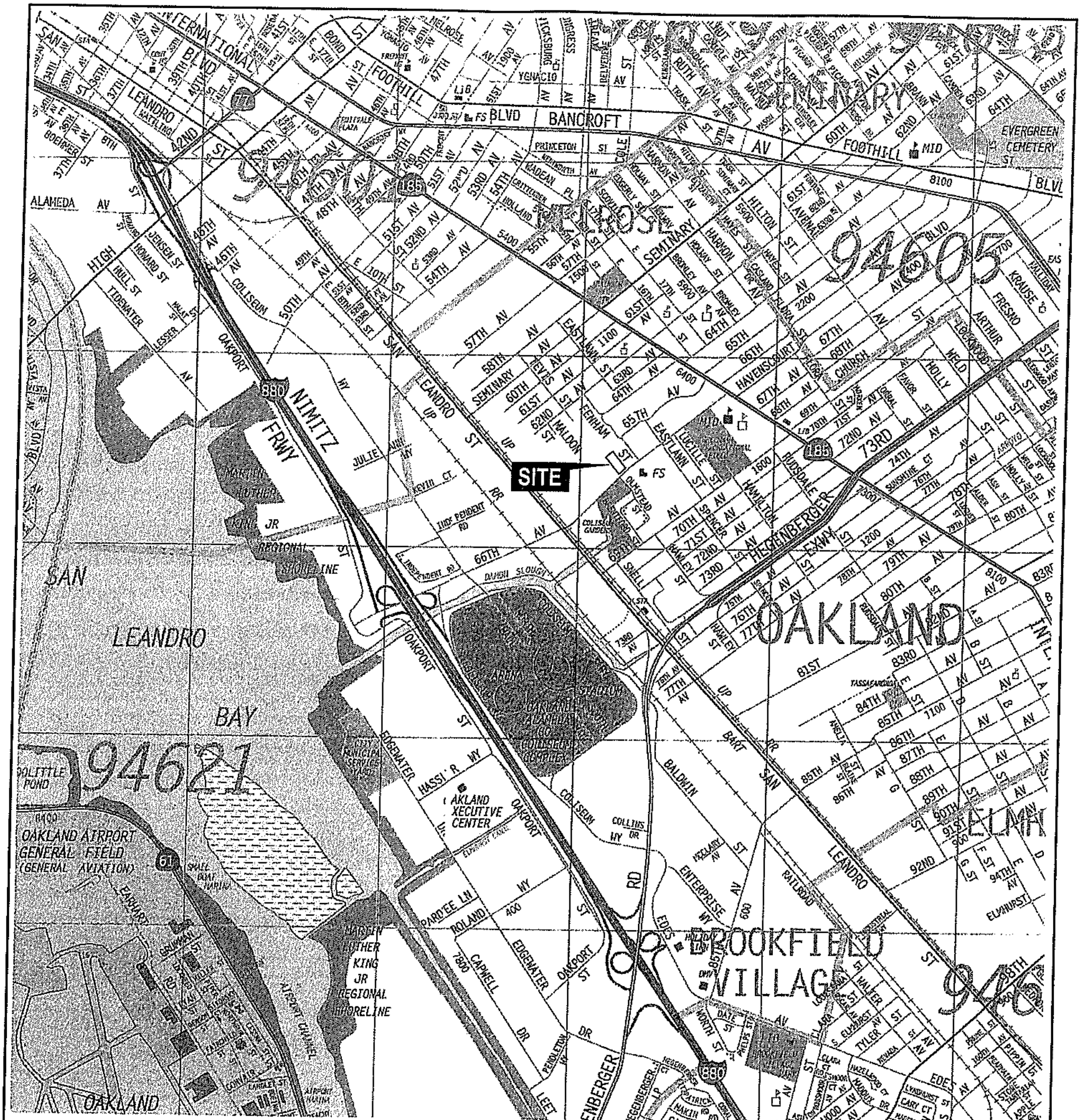
Table 4
Groundwater Elevation and Analytical Data
Proposed Charter School Site
1009 66th Avenue
Oakland California

Sample ID	GW Elevations (ft, MSL)	Date Sampled	Benzene (µg/L)	MTBE (µg/L)	TPHg (mg/L)
MW-2	8.01	Dec-02	<0.5	5.8	<50
	9.76	Feb-03	<0.5	10	<50
	9.94	May-03	<0.5	16	<50
	NM	Mar-05	<0.5	15	<0.050
MW-3	7.93	Jun-97	<0.5	<5	<50
	7.91	Jul-97	NA	NA	NA
	7.27	Sep-97	<0.5	<5	<50
	7.91	Dec-97	<0.5	<5	<50
	10.32	Mar-98	<0.5	<5	<50
	7.47	Oct-98	NA	NA	NA
	7.98	Jan-99	0.78	8.7	<50
	9.58	Apr-99	5.4	25.0	<50
	9.31	May-99	NA	NA	NA
	8.29	Jul-99	<0.5	<5	<50
	7.08	Nov-99	<0.5	<5	<50
	10.14	Mar-00	<0.5	<5	<50
	9.27	May-00	<0.5	<5	<50
	8.29	Jul-00	<0.5	<5	<50
	8.00	Oct-00	<0.5	<5	<50
	8.18	Nov-00	NA	NA	NA
	8.14	Jul-01	<0.5	<5	<50
	8.51	Nov-01	<0.5	<5	<50
	9.55	Feb-02	<0.5	<5	<50
	8.06	Dec-02	<0.5	0.78	<50
	9.72	Feb-03	<0.5	<0.5	<50
	9.88	May-03	<0.5	2.6	<50
	NM	Mar-05	<0.5	<2	<0.050
MW-4	NM	Sep-98	26,000	26,000	170.0
	7.46	Oct-98	NA	NA	NA
	8.19	Jan-99	1,700	16,000	2.6
	6.07	Apr-99	28,000	67,000	210.0
	9.28	May-99	NA	NA	NA
	8.60	Jul-99	16,000	68,000	91.0
	7.51	Nov-99	8,500	58,000	63.0
	10.19	Mar-00	16,000	44,000	95.0
	9.38	May-00	15,000	77,000	91.0
	8.13	Jul-00	11,000	80,000	130.0
	7.89	Oct-00	6,700	68,000	59.0
	8.17	Nov-00	NA	NA	NA
MW-4	8.44	Jul-01	25,000	44,000	180.0
	8.11	Nov-01	8,100	57,000	67.0
	9.57	Feb-02	20,000	47,000	98.0
	8.01	Dec-02	340	17,000	200.0
	9.78	Feb-03	8,100	30,000	63.0
	9.91	May-03	24,000	42,000	530.0
	NM	Mar-05	22,053	5,841	152.2
MW-5 (MW-4 dup)	NM	Mar-05	21,536	6,026	162.8

Table 4
Groundwater Elevation and Analytical Data
Proposed Charter School Site
1009 66th Avenue
Oakland California

Sample ID	GW Elevations (ft, MSL)	Date Sampled	Benzene (μg/L)	MTBE (μg/L)	TPHg (mg/L)
EW-1	NM	Dec-02	530	2,600	6.6
	NM	Feb-03	170	5,000	4.0
	NM	May-03	12	300	0.3
	NM	Mar-05	<0.5	8	0.105
1A	NA	Mar-05	<0.5	<2	<0.050
1C	NA	Mar-05	<0.5	<2	<0.050
2C	NA	Mar-05	<0.5	<2	<0.050
2A-2W(4') GW1	NA	Aug-05	<0.5	<0.5	<0.10
2B-N(20') GW1	NA	Aug-05	28,496	<0.5	221.1
2B-N(37') GW1	NA	Aug-05	10,754	7,007	146.6
2B-2E(20') GW1	NA	Aug-05	<0.5	<0.5	<0.10
2C-E(10') GW1	NA	Aug-05	<0.5	<0.5	0.16
2C-W(20') GW2	NA	Aug-05	NA	<0.5	<0.10
3A	NA	Mar-05	<0.5	<2	<0.050
4A	NA	Mar-05	<0.5	NA	<0.050
5A	NA	Mar-05	<0.5	NA	<0.050
5C	NA	Mar-05	<0.5	NA	<0.050
SB-19-GW	NA	Dec-05	25	1,100	2.2
SB-19-GWDUP	NA	Dec-05	34	1,100	2.7
SB-22-GW	NA	Dec-05	<0.5	<2	<0.050
SB-22-GWDUP	NA	Dec-05	<0.5	<2	<0.050
SB-33-GW	NA	Dec-05	<0.5	<2	<0.050
SB-35-GW	NA	Dec-05	<0.5	<2	<0.050
SB-35-GWDUP	NA	Dec-05	<0.5	<2	<0.050
NW-1 S	12.96	Dec-05	<0.5	<2	<0.050
NW-1 I	12.02	Dec-05	<0.5	8	<0.050
NW-1 D	12.02	Dec-05	<0.5	37	<0.050
NW-2 S	10.80	Dec-05	570	1,600	7.1
NW-2 I	11.64	Dec-05	22,000	120,000	120.0
NW-2 D	11.22	Dec-05	300	1,600	1.4
NW-3 S	12.31	Dec-05	<0.5	<2	<0.050
NW-3 I	11.26	Dec-05	<0.5	<2	<0.050
NW-3 D	11.26	Dec-05	<0.5	<2	<0.050
DUP-1 (NW-2D)	NA	Dec-05	320	1,500	1.6

TPHg = Total Petroluem Hydrocarbons quantified as gasoline
μg/L = micrograms per liter
mg/L = milligrams per liter
NA = Not Analyzed For Noted Compound
NM = Not Measured
* = Per CSS Environmental Preliminary Environmental Assessment Report (Table 7)



MAP SOURCE:

ALAMEDA COUNTY
2002 Edition

Site Vicinity

Proposed Charter School Site, 1009 66th Avenue, Oakland, California

LFR

Figure 1

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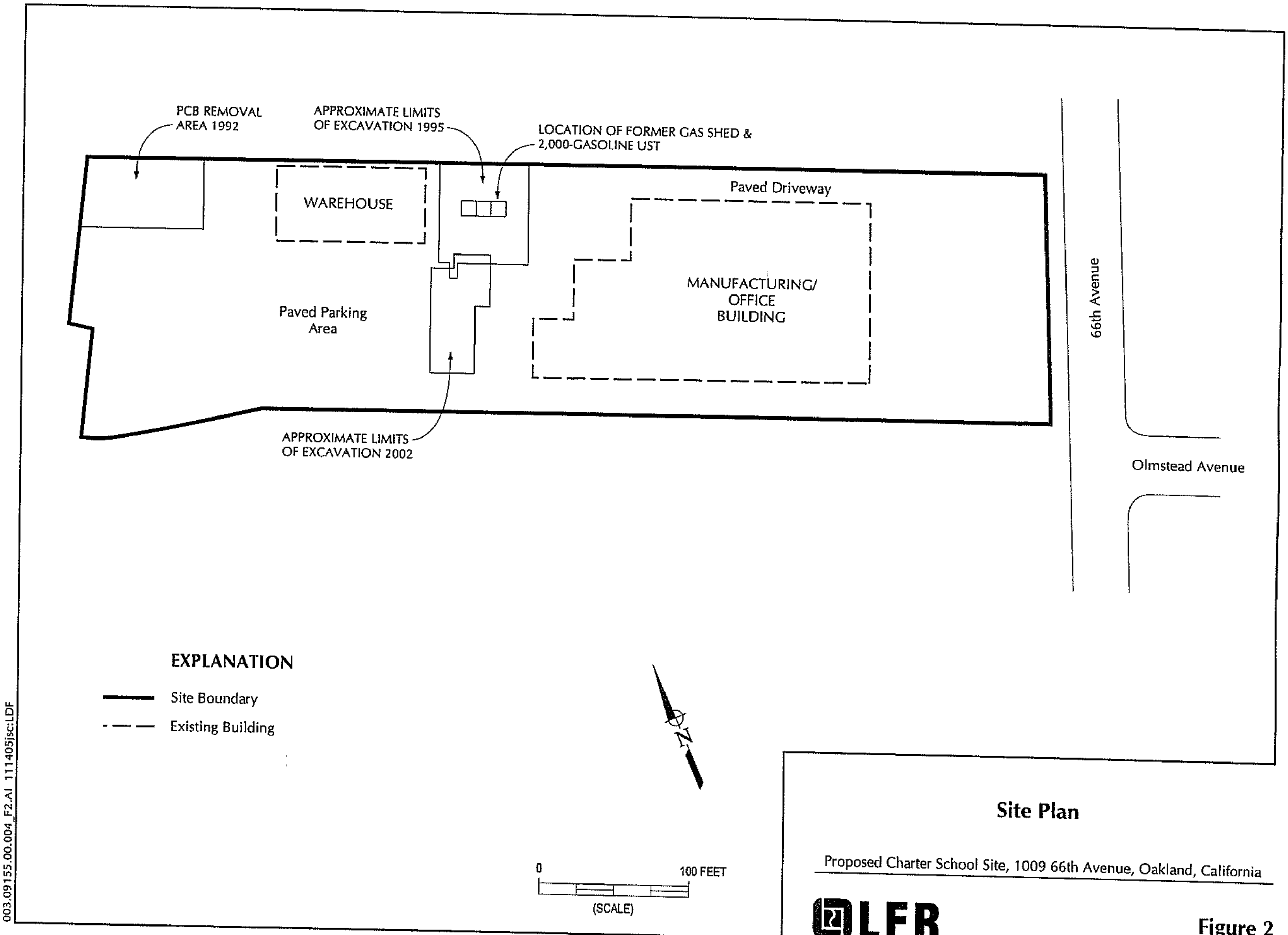
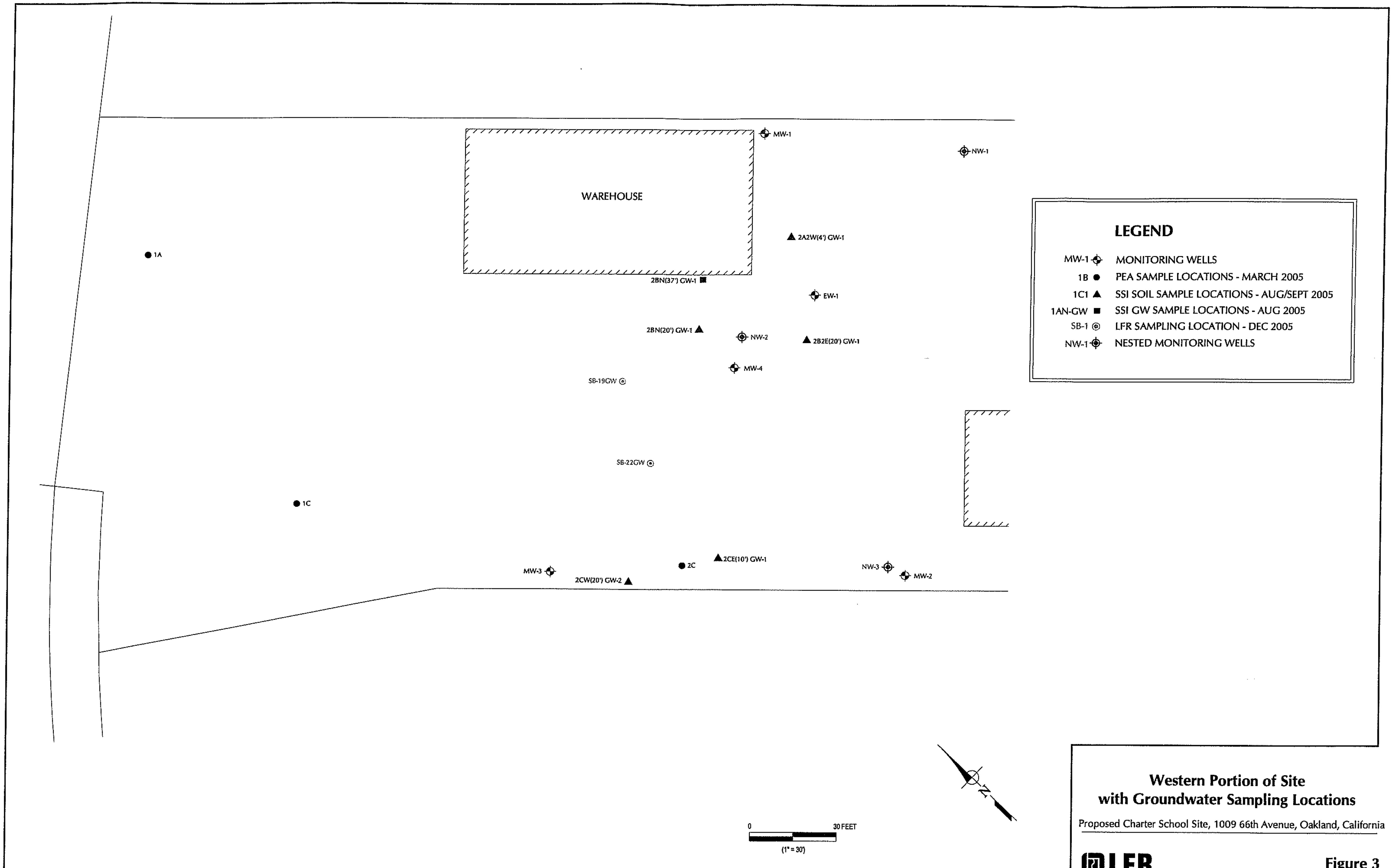


Site Plan

Proposed Charter School Site, 1009 66th Avenue, Oakland, California

LFR

Figure 2

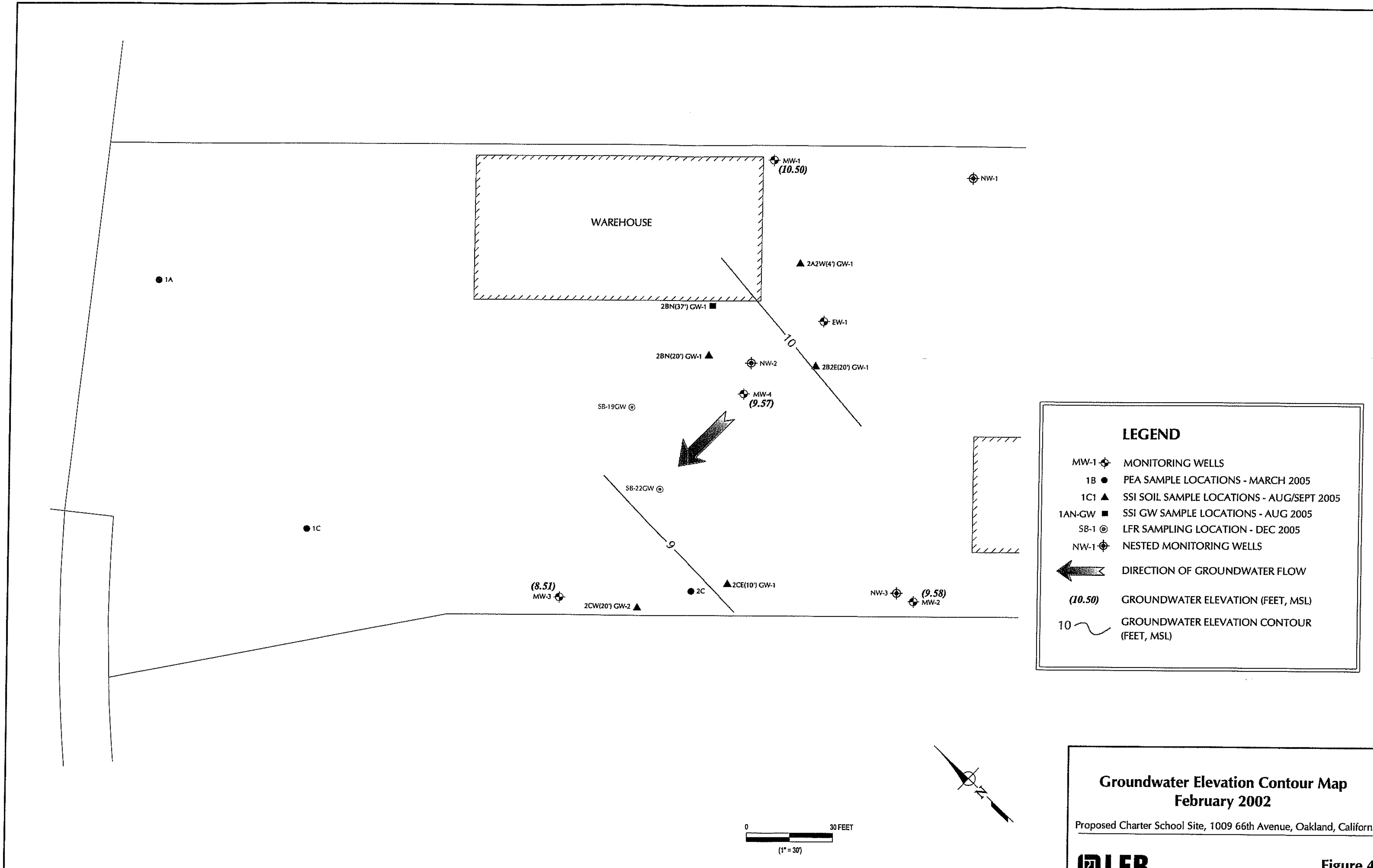


Western Portion of Site with Groundwater Sampling Locations

Proposed Charter School Site, 1009 66th Avenue, Oakland, California

LFR

Figure 3

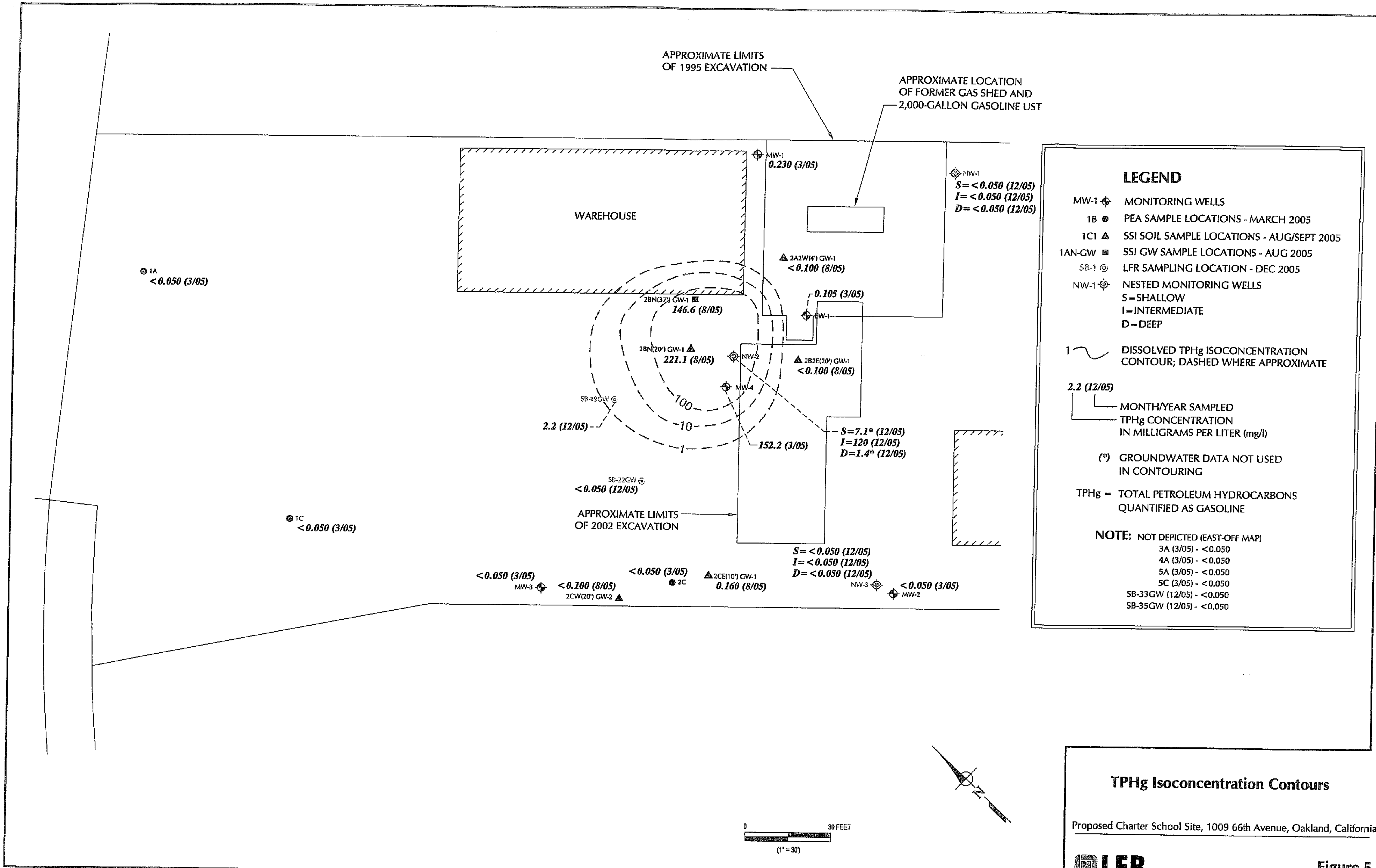


Groundwater Elevation Contour Map
February 2002

Proposed Charter School Site, 1009 66th Avenue, Oakland, California

LFR

Figure 4

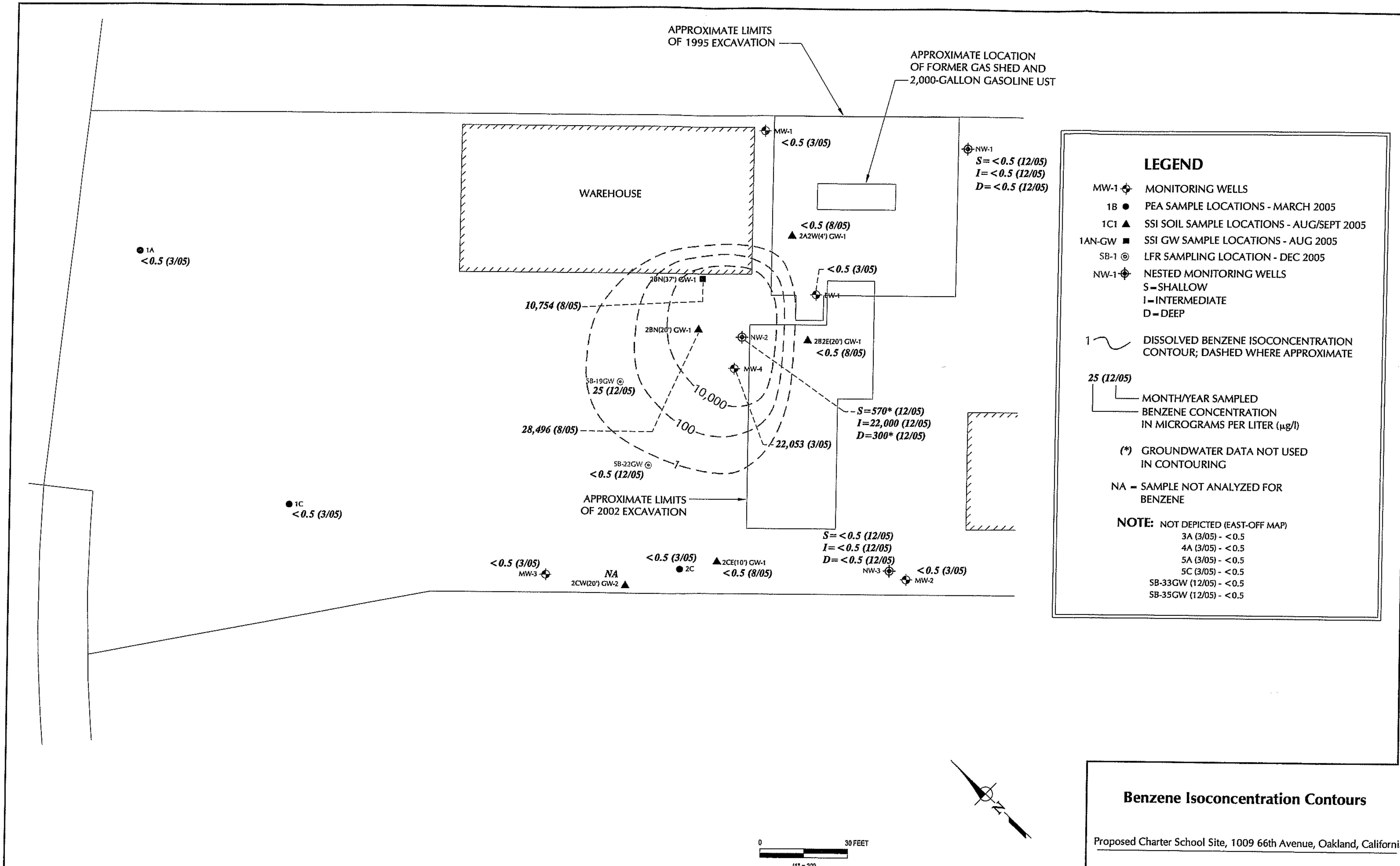


TPHg Isoconcentration Contours

Proposed Charter School Site, 1009 66th Avenue, Oakland, California

LFR

Figure 5

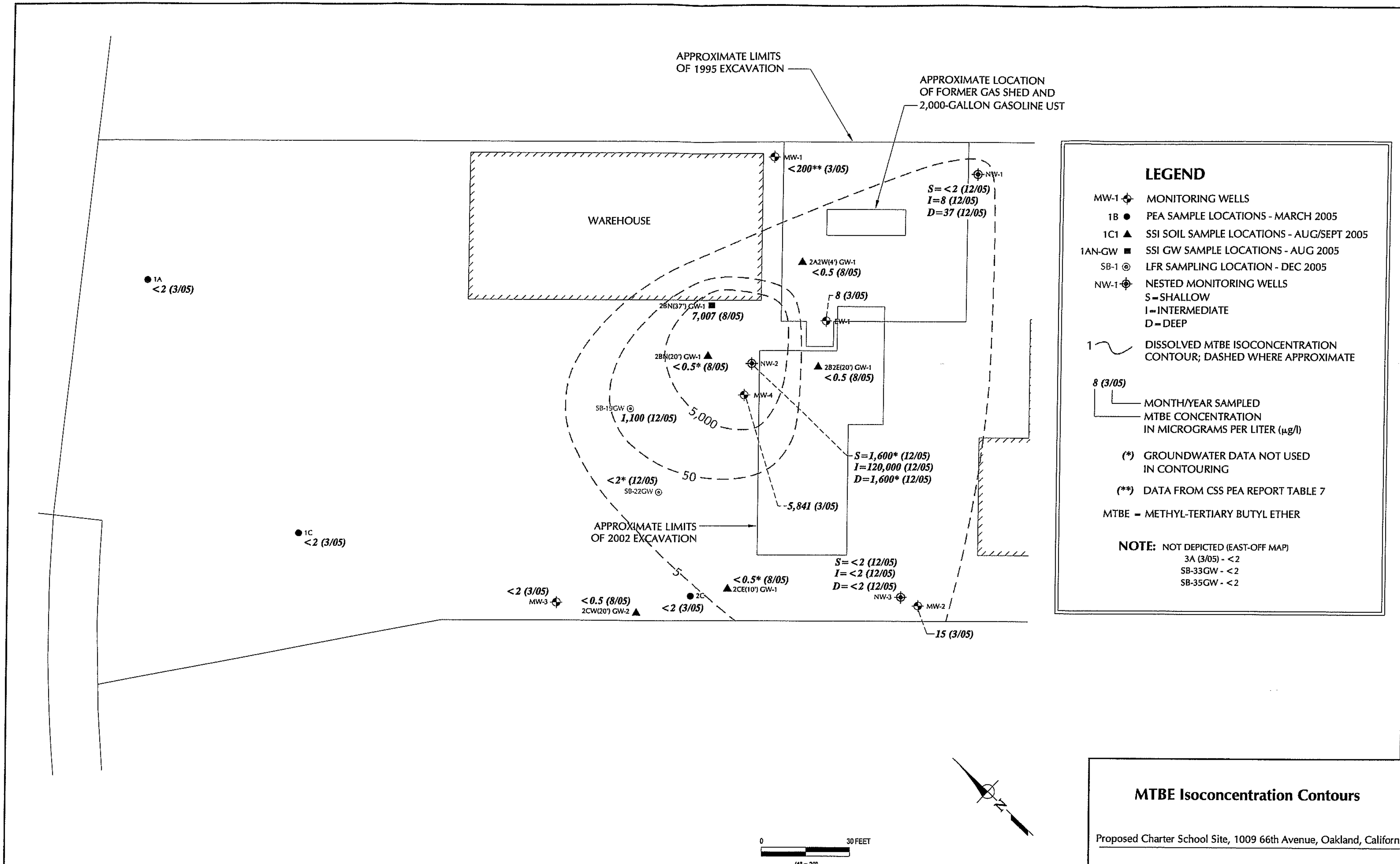


Benzene Isoconcentration Contours

Proposed Charter School Site, 1009 66th Avenue, Oakland, California

LFR

Figure 6



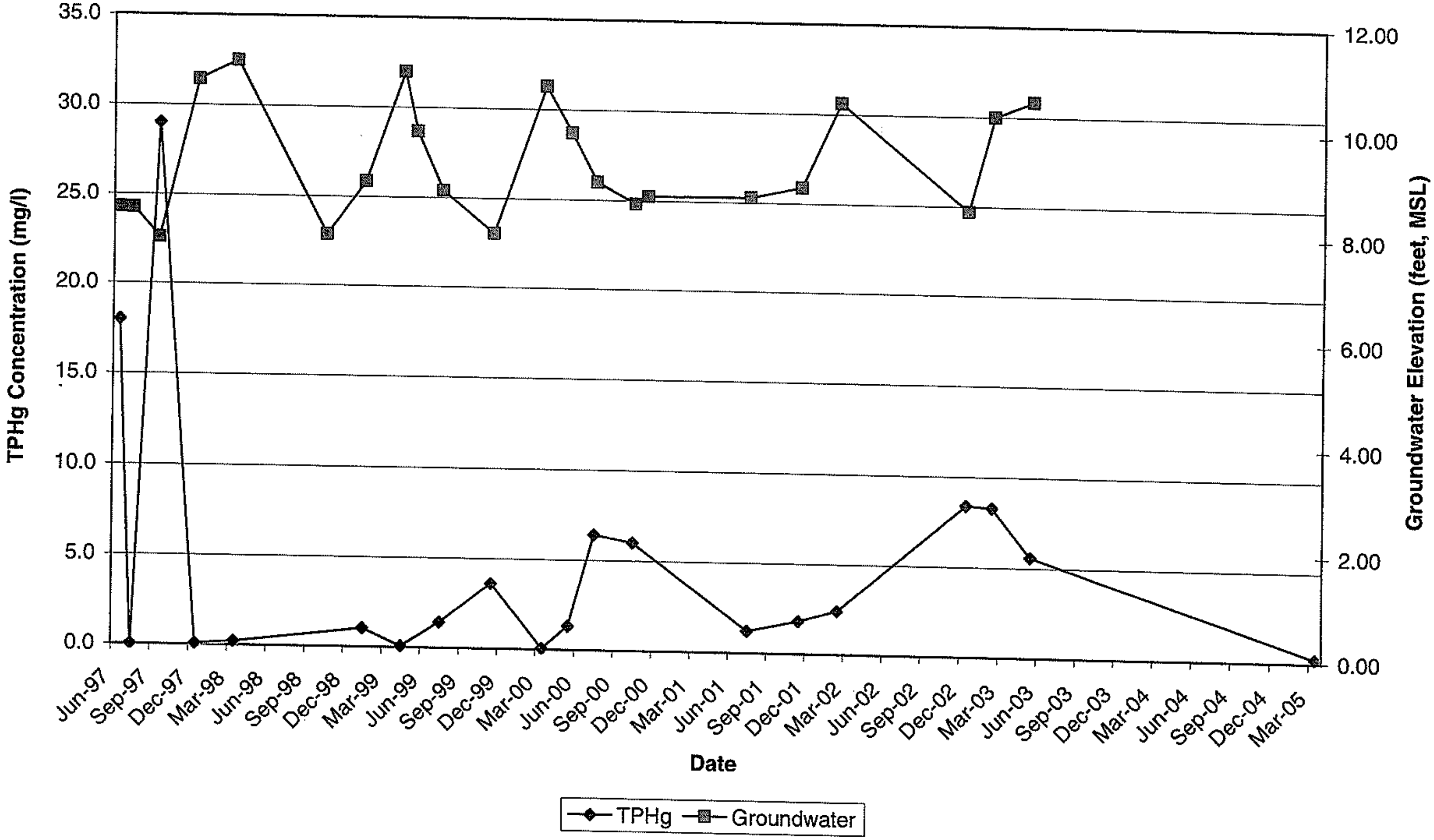
MTBE Isoconcentration Contours

Proposed Charter School Site, 1009 66th Avenue, Oakland, California

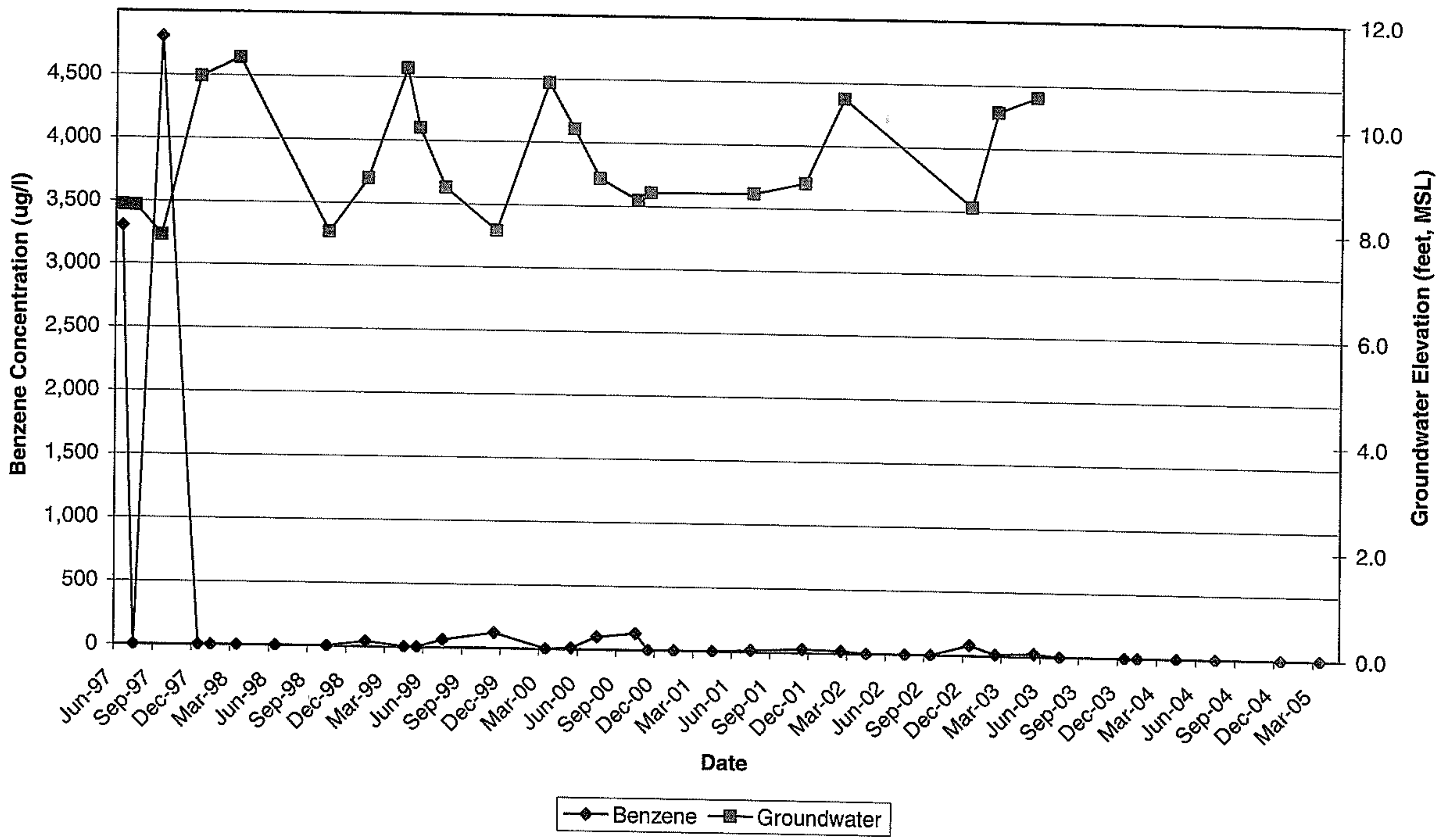
LFR

Figure 7

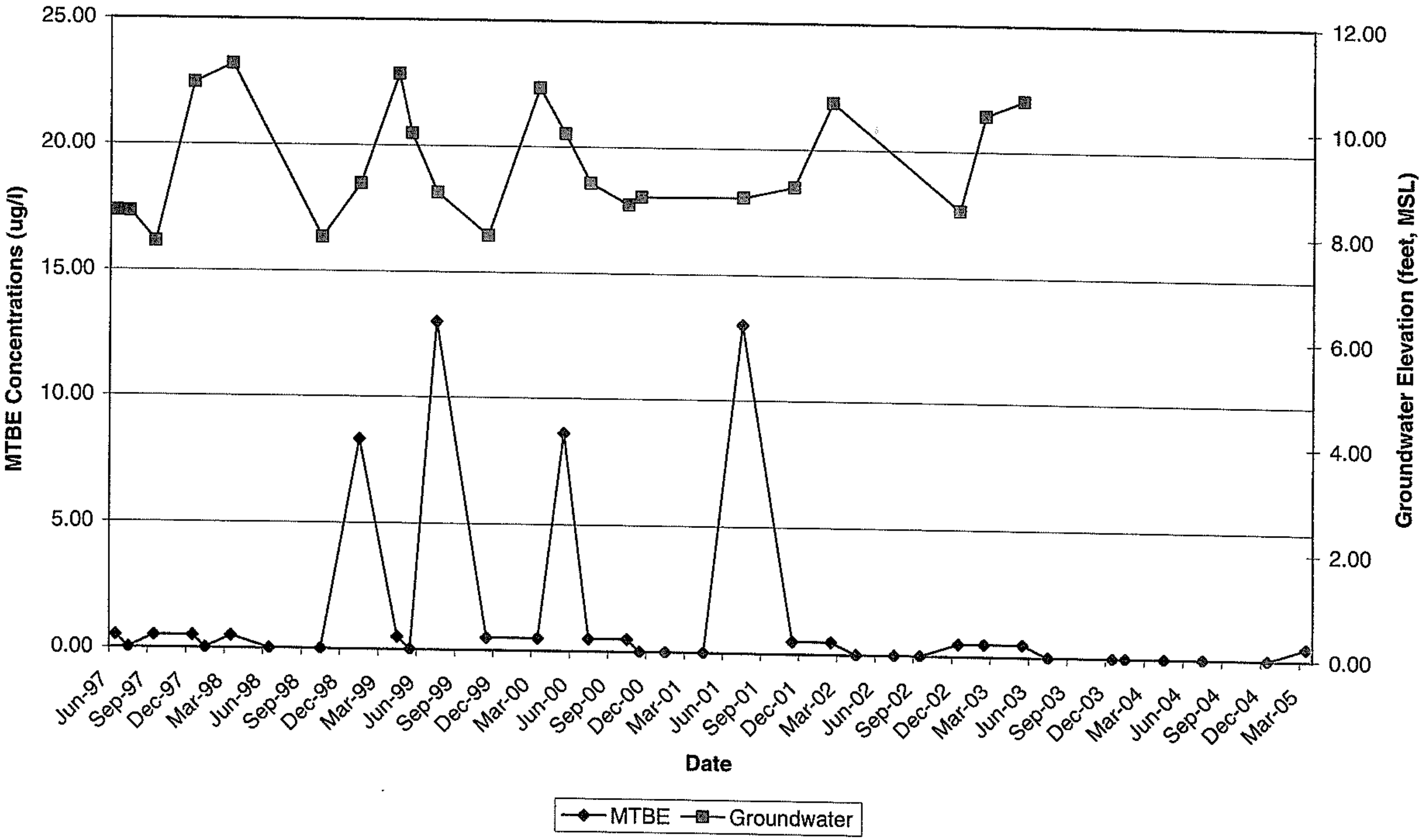
Concentration of TPHg vs. Time for Monitoring Well MW-1
Proposed Charter School Site, 1009 66th Avenue, Oakland, California
Figure 8



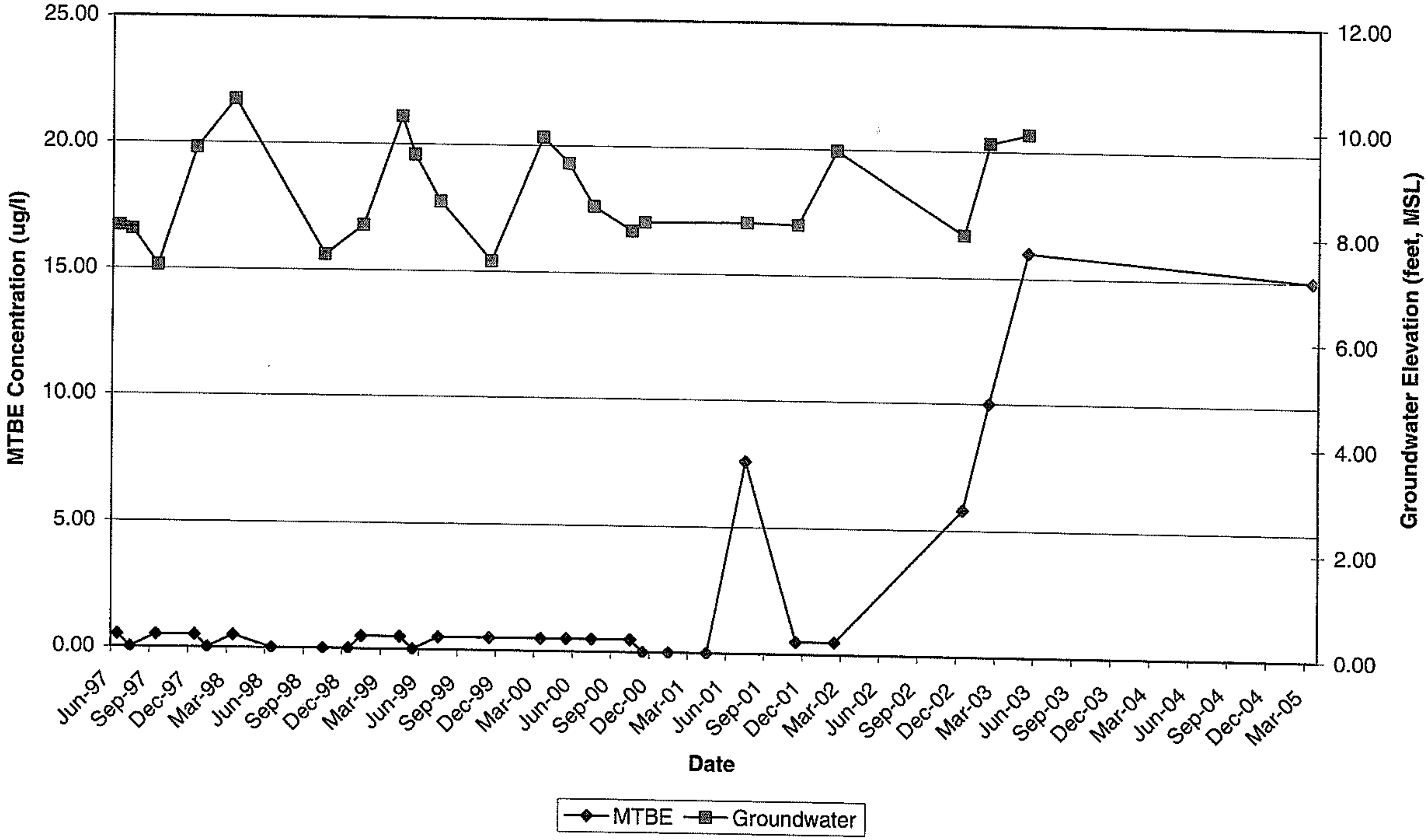
Concentration of Benzene vs. Time for Monitoring Well MW-1
Proposed Charter School Site, 1009 66th Avenue, Oakland, California
Figure 9



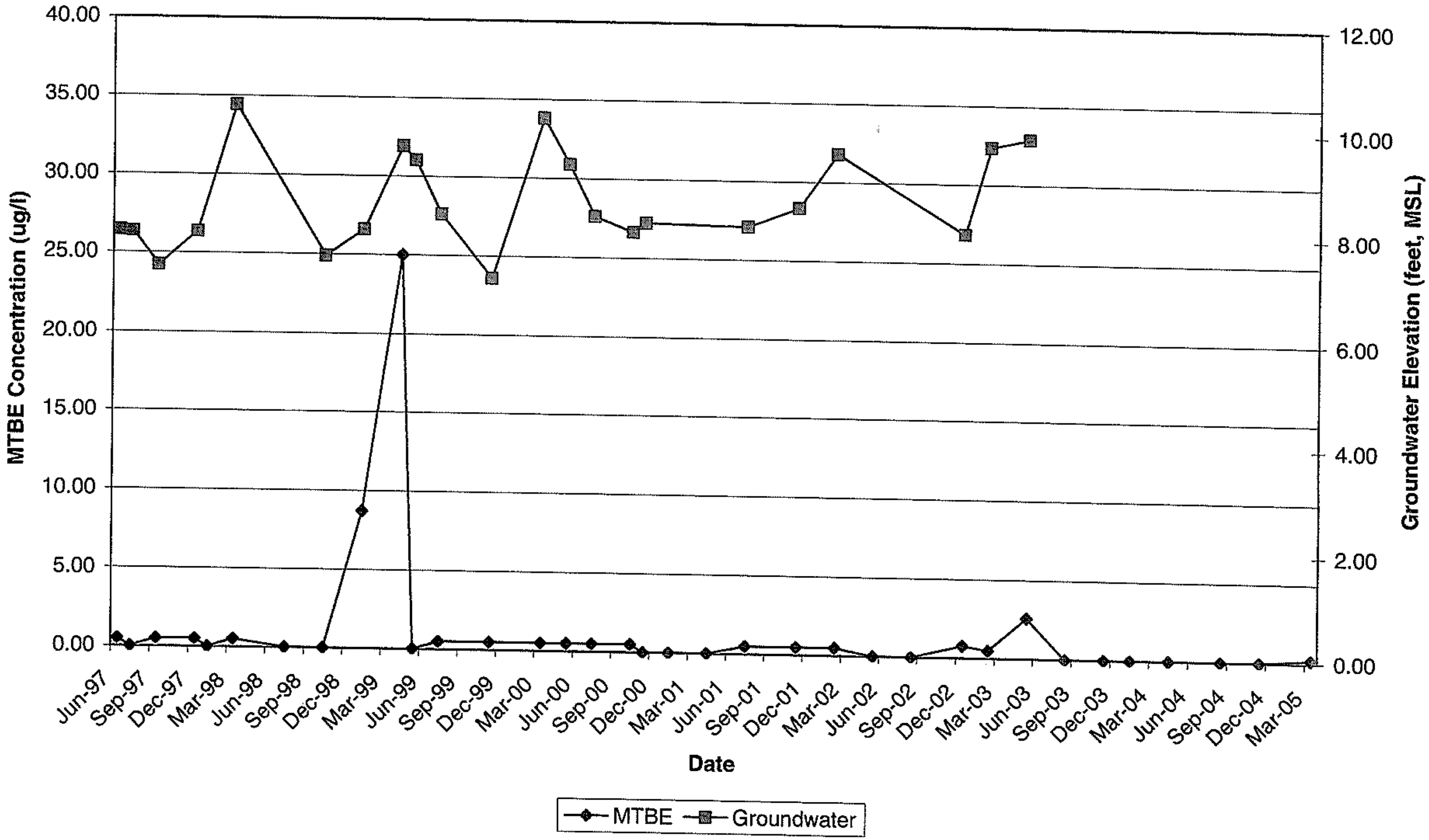
Concentration of MTBE vs. Time for Monitoring Well MW-1
Proposed Charter School Site, 1009 66th Avenue, Oakland, California
Figure 10



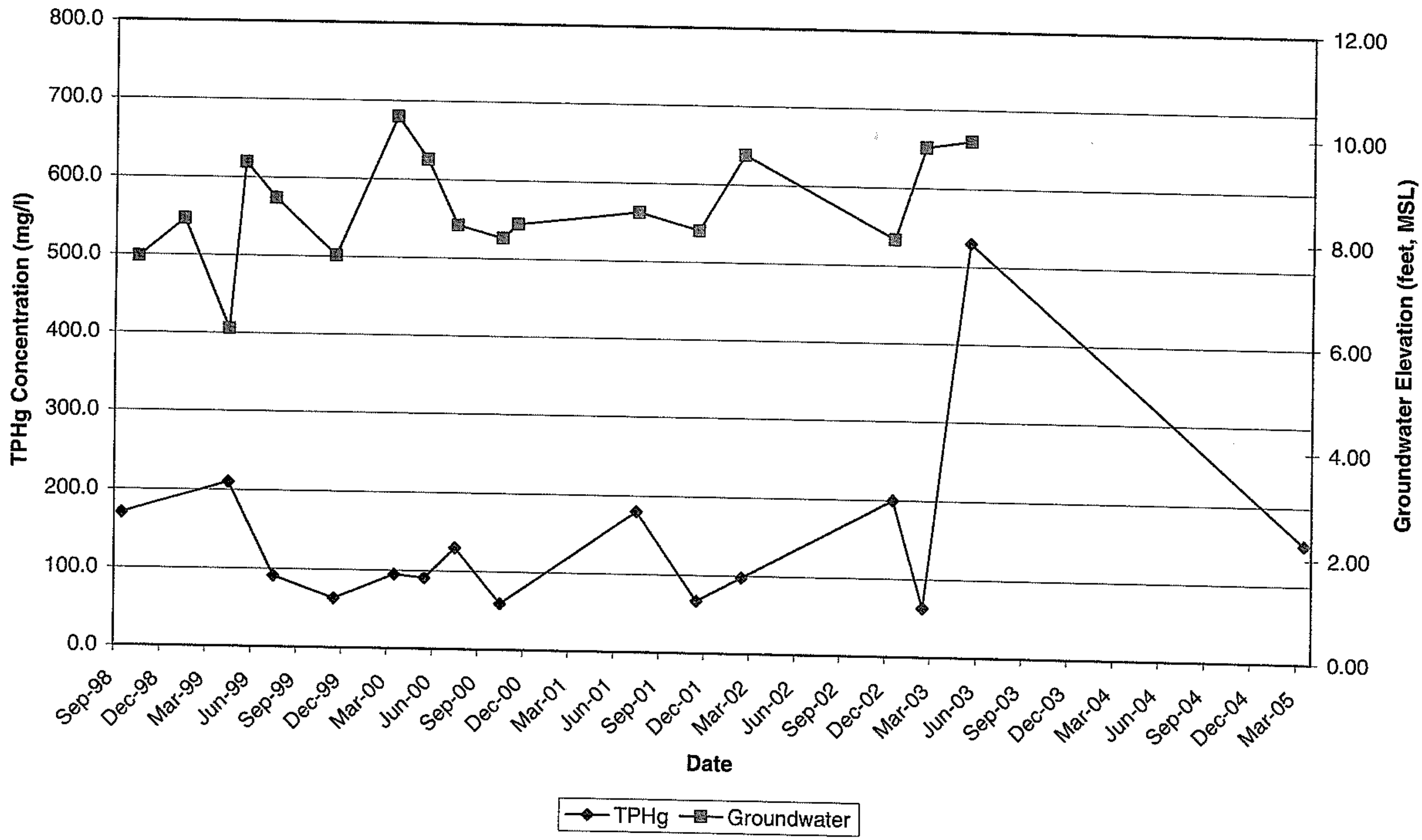
Concentration of MTBE vs. Time for Monitoring Well MW-2
Proposed Charter School Site, 1009 66th Avenue, Oakland, California
Figure 11



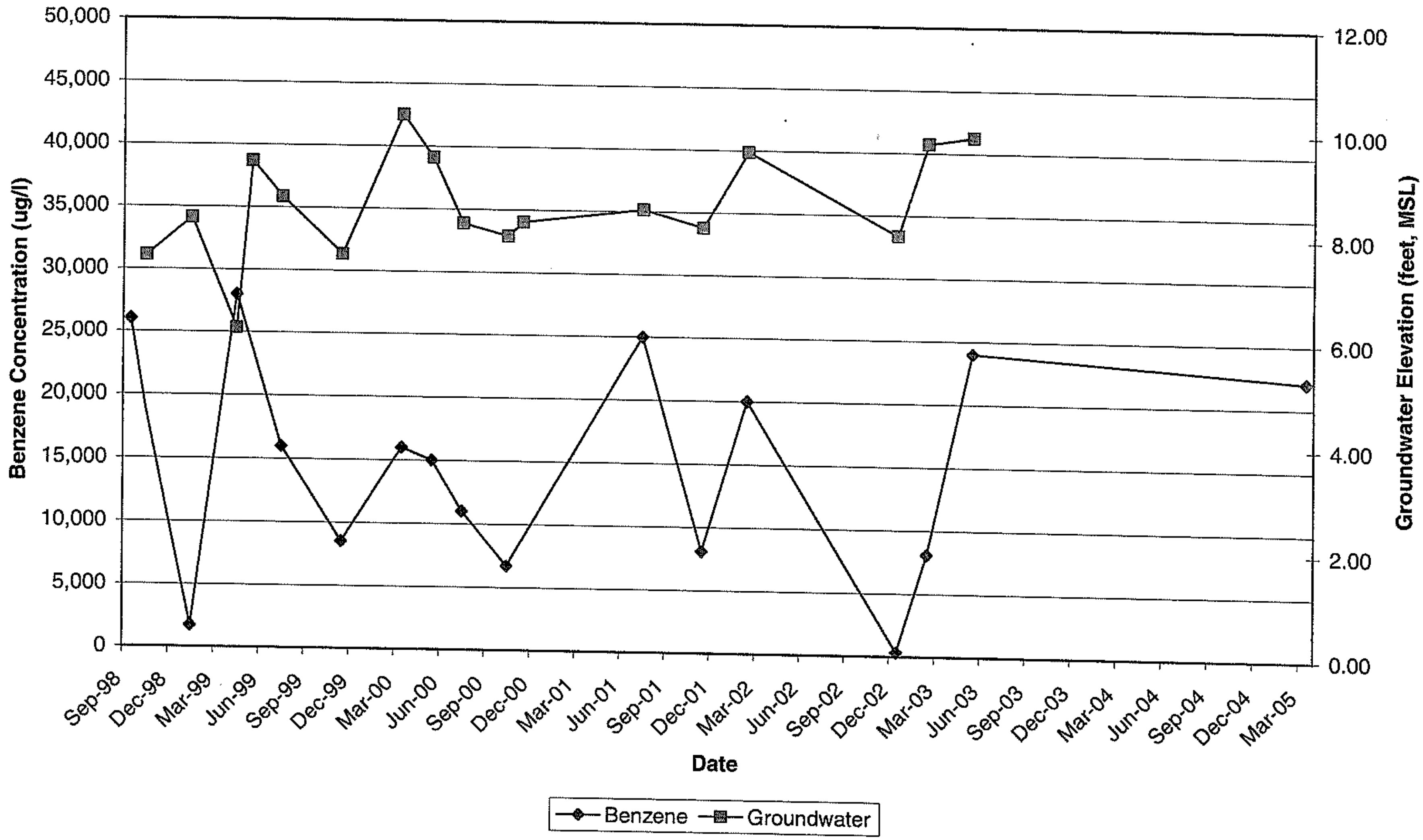
Concentration of MTBE vs. Time for Monitoring Well MW-3
Proposed Charter School Site, 1009 66th Avenue, Oakland, California
Figure 12

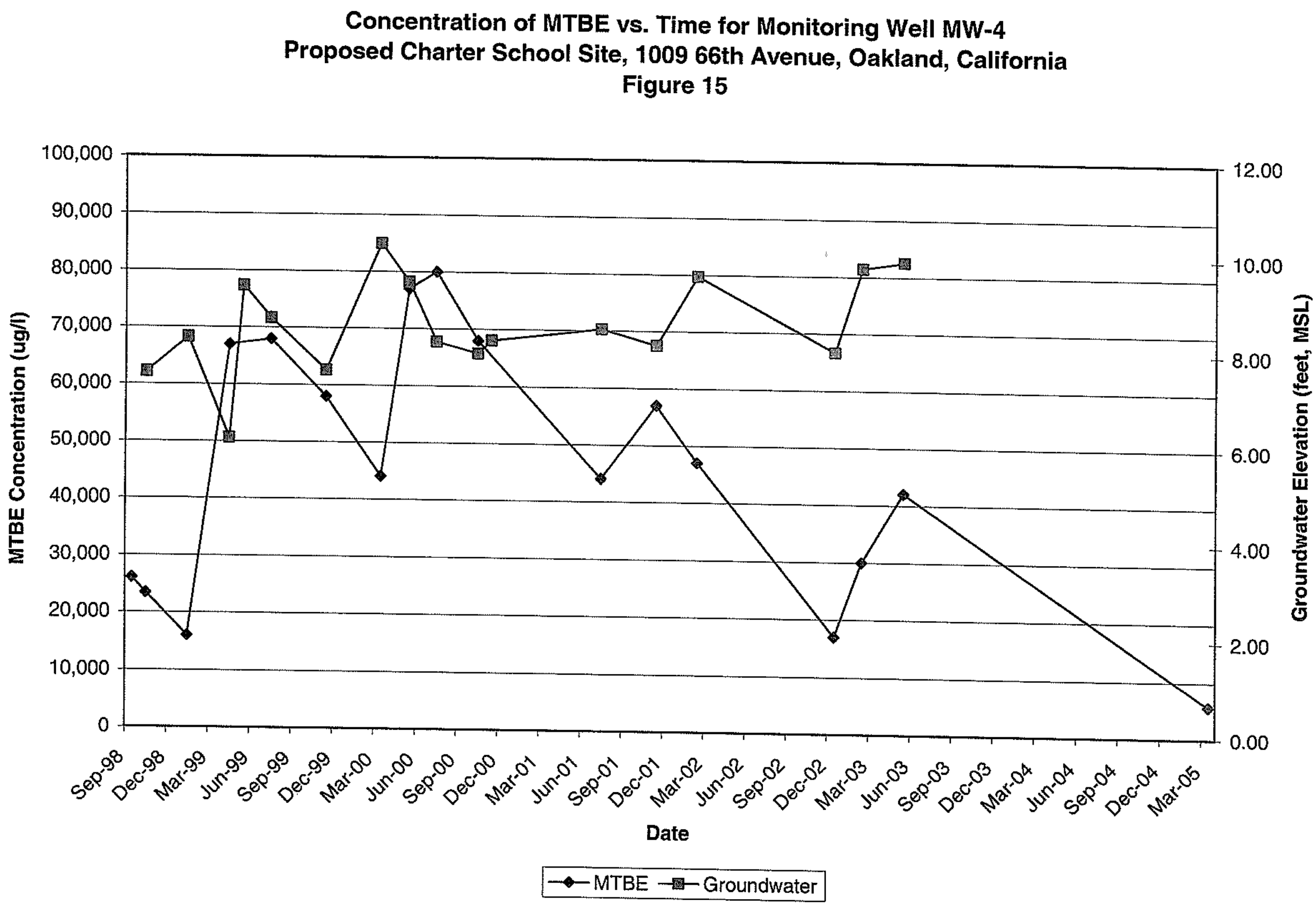


Concentration of TPHg vs. Time for Monitoring Well MW-4
Proposed Charter School Site, 1009 66th Avenue, Oakland, California
Figure 13



Concentration of Benzene vs. Time for Monitoring Well MW-4
Proposed Charter School Site, 1009 66th Avenue, Oakland, California
Figure 14





Concentration of MTBE vs. Time for Monitoring Well MW-4
Proposed Charter School Site, 1009 66th Avenue, Oakland, California
Figure 15
MTBE Concentration (ug/l)
100,000
90,000
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
Groundwater Elevation (feet, MSL)
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Sep-98
Dec-98
Mar-99
Jun-99
Sep-99
Dec-99
Mar-00
Jun-00
Sep-00
Dec-00
Mar-01
Jun-01
Sep-01
Dec-01
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Sep-02
Dec-02
Mar-03
Jun-03
Sep-03
Dec-03
Mar-04
Jun-04
Sep-04
Dec-04
Mar-05
Date
MTBE
Groundwater

APPENDIX C

Activities Coordination Plan

Activities Coordination Plan
for Soil Removal Action Work Plan at
Proposed Aspire Charter High School
1009 66th Avenue
Oakland, Alameda County, California
DTSC Site Code: 204147-11

003-09155-00-004
August 17, 2006

Prepared for
Aspire Public Schools
426 17th Street, Suite 200
Oakland, California 94612-2820

Prepared by
LFR Inc.
4190 Douglas Boulevard, Suite 200
Granite Bay, California 95746

LFR
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CONTENTS

ACRONYMS AND ABBREVIATIONS

Aspire	Aspire Public Schools
COC	Compounds of Concern
cy	cubic yards
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
EOA	Environmental Oversight Agreement
HSP	Health and Safety Plan
LFR	LFR Inc.
mini-RAM	miniature real-time aerosol monitor
PAM	Personal Air Monitor
PCG	Preliminary Cleanup Goal
PEA	Preliminary Environmental Assessment
QA/QC	Quality Assurance/Quality Control
QA	Quality Assurance
QC	Quality Control
RAW	Removal Action Work Plan
SAP	Sampling and Analysis Plan
SSI	Supplemental Site Investigation
VOCs	Volatile Organic Compounds

CERTIFICATION

LFR Inc. has prepared this Activities Coordination Plan (ACP) on behalf of Aspire Public Schools in a manner consistent with the level of care and skill ordinarily exercised by professional geologists and environmental scientists. This ACP was prepared under the technical direction of the undersigned California Professional Geologists and Registered Environmental Assessors II.

Lita D. Freeman — 8/17/06

Lita D. Freeman, P.G., R.E.A. II — Date
Senior Associate Geologist
California Registered Geologist No. 7368
California Registered Environmental Assessor II No. 20106

Alan D. Gibbs — 8/17/06

Alan Gibbs, P.G., C.HG., R.E.A. II — Date
Principal Hydrogeologist
California Registered Geologist No. 4827
California Registered Environmental Assessor II No. 20009

* A professional geologist's or registered environmental assessor's certification of conditions comprises a declaration of his or her professional judgment. It does not constitute a warranty or guarantee, expressed or implied, nor does it relieve any other party of its responsibility to abide by contract documents, applicable codes, standards, regulations, and ordinances.

1.0 INTRODUCTION

This Activities Coordination Plan (ACP) has been prepared by LFR Inc. (LFR) on behalf of Aspire Public Schools ("Aspire") for the property located at 1009 66th Avenue in Oakland, Alameda County, California ("the Site"; Figure 1). LFR prepared this ACP under the direction and oversight of the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC).

The purpose of the ACP is to describe the coordination of the various activities that will be performed at the Site during the removal action at the Site as described in the Soil Removal Action Work Plan (RAW) prepared by LFR (2006a).

Implementation of the Soil RAW includes excavation and off site disposal of approximately 8,194 in-place cubic yards (cy) to 9,009 in-place cy of soil impacted with gasoline, diesel, motor oil, various semivolatile organic compounds/polynuclear aromatic hydrocarbons (SVOCs/PAHs), arsenic, lead, polychlorinated biphenyls (PCBs), and various volatile organic compounds (VOCs), including benzene, toluene, ethylbenzene, and total xylenes (BTEX) and methyl tertiary-butyl ether (MTBE). The excavated soil will be loaded onto trucks for transport to off-site disposal facilities during the removal action at the Site as described in the Soil RAW (LFR 2006a).

1.1 Site Description

The approximate 2.51 acre site is located in an area of commercial, industrial, government and multi-family residential developments. The Site is located on the western side of 66th Avenue between East 14th Street to the north and San Leandro Street to the south. Aspire plans to construct a charter high school on the Site.

The Site has been used for manufacturing and warehouse storage in the past. The Site is currently developed with two buildings; including one denoted as a "Manufacturing/Office Building" and one denoted as a "Warehouse" on Figure 2. Landscaping areas and paved parking areas and driveways surround the on-site buildings.

1.2 Background

Pursuant to California Health and Safety Code Section 25355.5 (a)(1)(C), Aspire entered into a Environmental Oversight Agreement (EOA) with the DTSC to receive proper regulatory oversight and meet Education Code requirements for this potential new school site. Consistent with requirements in the EOA, a PEA and a Supplemental Site Investigation (SSI) was conducted for the Site in accordance with DTSC-approved work plans prepared by CSS Environmental Services, Inc. (CSS) and LFR (CSS 2005a, CSS 2005b, LFR 2005).

The purpose of the PEA and SSI was to establish whether a release or threatened release of hazardous substances posing a threat to human health or the environment exists at the Site and define the extent of the impacted soil. PEA and SSI sampling locations are shown on Figures 3A (approximate locations) and 3B (surveyed locations).

The PEA and SSI results indicated that soil impacted with gasoline, diesel, motor oil, various SVOCs/PAHs, arsenic, lead, PCBs, and various VOCs at concentrations above the Preliminary Cleanup Goals (PCG) is present on the Site. The results of the PEA and SSIs are presented in reports by CSS and LFR (CSS 2005c, CSS 2005d, LFR 2006b).

Accordingly, a Soil RAW has been developed to mitigate human health and environmental risks and hazards; its scope of work includes excavation, transport, and disposal of impacted soil at off-site facilities, collecting and analyzing waste characterization samples, and collecting and analyzing confirmation samples. The areas of the proposed removal action are shown on Figure 4.

2.0 AREAS OF WORK

Impacted soil has been identified at a number of on-site locations. Excavation of the impacted soil was the selected alternative based on the stated remedial goals, as well as the criteria of effectiveness, implementability, and cost (see Soil RAW). The areas to be excavated are shown on Figure 4 and include the following:

- **Around boring 1A:** soil impacted with PCBs
- **Around boring 1B:** soil impacted with PCBs
- **Around boring 1BS(10'):** soil impacted with arsenic
- **Around boring 1C:** soil impacted with PCBs and arsenic
- **Beneath the Warehouse:** soil impacted with arsenic, gasoline, motor oil, BTEX, and MTBE
- **South of the Warehouse:** soil impacted with arsenic, gasoline, motor oil, BTEX, and MTBE
- **South and east of the Warehouse:** soil impacted with motor oil, SVOCS/PAHs, arsenic, BTEX, and MTBE
- **Along southern border at and west of boring 2C:** soil impacted with PCBs
- **Beneath Manufacturing/Office Building at boring 3B:** soil impacted with PCBs
- **Beneath Manufacturing/Office Building at boring 4B:** soil impacted with PCBs
- **Beneath Manufacturing/Office Building at boring 4BS(10'):** soil impacted with PCBs

- **Beneath Manufacturing/Office Building at boring 4BS(20')**: soil impacted with gasoline, diesel, and motor oil
- **Around borings 5A and 5ASE(10'):** soil impacted with lead
- **Around borings 5C and 5CESE(20'):** soil impacted with lead, diesel, motor oil, and SVOCs/PAHs

3.0 ACTIVITIES PLAN

Typically, impacted soil nearest the Site's ingress point would be excavated first with work progressing towards the farthest area on the Site. This activities plan would reduce the likelihood of vehicles traveling across impacted soil and thereby transporting impacted soil from one area to another. However, due to Aspire's schedule, LFR proposes to begin excavation of the impacted soil located farthest from the Site's ingress point (around borings 1B, 1BS(10') and 1C). The presence of asphalt pavement and concrete floor slabs across the Site (except at the western end) will prevent the transport of impacted soil from one area to another. The asphalt pavement and concrete floor slabs will be removed as work progressed eastward across the Site.

LFR proposes the following activities plan for the Site:

- identify the underground utilities on the Site
- destroy the existing groundwater monitoring wells
- begin abating asbestos-containing materials (ACMs) and lead-based paints (LBPs) in the Warehouse and the Manufacturing/Office Building
- excavate soil impacted with PCBs at Area 1A and stockpile soil at the southwestern corner of the Site
- excavate soil impacted with PCBs at Area 1B and stockpile soil at the southwestern corner of the Site
- excavate soil impacted with arsenic at Area 1BS(10') and stockpile soil at the southwestern corner of the Site
- excavate soil impacted with arsenic and PCBs at Area 1C and stockpile soil at the southwestern corner of the Site
- collect confirmation samples from Areas 1A, 1B, 1BS(10') and 1C and waste characterization samples from stockpiles of soil excavated from these areas as described in the Soil RAW; based on the results of the confirmation samples, excavate additional soil or backfill excavations using imported fill material as described in the Soil RAW; load excavated soil into trucks and transport to an appropriate disposal facility as described in the Soil RAW
- remove pavement and excavate soil impacted with PCBs at Area 2C and stockpile soil at the southwestern corner of the Site

- collect confirmation samples from Area 2C and waste characterization samples from stockpiles of soil excavated from this area as described in the Soil RAW; based on the results of the confirmation samples, excavate additional soil or backfill excavation using imported fill material as described in the Soil RAW; load excavated soil into trucks and transport to an appropriate disposal facility as described in the Soil RAW
- demolish the Warehouse after abatement of ACMs, LBPs, and PCB-containing materials (e.g., concrete, metal, etc.)
- excavate soil impacted with arsenic, gasoline, motor oil and VOCs beneath the Warehouse and stockpile soil at the northwestern corner of the Site
- collect confirmation samples from beneath the Warehouse and waste characterization samples from stockpiles of soil excavated from this area as described in the Soil RAW; based on the results of the confirmation samples, excavate additional soil or backfill excavation using imported fill material as described in the Soil RAW; load excavated soil into trucks and transport to an appropriate disposal facility as described in the Soil RAW
- demolish the Manufacturing/Office Building after abatement of ACMs and LBPs
- remove pavement and excavate soil impacted with arsenic, gasoline, motor oil and VOCs south of the Warehouse and soil impacted with motor oil, SVOCs/PAHs, arsenic, and VOCs southeast and east of the Warehouse (one large excavation will be located in this area); stockpile soil on the concrete floor slab of the Manufacturing/Office Building (building demolished by this time)
- groundwater entering the excavation south, southeast and east of the Warehouse will be pumped into an on-site 21,000-gallon Baker tank located along the Site's southern border; samples of the water will be collected for analysis and the water will be discharged into the sanitary sewer under a permit from East Bay Municipal Utilities District (East Bay MUD); if East Bay MUD's acceptance criteria cannot be met based on the analytical results of the water, then the water will be transferred into vacuum trucks for transport to an appropriate disposal facility
- collect confirmation samples from the excavation located south, southeast and east of the Warehouse and waste characterization samples from stockpiles of soil excavated from these areas as described in the Soil RAW; based on the results of the confirmation samples, excavate additional soil or backfill excavation using imported fill material as described in the Soil RAW; load excavated soil into trucks and transport to an appropriate disposal facility as described in the Soil RAW
- remove concrete floor slab and excavate soil impacted with PCBs at Area 3B; stockpile soil on the concrete floor slab of the Manufacturing/Office Building (building demolished by this time)
- remove concrete floor slab and excavate soil impacted with PCBs at Area 4B; stockpile soil on the concrete floor slab of the Manufacturing/Office Building (building demolished by this time)

- remove concrete floor slab and excavate soil impacted with PCBs at Area 4BS(10'); stockpile soil on the concrete floor slab of the Manufacturing/Office Building (building demolished by this time)
- remove concrete floor slab and excavate soil impacted with gasoline, diesel and motor oil at Area 4BS(20'); stockpile soil on the concrete floor slab of the Manufacturing/Office Building (building demolished by this time)
- collect confirmation samples from the excavations located at Areas 3B, 4B, 4BS(10'), and 4BS(20') and waste characterization samples from stockpiles of soil excavated from these areas as described in the Soil RAW; based on the results of the confirmation samples, excavate additional soil or backfill excavations using imported fill material as described in the Soil RAW; load excavated soil into trucks and transport to an appropriate disposal facility as described in the Soil RAW
- remove pavement and excavate soil impacted with lead at Area 5A and 5ASE(10'); stockpile soil on the concrete floor slab of the Manufacturing/Office Building (building demolished by this time)
- remove pavement and excavate soil impacted with lead, diesel, motor oil and SVOCs/PAHs at Area 5C and 5CESE(20'); stockpile soil on the concrete floor slab of the Manufacturing/Office Building (building demolished by this time)
- collect confirmation samples from the excavations located at Areas 5A/5ASE(10') and Area 5C/5CESE(20') and waste characterization samples from stockpiles of soil excavated from these areas as described in the Soil RAW; based on the results of the confirmation samples, excavate additional soil or backfill excavations using imported fill material as described in the Soil RAW; load excavated soil into trucks and transport to an appropriate disposal facility as described in the Soil RAW
- LFR will be in radio contact or telephone contact with disposal truck drivers to coordinate trips between the Site and disposal facilities so that trucks do not park along 66th Avenue between the Site and Interstate 880.

Figure 5 shows the proposed storage, stockpile, staging, loading, and decontamination areas to be used during this project.

Soil stockpiles will be placed on plastic sheeting and covered with plastic sheeting pending receipt of waste characterization analytical results and removal from the Site. Waste characterization samples will be submitted to a fixed laboratory for analysis.

LFR will be in radio contact or telephone contact with disposal truck drivers to coordinate trips between the Site and disposal facilities so that trucks do not park along 66th Avenue between the Site and Interstate 880. Trucks waiting to be loaded may park along San Leandro Street or other legally permissible locations. When possible, trucks will return to the Site with clean fill material to be used for backfilling excavations.

Based on a quantity of 8,194 cubic yards of impacted soil to be removed from the Site, LFR estimates that approximately 15 trucks will leave the Site each day enroute to appropriate disposal facilities for the impacted soil.

To minimize the number of truck operating along 66th Avenue during this project, trucks hauling impacted soil to disposal facilities will return to the Site with clean imported fill material, when possible.

Groundwater entering the excavation south, southeast and east of the Warehouse will be pumped into an on-site 21,000-gallon Baker tank located along the Site's southern border. Samples of the water will be collected for analysis and the water will be discharged to the sanitary sewer under a permit from East Bay MUD if contaminants are within East Bay MUD's acceptance criteria. If East Bay MUD's acceptance criteria cannot be met based on the analytical results of the water, then the water will be transferred from the on-site Baker tank to vacuum trucks. Each vacuum truck transports approximately 5,000 gallons per trip. LFR anticipates approximately 45 truck loads to dispose of dewatering effluent. A total of 45 truck trips over a one month period represents approximately one to two trucks per day to adequately dispose of effluent. LFR anticipates the increased number of transport trucks will not affect the traffic congestion along 66th Avenue based on the industrial nature of the site vicinity, the truck traffic normally present in the site vicinity, and the short distance (approximately 3 city blocks) between the Site and Interstate 880. Figure 5 shows the proposed location for the Baker tank.

LFR contacted the Oakland Fire Department Station 29 located to the east of the Site across 66th Avenue at 1016 66th Avenue, to discuss potential impact to emergency responses by the proposed remedial work at the Site. According to the Oakland Fire Department dispatchers, trucks may operate on 66th Avenue providing the trucks do not park along 66th Avenue and/or within the painted "no parking" section directly in front of Fire Station 29. No additional activities or coordination are required by LFR with the Oakland Fire Department for using 66th Avenue as an access road between the Site and Interstate 880.

4.0 REFERENCES

CSS Environmental Services, Inc. 2005a. Preliminary Environmental Assessment Workplan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, California. March 4.

———. 2005b. Draft - Supplemental Site Investigation (SSI) Workplan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, California. May 24.

———. 2005c. Draft - Preliminary Endangerment Assessment Report, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, California. April 11.

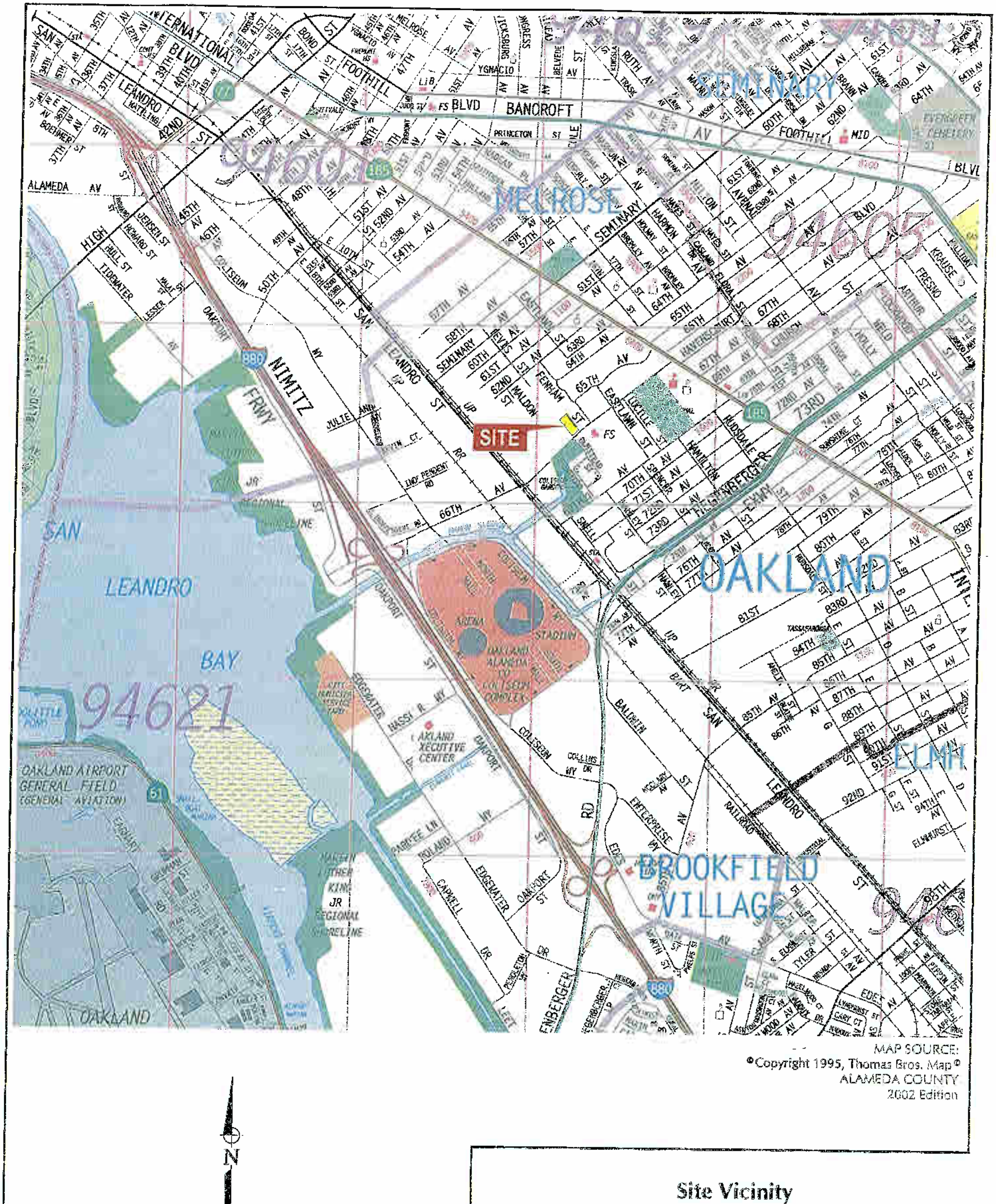
———. 2005d. Draft - Supplemental Site Investigation (SSI) Summary Report, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, California. October 6.

LFR Inc. 2005. Additional Supplemental Site Investigation Work Plan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California. December 13.

———. 2006a. Soil Removal Action Work Plan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California. March 13.

———. 2006b. Additional Supplemental Site Investigation Report, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California. January 23.

Figures



MAP SOURCE:
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ALAMEDA COUNTY
2002 Edition

Site Vicinity

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 1

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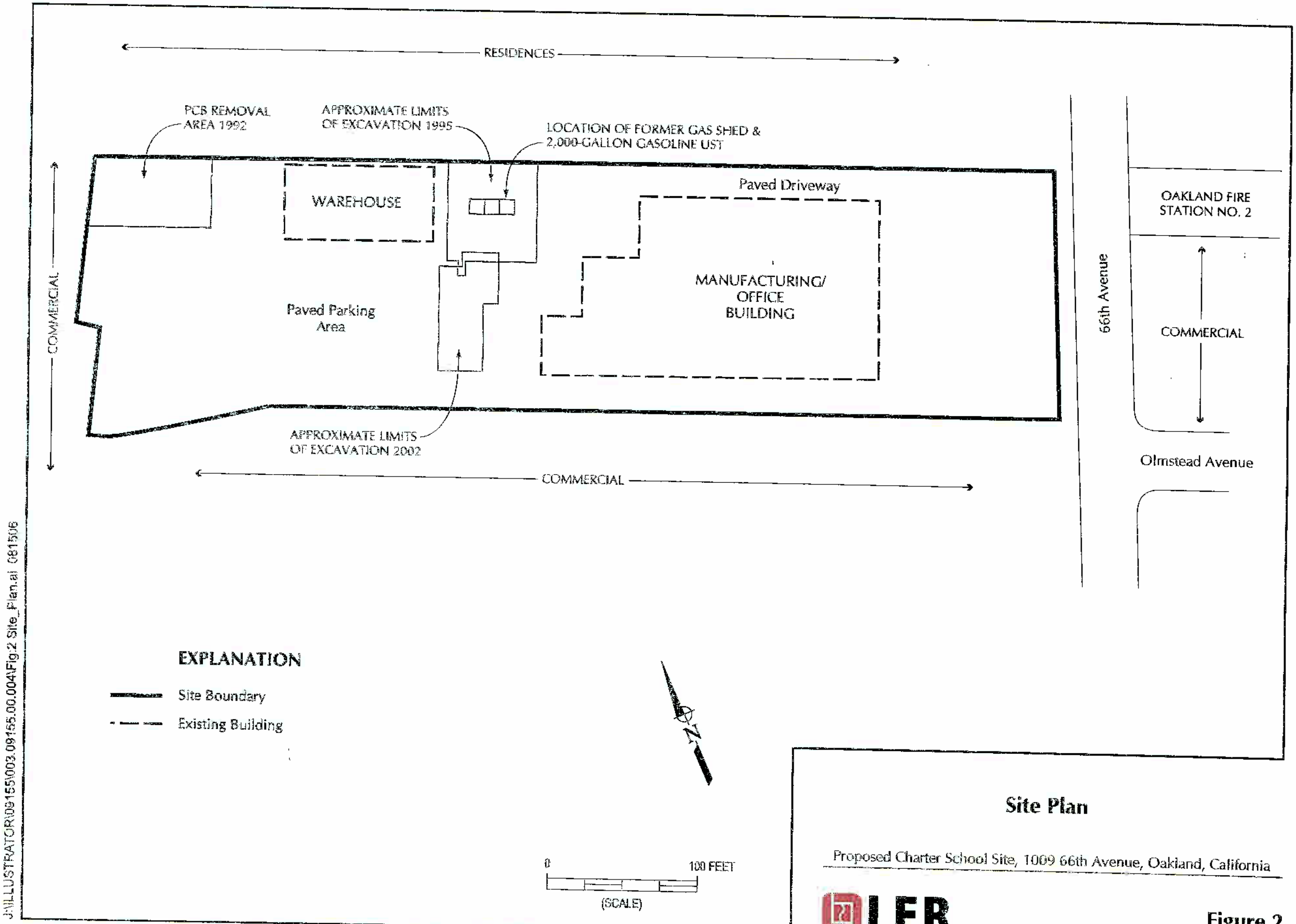
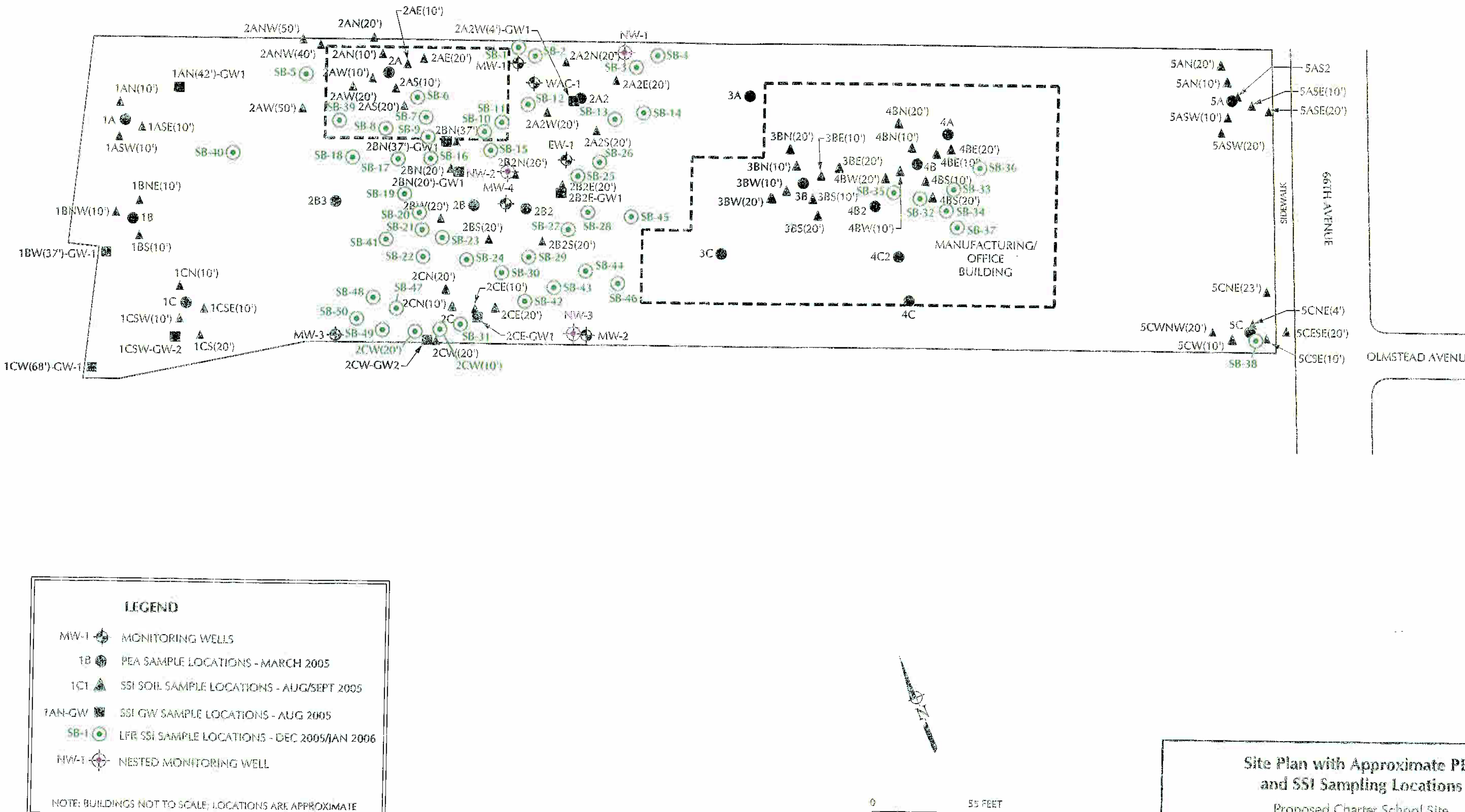


Site Plan

Proposed Charter School Site, 1009 66th Avenue, Oakland, California

LFR

Figure 2



Site Plan with Approximate PEA and SSI Sampling Locations

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 3A

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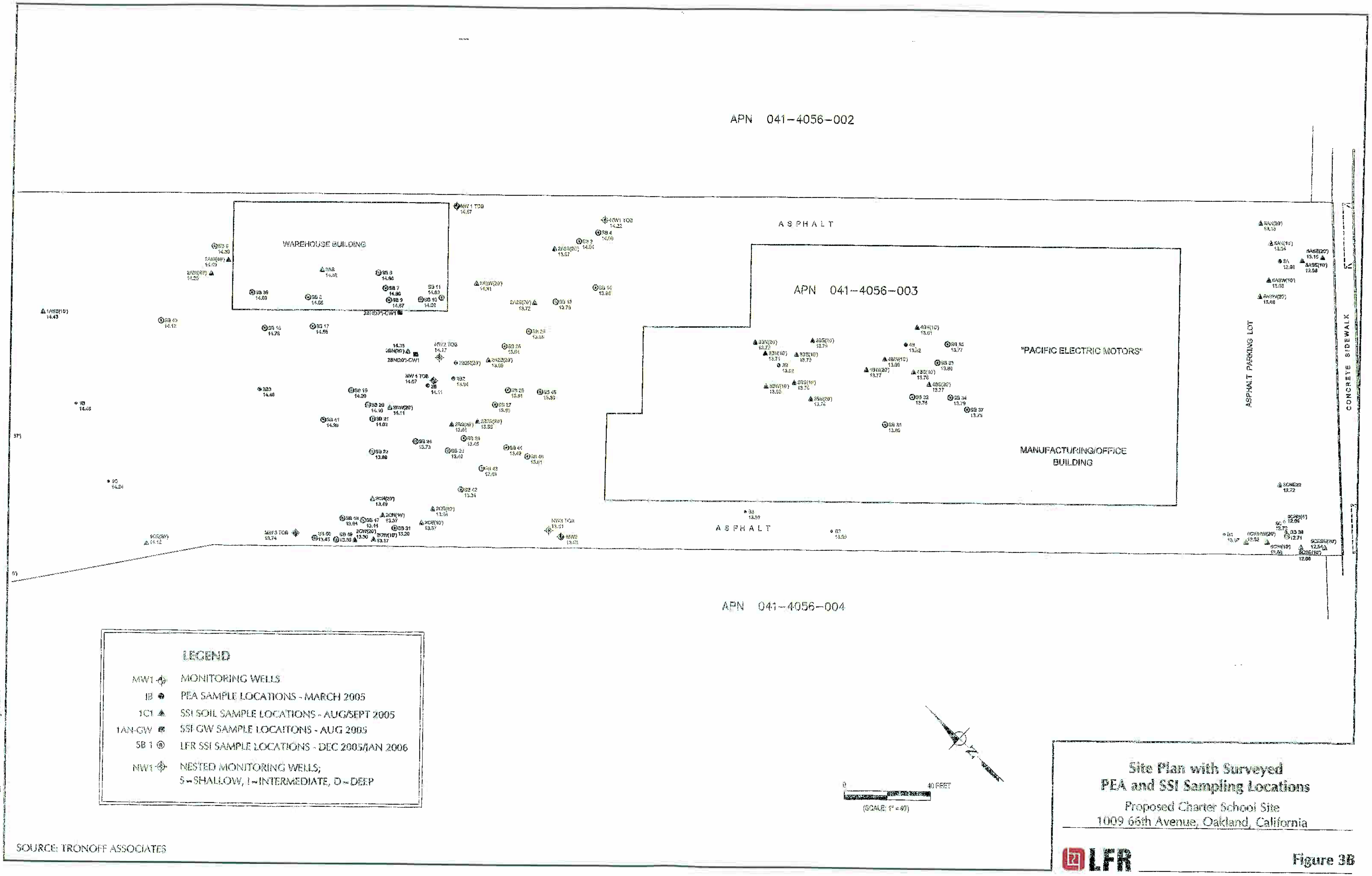
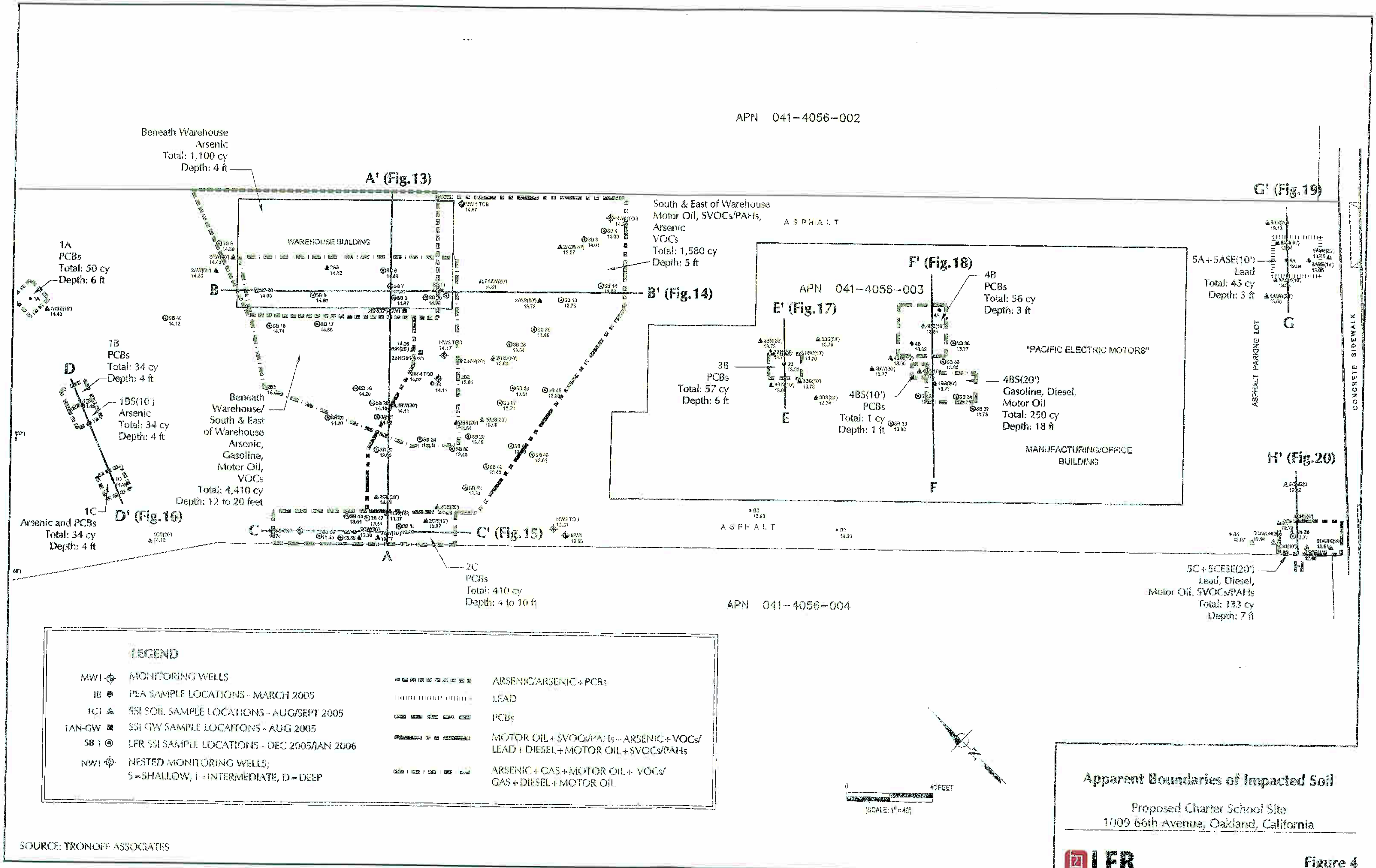
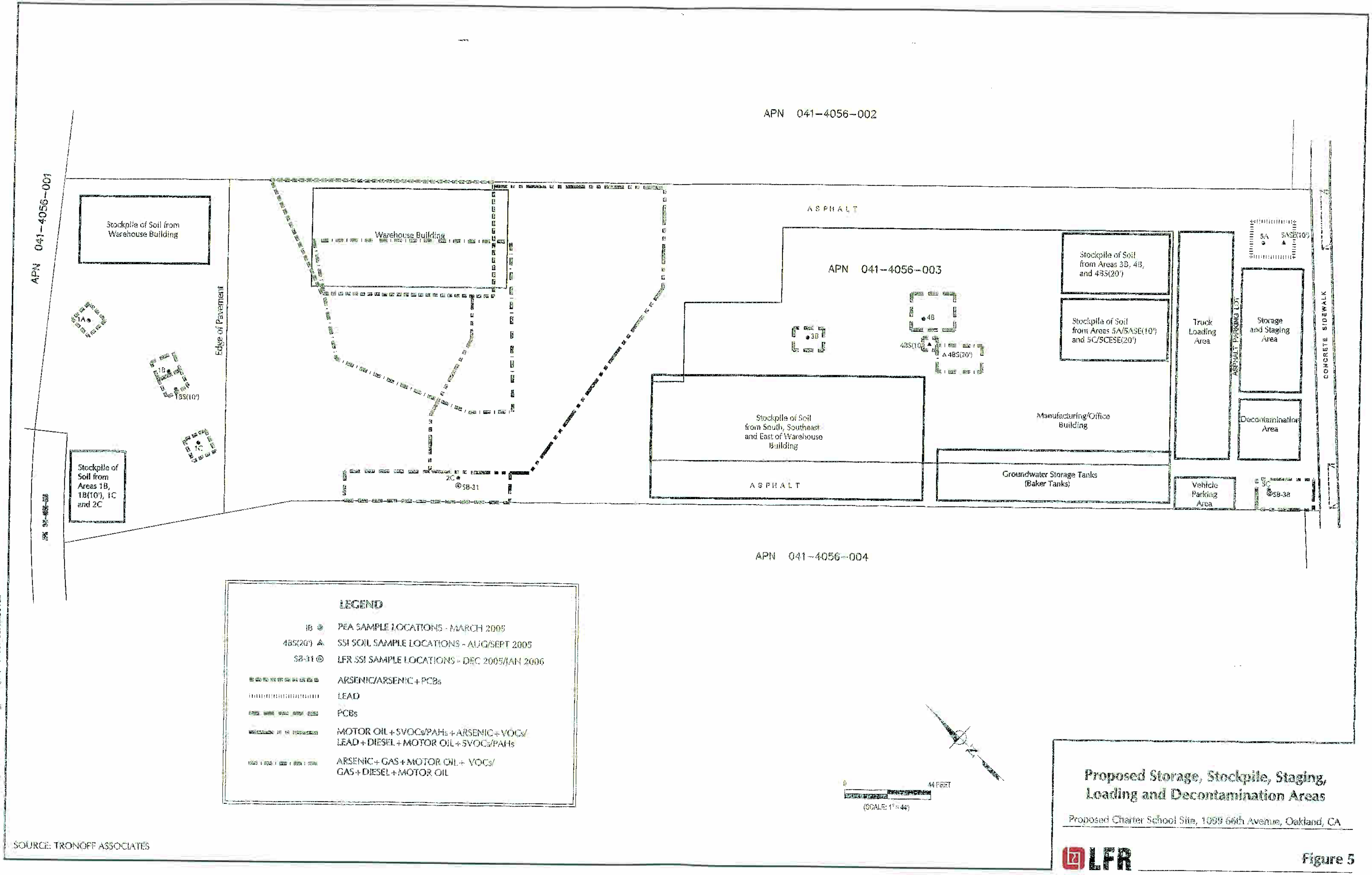

APN 041-4056-002
APN 041-4056-003
APN 041-4056-004
WAREHOUSE BUILDING
ASPHALT
"PACIFIC ELECTRIC MOTORS"
MANUFACTURING/OFFICE BUILDING
ASPHALT PARKING LOT
CONCRETE SIDEWALK
LEGEND
MW1 MONITORING WELLS
1B PEA SAMPLE LOCATIONS - MARCH 2005
1C1 SSI SOIL SAMPLE LOCATIONS - AUG/SEPT 2005
1AN-GW SSI GW SAMPLE LOCAITONS - AUG 2005
SB 1 LFR SSI SAMPLE LOCATIONS - DEC 2005/JAN 2006
NW1 NESTED MONITORING WELLS; S=SHALLOW, I=INTERMEDIATE, D=DEEP
0 40 FEET
(SCALE: 1" = 40')
SOURCE: TRONOFF ASSOCIATES
Site Plan with Surveyed PEA and SSI Sampling Locations
Proposed Charter School Site
1009 66th Avenue, Oakland, California
LFR
Figure 3B



Apparent Boundaries of Impacted Soil

Proposed Charter School Site
1009 66th Avenue, Oakland, California

Figure 4



Proposed Storage, Stockpile, Staging, Loading and Decontamination Areas

Proposed Charter School Site, 1099 66th Avenue, Oakland, CA

LFR

Figure 5

APPENDIX D

Sampling and Analysis Plan

Sampling and Analysis Plan
for Soil Removal Action Work Plan at
Proposed Aspire Charter High School
1009 66th Avenue
Oakland, Alameda County, California
DTSC Site Code: 204147-11

003-09155-00-004
August 17, 2006

Prepared for
Aspire Public Schools
426 17th Street, Suite 200
Oakland, California 94612-2820

Prepared by
LFR Inc.
4190 Douglas Boulevard, Suite 200
Granite Bay, California 95746

LFR
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CONTENTS

ACRONYMS AND ABBREVIATIONS

Aspire	Aspire Public Schools
COC	Compounds of Concern
cy	cubic yards
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
EOA	Environmental Oversight Agreement
HSP	Health and Safety Plan
LFR	LFR Inc.
mini-RAM	miniature real-time aerosol monitor
PAM	Personal Air Monitor
PCG	Preliminary Cleanup Goal
PEA	Preliminary Environmental Assessment
QA/QC	Quality Assurance/Quality Control
QA	Quality Assurance
QC	Quality Control
RAW	Removal Action Work Plan
SAP	Sampling and Analysis Plan
SSI	Supplemental Site Investigation
VOCs	Volatile Organic Compounds

CERTIFICATION

LFR Inc. has prepared this Sampling and Analysis Plan (SAP) on behalf of the Aspire Public Schools in a manner consistent with the level of care and skill ordinarily exercised by professional geologists and environmental scientists. This SAP was prepared under the technical direction of the undersigned California Professional Geologists and Registered Environmental Assessors II.

Lita D. Freeman — 8/17/06

Lita D. Freeman, P.G., R.E.A. II
Senior Associate Geologist
California Registered Geologist No. 7368
California Registered Environmental Assessor II No. 20106

Date

Alan D. Gibbs — 8/17/06

Alan Gibbs, P.G., C.HG., R.E.A. II
Principal Hydrogeologist
California Registered Geologist No. 4827
California Registered Environmental Assessor II No. 20009

Date

* A professional geologist's or registered environmental assessor's certification of conditions comprises a declaration of his or her professional judgment. It does not constitute a warranty or guarantee, expressed or implied, nor does it relieve any other party of its responsibility to abide by contract documents, applicable codes, standards, regulations, and ordinances.

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) has been prepared by LFR Inc. (LFR) on behalf of Aspire Public Schools ("Aspire") for the property located at 1009 66th Avenue in Oakland, Alameda County, California ("the Site"; Figure 1). LFR prepared this SAP under the direction and oversight of the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC).

The purpose of the SAP is to describe the methods to be used for collecting and analyzing confirmation samples during the removal action at the Site as described in the Soil Removal Action Work Plan (RAW) prepared by LFR (LFR 2006a). Implementation of the Soil RAW includes excavation and off site disposal of approximately 8,194 in-place cubic yards (cy) to 9,009 in-place cy of soil impacted with gasoline, diesel, motor oil, various semivolatile organic compounds/polynuclear aromatic hydrocarbons (SVOCs/PAHs), arsenic, lead, polychlorinated biphenyls (PCBs), and various volatile organic compounds (VOCs). This impacted soil will be excavated during the removal action at the Site as described in the Soil RAW (LFR 2006a).

1.1 Site Description

The approximate 2.51 acre site is located in an area of commercial, industrial, government and multi-family residential developments. The Site is located on the western side of 66th Avenue between East 14th Street to the north and San Leandro Street to the south. Aspire plans to construct a charter high school on the Site.

The Site has been used for manufacturing and warehouse storage in the past. The Site is currently developed with two buildings; including one denoted as a "Manufacturing/Office Building" and one denoted as a "Warehouse" on Figure 2. Landscaping areas and paved parking areas and driveways surround the on-site buildings.

1.2 Background

Pursuant to California Health and Safety Code Section 25355.5 (a)(1)(C), Aspire entered into a Environmental Oversight Agreement (EOA) with the DTSC to receive proper regulatory oversight and meet Education Code requirements for this potential new school site. Consistent with requirements in the EOA, a Preliminary Environmental Assessment (PEA) and a Supplemental Site Investigation (SSI) was conducted for the Site in accordance with DTSC-approved work plans prepared by CSS Environmental Services, Inc. (CSS) and LFR (CSS 2005a, CSS 2005b, LFR 2005).

The purpose of the PEA and SSI was to establish whether a release or threatened release of hazardous substances posing a threat to human health or the environment exists at the Site and define the extent of the impacted soil. PEA and SSI sampling locations are shown on Figures 3A (approximate locations) and 3B (surveyed locations).

The PEA and SSI results indicated that soil impacted with gasoline, diesel, motor oil, various SVOCs/PAHs, arsenic, lead, PCBs, and various VOCs at concentrations above the Preliminary Cleanup Goals (PCG) is present on the Site. The results of the PEA and SSIs are presented in reports by CSS and LFR (CSS 2005c, CSS 2005d, LFR 2006b).

Accordingly, a Soil RAW has been developed to mitigate human health and environmental risks and hazards; its scope of work includes excavation, transport, and disposal of impacted soil at off-site facilities, collecting and analyzing waste characterization samples, and collecting and analyzing confirmation samples. The areas of the proposed removal action are shown on Figure 4.

2.0 CONFIRMATION SAMPLING

Confirmation samples will be collected from each sidewall and from the floor of the excavations. The proposed sampling strategy for this alternative would be to collect one sample for every 25 linear feet along each sidewall, and approximately one confirmation sample from the floor of each excavation for every 625 square feet. Confirmation samples will also be collected from various locations as requested by DTSC and noted below. The sidewall samples may be collected from varying depths along the sidewalls or at depths where COCs were detected in the past at concentrations above the PCG.

Existing soil analytical data collected from the Site may be appropriate for use as confirmation data (i.e. soil samples collected during the PEA and SSI from borings to the east of the former underground storage tank excavations with concentrations of COCs less than the PCGs). In addition, shallow groundwater is anticipated in the central portion of the Site (at 3 to 4 feet below ground surface). Therefore, confirmation soil sampling of the excavation floor may be restricted to non-saturated areas, unless deemed prudent to sample specific areas based on site conditions.

During implementation of the Soil RAW, LFR will discuss use of existing soil analytical data for confirmation purposes with DTSC. In addition, LFR will discuss omitting collection of floor confirmation samples in those areas where saturated soils are present in the excavations with DTSC.

Based on the proposed sampling strategy for confirmation samples, LFR assumes that the following number of sidewall and floor confirmation samples will be collected (as noted above some samples may not be collected from these areas based on existing analytical data and site conditions during implementation of the Soil RAW; confirmation sampling locations will be discussed with and approved by DTSC):

- **Around boring 1A:** Four sidewall samples and one floor sample analyzed for PCBs using EPA Method 8082A
- **Around boring 1B:** Three sidewall samples and one floor sample analyzed for PCBs using EPA Method 8082A
- **Around boring 1BS(10'):** Three sidewall samples and one floor sample analyzed for arsenic using EPA Method 6010B
- **Around boring 1C:** Four sidewall samples and one floor sample analyzed for PCBs using EPA Method 8082A and arsenic using EPA Method 6010B
- **Beneath the Warehouse**: Eight sidewall samples (along northern sidewall and western sidewall, including the area west of borings 2AW(40'), 2AW(50'), 2ANW(50'), and SB-5) and six floor samples analyzed for arsenic using EPA Method 6010B
- **Beneath and south of the Warehouse:** Eight sidewall samples (along western sidewall and eastern sidewall) and 12 floor samples analyzed for gasoline and motor oil using EPA Method 8015 Modified, BTEX and MTBE using EPA Method 8260 (collected using EPA Method 5035), and arsenic using EPA Method 6010B
- **South and east of the Warehouse:** Twelve sidewall samples (two sidewall samples on the southwestern sidewall to the west of borings 2CN(20') and SB-22, six sidewall samples along southeastern and eastern sidewalls, and four sidewall samples along northern sidewall) and 16 floor samples analyzed for motor oil using EPA Method 8015 Modified, BTEX and MTBE using EPA Method 8260 (collected using EPA Method 5035), arsenic using EPA Method 6010B, and SVOCs/PAHs using EPA Method 8270C
- **Along southern border at and west of boring 2C:** Nine sidewall samples and three floor samples analyzed for PCBs using EPA Method 8082A
- **Beneath the Manufacturing/Office Building at boring 3B:** Four sidewall samples and one floor sample analyzed for PCBs using EPA Method 8082A
- **Beneath the Manufacturing/Office Building at boring 4B:** Four sidewall samples and one floor sample analyzed for PCBs using EPA Method 8082A and PCE using EPA Method 8260
- **Beneath the Manufacturing/Office Building at boring 4BS(10'):** Three sidewall samples and one floor sample analyzed for PCBs using EPA Method 8082A
- **Beneath the Manufacturing/Office Building at boring 4BS(20'):** Four sidewall samples and one floor sample analyzed for gasoline, diesel, and motor oil using EPA Method 8015 Modified
- **Around borings 5A and 5ASE(10'):** Four sidewall samples and one floor sample analyzed for lead using EPA Method 6010B
- **Around borings 5C and 5CESE(20'):** Six sidewall samples and one floor sample analyzed for lead using EPA Method 6010B, diesel and motor oil using EPA Method 8015 Modified, and SVOCs/PAHs using EPA Method 8270C

The excavations at borings 1B and 1BS(10') will merge; therefore, a fourth sidewall sample will not be collected from either of these excavations. The excavations at borings 4BS(10') and 4BS(20') will merge; therefore, a fourth sidewall sample will not be collected on the eastern wall of the excavation at 4BS(10'). Likewise, LFR anticipates that removal of impacted soil in the central portion of the Site will result in one large excavation. Therefore, sidewall samples will not be collected along the eastern wall of the Warehouse for arsenic, motor oil, SVOCs/PAHs, BTEX, or MTBE analyses. Sidewall samples will be collected along the eastern wall of the gasoline/motor oil/BTEX/MTBE/arsenic-impacted area [i.e., east of boring SB-11, east of nested well NW-2, east of boring 2BS(10'), and south of boring SB-24].

As requested by the DTSC, targeted confirmation soil samples will be collected at the following locations due to identified data gaps:

- Gasoline and VOCs (BTEX and MTBE) in the following areas:
  - Around and below boring 2B2N(20'), including to the northeast, east, and southeast of this boring at depths of 10 feet and 15 feet bgs
  - Below boring SB-10 (from a depth of 25 feet bgs) and boring SB-11 (from a depth of 20 feet bgs)
  - Around and below boring SB-3, including to the northwest, west, and southwest of this boring from a depth of 15 feet bgs
- Motor Oil and diesel in the following areas:
  - Diesel below boring 4BS, starting at a depth of 20 feet bgs; soil samples from this area will be analyzed for PAHs in addition to diesel
  - Motor oil below and around borings SB-43 and SB-44, including to the southwest, south, southeast, and east of these borings
- SVOCs around boring 2B2S(20'), including to the northeast, east, and southeast of this boring
- Lead west of boring 5A at the surface
- PCBs in the following areas:
  - West of boring 1C, east of boring 1B, and north and east of boring SB-50
  - Below 5 feet bgs at borings 2C and 2CW(10') and below 10 feet bgs at boring SB-50

    - Below and around borings 6B and 6C
    - Below and around boring SB-44, including to the west, north and east and at a depth of more than 5 feet bgs

- VOCs (BTEX and MTBE) in the following areas (step-outs may be required):
    - Below 10 feet bgs at and around borings 2B, 2BN(20'), 2BW(20'), and 2B2N(20')
    - Below 15 feet bgs at and around borings 2BN(37'), SB-6, SB-7, SB-11, SB-17, SB-24, and 2B3
    - Below 20 feet bgs at borings SB-9 and SB-10

Additional soil will be removed, if necessary, until confirmation sample results indicate that residual concentrations of COCs are less than the PCGs.

For quality assurance/quality control (QA/QC), LFR will also collect one blind duplicate soil sample for every 10 soil samples. The duplicate sampling program represents at least 10 percent of the total number of samples proposed for analysis. Field blank samples and equipment blank samples will be collected as outlined below.

3.0 SAMPLE COLLECTION

Specifics of sample collection are discussed below.

3.1 Soil Sampling

Confirmation samples (non-saturated) will be collected in 2-inch-diameter brass or stainless steel liners, Encore samplers, or glass jars, as appropriate, using hand-sampling equipment or hand-pressure at the excavation sidewalls and floors or, in excavations deeper than 4 feet, using a backhoe to remove soil from the excavation sidewalls and floors and collecting the soil samples directly from the backhoe bucket.

The samples will be placed in an ice-chilled cooler, for transport to a California state-certified laboratory for analysis under standard chain-of-custody protocol.

Sample labels will be completed and attached to the sample container for every sample collected. Labels are made of a waterproof material backed with a water-resistant adhesive. Labels will be filled out using waterproof ink and will include (at least) the sample name, the sampling date and time, the sampling location, the sampler's name, and the analyses to be conducted. The types of samples to be collected are discussed below.

3.2 Quality Control Sampling

Quality control (QC) sampling to be performed for this project include field blanks, equipment blanks, trip blanks (if appropriate), and field duplicates. Each field blank and duplicate QC sample will be assigned a unique number so that the laboratory will not know which samples are field blanks or duplicates. Trip blanks will be identified as such and will undergo the QC checks described below. Field blank and duplicate QC samples will be identified in the field activities logbook according to type.

3.2.1 Field Blanks

Field blanks will be collected by pouring laboratory-supplied, organic-free, deionized water directly into appropriate sample containers once per field day. Their purpose is to evaluate the presence of chemicals for which environmental samples are being analyzed in the water used for equipment decontamination. The field blank samples will be stored and processed in the same manner as the other samples.

Additional field blanks may be collected at the sampler's discretion. The sampler, after consultation with the LFR project manager, hydrogeological analyst, or QA/QC officer, may instruct the laboratory either to analyze such additional samples or to hold them for possible analysis later, pending initial results. If initial results for a sample collected at the time a field blank was collected indicate that a sample contains unexplainable concentrations of constituents, the field blank sample will be analyzed.

3.2.2 Equipment Blanks

Equipment rinsate blanks (equipment blanks) will be collected immediately before samples are collected by pouring laboratory-supplied, organic-free, deionized water into the bailer or other sample collection device, and then into the appropriate sample containers. At least one equipment blank will be collected for each analytical method during each sampling episode.

Additional equipment blanks may be collected at the sampler's discretion. The sampler, after consultation with the LFR project manager, hydrogeological analyst, or QA/QC officer, may instruct the laboratory either to analyze such additional samples or to hold them for possible analysis later, pending initial results. If initial results for a sample collected at the time an equipment blank was collected indicate that a sample contains unexplainable concentrations of constituents, the equipment blank sample will be analyzed.

3.2.3 Trip Blanks

Trip blanks are prepared by the laboratory using organic-free, deionized water supplied in appropriate pre-filled sample containers. One trip blank will be included with each shipment of groundwater samples, if any, to be analyzed for VOCs. Trip blanks will be analyzed for VOCs only. The trip blank is analyzed as a check for possible contamination of the sample bottles and/or the organic-free deionized water used for field blanks.

3.2.4 Field Duplicates

A minimum of 1 field duplicate soil sample per analysis method per every 10 field samples (approximately 10 percent of the number of samples) will be collected and analyzed. Field duplicate samples will be collected in the same manner as confirmation soil samples.

3.3 Air Monitoring

A miniature real-time aerosol monitor (mini-RAM) will be used to monitor total dusts generated during site work. Background dust levels will be established by monitoring dust levels at the Site for several days during the two weeks prior to implementation of this Soil RAW. Background dust levels will be documented at air monitoring stations established at approximately 100 foot intervals along the Site's perimeters (a total of 16 stations including seven stations each of the northern and southern borders and one station each on the eastern and western borders).

If dust in excess of background levels (greater than 0.25 milligrams per cubic meter [mg/m^3] above background levels) is observed for a sustained period of time (greater than 5 minutes), appropriate dust suppression measures (e.g., spraying soil with water) will be undertaken. As noted in the HSP (Appendix F of this Soil RAW), a total dust reading of 1.36 mg/m^3 would result in an exceedance of the Acute Reference Exposure Level of 0.00019 mg/m^3 established for arsenic by the California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA). A total dust action level of 0.25 mg/m^3 above background levels would be conservative for the various COCs detected on the Site that would be likely to adhere to windblown dust and protective of the on-site workers and members of the surrounding community.

If during excavation activities dust is observed in the area being excavated, appropriate dust suppression measures (e.g., spraying soil with water) will be undertaken.

Field staff will obtain and document total dust readings from the mini-RAM throughout each work day when impacted soil excavation activities are occurring on the Site. These readings will be obtained from air monitoring stations established at approximately 100 foot intervals along the Site's perimeters (a total of 16 stations including seven stations each of the northern and southern borders and one station each on the eastern and western borders) and various points (upwind, downwind, etc.) around each active excavation area.

In addition to monitoring for total dust using a mini-RAM, Personal Air Monitors (PAMs) to record total dust and fixed air monitors with cassettes that can be submitted to a laboratory for analysis will be used each work day when impacted soil excavation activities are occurring on the Site. A PAM will be worn by at least one worker operating earth moving equipment (backhoe, excavator, etc.). At least four fixed air monitoring stations will be established on the Site during each work day when impacted soil excavation activities are occurring on the Site. One air monitoring station will be located on the northern border of the Site to document conditions by the adjacent residences. Locations for all air monitoring stations will be selected prior to implementation of this Soil RAW and may be changed during the course of work at the Site. The cassettes will be submitted to a laboratory and analyzed, at a minimum, for total dust, total lead, total arsenic, and PCBs.

On-site worker exposure to airborne contaminants (VOCs) will be monitored during intrusive site activities. A calibrated photoionization detector (PID) with a lamp strength of 10.6 eV or flame ionization detector (FID) will be used to monitor changes in exposure to volatile organic compounds (VOCs). Personnel will perform routine monitoring during site operations to evaluate concentrations of VOCs in employee breathing zones. If VOCs are detected above predetermined action levels specified in Section 10 of the HSP, the procedures found in Section 7 of the HSP will be followed.

3.4 Chain-of-Custody Forms

Chain-of-custody forms are used to document sample collection and shipment to laboratory for analysis. Each chain-of-custody form will be prepared in triplicate. Two of the three copies will accompany each shipment of samples to the laboratory. One copy will be kept in LFR's project file.

A chain-of-custody form will accompany each sample shipment for analyses. Forms will be completed and sent with the samples for each laboratory and each shipment. If multiple coolers are sent to a single laboratory on a single day, chain-of-custody forms will be completed and sent with the samples for each cooler.

The chain-of-custody form will identify the contents of each shipment and maintain the custodial integrity of the samples. Generally, a sample is considered to be in someone's custody if it is either in someone's physical possession, in someone's view, locked up, or kept in a secured area that is restricted to authorized personnel.

3.5 Decontamination Procedures

Equipment that comes into contact with potentially impacted soil or water will be decontaminated consistently to assure the quality of samples collected. Disposable equipment intended for one-time use will not be decontaminated, but will be packaged for appropriate disposal. Decontamination will occur before and after each use of a piece of equipment. Drilling and sampling devices used will be decontaminated using the following procedures:

- non-phosphate detergent and tap water wash, in a 5-gallon plastic bucket, using a brush
- initial deionized/distilled water rinse, in a 5-gallon plastic bucket

- final deionized/distilled water rinse in a 5-gallon plastic bucket

Equipment will be decontaminated in a predesignated area on plastic sheeting, and clean bulky equipment will be stored on plastic sheeting in uncontaminated areas. Cleaned small equipment will be stored in plastic bags. Materials to be stored more than a few hours will also be covered.

4.0 REFERENCES

CSS Environmental Services, Inc. 2005a. Preliminary Environmental Assessment Workplan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, California. March 4.

———. 2005b. Draft - Supplemental Site Investigation (SSI) Workplan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, California. May 24.

———. 2005c. Draft - Preliminary Endangerment Assessment Report, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, California. April 11.

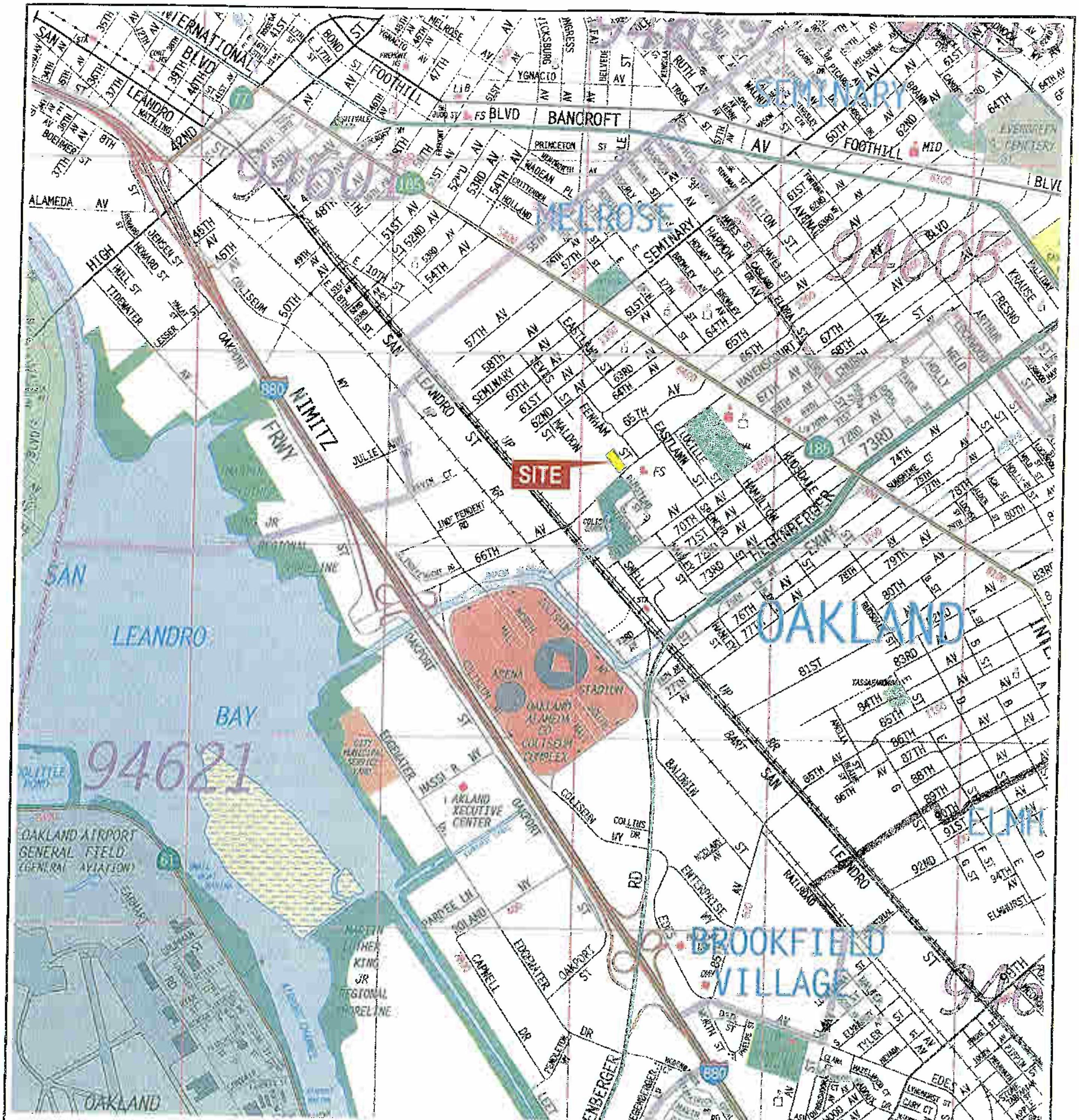
———. 2005d. Draft - Supplemental Site Investigation (SSI) Summary Report, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, California. October 6.

———. LFR Inc. 2006a. Soil Removal Action Work Plan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California. March 13.

———. 2005. Additional Supplemental Site Investigation Work Plan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California. December 13.

———. 2006b. Additional Supplemental Site Investigation Report, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California. January 23.

Figures



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Site Vicinity

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 1

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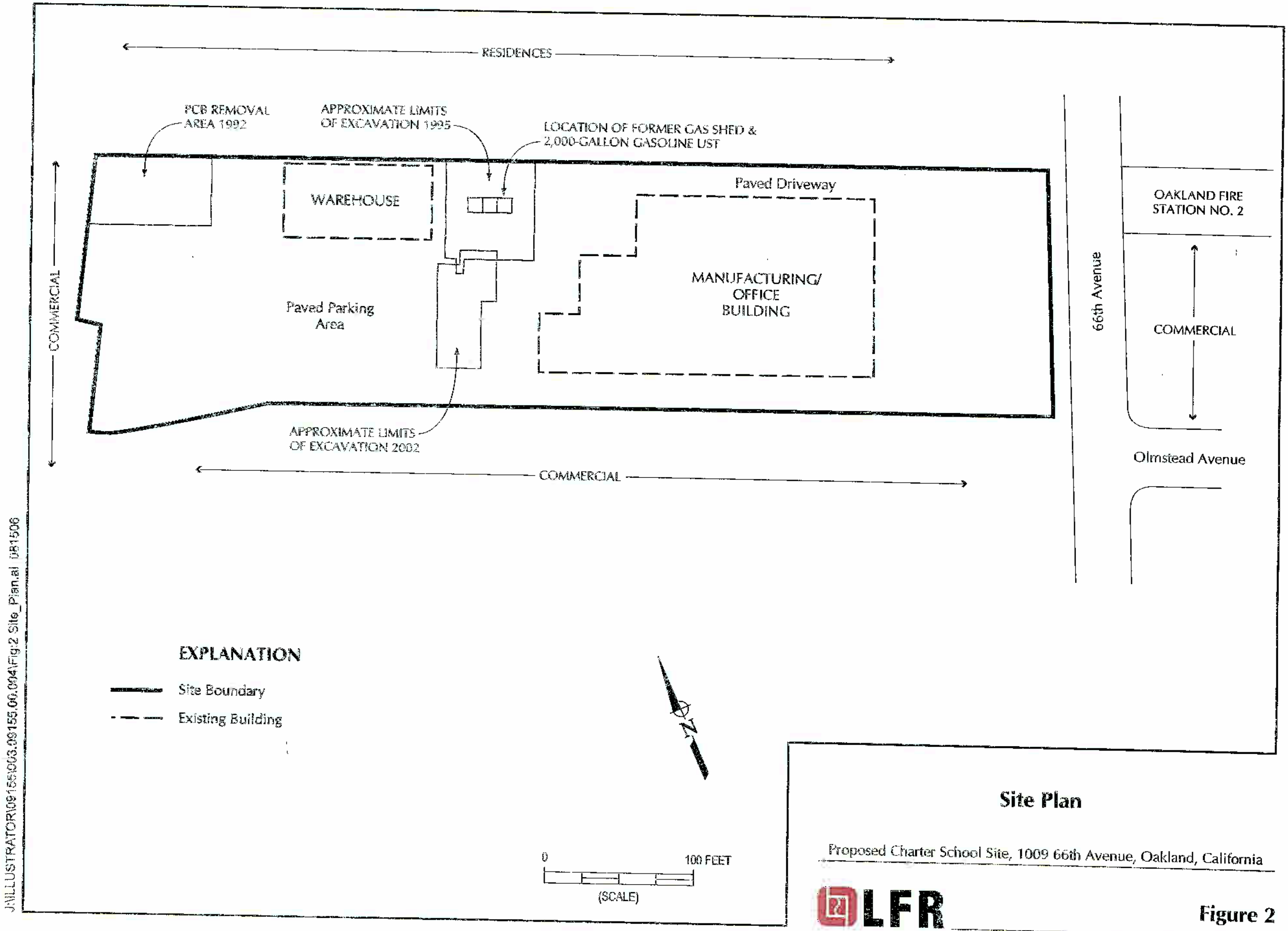

Site Plan

Proposed Charter School Site, 1009 66th Avenue, Oakland, California

LFR

Figure 2

APPENDIX E

Well Sampling and Destruction Plan

Well Sampling and Destruction Plan for Proposed Aspire Charter High School
1009 66th Avenue
Oakland, Alameda County, California
DTSC Site Code: 204147-11

003-09155-00-004
August 17, 2006

Prepared for
Aspire Public Schools
426 17th Street, Suite 200
Oakland, California 94612-2820

Prepared by
LFR Inc.
4190 Douglas Boulevard, Suite 200
Granite Bay, California 95746

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CONTENTS

ACRONYMS AND ABBREVIATIONS

Aspire	Aspire Public Schools
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
HSP	Health and Safety Plan
LFR	LFR Inc.
OSHA	Occupational Safety and Health Administration

CERTIFICATION

LFR Inc. has prepared this Well Sampling and Destruction Plan on behalf of Aspire Public Schools in a manner consistent with the level of care and skill ordinarily exercised by professional geologists and environmental scientists. This Well Destruction Plan was prepared under the technical direction of the undersigned California Professional Geologists and Registered Environmental Assessors II.

8/17/06

Lita D. Freeman, P.G., R.E.A. II — Date
Senior Associate Geologist
California Registered Geologist No. 7368
California Registered Environmental Assessor II No. 20106

8/17/06

Alan Gibbs, P.G., C.HG., R.E.A. II — Date
Principal Hydrogeologist
California Registered Geologist No. 4827
California Regist[illegible] Environmental Assessor II No. 20009

* A professional [illegible] mental assessor's certification of conditions comprises a de[illegible] judgment. It does not constitute a warranty or guarantee, expressed [illegible] relieve any other party of its responsibility to abide by contract documents, applicable codes, standards, regulations, and ordinances.

1.0 INTRODUCTION

This Well Sampling and Destruction Plan was prepared by LFR Inc. (LFR) on behalf of Aspire Public Schools ("Aspire") for the property located at 1009 66th Avenue in Oakland, Alameda County, California ("the Site"; Figures 1 and 2). LFR prepared this Well Sampling and Destruction Plan under the direction and oversight of the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC).

The purpose of this plan is to describe the destruction of eight monitoring wells.

2.0 BACKGROUND

The approximate 2.51 acre site is located in an area of commercial, industrial, government and multi-family residential developments. The Site is located on the western side of 66th Avenue between East 14th Street to the north and San Leandro Street to the south. Aspire plans to construct a charter high school on the Site.

The Site has been used for manufacturing and warehouse storage in the past. The Site is currently developed with two buildings; including one denoted as a "Manufacturing/Office Building" and one denoted as a "Warehouse" on Figure 2. Landscaping areas and paved parking areas and driveways surround the on-site buildings.

3.0 HEALTH AND SAFETY PLAN AND ACCESS AGREEMENTS

Prior to mobilizing to the Site, LFR will prepare an addendum to the site-specific health and safety plan (HSP) to identify potential hazards associated with implementing the proposed well destruction activities. The addendum will be prepared to augment the site-wide "Health and Safety Plan for Supplemental Site Investigation Activities at Proposed Aspire Charter High School," prepared by LFR and dated November 18, 2005 (LFR 2005). Appropriate precautionary measures will be taken to address potential hazards.

3.1 Utility Locating

Underground utilities in areas of planned work will be located and marked with white paint or white flags for Underground Services Alert (USA). USA will be notified a minimum of 48-hours prior to conducting fieldwork to allow utility companies with possible underground utilities in the work areas an opportunity to mark utility locations on the ground surface with paint. In addition, LFR will retain a private utility locator to locate subsurface features in the area of each groundwater monitoring well.

3.2 Well Destruction Permits

Prior to scheduling fieldwork, LFR will obtain groundwater monitoring well destruction permits from the Alameda County Public Works Agency (telephone number 510-670-6633) for the eight groundwater monitoring wells located on the Site.

LFR will complete the groundwater monitoring well destruction permits and submit the completed permits to the Alameda County Public Works Agency.

LFR will coordinate field activities with an Alameda County Public Works Agency field inspector a minimum of two weeks in advance to secure a well destruction permit and provide adequate notice to allow field inspection of well activities and grouting procedures.

4.0 FIELD METHODS AND PROCEDURES

This section provides the methods and procedures for monitoring well destruction activities.

4.1 Monitoring Well Sampling

Monitoring wells MW-1, MW-2, MW-3, MW-4, EW-1, NW-1, NW-2, and NW-3 will be sampled immediately prior to destruction. LFR staff will document depth-to-water measurements in the on-site wells and collect groundwater samples from each well using low-flow methods.

Groundwater samples will be analyzed for gasoline using U.S. Environmental Protection Agency (EPA) Method 8015 Modified and benzene, toluene, ethylbenzene, and total xylenes (BTEX) and methyl tertiary-butyl ether (MTBE) using EPA Method 8260. The samples will be analyzed on a normal 5-day turnaround time.

4.2 Monitoring Well Destruction

Monitoring wells MW-1, MW-2, MW-3, MW-4, EW-1, NW-1, NW-2, and NW-3 will be destroyed in accordance in Alameda County Public Works Agency's guidelines and DWR - California Well Standards Bulletin 74-90, Part III, Sections 16 through 19. Well destruction activities will be completed by a California C-57 licensed contractor.

Prior to destruction, the depth to groundwater and total depth will be documented for each well using an electronic water-level meter to demonstrate that no obstructions exist that will impede sealing activities. If the well is obstructed, regulations require that the well be cleaned to remove down-hole debris prior to destruction.

Each monitoring well will be destroyed by first removing the well box. Once the monument or well box is removed, a California-licensed well driller will seal the borehole by either pressure grouting or tremie grouting the borehole to the surface with neat cement. A tremie pipe will be used to place the cement if more than 3 feet of water is present in the well. During the pressure grouting procedure, a minimum of 25 pounds per square inch will be maintained for five minutes or until pumping refusal. The completed seal will match existing conditions surrounding the well.

LFR discussed destruction of the groundwater monitoring wells on the Site with a Alameda County Public Works Agency representative. According to the Alameda County Public Works Agency representative, overdrilling of the on-site groundwater monitoring wells will not be required, based on the well construction details provided by LFR.

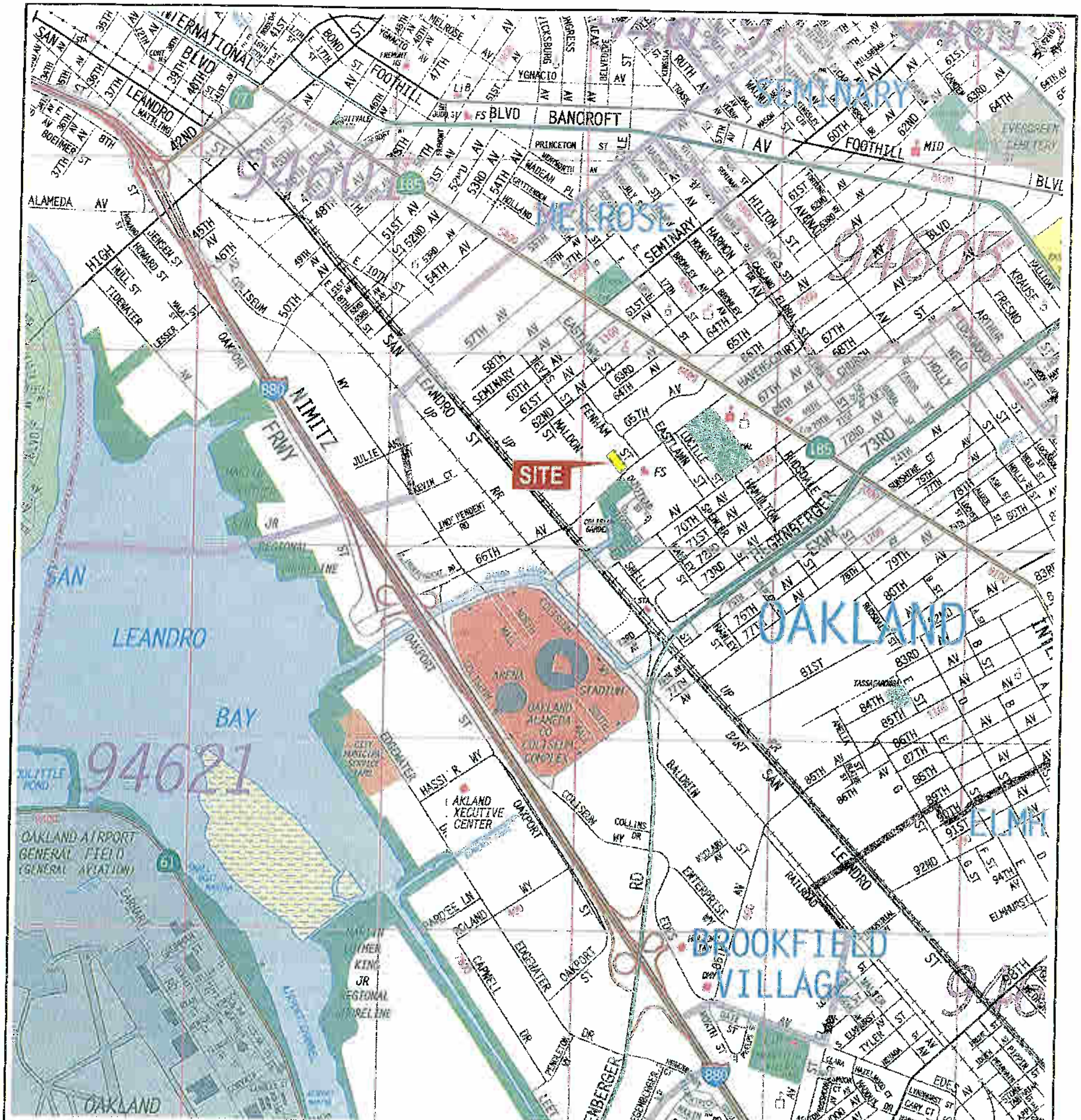
4.3 Waste Disposal

Waste generated during destruction activities will be temporarily stored on site in U.S. Department of Transportation approved 55-gallon drums. Samples will be collected of soil and wastewater generated during the destruction activities and submitted to an analytical laboratory for analysis. Upon receipt of the analytical data, the waste will be transported to an off-site facility for proper disposal.

5.0 REFERENCES

LFR Inc. 2005. Soil Health and Safety Plan for Supplemental Site Investigation Activities, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California. March 13.

Figures



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Site Vicinity

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 1

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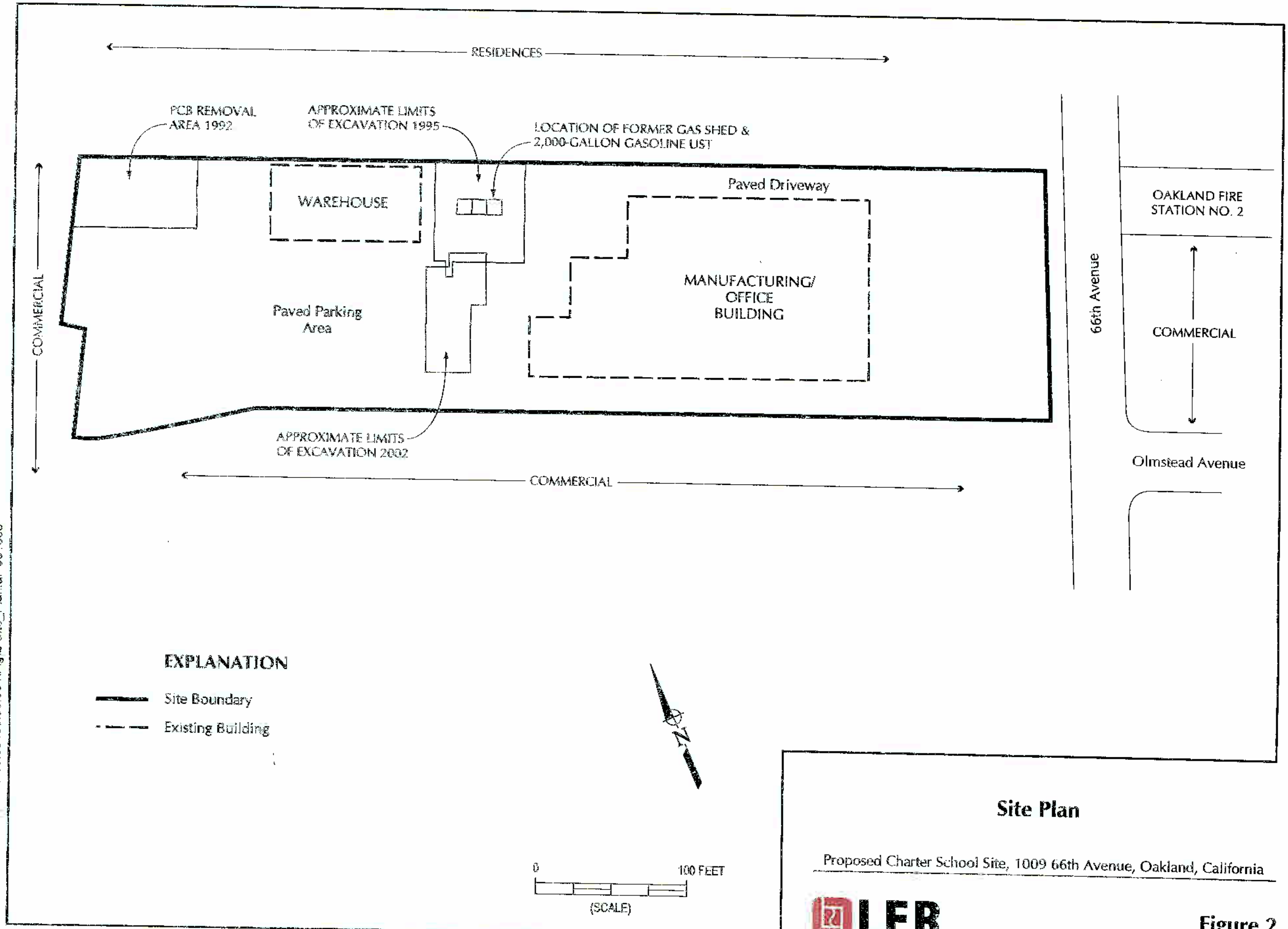

Site Plan

Proposed Charter School Site, 1009 66th Avenue, Oakland, California

LFR

Figure 2

APPENDIX F

Health and Safety Plan

Health and Safety Plan
for Soil Removal Action Work Plan at
Proposed Aspire Charter High School
1009 66th Avenue
Oakland, Alameda County, California
DTSC Site Code: 204147-11

August 17, 2006
003-09155-00

Prepared for
Aspire Public Schools
426 17th Street, Suite 200
Oakland, California 94612-2820

Prepared by
LFR Inc.
4190 Douglas Boulevard, Suite 200
Granite Bay, California 95746

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CONTENTS

ACRONYMS AND ABBREVIATIONS

APR	air-purifying respirator
Aspire	Aspire Public Schools
bgs	below ground surface
CCR	California Code of Regulations
COC	compound of concern
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
FID	flame ionization detector
GFCI	ground fault circuit interrupters
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	high-efficiency particulate air
HSP	Health and Safety Plan
kV	kiloVolt
LEL	lower explosive limit
LFR	LFR Inc.
MSDS	material safety data sheet
ND	Not Detected
OSHA	Occupational Safety and Health Administration
PEA	Preliminary Environmental Assessment
PID	photoionization detector
PPE	personal protective equipment
PVC	polyvinyl chloride
QA/QC	Quality Assurance/Quality Control
RAW	Removal Action Work Plan
SSI	Supplemental Site Investigation
SSO	Site Safety Officer
UST	underground storage tank
VOCs	volatile organic compounds

1.0 GENERAL

LFR Inc. (LFR) has prepared this Health and Safety Plan (HSP) for use during the activities described in the Soil Removal Action Work Plan (RAW) prepared on behalf of Aspire Public Schools ("Aspire") for the proposed Aspire Charter High School property located at 1009 66th Avenue in Oakland, Alameda County, California ("the Site"). Activities conducted under LFR's direction at the Site will be in compliance with applicable Occupational Safety and Health Administration (OSHA) regulations, particularly those in Title 8 California Code of Regulations (CCR) 5192, and other applicable federal, state, and local laws, regulations, and statutes. A copy of this HSP will be kept on site during scheduled field activities.

This HSP addresses the potential hazards associated with planned field activities at the Site. It presents the minimum health and safety requirements for establishing and maintaining a safe working environment during the course of work. In the event of conflicting requirements, the procedures or practices that provide the highest degree of personnel protection will be implemented. If work plan specifications change or if site conditions encountered during the course of the work are found to differ substantially from those anticipated, LFR's Director of Health and Safety must be informed immediately upon discovery, and appropriate changes will be made to this HSP.

It is the Project Manager's responsibility to ensure that health and safety procedures are enforced at the Site. Project personnel, including subcontractors, shall receive a copy of this HSP and sign the form to indicate acceptance before on-site project activities begin.

LFR's health and safety programs and procedures, including medical monitoring, respiratory protection, injury and illness prevention, hazard communication, and personal protective equipment (PPE), are documented in the LFR Corporate Health and Safety Manual. These health and safety procedures are incorporated herein by reference, and LFR employees will adhere to the procedures specified in the manual.

When specified in contract documents, this HSP may cover the activities of LFR subcontractors. However, this HSP may not address hazards associated with tasks and equipment that are specialties of the subcontractor (e.g., operation of a drill rig or earth-moving equipment). Subcontractors are responsible for developing, maintaining, and implementing their own health and safety programs, policies, and procedures.

LFR is responsible for the safety of its employees and subcontractors under its control, but assumes no responsibility for the activities of other contractors or their subcontractors who may be working concurrently at the general project location. LFR will use a reasonable degree of care when marking potentially hazardous areas within its project work site and restricting access as appropriate. LFR will not be responsible for others outside its control who disregard such marked hazards or restricted access. This HSP has been prepared specifically for this project and is intended to address health and safety issues solely with respect to LFR's work. All references, therefore, to the site, the work, activities, site personnel, workers, persons, or subcontractors in this HSP are with respect to LFR work only.

2.0 SITE DESCRIPTION AND BACKGROUND

The approximate 2.51 acre site is located in an area of commercial, industrial, government and multi-family residential developments. The Site is located on the western side of 66th Avenue between East 14th Street to the north and San Leandro Street to the south. Aspire plans to construct a charter high school on the Site.

The Site has been used for manufacturing and warehouse storage in the past. The Site is currently developed with a Manufacturing/Office Building and a Warehouse Building. Landscaping areas and paved parking areas and driveways surround the on-site buildings.

3.0 PLANNED SITE ACTIVITIES

The Soil RAW was prepared under the oversight of the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). This Soil Raw was prepared based on the results of the Preliminary Environmental Assessment (PEA) and Supplemental Site Investigations previously performed at the Site. The Soil RAW includes removal of soil impacted by gasoline, diesel, motor oil, various semivolatile organic compounds/polynuclear aromatic hydrocarbons (SVOCs/PAHs), arsenic, lead, polychlorinated biphenyls (PCBs), and various volatile organic compounds (VOCs). These compounds are the compounds of concern (COCs) identified at the Site.

Scheduled work will consist of the following activities:

- Soil containing concentrations of COCs above their respective Preliminary Cleanup Goals (PCG) will be removed from the Site. LFR anticipates that soil will be excavated to a maximum depth of approximately 18 feet below ground surface (bgs). The actual depth of the excavation and volume of soil requiring disposal will be based on analytical results of confirmation soil samples, LFR's discussion with DTSC during removal action and field conditions.

- Confirmation soil samples will be collected from the base and sidewalls of the excavation using hand-sampling equipment or hand-pressure if the excavation is less than 4 feet in depth. In the event the excavation exceeds 4 feet in depth, the samples will be taken from the bucket of the backhoe.

Work is anticipated to begin in 2006 and is expected to last up to 45 working days.

4.0 KEY PROJECT PERSONNEL AND RESPONSIBILITIES

Project Director	Alan Gibbs
Project Manager	Lita Freeman
Site Safety Officer (SSO)	To Be Determined
Corporate Director, Health and Safety	David McElwain

The responsibilities of key project personnel are outlined below.

4.1 Project Director

The Project Director has the ultimate responsibility for overall coordination of work related to the project, adherence to project schedule and Quality Assurance/Quality Control (QA/QC).

- ensuring that project personnel review and understand the requirements of this HSP

4.2 Project Manager

The Project Manager has the ultimate responsibility for the health and safety of LFR personnel at the Site. The Project Manager is responsible for:

- ensuring that project personnel review and understand the requirements of this HSP
- keeping the Director of Health and Safety informed of project developments
- keeping on-site personnel, including subcontractors, informed of the expected hazards and appropriate protective measures at the Site
- providing resources necessary for maintaining a safe and healthy work environment for LFR personnel

4.3 Director of Health and Safety

The Director of Health and Safety is responsible for the review, interpretation, and modification of this HSP. Modifications to this HSP that may result in less stringent precautions cannot be undertaken by the Project Manager or SSO without the approval of the Director of Health and Safety. In addition, he has the following responsibilities:

- advising the Project Manager and SSO on matters relating to health and safety on this project
- recommending appropriate safeguards and procedures
- modifying this HSP, when necessary
- approving changes in health and safety procedures employed at the Site

4.4 Site Safety Officer

The SSO is responsible for enforcing the requirements of this HSP once site work begins. The SSO has the authority to immediately correct situations where noncompliance with this HSP is noted and to immediately stop work in cases where an immediate danger to site workers or the environment is perceived. Responsibilities of the SSO also include:

- obtaining and distributing PPE and air monitoring equipment necessary for this project
- limiting access at the Site to authorized personnel
- communicating unusual or unforeseen conditions at the Site to the Project Manager
- supervising and monitoring the safety performance of site personnel to evaluate the effectiveness of health and safety procedures and correct deficiencies
- conducting daily tailgate safety meetings before each day's activities begin
- conducting a site safety inspection prior to the commencement of each day's field activities

4.5 Subcontractor Personnel

Subcontractor personnel are expected to comply with the minimum requirements specified in this HSP. Failure to do so may result in the removal of the subcontractor or any of the subcontractor's workers from the job site. Subcontractors may employ health and safety procedures that afford them a greater measure of personal protection than those specified in this plan so long as they do not pose additional hazards to themselves, the environment, or others working in the area.

5.0 HAZARDS OF KNOWN OR EXPECTED CHEMICALS OF CONCERN

Several previous site investigations have been conducted at the Site including a Preliminary Environmental Assessment and two Supplemental Site Investigations (SSIs). Compounds identified at the Site are noted in the following table.

Known Compounds	Source	Known Concentration Range	
		Lowest	Highest
Gasoline	Soil/ Groundwater	ND	4,900 mg/kg in soil 221 mg/l in groundwater
Diesel	Soil	ND	1,200 mg/kg in soil 7.2 mg/l in groundwater
Motor Oil	Soil	ND	22,524 mg/kg in soil 2.6 mg/l in groundwater
Benzene	Soil/ Groundwater	ND	36,000 μg/kg in soil 10,755 μg/l in groundwater
Toluene	Soil/ Groundwater	ND	170,000 μg/kg in soil 24,000 μg/l in groundwater
Ethylbenzene	Soil/ Groundwater	ND	110,000 μg/kg in soil 3,429 μg/l in groundwater
Total Xylenes	Soil/ Groundwater	ND	400,000 μg/kg in soil 15,529 μg/l in groundwater
MTBE	Groundwater	ND	32,000 μg/kg in soil 120,000 μg/l in groundwater
PCBs	Soil/ Groundwater	ND	69.7 mg/kg in soil 22,000 μg/l in groundwater
SVOCs/PAHs	Soil	ND	Benzo(a)anthracene in soil at 32.8 mg/kg Benzo(a)pyrene in soil at 66.9 mg/kg Benzo(k)fluoranthene in soil at 63.5 mg/kg
Arsenic	Soil	ND	140 mg/kg in soil
Lead	Soil	ND	398 mg/kg in soil

Exposure pathways of concern for chemical compounds that may be present at the Site are inhalation of airborne contaminants, direct skin contact with contaminated materials, and incidental ingestion of affected media. Wearing protective equipment and following decontamination procedures listed in Section 9 can minimize dermal contact and incidental ingestion. To minimize inhalation hazards, dust or vapor control measures will be implemented, where necessary, and action levels will be observed during scheduled activities. Site-specific action levels are presented in Section 10. Chemical descriptions of compounds of concern (COCs), including health effects and exposure limits, are located in Appendix A.

On-site worker exposure to airborne contaminants will be monitored during intrusive site activities. A calibrated photoionization detector (PID) with a lamp strength of 10.6 eV or flame ionization detector (FID) will be used to monitor changes in exposure to VOCs. Personnel will perform routine monitoring during site operations to evaluate concentrations of VOCs in employee breathing zones. If VOCs are detected above predetermined action levels specified in Section 10, the procedures found in Section 7 of this HSP will be followed.

In accordance with the Hazard Communication standard, material safety data sheets (MSDSs) will be maintained on site for chemical products used by LFR personnel at the Site. In addition, containers will be clearly labeled in English to indicate their contents and appropriate hazard warnings.

6.0 PHYSICAL HAZARDS

The following potential physical hazards may be encountered during scheduled activities at the Site:

- slips, trips, and falls
- heavy equipment
- heat stress
- cold stress
- noise
- electrical sources
- excavations
- underground and overhead utilities
- materials and equipment handling
- biological hazards
- fire/explosion
- lightning/electrical storms
- traffic

6.1 General Safe Work Practices

- Workers will thoroughly clean their hands, faces, and other potentially contaminated areas before smoking, eating, or leaving the Site.
- Respiratory devices may not be worn with beards or long sideburns, or under other conditions that prevent a proper seal.
- Accidents and/or injuries associated with work at the Site will be immediately reported to the SSO. If necessary, an incident report will be initiated by the SSO.

- Periodic safety briefings will be held to discuss current site conditions, field tasks being performed, planned modifications, and work concerns.
- Site conditions may include uneven, unstable, or slippery work surfaces. Substantial care and personal observation is required on the part of each employee to prevent injuries from slips, trips, and falls.
- Workers will maintain good housekeeping practices during field activities to maintain a safe working environment. The work site will be kept free of debris, waste, and trash.
- The "buddy system" will be used whenever appropriate.
- To prevent head injury, ANSI-approved hard hats will be worn at all times while the worker is in an area where overhead obstructions or falling objects may be encountered.
- To prevent eye injuries, workers must wear ANSI-approved safety glasses during field activities.

6.2 Heavy Equipment

Equipment, including earth-moving equipment, drill rigs, or other heavy machinery, will be operated in compliance with the manufacturer's instructions, specifications, and limitations, as well as any applicable regulations. The operator is responsible for inspecting the equipment daily to verify that it is functioning properly and safely.

Operation of equipment at the Site for the activities outlined in Section 3 poses potential physical hazards. The following precautions should be observed whenever heavy equipment is in use:

- PPE, including steel-toed boots, safety glasses, and hard hats, must be worn.
- Personnel must be aware of the location and operation of heavy equipment and take precautions to avoid getting in the way of its operation. Workers must never assume that the equipment operator sees them; eye contact and hand signals should be used to inform the operator of intent.
- Traffic safety vests are required for personnel working near mobile heavy equipment or near high traffic areas.
- Personnel should not walk directly in back of, or to the side of, heavy equipment without the operator's knowledge.
- Nonessential personnel will be kept out of the work area.

6.3 Heat Stress

Adverse climate conditions, primarily heat, are important considerations in planning and conducting site operations. Heat-related illnesses range from heat fatigue to heat stroke, with heat stroke being the most serious condition. The effects of ambient temperature can cause physical discomfort, loss of efficiency, and personal injury, and can increase the probability of accidents. In particular, protective clothing that decreases the body's ventilation can be an important factor leading to heat-related illnesses.

To reduce the possibility of heat-related illness, workers should drink plenty of fluids and establish a work schedule that will provide sufficient rest periods for cooling down. Personnel shall maintain an adequate supply of non-caffeinated drinking fluids on site for personal hydration. Workers should be aware of signs and symptoms of heat-related illnesses, as well as first aid for these conditions. These are summarized in the table below.

Condition	Signs	Symptoms	Response
Heat Rash or Prickly Heat	Red rash on skin.	Intense itching and inflammation.	Increase fluid intake and observe affected worker.
Heat Cramps	Heavy sweating, lack of muscle coordination.	Muscle spasms, and pain in hands, feet, or abdomen.	Increase fluid uptake and rest periods. Closely observe affected worker for more serious symptoms.
Heat Exhaustion	Heavy sweating; pale, cool, moist skin; lack of coordination; fainting.	Weakness, headache, dizziness, nausea.	Remove worker to a cool, shady area. Administer fluids and allow worker to rest until fully recovered. Increase rest periods and closely observe worker for additional signs of heat exhaustion. If symptoms of heat exhaustion recur, treat as above and release worker from the day's activities after he/she has fully recovered.

Condition	Signs	Symptoms	Response
Heat Stroke	Red, hot, dry skin; disorientation; unconsciousness	Lack of or reduced perspiration; nausea; dizziness and confusion; strong, rapid pulse.	Immediately contact emergency medical services by dialing 911. Remove the victim to a cool, shady location and observe for signs of shock. Attempt to comfort and cool the victim by administering small amounts of cool water (if conscious), loosening clothing, and placing cool compresses at locations where major arteries occur close to the body's surface (neck, underarms, and groin areas). Carefully follow instructions given by emergency medical services until help arrives.

6.4 Cold Stress

Workers performing activities during winter and spring months may encounter extremely cold temperatures, as well as conditions of snow and ice, making activities in the field difficult. Adequate cold weather gear, especially head and foot wear, is required under these conditions. Workers should be aware of signs and symptoms of hypothermia and frostbite, as well as first aid for these conditions. These are summarized in the table below.

Condition	Signs	Symptoms	Response
Hypothermia	Confusion, slurred speech, slow movement.	Sleepiness, confusion, warm feeling.	Remove subject to warm area, such as truck cab; give warm fluids; warm body core as rapidly as possible; remove outer clothing and wrap torso in blankets with hot water bottle or other heat source. Get medical attention immediately.
Frostbite	Reddish area on skin, frozen skin.	Numbness or lack of feeling on exposed skin.	Place affected extremity in warm, not hot, water, or wrap in warm towels. Get medical attention.

6.5 Noise

Noise may result primarily from the operation of drill rigs and mechanical equipment. The use of heavy equipment may generate noise above the Cal/OSHA permissible exposure limit for noise of 90 dBA for an 8-hour time-weighted average. Workers will wear appropriate hearing protection when operating or working near heavy equipment. If loud noise is present or normal conversation becomes difficult, hearing protection in the form of ear plugs, or equivalent, will be required.

6.6 Electric Shock

Electrical equipment to be used during field activities will be suitably grounded and insulated. Ground fault circuit interrupters (GFCI), or equivalent, will be used with electrical equipment to reduce the potential for electrical shock.

Lockout/tagout procedures in accordance with 8 CCR 3314 will be conducted before activities begin on or near energized or mechanical equipment that may pose a hazard to site personnel. Workers conducting the operation will positively isolate the piece of equipment, lock/tag the energy source, and verify effectiveness of the isolation. Only employees who perform the lockout/tagout procedure may remove their own tags/locks. Employees will be thoroughly trained before initiating this procedure.

6.7 Excavations

A competent person who is capable of identifying existing and predictable hazards in the surroundings, or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them, will be present during excavation activities.

The atmosphere will be tested in excavations greater than 4 feet in depth where oxygen deficiency or toxic or flammable gases are likely to be present before employees are permitted to enter and begin work. The atmosphere should be ventilated and re-tested until flammable gas concentrations less than 10 percent of the lower explosive limit (LEL) are obtained. Worker entry will not be allowed if the oxygen concentration is less than 19.5 percent. LFR will control dust and volatile levels at the excavations by use of a water spray/mist and engineering controls (ventilation equipment, etc.) so that OSHA limits are met.

Workers will not enter excavations greater than 5 feet in depth without appropriate protective systems such as benching, sloping, or shoring. Side slopes will not be steeper than 1½:1 without a written report from a qualified civil or geotechnical engineer. Excavations will be constructed in accordance with the Cal/OSHA Excavation Safety Standard, 8 CCR 1541.

The competent person will inspect excavations daily. If there is evidence that a cave-in or slide is possible, work will cease until the necessary safeguards have been taken.

Excavated material will be placed far enough from the edge of the excavation (a minimum of 2 feet) so that it does not fall back into the opening. At the end of each day's activities, open excavations will be clearly marked and secured to prevent nearby workers or unauthorized personnel from entering them. Remote sampling techniques will be the preferred method of sample collection in excavations.

6.8 Underground and Overhead Utilities

The locations of underground utilities (e.g., pipes, electrical conductors, fuel lines, and water and sewer lines) must be determined before soil intrusive work is performed. The state underground utility notification authority (e.g., USA, Dig Alert, or Blue Stake) will be contacted prior to the start of intrusive field activities in accordance with local notification requirements. In addition, a private utility locator will be used to clear areas where drilling or excavation will occur.

Equipment with articulated upright booms or masts shall not be permitted to pass within 20 feet of an overhead utility line (less than 50 kV) while the boom is in the upright position. For transmission lines in excess of 50 kV, an additional distance of 4 inches for each 10 kV over 50 kV will be used.

6.9 Materials and Equipment Handling Procedures

The movement and handling of equipment and materials on the Site pose a risk to workers in the form of muscle strains and minor injuries. These injuries can be avoided by using safe handling practices, proper lifting techniques, and proper personal safety equipment such as steel-toed boots and sturdy work gloves. Where practical, mechanical devices will be utilized to assist in the movement of equipment and materials. Workers will not attempt to move heavy objects by themselves without using appropriate mechanical aids such as drum dollies or hydraulic lift gates.

6.10 Biological Hazards

Biological hazards that may be encountered at the Site include possible exposure to:

- **Fur-bearing animals**. Animals may potentially carry the rabies virus or ticks that may transmit Lyme disease to humans. Avoid contact. Do not attempt to feed or touch.
- **Poisonous reptiles**. Primarily snakes (rattlesnake, water moccasin, copperhead). Avoid contact and areas that may harbor snake populations including high grass, shrubs, and crevices.
- **Poisonous insects**. Common examples include bees and wasps. Avoid contact with insects and their hives.
- **Spiders**. The black widow and brown recluse spiders are the most venomous. Avoid contact with spiders and areas where they may hide.

- **Poisonous plants**. Common examples include poison ivy and poison oak. Avoid contact. Long-sleeved shirts and pants will allow some protection against inadvertent contact.

If any biological hazards are identified at the Site, workers in the area will immediately notify the SSO and other site personnel.

6.11 Fire/Explosion

Site workers should have an increased awareness concerning fire and explosion hazards whenever working with or near flammable materials, especially when performing any activity that may generate sparks, flame, or other source of ignition. Intrinsically safe equipment is required when working in or near environments with the potential for an explosive atmosphere. The SSO will verify facility requirements for a “hot work” permit before activities that may serve as a source of ignition are conducted.

Flammable materials will be kept away from sources of ignition. In the event of fire, work will cease, the area will be evacuated, and the local fire response team will be notified immediately. Only trained, experienced fire fighters should attempt to extinguish substantial fires at the Site. Site personnel should not attempt to fight fires, unless properly trained and equipped to do so. A fully charged ABC dry chemical fire extinguisher will be readily available for use during all scheduled activities at the Site.

6.12 Lightning/Electrical Storms

Lightning can be unpredictable and may strike many miles in front of, or behind, a thunderstorm. Workers will therefore cease field operations at the **first** sign of a thunderstorm and suspend activities until at least 30 minutes after the last observed occurrence of lightning or thunder. For purposes of this HSP, signs of a thunderstorm will include any visible lightning or audible thunder.

In the event of a thunderstorm, workers will take the following actions:

- Get inside a permanent building structure (not a shed or canopy) or fully enclosed metal vehicle (not a convertible or camper shell) with the windows fully up.
- Stay away from tall isolated objects, such as trees, drill rigs, telephone poles, or flag poles.
- Avoid large open areas, such as fields or parking lots, where a person is the relatively highest object.
- Stay away from lakes, ponds, railroad tracks, fences, and other objects that could transmit current from a distant lightning strike.

6.13 Traffic

Vehicular traffic presents opportunities for serious injury to persons or property. Traffic may consist of street traffic or motor vehicles operated by facility employees or visitors to the Site. Workers and other pedestrians are clearly at risk during periods of heavy traffic. Risk from motor vehicle operations may be minimized by good operating practices and alertness, and care on the part of workers and pedestrians.

Site personnel will wear high-visibility safety vests whenever activities are conducted in areas of heavy traffic. Work vehicles will be arranged to be used as a barrier between site workers and nearby traffic. If required by local ordinances or site location, a traffic control plan will be developed implemented.

7.0 PERSONAL PROTECTIVE EQUIPMENT

The purpose of PPE is to protect employees from hazards and potential hazards they are likely to encounter during site activities. The amount and type of PPE used will be based on the nature of the hazard encountered of anticipated. Respiratory protection will be utilized when an airborne hazard has been identified using real-time air monitoring devices, or as a precautionary measure in areas designated by the Director of Health and Safety or SSO.

Dermal protection, primarily in the form of chemical-resistant gloves and coveralls, will be worn whenever contact with chemically affected materials (e.g., soil, groundwater, sludge) is anticipated, without regard to the level of respiratory protection required.

LFR personnel will be provided with appropriate personal safety equipment and protective clothing. The SSO is to inform each worker about necessary protection and must provide proper training in the use of the safety equipment. The required PPE to be worn is described below.

7.1 Conditions Requiring Level D Protection

In general, site activities will commence in Level D PPE unless otherwise specified, or if the SSO determines on site that a higher level of PPE is required. Air monitoring of employee breathing zones will be routinely conducted using real-time air monitoring devices to determine if upgrading to Level C PPE is necessary. Level D PPE will be permitted as long as air monitoring data indicate that airborne concentrations of chemicals of concern are maintained below the site-specific action levels defined in Section 10.

It is important to note that dermal protection is required whenever contact with chemically affected soils or groundwater is anticipated. The following equipment is specified as the minimum PPE required to conduct activities at the Site:

- work shirt and long pants
- ANSI-approved steel-toed boots or safety shoes
- ANSI-approved safety glasses
- ANSI-approved hard hat

Other personal protection readily available for use, if necessary, includes the following:

- outer nitrile gloves and inner nitrile surgical gloves when direct contact with chemically affected soils or groundwater is anticipated (nitrile surgical gloves may be used for collecting or classifying samples as long as they are removed and disposed of immediately after each sampling event)
- chemical-resistant clothing (e.g., Tyvek or polycoated Tyvek coveralls) when contact with chemically affected soils or groundwater is anticipated
- safety shoes/boots with protective overboots or knee-high PVC polyblend boots when direct contact with chemically affected soils is anticipated
- hearing protection
- sturdy work gloves

7.2 Conditions Requiring Level C Protection

If air monitoring indicates that the site-specific action levels defined in Section 10 are exceeded, workers in the affected area(s) will upgrade PPE to Level C. In addition to the protective equipment specified for Level D, Level C also includes the following:

- NIOSH-approved half- or full-face air-purifying respirator (APR) equipped with filter cartridges as specified in Section 10.0. Note: safety glasses are not required when wearing a full-face APR.
- chemical-resistant clothing (e.g., Tyvek, polycoated Tyvek, or Saranex coveralls) when contact with chemically affected soils or groundwater is anticipated
- outer nitrile gloves and inner nitrile surgical gloves when direct contact with chemically affected soils or groundwater is anticipated (nitrile surgical gloves may be used for collecting or classifying samples as long as they are removed and disposed of immediately after each sampling event)
- safety shoes/boots with protective overboots or knee-high PVC polyblend boots when direct contact with chemically affected soils is anticipated

Respirators will be stored in clean containers (i.e., self-sealing bag) when not in use. Respirator cartridges will be replaced in accordance with the following change-out schedule.

Type of Cartridge	Cartridge Change-out Schedule
Particulate (i.e., HEPA)	At least weekly or whenever the employee detects an increase in breathing resistance. This will occur as the filter becomes loaded with particulate matter.
Sorbent (i.e., organic vapor)	At the end of each day's use or whenever the employee detects an abnormal odor or other indicator.

Personnel who wear air-purifying respirators will be trained in their use and must have successfully passed a qualitative respiratory fit test in accordance with and 8 CCR 5144 within the last 12 months.

7.3 Conditions Requiring Stoppage of Work

If air monitoring indicates that the site-specific action levels defined in Section 10 are exceeded, activities must cease, and personnel must evacuate the Exclusion Zone (see Section 9). The Project Manager and Director of Health and Safety will be contacted immediately.

8.0 SAFETY PROCEDURES AND SITE REQUIREMENTS

Real-time air monitoring devices will be used to analyze airborne contaminant concentrations every 30 minutes in the workers' breathing zones while workers are in the designated Exclusion Zone. If elevated concentrations are indicated, the monitoring frequency will be increased, as appropriate. The equipment will be calibrated daily, and the results will be recorded on LFR's Air Monitoring form or project log book. The results of air monitoring will be recorded on an LFR Air Monitoring Form or project log book and will be retained in the project files following completion of field activities. A copy of the Air Monitoring Form is located in Appendix B.

A daily morning briefing to cover safety procedures and contingency plans in the event of an emergency is to be included with a discussion of the day's activities. These daily meetings will be recorded on LFR Daily Tailgate Safety Meeting Forms. A debriefing to cover the activities is to be held upon completion of the work. A copy of the Daily Tailgate Safety Meeting Form is included in Appendix B.

The SSO will conduct a safety inspection of the work site before each day's activities begin to verify compliance with the requirements of the HSP. Results of the first day's inspection will be documented on an LFR Site Safety Checklist. A copy of the checklist is included in Appendix B.

Minimum emergency equipment maintained on site will include a fully charged 20-pound ABC dry chemical fire extinguisher, an adequately stocked first aid kit, and an emergency eyewash station (when corrosive chemicals are present).

8.1 Training Requirements

Site personnel, including subcontractors and visitors conducting work in controlled areas of the Site, must have completed the appropriate training as required by 8 CCR 5192. Further site-specific training will be conducted by the SSO prior to the initiation of project activities. This training will include, but will not necessarily be limited to, emergency procedures, site control, personnel responsibilities, and the provisions of this HSP.

General site workers (such as equipment operators, general laborers, and supervisory personnel) engaged in hazardous substance removal or other activities that could expose them to hazardous substances must have successfully completed an initial 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training course. In addition, each employee must have attended an eight-hour annual HAZWOPER refresher training course within the past 12 months if their initial 40-hour HAZWOPER training course was completed more than 12 months prior.

8.2 Medical Surveillance Requirements

Site personnel, including subcontractors and site visitors, who will or may work in an area designated as an exclusion zone must have fulfilled the appropriate medical monitoring requirements in accordance with 8 CCR 5192(f). Each individual entering an exclusion zone must have completed an annual surveillance examination and/or an initial baseline examination within the last 12 months.

9.0 SITE CONTROL MEASURES

Procedures must be followed to maintain site control so that persons who may be unaware of site conditions are not exposed to hazards. The work area will be barricaded by tape, warning signs, or other appropriate means. Pertinent equipment or machinery will be secured and stored safely.

Access inside the specified work area will be limited to authorized personnel. Only LFR employees and designated LFR subcontracted personnel, as well as designated employees of the client, will be admitted to the work site. Personnel entering the work area are required to sign the signature page of this HSP, indicating they have read and accepted the health and safety practices outlined in this plan.

9.1 Establishing Work Zones

In some instances it may be necessary to define established work zones: an Exclusion Zone, a Contamination Reduction Zone, and a Support Zone. Work zones may be established based on the extent of anticipated contamination, projected work activities, and the presence or absence of non-project personnel. The physical dimensions and applicability of work zones will be determined for each area based on the nature of job activity and hazards present. Within these zones, prescribed operations will occur using appropriate PPE. Movement between zones will be controlled at checkpoints.

Considerable judgment is needed to maintain a safe working area for each zone, balanced against practical work considerations. Physical and topographical barriers may constrain ideal locations. Field measurements combined with climatic conditions may, in part, determine the control zone distances. Even when work is performed in an area that does not require the use of chemical-resistant clothing, work zone procedures may still be necessary to limit the movement of personnel and retain adequate site control.

Personnel entering the designated Exclusion Zone should exit at the same location. There must be an alternate exit established for emergency situations. In all instances, worker safety will take precedence over decontamination procedures. If decontamination of personnel is necessary, exiting the Site will include the decontamination procedures described below.

9.2 Decontamination Procedures

Despite protective procedures, personnel may come in contact with potentially hazardous compounds while performing work tasks. If so, decontamination needs to take place using an Alconox or TSP wash, followed by a rinse with clean water. Standard decontamination procedures for levels C and D are as follows:

- equipment drop
- boot cover and outer glove wash and rinse
- boot cover and outer glove removal
- suit wash and rinse
- suit removal
- safety boot wash and rinse
- inner glove wash and rinse
- respirator removal
- inner glove removal
- field wash of hands and face

Workers should employ only applicable steps in accordance with level of PPE worn and extent of contamination present. The SSO shall maintain adequate quantities of clean water to be used for personal decontamination (i.e., field wash of hands and face) whenever a suitable washing facility is not located in the immediate vicinity of the work area. Disposable items will be disposed of in an appropriate container. Wash and rinse water generated from decontamination activities will be handled and disposed of properly. Non-disposable items may need to be sanitized before reuse. Each site worker is responsible for the maintenance, decontamination, and sanitizing of his/her own PPE.

Used equipment may be decontaminated as follows:

- An Alconox or TSP and water solution will be used to wash the equipment.
- The equipment will then be rinsed with clean water.

Each person must follow these procedures to reduce the potential for transferring chemically affected materials off site.

10.0 ACTION LEVELS

The following action levels were developed for exposure monitoring with real-time air monitoring instruments as specified in Section 5. Air monitoring data will determine the required respiratory protection levels at the Site during scheduled intrusive activities. The action levels are based on sustained readings indicated by the instrument(s). Air monitoring will be performed and recorded at up to 30-minute intervals.

If elevated concentrations are indicated, the monitoring frequency will be increased, as appropriate. If during this time, sustained measurements are observed, the following actions will be instituted, and the Project Manager and Director of Health and Safety will be notified. For purposes of this HSP, sustained readings are defined as the average airborne concentration maintained for a period of one (1) minute.

Activity	Action Level	Level of Respiratory Protection
Excavation of Impacted Soil	$<$ 5 ppm above background (VOCs) [1] $<$ 0.5 mg/m^3 above background (dust)	Level D: No respiratory protection required.
	5 to 25 ppm (VOCs) 0.5 to 2.5 mg/m^3 (dust)	Level C: Half-or full-face air-purifying respirator fitted with organic vapor/HEPA filter cartridges.
	$>$ 25 ppm (VOCs) $>$ 2.5 mg/m^3 (dust)	Cease operations and evacuate work area. Contact Director of Health and Safety and Project Manager immediately.

Notes:
1. LFR will perform specific monitoring for benzene using detector tubes in order to document that site workers have not been exposed above the PEL for benzene.

If dust in excess of background levels (greater than 0.25 mg/m^3 above background levels) is observed for a sustained period of time (greater than 5 minutes), appropriate dust suppression measures (e.g., spraying soil with water) will be undertaken. A total dust reading of 1.36 mg/m^3 would result in an exceedance of the Acute Reference Exposure Level of 0.00019 mg/m^3 established for arsenic by the California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA). A total dust action level of 0.25 mg/m^3 above background levels would be conservative for the various COCs detected on the Site that would be likely to adhere to windblown dust and protective of the on-site workers and members of the surrounding community. Calculations for airborne arsenic and lead concentrations are presented in Appendix C.

11.0 CONTINGENCY PROCEDURES

In the event of an emergency, site personnel will signal distress with three blasts of a horn (a vehicle horn will be sufficient), or other predetermined signal. Communication signals, such as hand signals, must be established where communication equipment is not feasible or in areas of loud noise.

It is the SSO's duty to evaluate the seriousness of the situation and to notify appropriate authorities. Section 12 of this plan contains emergency telephone numbers as well as directions to the hospital. Nearby telephone access must be identified and available to communicate with local authorities. If a nearby telephone is not available, a cellular telephone will be maintained on site during work activities.

Personnel should dial 911 in the event of an emergency.

11.1 Injury/Illness

If an exposure or injury occurs, work will be temporarily halted until an assessment can be made of whether it is safe to continue work. The SSO, in consultation with the Director of Health and Safety, will make the decision regarding the safety of continuing work. The SSO will conduct an investigation to determine the cause of the incident and steps to be taken to prevent recurrence.

In the event of an injury, the extent and nature of the victim's injuries will be assessed and first aid will be rendered as appropriate. If necessary, the individual may be transported to the nearby medical center. The mode of transportation and the eventual destination will be based on the nature and extent of the injury. A hospital route map is presented in Appendix D.

In the event of a life-threatening emergency, the injured person will be given immediate first aid and emergency medical services will be contacted by dialing 911. The individual rendering first aid will follow directions given by emergency medical personnel via telephone. A person trained in first aid/CPR techniques will be present during field activities.

11.2 Fire

In the event of fire, personnel should contact the local fire department immediately by dialing 911. When representatives of the fire department arrive, the SSO, or designated representative, will advise the commanding officer of the location, nature, and identification of hazardous materials on site. Only trained, experienced fire fighters should attempt to extinguish substantial fires at the Site. Site personnel should not attempt to fight fires, unless properly trained and equipped to do so.

Smoking is not permitted in controlled areas (i.e., exclusion or contamination reduction zones), near flammable or combustible materials, or in areas designated by the facility as non-smoking areas.

11.3 Underground Utilities

In the event that an underground conduit is damaged during excavation or drilling, mechanized equipment will immediately be shut off until the nature of the piping can be determined. Depending on the nature of the broken conduit (e.g., natural gas, water, or electricity), the appropriate local utility will be contacted.

11.4 Evacuation

The SSO will designate evacuation routes and refuge areas to be used in the event of an emergency. Site personnel will stay upwind from vapors or smoke and upgradient from spills. If workers are in an Exclusion or Contamination Reduction Zone at the start of an emergency, they should exit through the established decontamination areas whenever possible. If evacuation cannot be done through an established decontamination area, site personnel will go to the nearest safe location and remove contaminated clothing there or, if possible, leave it near the Exclusion Zone. Personnel will assemble at the predetermined refuge following evacuation and decontamination. The SSO, or designated representative, will count and identify site personnel to verify that all have been evacuated safely.

11.5 Hazardous Material Spill

If a hazardous material spill occurs, site personnel should locate the source of the spill and determine the hazard to the health and safety of site workers and the public. Attempt to stop or reduce the flow if it can be done without risk to personnel. Isolate the spill area and do not allow entry by unauthorized personnel. De-energize sources of ignition within 100 feet of the spill, including vehicle engines. Should a spill be of the nature or extent that it cannot be safely contained, or poses an imminent threat to human health or the environment, an emergency cleanup contractor will be called out as soon as possible. Spill containment measures listed below are examples of responses to spills.

- Right or rotate containers to stop the flow of liquids. This step may be accomplished as soon as the spill or leak occurs, providing it is safe to do so.
- Sorbent pads, booms, or adjacent soil may be used to dike or berm materials, subject to flow, and to solidify liquids.
- Sorbent pads, soil, or booms, if used, shall be placed in appropriate containers after use, pending disposal.
- Contaminated tools and equipment shall be collected for subsequent cleaning or disposal.

12.0 EMERGENCY CONTACTS

Emergency Services (Police/Fire Department/Ambulance):	911
National Response Center:	(800) 424-8802
Poison Control Center:	(800) 876-4766 or (800) 222-1222
TOXLINE:	(301) 496-1131
CHEMTREC:	(800) 424-9300
LFR Corporate Director, Health and Safety (David McElwain, CSP):	(714) 444-0111
LFR Corporate Administration (Lori Clark; Emeryville, CA):	(510) 596-9604
LFR Granite Bay office:	(916) 786-0320
LFR Project Director (Alan Gibbs):	Office: (916) 786-8129 Cell: (916) 240-2293
LFR Project Manager (Lita Freeman):	Office: (916) 786-2456 Cell: (510) 918-5960
Client Contact (Charles Robitaille):	(510) 251-1660
Nearby Hospital:	(510) 522-3700

ALAMEDA HOSPITAL
2070 Clinton Ave
Alameda, CA

Directions to Hospital:

- Start at 1009 66th Avenue going toward Olmstead Avenue
- Take the ramp onto I-880 North toward Downtown Oakland
- Take the 23rd Avenue Exit, 29th Avenue onto Park Street
- Turn Right on Clinton Avenue
- Arrive at 2070 Clinton Avenue (Alameda Hospital)

A hospital route map is presented in Appendix D.

13.0 LFR APPROVALS

This HSP has been prepared for the following project:

Soil Removal Action Work Plan at
Proposed Aspire Charter High School
1009 66th Avenue
Oakland, Alameda County, California

LFR Project Number: 003-09155-00

This HSP has been reviewed and approved by the following LFR personnel:

[signature] 8/17/06

Site Safety Officer — Date

Lita D. Freeman [signature] 8/17/06

Lita Freeman — Date
Project Manager

[signature] 8/17/06

David McElwain — Date
Corporate Director, Health and Safety

SIGNATURE PAGE

The following signatures indicate that this Health and Safety Plan has been read and accepted by LFR personnel as well as subcontractors and their personnel.

NAME	COMPANY	SIGNATURE	DATE

Important notice to subcontractor(s):

This Health and Safety Plan has been prepared solely for the use of LFR personnel. It is supplied to you for informational purposes only and may not be relied upon for protection of your employees. The Subcontractor is responsible for providing, at its cost, all personal protective clothing and equipment required for its employees to perform their work in a safe manner and in compliance with all applicable state and federal OSHA regulations. Subcontractor is responsible for ensuring that such equipment is in good condition and is properly inspected and maintained. Subcontractor must, at a minimum, use the equipment and follow the procedures described in this HSP. Failure to do so may result in immediate termination of Subcontractor's services. This does not relieve Subcontractor of the responsibility to provide equipment and institute procedures affording a greater degree of protection than those specified in this HSP should Subcontractor determine such measures are necessary to protect the health and welfare of its employees, second-tier subcontractors, or others under its control or direction.

APPENDIX A

CHEMICAL DESCRIPTIONS

CHEMICAL DESCRIPTIONS

The following chemical descriptions are presented for chemicals that may be present at the Site. Each chemical description includes physical and odor recognition characteristics, health effects associated with exposure, and exposure limits expressed as an eight-hour time weighted average (TWA). Provided are federal OSHA ("OSHA") permissible exposure limits (PELs; located in 29 CFR 1910.1000); California OSHA ("Cal/OSHA") PELs (located in 8 CCR 5155); and American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs).

ARSENIC

Metallic arsenic is most commonly a gray, brittle, crystalline solid. It can also be in a black or yellow amorphous form. Arsenic is also commonly found in its volatile white trioxide form. Arsenic is used in several insecticides, herbicides, defoliants, desiccants, and rodenticides and appears in a variety of forms. It is also used in tanning, pigment production, glass manufacturing, wood preservation, and anti-fouling coatings. Arsenic is classified as a known carcinogen.

Short-term exposure to arsenic can cause marked irritation of the stomach and intestines with nausea, vomiting, and diarrhea. In severe cases the vomiting and stools are bloody and the exposed individual goes into collapse and shock with weak, rapid pulse, cold sweats, coma, and death. Inorganic arsenicals are more toxic than organic arsenicals, and the trivalent form is more toxic than the pentavalent form. Acute arsenic poisoning usually results from ingestion exposures. Blood cell changes, blood vessel damage, and impaired nerve function can also result from chronic arsenic ingestion. Other effects include skin changes, irritation of the throat, increased risk of cancer of the liver, bladder, kidney, and lung.

- The OSHA PEL is listed as 0.01 mg/m^3 for inorganic forms of arsenic and 0.5 mg/m^3 for organic forms.
- The Cal/OSHA PEL is listed as 0.01 mg/m^3 for inorganic forms of arsenic and 0.2 mg/m^3 for organic forms.
- The TLV is listed as 0.01 mg/m^3 for arsenic and inorganic arsenic compounds.

WARNING: This chemical is known to the State of California to cause cancer.

WARNING: This chemical is known to the State of California to cause birth defects or other reproductive harm.

BENZENE

Benzene is a clear, volatile liquid. It is colorless, highly flammable, and toxic, with a characteristic odor. It is a severe eye and moderate skin irritant. Human effects by inhalation and ingestion include euphoria, changes in sleep and motor activity, nausea and vomiting, other blood effects, dermatitis, and fever. In industry, inhalation is the primary route of chronic benzene poisoning. If the liquid is aspirated into the lung it may cause pulmonary edema. Poisoning by skin contact has also been reported. Exposure to high concentrations (3,000 ppm) may result in acute poisoning, which is characterized by the narcotic action of benzene on the central nervous system. Chronic poisoning occurs most commonly through inhalation and dermal absorption. Benzene is a known human carcinogen that can cause leukemia.

- The OSHA PEL is listed as 1 ppm.
- The Cal/OSHA PEL is listed as 1 ppm.
- The TLV is listed as 0.5 ppm.

Note: Published exposure limits designate a skin notation indicating that dermal contact can contribute to the overall exposure.

WARNING: This chemical is known to the State of California to cause cancer.

WARNING: This chemical is known to the State of California to cause birth defects or other reproductive harm.

DIESEL FUEL

Diesel fuel is a gas oil fraction available in various grades as required by different engines. Composition of diesel varies in ratios of predominantly aliphatic, olefinic, cycloparaffinic, aromatic hydrocarbons, and additives.

It is a severe skin irritant and ingestion of diesel can lead to systemic effects such as gastrointestinal irritation, vomiting, diarrhea, and, in severe cases, drowsiness and central nervous system depression, progressing to coma and death. Absorption of diesel fuel can cause hemorrhaging and pulmonary edema, progressing to pneumonitis and renal involvement. It is combustible when exposed to heat or flame, and can react with strong oxidizing materials.

- No OSHA PEL or Cal/OSHA PEL is listed for diesel.
- No TLV is currently listed (a value of 100 mg/m^3 is proposed).

Note: Published exposure limits designate a skin notation indicating that dermal contact can contribute to the overall exposure.

WARNING: The exhaust from this chemical is known to the State of California to cause cancer.

ETHYLBENZENE

Ethylbenzene is a clear, colorless liquid. It is mildly toxic by inhalation and skin contact. Inhalation can cause eye, sleep, and pulmonary changes. It is an eye and skin irritant at levels as low as 0.1% (1,000 ppm) of the vapor in air. At higher concentrations, it is extremely irritating at first, then can cause dizziness, irritation of the nose and throat, and a sense of constriction in the chest. Exposure to high concentrations of ethylbenzene vapor may result in irritation of the skin and mucous membranes, dizziness, irritation of the nose and throat, and a sense of constriction of the chest.

- The OSHA PEL is listed as 100 ppm.
- The Cal/OSHA PEL is listed as 100 ppm.
- The TLV is listed as 100 ppm.

GASOLINE

Gasoline is produced from the light distillates during petroleum fractionation. Its major components include paraffins, olefins, naphthenes, aromatics, and recently ethanol. Gasoline also contains various functional additives as required for different uses, such as antiknock fluids, antioxidants, metal deactivators, corrosion inhibitors, anti-icing agents, preignition preventers, upper-cylinder lubricants, dyes, and decolorizers. Lead additives in particular were widely used in gasoline until the introduction of vehicle catalytic converters.

Mild cases of gasoline ingestion can cause inebriation, vomiting, vertigo, drowsiness, confusion, and fever. Aspiration into the lungs and secondary pneumonia may occur unless prevented. Gasoline can cause hyperemia of the conjunctiva and other eye disturbances. Gasoline is a skin irritant and a possible allergen. Repeated or chronic dermal contact can result in drying of the skin, lesions, and other dermatologic conditions.

- No OSHA PEL is listed for gasoline.
- The Cal/OSHA PEL is listed as 300 ppm.
- The TLV is listed as 300 ppm.

WARNING: The exhaust from this chemical is known to the State of California to cause cancer.

LEAD

Lead (inorganic) is a bluish-white, silver or gray odorless solid. Short-term exposure to lead can cause decreased appetite, insomnia, headache, muscle and joint pain, colic, and constipation. Considerable data exist on the effects of lead exposure in humans. It is a poison by ingestion and a suspected human carcinogen of the lungs and kidneys. There are data to suggest that lead is a mutagen and can cause reproductive effects. Human systemic effects by ingestion and inhalation (the two routes of absorption) include loss of appetite, anemia, malaise, insomnia, headache, irritability, muscle and joint pains, tremors, flaccid paralysis without anesthesia, hallucinations and distorted perceptions, muscle weakness, gastritis, and liver changes. Recent experimental evidence suggests that blood levels of lead below 10 μg/dl (micrograms per deciliter) can have the effect of diminishing the IQ scores of children.

- The OSHA PEL is listed as 0.05 mg/m^3.
- The Cal/OSHA PEL is listed as 0.05 mg/m^3.
- The TLV is listed as 0.05 mg/m^3.

WARNING: This chemical is known to the State of California to cause cancer.

WARNING: This chemical is known to the State of California to cause birth defects or other reproductive harm.

METHYL TERT-BUTYL ETHER (MTBE)

MTBE is a clear liquid with a distinct ether-like odor. It is primarily used in the formulation of gasoline as an octane enhancer and oxygenator. Little exposure data are available for MTBE, but it has been reported to cause headaches, nausea, dizziness, and irritation of the nose, throat, and eyes. Current carcinogenicity data indicate that it is a possible weak carcinogen at most.

- No OSHA PEL is listed for MTBE.
- The Cal/OSHA PEL is listed as 40 ppm.
- The TLV is currently listed as 40 ppm (a value of 50 ppm is proposed).

POLYCHLORINATED BIPHENYLS (PCBs)

PCBs are a series of technical mixtures consisting of many isomers and compounds that vary from mobile oil liquids to white crystalline solids and hard non-crystalline resins. Technical products vary in composition, in the degree of chlorination, and possibly according to batch. Generally, they are moderately toxic by ingestion, and some are poisons by other routes. Most are suspect human carcinogens and experimental tumorigens, and exhibit experimental reproductive effects. They have two distinct actions on the body: a skin effect (chloracne) and a toxic action on the liver. The higher the chlorine content, the more toxic the PCBs tend to be.

- The OSHA PEL is listed as 0.5 mg/m^3 for 54% chlorine content (as a PCB) and 1.0 mg/m^3 for 42% chlorine content (as a PCB).
- The Cal/OSHA PEL is listed as 0.5 mg/m^3 for 54% chlorine content (as a PCB) and 1.0 mg/m^3 for 42% chlorine content (as a PCB).
- The TLV is listed as 0.5 mg/m^3 for 54% chlorine content (as a PCB) and 1.0 mg/m^3 for 42% chlorine content (as a PCB).

Note: Published exposure limits designate a skin notation indicating that dermal contact can contribute to the overall exposure.

WARNING: This chemical is known to the State of California to cause cancer.

WARNING: This chemical is known to the State of California to cause birth defects or other reproductive harm.

SEMIVOLATILE ORGANIC COMPOUNDS / POLYCYCLIC AROMATIC HYDROCARBONS

SVOCs/PAHs constitute a class of materials of which benzo[a]pyrene (BaP) is one of the most common and also the most hazardous. In general, SVOCs/PAHs can be formed in any hydrocarbon combustion process. The less efficient the combustion process, the higher the SVOC/PAH emission factor is likely to be. The major sources are stationary sources, such as heat and power generation, refuse burning, industrial activity, such as coke ovens, and coal refuse heaps. SVOCs/PAHs may also be released from oil spills. Because of the large number of sources, people are exposed to very low levels of SVOCs/PAHs every day.

Certain SVOCs/PAHs, such as the more common BaP, have been demonstrated to be carcinogenic at relatively high exposure levels in laboratory animals. BaP is a yellowish crystalline solid that consists of five benzene rings joined together. It is highly soluble in fat tissue and has been shown to produce tumors in the stomachs of laboratory mice. In addition, skin cancers have been induced in a variety of animals at very low levels and unspecified lengths of application.

It is important to recognize the SVOCs'/PAHs' ability to adhere to soil and other particulates. Therefore, good particulate emission controls and the use of air purifying respirators with particulate filters are required for protection against airborne SVOC/PAH hazards.

- The OSHA PEL is listed as 0.2 mg/m^3 (as coal tar pitch volatiles).

- The Cal/OSHA PEL is listed as 0.2 mg/m^3 (as coal tar pitch volatiles).
- The TLV is listed as 0.2 mg/m^3 (as coal tar pitch volatiles).

PETROLEUM HYDROCARBONS

Petroleum distillates (naphtha) are mildly toxic by inhalation. They can cause unconsciousness, dyspnea, and a bluish tint to the skin. Recovery follows after removal from exposure. In mild form, intoxication resembles drunkenness. On a chronic basis, no true poisoning occurs; however, effects may include headache, lack of appetite, dizziness, sleeplessness, indigestion, and nausea. It is combustible when exposed to heat or flame and can react with oxidizing materials.

- The OSHA PEL is listed as 500 ppm (as petroleum distillates).
- The Cal/OSHA PEL is listed as 300 ppm (as VM&P naphtha).
- The TLV is listed as 300 ppm (as VM&P naphtha).

TOLUENE

Toluene is a colorless liquid with a benzol-like odor. Human systemic effects of exposure to toluene include central nervous system changes, hallucinations or distorted perceptions, motor activity changes, psychophysiological changes, and bone marrow changes. It is a severe eye irritant and an experimental teratogen. Inhalation of high vapor concentrations may cause impairment of coordination and reaction time, headaches, nausea, eye irritation, loss of appetite, a bad taste in the mouth, and lassitude.

- The OSHA PEL is listed as 200 ppm.
  - The Cal/OSHA PEL is listed as 50 ppm.
  - The TLV is listed as 50 ppm.

Note: Published exposure limits designate a skin notation indicating that dermal contact can contribute to the overall exposure.

WARNING: This chemical is known to the State of California to cause birth defects or other reproductive harm.

XYLENE

Xylene is a clear, colorless liquid. It exhibits the general chlorinated hydrocarbon central nervous system effects, olfactory (smell) changes, eye irritation and pulmonary changes. It is a severe skin irritant. There are three isomers: ortho, meta, and para.

Exposure to high concentrations of xylene vapor may result in eye and skin irritation. Eye irritation may occur at concentrations of about 200 ppm.

- The OSHA PEL is listed as 100 ppm.
- The Cal/OSHA PEL is listed as 100 ppm.
- The TLV is listed as 100 ppm.

APPENDIX B

LFR Inc. FORMS

AIR MONITORING FORM

Date ______________________ *LFR Project No.* ______________________

Project Name ______________________ *Type of Activities* ______________________

Type of PID/FID ______________________ *Serial No.* ______________________

Initial Calibration Reading ______________ *End-of-Use Calibration Check* ______________

Calibration Standard/Concentration ______________________

Mini-RAM Serial No. ______________________ *Zeroed in Z-Bag?* ☐ Yes ☐ No

Time	Activity/Location	PID/FID (ppm)	Mini-RAM (mg/m^3)

Name (print) ______________________ *Signature* ______________________

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SITE SAFETY CHECKLIST

Project Name ______________________ *LFR Project No.* ______________________

Project Activities ____

	YES	NO	N/A
Written Health and Safety Plan (HSP) is on site	☐	☐	☐
Addenda to the HSP are documented on site	☐	☐	☐
Information in the HSP matches conditions and activities at the site	☐	☐	☐
HSP has been read and signed by all site personnel, including visitors	☐	☐	☐
Daily tailgate safety meetings have been held and documented	☐	☐	☐
Site personnel have appropriate training and medical clearance	☐	☐	☐
Air monitoring is performed and documented as described in the HSP	☐	☐	☐
Air monitoring equipment has been calibrated daily	☐	☐	☐
Site zones are set up and observed where appropriate	☐	☐	☐
Access to the work area limited to authorized personnel	☐	☐	☐
Decontamination procedures are followed and match the requirements of the HSP	☐	☐	☐
Decontamination stations (including hand/face wash) are set up and used	☐	☐	☐
Personal protective equipment used matches HSP requirements	☐	☐	☐
Hearing protection used where appropriate	☐	☐	☐
Respirators are properly cleaned and stored	☐	☐	☐
Utility locator has cleared subject locations	☐	☐	☐
Overhead utilities do not present a hazard to field equipment/personnel	☐	☐	☐
Traffic control measures have been implemented	☐	☐	☐
Trenches and excavations are in compliance with federal, state, and local safety requirements before worker entry	☐	☐	☐
Spoils are placed no closer than 2 feet from the edge of an excavation	☐	☐	☐
Emergency and first aid equipment is on site as described in the HSP	☐	☐	☐
Drinking water is readily available	☐	☐	☐
Accessible phone is readily available for emergency use	☐	☐	☐
Proper drum and material handling techniques are used	☐	☐	☐
Drums and waste containers are labeled appropriately	☐	☐	☐
Extension cords are grounded and protected from water and vehicle traffic	☐	☐	☐
Tools and equipment are in good working order	☐	☐	☐

Notes (All "no" answers must be addressed and corrected immediately. Note additional health and safety observations here): ____

____

____

____

____

____

Conducted By: ______________ *Signature:* ______________ *Date:* ______________

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DAILY TAILGATE SAFETY MEETING FORM

Date ________ *Time* __________ *LFR Project No.* ______________________________

Project Name ______________________ *Specific Location* ____________________

Type of Work ____

Chemicals Present ____

SAFETY TOPICS DISCUSSED

Protective Clothing/Equipment ____________________________________

____

Hazards of Chemicals Present ____________________________________

____

Physical Hazards ____

____

Special Hazards ____

____

Other Topics ____

____

ATTENDEES

Name (please print)	***Signature***

APPENDIX C

CALCULATIONS FOR ARSENIC AND LEAD IN AIR

$$Chemical\ Conc.\ in\ Air = (Total\ Dust\ Conc.\ in\ Air)(Maximum\ Soil\ Conc.)(CF)$$

$$\frac{mg\ Chemical}{m^3} = \left(\frac{mg\ Dust}{m^3}\right)\left(\frac{mg\ Chemical}{kg\ soil}\right)\left(\frac{1\ kg\ soil}{1x10^{+6}\ mg\ soil}\right)$$

$Fence-Line\ Action\ Level\ for\ Arsenic = \frac{0.19\ \mu g}{m^3} = \frac{1.9x10^{-4}\ mg}{m^3}$ (OEHHA Acute REL).

$$\frac{1.9x10^{-4}\ mg\ As}{m^3} = \left(\frac{x\ mg\ Dust}{m^3}\right)\left(\frac{140\ mg\ As}{kg\ soil}\right)\left(\frac{1\ kg\ soil}{1x10^{+6}\ mg\ soil}\right)$$

$$\frac{x\ mg\ Dust}{m^3} = \frac{1.36\ mg\ Total\ Dust}{m^3}$$

$$\text{Chemical Conc. in Air} = (\text{Total Dust Conc. in Air})(\text{Maximum Soil Conc.})(CF)$$

$$\frac{mg\ Chemical}{m^3} = \left(\frac{mg\ Dust}{m^3}\right)\left(\frac{mg\ Chemical}{kg\ soil}\right)\left(\frac{1\ kg\ soil}{1x10^{+6}\ mg\ soil}\right)$$

$\text{Fence-Line Action Level for lead} = \frac{1.5\ \mu g}{m^3} = \frac{1.5x10^{-3}\ mg}{m^3}$ *(NAAQS for lead).*

$$\frac{1.5x10^{-3}\ mg\ Pb}{m^3} = \left(\frac{x\ mg\ Dust}{m^3}\right)\left(\frac{398\ mg\ Pb}{kg\ soil}\right)\left(\frac{1\ kg\ soil}{1x10^{+6}\ mg\ soil}\right)$$

$$\frac{x\ mg\ Dust}{m^3} = \frac{3.77\ mg\ Total\ Dust}{m^3}$$

APPENDIX D

HOSPITAL ROUTE MAP

Yahoo! Driving Directions

Starting from: A 1009 66th Ave, Oakland, CA 94621-3535

Arriving at: B ALAMEDA HOSPITAL 2070 Clinton Ave, Alameda, CA

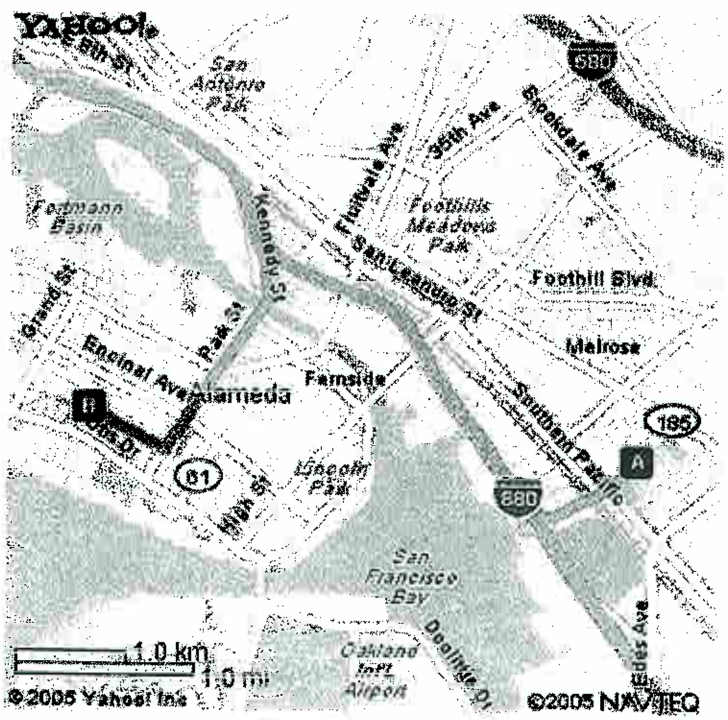
Distance: 5.2 miles **Approximate Travel Time:** 11 mins

Your Directions

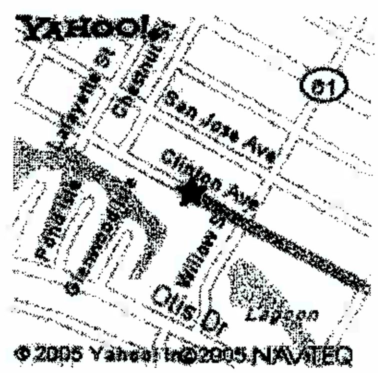
1.	Start at **1009 66TH AVE, OAKLAND** going toward **OLMSTEAD ST** - go **0.6 mi**
2.	Take ramp onto **I-880 NORTH** toward **DOWNTOWN OAKLAND** - go **2.3 mi**
3.	Take the **23RD AVENUE** exit - go **0.8 mi**
4.	Continue on **29TH AVE** - go **0.1 mi**
5.	**29TH AVE** becomes **PARK ST** - go **0.9 mi**
6.	Turn R on **CLINTON AVE** - go **0.5 mi**
7.	Arrive at **ALAMEDA HOSPITAL**

When using any driving directions or map, it's a good idea to do a reality check and make sure the road still exists, watch out for construction, and follow all traffic safety precautions. This is only to be used as an aid in planning.

Your Full Route



Your Destination



Address:
ALAMEDA HOSPITAL 2070 Clinton Ave
Alameda, CA

APPENDIX G

Quality Assurance Project Plan

Quality Assurance Project Plan
for Soil Removal Action Work Plan at
Proposed Aspire Charter High School
1009 66th Avenue
Oakland, Alameda County, California
DTSC Site Code: 204147-11

003-09155-00-004
August 17, 2006

Prepared for
Aspire Public Schools
426 17th Street, Suite 200
Oakland, California 94612-2820

Prepared by
LFR Inc.
4190 Douglas Boulevard, Suite 200
Granite Bay, California 95746

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TABLES

FIGURES

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ACRONYMS AND ABBREVIATIONS

μg/kg	micrograms per kilogram, approximately equivalent to parts per billion
μg/l	micrograms per liter, approximately equivalent to parts per billion
Aspire	Aspire Public Schools
BAAQMD	Bay Area Air Quality Management District
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CL	Control Limits
COC	Compound of Concern
cy	cubic yards
C&T	Curtis & Tompkins, Ltd.
CLP	Contract Laboratory Program
DHS	California Department of Health Services
DQOs	data-quality objectives
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
ELAP	Environmental Laboratory Accreditation Program
EOA	Environmental Oversight Agreement
HSP	Health and Safety Plan
IDL	instrument detection limit
LCL	lower control limits
LFR	LFR Inc.
LWL	lower warning limits
MDL	method detection limit
MTBE	methyl tertiary-butyl ether
mg/kg	milligrams per kilogram, approximately equivalent to parts per million
mg/l	milligrams per liter, approximately equivalent to parts per million
mini-RAM	miniature real-time aerosol monitor
NFA	No Further Action
PCG	Preliminary Cleanup Goal
PEA	Preliminary Environmental Assessment
PID	photoionization detector
PQL	practical quantitation limit
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan

QC	Quality Control
RAW	Removal Action Work Plan
RPD	relative percent differences
SOP	standard operating procedures
SPR	spike percent recovery
SQL	sample quantitation limit
SSI	Supplemental Site Investigation
TPH	total petroleum hydrocarbons
U.S. EPA	United States Environmental Protection Agency
UCL	upper control limits
USCS	Unified Soil Classification System
UWL	upper warning limits
VOCs	volatile organic compounds

CERTIFICATION

LFR Inc. has prepared this Quality Assurance Project Plan (QAPP) on behalf of Aspire Public Schools in a manner consistent with the level of care and skill ordinarily exercised by professional geologists and environmental scientists. This QAPP was prepared under the technical direction of the undersigned California Professional Geologists and Registered Environmental Assessors II.

Lita D. Freeman — 8/17/06

Lita D. Freeman, P.G., R.E.A. II — Date
Senior Associate Geologist
California Registered Geologist No. 7368
California Registered Environmental Assessor II No. 20106

Alan Gibbs — 8-17-06

Alan Gibbs, P.G., C.HG., R.E.A. II — Date
Principal Hydrogeologist
California Registered Geologist No. 4827
California Registered Environmental Assessor II No. 20009

* A professional geologist's or registered environmental assessor's certification of conditions comprises a declaration of his or her professional judgment. It does not constitute a warranty or guarantee, expressed or implied, nor does it relieve any other party of its responsibility to abide by contract documents, applicable codes, standards, regulations, and ordinances.

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared by LFR Inc. (LFR) on behalf of Aspire Public Schools ("Aspire") for the property located at 1009 66th Avenue in Oakland, Alameda County, California ("the Site"; Figure 1). LFR prepared this SAP under the direction and oversight of the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC).

The purpose of the QAPP is to describe the quality assurance (QA) and quality control (QC) methods that will be employed during the removal action at the Site as described in the Soil Removal Action Work Plan (RAW) prepared by LFR (2006).

Implementation of the Soil RAW includes excavation and off site disposal of approximately 8,194 in-place cubic yards (cy) to 9,009 in-place cy of soil impacted with gasoline, diesel, motor oil, various semivolatile organic compounds/polynuclear aromatic hydrocarbons (SVOCs/PAHs), arsenic, lead, polychlorinated biphenyls (PCBs), and various volatile organic compounds (VOCs). This impacted soil will be excavated for off-site disposal during the removal action at the Site as described in the Soil RAW (LFR 2006). This work is anticipated to take up to 45 working days to complete.

1.1 Site Description

The approximate 2.51 acre site is located in an area of commercial, industrial, government and multi-family residential developments. The Site is located on the western side of 66th Avenue between East 14th Street to the north and San Leandro Street to the south. Aspire plans to construct a charter high school on the Site.

The Site has been used for manufacturing and warehouse storage in the past. The Site is currently developed with two buildings; including one denoted as a "Manufacturing/Office Building" and one denoted as a "Warehouse" on Figure 2. Landscaping areas and paved parking areas and driveways surround the on-site buildings.

1.2 Background

Pursuant to California Health and Safety Code Section 25355.5 (a)(1)(C), Aspire entered into a Environmental Oversight Agreement (EOA) with the DTSC to receive proper regulatory oversight and meet Education Code requirements for this potential new school site. Consistent with requirements in the EOA, a Preliminary Environmental Assessment (PEA) and a Supplemental Site Investigation (SSI) was conducted for the Site in accordance with DTSC-approved work plans prepared by CSS Environmental Services, Inc. (CSS) and LFR (CSS 2005a, CSS 2005b, LFR 2005). The purpose of the PEA and SSI was to establish whether a release or threatened release of hazardous substances posing a threat to human health or the environment exists at the Site and define the extent of the impacted soil. PEA and SSI sampling locations are shown on Figures 3A (approximate locations) and 3B (surveyed locations).

The PEA and SSI results indicated that soil impacted with gasoline, diesel, motor oil, various SVOCs/PAHs, arsenic, lead, PCBs, and various VOCs at concentrations above the Preliminary Cleanup Goals (PCG) is present on the Site. The results of the PEA and SSIs are presented in reports by CSS and LFR (CSS 2005c, CSS 2005d, LFR 2006b).

Accordingly, a Soil RAW has been developed to mitigate human health and environmental risks and hazards; its scope of work includes excavation, transport, and disposal of impacted soil at off-site facilities, collecting and analyzing waste characterization samples, and collecting and analyzing confirmation samples. The areas of the proposed removal action are shown on Figure 4.

1.3 Purpose and Objectives

The purpose of the QAPP is to identify the methods to be employed to establish technical accuracy, precision, and validity of data generated at the Site. This QAPP details procedures to be used during implementation of the Soil RAW to provide for the collection of representative data and appropriate completion of the remedial activities at the Site; it can be divided into two broad components: QA and QC.

The QA program is designed to ensure that data precision, accuracy, completeness, comparability, and representatives meet defined data-quality objectives (DQOs). Quality control is the routine application of procedures for achieving prescribed performance standards (in monitoring and measurement) during project planning, field activities, sample analysis, sample and data handling, and data evaluation and interpretation.

The principal rationale for conducting the confirmation sampling associated with the RAW is to demonstrate that the compounds of concern (COCs) have been removed from the Site, to make the Site suitable for construction of a school campus. The data collected will be further used to assess the relative threat associated with any residual levels of hazardous substances in the soil following the soil removal. The confirmation sampling program has been designed to include sufficient data through adequate numbers of samples, a comprehensive analytical program, and proper quality control procedures. The procedures presented in this QAPP will establish the quality of the data used for this purpose.

Decisions will be based on data obtained from the sampling and analysis program. It is intended that data collected through implementation of this QAPP will satisfy local, state, and federal data quality requirements. These data may be used to characterize the nature and extent of residual concentrations of arsenic that remain following excavation, support additional risk assessment that may be needed, and support the No Further Action (NFA) determination that is required for additional school development.

However, if the evaluation indicates unacceptable risk of exposure, then the data can be used by Aspire for consideration of further action.

1.4 Informational Sources

This QAPP has been prepared using information from the following United States Environmental Protection Agency (U.S. EPA) documents:

- Methods for Chemical Analyses of Water and Waste, EPA 600/4-79-020, revised November 1986
- Interim Guidelines and Specifications for Preparing Quality-Assurance Project Plans, QAMS-005/80, January 1986
- Guidance for Preparation of Combined Work/Quality-Assurance Project Plans for Environmental Monitoring, OWRS QA-1, May 1984
- Laboratory Data Validation Functional Guidelines for Evaluating Organic Analyses, February 1988 (Draft)
- Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses, July 1988 (Draft)
- Data-Quality Objectives for Remedial Response Activities, EPA 540/G-87/003A, March 1987
- Test Methods for Evaluating Solid Waste, EPA SW-846, Third Edition, November 1986
- Laboratory Documentation Requirements for Data Validation, EPA 9QA-07-90, 1990
- Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846, Third Edition, 1996
- U.S. EPA Guidance for Quality Assurance Project Plans, EPA QA/G-5, 1998
- Guidance for the Data Quality Objectives Process, EPA QA/G-4, 2000
- U.S. EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5, 2001
- Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, EPA 540/R-01/008, 2002

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

Responsibilities of the key LFR personnel working on the project are as follows:

Project Director: Mr. Alan Gibbs, P.G., R.E.A. II, Principal Geologist. Oversees project implementation and progress. Provides technical and managerial advice to the project manager.

Project Manager: Ms. Lita Freeman, P.G., R.E.A. II, Senior Associate Geologist. Schedules tasks and manages technical aspects of the project. Ensures that the Health and Safety Plan (HSP) for the project is implemented. Reports to the project director.

QA/QC Officer: Ms. Amy Goldberg Day, R.E.A., Senior Associate Project Toxicologist. Assists in design, monitors project, and evaluates the project's QA/QC program. Makes recommendations to the project director and project manager on QA/QC issues.

Corporate Health and Safety Officer: Mr. David McElwain. Assists in review of HSP and advises on site-specific health and safety procedures.

California Department of Health Services (DHS)-Certified Subcontractor Laboratory: Curtis & Tompkins, Ltd. (C&T) or other qualified laboratory. Analyzes environmental media samples using appropriate methods. An equivalent laboratory may be substituted for this facility based on availability and costs of the analyses. The laboratory's project manager will report to LFR's project manager on all aspects of the sample analyses. In addition, LFR's project manager will be advised of any matters related to data quality during the course of the RAW implementation. The analytical laboratory will comply with the QA and QC procedures outlined in the laboratory's QA Plan and the approved U.S. EPA methods of analyses.

The quality of the laboratory data will be such that the data can be evaluated using the process defined in the *Risk Assessment Guidance for Superfund* (U.S. EPA 1989) and *Laboratory Data Validation Functional Guidelines* (U.S. EPA 1994a and 1994b). Using this process will allow data quality to be evaluated for the potential uses noted in Section 3.1.2.

3.0 QA/QC OBJECTIVES

The QA objective is to evaluate the appropriateness of data generated during the project (i.e., precision, accuracy, completeness, comparability, and representatives). Before data appropriateness can be evaluated, the potential uses of the data and corresponding analytical method levels must be identified. This is accomplished by defining DQOs, as discussed below.

The QC objective is to evaluate the quality of data collected before they are included in reports or used in evaluations or analyses. Before data quality can be evaluated, QC procedures, including data reduction, validation, and acceptance criteria, must be defined and followed for field and laboratory activities.

3.1 Data Quality Objectives

DQOs have been specified for each data collection activity, and the work will be conducted and documented so that the data collected are of sufficient quality for their intended use (U.S. EPA 1998). DQOs specify the data type, quality, quantity, and uses needed to make decisions, and are the basis for designing data collection activities. The DQOs have been used to design the data collection activities. The DQOs for this project are discussed in the following sections.

3.1.1 Data Quality Objective Process

The project DQOs developed specifically for the planned sampling and analysis program have been established based on U.S. EPA's seven-step DQO process (U.S. EPA 2000). LFR's project manager will evaluate the project DQOs to establish if the quantitative and qualitative needs of the sampling and analysis program have been met. The project definition associated with each step of the DQO process can be summarized as follows.

State the Problem: The Site was previously used for manufacturing and warehousing. Past operations at the Site included manufacturing of specialty magnets, power supplies, and components used in high-energy physics and repairing and rebuilding of motors, generators, transformers and specialty magnets.

During the PEA and SSI performed by CSS and LFR, soil impacted with gasoline, diesel, motor oil, various SVOCs/PAHs, arsenic, lead, PCBs, and various VOCs was identified on the Site at concentrations above the PCGs.

The Soil RAW describes procedures for removal of the impacted soil. A confirmation sampling program has been designed to demonstrate that the impacted soil has been removed, and the Site is suitable for development as a school campus.

Identify the Decision: The data obtained from the confirmation sampling and analysis activities will be used to demonstrate that impacted soil has been removed from the Site. The residual concentrations of COCs in soil will meet the PCGs that have been established based on the development of the Site as a school campus.

Identify Inputs to the Decision: Inputs to the decision will include results of analytical testing of surface and subsurface soil from selected locations on the Site. These samples will be tested for COCs identified at the Site.

Define the Remediation Boundaries: The boundaries of the excavations are shown on Figure 4. Based on the PEA and SSI results, detected concentrations of COCs above the PCGs were found in these areas. The excavation floors and sidewalls will be sampled to document the vertical and lateral extents of residual concentrations of COCs. During implementation of the Soil RAW, LFR will discuss use of existing soil analytical data for confirmation purposes with DTSC. In addition, LFR will discuss omitting collection of floor confirmation samples in those areas where saturated soils are present in the excavations with DTSC.

Develop a Decision Rule: Decisions will be based upon laboratory results for COCs. If no detectable concentrations of COCs are reported based on valid analytical data, then a decision will be made that the Site is fully characterized and remediated with respect to the COCs and no further sampling will be required as part of this Soil RAW. If COCs are detected in the samples tested, then the data will be compiled for use in evaluating the completion of the soil removal. The results of the data evaluation will be used by Aspire to request NFA consent from DTSC following completion of the Groundwater RAW or to support the implementation of additional soil removal.

Specify Limits on Decision Error: The results of analytical testing will be subjected to data evaluation or validation as specified in Section 3.1.4. Data are considered valid if the specified limits on precision, accuracy, representativeness, comparability and completeness are achieved. Positive COC results will be considered in evaluating the need for additional sampling of site soil, and assessing the necessity for reducing risks posed by the potentially impacted soil.

Optimize the Design: The field sampling program has been designed to provide the type and quantity of data needed to satisfy each of the aforementioned objectives. The quality of the data will be assessed through the procedures further described in this QAPP.

3.1.2 U.S. EPA Analytical Method Levels

U.S. EPA has identified five levels of analytical methods, whose use depends on the DQOs identified for a project. The levels are defined as follows:

Level I: Field Testing. Level I methods include the use of handheld instruments. Data QA/QC includes proper calibration of instruments and appropriate data interpretation.

Level II: Tentative Identification of Compounds. Under Level II, compound identification is presented as a range. This level usually includes screening by a mobile laboratory, with variable data QA/QC, depending on the report format.

Level III: Organic and Inorganic Analysis Using U.S. EPA Procedures. Level III methods involve the use of U.S. EPA procedures generally taken from *Test Methods for Evaluating Solid Waste* and other recognized laboratory method manuals, except those that include the U.S. EPA Contract Laboratory Program (CLP). Level III results have quantitation limits similar to those obtained from CLP analyses; under Level III, data QA/QC can be performed to provide data of the same quality as Levels IV and V.

Level IV: Hazardous Substance List Analyses. This level covers organic and inorganic analyses for compounds on the Hazardous Substance List, as defined by the U.S. EPA CLP Statement of Work, which is issued periodically and detailed in each contract-year's description of routine analytical services. These analyses are conducted exclusively by U.S. EPA CLP laboratories, which are under (sub)contract to the federal government or its contractor. Data QA/QC is rigorous; raw data are generally validated by a data-validation contractor.

Level V: Nonconventional Parameters. Level V methods identify nonconventional parameters using analyses that are developed or modified for the particular parameter(s) being analyzed. Significant lead time is generally needed, and data QA/QC is method specific.

3.1.3 Identification of Data Uses and Definition of Project DQOs

In defining DQOs, general factors to be considered include all potential uses of the data (e.g., site characterization, health risk assessment, engineering and design, remediation, monitoring); cost limitations; the schedule of the project; and overall levels of concern (health risk assessment-based criteria) for the project.

The DQOs for this project are (1) to generate field data (for use in sample screening and health and safety monitoring) and laboratory data (for use in site characterization and monitoring of remedial activities) of a quality appropriate for the data's use; and (2) to evaluate the quality of the data. The quality of the field data, which will be generated using portable instruments that must be calibrated following the procedures described in Section 6.0, must be sufficient to allow proper evaluation of the results.

3.1.4 Analytical Method Levels to Be Used During the Project

On the basis of the DQOs and known site conditions (from previously generated data), Level I and Level III analytical methods have been selected for this project. Level I methods will be implemented in the field for sample screening and for health and safety reasons. They include the use of a portable photoionization detector (PID).

Level III methods will be applied to all soil and water samples submitted to C&T for analysis, so that after the data have been reviewed and validated, they will be suitable for use in site characterization and monitoring during remedial-action implementation. Level III analyses will be conducted by C&T under subcontract to LFR. The level of QA/QC and associated documentation will comply with the requirements of DHS' Environmental Laboratory Accreditation Program (ELAP). QA/QC procedures and requirements in addition to the ELAP requirements are detailed in this QAPP. Sample quantitation limit goals (listed in Table 1), if achieved, will provide results sufficient for use in a health risk assessment and for other potential uses identified. The methods chosen for soil and groundwater analyses (Section 7.0) are the best available technologies that meet the QA/QC requirements of this project.

3.2 Data Acceptance Criteria

In addition to being evaluated against the sample quantitation limit goals outlined in Section 7.0, laboratory data generated during the project will be evaluated for precision, accuracy, completeness, comparability, and representativeness. Precision and accuracy are the primary parameters used in evaluating the quality of the data. Data evaluation will be conducted in accordance with the guidance entitled *Laboratory Data Validation Functional Guidelines* (U.S. EPA 1994a and 1994b). Table 2 presents initial QA objectives to be used in evaluating laboratory and field QC samples.

3.2.1 Precision and Accuracy Criteria

Precision criteria allow evaluation of the reproducibility of measurements under a given set of conditions. They quantitatively measure the variability of a group of measurements. Data precision is measured by calculating relative percent differences (RPDs; see Section 11.0) of the analytical results for field and laboratory splits.

Accuracy criteria allow evaluation of the bias in a measurement system. Evaluation of data accuracy includes a quantitative measure of the bias by calculating spike percent recovery (SPR; see Section 11.0). Blank results will also be evaluated, as described in Section 11.0.

Because the precision and accuracy of any data obtained will depend on the type of measurement and the type of medium sampled (solid, liquid, or vapor), the data acceptance criteria for precision and accuracy should be site- and measurement-specific. Initially, laboratory data acceptance criteria for precision and accuracy will be based on control limits used by C&T (Table 2).

If deemed necessary, site-specific data acceptance criteria will be developed after sufficient data are collected to perform valid statistical calculations to determine project data-based acceptance criteria. The results of the precision and accuracy evaluation of the initial data will be used to assess the appropriateness of the initial data acceptance criteria. When the data-pool size has reached at least 25 QC points, acceptance criteria will be derived from historical QC data collected by LFR at the Site and from new QC data as they become available. Data acceptance criteria will not be re-evaluated after the data-pool size has exceeded 30 QC points.

Other acceptance criteria may be defined for duplicate samples containing compounds at very low concentrations because of the inherent variability of results near the detection limit. The inherent variability in lithology and geology, including the geochemistry of most geologic media, will be taken into consideration in developing data acceptance criteria. An upper warning limit of two standard deviations above the mean and an upper control limit of three standard deviations above the mean will be applied throughout the analysis. Attachment 1 summarizes C&T's calibration and QC procedures.

If laboratory data precision and accuracy do not meet the data acceptance criteria, the reason will be noted in LFR's project report. Corrective action to be taken if precision and accuracy data acceptance criteria are not met may include additional sampling and/or reanalysis.

3.2.2 Completeness, Comparability, and Representativeness Criteria

Data completeness will be evaluated using the following calculation: the number of valid data generated divided by the number of valid data planned, expressed as a percentage. Although 100 percent data completeness is theoretically ideal, 80 percent data completeness is generally associated with Level III, IV, and V analyses (U.S. EPA 1987) and accounts for unforeseen incidents associated with the data collection. Consequently, the data completeness goal for this project is 80 percent. Deviations from specifications in this QAPP will be detailed in the project report.

To ensure that the data collected are comparable to both previous and subsequent data, standardized procedures will be followed during field sampling, laboratory analysis, and data evaluation. Whenever procedures change from one sampling round to another, or within a sampling episode, historical data will be compared to recent data before data are validated and reduced.

To obtain representative data, strict technical and management procedures (as detailed below) will be followed, including careful planning of sample collection procedures and analytical methodologies. These procedures will be audited as described in Section 10.0.

4.0 FIELD ACTIVITIES

This section describes routine procedures designed to ensure quality data acquisition, the collection of representative samples, and minimal sample contamination. To allow comparison of data from different data collection events, soil results will be reported in the units of milligrams per kilogram (mg/kg) and groundwater results will be reported in units of milligrams per liter (mg/l) or micrograms per liter (μg/l). Sampling locations will be consistently indicated on site maps, and all lithologic descriptions will be in accordance with the Unified Soil Classification System (USCS).

4.1 Excavation of Impacted Soil and Confirmation Sampling

Conventional construction equipment such as backhoes and loaders will be used for excavation of impacted soil. The equipment will be operated by a person with a current Hazardous Waste Operations certificate. Excavation of soil will continue until visual observations, analytical results, and/or PID readings indicate that the impacted soil has been removed from the area. The excavated soil will be loaded directly into trucks or temporarily stockpiled on the Site and disposed of appropriately. Impacted soil temporarily stockpiled will be placed on plastic sheeting and covered with plastic sheeting while on the Site.

After removal of the impacted soil is completed, confirmation soil samples will be collected from the sidewalls and floor of the excavations to confirm that residual concentrations of COCs are less than the PCGs established in the Soil RAW.

Existing soil analytical data collected from the Site may be appropriate for use as confirmation data (i.e. soil samples collected during the PEA and SSI from borings to the east of the former underground storage tank excavations with concentrations of COCs less than the PCGs). In addition, shallow groundwater is anticipated in the central portion of the Site (at 3 to 4 feet below ground surface). Therefore, confirmation soil sampling of the excavation floor may be restricted to non-saturated areas, unless deemed prudent to sample specific areas based on site conditions.

During implementation of the Soil RAW, LFR will discuss use of existing soil analytical data for confirmation purposes and omitting collection of floor confirmation samples in those areas where saturated soils are present in the excavations with DTSC.

The confirmation soil samples will be collected in 2-inch-diameter brass or stainless steel liners using hand-sampling equipment or hand-pressure. Confirmation samples will be collected every 25 linear feet along each sidewall and from the floor of the excavation (approximately one sample for every 625 square feet).

Following removal of the impacted soil, the excavation will be backfilled using on-site soil with COCs below the action levels and/or "clean" imported fill material. If drain rock or gravel is used as a backfill material, a geotextile fabric will be placed on top of the rock/gravel prior to placing finer-grained fill material in the excavation. Fill material will be compacted using appropriate vibratory or drum roller compaction equipment.

Imported fill material will consist of mineral soil, substantially free of clay, organic materials, loam, wood, and trash. The imported fill material will not contain stones larger than 3 inches in any dimension, broken concrete, masonry, rubble, asphalt pavement, or other waste. The source of the imported fill material will be documented and samples of the material will be submitted for laboratory analysis to establish its chemical quality, if necessary.

Compaction testing of the engineering fill will be performed and documented by LFR personnel or Aspire's contractor. The backfilled areas will be rough graded to minimize ponding of water and to direct surface-water flow away from the Site in preparation for construction activities. Additional site restoration will not be performed as the construction of the school campus will begin after completion of the removal action.

Excavated soil will be profiled for disposal by hand-driving a brass or stainless steel tube into randomly selected portions of the excavated soil. The soil will then be transported to the appropriate disposal facility selected by Aspire.

4.2 Decontamination

Equipment used during this project that might come into contact with contaminated materials will be properly decontaminated before and after each use. Generally, equipment will be cleaned with high-pressure hot water (steam cleaning) and/or washed with a laboratory-grade detergent (such as Alconox^{TM}) and rinsed with deionized or distilled water.

A washdown area will be constructed on the Site to decontaminate trucks and equipment. The washdown area will be constructed by laying plastic sheeting, sealing seams, and berming edges to contain wash water. A thin layer of sand will be placed under the sheeting, if necessary, to reduce the potential for tears from vehicle tires. Trucks entering the excavations with impacted soil and leaving the Site will be decontaminated, as necessary. Vehicles requiring decontamination will drive onto the washdown area for cleaning and then drive off after decontamination is completed. Trucks will be brushed off, washed with water or detergent, scrubbed, and rinsed, as necessary, to reduce tracking of soil onto adjacent paved public roadways. Mitigation of track-in and track-out soil will be in conformance with the Bay Area Air Quality Management District (BAAQMD).

5.0 SAMPLE CONTAINMENT, LOGGING, HANDLING, AND CUSTODY

5.1 Sample Containers, Preservation, and Holding Times

Table 3 lists appropriate containers, preservation methods, and holding times for the following analyses that may be conducted during this project:

- gasoline, diesel, and motor oil using modified EPA Method 8015
- SVOCs/PAHs, using EPA Method 8270C
- Title 26 metals, specifically arsenic and lead, using EPA Method 6010B/7000 Series
- PCBs, using EPA Method 8082A
- VOCs, using EPA Method 8260B as appropriate, and combined with collection by EPA Method 5035

Water sample containers, if used, that have been prepreserved by the laboratory must be labeled as such. Containers will not be reused.

Soil and water samples will be placed in coolers and chilled to approximately 4°C. Regular ice used in the coolers will be sealed in a plastic bag other than the one in which it was purchased. Reusable “blue ice” packets may also be used.

Any sample analyzed after the recommended holding time has been exceeded will be appropriately flagged in data summary tables (see Section 11.0). These data can be used for quantitative purposes only with appropriate disclosure and qualification.

5.2 Documentation and Sample Custody

Sample custody and documentation procedures link each reported datum with its associated sample. Documentation and custody procedures cover field, office, and laboratory activities. Chain-of-custody forms, which are central to these procedures, will travel with all samples and their associated data throughout the tracking process.

Field documentation consists of sample labels, sampling information forms, a field activities logbook, and chain-of-custody forms. These documents will be completed using indelible ink. Any corrections to a document will be made by drawing a line through the error and entering the correct value, without obliterating the original entry. Anyone correcting an original document will initial and date all changes. Field documentation is described in detail below.

5.2.1 Sample Labels

Sample labels will be completed and attached to the sample container for every sample collected. Labels are made of a waterproof material backed with a water-resistant adhesive. Labels will be filled out using waterproof ink and will include (at least) the sample name, the sampling date and time, the sampling location, the sampler’s name, and the analyses to be conducted.

5.2.2 Field Activities Logbook

A field activities logbook will be used to record daily field activities. Each logbook entry will include the following, as necessary, for each activity undertaken:

- name of person making entry
- date and time of entry
- location of activity
- equipment calibration status
- personnel present at the Site
- sampling and measurement methods
- total number of samples collected

- sample numbers
- laboratory to perform analysis
- field observations and comments

5.2.3 Chain-of-Custody Forms

Chain-of-custody forms will be prepared for groups of samples collected at a given location on a given day. Each chain-of-custody form will be prepared in triplicate. Two of the three copies will accompany each shipment of samples to the laboratory. One copy is kept in LFR's QA/QC file, and the pink copy is kept in the project file. The chain-of-custody forms identify the personnel involved in sample transfer and accompany the samples from the time of collection until received by the laboratory. Information entered on the chain-of-custody forms consists of the following:

- project name and number
- field activities logbook number
- chain-of-custody serial number
- project location
- sample numbers
- sampler's/recorder's signature
- date and time of collection
- number of containers
- sample type
- analyses requested
- inclusive dates of possession
- name of person receiving the sample
- laboratory sample number
- date and time of receipt of sample
- address of laboratory
- miscellaneous remarks

Samples will be shipped so that no more than 24 hours elapse from the time of shipment to the time the laboratory receives the samples. The method of shipment may be hand delivery by field personnel, laboratory courier, or commercial shipping services (such as United Parcel Service or Federal Express). The method of sample shipment will be noted on the chain-of-custody form. Strict chain-of-custody procedures will be maintained during sample handling.

The condition of the samples upon arrival at the laboratory will be documented on the chain-of-custody forms or similar forms. A copy of the completed chain-of-custody forms and other pertinent forms will be provided by the laboratory along with the analytical results.

5.2.4 Office Documentation

Samples will be tracked and data archived at LFR's Granite Bay office. LFR's QA/QC Officer will be responsible for ensuring that documentation is in order and that all results are obtained for the analyses requested on the chain-of-custody form and that sample identifications on the laboratory reports match those on the chain-of-custody form. The project file will be used in data tracking and documentation, as discussed below.

The project file is the common location for all information required in data evaluation and report preparation. It contains documents including work plans, sampling plans, assessment reports, correspondence, field activities logbooks, chain-of-custody forms, and sampling information forms. The file is organized for easy retrieval and long-term storage of information (two years or more). The LFR project manager will direct the maintenance of the project file.

5.2.5 Laboratory Custody

The laboratory will designate a sample custodian who will accept custody of the shipped samples and check that the information on the sample labels matches that on the chain-of-custody form. The custodian will then enter the appropriate data into the laboratory's sample tracking system. The custodian will use the sample number on the sample label or will assign a unique laboratory number to each sample. As a record of sample receipt, the analytical laboratory will return a copy of the chain-of-custody form, with the assigned laboratory numbers, to the sampler. The custodian will then transfer the sample(s) to the proper analyst(s) or store the sample(s) under refrigeration until they are analyzed.

Laboratory personnel are responsible for the care and custody of samples from the time they are received until the sample is exhausted or disposed. Disposal of unused samples must comply with applicable local, state, and federal environmental regulations. Data sheets and laboratory records will be retained as permanent documentation.

The laboratory will immediately notify LFR's project manager if conditions or problems are identified which require immediate resolution. Such conditions include container breakage, missing, or improper chain-of-custody forms, exceeding holding times, missing or illegible sample labeling, or temperature excursions.

5.3 Sample Packaging and Transport

Each soil and groundwater sample will be packaged and transported according to the following procedure:

- Attach completed label to each sample.
- Properly seal and package sample containers (package samples so the potential for shipping damage is minimized).
- Complete chain-of-custody forms.
- Seal the top two copies of the chain-of-custody form inside a reclosable plastic bag.
- Seal the shipping container with several strips of strapping tape.
- Arrange for appropriate shipment to the analytical laboratory.

Samples will be transported to the laboratory by LFR or by courier pickup, following the chain-of-custody and documentation protocols outlined above.

6.0 EQUIPMENT MAINTENANCE AND CALIBRATION

Field personnel will follow the protocols described below to ensure that equipment is in good working condition and that field measurements made by different individuals or at different times are consistent and reproducible.

6.1 Maintenance

Equipment operation will be routinely checked and maintained to minimize breakdowns in the field, and nonfunctional equipment will be removed from service.

6.2 Field Calibration

Calibration of field instruments is necessary to ensure that they are operating correctly and are adjusted so that they yield accurate measurements. Adjustments made to field equipment are recorded in each instrument-dedicated logbook that is kept with the instrument.

6.2.1 Groundwater-Level Measurement Equipment

Electric Well Sounder. Water levels will be measured using a battery-powered sounder (Solinst brand) that has regular 0.01-foot intervals permanently marked on the sounder line. The calibration of each electric sounder will be checked at least once every three months. Markings will first be checked by physically comparing the spacings with a graduated steel tape. If the difference between the two measurements is not less than 0.05 foot per 100 feet, the measurement will be repeated, and repairs made, if necessary. Calibration checks will be recorded in the instrument log book that is kept at the LFR maintenance facility. The sounder will also be checked for calibration after any incident that may alter the instrument's accuracy.

If more than one electric sounder is used during a single set of measurements, all sounders used will be checked against each other by measuring water depth for at least two measurement stations. The results of these measurements will be recorded in the field notes. If any difference between measured values obtained at the same station exceeds 0.05 foot, the calibration of the sounders will be checked using a steel tape, as above, so that the difference may be resolved.

6.2.2 Organic Vapor Meter

Field measurements may be collected using portable organic vapor meters that feature hydrocarbon detection by photoionization (e.g., by HNU Model PI 101 PID). The PID is used to measure organic gases and vapors in soil gas as well as in ambient air.

With the PID, manufacturer-supplied calibration standard span gas will be used to calibrate the meter. Calibration of the PID will be performed before each day's sampling activities begin, and as needed throughout the day if irregularities in the readings become apparent.

LFR will maintain a log book containing calibration data for each PID, including time and date of the previous calibration, who performed the calibration, and how it was performed.

6.2.3 Miniature Real-time Aerosol Monitor

Field measurements for total dust will be collected using a miniature real-time aerosol monitor.

A miniature real-time aerosol monitor (mini-RAM) will be used to monitor total dusts generated during site work. Background dust levels will be established by monitoring dust levels at the Site for several days during the two weeks prior to implementation of this Soil RAW. Background dust levels will be documented at air monitoring stations established at approximately 100 foot intervals along the Site's perimeters (a total of 16 stations including seven stations each of the northern and southern borders and one station each on the eastern and western borders).

If dust in excess of background levels (greater than 0.25 milligrams per cubic meter [mg/m^3] above background levels) is observed for a sustained period of time (greater than 5 minutes), appropriate dust suppression measures (e.g., spraying soil with water) will be undertaken. As noted in the HSP (Appendix F of this Soil RAW), a total dust reading of 1.36 mg/m^3 would result in an exceedance of the Acute Reference Exposure Level of 0.00019 mg/m^3 established for arsenic by the California Environmental Protection Agency, Office of Environmental Health Hazard Assessment (OEHHA). A total dust action level of 0.25 mg/m^3 above background levels would be conservative for the various COCs detected on the Site that would be likely to adhere to windblown dust and protective of the on-site workers and members of the surrounding community.

If during excavation activities dust is observed in the area being excavated, appropriate dust suppression measures (e.g., spraying soil with water) will be undertaken.

Field staff will obtain and document total dust readings from the mini-RAM throughout each work day when impacted soil excavation activities are occurring on the Site. These readings will be obtained from air monitoring stations established at approximately 100 foot intervals along the Site's perimeters (a total of 16 stations including seven stations each of the northern and southern borders and one station each on the eastern and western borders) and various points (upwind, downwind, etc.) around each active excavation area.

6.3 Laboratory Calibration

Maintenance and calibration of laboratory instruments is required to ensure that the analytical system is operating correctly and functioning at the proper sensitivity to meet established detection limits. Calibration and repair records are maintained by the analytical laboratory.

The standard operating procedures (SOPs) for analyses to be conducted as part of this project are contained in U.S. EPA (1986). Each instrument will be calibrated with standard solutions appropriate for the type of instrument and the linear range established for the analytical method used.

7.0 LABORATORY ANALYSIS

7.1 Methods

The analytical laboratory will perform organic chemical analyses using the methods identified on Table 3. Confirmation soil samples will be collected from the excavation sidewalls and floor as described in the Soil RAW and analyzed for COCs using appropriate U.S. EPA methods and laboratory reporting limits (see Section 5.1).

7.2 QA/QC Procedures

The laboratory will follow its own internal QA/QC procedures during routine operations and will base its analytical QA/QC on EPA Method manuals and its own specific QA/QC procedures, which should include (as a minimum), method blanks, method calibration standards, and method or matrix spike recoveries.

Sample holding times for various analyses to be conducted are summarized in Table 3. Samples will be analyzed at the laboratory within specific holding times; the laboratory may not analyze any sample that has exceeded its holding time without permission of LFR.

Calculations for reporting chemical concentrations will be performed by the laboratory according to the procedures specified for each referenced method of analysis. Calculations conducted by the analytical laboratory in converting raw data to reported results will be readily available for inspection. The accuracy and correctness of any data reported by the laboratory will be checked by senior laboratory personnel before the laboratory reports its results.

7.3 Quantitation Limits

There are four commonly used detection or quantitation limits: instrument detection limit (IDL), method detection limit (MDL), sample quantitation limit (SQL), and practical quantitation limit (PQL).

IDL: The minimum amount of an analyte that can be identified using an individual instrument. The laboratory usually determines the IDL by calculating the standard deviation of the results of seven replicate spike sample analyses performed using a single instrument and multiplying by 3.

MDL: The minimum amount of an analyte that can be identified using a specific method. The laboratory usually determines the MDL by calculating the standard deviation of the results of seven replicate spike sample analyses and multiplying by 3, using reagent water as a sample. The MDL is an ideal detection limit when there is no background laboratory contamination and the sample to be analyzed is a clean sample free of matrix effects. When MDLs are defined within a particular method, they are established using reagent water as a sample. Also known as the method quantitation limit, this limit is not sample-specific and does not vary with any sample preparation or dilutions required for each sample analyzed. The MDL is the IDL plus adjustments for typical sample preparation techniques.

SQL: The minimum amount of an analyte that can be identified using a specific method and instrument, taking into account sample dilutions required for the method as well as for matrix effects or high compound concentrations, and the IDL and MDL information. The laboratory may elevate the SQL because of known method problems, such as blank contamination, or on the basis of the laboratory’s experience with the method. The SQL is the most common “detection limit” or “reporting limit” referred to in laboratory reports.

PQL: The minimum amount of an analyte that can be reliably identified within specified limits of precision and accuracy during routine laboratory operations. The PQL is defined in U.S. EPA (1986). PQLs represent goals for each analytical laboratory and are generally higher than a laboratory's expected sample quantitation limits.

Sample results will be reported using SQLs because they represent the actual sample detection limits, taking into account matrix effects and sample dilutions rather than arbitrarily reporting the sample detection limits on the basis of the analysis of reagent water. Expected sample quantitation limits, assuming no dilutions, are presented in Table 1.

8.0 DATA REDUCTION AND VALIDATION

All data collected during the project will be reduced and validated before being included in reports. Copies of laboratory reports will be stored in the project file.

8.1 Reduction

Data reduction will be conducted as follows. If laboratory data are received in electronic form, they will be transferred into a spreadsheet database program. When data are not received from the laboratory in electronic form, LFR personnel will enter the data into a computer database or spreadsheet program manually, and other LFR personnel will check that the data have been entered correctly. Data for relevant compounds reported at concentrations above sample quantitation limits will be presented in summary tables. The tables may also contain the following information: laboratory name; sample number; laboratory number; sampling date; field measurement; and QC analytical data.

8.2 Field Data Validation

LFR personnel will validate water-level data obtained from field measurements before the data are included in any reports or used in any calculations. Field data will be validated by checking procedures used in the field and comparing current measurements with historical data. To allow comparison of data from different sampling episodes, results must be reported in the same units. The units to be used for the various parameters are identified below.

- **Water Levels:** Levels will be measured in feet.
- **Organic Vapor and Gas Concentrations:** Field measurements collected for sample screening and health and safety purposes using a PID will be reported in parts per million.

8.3 Laboratory Analytical Data Validation

LFR's QA/QC officer or a designee will validate analytical data before the summary tables have been created and before the data are included in any reports or used in any calculations. Validation of laboratory analytical data involves specific procedures for evaluating and/or calculating data precision, accuracy, and completeness; those procedures are described in detail in Section 11.

Calculations performed by the laboratory in converting raw data to reported results will be readily available for inspection. The accuracy of all analytical results must be checked by senior laboratory personnel before the laboratory reports the results.

If suspect laboratory performance is evident, either in precision or accuracy evaluations or in detectable chemical concentrations in trip blank samples, the LFR QA/QC officer will notify the laboratory and the laboratory will take appropriate corrective action, such as reanalyzing samples or conducting a detailed review of spectra or chromatograms. The LFR QA/QC officer also will make recommendations to the LFR project manager on any additional action LFR should take, such as resampling or modification of the sampling or analytical protocol. The LFR project manager will then take appropriate action.

9.0 QC CHECK SAMPLES

Field and laboratory QC check samples will be analyzed as required by regulatory agencies and will consist of introducing various control samples into the sample analysis stream, to help evaluate the accuracy and precision of analytical results.

9.1 Field

The types of QC check samples that may be used for this project are field blanks, equipment blanks, trip blanks, and field duplicates. Each field blank and duplicate QC sample will be assigned a unique number so that the laboratory will not know which samples are field blanks or duplicates. Trip blanks will be identified as such and will undergo the QC checks described below. Field blank and duplicate QC samples will be identified in the field activities logbook according to type.

9.1.1 Field Blanks

Field blanks will be collected by pouring laboratory-supplied, organic-free, deionized water directly into appropriate sample containers once per field day. Their purpose is to evaluate the presence of chemicals for which environmental samples are being analyzed in the water used for equipment decontamination. The field blank samples will be stored and processed in the same manner as the other samples.

Additional field blanks may be collected at the sampler's discretion. The sampler, after consultation with the LFR project manager, hydrogeological analyst, or QA/QC officer, may instruct the laboratory either to analyze such additional samples or to hold them for possible analysis later, pending initial results. If initial results for a sample collected at the time a field blank was collected indicate that a sample contains unexplainable concentrations of constituents, the field blank sample will be analyzed.

9.1.2 Equipment Blanks

Equipment rinsate blanks (equipment blanks) will be collected immediately before samples are collected by pouring laboratory-supplied, organic-free, deionized water into the bailer or other sample collection device, and then into the appropriate sample containers. At least one equipment blank will be collected for each analytical method during each sampling episode.

Additional equipment blanks may be collected at the sampler's discretion. The sampler, after consultation with the LFR project manager, hydrogeological analyst, or QA/QC officer, may instruct the laboratory either to analyze such additional samples or to hold them for possible analysis later, pending initial results. If initial results for a sample collected at the time an equipment blank was collected indicate that a sample contains unexplainable concentrations of constituents, the equipment blank sample will be analyzed.

9.1.3 Trip Blanks

Trip blanks are prepared by the laboratory using organic-free, deionized water supplied in appropriate pre-filled sample containers. One trip blank will be included with each shipment of groundwater samples. Trip blanks will be analyzed for VOCs only. The trip blank is analyzed as a check for possible contamination of the sample bottles and/or the organic-free deionized water used for field blanks.

9.1.4 Field Duplicates

A minimum of 1 field duplicate sample per analysis method per every 10 field samples (at least 10 percent of the number of samples) will be collected and analyzed.

9.2 Laboratory

The types of samples that may be used for laboratory QC are blanks, duplicates, and spikes. The laboratory will also report information on surrogate-compound recoveries (where applicable for the method) and dates of analysis. In addition, the laboratory will record (but not necessarily report) information on second-column confirmation of positive detections for organics analyses (where applicable), internal standards (where applicable), recording of compliance with limits associated with daily calibration checks, control charts or equivalents for method-specific spikes and surrogate spikes, and instrument initial calibration and tuning (where applicable).

9.2.1 Blanks

Blanks are indicators of possible sample contamination. Samples can be contaminated during and after field sampling. Often this results from container contamination before or during field sampling. After field sampling, samples may be contaminated during transport and storage prior to analysis and during laboratory chemical analysis. To isolate the stage at which sample contamination may have occurred, two types of blank samples may be analyzed, namely trip blanks and laboratory-reagent blanks (method/reagent and matrix blanks). In the blank analysis, reagent or method blanks will be samples of laboratory deionized and distilled water.

9.2.2 Duplicates

Laboratory duplicates are samples used to estimate data precision as affected by laboratory sources of variation. To measure precision, the laboratory will analyze matrix spikes in duplicate.

9.2.3 Spikes

Spike sample results allow the accuracy of the analytical methodologies to be assessed. For this project, matrix spikes, matrix-spike duplicates, method spikes, and method-spike duplicates will be analyzed by the laboratory. Matrix spikes and matrix-spike duplicates are samples spiked with a predetermined quantity of selected target compounds for each matrix type (i.e., soil or groundwater from the Site). Following analysis, percent recovery of the spikes and the RPD of the two spikes are calculated. Method spikes and method-spike duplicates are samples prepared using laboratory reagent water and adding a predetermined quantity of selected target compounds. Following analysis, percent recovery of the spikes and the RPD of the two spikes are calculated.

In addition, surrogates (compounds similar in composition and structure to the compounds of interest but which are not normally found in the environment) will be added, as applicable, to samples to allow for evaluation of matrix effects or preparatory effects on each sample.

9.2.4 Sample Ratios

Reagent blanks and method blanks will be analyzed at a ratio of one per 20 samples or for every batch of samples per matrix analyzed, whichever is more frequent. Matrix spikes will be analyzed at a ratio of 1 per 10 samples (or batch of samples, whichever is more frequent) per analysis or a set of duplicate matrix spikes per 20 samples (or batch of samples, whichever is more frequent) per analysis. Where applicable, surrogates and internal standards will be added to each sample.

10.0 AUDIT PROCEDURES

Internal and external QA/QC audits will be performed and documented in the project file, as discussed below.

10.1 Internal Audits

Field personnel will participate in periodic internal performance and system audits conducted by the project manager and/or QA/QC officer. The QA/QC officer's internal audit will include evaluating and validating the data collected in every phase of the investigation at the Site, as discussed in Section 8.0. Internal laboratory performance and system audits will also be conducted by the analytical laboratory, according to its own specifications.

10.1.1 Field Personnel Performance

The project manager, QA/QC officer, or their designated representative will randomly observe field staff or review field notes to ensure that field procedures described in this QAPP are being followed and will conduct at least one site visit during each new major phase of work during that phase's execution. Deviation from the procedures contained in this QAPP that may compromise the quality of data obtained in the field will be reported by the project manager or QA/QC officer, who will decide on appropriate corrective action.

Additionally, the sampling program will be audited once for each new phase of work, to decide whether the soil sampling procedures described in this QAPP have been followed. The project manager, the QA/QC officer, or their designated representative will observe the work and/or review selected documentation of the fieldwork.

10.1.2 System Audits

The QA/QC officer or their designated representative will perform system audits as needed to evaluate the following:

- the effects of sampling methods on the representativeness of soil sampled from the subsurface
- the effect of sampling protocols on data quality and validity
- the effect of sample custody and handling methods on sample integrity
- the adequacy of procedures for tracking, documenting, checking, and validating samples and data during sampling and analysis
- the appropriateness of the chemical analysis methods
- the sufficiency and appropriateness of QC checks in ensuring DQOs are met

The QA/QC officer or their designated representative will prepare a summary of the system audit for presentation to the project manager.

10.1.3 QC Check Programs

The QA/QC officer is responsible for validating data according to the evaluation steps described in Section 8.0. The comprehensive data validation requirements are to be fulfilled before data are included in any reports. Where appropriate, each report will contain QC and QA sections.

10.1.4 Laboratory Performance Audits

The laboratory used will follow an internal audit procedure that includes the following:

- a quarterly system audit conducted by the laboratory QA/QC officer
- when QA/QC questions arise, special audits by the laboratory QA/QC officer or other appropriate laboratory personnel

10.2 External Audits

In addition to the external audits required of the contract laboratory for certification or other programs, laboratory performance and procedures will be externally audited by the LFR QA/QC officer. The LFR QA/QC officer will audit the analytical laboratory annually, or when unresolvable problems are identified in the laboratory results, and will prepare an audit report for the project manager. This audit will include inspection of control charts associated with the instruments used and for the compounds analyzed. Control samples and all raw data related to the samples analyzed will also be examined. The contract laboratory will undergo auditing through mandatory blind sample analyses, as required by regulatory agencies.

11.0 DATA VALIDATION PROCEDURES

This section describes procedures for validating analytical data, including diagnostic procedures for identifying possible sources of error and appropriate corrective action.

LFR's QA/QC officer or their designated representative will evaluate analytical data for samples using quantitative tests, qualitative assessment, and professional judgment to ensure that the data reported by the laboratory are representative of actual field conditions. Analytical results first will be checked for completeness, using the criteria described in Section 8.0, including the analytical method sensitivity (reported sample quantitation limit). If the laboratory's rationale for elevated sample quantitation limits is not appropriate, corrective action will be implemented. Blanks, duplicates, and spikes (QC samples) then will be evaluated for contamination, data precision, and data accuracy, respectively.

The completion of all analyses requested on the chain-of-custody form will be verified by tracking the status of each sample being analyzed. Tracking will be maintained until all samples have been analyzed and the results have been reported by the analytical laboratory and received by LFR's QA/QC officer. Analytical data will be reduced and compiled into summary tables as described in Section 8.0.

11.1 Data Acceptance Criteria and Evaluation Procedures for Control Samples

QC sample data will be comprehensively evaluated for contamination, accuracy, and precision, as discussed below. Analytical results for both field and laboratory QC samples will be evaluated for the extent to which they represent actual field conditions. Simple statistical parameters and qualitative indicators will be used in validating data. Table 2 presents initial QA objectives to be used in evaluating laboratory and field QC samples.

Field and laboratory blank samples will be used to determine if and where any field samples may have been contaminated and the significance of any such contamination. Duplicate samples will be used to assess the precision of the analytical procedure.

11.2 Blanks

Field and laboratory blank data will be evaluated for those samples with which the blanks are associated. Any compound detected in any of the field or laboratory blank samples will also be checked for in trip blanks which were shipped with the same field blanks, or which were analyzed using the same equipment and on the same day(s) as the laboratory blanks were analyzed. The maximum detectable concentration of each compound of any associated blank will be used in the evaluation of the data.

If the blank contains detectable concentrations of common laboratory contaminants (methylene chloride, acetone, toluene, and bis[2-ethylhexyl]phthalate), the sample results will only be considered positive detections if the concentrations exceed 10 times the maximum amount detected in any blank. If the concentration of the common laboratory contaminant in the sample is less than 10 times the maximum amount detected in the blanks, the sample result will be tabulated as not detected, with the detection limit adjusted to the original laboratory reported sample result.

The "not detected" result will be flagged as "suspect" in the summary tables. The summary tables LFR prepares from laboratory data will include flags or qualifiers, but laboratory data reports will not be flagged or qualified except according to the laboratory's standard reporting practice. Laboratory data reports will be included in the quarterly or investigation reports.

If the blank contains detectable concentrations of chemicals that are not considered common laboratory contaminants, then the analytes will only be considered detected if the concentrations exceed 5 times the maximum amount detected in any blank. If the sample concentration of the contaminant is less than 5 times the maximum amount detected in the blanks, the sample result will be tabulated as not detected, with the detection limit adjusted to the original laboratory reported sample result.

The "not detected" result will be flagged as "suspect" in the summary tables. Under no circumstances will any sample result be deleted from the summary tables for blank-related problems. Corrective action for blank contamination may include reanalysis of samples, resampling, review of raw data (including chromatograms), and/or an audit of the analytical lab and/or field activities by the LFR project manager and/or the LFR QA/QC officer.

11.3 Duplicates and Spikes

Spike results (including results for method spikes and surrogate spikes) will be evaluated for accuracy and expressed in terms of SPR for each compound. The SPR is the difference in concentration between the total measured concentration in the spike sample and the original concentration in the sample, divided by the actual spike concentration added to the sample. The SPR will be computed on a compound-by-compound basis for spiked sample data.

Duplicate results will be statistically evaluated for data precision, using the RPD values computed from the data reported. RPD is the difference in measured concentrations between either field duplicates or laboratory splits, divided by their average measured concentration, expressed as a percentage.

Corrective action for SPR or RPD values that exceed the limits detailed below may include reanalysis of samples, resampling, review of raw data (including chromatograms), and/or an audit of the analytical lab and/or field activities by the LFR project manager and/or the LFR QA/QC officer.

One of the following statistical testing and acceptance criteria will be selected and applied:

1. Preselected upper warning and control limits (UWLs and UCLs) and lower warning and control limits (lower warning limits [LWLs] and lower control limits [LCLs]) will be used to assess soil or groundwater data when historical QC data for the site under investigation are insufficient. The warning limits are cautionary indicators that results should be closely evaluated prior to data validation. QC data that exceed control limits may indicate poor data quality. These preselected UCLs for laboratory QC samples are based on those currently used by LFR. For duplicate results expressed as RPDs, the only applicable limits are the UWL and UCL. Other acceptance criteria may be used when compounds are detected near the reporting limit.

2. The UWL, UCL, LWL, and LCL may be computed from the historical QC duplicate and spike data after collection of adequate quantities of QC data (at least

25 QC data points). The control limits (CLs) are ideally at the 95 percent confidence interval for a one-tailed normal distribution for duplicate results expressed as RPD and for a two-tailed normal distribution for spike results expressed as SPR. The CL value for half of a bell-shaped curve is 2.77 of the standard deviation or standard error, depending on the applicable parameter. It will, however, be approximated as three times the standard deviation for statistical testing. The warning limit is two-thirds of the UCL, hence twice the standard deviation.

3. Other tests for statistical significance, such as Student's t-test, F-test, or chi-test, will be selected and applied, as appropriate.

12.0 CORRECTIVE ACTION

If data evaluation brings questionable data to light, corrective action may be necessary. Criteria for determining when corrective action is necessary and the procedure for implementing corrective action are discussed in Section 10.0. Corrective action may include analyzing an additional blank or duplicate sample, if available; rechecking laboratory calculations and chromatograms; resampling; modifying the sampling and/or analytical protocol; or other measures. The LFR QA/QC officer will make recommendations for corrective action to the LFR project manager, who will decide what action, if any, to take.

13.0 QA REPORTING

The results of QA/QC audits will be included in reports as described in Section 10.

14.0 REFERENCES

CSS Environmental Services, Inc. 2005a. Preliminary Environmental Assessment Workplan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, California. March 4.

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LFR Inc. 2006a. Soil Removal Action Work Plan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California. March 13.

———. 2005. Additional Supplemental Site Investigation Work Plan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California. December 13.

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———. 1989. Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual, Part A. EPA/540/1-89/002. U.S. EPA Office of Emergency and Remedial Response, Washington, D.C. Interim Final. December.

———. 1994a. Laboratory Data Validation Functional Guidelines for Evaluating Organics Analyses. U.S. EPA OSWER Directive 9240.1-27. December.

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———. 1998. Guidance for Quality Assurance Project Plans, EPA QA/G-5.

———. 2000. Guidance for the Data Quality Objectives Process, EPA QA/G-4.

Table 1
Sample Quantitation Limits
From Curtis and Tompkins, Ltd.

EPA 8015m - Extractable Hydrocarbons

CAS #	Target Compound	Reporting Limit (ug/L)	Reporting Limit (mg/Kg)
68334-30-5	Diesel	50	1
Additional Compounds (may be added to target list):			
	Motor Oil	300	5
	Hydraulic Fluid	300	5
Surrogate:			
630-01-3	Hexacosane		

EPA 8015m - Purgeable Hydrocarbons

CAS #	Target Compound	Reporting Limit (ug/L)	Reporting Limit (mg/Kg)
8006-61-9	Gasoline	50	1
Additional Compounds (may be added to target list):			
	Mineral Spirits	50	1
	Stoddard Solvent	50	1
Surrogates:			
98-08-8	Trifluorotoluene		
460-00-4	Bromofluorobenzene		

Table 1
Sample Quantitation Limits
From Curtis and Tompkins, Ltd.

EPA 8082 - PCBs

CAS #	Target Compound	Reporting Limit (ug/L)	(ug/Kg)
12674-11-2	Aroclor-1016	0.5	12
11104-28-2	Aroclor-1221	1	24
11141-16-5	Aroclor-1232	0.5	12
53469-21-9	Aroclor-1242	0.5	12
12672-29-6	Aroclor-1248	0.5	12
11097-69-1	Aroclor-1254	0.5	12
11096-82-5	Aroclor-1260	0.5	12

Recommended Surrogates:

2051-24-3	Decachlorobiphenyl (DCB)
877-35-2	Tetrachloro-m-xylene (TCMX)

Table 1
Sample Quantitation Limits
From Curtis and Tompkins, Ltd.

EPA 8270 - Semivolatile Organic Compounds

CAS #	Target Compound	Reporting Limit (ug/L)	Reporting Limit (ug/Kg)
83-32-9	Acenaphthene	10	330
208-96-8	Acenaphthylene	10	330
120-12-7	Anthracene	10	330
103-33-3	Azobenzene	10	330
56-55-3	Benzo(a)anthracene	10	330
50-32-8	Benzo(a)pyrene	10	330
205-99-2	Benzo(b)fluoranthene	10	330
207-08-9	Benzo(k)fluoranthene	10	330
191-24-2	Benzo(g,h,i)perylene	10	330
65-85-0	Benzoic acid	50	1,700
100-51-6	Benzyl alcohol	10	330
111-91-1	bis(2-Chloroethoxy)methane	10	330
111-44-4	bis(2-Chloroethyl)ether	10	330
108-60-1	bis(2-Chloroisopropyl)ether	10	330
117-81-7	bis(2-Ethylhexyl)phthalate	10	330
101-55-3	4-Bromophenyl-phenylether	10	330
85-68-7	Butylbenzylphthalate	10	330
106-47-8	4-Chloroaniline	10	330
59-50-7	4-Chloro-3-methylphenol	10	330
91-58-7	2-Chloronaphthalene	10	330
95-57-8	2-Chlorophenol	10	330
7005-72-3	4-Chlorophenyl-phenylether	10	330
218-01-9	Chrysene	10	330
53-70-3	Dibenz(a,h)anthracene	10	330
132-64-9	Dibenzofuran	10	330
95-50-1	1,2-Dichlorobenzene	10	330
541-73-1	1,3-Dichlorobenzene	10	330
106-46-7	1,4-Dichlorobenzene	10	330
91-94-1	3,3'-Dichlorobenzidine	50	1,700
120-83-2	2,4-Dichlorophenol	10	330
84-66-2	Diethylphthalate	10	330
105-67-9	2,4-Dimethylphenol	10	330
131-11-3	Dimethylphthalate	10	330
84-74-2	Di-n-butylphthalate	10	330
534-52-1	4,6-Dinitro-2-methylphenol	50	1,700
51-28-5	2,4-Dinitrophenol	50	1,700
121-14-2	2,4-Dinitrotoluene	10	330
606-20-2	2,6-Dinitrotoluene	10	330
117-84-0	Di-n-octylphthalate	10	330
206-44-0	Fluoranthene	10	330
86-73-7	Fluorene	10	330

CAS #	Target Compound	Reporting Limit (ug/L)	Reporting Limit (ug/Kg)
118-74-1	Hexachlorobenzene	10	330
87-68-3	Hexachlorobutadiene	10	330
77-47-4	Hexachlorocyclopentadiene	50	1,700
67-72-1	Hexachloroethane	10	330
193-39-5	Indeno(1,2,3-cd)pyrene	10	330
78-59-1	Isophorone	10	330
91-57-6	2-Methylnaphthalene	10	330
95-48-7	2-Methylphenol	10	330
1319-77-3	3-,4-Methylphenol	10	330
88-74-4	2-Nitroaniline	50	1,700
99-09-2	3-Nitroaniline	50	1,700
100-01-6	4-Nitroaniline	50	1,700
88-75-5	2-Nitrophenol	50	1,700
100-02-7	4-Nitrophenol	50	1,700
621-64-7	N-Nitroso-di-n-propylamine	10	330
62-75-9	N-Nitrosodimethylamine	10	330
86-30-6	N-Nitrosodiphenylamine	10	330
91-20-3	Naphthalene	10	330
98-95-3	Nitrobenzene	10	330
87-86-5	Pentachlorophenol	50	1,700
85-01-8	Phenanthrene	10	330
108-95-2	Phenol	10	330
129-00-0	Pyrene	10	330
120-82-1	1,2,4-Trichlorobenzene	10	330
95-95-4	2,4,5-Trichlorophenol	10	1,700
88-06-2	2,4,6-Trichlorophenol	10	330

Recommended Surrogates:

321-60-8	2-Fluorobiphenyl
367-12-4	2-Fluorophenol
4165-60-0	Nitrobenzene-d5
13127-88-3	Phenol-d5
1718-51-0	Terphenyl-d14
118-79-6	2,4,6-Tribromophenol

Table 1
Sample Quantitation Limits
From Curtis and Tompkins, Ltd.

Polyaromatic Hydrocarbons by GCMS Method EPA 8270

CAS #	Target Compound	Reporting Limit (ug/L)	(ug/Kg)
83-32-9	Acenaphthene	10	50
208-96-8	Acenaphthylene	10	50
120-12-7	Anthracene	10	50
56-55-3	Benzo(a)anthracene	10	50
50-32-8	Benzo(a)pyrene	10	50
205-99-2	Benzo(b)fluoranthene	10	50
207-08-9	Benzo(k)fluoranthene	10	50
191-24-2	Benzo(g,h,i)perylene	10	50
218-01-9	Chrysene	10	50
53-70-3	Dibenz(a,h)anthracene	10	50
206-44-0	Fluoranthene	10	50
86-73-7	Fluorene	10	50
193-39-5	Indeno(1,2,3-cd)pyrene	10	50
91-20-3	Naphthalene	10	50
85-01-8	Phenanthrene	10	50
129-00-0	Pyrene	10	50

Surrogates:

321-60-8	2-Fluorobiphenyl
4165-60-0	Nitrobenzene-d5
1718-51-0	Terphenyl-d14

Table 1
Sample Quantitation Limits
From Curtis and Tompkins, Ltd.

California Title 26 Metals (6010B/ 7000)

CAS#	Element	Reporting Limit (ug/L)	Reporting Limit (mg/Kg)
7440-36-0	Antimony	60	3
7440-38-2	Arsenic	5	0.25
7440-39-3	Barium	10	0.5
7440-41-7	Beryllium	2	0.1
7440-43-9	Cadmium	5	0.25
7440-47-3	Chromium	10	0.5
7440-48-4	Cobalt	20	1
7440-50-8	Copper	10	0.5
7439-92-1	Lead	3	0.15
7439-97-6	Mercury	0.2	0.04
7439-98-7	Molybdenum	20	1
7440-02-0	Nickel	20	1
7782-49-2	Selenium	5	0.25
7440-22-4	Silver	5	0.25
7440-28-0	Thallium	5	0.25
7440-62-2	Vanadium	10	0.5
7440-66-6	Zinc	20	1

ICP-MS Reporting Limits

CAS#	Element	Reporting Limit (ug/L)	Reporting Limit (mg/Kg)
7440-36-0	Antimony	1	0.25
7440-38-2	Arsenic	1	0.25
7440-39-3	Barium	1	0.25
7440-41-7	Beryllium	1	0.25
7440-43-9	Cadmium	1	0.25
7440-47-3	Chromium	1	0.50
7440-48-4	Cobalt	1	0.25
7440-50-8	Copper	1	0.25
7439-92-1	Lead	1	0.25
7439-98-7	Molybdenum	1	0.25
7440-02-0	Nickel	1	0.25
7782-49-2	Selenium	1	0.25
7440-22-4	Silver	1	0.25
7440-28-0	Thallium	1	0.25
7440-62-2	Vanadium	1	0.25
7440-66-6	Zinc	10	1.0

Table 2
Quality Control Limits
from Curtis and Tompkins, Ltd.

6010B QC Limits

Matrix	Compound	LCS/BS/BSD Recovery	BS/BSD RPD	MS/MSD Recovery	MS/MSD RPD
Water	Antimony	75 - 126	20	62 - 135	20
	Arsenic	79 - 123	20	66 - 134	29
	Barium	80 - 120	20	66 - 123	20
	Beryllium	80 - 120	20	65 - 128	20
	Cadmium	80 - 120	20	61 - 124	20
	Chromium	79 - 120	20	64 - 123	20
	Cobalt	80 - 120	20	65 - 120	20
	Copper	80 - 120	20	62 - 130	20
	Lead	78 - 120	20	58 - 129	28
	Molybdenum	80 - 120	20	68 - 122	20
	Nickel	78 - 120	20	60 - 126	20
	Selenium	72 - 121	20	62 - 131	23
	Silver	80 - 120	20	47 - 138	20
	Thallium	70 - 121	20	57 - 126	29
	Vanadium	80 - 120	20	59 - 132	20
	Zinc	78 - 120	20	49 - 139	31
	Aluminum	80 - 126	20	59 - 145	25
	Calcium	76 - 120	20	44 - 137	20
	Iron	80 - 120	20	58 - 142	20
	Magnesium	80 - 120	20	58 - 135	20
	Manganese	77 - 120	20	46 - 136	20
	Potassium	80 - 120	20	51 - 147	22
	Sodium	80 - 123	20	58 - 141	20
	Boron	77 - 120	20	69 - 122	25
	Tin	80 - 102	20	71 - 120	20
	Titanium	76 - 120	20	77 - 120	30

Table 2
Quality Control Limits
from Curtis and Tompkins, Ltd.

6010B QC Limits

Matrix	Compound	LCS/BS/BSD Recovery	BS/BSD RPD	MS/MSD Recovery	MS/MSD RPD
Soil	Antimony	70 - 120	20	50 - 120	47
	Arsenic	72 - 120	20	48 - 120	32
	Barium	73 - 120	20	63 - 142	34
	Beryllium	73 - 120	20	54 - 120	22
	Cadmium	69 - 120	20	43 - 120	26
	Chromium	72 - 120	20	62 - 145	33
	Cobalt	70 - 120	20	45 - 129	33
	Copper	72 - 120	20	62 - 150	40
	Lead	70 - 120	20	46 - 128	39
	Molybdenum	74 - 120	20	43 - 120	25
	Nickel	72 - 120	20	62 - 141	37
	Selenium	66 - 120	20	52 - 102	28
	Silver	69 - 120	20	58 - 120	21
	Thallium	68 - 120	20	51 - 120	26
	Vanadium	72 - 120	20	62 - 150	28
	Zinc	65 - 120	20	55 - 150	38
	Aluminum	67 - 120	20	57 - 150	38
	Calcium	69 - 120	20	59 - 150	41
	Iron	70 - 120	20	60 - 150	38
	Magnesium	69 - 120	20	59 - 150	36
	Manganese	69 - 120	20	59 - 150	45
	Potassium	72 - 120	20	62 - 142	34
	Sodium	61 - 129	20	47 - 146	34
	Boron	80 - 120	20	70 - 130	30
	Tin	80 - 120	20	70 - 130	30
	Titanium	76 - 120	20	66 - 150	42

Table 2
Quality Control Limits
from Curtis and Tompkins, Ltd.

6020A QC Limits

Matrix	Compound	LCS/BS/BSD Recovery	BS/BSD RPD	MS/MSD Recovery	MS/MSD RPD
Water	Antimony	80 - 120	20	66 - 127	30
	Arsenic	80 - 120	20	52 - 145	35
	Barium	80 - 120	20	61 - 138	20
	Beryllium	79 - 120	28	45 - 146	38
	Cadmium	80 - 120	20	47 - 136	30
	Chromium	80 - 120	20	57 - 139	42
	Cobalt	80 - 120	20	49 - 141	20
	Copper	80 - 120	20	57 - 134	47
	Lead	80 - 120	20	64 - 133	44
	Molybdenum	80 - 120	20	69 - 125	35
	Nickel	80 - 120	20	46 - 142	49
	Selenium	80 - 120	20	40 - 148	40
	Silver	80 - 120	20	22 - 127	30
	Thallium	78 - 120	20	59 - 129	30
	Vanadium	80 - 120	20	50 - 143	32
	Zinc	80 - 121	20	53 - 134	49
	Aluminum	80 - 121	20	52 - 138	30
	Calcium	61 - 143	20	41 - 149	24
	Iron	80 - 122	20	58 - 141	31
	Magnesium	80 - 120	20	45 - 137	20
	Manganese	80 - 120	20	57 - 135	20
	Potassium	80 - 120	20	58 - 131	21
	Sodium	80 - 120	20	52 - 131	26

Table 2
Quality Control Limits
from Curtis and Tompkins, Ltd.

6020A QC Limits

Matrix	Compound	LCS/BS/BSD Recovery	BS/BSD RPD	MS/MSD Recovery	MS/MSD RPD
Soil	Antimony	80 - 120	20	75 - 120	30
	Arsenic	80 - 120	20	75 - 125	30
	Barium	80 - 120	20	73 - 120	30
	Beryllium	75 - 124	20	55 - 134	30
	Cadmium	78 - 122	20	68 - 132	30
	Chromium	70 - 137	20	70 - 130	30
	Cobalt	80 - 120	20	70 - 126	30
	Copper	80 - 120	20	76 - 127	30
	Lead	80 - 120	20	76 - 123	30
	Molybdenum	80 - 120	20	73 - 123	30
	Nickel	80 - 120	20	73 - 125	30
	Selenium	80 - 120	20	73 - 123	30
	Silver	80 - 120	20	77 - 129	30
	Thallium	66 - 120	20	56 - 120	30
	Vanadium	70 - 122	20	60 - 132	30
	Zinc	78 - 124	20	68 - 134	30
	Aluminum	80 - 120	20	70 - 130	30
	Calcium	75 - 150	20	56 - 150	30
	Iron	76 - 125	20	66 - 135	30
	Magnesium	80 - 123	20	76 - 133	30
	Manganese	80 - 120	20	70 - 130	30
	Potassium	79 - 124	20	69 - 134	30
	Sodium	79 - 148	20	69 - 150	30

Table 2
Quality Control Limits
from Curtis and Tompkins, Ltd.

Mercury QC Limits

Matrix	Compound	LCS Recovery	LCS/LCSD RPD	MS/MSD Recovery	MS/MSD RPD
Water	Mercury	80-116	20	80-114	22
Soil	Mercury	80-114	20	62-130	27

Table 2
Quality Control Limits
from Curtis and Tompkins, Ltd.

8015M/ 8021 QC Limits

Matrix	Compound	LCS Recovery	LCS/LCSD RPD	MS/MSD Recovery	MS/MSD RPD
Water	Gasoline	79 - 120	20	67 - 120	20
	Trifluorotoluene (s)	68 - 145		68 - 145	
	Bromofluorobenzene (s)	66 - 143		66 - 143	
Soil	Gasoline	78 - 120	20	44 - 133	31
	Trifluorotoluene (s)	58 - 144		58 - 144	
	Bromofluorobenzene (s)	60 - 146		60 - 146	
Water	MTBE	59 - 135	20	56 - 146	30
	Benzene	65 - 122	20	52 - 149	30
	Toluene	67 - 121	20	69 - 130	30
	Ethylbenzene	70 - 121	20	70 - 131	30
	m,p-Xylenes	72 - 125	20	68 - 137	30
	o-Xylene	73 - 122	20	73 - 133	30
	Trifluorotoluene (s)	53 - 143		53 - 143	
	Bromofluorobenzene (s)	52 - 124		52 - 124	
Soil	MTBE	58 - 115	20	58 - 116	20
	Benzene	68 - 117	20	62 - 117	20
	Toluene	70 - 120	20	55 - 121	20
	Ethylbenzene	67 - 124	20	46 - 128	20
	m,p-Xylenes	72 - 124	20	33 - 141	20
	o-Xylene	72 - 123	20	40 - 136	20
	Trifluorotoluene (s)	65 - 134		65 - 134	
	Bromofluorobenzene (s)	55 - 138		55 - 138	

Table 2
Quality Control Limits
from Curtis and Tompkins, Ltd.

TPH-Extractable QC Limits

Matrix	Compound	LCS Recovery	LCS/LCSD RPD	MS/MSD Recovery	MS/MSD RPD
Water	Diesel	37 - 120	26	44 - 131	26
	Hexacosane (s)	39 - 137		39 - 137	
Soil	Diesel	56 - 121	20	37 - 128	37
	Hexacosane (s)	48 - 137		48 - 137	

8082 QC Limits

Matrix	Compound	LCS Recovery	LCS/LCSD RPD	MS/MSD Recovery	MS/MSD RPD
Water	Aroclor 1016	70 - 127	20	60 - 137	30
	Aroclor 1260	60 - 123	25	50 - 133	35
	TCMX (s)	37 - 140		37 - 140	
	DCBP (s)	17 - 150		17 - 150	
Soil	Aroclor 1016	76 - 123	20	57 - 139	20
	Aroclor 1260	69 - 125	20	47 - 143	38
	TCMX (s)	55 - 150		55 - 150	
	DCBP (s)	37 - 150		37 - 150	

Table 2
Quality Control Limits
from Curtis and Tompkins, Ltd.

8270C QC Limits

Matrix	Compound	LCS Recovery	LCS/LCSD RPD	MS/MSD Recovery	MS/MSD RPD
Water	Phenol	36 - 120	22	26 - 130	32
	2-Chlorophenol	40 - 120	23	30 - 130	33
	1,4-Dichlorobenzene	38 - 120	26	28 - 130	36
	N-Nitroso-di-n-propylamine	32 - 120	20	22 - 130	30
	1,2,4-Trichlorobenzene	40 - 120	23	30 - 130	33
	4-Chloro-3-methylphenol	42 - 120	20	32 - 130	30
	Acenaphthene	50 - 120	20	40 - 130	30
	4-Nitrophenol	38 - 120	20	28 - 130	30
	2,4-Dinitrotoluene	49 - 120	20	39 - 130	30
	Pentachlorophenol	22 - 120	20	12 - 130	30
	Pyrene	41 - 120	20	31 - 130	30
	2-Fluorophenol	28 - 120		28 - 120	
	Phenol-d5	34 - 120		34 - 120	
	2,4,6-Tribromophenol	32 - 123		32 - 123	
	Nitrobenzene-d5	38 - 120		38 - 120	
	2-Fluorobiphenyl	40 - 120		40 - 120	
	Terphenyl-d14	29 - 132		29 - 132	
Soil	Phenol	35 - 120	20	37 - 120	24
	2-Chlorophenol	35 - 120	20	40 - 120	25
	1,4-Dichlorobenzene	34 - 120	20	35 - 120	41
	N-Nitroso-di-n-propylamine	27 - 120	20	31 - 120	26
	1,2,4-Trichlorobenzene	34 - 122	20	36 - 125	26
	4-Chloro-3-methylphenol	38 - 120	20	41 - 120	24
	Acenaphthene	40 - 120	20	42 - 120	32
	4-Nitrophenol	24 - 120	20	20 - 120	31
	2,4-Dinitrotoluene	36 - 120	20	38 - 120	28
	Pentachlorophenol	24 - 120	20	17 - 120	47
	Pyrene	34 - 120	20	22 - 140	34
	2-Fluorophenol	34 - 120		34 - 120	
	Phenol-d5	37 - 120		37 - 120	
	2,4,6-Tribromophenol	24 - 120		24 - 120	
	Nitrobenzene-d5	35 - 120		35 - 120	
	2-Fluorobiphenyl	38 - 121		38 - 121	
	Terphenyl-d14	32 - 127		32 - 127	

Table 3
Analytical Methods, Container Types, and Preservatives

From Curtis and Tompkins, Ltd.

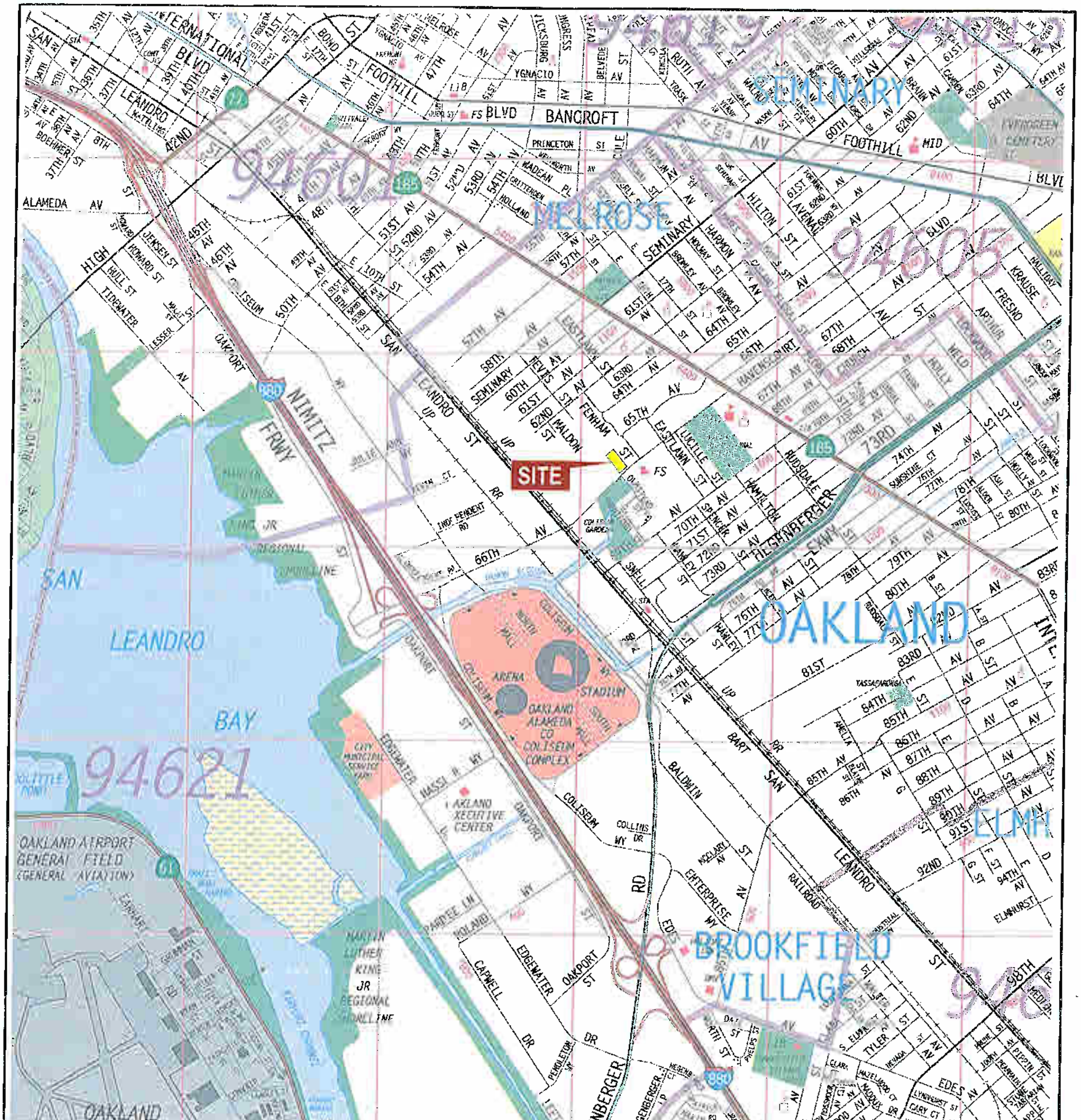
Analysis	Matrix	Analytical Method	Holding Time[a]	Minimum Volume	Container (water)	Preservative (water)[b]
Diesel and Motor Oil[c]	Water Soil	EPA 8015 mod	14/40[d]	500 ml 50 g	1-l glass	None
Gasoline[e]	Water Soil	EPA 8015 mod	14 days	40 ml 5 g	2 x 40mL VOA	HCl[f]
Polychlorinated Biphenyls	Water Soil	EPA 8082	7/40[d] 14/40[d]	1 l 30 g	1-l glass	None
Polynuclear Aromatic Hydrocarbons	Water Soil	EPA 8270	7/40[d] 14/40[d]	1 l 30 g	1-l glass	None[f]
CCR Title 26 Metals	Water Soil	EPA 6010/7470	6 mo/28 d[g]	100 ml 5 g	1-l poly	HNO_3

Notes:

a.) Holding times specified in 40 CFR 136.3 Table 2 (Clean Water Act/NPDES) and SW-846 Table 2-36 Revision 3, December 1996.
b.) Samples should be kept at 4^0C from time of collection until analysis.
c.) Total petroleum hydrocarbons quantified as diesel and motor oil.
d.) X/Y: X days from sample collection to extraction, then Y days from extraction to analysis.
e.) Total petroleum hydrocarbons as gasoline
Reporting limits may be higher for fuels other than gasoline.
f.) Free chlorine should be neutralized with 0.008% $Na_2S_2O_3$.
g.) 28 day holding time for mercury; 6 month holding time for all other elements.

EPA = U.S. Environmental Protection Agency
m = months
mod = modified
(m)l = (milli)liters
CCR = California Code of Regulations
g = grams
VOA = volatile organic analysis vial
d = days
HCl = hydrochloric acid to pH < 2
HNO_3 = nitric acid to pH < 2

Figures



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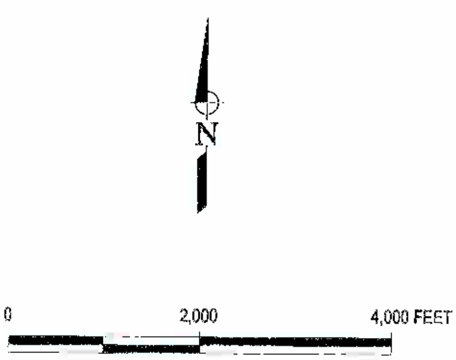

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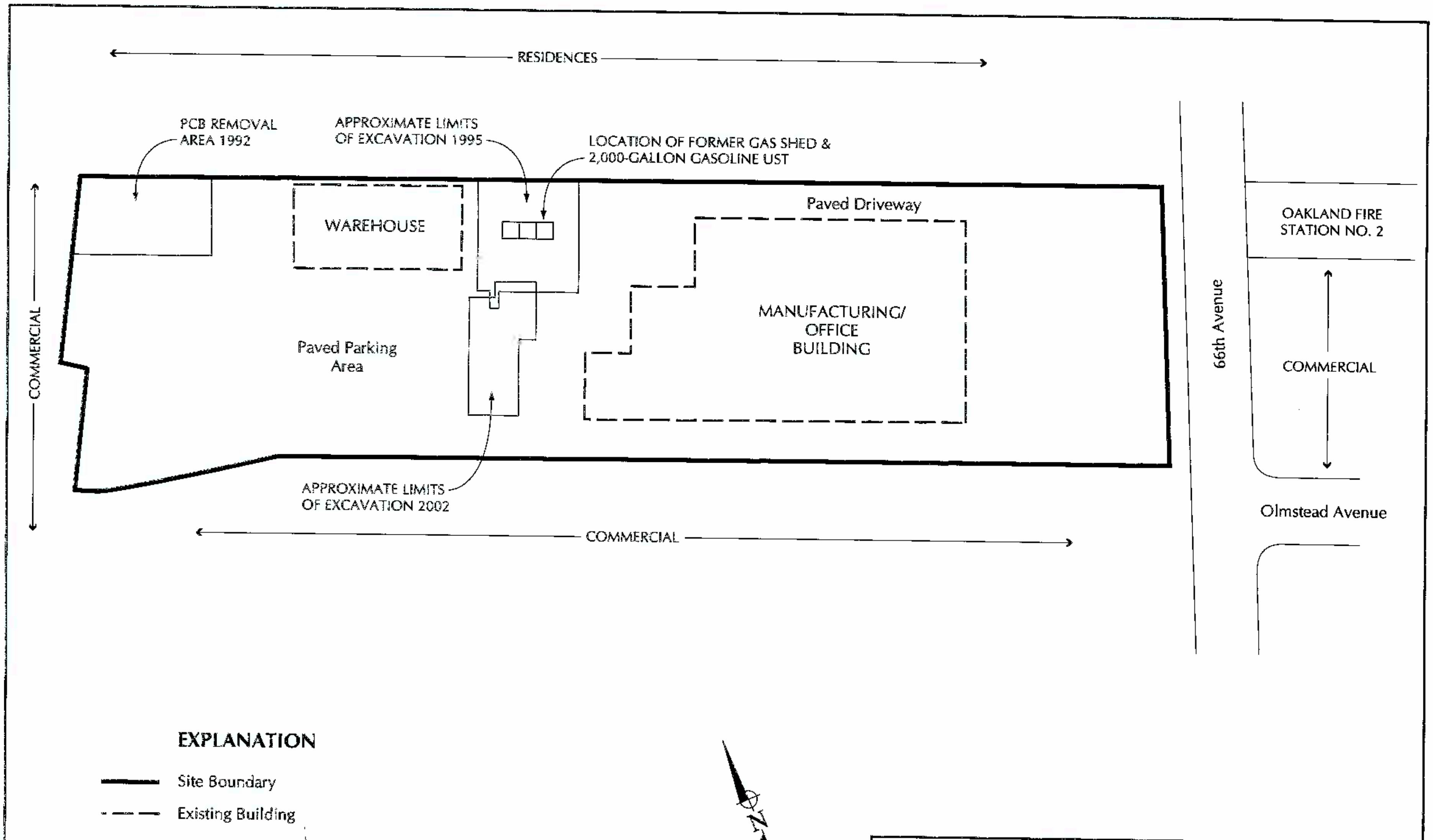
Site Vicinity

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 1

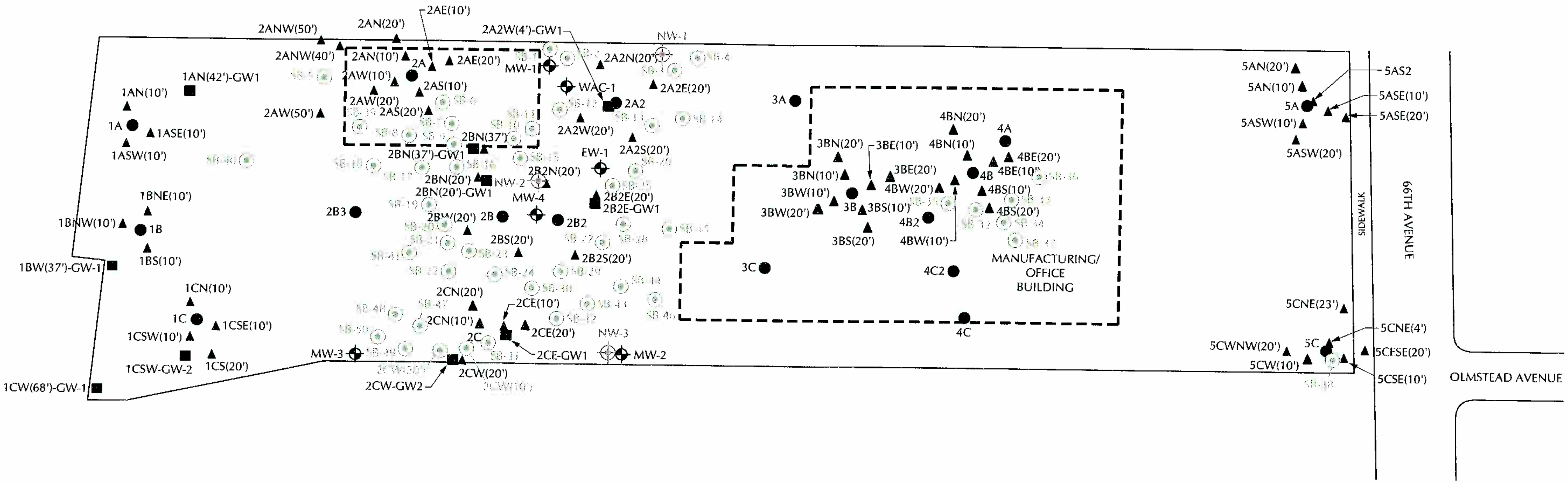


Site Plan

Proposed Charter School Site, 1009 66th Avenue, Oakland, California

LFR

Figure 2



LEGEND

MW-1 — MONITORING WELLS

1B — PEA SAMPLE LOCATIONS - MARCH 2005

1C1 — SSI SOIL SAMPLE LOCATIONS - AUG/SEPT 2005

1AN-GW — SSI GW SAMPLE LOCATIONS - AUG 2005

SB-1 — LFR SSI SAMPLE LOCATIONS - DEC 2005/JAN 2006

NW-1 — NESTED MONITORING WELL

NOTE: BUILDINGS NOT TO SCALE; LOCATIONS ARE APPROXIMATE

N

0 55 FEET

(APPROXIMATE SCALE: 1" = 55')

Site Plan with Approximate PEA and SSI Sampling Locations

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 3A

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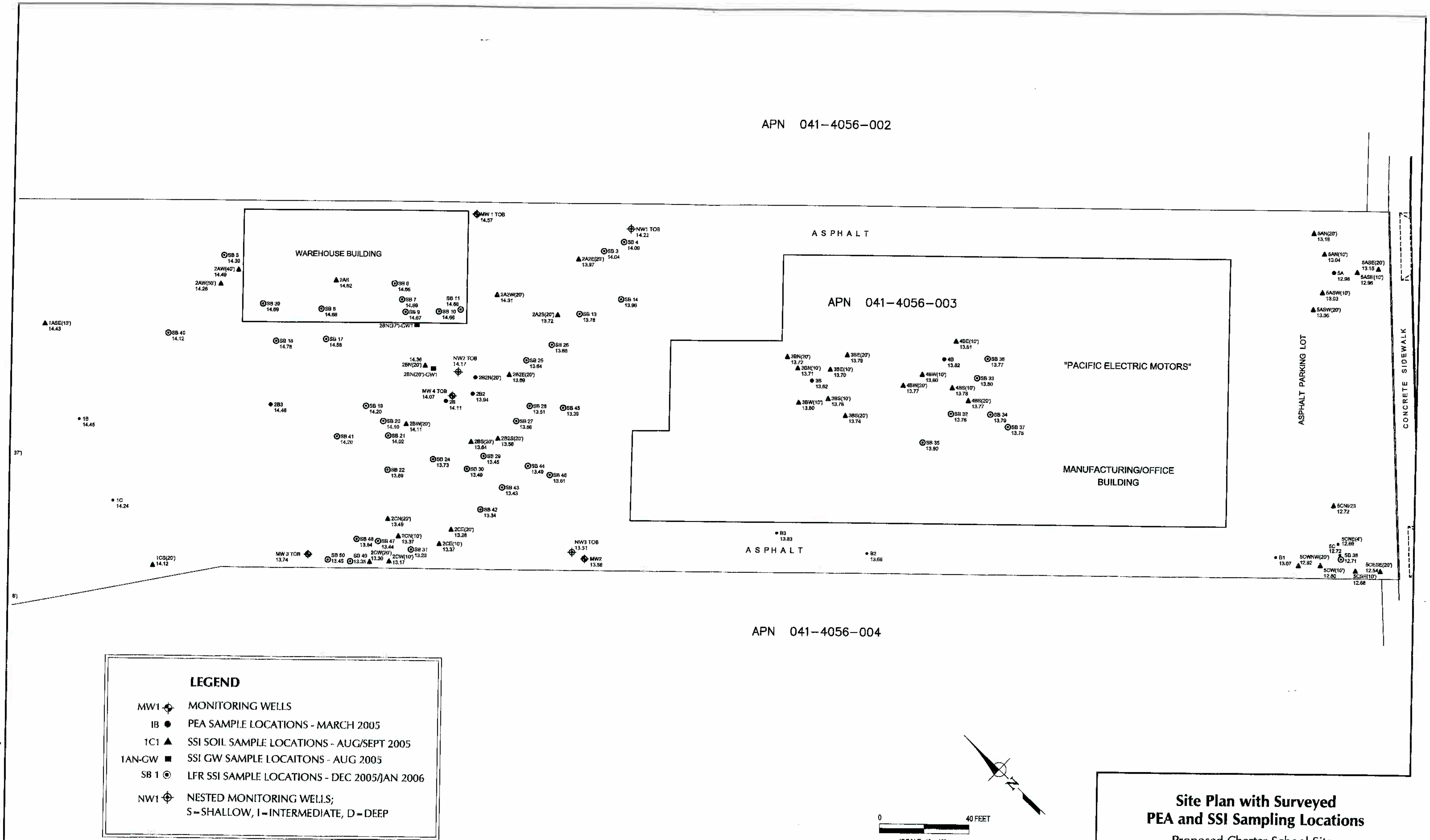

SOURCE: TRONOFF ASSOCIATES

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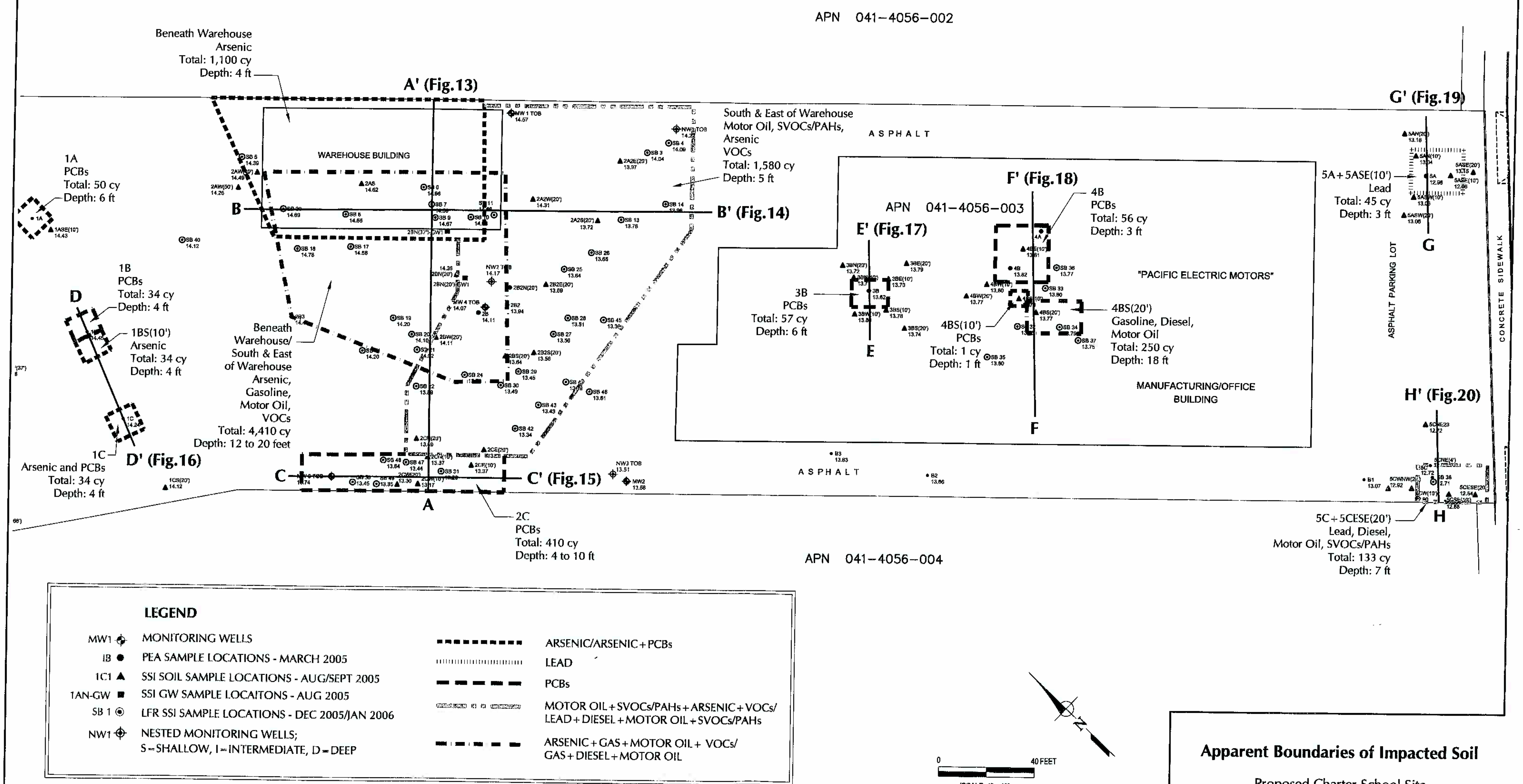
Site Plan with Surveyed PEA and SSI Sampling Locations

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 3B



SOURCE: TRONOFF ASSOCIATES

Apparent Boundaries of Impacted Soil

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 4

Calibration and QC Procedures for Petroleum Hydrocarbons - Method SW8015 Modified

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
SW8015 mod	Volatile and Extractable Total Petroleum Hydrocarbons(TPH/G, TPH/D)	Five-point initial calibration for all analytes	Initial calibration prior to sample analysis	Average response - RSD for each analyte ≤20% linear – least squares regression r ≥ 0.99 non-linear – correlation coefficient ≥ 0.99 (6 points shall be used for second order)	Correct problem then repeat initial calibration
		Calibration verification	Beginning of each sequence, after every 10 samples and at the end of the sequence	All concentration levels within ±15% of initial calibration	Correct problem then repeat initial calibration verification and reanalyze all samples since last successful calibration verification
		Method blank	One per analytical batch	No TPH detected ≥ RL	Correct problem then reprep and analyze method blank and all samples processed with the contaminated blank
		LCS	One LCS per analytical batch	Batch QC acceptance criteria	Correct problem then reprep and analyze the LCS and all samples in the affected batch
		Surrogate spike	Every sample, spike, standard, and method blank	QC acceptance criteria	Correct problem then reextract and analyze sample
		MS/MSD	One MS/MSD per every 20 project samples per matrix	Batch QC acceptance criteria	None

Calibration and QC Procedures for Polychlorinated Biphenyls (PCB) - Method SW8082

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
SW8082	PCBs	Five-point initial calibration for all analytes	Initial calibration prior to sample analysis	linear - average RSD for all analytes ≤20% with no individual analyte RSD >30%	Correct problem then repeat initial calibration
				linear – least squares regression r ≥ 0.99	
				non-linear – correlation coefficient r ≥ 0.99 (6 points shall be used for second order)	
		Second-source calibration verification for 1016/1260 mix	Once per five-point initial calibration	Mix within ±15% of expected value	Correct problem then repeat initial calibration
		Retention time window calculated for each analyte	Each initial calibration and calibration verifications	± 3 times standard deviation for each analyte retention time from 72-hour study, or defaults listed in SW-846	Correct problem then reanalyze all samples analyzed since the last retention time check
		Calibration verification for 1016/1260 mix	At beginning of sequence, after every 20 samples and at the end of the sequence	All analytes within ±15% of expected value	Correct problem then repeat initial calibration verification and reanalyze all samples since last successful calibration verification
		Method blank	One per extraction batch	No analytes detected ≥ RL	Correct problem then reextract and analyze method blank and all samples in the affected batch

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
		LCS	One LCS per extraction batch	Batch QC acceptance criteria	Correct problem then reextract and analyze the LCS and all samples in the affected batch
		Surrogate spike	Every sample, spiked sample, standard, and method blank	QC acceptance criteria	Correct problem then reextract and analyze sample
		MS/MSD	One MS/MSD per every 20 project samples per matrix	QC acceptance criteria	none

Calibration and QC Procedures for Semivolatile Organics – Method SW8270C

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
SW8270C	Semivolatile Organics	Five-point initial calibration for all analytes	Initial calibration prior to sample analysis	SPCCs average RF ≥ 0.050 and %RSD for RFs for CCCs ≤ 30% and one option below	Correct problem then repeat initial calibration
				option 1- average Rf - non-ccc/spcc RSD ≤15%	
				option 2 linear – least squares regression r > 0.99	
				option 3 non-linear – correlation coefficient r ≥ 0.99 (6 points shall be used for second order)	
		Second-source calibration verification	Once per five-point initial calibration	Each SPCC RF ≥ 0.05, CCC %RSD ≤ 30%, Non-SPCC/CCC RF > 0.05	Correct problem then repeat initial calibration
		Retention time window calculated for each analyte	Each sample	Relative retention time (RRT) of the analyte within ± 0.06 RRT units of the RRT	Correct problem then reanalyze all samples analyzed since the last retention time check
		Calibration verification	Daily, before sample analysis and every 12 hours of analysis time	Each SPCC RF ≥ 0.05; CCCs %D ≤ 20%; all analytes RF ≥ 0.05	Correct problem then repeat initial calibration
		Internal Standards	Each sample	Retention time ±30 seconds from retention time of the mid-point std. in the ICAL. EICP area within -50% to +100% of ICAL mid-point std.	Inspect mass spectrometer and GC for malfunctions; mandatory reanalysis of samples analyzed while system was malfunctioning

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
		Method blank	One per extraction analytical batch	No analytes detected ≥ RL	Correct problem then reprep and analyze method blank and all samples in the affected batch
		LCS	One LCS per extraction batch	Batch QC acceptance criteria	Correct problem then reprep and analyze the LCS and all samples in the affected batch
		MS/MSD	One MS/MSD per every 20 project samples per matrix	Batch QC acceptance criteria	none
		Check of mass spectral ion intensities using DFTPP	Prior to initial calibration and calibration verification	Refer to criteria listed in the method	Retune instrument and verify
		Surrogate spike	Every sample, spiked sample, standard, and method blank	QC acceptance criteria	Correct problem then reextract and analyze sample

Calibration and QC Procedures for ICP Metals - Method SW6010B

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
SW6010B	ICP Metals	Initial calibration (minimum 1 standard and a blank)	Daily initial calibration prior to sample analysis	N/A	N/A
		Initial calibration verification (second source)	Daily after initial calibration	All analytes within ±10% of expected value	Correct problem then repeat initial calibration
		Calibration blank	After every calibration verification	No analytes detected ≥ RL	Correct problem then analyze calibration blank and previous 10 samples
		Calibration Verification Standard	After every 10 samples and at the end of the analysis sequence	All analyte(s) within ±10% of expected value and RSD of replicate integrations <5%	Repeat calibration and reanalyze all samples since last successful calibration
		Interference check solution (ICS-AB)	At the beginning of an analytical run	Within ±20% of expected value	Terminate analysis; correct problem; reanalyze ICS; reanalyze all affected samples
		Method blank	One per digestion batch	No analytes detected ≥ RL	Correct problem then redigest and analyze method blank and all samples in the affected blank
		LCS for the analyte	One LCS per digestion batch	QC acceptance criteria	Correct problem then reprep and analyze the LCS and all samples in the affected batch
		Serial Dilution	One per digestion batch	1:5 dilution should agree within ±10% of the original determination	
		MS/MSD	One MS/MSD per every 20 project samples per matrix	QC acceptance criteria	none

Calibration and QC Procedures for ICP-MS Metals - Method SW6020A

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
SW6020A	ICP-MS Metals	MS tuning sample	Prior to initial calibration and calibration verification	Refer to criteria listed in the method	Retune instrument then reanalyze tuning solution
		Five-point initial calibration for all analytes	Daily initial calibration prior to sample analysis	N/A	N/A
		Initial calibration verification (second source)	Daily after initial calibration	All analytes within ±10% of expected value	Correct problem then repeat initial calibration
		Calibration blank	After every calibration verification	No analytes detected ≥ RL	Correct problem then analyze calibration blank and previous 10 samples
		Calibration Verification Standard	After every 10 samples and at the end of the analysis sequence	All analyte(s) within ±10% of expected value and RSD of replicate integrations <5%	Repeat calibration and reanalyze all samples since last successful calibration
		Interference check solutions (ICS-AB)	At the beginning and end of an analytical run or twice during an 12 hour period, whichever is more frequent	ICS-AB Within ±20% of true value	Terminate analysis; locate and correct problem; reanalyze ICS; reanalyze all affected samples
		Method blank	One per digestion batch	No analytes detected ≥ RL	Correct problem then redigest and analyze method blank and all samples in the affected blank
		LCS for the analyte	One LCS per digestion batch	QC acceptance criteria	Correct problem then reprep and analyze the LCS and all samples in the affected batch
		Serial Dilution	One per digestion batch	1:5 dilution should agree within ±10% of the original determination	

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
		MS/MSD	One MS/MSD per every 20 project samples per matrix	QC acceptance criteria	none
		Internal Standards (ISs)	Every sample	IS intensity within 30-120% of intensity of the IS in the initial calibration	Perform corrective action as described in method SW6020A

Calibration and QC Procedures for Mercury - Method SW-7470A/ SW-7471A

Method	Applicable Parameter	QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
SW-7470A / SW-7471A	Mercury	Initial multipoint calibration (minimum 5 standards and a blank)	Daily initial calibration prior to sample analysis	Linear Regression Correlation coefficient r ≥0.995	Correct problem then repeat initial calibration
		Initial Calibration Verification (Second-source standard)	Once per initial daily multipoint calibration	Analyte within ± 10% of expected value	Correct problem then repeat initial calibration
		Calibration blank	Once per initial daily multipoint calibration	No analyte detected ≥ RL	Correct problem then reanalyze calibration blank and all samples associated with blank
		Calibration verification	After every 10 samples and at the end of the analysis sequence	The analyte within ±20% of expected value	Correct problem then repeat calibration and reanalyze all samples since last successful calibration
		Method blank	One per analytical batch	No analytes detected ≥ RL	Correct problem then reprep and analyze method blank and all samples processed with the contaminated blank
		LCS	One LCS per digestion batch	QC acceptance criteria	Correct problem then reprep and analyze the LCS and all samples in the affected batch
		MS/MSD	One MS/MSD per every 20 project samples per matrix	QC acceptance criteria	none

APPENDIX H

Transportation Plan

Transportation Plan
for Soil Removal Action Work Plan at Proposed Aspire Charter High School
1009 66th Avenue
Oakland, Alameda County, California
DTSC Site Code: 204147-11

003-09155-00-004
August 17, 2006

Prepared for
Aspire Public Schools
426 17th Street, Suite 200
Oakland, California 94612-2820

Prepared by
LFR Inc.
4190 Douglas Boulevard, Suite 200
Granite Bay, California 95746

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CONTENTS

FIGURES

APPENDICES

ACRONYMS AND ABBREVIATIONS

Aspire	Aspire Public Schools
CFR	Code of Federal Regulations
CHP	California Highway Patrol
COCs	Compounds of Concern
cy	cubic yards
DOT	Department of Transportation
DTSC	California Environmental Protection Agency, Department of Toxic Substances Control
ERC	Emergency Response Contractor
HSP	Health and Safety Plan
LFR	LFR Inc.
mg/kg	milligrams per kilogram
mg/l	milligrams per liter
NFA	No Further Action
OSHA	Occupational Safety and Health Administration
PCG	Preliminary Cleanup Goal
PEA	Preliminary Environmental Assessment
RAW	Removal Action Work Plan
SSI	Supplemental Site Investigation
U.S. EPA	United States Environmental Protection Agency

CERTIFICATION

LFR Inc. has prepared this Transportation Plan on behalf of Aspire Public Schools in a manner consistent with the level of care and skill ordinarily exercised by professional geologists and environmental scientists. This Transportation Plan was prepared under the technical direction of the undersigned California Professional Geologists and Registered Environmental Assessors II.

Lita D. Freeman — 8/17/06

Lita D. Freeman, P.G., R.E.A. II — Date
Senior Associate Geologist
California Registered Geologist No. 7368
California Registered Environmental Assessor II No. 20106

Alan Gibbs — 8-17-06

Alan Gibbs, P.G., C.HG., R.E.A. II — Date
Principal Hydrogeologist
California Registered Geologist No. 4827
California Registered Environmental Assessor II No. 20009

* A professional geologist's or registered environmental assessor's certification of conditions comprises a declaration of his or her professional judgment. It does not constitute a warranty or guarantee, expressed or implied, nor does it relieve any other party of its responsibility to abide by contract documents, applicable codes, standards, regulations, and ordinances.

1.0 INTRODUCTION

This Transportation Plan was prepared by LFR Inc. (LFR) on behalf of the proposed Aspire Public Schools ("Aspire") for the property located at 1009 66th Avenue in Oakland, Alameda County, California ("the Site"; Figure 1). LFR prepared this Transportation Plan under the direction and oversight of the California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). This Transportation Plan was prepared to comply with the May 1994 Interim Final Guidance for Preparation of Transportation Plans at Hazardous Substance Release Sites prepared by the DTSC.

The purpose of this plan is to describe the management and transportation of soil impacted with gasoline, diesel, motor oil, various semivolatile organic compounds/polynuclear aromatic hydrocarbons (SVOCs/PAHs), arsenic, lead, polychlorinated biphenyls (PCBs), and various volatile organic compounds (VOCs). This impacted soil will be excavated for transport to off-site disposal facilities during the removal action at the Site as described in the Soil Removal Action Work Plan (RAW) prepared by LFR (LFR 2006).

This Transportation Plan describes emergency procedures that will be activated in the event of a significant unplanned spill of impacted soil during transportation from the Site to the waste disposal facility. Implementation of the RAW includes excavation and off-site disposal of approximately 8,194 in-place cubic yards (cy) to 9,009 in-place cy of impacted soil from the Site. This work is anticipated to take up to 45 working days to complete.

Remedial alternatives for groundwater will be evaluated in a separate Groundwater RAW as requested by the DTSC.

2.0 BACKGROUND

2.1 Site Description

The approximate 2.51 acre site is located in an area of commercial, industrial, government and multi-family residential developments. The Site is located on the western side of 66th Avenue between East 14th Street to the north and San Leandro Street to the south. Aspire plans to construct a charter high school on the Site.

The Site has been used for manufacturing and warehouse storage in the past. The Site is currently developed with two buildings; including one denoted as a "Manufacturing/Office Building" and one denoted as a "Warehouse" on Figure 2. Landscaping areas and paved parking areas and driveways surround the on-site buildings.

2.2 Description of Removal/Removal Actions

An estimated volume of 8,194 in-place cy of impacted soil is anticipated to be removed from the Site for off-site disposal. Soil removal will be accomplished by use of earthmoving equipment (backhoes, excavators, articulated loaders, etc.). Excavated soil will either be temporarily stockpiled in an on-site staging area or directly loaded into trucks for off-site disposal.

Before off-site disposal, soil will be sampled to waste disposal characterization in accordance with the requirements of the selected waste disposal facility.

Work is anticipated to begin during the fall of 2006 and is expected to last up to 45 days.

3.0 PURPOSE AND OBJECTIVE

The purpose of this Transportation Plan is to minimize potential health, safety, and environmental risks resulting from the transportation of impacted soil and/or equipment during the proposed removal action. The proposed removal action at the Site focuses on the removal and disposal of soils impacted with compounds of concern (COCs) to reduce the threat to human health and to provide a permanent solution that reduces the toxicity, mobility, and volume of impacted soil. The Preliminary Cleanup Goals (PCGs) that have been established are protective of human health and the environment and reduces the potential for exposure to COCs in soil encountered at the Site.

The remedial goal is for impacted soil to be excavated and removed from the Site and treated and/or disposed of at properly licensed facilities off-site. Dewatering effluent will be discharged to the storm or sanitary sewer system or transferred into vacuum trucks for transport to an appropriate disposal.

As part of the no-further-action (NFA) decision, DTSC will certify that the necessary response actions have been completed in accordance with the approved RAW and that site conditions do not pose a significant risk to students, staff, and faculty at the Site.

4.0 CHARACTERISTICS OF WASTE/MATERIAL TO BE TRANSPORTED

4.1 Description of Waste to Be Transported

The waste to be transported is soil impacted with gasoline, diesel, motor oil, various SVOCs/PAHs, arsenic, lead, PCBs, and various VOCs and groundwater impacted with hydrocarbons. The source for the COCs is likely associated with the past commercial/industrial activities at the Site.

The Site lies in and is surrounded by an industrial area where the soil is mostly covered by asphalt pavement and buildings. Borings advanced on the Site have revealed a layer of aggregate based fill below the asphalt pavement and buildings. This fill material has been described as reddish-brown, brown or dark gray silty sand containing angular gravel up to ¾ inch in diameter in some locations.

The native soil and lithology is consistent with alluvial fan deposits. Soil layers typically consist of irregularly bedded layers of low permeability material of silt and clay with lenses and thin layers of sand.

4.2 Determination of Whether the Waste is Hazardous

The final determination of whether the excavated soil to be removed is hazardous has not yet been established. During the excavation and removal, soil will be sampled and analyzed to evaluate whether the waste is hazardous, or as required by the disposal facility. Dewatering effluent from excavation will be sampled and characterized for proper disposal.

4.3 Applicable Regulations

Waste classified as non-hazardous will be transported and disposed of at an appropriate disposal facility in accordance with local, state, and federal regulations.

If excavated soil is classified as hazardous, Aspire (as the hazardous waste generator) will secure an U.S. Environmental Protection Agency (EPA) identification number from DTSC for proper management of the hazardous waste. The transporation contractor and disposal facility will comply with the DTSC requirements of hazardous waste transportation and disposal. The hazardous waste will be transported by a registered hazardous waste hauler under a uniform hazardous waste manifest.

5.0 DESTINATION OF WASTE/MATERIAL

The transportation contractor will transport an in-place volume of approximately 8,143 in-place cy of soil to either a Class I or Class II disposal facility, as appropriate. Disposal at a Class III landfill is not foreseen for this project. The potential disposal facilities selected for this project are:

Class	Name	Address
I	Kettleman Hills Landfill	35251 Old Skyline Road Kettleman City, California (559) 386-9711

I	Buttonwillow Landfill	2500 West Lokern Road Buttonwillow, California (661) 762-6200
II	Altamont Landfill	10840 Altamont Pass Road, Livermore, California 925-455-7300
II	Forward Landfill	9999 South Austin Road, Manteca, California (209) 982-4298
II	West Contra Costa County Landfill	One Parr Boulevard Richmond, California (510) 233-4330
Wastewater Disposal	East Bay Municipal Utilities District Wastewater Treatment Plant	2020 Wake Avenue Oakland, California (510) 287-1542

6.0 TRANSPORTATION MODE

The waste soil will be transported by dump trucks with a 24 ton maximum capacity. It is anticipated that between 8,194 cy (approximately 10,652 tons using 1.3 cy/ton) and 9,009 cy (approximately 15,315 tons using 1.7 cy/ton) of impacted soil will be removed from the Site for disposal. Approximately 444 truckloads (based on 10,652 tons) to 638 truckloads (based on 15,315 tons) will be necessary to remove the impacted soil from the Site. Trailers with plastic liners will be utilized for wet non-hazardous soil and hazardous soil. Trailers will be covered with tight-fitting tarp-style covers prior to leaving the Site.

Groundwater entering the excavation will be pumped into an on-site 21,000-gallon Baker tank located along the Site's southern border. Samples of the water will be collected for analysis and the water will be discharged to the sanitary sewer under a permit from East Bay MUD if contaminants are within East Bay MUD's acceptance criteria. If East Bay MUD's acceptance criteria cannot be met based on the analytical results of the water, then the water will be transferred from the on-site Baker tank to vacuum trucks. Each vacuum truck transports approximately 5,000 gallons per trip. LFR anticipates approximately 45 truck loads to dispose of dewatering effluent. A total of 45 truck trips over a one month period represents approximately one to two trucks per day to adequately dispose of effluent.

6.1 Transporter Qualifications

The transportation contractor will be registered with the DTSC and the U.S. EPA, as appropriate. Vehicles utilized for waste transport will be properly maintained, registered, operated, and placarded in compliance with local, state, and federal requirements. The vehicles will be equipped with dust covers and other required equipment to prevent releases of material.

If the waste material to be transported is hazardous, the transportation contractor will submit proof of valid hauler registration.

6.2 Transporter Equipment

The transportation contractor will equip the trucks with a basic spill kit and fire extinguishers, and have 24-hour emergency response capability.

7.0 TRANSPORTATION ROUTES

7.1 Primary Routes

The following routes to each of the two classes of landfills were selected. The routes described below are the most direct routes, which avoid residential areas, except to access the highway, and hazardous road conditions. The roadways selected for transport are not listed with the California Highway Patrol (CHP) as prohibited for the hauling of hazardous waste. Additionally, local ordinances or road maintenance activities do not restrict the designated routes.

LFR contacted the Oakland Fire Department Station 29 located to the east of the Site across 66th Avenue at 1016 66th Avenue, to discuss potential impact to emergency responses by the proposed remedial work at the Site. According to the Oakland Fire Department dispatchers, trucks may operate on 66th Avenue providing the trucks do not park along 66th Avenue and/or within the painted "no parking" section directly in front of Fire Station 29. No additional activities or coordination are required by LFR with the Oakland Fire Department for using 66th Avenue as an access road between the Site and Interstate 880.

To minimize the number of truck operating along 66th Avenue during this project, trucks hauling impacted soil to disposal facilities will return to the Site with clean imported fill material, when possible.

Figures in Appendix A show the local locations of the disposal facilities.

- **Kettleman Hills Landfill (Class I):** Trucks loaded with soil will exit the Site by turning right (southwest) on 66th Avenue and traveling approximately 0.7 mile to southbound Interstate 880. Trucks will proceed approximately 5.6 mile on southbound Interstate 880 and merge onto southbound Highway 238 and travel approximately 3 miles. Trucks will then merge with Interstate 580 eastbound and travel approximately 46 miles until merging with Interstate 5. Trucks will travel south approximately 136 miles, turning right on Highway 41 and proceeding west approximately 2 miles. The landfill is located at 35251 Old Skyline Road, Kettleman City, California. The estimated roundtrip time from the Site to the facility is 4 hours with a possibility of an additional 1 hour for heavy traffic.

- **Buttonwillow Landfill (Class I):** Trucks loaded with soil will exit the Site by turning right (southwest) on 66th Avenue and traveling approximately 0.7 mile to southbound Interstate 880. Trucks will proceed approximately 5.6 mile on southbound Interstate 880 and merge onto southbound Highway 238 and travel approximately 3 miles. Trucks will then merge with Interstate 580 eastbound and travel approximately 46 miles until merging with Interstate 5. Trucks will travel south approximately 182 miles, turn right at exit 263 and proceed approximately 3 miles to Sullivan Road. Trucks will then turn left (east) on Sullivan Road and proceed east approximately 0.5 miles to the intersection of Sullivan Road and Miller Avenue. The landfill is located at the intersection of Sullivan Road and Miller Avenue in Buttonwillow, California. The estimated roundtrip time from the Site to the facility is 4 hours with a possibility of an additional 1 hour for heavy traffic.
- **Altamont Landfill (Class II):** Trucks loaded with soil will exit the Site by turning right (southwest) on 66th Avenue and traveling approximately 0.7 mile to southbound Interstate 880. Trucks will proceed approximately 5.6 mile on southbound Interstate 880 and merge onto southbound Highway 238 and travel approximately 3 miles. Trucks will travel east on Highway 238 to Interstate 580, and east on Interstate 580 to South Vasco Road exit, take the South Vasco Road exit to North Vasco Road, continue on North Vasco Road to North Front, and continue on North Front Road to Altamont Pass Road, Livermore, California. The Landfill is located at 10840 Altamont Pass Road. The estimated roundtrip time from the Site to the facility is 3 hours with a possibility of an additional 2 hours for rush-hour traffic.
- **Forward Landfill (Class II):** Trucks loaded with soil will exit the Site by turning right (southwest) on 66th Avenue and traveling approximately 0.7 mile to southbound Interstate 880. Trucks will proceed approximately 5.6 mile on southbound Interstate 880 and merge onto southbound Highway 238 and travel approximately 3 miles. Trucks will travel east on Highway 238 to Interstate 580, and east on Interstate 580 to Interstate 205, north on Interstate 205 to California Highway 120, east on California Highway 120 to California Highway 99, north on California Highway 99 to French Camp Road, and south on French Camp Road to Austin Road. The Landfill is located at 9999 South Austin Road, near Manteca, California. The estimated roundtrip time from the Site to the facility is 5 hours with a possibility of an additional 2 hours for rush-hour traffic.
- **West Contra Costa County Landfill (Class II):** Trucks loaded with soil will exit the Site by turning right (southwest) on 66th Avenue and traveling approximately

0.7 mile to northbound Interstate 880. Trucks will turn right (north) on Interstate 880 and proceed north approximately 18 miles, and turn right at Canal Boulevard in Richmond, California. Trucks will proceed approximately 0.2 miles on Canal Boulevard and continue on through Richmond Parkway for approximately 3 miles, turning left on Parr Boulevard. The Waste Treatment Facility is located at One Parr Boulevard in Richmond, California. The estimated roundtrip time from the Site to the facility is 1 hour with a possibility of an additional 1 hour for heavy traffic.

- **East Bay Municipal Utilities District Wastewater Treatment Plant (water disposal):** Trucks loaded with waste water (i.e. water pumped from the on-site excavations) will exit the Site by turning right (southwest) on 66th Avenue and traveling approximately 0.7 mile to northbound Interstate 880. Trucks will turn right (north) on Interstate 880 and proceed north approximately 4 miles and exit at West Grand Avenue in Oakland, California. Trucks will turn left onto West Grand Avenue and proceed approximately 0.5 miles, then make a right turn onto Wake Avenue. The wastewater treatment plant is located at 2020 Wake Avenue in Oakland, California. The estimated roundtrip time from the Site to the facility is 1 hour with a possibility of an additional 0.5 hour for heavy traffic.

7.2 Secondary Routes

Given the distances between the Site and the proposed soil disposal facilities, there are numerous secondary routes that are possible. If one of the primary routes is not passable, the most direct secondary route (based on evaluating a map) will be selected. Prior to using the secondary route, the hauler will ensure that none of the secondary roadways selected for transport are listed with the CHP as prohibited for the hauling of hazardous waste, if the soil being hauled falls into that classification, and that local ordinances or road maintenance activities do not restrict the designated routes.

7.3 Scheduling

The anticipated number of trips per day is expected to be approximately 15. It is anticipated that work will occur between the hours of 7:00 a.m. and 5:00 p.m. Every reasonable effort will be made to avoid heavy truck traffic during peak traffic hours.

7.4 Emergency Services Notification List

The following is a list of emergency services organizations:

Transportation Route Notification List of Emergency Service Organizations

Name	Telephone Number
Emergency Services	911
Chemtrec	800-424-9300 (for information) 800-843-0699 (for hazardous material/waste incidents)
City of Oakland Fire Department	(510) 444-1616
Alameda County Sheriff's Department	(510) 268-7300
Contra Costa County Sheriff's Department	(925) 335-1500
Fresno County Sheriff's Department	(559) 488-3939
Kings County Sheriff's Department	(559) 584-9276
Kern County Sheriff's Department	(661) 634-9999
Merced County Sheriff's Department	(209) 385-7606
San Joaquin County Sheriff's Department	(209) 468-4562
Stanislaus County Sheriff's Department	(209) 525-7216

Transportation Route Notification List of Emergency Service Organizations (cont)

Name	Telephone Number
California Regional Water Quality Control Board	(510) 622-2300 (559) 445-5116
CalTrans	(510) 286-4444 (209) 948-7543 (559) 444-2409
California Highway Patrol	Oakland – (510) 450-3821 Dublin – (925) 828-0466 Tracy – (209) 835-8920 Coalinga – (559) 935-2093 Buttonwillow – (661) 764-5580
U.S. National Response Center	(800) 424-8802
Emergency Services	911
Chemtrec	800-424-9300 (for information) 800-843-0699 (for hazardous material/waste incidents)
City of Oakland Fire Department	(510) 444-1616
Alameda County Sheriff's Department	(510) 268-7300
Contra Costa County Sheriff's Department	(925) 335-1500
Fresno County Sheriff's Department	(559) 488-3939
Kings County Sheriff's Department	(559) 584-9276
Kern County Sheriff's Department	(661) 634-9999
Merced County Sheriff's Department	(209) 385-7606
San Joaquin County Sheriff's Department	(209) 468-4562
Stanislaus County Sheriff's Department	(209) 525-7216
California Regional Water Quality Control Board	(559) 445-5116
CalTrans	(559) 488-4082 or 488-4248
California Highway Patrol	Oakland – (510) 450-3821 Dublin – (925) 828-0466 Tracy – (209) 835-8920 Coalinga – (559) 935-2093 Buttonwillow – (661) 764-5580
U.S. National Response Center	(800) 424-8802

8.0 TRAFFIC CONTROL AND LOADING PROCEDURES

8.1 Traffic Control

Existing traffic patterns at various times of day will be established so that the operation will not affect traffic conditions more than necessary. It is anticipated that work will occur between the hours of 7:00 a.m. and 5:00 p.m. Every effort will be made to avoid heavy truck traffic during peak traffic hours.

LFR will be in radio contact or telephone contact with disposal truck drivers to coordinate trips between the Site and disposal facilities so that trucks do not park along 66th Avenue between the Site and Interstate 880.

8.2 Loading Procedures

Soil will be loaded within a staging area using a backhoe, an articulated front-end loader or similar piece of equipment into dump trucks. Dust generation will be minimized by spraying loads with water during loading, as necessary, slowly dumping each bucket load, and minimizing dumping height. Trailers with plastic liners will be utilized for wet non-hazardous soil and hazardous soil. Trailers will be covered with tight-fitting tarp-style covers prior to leaving the Site.

LFR personnel will observe each truck prior to departure to document proper loading, covering/sealing, decontamination, placarding, and manifesting. Observation and documentation of each load will include date, time, vehicle type, drivers license number, vehicle license number, and signature of the inspector.

A washdown area will be constructed on the Site to decontaminate trucks and equipment. The washdown area will be constructed by laying plastic sheeting, sealing seams, and berming edges to contain wash water. A thin layer of sand will be placed under the sheeting, if necessary, to reduce the potential for tears from vehicle tires. Trucks entering the excavations with impacted soil and leaving the Site will be decontaminated, as necessary. Vehicles requiring decontamination will drive onto the washdown area for cleaning and then drive off after decontamination is completed. Trucks will be brushed off, washed with water or detergent, scrubbed, and rinsed, as necessary, to reduce tracking of soil onto adjacent paved public roadways. Mitigation of track-in and track-out soil will be in conformance with the Bay Area Air Quality Management District regulations.

If East Bay MUD's acceptance criteria cannot be met based on the analytical results of the water, the dewatering effluent will be transferred from the on-site Baker tank to vacuum trucks and transported to a properly licensed disposal facility. Each vacuum truck transports approximately 5,000 gallons.

9.0 RECORD KEEPING

The following information will be recorded and tracked by LFR personnel for each load of impacted soil transported off site:

- date and time trucks left the Site
- weight/volume of waste/material
- trucking company and driver
- vehicle identification
- manifest number associated with each load

The following transportation documents must be carried with the driver when transporting the waste/material:

- bill of lading identifying the shipment
- if necessary, hazardous waste manifest and analytical results representing the load
- map and complete instructions describing the route to be traveled
- special instructions including emergency procedures and contacts for the transporter

10.0 HEALTH AND SAFETY

All contractors will be responsible for operating in accordance with the most current Occupational Safety and Health Administration (OSHA) regulations including 29 Code of Federal Regulations (CFR) 1910.120, Hazardous Waste Operations and Emergency Response, and 29 CFR 1926, Construction Industry Standards, as well as other applicable local, state, and federal laws and regulations. A site-specific Health and Safety Plan (HSP) is included in the Soil RAW.

11.0 CONTINGENCY PLAN

Prior to the start of soil transport operations, the transportation contractor will contact an Emergency Response Contractor (ERC) to establish communication regarding the transportation of hazardous material from the Site to the disposal facilities. The ERC will be provided with a copy of the Transportation Plan. The transportation contractor will work with the ERC to establish appropriate responses to transportation emergencies. The transportation company personnel will be briefed on procedures for contacting either the transportation contractor or the ERC in the event of a spill or incident during soil transport. The ERC will handle emergency spill response measures, including the cleanup and disposal of any spilled material.

The following sections outline the individual responsibilities of the parties expected to be involved in this project.

11.1 Emergency Response Contractor Responsibilities

The following matters shall be the responsibility of the ERC selected for the project:

- Upon notification that a spill has occurred, the ERC will call the reporting party to obtain complete details regarding the incident. Enough information must be obtained to develop initial response actions.
- Communication with the scene will be established.
- In the event of an emergency, the ERC will respond to the scene as soon as possible after gathering information to gauge an appropriate response to the spill.
- ERC will relay the following information to the National Response Center
  - Name of person reporting the incident
  - Telephone number where person reporting can be reached
  - Date, time, and location of the incident
  - The extent of injuries, if any
  - Classification, name and quantity of hazardous materials/waste involved
  - Type of incident and nature of hazardous materials/waste involvement and whether a continuing danger exists at the scene
  - Name and identification number of waste generator
  - Product shipping, hazardous class, and United Nations or North American hazardous material identification number
  - Estimated quantity of materials/waste spilled
  - Extent of impact to land, water, or air, if known
  - Shipping name, hazard class, and identification number of other materials carried, if any

11.2 Transportation Contractor Responsibilities

Adherence to the following conditions shall be the responsibility of the transporter firm contracted for the project:

- The contractor used to transport soil from the site will be permitted by the U.S. EPA.
- Department of Transportation (DOT) safety regulations will be strictly followed. These include use of qualified drivers, written and road tests of drivers, medical

evaluation, hours of service limitation, equipment standards and inspections, and operating procedures.

- The contractor will possess an EPA Transporter Identification Number.
- The contractor will maintain public liability and property damage insurance in an amount specified by Aspire.
- The contractor will be provided a copy of the Transportation Plan and HSP for the project and is expected to adhere to the conditions of the plan. The contractor will advise its drivers regarding the characteristics of the material being hauled, and corrective measures that must be taken in the event of an accident or exposure.
- The transportation contractor's vehicles, including trucks and trailers, must be equipped and maintained in accordance with the Federal Motor Carrier Safety Regulations (49 CFR Parts 393 and 396). These regulations specify minimum standards for equipment, including brakes, tires, lights, suspension, steering, emergency equipment, and maintenance. Trucks will be equipped with radios.

11.3 Driver Responsibilities

In the event of an emergency, a driver's responsibilities are as follows:

- Park the unit in the most secure area available, away from homes, traffic, or businesses.
- Never abandon the truck or disconnect the trailer unless told to do so by the proper authorities or there is immediate danger which could affect the cargo.
- Set out flares or reflectors.
- Warn persons to keep away (minimum distance 500 feet, actual distance to be established by the DOT emergency response guidebook).
- Protect manifest, paperwork, instruction materials, and equipment for later use.
- Notify the ERC listed on the manifest, the driver's dispatcher, or supervisor, providing the following:
  - Proper shipping name, hazard class, and identification number of materials
  - Exact Location
  - Quantity of material spilled
  - Location and distance to any surface water
  - Nature and extent of any injuries or property damage
  - Weather conditions
  - A telephone number where communications with the scene can be established
  - An estimate of what response and cleanup will be needed
- Stay at the scene until relieved by an ERC.

- If the nature of the spill allows the driver, using appropriate personal protective equipment, to safely take action, he may attempt to dike the area, place a plastic liner down to collect the material or otherwise respond to the emergency. The driver is not to attempt to enter a closed unit or handle waste materials without qualified assistance.

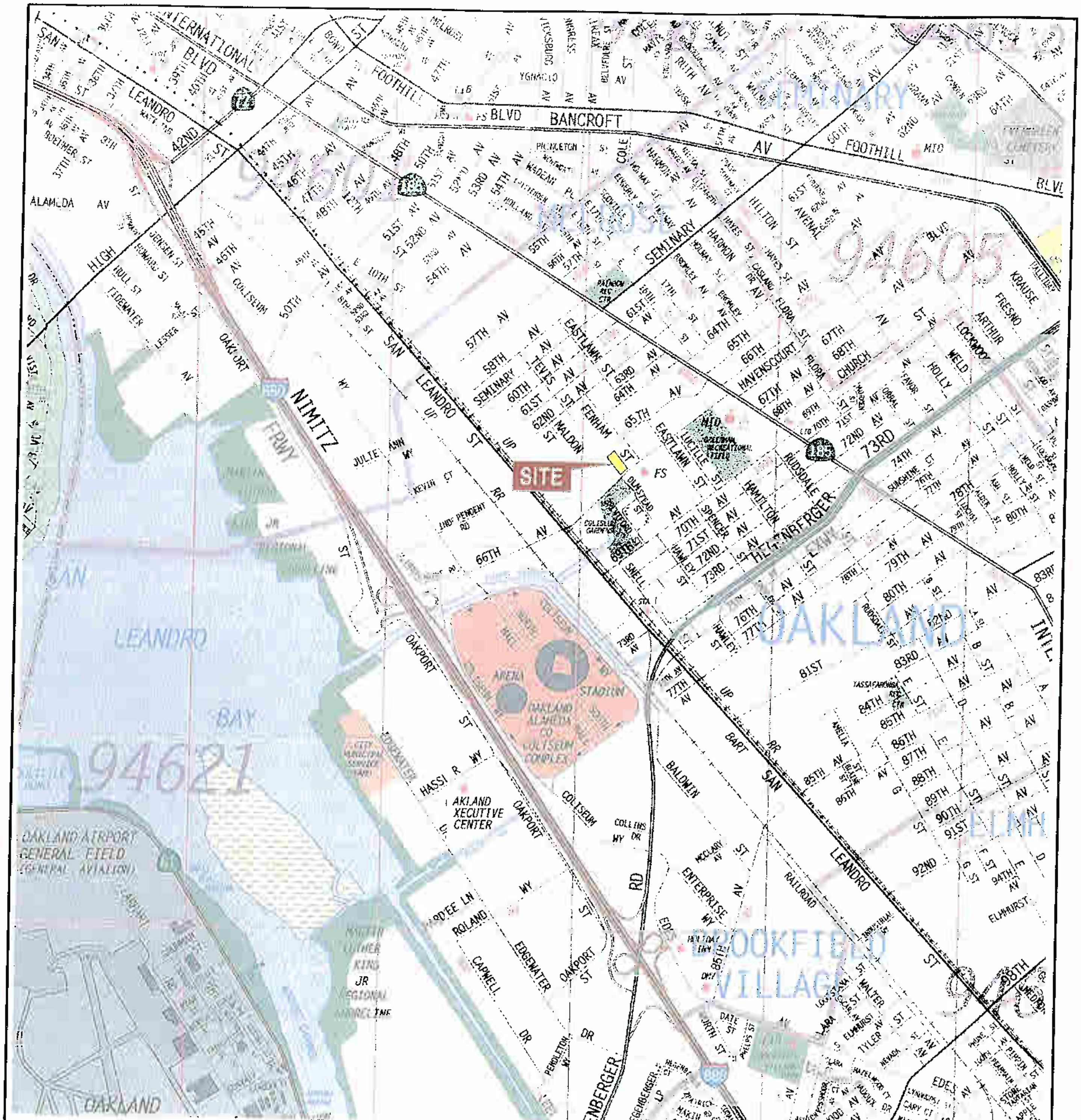
11.4 Job Site Contractor Responsibilities

The project general contractor overseeing the soil removal project will be responsible for assuring that the Transportation Plan prepared for the project is followed. The project general contractor will act as a liaison between the site and the transporter. The project general contractor will oversee the proper preparation of manifests to comply with applicable federal, state, and DOT regulations.

12.0 REFERENCES

LFR Inc. 2006. Soil Removal Action Work Plan, Proposed Aspire Charter High School, 1009 66th Avenue, Oakland, Alameda County, California. March 13.

Figures



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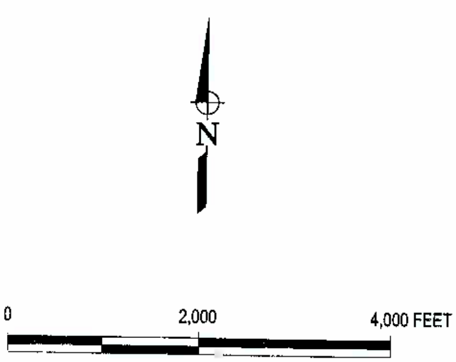

Site Vicinity

Proposed Charter School Site
1009 66th Avenue, Oakland, California

LFR

Figure 1

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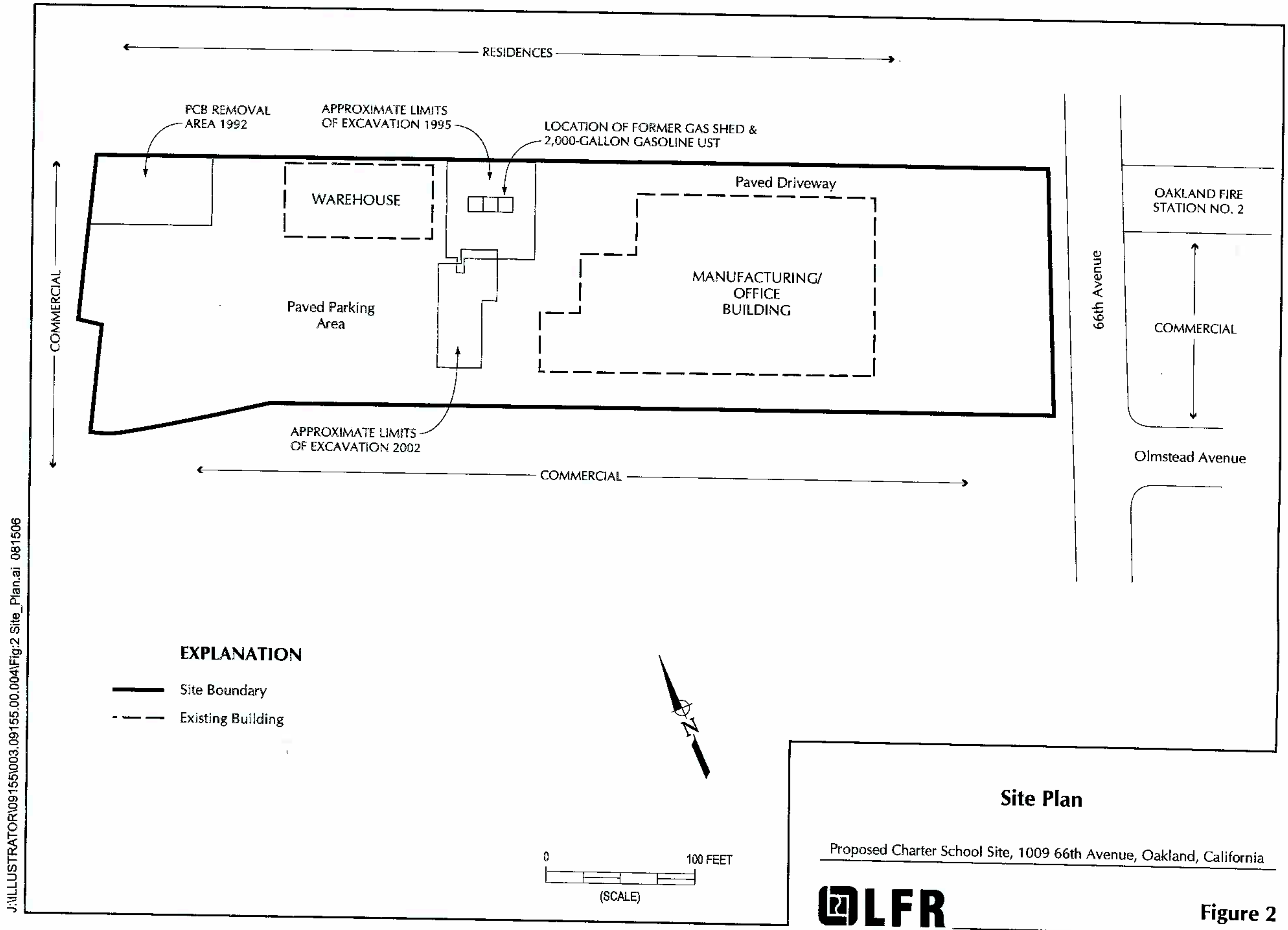


Site Plan

Proposed Charter School Site, 1009 66th Avenue, Oakland, California

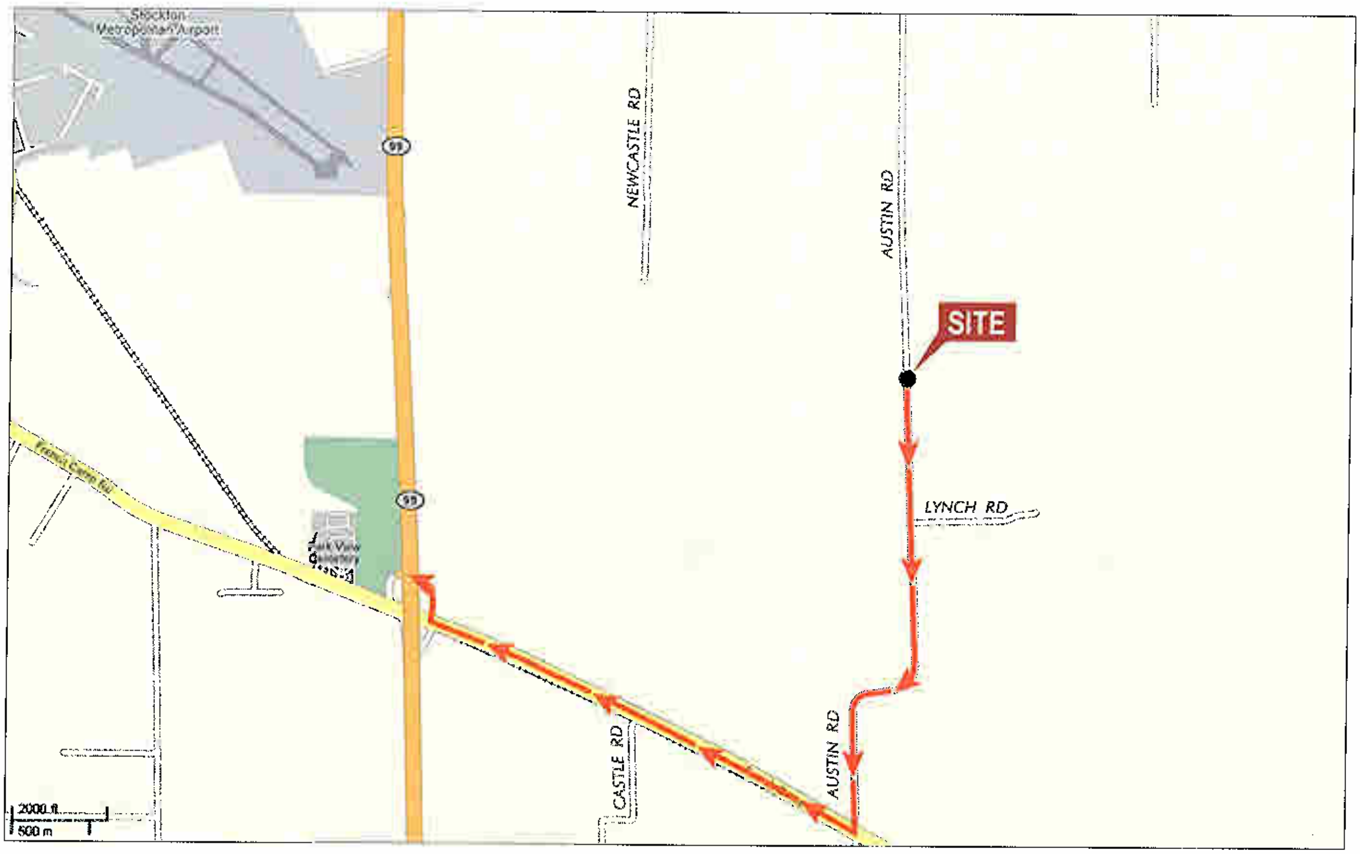
LFR

Figure 2

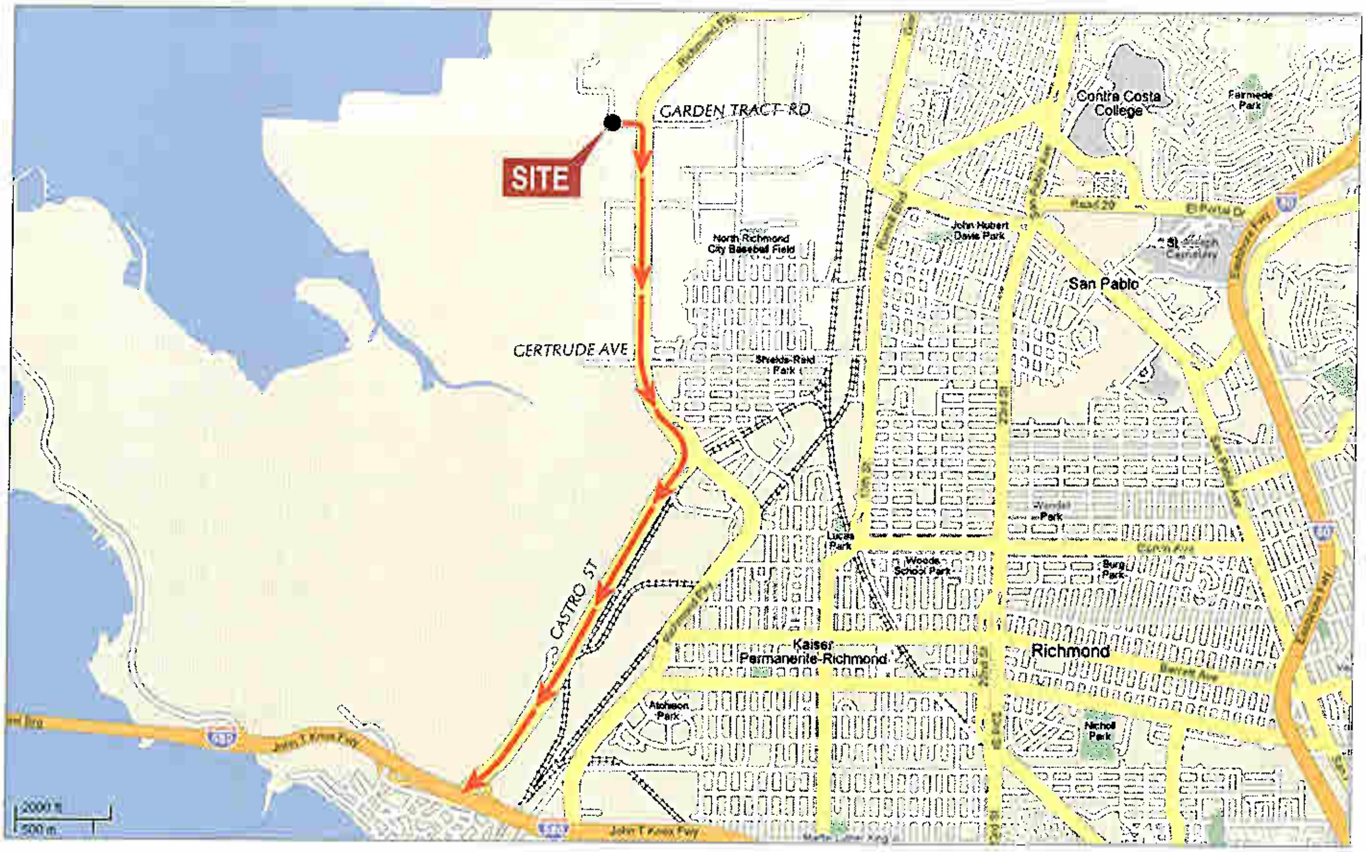
APPENDIX A

Routes to Disposal Facilities

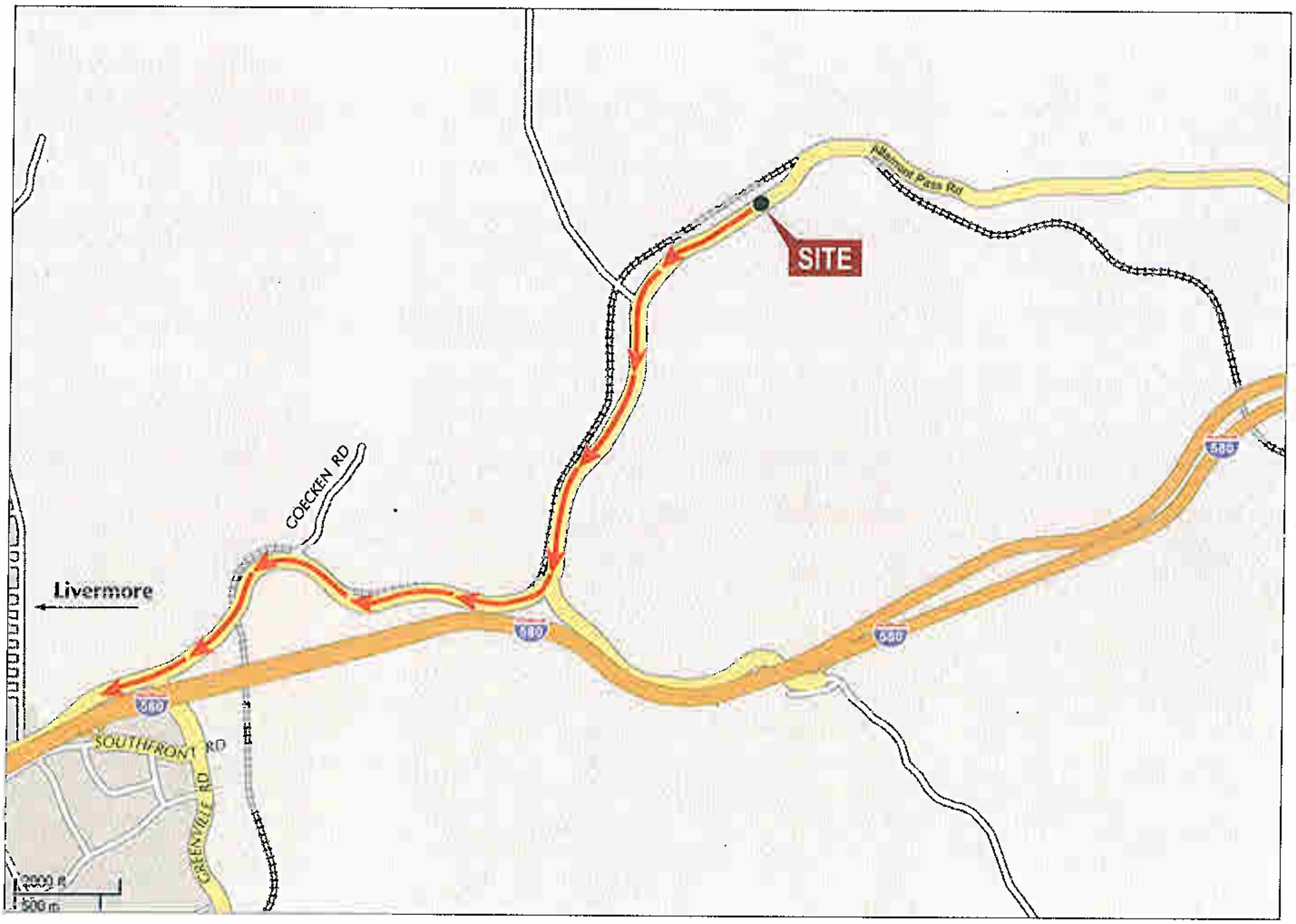
Forward Landfill
9999 South Austin Road
Manteca, CA



West Contra Costa Landfill
1 Parr Boulevard
Richmond, CA

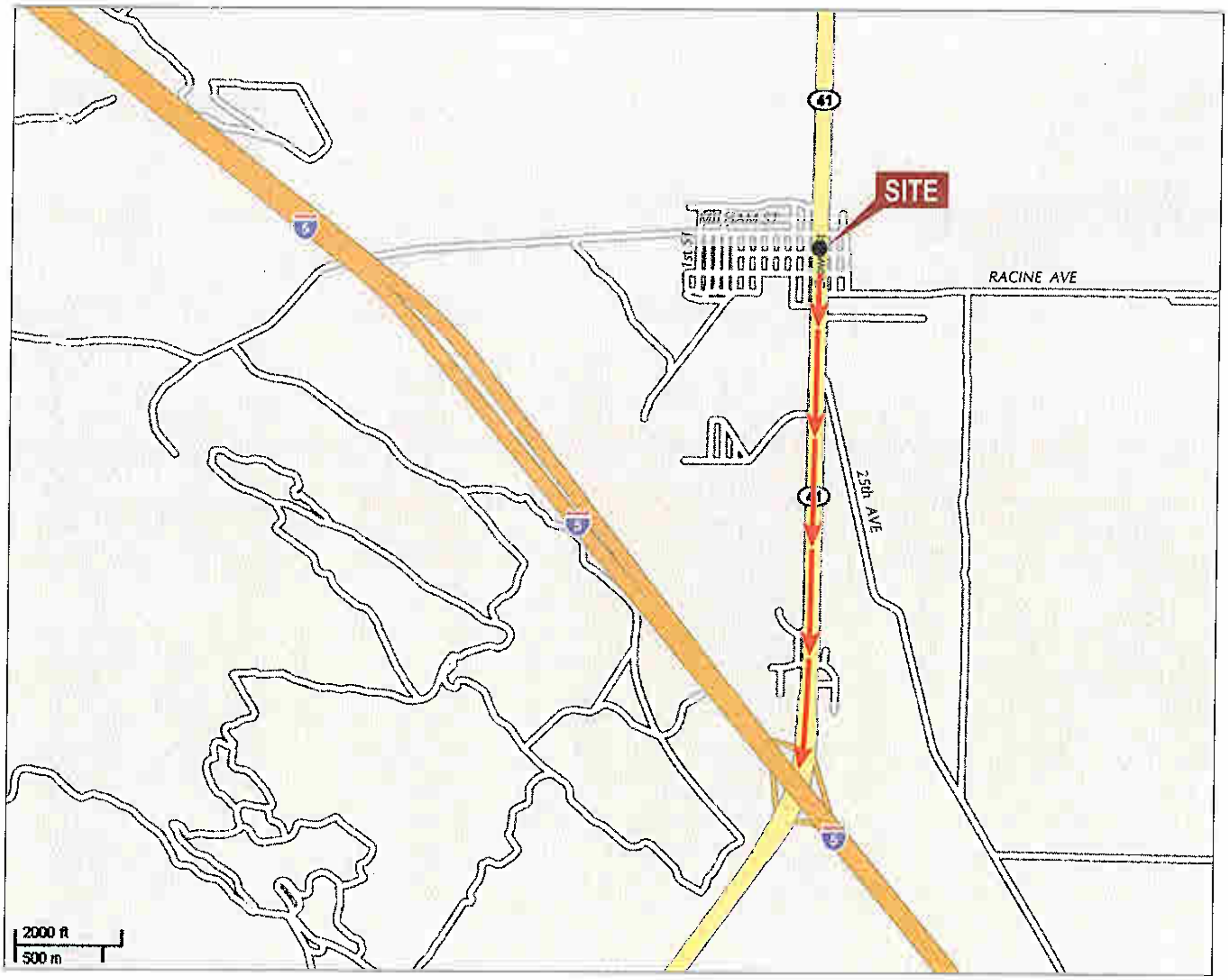


Altamont Landfill
10840 Altamont Pass Road
Livermore, CA

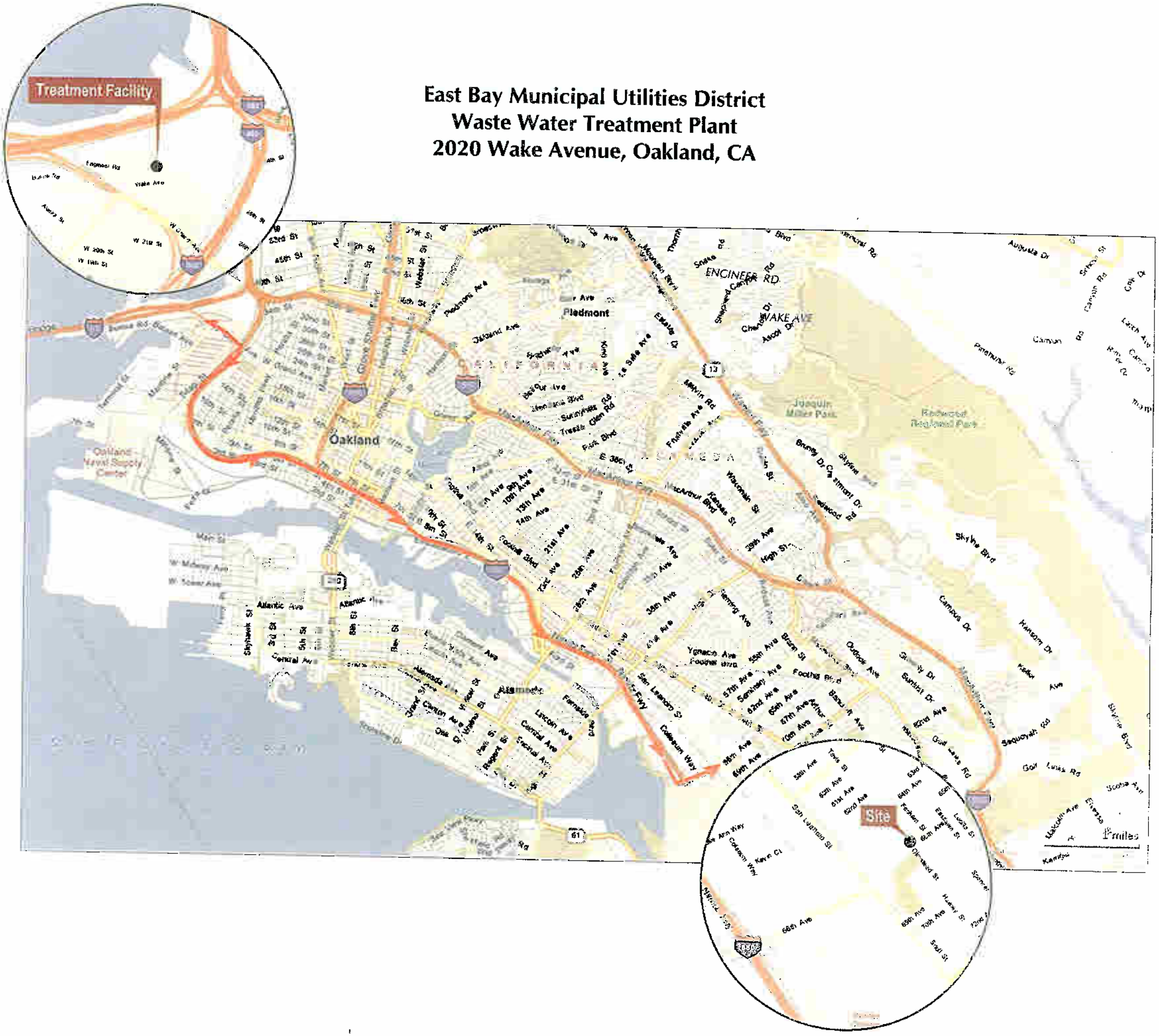


Buttonwillow Landfill
Sullivan Road and Miller Avenue
Buttonwillow, CA

Kettleman Hills Landfill
35251 Old Skyline Drive
Kettleman City, CA



East Bay Municipal Utilities District
Waste Water Treatment Plant
2020 Wake Avenue, Oakland, CA



APPENDIX B

Disposal Facility Waste Acceptance Information

Facility Audit: Buttonwillow, CA

CleanHarbors®
ENVIRONMENTAL SERVICES, INC.

Table of Contents

1.0 General Company Information

Introduction

Clean Harbors is a publicly traded company that maintains a vast network of service centers and waste management, treatment and disposal facilities, providing a broad range of environmental services. Services include hazardous and non-hazardous waste transportation and disposal, laboratory chemical packing, emergency response, and field services and industrial maintenance. Since its inception in 1980, Clean Harbors has grown to become the largest provider of environmental services in North America and its locations span the United States, Canada, and include locations in Mexico and Puerto Rico.

Network of Services

Strategically located across North America, Clean Harbors' service centers are the primary interface with customers and the focal point for providing waste management activities, laboratory chemical packing services, and emergency response, field services and industrial maintenance. From the service center Site Service crews and equipment are dispatched to perform various planned work on customers' sites, as well as emergency response. CleanPack teams are also based at the service centers and provide customers with laboratory chemical packing services.

Technical Services - *Transportation & Disposal* - Clean Harbors' network of company owned waste treatment, storage and disposal facilities are located across North America and offer a broad range of disposal, recycling and treatment technologies for hazardous and non-hazardous materials. Technologies include:

- Incineration
- Wastewater Treatment
- Recycling
- Fuels Blending
- Landfill

All of our disposal facilities uphold rigorous quality assurance programs to meet the highest standards of both internal and external audits.

Waste streams handled by Clean Harbors can be in any form from gas to liquids, solids and sludge. Clean Harbors can dispose of virtually any type of waste, hazardous or non-hazardous from exotic water reactive wastes to typical paint or oil wastes.

Our transportation services handle everything from small one-time shipments to multiple large shipments, and include drum, bulk and rail capabilities. Once you place your order and before the pick up is even made, Clean Harbors begins the process of managing your waste. Your order enters our Logistics center where your waste is designated for disposal via the least cost routing. Company owned and operated trucks are assigned based on the most efficient route or on pre-established schedules. Satellite tracking and communications allows trucks to be dispatched on the fly from anywhere in the country. The disposal facility is determined based on the most appropriate, yet lowest cost disposal method.

Plant inventories are centrally monitored real-time and our facilities know in advance and begin load planning for efficient processing of incoming waste. All this upfront work is managed centrally and electronically to provide the most cost effective and efficient handling of orders, and waste transportation and disposal, in the industry.

CleanPack® Laboratory Chemical Packing Services - Clean Harbors' staff of professionally trained CleanPack chemists work on customers' sites to collect, label and package unwanted laboratory quantities of chemicals and wastes for disposal in compliance with local, state, and federal regulations. CleanPack teams provide reactive material handling services for the proper management and disposal of highly reactive and dangerous chemicals, laboratory move services as well as assisting in facility closures. Our household hazardous waste collection program offers a cost effective and safe manner for States, Cities and Towns to keep their resident's free of unwanted old and obsolete pesticides, paints, fertilizers and other potentially harmful materials.

Site Services - *Field Service* crews work in hazardous and non-hazardous environments, crews perform routine planned jobs and emergency responses specializing in site decontamination, biohazard response, confined space entry, product recovery and transfer, excavation and removal, vacuum services, as well as scarifying and sandblasting, marine services and booming. While remediation and environmental construction services of any scale including remedial systems design, custom fabrication and welding, mobile treatment, well maintenance and video inspection complement Clean Harbors' capabilities.

Industrial Service teams use advanced industrial cleaning technologies including chemical cleaning, hydroblasting, vacuum services, steam cleaning, sodium bicarbonate blasting, and abrasive blasting to accomplish fast turnaround during time-critical plant shutdowns.

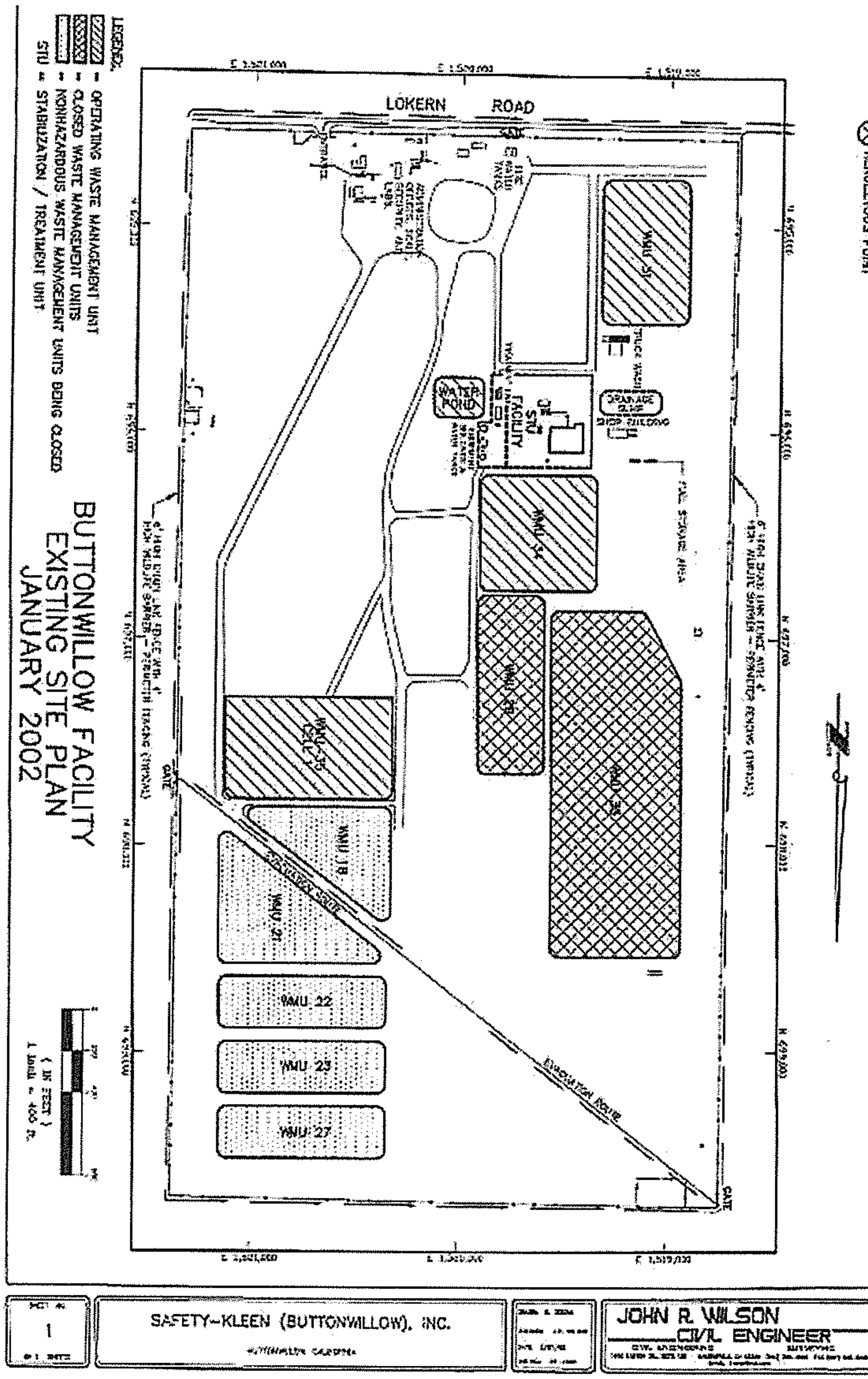
2. 0 Facility Information

Facility Overview

Clean Harbors Buttonwillow, LLC, is a subsidiary of Clean Harbors, Inc. headquartered in Braintree, Massachusetts, which owns and operates a hazardous waste storage, treatment and disposal facility located near Buttonwillow, California. This facility is commonly referred to as the Buttonwillow Facility. The Buttonwillow Facility is a fully permitted hazardous waste facility, permitted by various regulatory agencies in the State of California to receive, store, treat and landfill a variety of waste streams. The treatment methods utilized at this facility typically reduce toxicity of waste materials and make it suitable for disposal

Facility Name	Clean Harbors Buttonwillow, LLC.
Location	2500 West Lokern Road, P.O. Box 787 Buttonwillow, CA 93206 County:Kern
Property Owner	Facility Owner Clean Harbors Buttonwillow, LLC. 2500 West Lokern Road, P.O. Box 787 Buttonwillow, CA 93206-0787
SIC Code	4953 Refuse System
Facility EPA ID No	CAD980675276
Permit Type	Hazardous Waste Facility Permit
Waste Description	Hazardous and Non hazardous waste amendable for landfill disposal
Services Provided	Storage Stabilization/Solidification Landfill Non hazardous Liquid Waste Disposal
Operating Hours	9:00 AM to 5:00 PM Monday through Friday closed Saturday and Sunday. Special arrangements can be made for off-hour acceptance.
Facility Size	The property encompasses 320 acres in the eastern half of Section 16, Township 29S, Range 22E, Mount Diablo Base and Meridian. The assessors parcel number is 99-290-17.
Number of Employees	22 full time employees

Facility Site Plan



Facility History

The Buttonwillow facility was developed by Petroleum Waste, Inc. (PWI), a subsidiary of McKittrick Mud Company, on the land owned by McKittrick Mud. The Kern County Board of Supervisors approved development of the facility in 1982. The Kern County Planning Department in September 1982 subsequently issued a Conditional Use Permit (CUP), allowing the disposal of hazardous and nonhazardous wastes at the site. The facility was reviewed under the California Environmental Quality Act (CEQA) prior to issuance of the CUP. The facility was granted Hazardous Waste Facility Permits by the California Department of Toxic Substances Control (DTSC), formerly known as the Department of Health Services (DHS) and the U.S. Environmental Protection Agency (EPA) in May 1983 and October 1984, respectively. These permits allowed the facility to construct and operate a number of California hazardous waste and RCRA hazardous waste surface impoundments.

In 1986, IT Corporation purchased the facility. In September 1987, the facility submitted a revised RCRA Part B application. The submittal of this application was motivated primarily by the Toxic Pits Cleanup Act of 1984, which required the closure of the liquid hazardous waste surface impoundments at the facility, and the federal and state land disposal restrictions, which required treatment of wastes prior to land disposal. The revised application called for retrofitting the existing California hazardous and RCRA hazardous waste surface impoundments into eight new landfills (WMUs 101 through 108) and construction of three additional landfills (WMUs 28, 33, and 34) in previously undeveloped areas of the site. In addition, the application addressed construction of three units to be used for treatment of wastes prior to land disposal: the Stabilization Treatment Unit (STU), the Waste Stabilization Unit (WSU), and the Modular Inorganic Treatment System (MITS). The September 1987 permit application was modified several times by the various submittals listed previous, which incorporate revised unit design and operational plans. Based on these submittals, the facility was granted a modified Hazardous Waste Facility Permit by the DHS and EPA.

In June 1989, GSX Corporation purchased PWI from IT Corporation and later changed its name to Laidlaw Environmental Services (Lokern), Inc. in the June 1990. In July 1991, Laidlaw submitted a new RCRA Part B Permit Application to EPA, DTSC, Regional Water Quality Control Board (RWQCB) and the Kern County Planning Department and requested new permits for the facility. The Part B Permit Application requested the acceptance of all RCRA hazardous waste codes (removal of the petroleum exclusion), the construction of a 10,700,000 cubic yard landfill (WMU 35) in lieu of eight smaller landfills (WMUs 101 through 108), and to have the ability to act as a transfer facility. In addition, Laidlaw had no intention of constructing the MITS or WSU so these treatment units were deleted from the application.

As part of the permitting process, a Supplemental Environmental Impact Report (SEIR) was prepared, approved by the Kern County Board of Supervisors and a new CUP adopted on December 12, 1994.

On March 7, 1996 and April 30 1996, the DTSC signed the new Hazardous Waste Facility Permit and the RWQCB adopted new Waste Discharge Requirements, respectively. These new permits allow for the acceptance of addition RCRA nonRCRA hazardous wastes, nonhazardous waste and construction of new landfill WMU 35.

On May 20, 1998, Safety-Kleen Corporation became a wholly owned subsidiary of Laidlaw Environmental Services, Inc. (LES). In order to take advantage of the tremendous market value of the Safety-Kleen trade name, LES began conducting business as Safety-Kleen Corporation. As such, on July 1, 1998 Laidlaw Environmental Services (Lokern), Inc. changed its name to Safety-Kleen (Buttonwillow), Inc. The name change reflected adopting the Safety-Kleen trade name by the corporation. With the exception of this name change, no other change occurred to the physical plant, key personnel or operational procedures. The regulatory agencies that issued facility permits, licenses, or other approvals were properly notified of the name change. Any required applications, fees or additional information was also submitted to the appropriate regulatory agencies.

In June 2000, Safety-Kleen filed for bankruptcy protection under Chapter 11 of the Bankruptcy Code. As a result, the Chemical Services Division (CSD), which included the Buttonwillow Facility, was sold to Clean Harbors, Inc. on September 6, 2002. As such, all of the Buttonwillow Facility's permits were changed to reflect the changed in ownership.

Site Characterization

The following provides information regarding land use around the Buttonwillow facility, nearest surface water body, climatology, 100-year flood plain, hydrogeology, and environmental monitoring.

Land Use

Land use immediately adjacent to the facility consists of irrigated agriculture and undeveloped land. Irrigated agriculture, oil production activities and waste disposal site operations are the predominant land uses surrounding the Buttonwillow facility for several miles. The nearest resident is located approximately 3 miles northeast of the facility. The community of Buttonwillow is located 8 miles east of the Buttonwillow facility.

Surface Water Bodies

The nearest surface water body is the California Aqueduct. At its nearest point, the California Aqueduct is located approximately 0.75 miles north east of the Buttonwillow facility.

Climatology

The Buttonwillow facility is located in an arid environment. The facility receives an average of 5 inches of precipitation per year. The average annual pan evaporation rate is 108 inches. The 100 year, 24 hour storm event for the facility is 1.7 inches and the probable maximum 24-hour storm event is 5.36 inches.

100 Year Flood Plain

Hydrologic and hydraulic analyses show that none of the facility's waste management units are located within the 100-year flood plain. However, the northwest corner of the property is within the 100-year flood plain. The Buttonwillow facility does not have any operations in this area of the facility.

Hydrogeology

The Buttonwillow facility lies on the Antelope Plain on the southwestern flank of the San Joaquin Valley. In the vicinity of the facility, this gently sloping plain has been mapped as Quaternary alluvium underlain by the Plio-Pleistocene Tulare Formation.

Three distinct stratigraphic zones comprise the upper 600 feet of the sedimentary sequence beneath the site. This includes the Upper Zone, the Intermediate Zone, and the Lower Zone. Figure 4 shows a hydrogeologic cross-section of the Buttonwillow facility.

Upper Zone

The Upper Zone consists of the surficial Silt Unit and the underlying Upper Sand Unit. Due to the dipping strata, this zone varies in thickness from approximately 70 feet in the southwest corner of the facility to 220 feet in the northeast corner of the facility.

The top of the Upper Zone consists of a Silt Unit, which extends from ground surface to depths that vary from 30 feet in the southwestern corner of the facility to approximately 120 feet in the northeastern corner of the facility. In general, the Silt Unit has some interbeds of sand and gravel, with trace amounts of clay. In the southern and western portions of the facility, the Silt Unit contains interbeds of sandy gravel up to ten feet thick. Silty sand interbeds up to ten feet thick are also seen in the Silt Unit, predominantly in the lower ten feet of the unit which silt generally grades to sand. The Upper Sand Unit lies below the Silt Unit and varies in thickness from approximately 40 feet in the southern end to approximately 70 feet in the northeastern corner of the facility. This unit is composed of very fine-to coarse-grained sand, which is moderate to well sorted and loose to very dense. The Upper Sand is unsaturated in the southwestern area of the facility. A ground water-bearing zone appears as the base of the unit dips below approximately 230 feet MSL in the northeastern area of the facility. To the south, the Upper Zone is dry. See Figure 6.

Within the Upper Perched Zone, ground water flows generally to the east-southeast under unconfined conditions. The hydraulic gradient averages approximately 0.004, the hydraulic conductivity for this zone is 5.39 feet per day. Assuming an effective porosity of 0.25 based on soil samples collected within the zone, ground water velocity range from 8 to 31 feet per year within the Upper Perched Zone.

Ground water quality in the Upper Perched Zone is poor. The water is not potable. The total dissolved solids (TDS) concentration ranges from 2100 to 8000 mg/L. The electrical conductivity ranges from 2100 to 8500 umhos/cm.

Intermediate Zone

The Intermediate Zone is composed of the Upper Clay Layer, the Intermediate Unit, and the Lower Clay Layer. This zone varies in thickness from 35 to 55 feet across the facility.

The top of the Intermediate Zone consists of the Upper Clay Layer. The Upper Clay Layer appears to be continuous throughout the facility with a thickness ranging from 2 to 15 feet.

The underlying Intermediate Unit is approximately 30 to 40 feet thick and consists mainly of silt. The silt is slightly sandy, with fine sand and clay interbeds. Two fine-grained sand beds can be correlated in some areas of the facility within the Intermediate Unit; one is located at or near the top of the Intermediate Unit and the other located at or near the base of the unit. The uppermost sand body ranges from 3 to 8 feet in thickness and pinches out laterally in the southeastern areas of the facility. The lower sand body ranges from 4 to 8 feet thick and pinches out laterally in the southeastern corner of the facility, and is silty and thin to absent in the northern area.

The bottom of the Intermediate Zone consists of the Lower Clay Layer. The Lower Clay layer is continuous throughout the facility, with a thickness ranging from 4 to 12 feet. The Lower Clay Layer consists of stiff to very stiff, damp to moist fat clay, which frequently grades to increasing silt content near the base of the layer.

This zone becomes water bearing in the northeastern portion of the facility where the base of the Intermediate Unit dips below approximately 184 feet MSL. To the south, the Intermediate Zone is dry. Within the Intermediate Perched Zone, ground water flows to the east, under both confined and unconfined conditions. In the northeastern area of the facility, the Upper Clay Layer dips below the piezometric surface of the Intermediate Perched Zone, and the Intermediate Zone becomes confined. See Figure 7.

The hydraulic gradient averages approximately 0.003. The mean hydraulic conductivity is 2.38 feet per day. Assuming an effective porosity of 0.25, the ground water velocity is approximately 10 feet per year.

Ground water quality in the Intermediate Perched Zone is poor. The water is not potable. The total dissolved solids (TDS) concentration ranges from 2100 to 3200 mg/L. The electrical conductivity ranges from 2200 to 4400 umhos/cm.

Lower Zone

The Lower Zone is comprised of the Lower Unit, which is underlain by the Corcoran Clay, at a depth of approximately 600 feet. The average thickness of this zone is approximately 400 feet.

The Lower Unit is composed of generally interbedded sands, silts, and clays that vary in thickness from 2 to 50 feet. Correlatable sand beds, which thicken to 40 feet, are encountered, however, beds which are less than 10 feet thick and which pinch out laterally between wells are more prevalent.

The Corcoran Clay, which underlies the Lower Unit, was encountered at approximately 230 feet MSL indicating its depth below ground level is approximately 620 feet.

This stratigraphic zone is water bearing continuously across the facility. Ground water flow in the Lower Water Table Zone is predominantly to the northeast with a hydraulic gradient ranging from approximately 0.0015 in the northern portion of the facility to approximately 0.0065 in the central and southern portion of the facility. See Figure 8.

The mean hydraulic conductivity is 2.69 feet per day. Assuming an effective porosity of 0.25, the estimated ground water velocity is approximately 6 feet per year in the northern portion of the facility, and 26 feet per year in the southern central portions of the facility.

Ground water quality in the Lower Water Table Zone is poor. The water is not potable. The total dissolved solids (TDS) concentration ranges from 2100 to 3200 mg/L. The electrical conductivity ranges from 1800 to 3500 umhos/cm.

Environmental Monitoring

The following is a description of some of the environmental monitoring systems at the Buttonwillow facility.

Leachate Collection and Removal Systems

Leachate collection and removal systems (LCRSs) are designed to intercept and collect liquid migrating downward through the waste towards the liner system. Landfill LCRSs are monitored for the presence of liquid on a daily basis. When the liquid level in the sump approaches 12 inches in depth, the liquid is pumped from the sump.

Vadose Zone Monitoring

Located beneath the landfills in native soil is a steel pipe. Moisture content readings of the native soil beneath the landfill are taken quarterly with a neutron probe. If an increase in moisture content of greater than 6 percent is detected, the facility must investigate the source of the fluid. The vadose zone monitoring system acts as an early warning system against a possible release.

Ground Water Monitoring

The ground water monitoring network at the Buttonwillow facility consists of 86 wells. See Figure 5. Water level measurements are obtained from all 86. Background water quality samples are collected from 9 wells and downgradient or Point of Compliance (POC) samples are collected from 21 wells. See Table 2. Water level measurements and ground water monitoring samples are collected quarterly.

Ground water samples are analyzed for the following chemicals:

- General chemistry parameters (e.g., chloride, sulfate, TDS, EC, pH, etc).
- Metals (e.g. arsenic, barium, chromium, lead, etc.); and
- Volatile organic compounds (VOCs) by EPA Method 8240.

Quarterly, a technical report is prepared and submitted to EPA, DTSC, and RWQCB for review. Ground water contamination has not been detected at the Buttonwillow Facility.

Ambient Air Monitoring

The Buttonwillow facility has an ambient air monitoring program that consists of one upwind and two downwind air monitoring stations. Air samples are collected every twelve days in conjunction with the California Air Resources Board statewide air toxics monitoring program. Air samples are monitored for 10 metals and six VOCs.

Security

Security at the facility is provided by a staff of trained security personnel twenty four hours per day seven days per week. Security personnel monitor the main entrance gate, located on the north side of Lokern Road, and other perimeter gates. All facility personnel, vendors, contractors, waste haulers, and visitors are logged in and out of the facility at the main gate. Admittance to the facility is allowed with only proper identification. Each Buttonwillow facility employee is issued a badge, which must be shown to the guard prior to entry. Visitors and non-Clean Harbors employees are allowed entry only with verbal approval from a staff member at the facility. Visitors are issued visitor passes that are worn during their visit and returned when leaving.

Other security equipment includes normal emergency lighting, two-way radios, and the internal phone system. The truck receiving area and the main access gate are lighted for nighttime operations. The guard at the main gate and the truck-receiving operators working in the truck receiving area are equipped with two-way radios to immediately report potential problems.

A galvanized cyclone fence that is approximately 6 feet high surrounds the perimeter of the 320-acre facility. Entry into the fenced area is through the main gate. Surveillance of the main access gate is provided 24 hours a day, seven days per week. The other perimeter gates are kept locked and are used on in emergencies or for temporary access to and from the facility by Buttonwillow employees.

Warning signs are posted on the active and inactive entrances to the facility on the perimeter fence. The signs are visible from every approach to the facility and are legible at a distance of 25 feet.

Directions to Facility

Clean Harbors Buttonwillow, LLC.
2500 West Lokern Road
Buttonwillow, CA 93206-0787
(661) 762-6200

From Bakersfield:

1. Take Highway 58 west (approximately 35 miles) to Lokern Road.
2. Turn right on Lokern Road and follow Lokern Road to the Buttonwillow Facility.

From Los Angeles:

1. Take Interstate 5 North. From the Los Angeles area, you will travel approximately 100 miles north until you reach the Highway 58/Buttonwillow exit.
2. Take the Highway 58/Buttonwillow exit.
3. Go west on Highway 58 (approximately 8 miles) to Lokern Road.
4. Take a right onto Lokern Road (approximately 3 miles) and follow it to the Buttonwillow facility.

From San Francisco:

1. Take Interstate 5 South (approximately 200 miles) until you reach the Highway 58/Buttonwillow exit.
2. Go west on Highway 58 (approximately 8 miles) to Lokern Road.
3. Turn right onto Lokern Road (approximately 3 miles) and follow it to the Buttonwillow facility.

The Buttonwillow facility is located in Kern County, California. The facility is situated approximately 8 miles west of Buttonwillow and 36 miles west of Bakersfield on the northern side of Lokern Road.

3.0 Operating Licenses and Permits

The following contains information on various licenses and permits held by the Buttonwillow Facility.

Permit Summary

The Buttonwillow Facility currently permitted by the U.S. Environmental Protection Agency, the State of California and Kern County for the storage, treatment, and disposal of hazardous and nonhazardous waste. A list of permits is shown below:

ISSUING AGENCY	PERMIT NAME	PERMIT NUMBER	EXPIRATION DATE
Department of Toxic Substances Control	Hazardous Waste Facility Permit	CAD980675276	April 6, 2006
California Regional Water Quality Control Board	Waste Discharge Requirements	Board Order No. 96-094	None
Kern County Board of Supervisors	Conditional Use Permit	No. 4, Map 97	August 21, 2002
State Water Resources Control Board	General Storm Water Discharge Permit	No. 5C15S003164	None
San Joaquin Valley Unified Air Pollution Control District	Permit to Operate	See attached List	See Attached List
Fish & Wildlife Service	Incidental Take Permit Biological Opinion - Kern Mallow	Case No. 1-1-88-F-62R Case No. 1-1-94-F-46	None
California Department of Fish and Game	Wildlife Capture Permit (letter)	PRT-702631 Subpermit CHAMT	None
Kern County Environmental Health Services Department	Permit to Operate Underground Hazardous Storage Facility	No. 330131C	April 1, 2003
Kern County Department of Weights and Measures	Certificate of Registration Permit	No. WVS-6-044	June 2002
California Department of Food and Agriculture	Weighmaster License	No. 006305	September 1, 2002
California Department of Health Services	Domestic Water System	No. 03-12-94P-008	None
Department of Agriculture	Quarantine Compliance Agreement Permit to Move Soil	No. KER-3 No. S-3798	December 19, 2001
Environmental Protection Agency	Hazardous Waste Facility Permit	CAD980675276	April 6, 2006
Kern County Environmental Health Services Department	Solid Waste Facility Registration Permit	15-AA-0257	October 9, 2005
California Division of Safety and Health	Permit to Operate Pressure Vessel	See attached List	See attached List

SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT
PERMIT TO OPERATE (PTO) LIST

PERMIT NUMBER	EQUIPMENT DESCRIPTION	ISSUANCE DATE	EXPIRATION DATE
S-1259-01-0	WMU 28 (landfill)	April 17, 1996	March 31, 2006
S-1259-02-0	WMU 18 (nonhazardous pond)	April 17, 1996	March 31, 2006
S-1259-03-0	WMU 21 (nonhazardous pond)	April 17, 1996	March 31, 2006
S-1259-04-0	WMU 22 (nonhazardous pond)	April 17, 1996	March 31, 2006
S-1259-05-0	WMU 23 (nonhazardous pond)	April 17, 1996	March 31, 2006
S-1259-06-0	WMU 27 (nonhazardous pond)	April 17, 1996	March 31, 2006
S-1259-07-0	WMU 31 (nonhazardous pond)	April 17, 1996	March 31, 2006
S-1259-64-4	Hazardous Waste Landfill Operation #33	January16, 1997	March 31, 2006
S-1259-65-4	Hazardous Waste Landfill Operation #34	January16, 1997	March 31, 2006
S-1259-68-0	17,000 gal. Unloading Bay #1	April 17, 1996	March 31, 2006
S-1259-69-0	10,000 gal. Unloading Bay #2	April 17, 1996	March 31, 2006
S-1259-70-0	10,000 gal, Unloading Bay #3	April 17, 1996	March 31, 2006
S-1259-71-0	10,000 gal. Unloading Bay #4	April 17, 1996	March 31, 2006
S-1259-74-0	200 yd^3 Bulk Solid Additive Silo	February 4, 1997	March 31, 2006
S-1259-75-0	200 yd^3 Bulk Solid Additive Silo	February 4, 1997	March 31, 2006
S-1259-78-0	10,000 gal. Waste Water Storage Tank	April 17, 1996	March 31, 2006
S-1259-79-0	Auger Shredder Waste Stabilization Equip.	April 17, 1996	March 31, 2006
S-1259-81-0	2,000 gal. Above Ground Gasoline Tank	April 17, 1996	March 31, 2006
S-1259-82-0	450 Hp Turbocharged Diesel IC Engine for Emergency Generator	April 17, 1996	March 31, 2006
S-1259-83-0	208 Hp Turbocharged Diesel IC Engine for Emergency Fire Water Pump	April 17, 1996	March 31, 2006
S-1259-84-0	71 Hp John Deere Diesel IC Engine Water Pump	April 17, 1996	March 31, 2006
S-1259-85-0	78 Hp John Deere Diesel IC Engine for Air Compressor	April 17, 1996	March 31, 2006
S-1259-86-0	228 Hp Diesel IC Engine - Air Compressor	April 17, 1996	March 31, 2006

Principal Operating Licenses/Permits

Copies of existing permits which detail types of waste management licensed capacities and waste types accepted are available for inspection upon request at the site.]

BEFORE THE BOARD OF SUPERVISORS
COUNTY OF KERN, STATE OF CALIFORNIA

In the matter of:
AMENDMENT TO THE CIRCULATION ELEMENT OF THE GENERAL PLAN (CASE NO. 3, MAP NO. 97; APPROVAL OF CONDITIONAL USE PERMIT NO. 4 MAP NO. 97; FINDINGS AND DETERMINATIONS

Resolution No. 94-684

Reference No. 9411930
9411241
949355
9411225
948501

I, SUE DAVIS, Clerk of the Board of Supervisors of the County of Kern, State of California, do hereby certify that the following resolution, on motion of Supervisor Peterson, seconded by Supervisor Ashburn, was duly passed and adopted by said Board of Supervisors at an official meeting hereof this 12th day of December, 1994, by the following vote, to wit:

AYES: Ashburn, Austin, Peterson, Shell

NOES: Larwood

ABSENT: None

SUE DAVIS
Clerk of the Board of Supervisors
County of Kern, State of California

Kaaren Shatswell
Deputy Clerk

RESOLUTION

Section 1. WHEREAS;

(a) Laidlaw Environmental Services Inc. ("Laidlaw"), has filed an application with the Planning Department for the following project:

94-684

1) An amendment to the Circulation Element of the General Plan to allow the use of County-maintained roads, in addition to state and federal roads, as primary access to a hazardous waste facility (General Plan Amendment Case No. 3, Map No. 97); and

2) A Conditional Use Permit ("CUP") to allow the modification of an existing hazardous waste facility in an A (Exclusive Agriculture) District (CUP No. 4, Map No. 97) as more fully described in the application.

(b) The property which is subject to this application is located on the north side of Lokern Road, approximately four miles west of Highway 58 and 2 1/2 miles east of Highway 33, eight miles west of Buttonwillow and is described as follows:

> E/2 of Section 16, T29S, R22E, MDB&M, County of Kern, State of California (approximately 320 acres).

(c) This application has been made in the form and manner prescribed by the Kern County Ordinance Code and is on file with the Clerk of this Board. The proposed modifications to the existing facility include:

- Construction and operation of a new hazardous/nonhazardous waste landfill, Waste Management Unit ("WMU") 35, that will accommodate a greater capacity of wastes in lieu of eight previously approved landfills (WMUs 101-108).
- Addition of a new Container Storage Area (in addition to the existing Drum Handling and Storage Area).
- Acceptance of a wider range of hazardous and nonhazardous waste from industries other than the petroleum industry.
- Modification of the design of the Stabilization Treatment Unit previously permitted by DTSC and EPA. The modifications include:
  - The option for a second auger shredder for waste stabilization treatment.
  - Expanded waste repackaging and liquids bulking operations.
- Operation as a transfer facility for nonpetroleum-related wastes.

- Update of operational plans and procedures (e.g., Waste Analysis Plan, Contingency Plan) to address new operations, facility improvements, and new regulations.

Complete details of the requested modifications are contained in the application and reference is hereby made thereto for further particulars.

(d) Pursuant to the requirements of the California Environmental Quality Act ("CEQA") and the State and County CEQA Guidelines, a Draft Supplemental Environmental Impact Report ("SEIR") relating to the project was prepared by the Planning Department and circulated for comment as required by law. The Final SEIR, consisting of the Draft SEIR, technical appendices, public comments and the responses to comments on the Draft SEIR, was subsequently filed with the Clerk of the Board, together with a proposed Mitigation Monitoring Program.

(e) In accordance with the requirements of Health and Safety Code Section 25199.7, this Board appointed a seven member local assessment committee ("LAC") to advise it in considering the Laidlaw application.

(f) The LAC has conducted twelve public meetings since February 27, 1992 in order to consider the Laidlaw application and has provided its recommendations to the Board on this application.

(g) The Clerk of this Board has caused notice to be duly given of a public hearing in this matter in accordance with law, as evidenced by the affidavit of publication and the affidavit of mailing on file with the Clerk of this Board.

(h) The Planning Department Director reports that he will issue a Certificate of Fee Exemption for this action pursuant to Title 14, California Code of Regulations section 753.5(c), on the basis that there is no evidence that the proposed project will have potential for adverse effect on wildlife resources.

(i) All materials with regard to this project were made available to the Board of Supervisors for its review and consideration of this project including, but not limited to, the following:

(1) The staff report, and addenda thereto, including proposed conditions of approval, mitigation monitoring program, recommended statement of findings as required by CEQA (Public Resources Code § 21081) and the CEQA Guidelines (14 Cal. Code Regs. § 15091), and a proposed "Statement of Overriding Considerations";

(2) The Final SEIR dated August, 1994;

(3) The recommendations of the LAC and the record of its proceedings;

(4) A "Fair Share" analysis and a Needs Assessment prepared by Arthur D. Little, Inc. for the project;

(5) All documents and records filed in this proceeding by interested parties.

(j) A duly noticed public hearing was held on December 12, 1994, before the Board of Supervisors.

(k) Having reviewed and considered all testimony and materials made available to the Board of Supervisors including, but not limited to the Final SEIR, the staff reports and all the testimony and evidence in the record of the proceedings with respect to the project, the Board of Supervisors took the actions hereinafter set forth.

Section 2. NOW, THEREFORE, BE IT HEREBY RESOLVED by the Board of Supervisors of the County of Kern, State of California, as follows:

1. This Board finds the facts recited hereinabove are true and further finds that this Board has jurisdiction to consider, approve, and adopt the subject of this Resolution.

2. This Board finds and determines that the applicable provisions of the California Environmental Quality Act of 1970, the State CEQA Guidelines and the Kern County Guidelines have been duly observed in conjunction with said hearing and the considerations of this matter and all of the previous proceedings related hereto.

3. The project herein described is approved despite the existence of certain significant environmental effects identified in the SEIR, and this Board hereby makes and adopts the findings with respect to each thereof set forth in Exhibit "A", appended hereto and made a part hereof by reference, pursuant to section 15091 of the State CEQA Guidelines (Title 14, California Code of Regulations) and section 21081 of the Public Resources Code (CEQA) and declares that it considered the evidence described in connection with each such finding. Pursuant to section 21081(b) of the Public Resources Code and section 15093 of the State CEQA Guidelines, this Board hereby approves and adopts a "Statement of Overriding Considerations" (Section IV of Exhibit "A") as recommended by the Planning Department, and finds that the impacts of the project which remain significant and unavoidable are outweighed by the project's overriding benefits.

4. This Board finds and determines that said SEIR is complete and adequate in scope and has been completed in compliance with the California Environmental Quality Act of 1970, and the State CEQA Guidelines and the Kern County

Guidelines for implementation thereof, and that this Board has fully reviewed and considered the information in said SEIR with respect to the subject of this Resolution, and said SEIR is hereby declared to be certified in relation to the subject of this Resolution, and the related proposed Mitigation Monitoring Program is hereby adopted, a copy of which is attached hereto as Exhibit "B".

5. This Board finds and determines that the LAC has been provided with an adequate opportunity to review the proposed project and that this Board has taken the recommendations of the LAC into consideration prior to reaching its own independent determination on the project.

6. After careful consideration of all facts and evidence as presented at the hearing, this Board hereby approves the requested application, subject to the conditions as set forth in Exhibit "C" attached hereto and incorporated herein by this reference as if set forth in full.

7. This Board hereby amends the Circulation Element of the General Plan to designate the following as a Commercial Hazardous Waste Shipping Route: Buttonwillow Drive from I-5 to 7th Standard Road, 7th Standard Road from I-5 to Corn Camp Road, Corn Camp from 7th Standard Road to Highway 58, and Lokern Road from Highway 33 and Highway 58. The Director of the Planning Department shall cause appropriate notations to be entered in all documents and maps which embody the General Plan and the elements thereof in order to show such amendment.

8. In approving the requested application, this Board finds and determines that the proposed use is consistent with the goals and policies of the Kern County General Plan, including the goals and policies related to the management of hazardous waste as set forth in the Kern County and Incorporated Cities Hazardous Waste Management Plan ("CHWMP") as indicated hereinafter.

9. This Board finds that the adopted conditions of approval together with the modifications, changes and mitigation to the project as recommended in the Final SEIR adequately protect the public health and safety of the residents of Kern County and the preservation of its environment while ensuring that a fair share hazardous waste management system exists based on need to serve industry and public alike.

10. This Board finds that the approval of the proposed facility is in accordance with the fair share principle contained in the CHWMP in that:

(a) The hazardous waste facility siting and development plan approval, general plan amendments, and permits is consistent with and subject to all applicable and current policies and ordinances as follows:

(i) The project is in conformance with the siting criteria of the CHWMP and other criteria required by existing law. The project site has also been evaluated based on risk assessment, environmental evaluation ,including the CEQA process, and the public hearing process. The project is an existing hazardous waste facility and is currently designated 3.4/3.5 (Solid Waste Facilities/Potential Hazardous Waste Facilities Site) in the General Plan, indicating that the site is consistent with the siting criteria set forth in the CHWMP. The proposed changes to the facility will be included within the boundaries of the current site location and will not constitute an expansion of the facility boundary.

(ii) The project approval is consistent with the goal of the CHWMP and the Circulation Element to minimize the risk to public health from transportation of hazardous waste by designation of safe routes. This has been accomplished through the adopted conditions of approval regarding transportation, including the requirements for intersection improvements, and the approval of the 7th Standard Road to Corn Camp Road Alternate Route as the primary access to the facility. This alternate route uses roads adequately designed to safely accommodate projected traffic uses and minimizes the risk of short-term exposure and accident potential while avoiding sensitive uses through the community of Buttonwillow.

(iii) The project is in conformance with the CHWMP goals regarding air quality. Through the adopted conditions of approval the facility will be required to comply with all requirements of the San Joaquin Valley Unified Air Pollution Control District and control fugitive dust.

(iv) The adopted conditions of approval for the facility limit the period of approval to five (5) years. Any renewal of the permit will require the facility to comply with any new conditions imposed by the County that are required to bring the facility into conformity with the CHWMP, which will assure continued compliance with the policies of the CHWMP.

(v) The project is conformance with the CHWMP goals regarding water quality. The conditions of approval for the project as well as the proposed liner, leachate collection and removal system, and monitoring systems as outlined in the project description and SEIR, if designed and constructed in conformance with state requirements, will prevent the migration of waste out of the landfill into the underlying soils, groundwater or surface water and ensure that proper monitoring is performed to demonstrate that contamination is not taking place.

(vi) The project is consistent with the CHWMP goal to maintain accurate information of hazardous waste streams since the applicant currently maintains and will maintain detailed records of all wastes accepted by the facility.

(vii) The project is consistent will applicable goals and policies to reduce waste. The proposed modifications include a transfer station to allow options for offsite recycling and include the treatment of non-petroleum waste as an option to the landfilling of wastes received. Manifests on all wastes accepted will include documentation from the waste generator that proper waste minimization procedures have been followed according to state and federal law.

(b) The proposed facility modifications are in conformance with current interjurisdictional agreements regarding hazardous waste management. No inter-jurisdictional agreements are in place to provide for the siting of hazardous waste facilities or the disposal of hazardous waste generated in Kern County. Although Kern County has an existing Memorandum of Understanding ("MOU") with Kings, Fresno and Tulare counties, this MOU is limited to sharing information regarding common hazardous waste management issues and to investigating the feasibility of developing coordinated programs and does not address arrangements for accommodating the waste streams of the participating jurisdictions.

(c) The proposed facility modifications do not exceed the need for capacity within Kern County. The CHWMP provides that there is insufficient treatment, storage and disposal capability with the County to manage all types of hazardous waste generated locally. This is primarily the result of current restrictions to the existing Laidlaw facility to accept petroleum-related waste. The CHWMP projects that the County needs an additional Class I residuals repository or incinerator capacity of 20,000 tons per year for its needs through the year 2000. The CHWMP also cites a need for additional recycling facilities, treatment facilities and transfer stations. The modified facility is projected to receive an additional average of approximately 77,800 tons of waste per year. Capacity of the proposed modified facility will accommodate the County's projected repository requirements. Additionally, the statewide need for safe disposal capacity of hazardous waste ranges from 367,680 tons per year in 1994 to 950,040 tons per year in 2023 for a Low Demand scenario and from 809,520 tons per year in 1994 to 1,775,100 tons per year in 2023 for a High Demand scenario. Therefore, there is a need for Laidlaw's projected acceptance of 388,000 tons per year.

(d) Although the proposed facility exceeds the fair share facility, in terms of quantity of disposal capacity, the applicant has adequately demonstrated that the fair share facility is economically non-viable. Under both the Low Demand Scenario and the High Demand Scenario, comparing revenue and costs over a ten year period, the fair share facility is demonstrated to have a negative net present value.

(e) Potential adverse environmental impacts of the proposed facility have been or will be mitigated to the maximum feasible extent through the changes proposed in the project through the Final SEIR as well as through the conditions of approval applied to the project by this approval. The findings of this Board related to impacts, project alternatives, and statement of overriding considerations, contained in Exhibit "A," support this determination.

11. This Board finds and determines all feasible mitigation to reduce significant air quality impacts have been adopted as part of the project or through the adoption of conditions of approval and that the benefits of the project outweigh any unavoidable significant adverse effects on air quality found to exist after inclusion of all feasible mitigation. This determination is supported by the findings made in Exhibit "A" related to impacts with respect to air quality, contained in Sections I.C.13, II.C.1, and II.C.2, project alternatives, and the statement of overriding considerations.

12. This Board finds and determines that the proposed facility will provide for an adequate, secure and well-planned state of the art hazardous waste disposal facility with capacity limited by geologic and land use factors associated with the site, which will be available for disposal of treatment residuals and other hazardous waste

13. This Board hereby approves the requested conditional use permit, subject to the conditions of approval contained in Exhibit "C," based on the following findings:

(a) The proposed use is consistent with the goals and policies of the County General Plan, as set forth above.

(b) The proposed use is consistent with the purpose of the applicable district or districts. The site is located within an "A" zoning district and the proposed facility is permitted within that zone upon approval of a conditional use permit. The Zoning Ordinance states "Whenever a use is listed in any section of this title as a use permitted subject to securing a conditional use permit, it shall be approved only if it is consistent with the County General Plan and meets all requirements of this title and subject to any conditions deemed appropriate by the decision making authority." As noted above, the project is consistent with the General Plan and CHWMP and as conditioned will be consistent with the "A" zone.

(c) The proposed use is listed as a use subject to a conditional use permit in the applicable zoning district or a use determined to be similar to a listed conditional use, in accordance with the procedures set out in section 19.08.060. Section 19.12.030(H) of the Zoning Ordinance lists hazardous waste facilities, nonhazardous oil production, and/or oily waste disposal facilities, and large and small transfer stations as uses permitted by conditional use permit in the "A" zone. The project therefore complies with the requirements of the Zoning Ordinance.

(d) The proposed use meets the minimum requirements of the Zoning Ordinance applicable to the use and complies with all other applicable laws, ordinances and regulations of the County of Kern and the State of California. The proposed conditions of approval require the facility modifications to comply with county, State and federal regulations governing the hazardous waste management.

(e) The proposed use will not be materially detrimental to the health, safety and welfare of the public or to property and residents in the vicinity. An SEIR was prepared for this project, including a risk assessment, response to comments, and mitigation measures which demonstrate that the proposal will not be materially detrimental to the health, safety, and welfare of the public or to property and residents in the vicinity. The existing facility site is located in a non-intensive area that is adequately separated from any sensitive land uses. Additionally, the proposed conditions of approval requiring compliance with county, State, and federal regulations relative to hazardous waste transportation and management will ensure the health, safety, and welfare of the public.

14. Based on the absence of evidence in the record as required by Section 21082.2 of the State of California Public Resources Code (CEQA) for the purpose of documenting significant effects, it is the conclusion of the Lead Agency that this project will have impacts below the level of significance with regard to wildlife resources and, therefore, is hereby granted a "de minimis" exemption in accordance with Section 711 of the State of California Fish and Game Code. Additionally, the assumption of adverse effect is rebutted on the basis of the above-referenced absence of evidence in the record.

15. The Clerk of this Board shall cause a Notice of Determination to be filed with the County Clerk and the State Office of Planning and Research. Unless the project is declared exempt herein and a Certificate of Fee Exemption executed by the Director of the Planning Department is on file, the foregoing project is not operative, vested or final until the filing fees required pursuant to Fish and Game Code section 711.4 are paid by the applicant to the County Clerk.

16. The Clerk of this Board shall transmit copies of this Resolution to the following:

(a) Director, Planning Department

(b) Environmental Health Department

(c) Fire Department

(d) Dir. Dept. of Engineering & Survey Services

(e) County Counsel

(f) Laidlaw Environmental Services (Lokern), Inc.
P.O. Box 787
Buttonwillow, CA 93206

SDS:gm/sds.i
CUP-2.eir
94.8999

DEPARTMENT OF TOXIC SUBSTANCES CONTROL
REGION 1
8151 CROYDON WAY, SUITE 3
SACRAMENTO, CA 95827-2106

HAZARDOUS WASTE FACILITY PERMIT

Facility:	Laidlaw Environmental Services (Lokern), Inc. 2500 West Lokern Road Buttonwillow, California 93206 EPA ID Number: CAD 980 675 276
Operator:	Laidlaw Environmental Services (Lokern), Inc. 2500 West Lokern Road Buttonwillow, California 93206
Owner:	Laidlaw Environmental Services (Lokern), Inc. 2500 West Lokern Road Buttonwillow, California 93206
Effective Date:	April 6, 1996
Expiration Date:	April 6, 2006

Pursuant to Section 25200 of the California Health and Safety Code (hereinafter referred to as the H&S Code), this Hazardous Waste Facility Permit (hereinafter referred to as the Permit) is granted to Laidlaw Environmental Services (Lokern), Inc. (hereinafter called the Permittee), the owner and operator of the Laidlaw Environmental Services (Lokern), Inc., Facility (hereinafter called the Facility), subject to the conditions set forth in Attachment A, which consists of Parts I through VIII and by this reference is incorporated herein.

The Permittee is permitted to treat, transfer, store and dispose of hazardous waste in accordance with the conditions of this Permit. Any management of hazardous waste not authorized by this Permit is prohibited.

The Permittee operates a commercial, hazardous waste treatment, storage, and disposal facility located in Kern County, California, approximately 8 miles west of the community of Buttonwillow and 36 miles west of Bakersfield, at north latitude 35° 24' 00" and west longitude 119° 38' 00". The Facility occupies 320 acres owned by the Permittee and is located in the eastern 1/2 of Section 16, Township 29S, Range 22E, M.D.B. & M. (Assessors Parcel Number: 99-290-17).

The Permittee has submitted a revised Resource Conservation and Recovery Act (RCRA) Part B Permit Application dated July 17, 1991, to the Department of Toxic Substances Control (hereinafter called the Department) for review. The Department has reviewed the RCRA Part B Permit Application and has determined in a letter dated August 10, 1995, that the RCRA Part B Permit Application is complete. By issuance of this Permit, the RCRA Part B Permit Application is approved.

The following is a list of documents which constitute the Approved RCRA Part B Permit Application:

1. "Laidlaw Environmental Services (Lokern), Inc., RCRA Part B Application, Volumes 1 Through 5", dated July 17, 1991, including revision #1 (6/10/92), #2 (11/13/92) and #3 (5/26/95);

2. "Revised Monitoring System Plan, Laidlaw Environmental Services (Lokern), Inc., Volumes 1 Through 5", dated December 27, 1991, including revision #1 (6/10/92), #2 (11/13/92) and #3 (5/26/95); and

3. "Unit Specific Closure Plans, Existing RCRA Surface Impoundments Volume I, Unit Specific Closure Plans, Existing Surface Impoundments, Volumes I, II, III and IV", dated March 8, 1991, including revision #1 (6/10/92), #2 (11/13/92) and #3 (5/26/95).

The Permittee shall perform the hazardous waste management activity authorized by this Permit in accordance with the Approved RCRA Part B Permit Application.

The provisions and conditions of this Permit are severable, and if any provision or condition of this Permit or the application of any provision or condition of this Permit to any circumstance is held invalid, the application of such provision or condition to other circumstances and the remainder of this Permit shall not be affected thereby.

The Department's issuance of this Permit does not release the Permittee from any liability or duty imposed by federal or state statutes or regulations or local ordinances, except the obligation to obtain this Permit. Unless otherwise specifically provided in this Permit, the Permittee shall comply with the provisions of Chapter 6.5 of Division 20 of the H&S Code and 22 CCR, Division 4.5.

The Department's issuance of this Permit does not prevent the Department from adopting or amending regulations or issuing orders imposing requirements which are in addition to or more stringent than those in existence at the time this Permit was issued. The Permittee shall comply with any such additional or more stringent requirements in addition to the requirements and conditions specified in this Permit.

Where appropriate, this Permit is subject to H&S Code Sections 25159.5 and 25159.6, relating to incorporation of federal regulations into state regulations.

In accordance with 22 CCR 66270.1(d), Waste Discharge Requirements, Order No. 89-150, issued to Laidlaw Environmental Services (Lokern), Inc., on August 29, 1989, by the California Regional Water Quality Control Board - Central Valley Region (hereinafter referred to as the CVRWQCB or Regional Board) are incorporated by reference into the Permit. Subsequent Waste Discharge Requirements issued to Laidlaw Environmental Services (Lokern), Inc., during the term of this Permit shall also be incorporated by reference into the Permit.

The Department finds this Permit to be in compliance with the California Environmental Quality Act (CEQA). A Draft Supplemental Environmental Impact Report (SEIR) (SCH #92042028) was prepared by Ogden Environmental and Energy Services Co., Inc., for use by the Kern County Planning Department as part of the review process for the Conditional Use Permit adopted by the Kern County Board of Supervisors on December 12, 1994, pursuant to resolution number 94-684, including General Plan Amendment 3, Map 97 and Conditional Use Permit 4, Map 97. The Final Supplemental Environmental Impact Report (SEIR) was certified on December 12, 1994, by the Kern County Board of Supervisors.

The Hazardous Waste Facility Permit, dated January 1991, Modification 2, issued to the Permittee by the Department of Health Services, is revoked and reissued in accordance with 22 CCR 66270.41.

This Permit becomes effective as provided by 22 CCR 66271.14(b).

This Permit shall remain in effect for ten years from the effective date of the Permit unless revoked and reissued, terminated, or continued in accordance with 22 CCR Sections 66270.30(b), 66270.41, 66270.43, 66270.50, 66271.4(a) and 66271.14(b).

James M. Pappas

James M. Pappas, P.E.
Chief
Facility Permitting Branch

March 7, 1996

Date

Attachment

STATE OF CALIFORNIA - Environmental Protection Agency PETE WILSON, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION
~~~1 East Ashlan Ave.
~A, CA 93726
~HONE: (209) 445-5116
FAX: (209) 445-5910

28 May 1996

Ms. Marianna Buoni
Laidlaw Environmental Services
(Lokern), Inc.
P.O. Box 787
Buttonwillow, CA 93206

CERTIFIED MAIL
P 846 404 473

TRANSMITTAL OF ADOPTED/AMENDED WASTE DISCHARGE REQUIREMENTS

Enclosed is an official copy of Order No. 96-094 as adopted by the California Regional Water Quality Control Board, Central Valley Region, at the meeting held 30 April 1996 in Bakersfield, California.

WILLIAM F. PFISTER
Supervising Engineer
CEG No. 931

DKP:fmc

cc: U.S. Environmental Protection Agency, Region IX, San Francisco
Ms. Frances McChesney, Office of Chief Counsel, State Water Resources Control Board, Sacramento
Mr. James Pappas, DTSC, Sacramento
Ms. Liz Haven, State Water Resources Control Board, Sacramento
Department of Health Services, Office of Drinking Water, Fresno
Department of Water Resources, San Joaquin District, Fresno
Department of Fish and Game, Region IV, Fresno
Kern County Environmental Health Department, Bakersfield
Kern County Planning Department, Bakersfield
Mr. David Neilsen, Laidlaw Environmental Services (Lokern), Inc., Buttonwillow
Mr. Alfred Jr. and Janette Palla, Concerned Citizens to Stop Outside Dumping
Ms. Jane Melanie Williams, Desert Citizens Against Pollution, Rosamond
Ms. Anne Katten, MPH, CA Rural Legal Assitance Foundation, Sacramento
Mr. Donald and Catherine Palla, Bakersfield
Mr. Luke Cole, CA Rural Legal Assistance Foundation, San Francisco
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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER NO. 96-094

WASTE DISCHARGE REQUIREMENTS
FOR
LAIDLAW ENVIRONMENTAL SERVICES (LOKERN), INC.
LOKERN FACILITY
CLASS I AND CLASS II WASTE MANAGEMENT UNITS
BUTTONWILLOW
KERN COUNTY

The California Regional Water Quality Control Board, Central Valley Region, (hereafter Board) finds that:

1. Laidlaw Environmental Services (Lokern), Inc. submitted a RCRA Part B application dated 17 July 1991 and several revisions. The latest revision is dated 23 June 1995. The Part B Application meets the requirements for submission of a Report of Waste Discharge. Many other technical reports regarding site characteristics, facility design, monitoring, and operations have also been submitted. Waste discharge requirements need to be updated to incorporate proposed changes in the facility design/operations, to include proposed acceptance of new waste types, to modify the existing monitoring program, and to address closure.

2. The facility was developed by Petroleum Waste, Inc., a subsidiary of the McKittrick Mud Company. In February 1986, McKittrick Mud became a wholly-owned subsidiary of International Technology Corporation (IT). In June 1989, the facility, land, and assets were purchased by GSX Services of California, Inc. and assigned to GSX Services (Petroleum Waste), Inc., a wholly-owned subsidiary of GSX Services of California. In September 1990, GSX Services of California changed its name to Laidlaw Environmental Services of California and GSX Services (Petroleum Waste) changed its name to Laidlaw Environmental Services (Lokern), Inc., and is hereafter referred to as Discharger.

3. This Order is being issued in compliance with Title 23, California Code of Regulations (23 CCR), Section 2510, et seq. (hereafter, Chapter 15) and supersedes Waste Discharge Requirements (WDRs) Order No. 89-150. The Department of Toxic Substances Control (DTSC) is the lead agency for regulation of this facility. Kern County is the lead agency for purposes of the California Environmental Quality Act.

4. Health and Safety Code (HSC) Section 25204.6(b) requires consolidation of overlapping jurisdiction of the DTSC, the Board, and the State Water Resources Control Board at hazardous waste facilities that are subject to regulation of HSC Section 25180 et seq. and the Division 7 of the California Water Code. In order to meet this requirement, waste

The Department's issuance of this Permit does not release the Permittee from any liability or duty imposed by federal or state statutes or regulations or local ordinances, except the obligation to obtain this Permit. Unless otherwise specifically provided in this Permit, the Permittee shall comply with the provisions of Chapter 6.5 of Division 20 of the H&S Code and 22 CCR, Division 4.5.

The Department's issuance of this Permit does not prevent the Department from adopting or amending regulations or issuing orders imposing requirements which are in addition to or more stringent than those in existence at the time this Permit was issued. The Permittee shall comply with any such additional or more stringent requirements in addition to the requirements and conditions specified in this Permit.

Where appropriate, this Permit is subject to H&S Code Sections 25159.5 and 25159.6, relating to incorporation of federal regulations into state regulations.

In accordance with 22 CCR 66270.1(d), Waste Discharge Requirements, Order No. 89-150, issued to Laidlaw Environmental Services (Lokern), Inc., on August 29, 1989, by the California Regional Water Quality Control Board - Central Valley Region (hereinafter referred to as the CVRWQCB or Regional Board) are incorporated by reference into the Permit. Subsequent Waste Discharge Requirements issued to Laidlaw Environmental Services (Lokern), Inc., during the term of this Permit shall also be incorporated by reference into the Permit.

The Department finds this Permit to be in compliance with the California Environmental Quality Act (CEQA). A Draft Supplemental Environmental Impact Report (SEIR) (SCH #92042028) was prepared by Ogden Environmental and Energy Services Co., Inc., for use by the Kern County Planning Department as part of the review process for the Conditional Use Permit adopted by the Kern County Board of Supervisors on December 12, 1994, pursuant to resolution number 94-684, including General Plan Amendment 3, Map 97 and Conditional Use Permit 4, Map 97. The Final Supplemental Environmental Impact Report (SEIR) was certified on December 12, 1994, by the Kern County Board of Supervisors.

12. The mean annual precipitation at the site is 5 inches and the average annual pan evaporation is 108 inches. The probable maximum precipitation in a 24-hour period is 5.36 inches.

13. The nearest surface water, the California Aqueduct, is ½ mile northeast of the site, at its closest point.

14. No known Holocene faults exist within 200 feet of waste management units or the facility. In accordance with the most current geotechnical and seismic engineering practices, the Discharger determined peak design ground acceleration to be on the order of 0.5 g for near field events and 0.3 g for far field events. The near field event was based on an assumed maximum credible earthquake of magnitude 6.8 on a theoretical thrust fault approximately 7 km from the site. The far field event was based on a magnitude 8.3 earthquake on the San Andreas fault approximately 24 km from the site.

15. Current literature indicates that the facility is not in an area considered subject to deep or shallow subsidence or soil collapse. No evidence of subsidence, soil collapse, or soil failure has been observed on the facility during its operational history. The waste management units are not in areas subject to rapid geologic change.

16. Fan deposits consisting of reworked sediments from the Temblor Range cover the surface to a depth of several hundred feet. The fan deposits are underlain by the Tulare formation, a Pleistocene sedimentary unit consisting of nonmarine interbedded clay, gravel, and sand.

17. Attachment 3 of this Order is a conceptual cross-section of the top approximately 660 feet of the sedimentary sequence of deposits below the site. The sequence is considered to consist of three stratigraphic zones: the Upper Zone; the Intermediate Zone; and the Lower Zone. The entire sequence dips approximately 1.8 degrees toward the northeast.

    a. The Upper Zone consists of the Surficial Silt Unit and the underlying Upper Sand Unit. The thickness of the Surficial Silt Unit ranges from between 30 and 120 feet. The Upper Sand Unit is composed of very fine to coarse sand that is moderately well sorted and loose to very dense and is approximately 40 to 70 feet thick.

    b. The Intermediate Zone is composed of the Upper Clay, the Intermediate Unit, and the Lower Clay. The Upper Clay appears to be continuous across the facility with an approximate thickness of 5 feet. The Intermediate Unit is predominately composed of sandy silt with interbeds of fine sand and clay. This unit ranges in thickness from 30 to 40 feet. The Lower Clay appears to be continuous across the facility with an approximate thickness of 5 to 10 feet.

c. The Lower Zone is comprised of the Lower Unit, a sequence of interbedded sands, silts, and clays that are laterally discontinuous. The Lower Unit is underlain by a clay unit, assumed to be the Corcoran Clay, at approximately 620 feet below ground surface.

18. Three ground water zones have been identified in the upper 600 feet of the sedimentary sequence described above: the Upper Perched Zone; the Intermediate Perched Zone; and the Lower Water Table Zone.

19. The Upper Perched Zone aquifer (Upper Sand Unit) is perched on the Upper Clay of the Intermediate Zone. The Upper Zone thickness ranges from approximately 70 feet in the southwest corner of the site to approximately 220 feet in the northeast portion of the site. It becomes water bearing where the base of the Upper Sand Unit is greater than approximately 135 feet below ground surface (225 feet M.S.L.). The general direction of flow is to the southeast.

20. The Intermediate Perched Zone aquifer (Intermediate Unit) is perched on the Lower Clay of the Intermediate Zone. It varies in thickness from 35 to 55 feet over the site. This zone is unsaturated to the south and becomes water bearing beneath the northeastern portion of the site where the base of the unit is greater than approximately 175 feet below ground surface (184 feet M.S.L.). Ground water flows generally to the east and southeast, under both confined and unconfined conditions.

21. The Lower Water Table Zone exists within the Lower Zone. It is saturated beneath the facility at a depth of approximately 230 feet below ground surface (130 feet M.S.L.). This aquifer is unconfined in the southwestern portion of the facility and confined in the northeast. Ground water flow is to the northeast.

22. The Board, the DTSC, and the U.S. Environmental Protection Agency have defined the uppermost aquifer at the site to include the Upper Perched Zone, the Intermediate Perched Zone, and the Lower Water Table Zone.

23. The designated beneficial uses of ground water, as specified in the Water Quality Control Plan for the Tulare Lake Basin, Second Edition, in the region of the facility include

municipal and domestic supply (MUN), industrial service supply, industrial process supply, agricultural supply, water contact recreation supply, and wildlife habitat supply.

24. Background ground water quality in the three water bearing zones beneath the facility is generally considered poor. In the Upper Perched Zone, total dissolved solids (TDS) ranges from 2360 to 7380 mg/l, boron concentrations range from 7.0 to 11.8 mg/l, and chloride concentrations range from 454 to 2310 mg/l. In the Intermediate Perched Zone, TDS ranges from 2480 to 3130 mg/l, boron concentrations range from 6.4 to 7.3 mg/l, and chloride concentrations range from 500 to 748 mg/l. In the Lower Water Table Zone, TDS ranges from 2070 to 3230, boron concentrations range from 7.6 to 10.5 mg/l, and chloride concentrations range from 327 to 557 mg/l.

25. The designated beneficial uses of valley floor waters (surface water), as specified in the Water Quality Control Plan for the Tulare Lake Basin, Second Edition, are agricultural supply, industrial service process and supply, contact and noncontact water recreation, warm fresh water habitat, wildlife habitat, preservation of rare, threatened and endangered species, and ground water recharge.

26. The ground water detection monitoring system has not detected statistically significant concentrations of any waste constituents in any of the aquifers beneath the site, that would be indicative of a release from a waste management unit.

27. No producing wells, other than the Discharger's two water supply wells, are within one mile of the site. The water drawn from the Discharger's wells is primarily used for dust control, equipment washing, and for treatment by reverse osmosis and ion exchange to produce potable water.

WASTES AND THEIR CLASSIFICATION

28. The facility has been used for land disposal of liquid and solid hazardous wastes since 1983. Volume reduction by solar evaporation was previously the primary process for liquid waste treatment. Liquid hazardous waste is now treated in the Stabilization Treatment Unit by addition of various pozzolanic and cementitious admixtures. The resulting dry solid waste is discharged to one of the on-site Class I landfill units.

29. No liquid hazardous waste is currently discharged, or proposed to be discharged to any surface impoundment or landfill. No liquid waste of any kind is currently discharged, or proposed to be discharged to any landfill. Nonhazardous liquid waste will be discharged

to a lined Class II surface impoundment. Only solid waste containing no free liquids is currently, or proposed to be discharged to lined Class I landfills.

30. This Order allows the Discharger to accept a wider range of hazardous and nonhazardous wastes than previous Orders. Virtually all RCRA and California hazardous and nonhazardous waste are allowed to be disposed of, with the exception of the wastes and waste types listed under **A. Discharge Prohibitions.**

WASTE MANAGEMENT UNIT DESIGN

31. A plan of the existing facility, including the locations of former hazardous surface impoundments, is shown in Attachment 4 of this Order. A plan of the future facility is shown in Attachment 5.

PROPOSED

32. Current proposed modifications to waste management units include the following main elements:

    a. Clean closure of six former hazardous surface impoundments (WMUs 6, 11, 12, 16, 19, and 25) instead of closure in place as landfills, as was previously approved.

    b. The staged construction and operation of one new hazardous/nonhazardous waste landfill, WMU 35, in place of eight previously approved landfills. It is currently proposed that nine cells of approximately 10 acres each will be constructed. Each completed cell will have a final cover system constructed. Cells will be constructed with completed liner systems as additional capacity is required.

33. The geologic material immediately underlying the site does not meet the $1x10^{-7}$ cm/sec permeability standard for Class I waste management units prescribed in 23 CCR, Section 2531(b)(1).

34. Section 2510(b) and (c) of 23 CCR allows consideration of alternatives to a prescriptive standard, if compliance with the prescriptive standard is not feasible. The Discharger has proposed engineered alternatives to the prescriptive siting requirement that consider natural site characteristics and waste management unit design.

35. Each cell in WMU 35 is proposed to incorporate a base liner system consisting of (from bottom to top) a 36-inch clay liner compacted to permeability of 1 x 10^{-7} cm/sec, an 80-mil textured HDPE geomembrane, a secondary LCRS, a 36-inch clay liner compacted to a permeability of 1 x 10^{-7}, an 80-mil textured HDPE geomembrane, a primary LCRS, and an 18-inch protective soil cover (no specified permeability).

    The side slopes are proposed to incorporate a liner system consisting of (from bottom to top) a 36-inch clay liner compacted to permeability of 1 x 10^{-7} cm/sec, an 80-mil textured HDPE geomembrane, a secondary LCRS, a bentonite geocomposite clay liner, an 80-mil textured HDPE geomembrane, a primary LCRS, and an 18-inch protective soil cover (no specified permeability).

36. An evaluation of information contained in the Discharger's Report of Waste Discharge indicates that the proposed landfill construction will meet the siting performance goal in 23 CCR, Section 2531(a) as an engineered alternative because of the natural site conditions and liner system design, as described below:

    a. Additional Liners - An additional 80-mil HDPE liner and 36-inch compacted clay liner (permeability of 1 x 10^{-7} cm/sec) are included in the Discharger's proposal, beyond what is required to satisfy the prescribed standards. In addition, the compacted clay liners are 50 percent thicker than required and the geomembranes are 100 percent thicker than required.

    b. Redundant Leachate Collection and Removal Systems (LCRS) - The containment system for proposed landfills includes two LCRSs, whereas Chapter 15 requires one.

    c. Depth to Ground Water - The uppermost ground water occurs approximately 70 feet below the lowermost portion of the proposed waste management units. Chapter 15 requires a minimum separation of 5 feet between the waste and uppermost expected elevation of ground water.

    d. Climate - The facility is in an area that averages 5 inches of precipitation annually, and 108 inches of evaporation. The aridity of the area provides little chance that precipitation could assist the subsurface migration of wastes or waste constituents.

39. Nonhazardous surface impoundments 18, 21, 22, 23, and 27 do not contain LCRSs and thus do not meet the prescriptive standard of 23 CCR Section 2543. Closure is to be in accordance with the Specifications and Provisions of these requirements.

40. In February 1991, the Discharger submitted *Unit-Specific Closure Plans* for twenty-six former hazardous waste surface impoundments. WMUs 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 20, 24, 25, T-1, and RCRA WMUs R-1, R-2, R-3, and R-4 have been or will be clean closed in the area of future WMU 35.

41. Hazardous WMUs 1, 2, 3, 4, 5, 7, 8, 11, 13, 14, 17, 24, T-1, R-1, R-2, R-3, and R-4 have been clean closed in accordance with their specific closure plans.

42. Hazardous WMUs 6, 9, 10, 12, 15, 16, 19, 20, and 25 are to be closed in accordance with their specific closure plans and within a time schedule specified by the Department of Toxic Substances Control.

43. The facility closure and post closure plans, submitted in accordance with Health and Safety Code Section 25246, were reviewed as required by California Water Code Section 13227. The information in the plans indicate water quality will be adequately protected during the closure and post closure monitoring period.

GROUND WATER MONITORING

44. The Discharger submitted a ground water detection monitoring program, *Revised Monitoring System Plan*, dated 27 December 1991 and several revisions. The latest revision is dated 23 June 1995.

45. Attachment 6 of this Order shows the approximate location of current and proposed ground water monitoring points.

UNSATURATED ZONE MONITORING

46. The Discharger has demonstrated that the collection of soil-pore liquid samples with lysimeters or similar suction-based technology as a component of an unsaturated monitoring program is not feasible under ambient conditions at the site. The Discharger has demonstrated that measurement of moisture changes in the unsaturated zone with a neutron probe system provides better assurance of early detection of a release.

47. WMUs 28 and 31 do not contain unsaturated zone monitoring systems as required by 23 CCR Section 2550.7(d). Retrofitting of WMUs 28 and 31 with neutron probe access tubes, angle bored beneath the waste management units is to be in accordance with the **Specifications and Provisions** of these requirements.

EARTHQUAKE DAMAGE RESPONSE

48. The Discharger is to submit a Post-Earthquake Inspection and Response Plan for review and approval. The plan is to be carried out following a seismic event causing significant ground motion at the site.

CEQA CONSIDERATIONS

49. Kern County adopted the Supplemental Environmental Impact Report (SEIR) for the facility on 12 December 1994 in accordance with the California Environmental Quality Act (CEQA) (Public Resources Code, Section 21000 et seq.) and CEQA guidelines (14 CCR. Section 15000 et seq.). Kern County filed the Notice of Determination on 19 December 1994. The Board considered the SEIR and incorporated measures in these WDRs that are intended to mitigate significant effects on the environment.

50. Staff reviewed and considered the comments submitted to DTSC regarding the revision of the Discharger's draft Hazardous Waste Facility Permit.

OTHER LEGAL REFERENCES

51. The Board adopted the Water Quality Control Plan for the Tulare Lake Basin, Second Edition, (hereafter Basin Plan) which designates beneficial uses and contains water quality objectives for all waters of the Basin. These requirements implement the Basin Plan.

52. This Order implements the prescriptive standards and performance goals of Chapter 15.

53. The Board has notified the Discharger and interested agencies and persons of its intent to prescribe waste discharge requirements for this facility.

54. The Board, in a public hearing, heard and considered all comments pertaining to this facility and discharge.

55. If, as a result of the Kern County Superior Court decision dated 29 April 1996, reassessment of the Conditional Use Permit process to be conducted by Kern County results in a material change to these waste discharge requirements related to water quality, the Discharger must submit a new report of waste discharge.

IT IS HEREBY ORDERED that Order No. 89-150 be rescinded and Laidlaw Environmental Services (Lokern), Inc., its agents, successors, and assigns, in order to meet the provisions of Division 7 of the California Water Code and plans, policies, and regulations adopted thereunder, shall comply with the following:

A. DISCHARGE PROHIBITIONS

1. The discharge of leachate or waste to surface waters, surface water drainage courses, ground water, and natural geologic materials adjacent to the waste management units is prohibited.

2. The presence of hazardous waste in nonhazardous waste management units is prohibited.

The following discharges to waste management units are prohibited:

3. Waste containing free liquids, or containerized free liquids, into landfills.

4. Liquid hazardous waste, or liquids containing hazardous waste, into surface impoundments or landfills.

5. Wastes that have the potential to reduce or impair the integrity of containment structures or which, if commingled with other wastes in the waste management unit, could produce violent reaction, heat or pressure, fire or explosion, toxic by-products, or reaction products which in turn:

   a. require a higher level of containment than provided by the WMU;

   b. are 'restricted hazardous wastes'; or

   c. impair the integrity of containment structures.

6. Radioactive materials which either require special placarding because they exceed 2000 picocurries/gram of activity as referenced in 49 CFR 173.403(y) or are

defined as "NRC regulated source materials" as referenced in Health and Safety Code 25805(m).

7. Infectious or bio-hazardous materials, as defined by Health and Safety Code Section 25020.5.

8. D.O.T. Class I explosives.

9. Municipal garbage or refuse, except on-site generated trash.

10. Wastes containing polychlorinated biphenols (PCBs) greater than 50 mg/kg.

11. Wastes containing dioxins, identified by the following EPA waste codes:

FO20	FO23
FO21	FO26
FO22	FO27

12. Bulk or containerized hydrazine (EPA waste code U133).

13. Compressed gas cylinders greater than 1 liter.

B. DISCHARGE SPECIFICATIONS

GENERAL SPECIFICATIONS

1. Wastes shall be discharged only into waste management units specifically designed for their containment, as described in this Order.

2. Neither the treatment nor the discharge shall cause a condition of pollution or nuisance as defined by the California Water Code Section 13050.

3. The discharge shall not cause degradation of any water supply.

4. All compatible wastes not prohibited by state or federal regulations, or these requirements, may be placed in appropriate waste management units as specified in Chapter 15, provided that each waste is verified to be:

   a. compatible with containment systems; and

b. compatible with wastes residing within the WMU.

5. The Discharger shall comply with all applicable sections of Chapter 15, including sections not specifically referenced in these requirements.

6. Conditions may be added to the facility's design, operating plan, or post closure plans as necessary to protect water quality, human health or the environment.

WASTE MANAGEMENT UNIT CONSTRUCTION

7. All waste management units shall be designed and constructed in accordance with Chapter 15, Title 22, and this Order, and approved prior to construction and again prior to operation.

8. Base liner systems for new waste management unit cells shall consist of the following (from bottom to top): a 36-inch clay liner compacted to permeability of 1×10^{-7} cm/sec, an 80-mil textured HDPE geomembrane, a secondary LCRS, a 36-inch clay liner compacted to a permeability of 1×10^{-7}, an 80-mil textured HDPE geomembrane, a primary LCRS, and an 18-inch protective soil cover (no specified permeability)

   Side slope liner systems for new waste management unit cells shall consist of the following (from bottom to top): a 36-inch clay liner compacted to permeability of 1×10^{-7} cm/sec, an 80-mil textured HDPE geomembrane, a secondary LCRS, a bentonite geocomposite clay liner, an 80-mil textured HDPE geomembrane, a primary LCRS, and an 18-inch protective soil cover (no specified permeability)

9. Liner design is subject to change so long as the liner system provides equal or greater protection of water quality and if the design is approved by Board staff.

10. The Discharger shall provide notification at least 10 days prior to construction of the subgrade, the installation of the unsaturated zone system, the installation of all synthetic and clay liners and construction of the leachate collection and removal system(s) of all waste management units.

11. Visual observations and detailed geologic mapping of foundation conditions underlying each excavation for waste management units shall be made during construction by a California registered geologist or certified engineering geologist. A geologic report and map of the excavation for each waste

management unit shall be submitted before discharging waste to the waste management unit.

12. Surface impoundments shall be designed and constructed to prevent overtopping as a result of wind or seismic shaking.

13. Discharges to waste management units shall be stopped in the event of any containment system failure that causes a threat to water quality.

14. The facility shall be fenced and maintained to prevent unauthorized access.

15. The Discharger shall maintain in all surface impoundments a permanent marker delineating the brim of the waste management unit. The marker is to be used as the reference point for measuring the freeboard in the waste management unit.

LEACHATE COLLECTION AND REMOVAL SYSTEMS

16. Following placement of waste, liquid collected from surface impoundment LCRSs shall be returned to the impoundment from which it came or be discharged in a manner consistent with Chapter 15 and the classification of the liquid.

17. Following placement of waste, liquid collected from landfill LCRSs shall be managed as a hazardous waste in accordance with state and federal regulations.

18. If the rate of liquid generated in the secondary LCRS of waste management units having a secondary LCRS and the primary LCRS of other waste management units, exceeds the maximum flow rate that the system can remove, the Discharger shall:

    a. Within 7 days, provide written notification of the exceedance;

    b. Within 14 days, submit a preliminary written assessment which describes the amount of liquid, likely sources of liquid, possible location, size and cause of any leaks, and short-term action taken or planned; and

    c. Within 30 days, submit a report describing the effectiveness of the implemented actions and any other short-term or long-term actions to mitigate or stop any leaks.

19. Leachate collection and removal systems shall be monitored in accordance with Monitoring and Reporting Program No. 96-094.

PRECIPITATION AND DRAINAGE CONTROLS

20. The site shall be graded so that storm runoff from access roads adjacent to the waste management units is diverted away from landfills.

21. Diversion and drainage facilities shall be designed and constructed to accommodate the anticipated volume of precipitation and peak flows resulting from the probable maximum precipitation event.

WASTE CHARACTERISTICS

22. The Discharger shall remove to an appropriate waste management unit any wastes that are discharged at this site in violation of these requirements, or shall otherwise respond to such discharges in accordance with an approved contingency plan or other remedial plan.

GROUND WATER MONITORING

23. The Discharger shall provide notification at least 10 days prior to installing any ground water wells.

24. The ground water detection monitoring system shall consist of 30 monitoring wells, 4 interface wells, and 27 piezometers, as shown in Attachment 6 of this Order. Numbers and locations of monitoring points are subject to change by approval of Board staff.

25. Within 90 days of the effective date of this Order, the Discharger shall begin construction of the proposed ground water and interface monitoring wells listed in Table 1 of the Monitoring & Reporting Program, with the exception of wells associated with WMU 35. Monitoring wells associated with WMU 35 shall be installed prior to the start of construction of the cell to be monitored.

26. Ground water shall be monitored in accordance with Monitoring and Reporting Program No. 96-094.

UNSATURATED ZONE MONITORING

27. All landfills and surface impoundments shall have unsaturated zone monitoring systems designed and constructed in accordance with 23 CCR Section 2550.7(d)(1) and all applicable state and federal regulations.

28. The Discharger shall install neutron moisture detection probe access tubes, angle-bored beneath the WMUs as feasible, as an unsaturated zone monitoring system for hazardous waste landfill 28 and nonhazardous surface impoundment 31 in accordance with an approved plan and time schedule as specified in Provision C.13.a.

29. The unsaturated zone shall be monitored in accordance with Monitoring and Reporting Program No. 96-094.

EARTHQUAKE DAMAGE RESPONSE

30. The Discharger shall submit a post earthquake inspection and response plan for review and approval. The plan shall contain proposed methods of inspecting waste containment, storage, and treatment structures; waste management unit liners and covers; drainage control facilities; and detection monitoring facilities for damage following a seismic event which caused significant ground motion at the site. The plan shall also contain proposed criteria for implementation of the plan and proposed responses in case of damage. The plan shall be submitted within the time schedule contained in **Provision C.13.b.**

31. Earthquake damage shall be monitored in accordance with Monitoring and Reporting Program No. 96-094.

CLOSURE AND POST CLOSURE

32. No liquids shall be discharged to nonhazardous WMUs 18, 21, 22, 23, and 27.

33. The Discharger shall submit closure plans and a time schedule for closure of nonhazardous WMUs 18, 21, 22, 23, and 27 for approval by Board staff in accordance with the schedule contained in **Provision C.13.c.**

34. Hazardous WMUs 6, 9, 10, 12, 15, 16, 19, 20, and 25 shall be closed in accordance with the *Unit Specific Closure Plans*, and in accordance with a schedule approved by the Department of Toxic Substances Control.

35. Cover design for closure of future and existing landfills shall consist of the following (from the surface down): a 24-inch vegetated soil layer, a geotextile as a drainage layer, an 80-mil HDPE textured geomembrane, and a 24-inch clay barrier layer compacted to a maximum permeability of $1x10^{-7}$ cm/sec.

36. Cover system design is subject to change so long as the cover system provides equal or greater protection of water quality and if the design is approved by Board staff.

37. The post closure maintenance period shall continue for as long as wastes in the closed waste management units pose a threat to water quality.

C. PROVISIONS

1. The Discharger may be required to submit technical reports as directed by Board staff.

2. The Discharger shall comply with the attached Monitoring and Reporting Program No. 96-094.

3. The Discharger shall comply with the applicable Standard Provisions and Reporting Requirements, dated September 1993, which are a part of this Order.

4. This Order does not authorize violation of any federal, state, or local laws or regulations.

5. The Discharger shall maintain financial assurance for initiating and completing corrective action for any reasonably foreseeable release from a waste management unit. The Discharger shall adjust the cost estimate annually to account for inflation and any changes in facility design, construction, or operations.

6. The Discharger shall maintain financial assurance to provide means to ensure closure and post closure maintenance of each waste management unit in accordance with its approved closure plan. The Discharger shall adjust the cost

estimate annually to account for inflation and any changes in facility design, construction, or operations.

7. The Discharger shall submit a final construction certification report following completion of a new, or closure of a former, waste management unit. The final construction report shall include, but not be limited to, as-built construction drawings for the waste management unit, a construction QA/QC report with a written summary of the QA/QC program and all test results and analyses, and the certification, seal, and signature of an appropriately registered individual(s), stating that construction was completed in accordance with plans and regulations. For closure of a waste management unit, the certification report shall be submitted within 60 days following completion of closure.

8. The design, construction, operation, maintenance and closure of the facility or any portion of it, shall comply with the Discharger's Operations Plans, closure plan, ground water monitoring plan, waste management unit specifications and construction drawings, these requirements and all applicable state and federal regulations.

9. Future monitoring points may be added or relocated if it is determined that addition or relocation provides equal or greater protection of water quality.

10. Before closure of waste management units, the Discharger may be required to submit an updated closure plan that incorporates new engineering technology, construction methods, and materials, and that will insure consistency with the current State policy and regulations.

11. Hazardous wastes shall be accepted only when the generator has provided the operator with written documentation that adequately describes all toxic or hazardous constituents that could reasonably be expected to occur in the waste.

12. The Board will review this Order periodically and may revise requirements when necessary.

COMPLIANCE SCHEDULE

13. The Discharger shall complete the tasks outlined in these requirements and the attached Monitoring and Reporting Program No. 96-094 in accordance with the following time schedule:

Task		Compliance Date
a.	Unsaturated Zone Monitoring	
	Submit a revised plan and a time schedule for the retrofitting of unsaturated zone monitoring systems for WMUs 28 and 31, pursuant to Specification B.28.	**90 days from effective date of this Order**
b.	Earthquake Damage Monitoring	
	Submit a Post Earthquake Inspection and Response Plan, pursuant to Specification B.30.	**90 days from effective date of this Order**
c.	Closure Activities	
	Submit closure plans and closure time schedule for nonhazardous WMUs 18, 21, 22, 23, and 27, pursuant to Specification B.33.	**30 days from effective date of this Order**

I, WILLIAM H. CROOKS, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 30 April 1996.

William H. Crooks

WILLIAM H. CROOKS, Executive Officer

DKP:dkp/rac

The following list provides facility and regulatory agency contacts for the Buttonwillow facility:

Operations	Marianna Buoni, General Manager Clean Harbors Buttonwillow, LLC. P.O. Box 787, 2500 West Lokern Road Buttonwillow, CA 93206-0787 (661) 762-6200
Regulatory	Terry G. Davis, REA Facility Compliance Manager Clean Harbors Buttonwillow, LLC. P.O. Box 787, 2500 West Lokern Road Buttonwillow, CA 93206-0787 (661) 762-6200
RCRA Compliance	AbdulHamid Beig, CPSS, Hazardous Materials Specialist Hazardous Materials Specialist Department of Toxic Substances Control 1515 Tollhouse Road Clovis, CA 93611 (559) 297-3950
RCRA Permitting	Fred W. Guis Hazardous Substances Engineer Department of Toxic Substances Control 8800 Cal Center Drive Sacramento, CA 95826 (916) 255-3615
Water Quality	Terry Fox California Regional Water Quality Control Board, Region 5 1685 E Street Fresno, CA 93706-2020 (559) 445-5116
Air Quality	Michael Bus, Engineer San Joaquin Valley Air Pollution Control District 2700 "M" Street Bakersfield, CA 93301 (661) 862-5200
Health Department	Laurel Funk Kern County Environmental Health Services Department 2700 "M" Street, Suite 275 Bakersfield, CA 93301 (661) 862-8700
Local Planning	Ted James Planning Director Kern County Planning Department 2700 "M" Street Bakersfield, CA 93301 (661) 862-8600
EPA – Region IX	Kevin Wong U.S. Environmental Protection Agency – Region IX 75 Hawthorne Street San Francisco, CA 94105 (415) 744-2041

4.0 Process Description

Waste Analysis

The Waste Analysis Plan for the facility outlines pre-qualification and on-site acceptance analysis requirements. The Buttonwillow Facility can accept hazardous and nonhazardous for treatment, storage and/or disposal. The following wastes or materials are prohibited treatment, storage, and/or disposal:

- Radioactive materials which either require special placarding because they exceed 2,000 picocurries/gram of activity as referenced in 49 CFR 173.403(y) or are defined as "NRC regulated source materials" as referenced in the California Health & Safety Code 25805(M);
- Infectious or bio-hazardous materials;
- DOT Class 1 explosives;
- Municipal garbage or refuse'
- Polychlorinated biphenyls (PCBs) greater than 50 parts per million;
- Wastes identified by EPA waste codes F020, F021, F022, F023, F026, and F027, as defined in 40 CFR Part 261;
- Bulk or containerized hydrazine, defined in 40 CFR Part 261 as waste code U133; and
- Compressed gas cylinders greater than 1 liter.

Pre-Qualification

Prior to acceptance and treatment of a specific waste, A Waste Material Profile Sheet must be submitted to and approved by Clean Harbors prior to any waste shipment. Waste profile can be completed and submitted online on the Clean Harbors' website at www.cleanharbors.com. Once the waste material is accepted for treatment and disposal, this information becomes part of the permanent record in the generator's file and the waste may be scheduled for shipment.

On-Site Analysis/Acceptance

With each delivery of approved waste, a sample is taken from the load and tested to determine whether the waste is the same as the previously submitted sample. If this analysis differs significantly from the advance sample, the waste will be deemed non-conforming. All non-conforming wastes are further analyzed to determine the best treatment alternatives, whether on-site handling at an adjusted price or transshipment to an alternative treatment facility. The customer is contacted regarding any non-conforming waste and given the option for alternate handling or return of their waste. Once the acceptance process is complete, the waste will be off-loaded at a landfill, at the STU or nonhazardous surface impoundment WMU 31.

Treatment, Storage and Disposal Options

The Buttonwillow facility has two operating hazardous waste landfills, one nonhazardous surface impoundment, and a stabilization treatment unit. The Buttonwillow facility accepts hazardous and nonhazardous waste as solid, liquid and sludge. Waste is transported via trucks in both containers (drums, supersacks, tri-wall boxes) and bulk (vacuum trucks, dump trucks, roll-off bins, etc.) shipments.

Hazardous and nonhazardous waste is managed in the following waste management units (WMUs):

- Two landfills (WMU's 34 & 35)
- Stabilization Treatment Unit (STU)
- Drum Handling and Storage Area (DHSA) at the STU
- Bulk nonhazardous liquid waste is disposed on in nonhazardous surface impoundment WMU 31.

Landfill Operations

After the waste acceptance process is complete, the driver will proceed to the location specified by truck receiving for off-loading. When a truck arrives in the landfill, field personnel will direct the truck to the proper location for off-loading. Once the off-loading process is complete, earthmoving equipment moves and compacts the waste in its final disposal location. At the end of each operating day, the landfill is covered with soil or foam to reduce emissions and wind dispersal.

The Buttonwillow Facility has two operational landfills (WMU 34 and WMU 35). The liner systems for WMU 34 and 35 were completed in October 1995 and November 2001, respectively. The WMU 34 liner system consists of the following from top to bottom:

- 2-foot thick protective soil cover;
- Primary leachate collection and removal system;
- 80 mil textured HDPE liner;
- 3-foot thick clay liner with permeability of $1x10^{-9}$ cm/sec;
- 80 mil textured HDPE liner;
- Secondary leachate collection and removal system;
- 80 mil textured HDPE liner; and
- 3-foot thick clay liner with permeability of $1x10^{-9}$ cm/sec.

The WMU 35 liner system consists of the following from top to bottom:

- 1.5-foot thick protective soil cover;
- Primary leachate collection and removal system;

- 80 mil textured HDPE liner;
- 3-foot thick clay liner with permeability of $1x10^{-9}$ cm/sec, bentonite mat on side slopes;
- Secondary leachate collection and removal system;
- 80 mil textured HDPE liner; and
  - 3-foot thick clay liner with permeability of $1x10^{-9}$ cm/sec.

Table 1 summarizes the status and capacity of all waste management units at the facility.

Stabilization/Solidification of Waste

The STU was designed to receive, store, and process wastes hazardous and nonhazardous waste that cannot be disposed directly into a landfill. Pozzolanic and cementitious additives are mixed with waste processed at the STU to make the waste amenable to landfilling. The STU consists of the following:

- Four bulk unloading bays;
- One 10,000 gallon above ground dirty water tank;
- One 10,000 gallon above ground clean water tank;
- One auger shredder mixing chamber and process feed system;
- Two truck wash-out bays;
- 1500 drum storage area; and
- Two additive silos.

The STU is designed to process up to 100 tons per hour of bulk solid waste.

Container Management

Containers are off-loaded at the STU. The containers are opened and inspected as necessary for waste verification purposes. Once they have been approved for acceptance, the drums are placed into storage or treated through the STU. The Drum Handling and Storage Area (DHSA) portion of the STU is permitted to store containers for up to one year.

Non-hazardous Waste Surface Impoundment

The Buttonwillow Facility has a lined surface impoundment, WMU 31 that accepts bulk nonhazardous liquid waste for disposal. Bulk nonhazardous liquid wastes are discharged to the surface impoundment for solar evaporation. The liner system consists of the following from top to bottom:

- 2-foot protective soil cover;
- 40-mil PVC-OR geomembrane;
- 3-foot clay liner compacted to a permeability of $1x10^{-7}$ cm/sec;
- 40-mil PVC-OR geomembrane;

- Leachate collection and removal system;
- 40-mil PVC-OR geomembrane;
- 3-foot clay liner compacted to a permeability of $1x10^{-7}$ cm/sec;
- 40-mil PVC-OR geomembrane; and
- 2-foot clay liner compacted to a permeability of $1x10^{-7}$ cm/sec.

5.0 Closure Plan

A comprehensive facility closure plan has been developed in accordance with State and Federal requirements and is available at the site for inspection upon request. A Certificate of Insurance guarantees financial assurance for closure and post-closure.

The Buttonwillow Facility has clean closed 4 lined RCRA and 22 lined California hazardous waste surface impoundments in accordance with the revised closure plans submitted and approved by DHS in March 1991. In addition, the Buttonwillow Facility has closed two lined hazardous waste landfills (WMU 28 & 33). The final cover system consisted the following from top to bottom:

- 2-foot vegetative soil cover;
- 16-ounce geotextile fabric;
- 80-mil textured HDPE liner; and
- 2-foot clay liner compacted to a permeability of less than $1x10^{-7}$ cm/sec.

All of the above mentioned units have been certified closed by DTSC.

The Buttonwillow Facility is in the process of closing nonhazardous surface impoundments WMU 18, 21, 22, 23 and 27. The sludge in these surface impoundments is currently undergoing solidification and these units will be closed as Class II landfills. Each unit was lined with two 2-foot thick clay liners and two 40-mil PVC-OR liners. The final cover system will consist of a bentonite mat, a 60-mil HDPE liner, a geotextile fabric, and 2-feet of protective soil cover.

The final cover system for landfills WMU 34 and 35 will consist of a 2-foot vegetative soil cover, geotextile fabric, an 80-mil HDPE liner, and a 2-foot clay liner compacted to a permeability less than $1x10^{-7}$ cm/sec.

6.0 Insurance

Clean Harbors and its subsidiaries maintain General Liability and Automobile Liability insurance with aggregate limits of $30,000,000. The Company purchases Environmental Impairment Liability insurance for its' waste facilities with limits of $30,000,000 insuring the Company against liability for sudden and accidental occurrences from the time waste is picked up from a customer, while being handled at the Company's treatment and transfer facilities, through its delivery to a disposal site.

Clean Harbors purchases an insurance program for Closure (Post-Closure and Corrective Action where so required) in amounts that meet regulatory requirements.

Clean Harbors' Casualty Insurance Program Summary

Policy	Limits of Liability
Workers Compensation & Employer's Liability	Statutory $1,000,000 Each Accident
Business Automobile Liability (Includes MCS-90 Endorsement)	$1,000,000 Each Occurrence $5,000,000 MCS-90
Comprehensive General Liability	$1,000,000 Each Occurrence $3,000,000 Aggregate
Excess (Umbrella) Liability (Follow Form)	$30,000,000 Each Occurrence $30,000,000 Aggregate
Wharfingers Liability	$10,000,000 Any one Vessel/Any one Accident
Contractor's Pollution Liability (Off-Site)	$10,000,000 Each Occurrence $10,000,000 Aggregate
Protection and Indemnity	$1,000,000 Each Occurrence/Any one Vessel
Environmental Impairment Liability (Coverage for Clean Harbors Facilities)	$3,000,000 Each Occurrence $6,000,000 Aggregate
Excess Pollution Liability (Sudden and Accidental Occurrences)	$30,000,000 Each Occurrence $30,000,000 Aggregate
Total coverage for Pollution incidences that occur during transportation related activities	$30,000,000 Limit

For more detail concerning Clean Harbors' coverage, please contact the Clean Harbors Risk Management Department at (781) 849-1800

Facility Closure Certificate
http://clark.cleanharbors.com/TagTeam/client/staticdownload.asp?dbid=1&siteid=823042&dataid=640

Certificate of Liability Insurance
http://clark.cleanharbors.com/TagTeam/client/staticdownload.asp?dbid=1&siteid=823042&dataid=98

7.0 Appendix

Table 1: Waste Management Unit Statistics, Clean Harbors Buttonwillow, LLC

WMU No.	Number of Liners	Surface Area (acres)	Depth (feet)	Maximum Capacity	Date Placed into Service	Date Waste Last Received	Classification	LCRS (yes/no)
1	2	1.4	10	4,000,000 gal	11/82	3/89	Clean Closed	No
2	2	1.8	13	5,390,000 gal	12/82	6/88	Clean Closed	No
3	2	1.9	15	7,370,000 gal	3/83	5/89	Clean Closed	No
4	2	1.3	19	3,685,000 gal	8/83	2/89	Clean Closed	No
5	2	2.1	19	9,350,000 gal	5/83	11/86	Clean Closed	No
6	2	1.9	26	9,515,000 gal	Fall/83	9/85	Clean Closed	No
7	2	2.5	25	9,680,000 gal	10/83	4Q87	Clean Closed	No
8	2	2.0	25	7,975,000 gal	11/83	6/88	Clean Closed	No
9	2	3.2	25	12,320,000 gal	12/83	2/89	Clean Closed	No
10	2	2.5	23	11,000,000 gal	1/84	3/91	Clean Closed	No
11	2	4.5	18	16,280,000 gal	1/84	12/88	Clean Closed	No
12	2	5.3	18	22,000,000 gal	4/84	12/88	Clean Closed	No
13	2	2.6	14	9,680,000 gal	4/84	7/88	Clean Closed	No
14	2	5.2	25	19,250,000 gall	4/84	11/90	Clean Closed	No
15	2	5.3	25	22,000,000 gal	5/84	9/89	Clean Closed	No
16	4	5.6	25	23,100,000 gal	1/85	9/89	Clean Closed	No
17	4	4.9	25	20,000,000 gal	4/85	12/89	Clean Closed	No
18	4	4.2	28	17,000,000 gal	6/85	Inactive	Clean Closed	No
19	6	3.4	30	13,000,000 gal	10/85	12/88	Clean Closed	Yes
20	6	3.0	30	16,800,000 gal	3/86	Spring/88	Clean Closed	Yes
21	4	6.0	30	52,000,000 gal	11/85	Inactive	Nonhazardous	No
22	4	5.0	30	28,000,000 gal	1/86	Inactive	Nonhazardous	No
23	4	5.0	35	30,000,000 gal	2/86	Inactive	Nonhazardous	No
24	6	3.6	35	41,000,000 gal	9/86	6/88	Clean Closed	Yes
25	6	2.4	27	9,900,000 gal	5/86	5/87	Nonhazardous	Yes
26	4	4.5	29	26,400,000 gal	5/86	5/87	Clean Closed	No
27	4	4.5	28	18,700,000 gal	8/86	inactive	Nonhazardous	No
28	5	6.6	40	340,000 yd^3	1/88	closed	RCRA Landfill	Yes
31	5	7.7	32	47,800,000 gal	12/88	operational	Nonhazardous	Yes
33	5	24.0	70	1,850,000 yd^3	7/92	closed	RCRA Landfill	Yes
34	5	6.8	40	360,000 yd^3	10/96	operational	RCRA Landfill	Yes
35 #1	5	10.0	95	941,000 yd^3	11/01	operational	RCRA Landfill	Yes
T-1	5	1.9	16	4,950,000 gal	5/86	7/88	Clean Closed	Yes
R-1	5	1.9	14	4,675,000 gal	11/84	1/88	Clean Closed	Yes
R-2	5	2.5	14	5,900,000 gal	5/85	6/87	Clean Closed	Yes
R-3	5	1.9	14	4,455,000 gal	12/85	1/88	Clean Closed	Yes
R-4	5	2.1	14	5,000,000 gal	5/85	10/86	Clean Closed	Yes

Table 2: Ground Water Monitoring Network, Clean Harbors Buttonwillow, LLC

Upper Perched Zone Wells

Background	Point of Compliance
MW-QU	MW-131U
MW-TU	MW-144U
MW-130U	MW-145U
MW-143U	MW-146U
	MW-147U
	MW-158U
	MW-159U
	MW-160U
	MW-161U

Intermediate Perched Zone Wells

Background	Point of Compliance
MW-148I	MW-137RI
MW-149RI	

Lower Water Table Zone Wells

Background	Point of Compliance
MW-PL	MW-151L
MW-102RL	MW-152RL
MW-119RL	MW-153L
	MW-163L
	MW-164L
	MW-165L
	MW-166L
	MW-167L
	MW-168L
	MW-169L
	MW-170L

Table 3: List of Ground Water Chemical Analyses, Clean Harbors Buttonwillow, LLC

ANALYSIS	METHOD
Volatile Organics	8240
Metals	
Aluminum	6010
Antimony	6010
Barium	6010
Beryllium	6010
Boron	6010
Cadmium	6010
Calcium	6010
Chromium	6010
Cobalt	6010
Copper	6010
Iron	6010
Magnesium	6010
Manganese	6010
Molybdenum	6010
Nickel	6010
Silicon	6010
Silver	6010
Sodium	6010
Thallium	6010
Vanadium	6010
Zinc	6010
Arsenic	7061
Lead	7421
Mercury	7470
Selenium	7741

ANALYSIS	METHOD
Inorganics	
Alkalinity, Total	310.1
Bromide	300
Chloride	300
Sulfate	300
Fluoride	340/340.2
Cyanide	9010
Nitrate	9200
Total Dissolved Solids	160.1
Total Organic Carbon	9060
Total Organic Halogens	9020
* pH	9040
* Specific Conductance	9050
* Temperature	170.1

* Measured in the field.

Table 4: List of Permitted Waste Codes

PERMITTEE:

Clean Harbors Buttonwillow, LLC

EPA ID CAD980675276
Date of Issue: March 6, 1996
Expiration Date: April 6, 2006

Federal Waste Codes Permitted at the Buttonwillow Facility:

D001	D002	D003	D004	D005	D006	D007
D008	D009	D010	D011	D012	D013	D014
D015	D016	D017	D018	D019	D020	D021
D022	D023	D024	D025	D026	D027	D028
D029	D030	D031	D032	D033	D034	D035
D036	D037	D038	D039	D040	D041	D042
D043	F001	F002	F003	F004	F005	F006
F007	F008	F009	F010	F011	F012	F019
F024	F025	F028	F032	F034	F035	F037
F038	F039	K001	K002	K003	K004	K005
K006	K007	K008	K009	K010	K011	K012
K013	K014	K015	K016	K017	K018	K019
K020	K021	K022	K023	K024	K025	K026
K027	K028	K029	K030	K031	K032	K033
K034	K035	K036	K037	K038	K039	K040
K041	K042	K043	K044	K045	K046	K047
K048	K049	K050	K051	K052	K053	K054
K055	K056	K057	K058	K059	K060	K061
K062	K064	K065	K066	K069	K071	K073
K083	K084	K085	K086	K087	K088	K090
K091	K093	K094	K095	K096	K097	K098
K099	K100	K101	K102	K103	K104	K105
K106	K107	K108	K109	K110	K111	K112
K113	K114	K115	K116	K117	K118	K123
K124	K125	K126	K131	K132	K136	K141
K142	K143	K144	K145	K147	K148	K149
K150	K151	K156	K157	K158	K159	K160
K161	K169	K170	K171	K172	P001	P002
P003	P004	P005	P006	P007	P008	P009
P010	P011	P012	P013	P014	P015	P016
P017	P018	P020	P021	P022	P023	P024
P026	P027	P028	P029	P030	P031	P033
P034	P036	P037	P038	P039	P040	P041
P042	P043	P044	P045	P046	P047	P048
P049	P050	P051	P054	P056	P057	P058
P059	P060	P062	P063	P064	P065	P066
P067	P068	P069	P070	P071	P072	P073
P074	P075	P076	P077	P078	P081	P082
P084	P085	P087	P088	P089	P092	P093
P094	P095	P096	P097	P098	P099	P101
P102	P103	P104	P105	P106	P107	P108
P109	P110	P111	P112	P113	P114	P115
P116	P118	P119	P120	P121	P122	P123
P127	P128	P185	P188	P189	P190	P191
P192	P194	P196	P197	P198	P199	P201
P202	P203	P204	P205	U001	U002	U003
U004	U005	U006	U007	U008	U009	U010
U011	U012	U014	U015	U016	U017	U018
U019	U020	U021	U022	U023	U024	U025

U026	U027	U028	U029	U030	U031	U032
U033	U034	U035	U036	U037	U038	U039
U041	U042	U043	U044	U045	U046	U047
U048	U049	U050	U051	U052	U053	U055
U056	U057	U058	U059	U060	U061	U062
U063	U064	U066	U067	U068	U069	U070
U071	U072	U073	U074	U075	U076	U077
U078	U079	U080	U081	U082	U083	U084
U085	U086	U087	U088	U089	U090	U091
U092	U093	U094	U095	U096	U097	U098
U099	U101	U102	U103	U105	U106	U107
U108	U109	U110	U111	U112	U113	U114
U115	U116	U117	U118	U119	U120	U121
U122	U123	U124	U125	U126	U127	U128
U129	U130	U131	U132	U133	U134	U135
U136	U137	U138	U140	U141	U142	U143
U144	U145	U146	U147	U148	U149	U150
U151	U152	U153	U154	U155	U156	U157
U158	U159	U160	U161	U162	U163	U164
U165	U166	U167	U168	U169	U170	U171
U172	U173	U174	U176	U177	U178	U179
U180	U181	U182	U183	U184	U185	U186
U187	U188	U189	U190	U191	U192	U193
U194	U196	U197	U200	U201	U202	U203
U204	U205	U206	U207	U208	U209	U210
U211	U213	U214	U215	U216	U217	U218
U219	U220	U221	U222	U223	U225	U226
U227	U228	U234	U235	U236	U237	U238
U239	U240	U243	U244	U246	U247	U248
U249	U271	U277	U278	U279	U280	U328
U353	U359	U364	U365	U366	U367	U372
U373	U375	U376	U377	U378	U379	U381
U382	U383	U384	U385	U386	U387	U389
U390	U391	U392	U393	U394	U395	U396
U400	U401	U402	U403	U404	U407	U409
U410	U411					

California State Waste Codes Permitted at the Buttonwillow Facility:

121	122	123	131	132	133	134
135	141	151	161	162	171	172
181	211	212	213	214	221	222
223	231	232	241	251	252	271
272	281	291	311	322	331	341
342	343	351	352	411	421	431
441	451	461	471	481	491	511
512	513	521	531	541	551	561
571	581	591	611	612	613	711
721	722	723	724	725	726	727
728	741	751	791	792	801	

8.0 Financial Information

Financial information on Clean Harbors and its subsidiaries are available from the Clean Harbors website in the Investor Relations section.

http://www.cleanharbors.com/Sites/Corp_Site/Investor_Relations/IR_Order_Center/ir_order_center.html

CleanHarbors
ENVIRONMENTAL SERVICES, INC.


Transportation & Disposal


CleanPack Lab Chemical Packing


Field Services & Emergency Response


Industrial Services

Investor Order Center

View and download copies of Clean Harbor's financial and investor relations documents by clicking the links below. You may also request that printed copies of these documents be sent to you via the U.S. mail by using the email link below.

Materials Available for Download or Mailing:

- Investor Packet, containing the Clean Harbors Annual Report, Fact Sheet, our most recent quarterly publication and SEC filings [email request for package to be mailed]
- Clean Harbors Investor Fact Sheet [View/Download]
- 2002 Clean Harbors Annual Report [View/Download]
- 2002 Form 10K [View/Download]
- 2002 September 10Q [View/Downloand]
- 2002 March Form 10Q [View/Download]
- 2001 Annual Report [View/Download]
- 2001 Form 10K [View/Download]
- 2001 March Form 10Q [View/Download]
- 2001 June Form 10Q [View/Download]
- 2001 September 10Q [View/Download]
- 2000 Clean Harbors Annual Report [View/Download]
- 2000 Clean Harbors Form 10K [View/Download]

To request materials by U.S. Mail, please send an email to shareholderservices@cleanharbors.com with the following information:

1. Your first and last Name
2. Company name
3. Address
4. City, State, Zip
5. Phone number
6. List of materials you would like to receive

Any statement on Clean Harbors' investor relations Web site that is not a statement of historical fact is a forward-looking statement that is subject to various Risks & Uncertainties which are detailed from time to time in Clean Harbors' SEC filings. The Company recommends that you read this information. Clean Harbors undertakes no obligation to update any of the forward-looking statements on this Web site.

CLEAN HARBORS, INC.
1200 MARIETTA WAY
SPARKS, NV. 89431
Phone: (916)-416-5038
FAX: (206)309-0730

FACSIMILE TRANSMITTAL SHEET

TO: LITA FREEMAN	FROM: CHET LEIBOLD
COMPANY: LFR	DATE: May 4, 2006
FAX NUMBER: 916-786-0366	TOTAL NO. OF PAGES (INCLUDING COVER:) 2
PHONE NUMBER: 510-918-5960	
RE: SIGNED DISPOSAL LETTER	

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

NOTES/COMMENTS:

Lita,

Please find attached the signed acceptance letter, please let me know if you need anything else.

THANKS,

CHET LEIBOLD

Distributor Services Account Manager

April 27, 2006

Ms. Lita D. Freeman, P.G., R.E.A.II
LFR Inc.
4190 Douglas Boulevard, Suite 200
Granite Bay, California 95746

Subject: Acceptance of Waste from Proposed Charter High School, 1009 66th Avenue, Oakland, Alameda County, California

Dear Ms. Freeman:

Clean Harbors understands that LFR Inc. (LFR) has prepared a Removal Action Work Plan for the Proposed Charter High School property located at 1009 66th Avenue, Oakland, Alameda County, California ("the Site"). The Site is located on the western side of 66th Avenue between East 14th Street to the north and San Leandro Street to the south.

Based on investigation at the Site by LFR and other consultants, approximately 11,000 tons of soil impacted with petroleum hydrocarbons, various semi volatile organic compounds, arsenic, lead, polychlorinated biphenyls, and various volatile organic compounds will be removed from the Site for disposal at an appropriately licensed facility. LFR anticipates at this time that excavation and off-haul of impacted soil will occur in the fall of 2006, probably during October 2006. Clean Harbors Buttonwillow has the necessary permits and available capacity to receive 11,000 tons of waste from the proposed Charter high School property in the fall of 2006. This is subject to submittal of profile/sample/available analysis and approval of the waste meeting all permitted waste acceptance criteria.

If you have any questions or comments concerning the information presented in this letter, please call me at (916) 416-5038.

Sincerely,

Chet Leibold

Distributor Services Account Manager

YAHOO! DRIVING DIRECTIONS

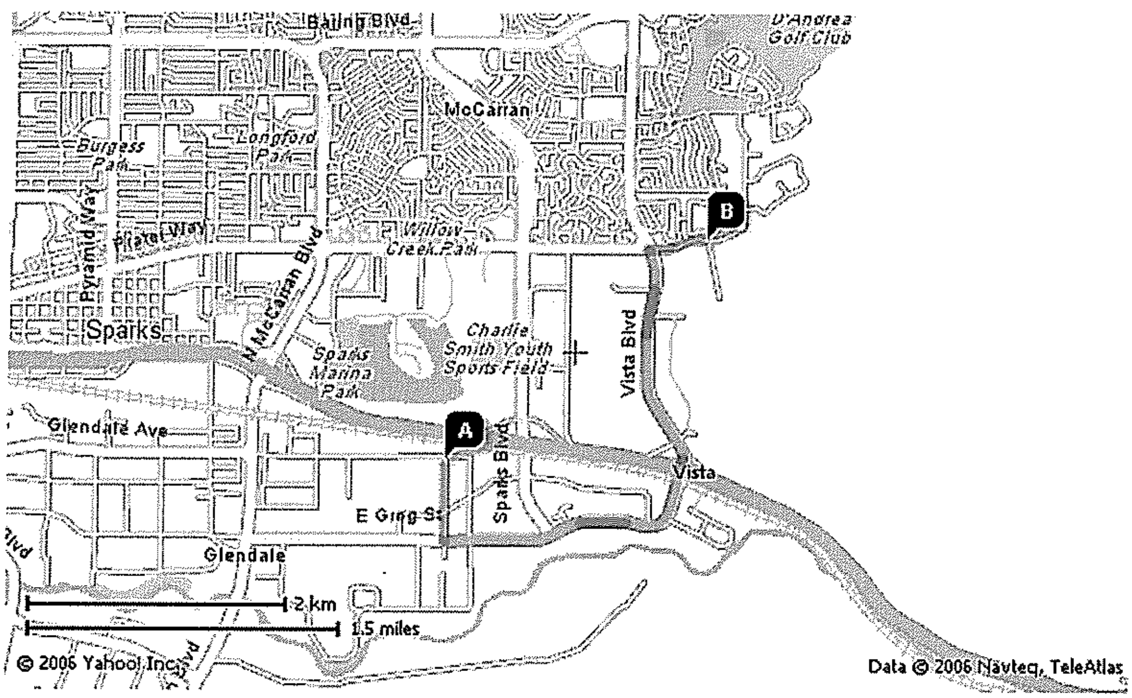
A 831 Deming Way Sparks, NV 89431-6403

1. Start at **831 DEMING WAY, SPARKS** going toward **KLEPPE LN** - **go 0.4** mi
2. Turn L on **E GREG ST** - **go 1.4** mi
3. Bear L on **VISTA BLVD** - **go 1.1** mi
4. Turn R on **E PRATER WAY** - **go 0.3** mi
5. Arrive at **2375 E PRATER WAY, SPARKS,** on the R

Distance: 3.1 miles, Travel Time: 7 mins

B 2375 E PRATER WAY SPARKS, NV

Total Distance: 3.1 miles, Total Travel Time: 7 mins



When using any driving directions or map, it's a good idea to do a reality check and make sure the road still exists, watch out for construction, and follow all traffic safety precautions. This is only to be used as an aid in planning.

Republic Services
West Contra Costa County Landfill

WASTE ACCEPTANCE GUIDELINES

September, 2004

ACCEPTANCE PROCEDURES

The following information summarizes acceptance procedures for the West Contra Costa County Landfill (WCCCL):

- Assist in determining WCCCL required laboratory analysis (or contact the landfill directly),
- Complete a "Special Waste Profile" (supplied by WCCCL),
- Submit completed Special Waste Profile, required chemical laboratory analyses, Chain of Custody and other required documentation to WCCCL,
- Obtain approval from WCCCL. *Note*: more information may be required upon review of material,
- Set up method of payment prior to transport of material, and
- A Republic manifest will be generated upon approval and sent to transporter, each truck must have a manifest, signed by the Generator prior to arriving at the landfill. These manifests are utilized for tracking purposes when the shipment arrives at the landfill.

Note: Per Executive Order No. D-62-02 issued on September 30, 2002 by Governor Gray Davis, decommissioned materials and/or residual radioactive materials are not allowed for management.

ACCEPTANCE CRITERIA

Laboratory Analysis

Petroleum Contaminated Soils

Product specific knowledge can be utilized to determine the appropriate analytical requirements for petroleum contaminated soils. Below is a list of petroleum hydrocarbons that are typically released, and the analyses that may address the regulated compounds under CCR Title 22 and 40 CFR.

Unleaded Gas:	TPH (8015M), BTEX
Leaded Gas:	TPH (8015M), BTEX (8020/8260), Lead (TTLC)
Kerosene:	TPH (8015M), BTEX
Jet Fuel:	TPH (8015M), BTEX, Lead (if leaded product)
Diesel:	TPH (8015M), BTEX
Used Hydraulic Oil:	TPH (1664), BTEX, 8260, 8270, CAM 17
Bunker Oil:	TPH (1664), BTEX, LUFT 5 Metals (or MSDS)
Virgin Motor Oil:	TPH (1664), BTEX,
Used Motor Oil:	TPH (1664), BTEX, 8260, 8270, CAM 17

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Petroleum Contaminated Soils, Cont'd.

Constituent	**Class II / Subtitle D**
Total Petroleum Hydrocarbons (gasoline): (also includes Kerosene and Jet Fuels)	No limit (Aquatic Toxicity > 5,000 ppm)
Total Petroleum Hydrocarbons (Diesel): (also includes Motor, Hydraulic, Heating and Bunker Oils, and Stoddard Solvent)	No limit (Aquatic Toxicity > 15,000 ppm)

The following requirements also apply to managing TPH impacted soils:

Constituent	**Class II TCLP (mg/L)**	**Class II Total (mg/Kg)**	**Class II STLC (mg/L)**
Benzene	0.50	n/a	n/a
Toluene	n/a	n/a	n/a
Ethylbenzene	n/a	n/a	n/a
Xylenes	n/a	n/a	n/a
Lead	5.0	350.0	5.0

The characteristics of reactivity, corrosivity, ignitability, and aquatic toxicity are unlikely in petroleum contaminated soils below certain TPH levels. In certain instances, additional analyses may be necessary.

Solvent Contaminated Waste

- If the contaminant is known, run the method(s) which target that contaminant.
- If specific contaminant is unknown, run the full 8260 analysis.
- Must address any RCRA (K, U, P or F codes) or TSCA listings, in writing.
- Metals, RCI, and/or Semi-volatile (8270), among other analyses may also be required depending on the nature of the contaminants or the process generating the waste.

WWTP Sludges / Biosolids

- TTLC and STLC (Cam 17 metals and organics), TCLP as necessary,
- Volatile Organics (8260),
- Pesticides / herbicides (8081),
- PCB's (8082),
- Percent moisture, (15% - Primary treatment, 20% - Secondary), and
- Cyanide (9010) and sulfide (376.1).

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Industrial Waste Streams

Utilizing the generator's description and knowledge of the waste stream, as well as accompanying analyses, the WCCCL will determine the required testing and frequency of sampling. In addition, the waste stream must not exhibit any of the hazardous characteristics of reactivity, corrosivity, ignitability, or toxicity.

Treated Wood

Treated wood is currently not accepted at the facility.

Drums

Only new, previously unused drums, or drums that have never contained a hazardous material may utilized for disposal at the West Contra Costa County Landfill (in accordance with 22 CCR 66261.7). All drums must be individually labeled with permanent ink and show the following:

- Approval or SWIC profile number,
- Generator's name,
- Origin site / facility address,
- Date of disposal, and
- Contents.

All materials contained in drums proposed for disposal must be pre-approved through the West Contra Costa County Landfill waste acceptance program. All drums arriving at the facility will be opened by the transporter, inspected by WCCCL staff, and resealed prior to passing the scalehouse.

Frequency

Representative samples are required for all incoming special waste streams. In general, a four point composite sample (four individual grab samples composited at the laboratory into one equally represented sample) is required to satisfy the requirements for a "representative" sample.

CONTAMINANTS	PROTOCOL	
	Volume	Frequency
Petroleum Hydrocarbons (8015M, 418.1, 1664) BTEX (8020/8260) Lead	0-25 cu. yd. 25-500 cu. yd. 500 – 1500 cu. yd 1501 cu. yd. and above.	One Grab Sample 4 Point Composite 4 Point Composite per 500 cu. yd. 4 Point Composite per 1000 cu. yd.
VOC's (8260) SVOC's (8270) Pesticides (8080) Herbicides (8150) Metals (CAM 17) PCB's (8080)	0-1000 cu. yd. 1000-2000 cu. yd. 2000 + cu. yd.	4 Point Composite per 500 cu. yd. Two 4 Point Composites. 4 Point Composite per 2000 cu. yd.

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Analytical Review

The following should be considered when submitting data from a California certified analytical laboratory to the WCCCL for review:

- The analytical data must be less than 12 months old.
- The analytical report must be legible, typed on the laboratory letterhead, include the address and phone number of the laboratory and signed by an authorized representative of the laboratory. Draft or preliminary reports will not be acceptable.
- The results must have been analyzed within required holding times.
- The results must also identify the units of measure and analytical method performed.
- Chain of custody documentation must be included in the analytical submitted for review.
- Laboratory Quality Assurance / Quality Control documentation must be presented with each analytical data set.
- For results reported as "non detect," a detection or reporting level must be indicated. Laboratory detection limits must be less than regulatory thresholds.

Constituent Limits: *Class II Cell*

West Contra Costa County Landfill currently manages one type of landfill disposal area: the Class II fill area. The limits maintained at the West Contra Costa County Landfill are presented below.

The WCCCL will only accept material that is represented by analytical results indicating concentrations below the listed values. The WCCCL will base approvals on total results where the total threshold limit concentration of a particular constituent does not equal or exceed 20 (TCLP dilution factor) or 10 (STLC dilution factor) times the listed soluble threshold for organic and inorganic compounds, respectively, except for Mercury. STLC Mercury values will be compared on an equivalent basis to TCLP criteria.

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Metals Contaminated Wastes

Cell Acceptance Limits:

Metal	**Class II Cell** TTLC (mg/Kg)	**Class II Cell** STLC (mg/L)	**Class II Cell** TCLP (mg/L)
Antimony	500.0	15.0	
Arsenic	500.0	5.0	5.0
Barium	10,000	100.0	100.0
Beryllium	75	0.75	
Cadmium	100	1.0	1.0
Chromium	2500	5.0	5.0
Chromium +6	500	5.0	
Cobalt	8,000	80.0	
Copper	2,500	25.0	
Fluoride	18,000	180	
Lead	350	5.0	5.0
Mercury	20	0.2	0.2
Molybdenum	3,500	350.0	
Nickel	2,000	20.0	
Selenium	100	1.0	1.0
Silver	500	5.0	5.0
Thallium	700	7.0	
Vanadium	2,400	24.0	
Zinc	5,000	250.0	

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Hazardous Organic Constituent Limits (Class II Cell Ceiling):

	Concentration		
Constituent	**TTLC (mg/Kg)**	**STLC (mg/L)**	**TCLP (mg/L)**
Aldrin	1.4	0.14	n/a
Benzene			0.5
Carbon Tetrachloride			0.5
Chlordane	2.5	0.25	0.03
Chlorobenzene			100.0
Chloroform			6.0
Cresols			200.0
2,4 D	100.0	10.0	10.0
DDT, DDE, DDD	1.0	0.10	n/a
1,4 Dichlorobenzene			7.5
1,2 Dichloroethane			0.5
1,1 Dichloroethylene			0.7
2,4 Dinitrotoluene			0.13
Dieldrin	8.0	0.8	n/a
Dioxin	0.01	0.001	n/a
Endrin	0.2	0.02	0.02
Heptachlor	4.7	0.47	0.008
Hexachlorobenzene			0.13
Hexachlorobutadiene			0.5
Hexachloroethane			3.0
Kepone	21.0	2.1	n/a
Lindane	4.0	0.4	0.4
Methoxychlor	100.0	10.0	10.0
Methyl Ethyl Ketone			200.0
Mirex	21.0	2.1	n/a
Nitrobenzene			2.0
Pentachlorophenol	17.0	1.7	100.0
Polychlorinated Biphenyls	50.0	5.0	n/a
Pyridine			5.0
Tetrachloroethylene			0.7
Toxaphene	5.0	0.5	0.5
Trichloroethylene	2040	204.0	0.5
2,4,5 TP (Silvex)	10.0	1.0	1.0
2,4,5 Trichlorophenol			400.0
2,4,6 Trichlorophenol			2.0
Vinyl Chloride			0.2

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Other Limits:

Moistur content must be:

< 85% from Primary Water Treatment Facilities,
< 80% from Secondary Water Treatment Facilities, or
< 50% all other sources.

Toxicity:

The waste has an acute oral LD50 < 5,000 mg/kg,
The waste has an acute dermal LD50 < 4,300 mg/kg,
The waste has an acute inhalation LC50 < 10,000 ppm, or
The waste has an acute aquatic 96-hour LC50 < 500 mg/l.

Ignitability:

Flash point > 60° C, or 140° F.

Corrosivity:

pH between 2.0 and 12.5.

Asbestos:

< 1.0 percent friable asbestos.

Must contain less than 0.001 percent by weight of any of the following substances:

2- Acetylaminofluorine;
Acrylonitrile;
4-Aminodiphenyl;
Benzidine and its salts;
bis (chloromethyl) ether (BCME);
Methyl chloromethyl Ether;
1,2-Dibromo-3-chloropronae (DBCP);
3,3'-Dichlorobenzidene and its salts (DCB);
4-Dimethylaminoazobenzene (DAB);
Ethyleneimine (EL);
alpha-Napthylamine (1-NA);
beta-Napthylamine (2-NA);
4-Nitrobiphenyl (4-NBP);
N-Nitrosodimethylamine (DMN);
beta-propiolactone (BPL); or
Vinyl Chloride.

Soils Reused as Alternative Daily Cover:

Limited to less than 50 ppm of volatile organic constituents (per BAAQMD Regulation 8, Rule 40, Section 602).

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