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FINAL
REMEDIAL INVESTIGATION/ FEASIBILITY STUDY REPORT

HEROIC WAR DEAD UNITED STATES ARMY RESERVE CENTER OAKLAND

Oakland, California

Submitted to:

California
Department of Toxic Substances Control

May 2007

Prepared by:

Geologica Inc.

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FOR
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OAKLAND, CALIFORNIA

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Prepared by:

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Executive Summary

This draft Remedial Investigation/Feasibility Study (RI/FS) report has been prepared on behalf of the United States Army Reserve (USAR) for the Heroic War Dead (HWD) USAR Center Oakland located in Oakland, CA. The East Bay Municipal Utility District (EBMUD) is considering acquiring the property from the USAR under the Real Property Exchange (RPX) program. As a condition for obtaining a Finding of Suitability to Transfer (FOST) government property, it is necessary to conduct appropriate environmental investigations of the HWD property, and if needed, develop a plan for addressing items requiring remedial action.

Background

The approximately 16 acre parcel includes six major buildings (numbered 1060, 1064, 1070, 1084, 1086, and 1101) and a number of minor buildings including three small sheds (buildings 1068, 1071 and Safety Patrol Shack). Other structures of potential environmental significance include storm and sanitary sewer piping (various locations across the site), the former vehicle wash rack (building 1073) east of building 1072, an active vehicle wash rack and a former vehicle grease rack west of the vehicle maintenance building (1084). The site was largely intertidal mudflats until land reclamation by land filling began in the early 1930's. Groundwater was encountered at depths of approximately 4 to 6 ft below ground surface on the property. Northwesterly groundwater flow was identified. The HWD property is located on the south side of the Interstate 80 onramp to the San Francisco Bay Bridge, approximately 500 ft south of San Francisco Bay.

Beginning in 1998, the USAR has conducted a number of environmental studies of limited portions of the HWD property. For a portion of the facility referred to as the Vehicle Wash Rack and Oil Water Separator, Installation Restoration Site 1 (IR Site 1), the USAR has conducted a Remedial Investigation (CDM, 2005a), Interim Remedial Action (CDM, 2004), and an FS (CDM, 2005b) to evaluate potential remedial alternatives. However, several studies conducted on behalf of the USAR and a baseline environmental survey of the property (Denali, 2004) conducted on behalf of EBMUD identified various real and potential environmental issues at the property that indicated a need for broader investigation and remediation of additional areas of the property. To address this need, EBMUD contracted performance of a series of environmental studies beginning in 2004 culminating in the preparation of this RI/FS report.

The environmental studies completed by the USAR and EBMUD were performed under the regulatory oversight and direction of the California Department of Toxic Substances Control (DTSC). The format, scope, and procedures employed in the investigation and remediation of the HWD property are intended to generally comply with requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP).

Purpose and Scope

The purpose of this document is to compile, summarize, and integrate the results of previous and current environmental studies conducted in order to identify remedial action objectives (RAOs) and a recommended remedial alternative for the property that is protective of human health and the environment.

The work completed in support of this objective that has not previously been reported included the collection and analysis of soil samples from two areas of the property in September and October 2006 with impacts from lead and carcinogenic polynuclear aromatic hydrocarbons (cPAHs), screening to identify contaminants of concern (COCs), and performance of a Feasibility Study (FS) to evaluate potential remedial alternatives and to identify and describe recommended remedial actions for the entire 17-acre HWD property.

Nature and Extent of Contamination

Based on the results of a number of environmental investigations conducted at the site beginning in 1998, a number of VOCs, metals, PAHs, petroleum hydrocarbons, and low levels of chlorinated pesticides were found to have impacted soil and groundwater and to a lesser extent, strictly for VOCs, soil vapor. The principal contaminants of concern in soil were PAHs and lead with minor areas with impacts from petroleum hydrocarbons and VOCs. The principal contaminants of concern in groundwater were petroleum hydrocarbons and VOCs in limited areas, and lead. However, high background concentrations of TDS, chloride, sulfate, and manganese make groundwater underlying the site and vicinity unusable without treatment. Elevated concentrations of a number of metals were identified which are believed to be present in groundwater as a result of slow dissolution of natural and anthropogenic materials in fill placed at the site and surrounding properties.

Cleanup Actions Completed

Several cleanup actions have been completed at the site. These consist of a waste-oil UST removal action conducted in 1995; removal of the vehicle wash rack, oil water separator, piping and associated solvent and TPH impacted soil in 2003; and removal of limited volumes of lead- and cPAH-impacted soil in 2005. No further action is indicated for the waste-oil UST area in the building 1070 yard. Remedial actions conducted in 2005 to remove lead-impacted soil beneath electric transformers formerly mounted on a platform north of building 1064, to remove surficial soil impacted by lead south of the Safety Patrol Shack on Engineer Road, and to remove cPAH-impacted soil near SI boring PV-4 at the west end of the building 1064 parking area were successful in meeting preliminary remediation goals.

Human Health and Ecological Risk Evaluation

An ecological risk scoping assessment conducted on behalf of the USAR, although limited in scope, indicated minimal risk to sensitive ecological receptors from constituents detected at the site. An evaluation of the potential for VOCs intrusion into onsite structures concluded that there was minimal risk from residual VOC

concentrations in site soil and groundwater. Comparison of soil and groundwater sampling data from the site and likely exposure pathways to EPA Region 9 PRGs for commercial/industrial soil indicated the need for a site wide human health risk assessment. The USACHPPM conducted a human health risk assessment for the site and concluded that constituents detected in soil at the site pose minimal risk to future industrial workers or construction workers. The DTSC's Human and Ecological Risk Division (HERD) staff noted that the risk assessment found that total carcinogenic risk posed by carcinogenic PAHs in soil in the building 1064 yard exceeded the 1E-05 risk threshold commonly employed by DTSC at commercial/ industrial properties. HERD also concluded that use of higher exposure parameter values to be consistent with Cal/EPA guidance and the use of lead concentrations more representative of identified "hot spot" areas rather than a site wide average lead concentration for soil would result in higher predicted risk to human health than indicated by the blood lead modeling analysis conducted by USACHPPM.

Feasibility Study

RAOs for the HWD property Feasibility Study for protection of human health were based on:

- Preventing human ingestion of lead in soil at concentrations greater than the EPA Region 9 commercial/industrial PRG of 800 mg/kg or cPAHs above a benzo(a)pyrene toxic equivalent value of 1 mg/kg; and,

- Preventing human ingestion of ground water containing contaminant concentrations above the State and federal MCLs and/or more stringent RWQCB water quality ESLs.

RAOs for protection of the environment were based on:

- Ensuring existing contaminant conditions do not change so as to threaten wildlife populations and vegetation communities.

The Feasibility Study for the HWD property evaluated six remedial alternatives in addition to the No Action alternative. As a result of the presence of elevated concentrations of several COCs in soil and groundwater, the No Action alternative is not considered viable for the property because it will not protect human health and the environment and maintain protection over time. Six active remedial alternatives were developed that incorporated combinations of institutional controls, soil removal, solidification, or containment to minimize exposure to potential sensitive receptors. Risk from ingestion of contaminated groundwater was managed by institutional controls in all alternatives due to excessive costs and elevated concentrations of COCs naturally present in site groundwater. Alternative 2 comprises imposition of institutional controls plus removal and offsite disposal of lead- and cPAH-impacted soil identified in the building 1070 and 1064 yards to depths of up to 10 foot (ft) below ground surface (bgs). Alternative 3 comprises imposition of institutional controls plus complete removal of cPAH-impacted soil identified in the building 1064 yard and removal of lead-impacted soil above the groundwater table in the soil horizon most likely to be contacted by

industrial site workers and construction workers (within 4 ft bgs). Alternative 4 comprises imposition of institutional controls plus complete removal of cPAH-impacted soil identified in the building 1064 yard and in situ solidification of lead-impacted soil in the building 1070 yard. Alternative 5 comprises imposition of institutional controls plus complete removal of cPAH-impacted soil identified in the building 1064 yard and containment (via a slurry wall and engineered cap) of lead-impacted soil in the building 1070 yard. Alternative 6 comprises imposition of institutional controls plus complete removal of cPAH-impacted soil identified in the building 1064 yard and construction of a pavement cap over lead-impacted soil in the building 1070 yard to prevent worker exposure via dermal contact and ingestion. Alternative 7 consists of imposition of institutional controls.

All of the active remedial measures include monitoring and reporting to the DTSC for a 30 year period to verify compliance with ARARs and adherence to the institutional controls. Additionally, Alternatives 3, 4, 5, and 6 include long term groundwater monitoring to detect potential adverse changes in site groundwater quality to be responsive to the RAO for environmental protection. Groundwater quality monitoring is not considered necessary for Alternative 2 because the alternative essentially involves complete removal of contaminated soil. Because it does not include groundwater monitoring, Alternative 7 may not be responsive to the RAO for environmental protection.

In a letter dated April 4, 2007, the DTSC indicated that Alternative 6 had a high likelihood of selection and successful implementation. The USAR, EBMUD, and DTSC have discussed a conceptual strategy for completing site cleanup to the satisfaction of the State and to achieve transfer or ownership at the earliest possible date whereby EBMUD would implement the selected remedial alternative at its sole expense and responsibility. The USAR will grant EBMUD a right of entry onto the HWD property in advance of formal transfer of the property to implement the selected remedies.

1. Introduction

This draft Remedial Investigation/Feasibility Study (RI/FS) has been prepared on behalf of the East Bay Municipal Utility District (EBMUD) for the Heroic War Dead (HWD) United States Army Reserve (USAR) Center Oakland (the "Site" or "subject property") located in Oakland, California (**Figure 1-1**). The USAR has previously conducted a number of environmental studies of limited portions of the property. In particular, the USAR has conducted a Remedial Investigation (CDM, 2005a), Interim Remedial Action (CDM, 2004), and an FS (CDM, 2005b) to evaluate potential remedial alternatives for a portion of the facility referred to as the Vehicle Wash Rack and Oil Water Separator, Installation Restoration Site 1 (IR Site 1). EBMUD is considering acquiring the site following transfer of the facility by the USAR under the Real Property Exchange (RPX) program. In support of the property transfer, EBMUD underwrote performance of a series of environmental studies beginning in 1999 culminating in the preparation of this RI/FS report. The environmental studies completed for the site by the USAR and EBMUD were performed under the regulatory oversight and direction of the California DTSC.

1.1 Purpose of Report

The purpose of this document is to compile, summarize, and integrate data developed from several sources to characterize environmental conditions at the site, to present the results of a Feasibility Study (FS) conducted to evaluate potential remedial alternatives, and to identify and describe recommended remedial actions for the entire 17-acre HWD property. Results of the RI/FS completed for the portion of the property referred to as IR Site 1 are incorporated into this report, as appropriate. In general, the format, scope, and procedures employed in the investigation and remediation of the HWD property are intended to comply with requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP).

1.2 Site Background

1.2.1 Site Location and Description

The site is located at 2400 Engineer Road in an industrial area on the west side of the City of Oakland, County of Alameda, California. The site and surrounding area are generally flat with a mean elevation of approximately 10 feet mean sea level (MSL). The site is bordered on the north by the eastbound lanes of Interstate Highway 80 (I-80), to the south by Engineer Road, to the west by the former Oakland Army Base, and to the east by the EBMUD SD-1 wastewater treatment plant (**Figure 1-2**).

The approximately 16 acre parcel includes six major buildings (numbered 1060, 1064, 1070, 1084, 1086, and 1101) and a number of minor buildings including three small sheds (buildings 1068, 1071 and Safety Patrol Shack) southwest of building 1070, two small buildings (building 1072 and KB 88) and a car port (building 1074) east of building 1070, as well as hazardous material storage sheds west of the vehicle maintenance

building (1084) and south of the car port (building 1074). Other structures of potential environmental significance include storm and sanitary sewer piping (various locations across the site), the former vehicle wash rack (building 1073) east of building 1072, an active vehicle wash rack and a former vehicle grease rack west of the vehicle maintenance building (1084), and the former alignment of a railroad siding along the south central site boundary that has been removed. The site layout with approximate underground utility locations is shown on **Figure 1-3**. Buildings 1060, 1070, 1084, and 1086 are currently occupied by USAR personnel. Buildings 1064, 1072, and the hazardous materials storage sheds are mainly used for equipment and material storage.

1.2.2 Site History

According to a review of historical aerial photographs and U.S.G.S. topographic maps conducted by Denali (2004), the site was largely intertidal mudflats until land reclamation by land filling began in the early 1930's. The 1915 topographic map of the area depicts the area currently occupied by the Oakland Army base, HWD property, and EBMUD wastewater treatment plant as a shallow embayment. The 1949 topographic map depicts the land occupied by the Oakland Army base built out more or less to its current configuration. However, with the exception of the 1101 building and area to the east, the area presently occupied by the HWD site and EBMUD wastewater treatment plant was depicted as undeveloped wet lands in the 1949 map. The 1959 topographic map shows the area filled, with two additional structures on the HWD site (most likely buildings 1060 and 1064) with substantial development of the EBMUD wastewater treatment plant. The 1965 topographic map of the area depicts the principal structures of the HWD site including buildings 1070, 1084 and 1086, essentially complete. The nature and source of fill material and timing of fill placement used to create the current land surface at the site and vicinity has not been identified. The U.S. Army reportedly developed the site during and after World War II. The USAR reportedly took over the property sometime in the early 1970's. The Baldwin rail yard, formerly located south of the site across Engineer Road, first appears on the 1947 aerial photo of the vicinity. The rail yard and associated track and other structures were removed within the last five years. Most recently, the property formerly occupied by the Baldwin rail yard was used for a construction material recycling operation.

1.3 Physical Characteristics of the Study Area

1.3.1 Surface-Water Hydrology

The site is located approximately 500 ft south of San Francisco Bay and approximately 1200 ft east of the easternmost extent of the Oakland Outer Harbor (**Figure 1-1**). No other surface water bodies were identified within ¼ mile of the site.

1.3.2 Hydrogeologic Setting

1.3.2.1 Regional Geologic and Hydrogeologic Setting

The site is located in the East Bay Plain, within the San Francisco Depression. In general, the San Francisco Depression is filled with a thick sequence of unconsolidated sand, silt, and clay deposited in interfluvial, bay, and intertidal environments, which is underlain by bedrock of the Franciscan Complex. The soil underlying the site consists of up to 10 feet of artificial fill underlain by Bay Mud and Merritt Sand. Regionally, the Bay Mud is reportedly about 20 to 40 feet thick and consists of clay and silty clay with lenses of sand and silt. Underlying the Bay Mud is the Merritt Sand. The Merritt Sand unit is reportedly about 65-feet thick and consists of loose, well-sorted, fine- to medium-grained sand. Groundwater reportedly occurs in the Merrit Sand under confined conditions; consequently upward groundwater gradients are likely.

1.3.2.2 Site Soil Lithology

Soils encountered at the site generally consisted of silt, sand, and gravel fill overlying native marine deposits. The source of the fill soil is unknown. In some locations the fill soil appeared to consist of reworked Bay Mud deposits, that is, dredge spoils. The fill horizon ranged in thickness from 5 to 8 feet. The contact with the underlying marine sequence was generally marked by a transition from the relatively non-cohesive, sandy fill soil to a plastic, gray-black, silty clay/clayey silt. A black, silty, fine to medium-grained sand with occasional shells was encountered in several, but not all, of the deeper borings underlying the upper clayey portion of the marine sequence. The plastic clay horizon ranged in thickness from less than 5 feet in the southeast corner of the property to greater than 10 feet in the northwest corner of the property. Based on regional geologic information, the clay horizon and underlying sand with shells together comprise the Bay Mud horizon. **Figure 1-4** presents a schematic subsurface cross section for the HWD site. The location of the cross section line is shown on **Figure 1-9b**.

1.3.2.3 Groundwater-Bearing Zones

Based on differences in groundwater elevation and total dissolved solids (TDS) concentration, two groundwater-bearing zones appear to be present within 20 ft of ground surface at the site. A relatively fresh, shallow groundwater-bearing zone was encountered in fill soil perched on top of the Bay Mud (plastic clay) horizon. Total dissolved solids concentrations in the upper groundwater-bearing zone ranged from 660 to 1,800 mg/L in December 2004 (GEOLOGICA, 2005). A deeper, more saline groundwater-bearing zone was encountered within relatively sandy marine deposits encountered below the top of the Bay Mud (plastic clay) horizon. Total dissolved solids concentrations in wells screened in the lower groundwater-bearing zone ranged from 15,000 to 21,000 mg/L in December 2004 (GEOLOGICA, 2005). The lower sandy horizon was not encountered in all explorations indicating that the unit may not be continuous across the site or may occur at greater depth than the borings were advanced. Water levels measured in site monitoring wells during high and low tides in San Francisco bay indicated that groundwater levels in the both the upper and lower groundwater-bearing zones are relatively sensitive to precipitation recharge and insensitive to tidal

fluctuations. Generally northwesterly groundwater flow towards San Francisco Bay has been observed at the site (CDM, 2005a; GEOLOGICA, 2005). Measurements of depth to groundwater and calculated groundwater elevation are presented in **Table 1-1**. **Figure 1-5** presents a groundwater elevation contour map developed from field measurements made in February 2005.

1.3.2.4 Beneficial Use of Groundwater

The population within a 4-mile radius of the Heroic War Dead United States Army Reserve Center Oakland, in Oakland, California derives its potable drinking water supply from municipal water provided by EBMUD. EBMUD obtains its water supply from the watershed of the Mokelumne River, which collects the melting snow from the Sierra Nevada Mountains. There are no known water supply wells producing groundwater from this shallow water-bearing zone. Because of high salinity frequently identified in shallow groundwater-bearing zones adjoining San Francisco Bay, use of shallow groundwater for drinking water purposes is unlikely without treatment.

1.4 Demography and Land Use

The site is located in an area that is currently predominantly used for industrial and commercial purposes and will remain predominately industrial for the foreseeable future. There are no residences within one quarter mile of the HWD property. Parsons (1999) reported that the nearest school is approximately 0.7 miles southeast of the subject site. The total number of households within a 4-mile radius is approximately 122,203, as determined by the 1990 Census of Population and Housing. As shown on **Figure 1-2**, the site is bordered on the east by the East Bay Municipal Utility District's Waste Water Treatment Plant. Interstate Highway 80 and approaches for the San Francisco Bay Bridge are to the north of the site with San Francisco Bay on the north side of the freeway. A currently vacant parcel that was most recently occupied by a concrete recycling operation and previously was the site of the Baldwin Railroad Yard borders the south center portion of the site across Engineer Road. The Oakland Terminal Railroad (OTR) leases a strip of land along southwest side of the Army Reserve property, on the south side of Engineer Road. Currently, the land is used for locomotive parking, up until 2005, the area was used for locomotive repair and maintenance. The land south of the southeast end of the Army Reserve property is currently vacant.

1.5 Ecology

Though the HWD property is not located in an area designated as a sensitive environment, Parsons (1999) reported that the site is located within ½-mile of areas in which endangered or threatened species may inhabit or use for feeding areas listed in the California Department of Fish and Game Natural Diversity Database . Parsons (1999) developed **Table 1-2** to summarize information regarding the presence of sensitive species, and their approximate habitat location relative to the HWD site.

1.6 Previous Environmental Investigations

A number of environmental investigations have been conducted for the site and vicinity. In chronological order, these include:

- In December 1995, acting on behalf of the USAR, the Navy Public Works Center, San Francisco Bay Environmental Department (NPWCSFBED) removed an out-of-use underground storage tank (UST) from the Building 1070 yard (Navy, 1996). The work was conducted under the oversight of the Alameda County Department of Environmental Health. Section 1.7.1 summarizes closure activities and sampling results.

- Woodward-Clyde Federal Services (Woodward-Clyde, 1999) was contracted by the U.S. Army Corps of Engineers (USACE) to conduct preliminary assessment/site investigations (PA/SIs) for six U.S. Army Reserve Center (USARC) facilities in California and Arizona to identify potential environmental contamination and assist in further evaluation of these facilities. Soil sampling was conducted at each of these facilities in the area of grease racks, a vehicle wash rack, and a transformer. Woodward-Clyde conducted field work at the HWD site in April 1998. Sampling results are summarized in Section 1.6.1 below.

- Denali (2004) conducted an environmental baseline survey of the HWD property in December 1999 and updated in September 2003 that included a site reconnaissance visit, review of historic aerial photographs and topographic maps, and an electronic database search. This work was conducted on behalf of EBMUD in support of their prospective acquisition of the property.

- ICF Kaiser (Kaiser, 1999) conducted soil and groundwater sampling at the Former Baldwin Railroad Yard and associated locomotive maintenance area located immediately south of the HWD site. This work was conducted on behalf of the U.S. Army as part of the investigation of Parcel 5 of the Oakland Army base in support of base closure activities. Sampling results are summarized in Section 1.6.2 below.

- In January 1999, Parsons Engineering Science (Parsons) conducted a Preliminary Assessment (PA) of the former vehicle grease rack and former vehicle wash rack at the HWD site (Parsons, 1999). The scope of the Parsons PA included a review of available information, a comprehensive target (electronic database) survey, and onsite and offsite reconnaissance. Site reconnaissance efforts focused on the former vehicle wash rack located near Building 1072 and the former vehicle grease rack located near Building 1084. Parsons did not collect any soil or groundwater samples during the 1999 PA, but cited the Woodward-Clyde field work in concluding that additional investigation and environmental sampling were needed at the site.

- In October 1999, Parsons (2000) conducted a field investigation of the Former Vehicle Wash Rack in the building 1070 yard. The work was conducted under DTSC oversight and was designed to follow up on the findings of the 1998 field program

conducted by Woodward-Clyde. Sampling results are discussed in Section 1.6.3 below.

- In August 2001, CDM Federal Programs Corporation (CDM) conducted a remedial investigation (RI) of the former vehicle wash rack, designated as Installation Restoration (IR) Site 1, which included soil and groundwater "grab" sampling and laboratory chemical analysis (CDM, 2005a). The work was conducted under DTSC oversight. Sampling results are discussed in Section 1.6.4 below. Results of an ecological risk scoping assessment completed for the RI are discussed in Section 4.

- In May 2003, the USAR contracted with CDM to remove the former vehicle wash rack and associated piping, oil water separator and adjacent impacted soil (CDM, 2004). The work was conducted under the oversight of the DTSC. Section 1.7.2 summarizes closure activities and sampling results.

- In April 2004, CDM installed six groundwater monitoring wells around the former vehicle wash rack (CDM, 2005c). The field program including collecting groundwater and soil vapor samples near the former vehicle wash rack. Sampling results are discussed in Section 1.6.5. CDM sampled the six IR Site 1 monitoring wells again in July 2004 and January 2005 (CDM 2005d; 2005e). Groundwater sampling results are summarized in section 1.6.6.

- In November/December 2004, GEOLOGICA conducted a site wide Site Inspection (SI) on behalf of EBMUD (GEOLOGICA, 2005). The work was conducted under DTSC oversight and included soil and groundwater "grab" sampling as well as installation of six groundwater monitoring wells. Sampling results are summarized in Section 1.6.7.

- In April 2005, GEOLOGICA advanced 26 additional soil borings at the site to confirm the locations of areas of potentially impacted soil identified in the SI (GEOLOGICA, 2005). Sampling results are summarized in Section 1.6.8.

- In November 2005, under contract to the USAR, Environmental Chemical Corporation (ECC) advanced soil test pits to remove lead and carcinogenic polynuclear aromatic hydrocarbon (cPAH)- impacted soil and to evaluate the lateral and vertical extent of impacts from these constituents at six locations on the HWD site (ECC, 2006). Section 1.7.3 summarizes excavation activities and sampling results.

- In June 2005, under contract to the USAR, CDM completed a draft Feasibility Study (FS) addressing groundwater quality issues associated with IR Site 1 CDM, 2005b). The findings of the IR Site 1 FS are discussed in Section 6.1.

- In September 2006, the U.S. Army Center for Health Promotion and Preventative Medicine (HPPM) completed a draft focused human health risk assessment of lead

and benzo(a)pyrene impacted soil at the HWD site (HPPM, 2006). Results of the HPPM risk assessment are discussed in Section 4.2.3.

Sections below summarize the findings of previously reported environmental investigations completed at the site. Procedures and analytical testing results for the September/October 2006 field program conducted by GEOLOGICA that have not previously been reported are presented in Section 2 of this report.

1.6.1 Woodward-Clyde Preliminary Assessment/Site Investigation

At the Heroic War Dead site, Woodward-Clyde advanced a total of 15 soil borings to depths of 5 to 7 feet (ft) below ground surface (bgs) in April, 1998 (Woodward-Clyde, 1999). Soil samples were collected from two borings (SO105 and SO106) advanced near the platform-mounted transformers located on the north side of Building 1064, four borings (SO101 through SO104) advanced near the former vehicle wash rack near Building 1072, four borings (SO201 through SO204) advanced near former vehicle grease rack near Building 1084, and from five presumed background locations (SO101BG, SO101BG-A, SO102BG, SO201BG and SO202BG) at the site. Sampling locations are shown on **Figure 1-6.** Nine soil samples and one field duplicate collected near the former vehicle wash rack and transformer areas were analyzed for metals, petroleum hydrocarbons, polychlorinated biphenyls (PCBs), and volatile organic compounds (VOCs). Six soil samples and one field duplicate collected near the former vehicle grease rack were analyzed for metals, petroleum hydrocarbons, and VOCs. Sampling results are summarized in **Table 1-3.**

Constituents detected at the site during the 1998 field program included petroleum hydrocarbons quantified as gasoline and diesel, volatile organic compounds (VOCs) including acetone, tetrachloroethene (PCE), trichloroethene (TCE), and metals including antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, silver, thallium, vanadium, and zinc. Only diesel, PCE, arsenic and lead were detected in soil samples at concentrations above their respective commercial/industrial property screening levels as listed in **Table 1-3**. These included:

- Petroleum hydrocarbons quantified as diesel detected in two samples (SO105SA and SO106FD) collected below the former location of platform mounted transformers behind building 1064 at concentrations of 720 and 510 milligrams per kilogram (mg/kg), above the San Francisco Bay Regional Water Quality Control Board's (SFB RWQCB's) risk-based soil Environmental Screening Level (ESL) for commercial/industrial property of 500 mg/kg (SFB RWQCB, 2005).
- The PCE concentrations of 67,000 and 13,000 micrograms per kilogram (ug/kg) detected in two soil samples (SO101SA and SO102SA) collected near the former location of an oil/water separator in the former vehicle wash rack area east of building 1070 exceeded the EPA PRG of 1,300 ug/kg (EPA, 2004).
- The lead concentrations of 2,300 and 1,000 mg/kg in two soil samples (SO105SA and SO106FD) collected below the former location of platform mounted transformers behind building 1064 and the lead concentration of 4,900 mg/kg in a sample

(SO102SA) collected near the former location of an oil/water separator in the building 1070 vehicle wash rack area exceeded the EPA PRG of 800 mg/kg.

- The arsenic concentrations in all 17 soil samples (including two field duplicate samples), ranging from 0.89 to 16 mg/kg, exceeded the California modified EPA PRG of 0.25 mg/kg, but were within the range of natural background concentrations in the San Francisco Bay area reported in the Kearney Foundation Report (Bradford et al, 1996).

Soil containing petroleum hydrocarbons and lead at concentrations above screening levels below the former location of platform mounted transformers behind building 1064 was removed and transported offsite for proper disposal in November 2005 during excavation of test pit explorations in this area (ECC, 2006). Soil containing PCE at concentrations above screening levels in the former vehicle wash rack area was removed and transported offsite for proper disposal in May 2003 (CDM, 2004).

1.6.2 Former Baldwin Railroad Yard Environmental Assessment

Under contract to the U.S. Army COE, ICF Kaiser (Kaiser) conducted a preliminary environmental assessment of the former Baldwin Railroad Yard in 1999 (Kaiser, 1999). The former Baldwin Railroad Yard was located on the south side of Engineer Road, immediately south of the site within the area designated as Parcel 5 in investigations conducted on behalf of the U.S. Army (see **Figure 1-2**). Kaiser (1999) indicated that five 7,000 gallon fuel oil Above Ground Storage Tanks (ASTs) and three 4,000 gallon ASTs reportedly used to store asphalt were formerly located on the eastern side of the parcel of land formerly occupied by the Baldwin Railroad Yard located immediately south of Building 1086 on the Heroic War Dead Site. The asphalt ASTs were reportedly removed in 1958. The fuel oil ASTs were reportedly removed in 1968. Kaiser reported that Kleinfelder (reference not found) detected total TPH-d at concentrations of up to 1,400 mg/kg in soil samples collected from a boring advanced near the former ASTs in 1998. Kaiser advanced six soil borings near the former ASTs in 1999 and collected soil and groundwater samples for analysis for TPH, PAHs, metals, and VOCs. TPH-d was detected at concentrations of up to 2,440 mg/kg in soil and 1.81 mg/L in groundwater. Six PAHs including fluorene at concentrations of up to 1.1 ug/L were detected. Arsenic and chromium were reportedly detected in groundwater above “tap water PRGs”.

Kaiser (1999) reported that Kleinfelder (reference not found) advanced a boring in 1998 near a locomotive maintenance area located on the south side of Engineer Road, south of Building 1064. Soil samples from the boring reportedly containing ethylbenzene, toluene, and xylenes at concentrations of up to 740 ug/kg. Organic compounds were not detected in a “grab” groundwater sample collected at that location. Laboratory testing reports from the Kleinfelder investigation were not available for review. Based on these results, the former Baldwin rail yard does not appear to be a significant source of potential contaminants of concern.

1.6.3 Former Vehicle Wash Rack Site Investigation

In October 1999, Parsons Engineering Science, Inc. (Parsons) advanced soil borings at 11 locations (USARCO-WR-B1 through USARCO-WR-B11) around the former vehicle wash rack near Building 1070 and collected soil, soil vapor, and groundwater samples for laboratory chemical analysis (Parsons, 2000). The 1999 field program was conducted under the direction of the DTSC to further investigate petroleum hydrocarbons and VOCs detected in soil samples collected during the 1998 field program conducted at the site by Woodward-Clyde. Sampling locations are shown on **Figure 1-7**. Parsons collected 22 soil samples, 11 soil gas samples, and 9 groundwater samples during the field program. The soil and groundwater samples were analyzed for petroleum hydrocarbons, VOCs, and metals. The soil vapor samples were analyzed for VOCs.

1.6.3.1 Parsons' Soil Quality Findings

Constituents detected in soil samples collected at the site during the 1999 field program included petroleum hydrocarbons quantified as gasoline, diesel, and motor oil, VOCs including ethylbenzene, xylenes, PCE, TCE, 1,1,1-trichloroethane (1,1,1-TCA), 1,1-dichloroethane (1,1-DCA), 1,4-dichlorobenzene (1,4-DCB), napthalene, and cis-1,2-dichloroethene (cis-1,2-DCE), and metals including antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, vanadium, and zinc. Only gasoline, diesel, motor oil, PCE, TCE, and arsenic were detected in soil samples at concentrations above their respective commercial/ industrial property screening levels as listed in **Table 1-4a**. These included:

- Petroleum hydrocarbons quantified as gasoline at concentrations of 1,000 and 3,000 mg/kg in soil samples collected at depths of 3 and 4.5 ft below the building 1070 washrack oil/water separator exceeded the SFB RWQCB ESL of 400 mg/kg (SFB RWQCB, 2005). Diesel and motor oil concentrations in the oil/water separator samples also exceeded their respective ESLs of 500 and 1,000 mg/kg. The diesel concentration (930 mg/kg) and the motor oil concentration (1,440 mg/kg) in the samples collected at depths of 2.5 ft and 6.5 ft, respectively, in boring WR-B6 exceeded respective ESLs of 500 and 1,000 mg/kg. Motor oil concentrations in soil samples from borings WR-B2 at 3 ft, WR-B3 at 2.5 ft, WR-B8 at 3 ft, and WR-B9 at 2.5 ft exceeded the ESL of 1,000 mg/kg (**Table 1-4a**).
- The PCE concentrations of 180,000 and 560,000 ug/kg detected in two soil samples (USARCO-WR-OWS-3 and USARCO-WR-OWS-5) collected beneath the former oil/water separator in the former vehicle washrack area east of building 1070 exceeded the EPA PRG of 1,300 ug/kg (EPA, 2004).
- The TCE concentrations of 11,000J and 20,000 ug/kg detected in the two soil samples collected beneath the former oil/water separator exceeded the California modified EPA PRG of 6,500 ug/kg.
- The arsenic concentrations in all 24 soil samples (including two field duplicate samples), ranging from 2.4 to 13.8 mg/kg, exceeded the California modified EPA PRG of 0.25 mg/kg, but were within the range of natural background concentrations in the San Francisco Bay area.

1.6.3.2 Parsons' Groundwater Quality Findings

Constituents detected in groundwater included petroleum hydrocarbons quantified as gasoline, TCE, PCE, 1,1-DCA, cis-1,2-DCE, trans-1,2-DCE and vinyl chloride. Of the organics, only TCE, PCE and vinyl chloride were detected at concentrations exceeding their respective groundwater screening levels protective of groundwater where groundwater is not a current or potential source of drinking water (**Table 1-4b**). These included:

- The vinyl chloride concentrations of 4.5 and 7.2 ug/l in WR-B2, 2,230 ug/l in WR-B3, 114 ug/l in WR-B4, and 660 ug/l in WR-B8 exceeded the RWQCB ESL of 3.8 ug/l.
- In groundwater from WR-B3, the concentrations of TCE (919 ug/l) and PCE (1,420 ug/l) exceeded the RWQCB ESLs for these constituents of 360 ug/l and 120 ug/l, respectively.
- The metals antimony, arsenic, barium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, vanadium and zinc were detected in groundwater. Concentrations of metals exceeding ESLs were detected in all nine groundwater sampling locations. Antimony was detected at 368 ug/l only in WR-B5. Arsenic concentrations exceeding ESLs were detected in four samples, ranging from 55.9 to 99.1 ug/l. Chromium was detected in every sample, and exceeded the ESL of 180 ug/l in seven samples with concentrations ranging from 165 to 43,800 ug/l. Cobalt concentrations ranged from 50.5 to 119 ug/l. Copper concentrations ranged from 39.4 to 548 ug/l. Lead, mercury and nickel concentrations exceeded ESLs in every sampling location. Lead ranged from 8.3 to 656 ug/l; its ESL is 2.5 ug/l. Mercury ranged from 0.21 to 2 ug/l and nickel ranged from 52.3 to 641 ug/l. Selenium, vanadium and zinc concentrations exceeded ESLs at all locations except WR-B2. It should be noted that the Parsons (2000) report does not specify whether the samples for metals analysis were filtered or unfiltered; the range of metals concentrations detected suggests the samples were not filtered.

1.6.3.3 Parsons' Soil Gas Findings

VOCs detected in soil gas samples collected in Parson's 1999 investigation included TCE, PCE, 1,1-DCA, cis-1,2-DCE, trans 1,2-DCE, benzene, ethylbenzene, toluene, xylenes and vinyl chloride. The results of this investigation are summarized in **Table 1-4c**. TCE, PCE, and vinyl chloride were detected at concentrations exceeding the shallow (less than five feet) soil gas screening levels established by SF RWQCB for evaluation of potential indoor air impacts at commercial and industrial sites. The concentrations detected included:

- PCE concentrations exceeded the soil gas ESL of 1,400 ug/m^3 at all eleven sample locations, with concentrations ranging from 2,100 ug/m^3 to 149,000 ug/m^3.
- The TCE concentrations of 4,200, 15,000, and 14,900 ug/m^3 detected in borings WR-B1, WR-B3, and WR-B8, respectively, exceeded the screening level of 4,100 ug/m^3.
- Vinyl chloride was only detected in WR-B4. The vinyl chloride concentration of 2,300 ug/m^3 exceeded the screening level of 110 ug/m^3.

Soil gas sampling locations WR-B1, WR-B2, WR-B6, WR-B10, and WR-B11 were located within the area of the vehicle wash rack Interim Remedial Action excavation completed in May 2003; consequently the solvent-impacted soil associated with soil gas detections in this area has been removed from the property.

1.6.4 Former Vehicle Wash Rack Remedial Investigation (RI)

In August 2001, CDM conducted a Remedial Investigation (RI) consisting of soil and groundwater "grab" sampling and laboratory chemical analysis in the vicinity of the Building 1072 former vehicle wash rack (CDM, 2005a). The Remedial Investigation was conducted with oversight by DTSC. A total of 22 subsurface soil samples were collected at depths ranging from 2- to 7-feet bgs at 11 locations (borings SB-01 through SB-11). Groundwater grab samples were collected from seven of the borings (SB-01, SB-03, SB-04, SB-07, SB-08, SB-09, and SB-11). Sample locations are shown on **Figure 1-7**. All samples were analyzed for petroleum hydrocarbons, VOCs, sVOCs including polynuclear aromatic hydrocarbons (PAHs), chlorinated pesticides, PCBs, and metals. Sampling results are discussed below.

1.6.4.1 Former Vehicle Wash Rack RI Soil Quality Findings

Constituents detected in soil samples collected during the 2001 field program included petroleum hydrocarbons, VOCs, SVOCs, chlorinated pesticides, PAHs, and metals. Only diesel, motor oil, benzo(a)pyrene, dibenzo(a,h)anthracene, arsenic and lead were detected in soil samples at concentrations above their respective commercial/industrial property screening levels as listed in **Table 1-5a**. These included:

- Petroleum hydrocarbons quantified as diesel were detected in shallow (2 feet bgs) samples in SB-03, SB-05, and SB-06 at concentrations ranging from 560 to 800 mg/kg. These concentrations exceeded the SFRWQCB ESL of 500 mg/kg. Petroleum hydrocarbons quantified as motor oil exceeded the ESL of 1000 mg/kg in shallow soil samples from borings SB-01, SB-03, and SB-06, with concentrations of 1,900 mg/kg, 2,400 mg/kg, and 1,700 mg/kg, respectively.
- Benzo(a)pyrene was detected in deeper soil samples in borings SB-04, SB10, and SB-11 at 7 feet bgs at concentrations exceeding the EPA PRG of 210 ug/kg. The detections reported were 250 ug/kg in SB-11, 320 ug/kg in SB-10, and 1,900 ug/kg in SB-05. Dibenzo(a,h)anthracene also exceeded its EPA PRG of 210 ug/kg in the soil sample from SB-04. The dibenzo(a,h)anthracene concentration reported was 1,100 ug/kg.
- Arsenic concentrations in all 22 soil samples, ranging from 2.19 to 18.1 mg/kg, exceeded the California modified EPA PRG of 0.25 mg/kg, but were within the range of natural background conditions in the San Francisco Bay area (University of California, 1996). Lead exceeded its EPA PRG of 800 mg/kg in one sample. Lead was detected at 1,520 mg/kg in SB-11 at 7 feet bgs.

Borings SB-05, SB-06, SB-10, and SB-11 were within the footprint of the vehicle wash rack soil removal action; chemical constituents detected in these borings have been removed from the site.

1.6.4.2 Former Vehicle Wash Rack RI Groundwater Quality Findings

Groundwater sampling analytical results indicated that the following constituents were detected at least once in groundwater samples: TPH as gasoline; TPH as diesel; TPH as motor oil; acetone; carbon disulfide; 4,4'-DDD; Beta-BHC; benzoic acid; bis(2-ethylhexyl) phthalate; chrysene; and phenanthrene. The concentrations of these constituents, however, did not exceed their respective groundwater screening levels (**Table 1-5b**). Several metals were detected in each of the groundwater samples. Constituents detected at concentrations above groundwater screening levels included:

- Benzo(b)fluoranthene in SB-11 at 0.097 ug/l (estimated) and Indeno(1,2,3-cd)pyrene in SB-01 at 0.057 ug/l exceeded the ESL of 0.029 ug/l for these compounds.
- Barium was detected at 2.65 mg/l in SB-04 and 5.28 mg/l in SB-09. These concentrations exceeded the 1.0 mg/l ESL. Cobalt was detected in one sample above its ESL. Copper concentrations exceeding the ESL of 0.0031 mg/l were detected in SB-01 at 0.00448 mg/l and in SB-11 at 0.00584 mg/l (estimated values). Lead exceeded the 0.0025 mg/l ESL in three samples, with concentrations ranging from 0.0036 to0.0704 mg/l
- Diesel was detected at concentrations of 1.1 and 1.4 mg/L in borings SB-04 and SB-09, respectively, above the ESL of 0.64 mg/L. Motor oil was detected the same samples at concentrations of 0.71 and 1.4 mg/L, respectively, also above the ESL of 0.64 mg/L.

Soil/groundwater sampling locations SB-05, SB-06, SB-10, and SB-11 were located within the area of the vehicle wash rack Interim Remedial Action excavation completed in May 2003; consequently the potentially impacted soil associated with constituent detections in this area has been removed from the property.

1.6.5 Former Vehicle Wash Rack Groundwater Monitoring Installation and Sampling Investigation

In April 2004, CDM installed and sampled six groundwater monitoring wells (MW-1 through MW-6) near the former vehicle wash rack and collected soil vapor samples adjacent to the monitoring well locations. The well installation and sampling work was conducted with oversight by DTSC (CDM, 2005c). The six soil vapor samples were analyzed for VOCs. The six groundwater samples were analyzed for VOCs, sVOCs including PAHs, chlorinated pesticides, and metals. No soil samples were collected for chemical analysis during the April 2004 field program. Sampling locations are shown on **Figure 1-8**. Sampling results are summarized in **Tables 1-6a** and **1-6b**, for groundwater and soil gas, respectively, and discussed below.

1.6.5.1 Groundwater Monitoring Well Sampling Results

Constitutents detected in groundwater samples after well installation in April 2004 included benzene, chloroform, 1,1-DCA, cis-1,2,-DCE, trans-1,2,-DCE, PCE, 1,1,1,-TCA, TCE, toluene, vinyl chloride, fluoranthene, pyrene, phthalates, and metals. Constituents detected at concentrations above screening levels are discussed below:

- Vinyl chloride was detected at 50 ug/l in MW-1 and at 4.2 ug/l in MW-2, at concentrations exceeding the RWQCB ESL of 3.8 ug/l.
- Benzene, cis-1,2-DCE, and PCE were detected at concentrations exceeding California MCLs for drinking water, however, the concentrations were below ESLs for groundwater that is not a drinking water source.
- Diethyl phthalate concentrations ranging from 2.5 to 3.3 ug/l, exceeded the ESL of 1.5 ug/l for this compound.
- Copper concentrations ranging from 4.5 to 48 ug/l in MW-1, MW-2, MW-3 and MW-4 exceeded the 3.1 ug/l ESL. Lead concentrations ranging from 19 to 27 ug/l in these wells exceeded the 2.5 ug/l ESL for lead. Mercury concentrations of 0.1 to 0.2 ug/l exceeded the 0.012 ug/l ESL. Nickel concentrations ranging from 17 to 39 ug/l exceeded the 8.2 ug/l ESL. Vanadium concentrations of 27 to 40 ug/l exceeded its ESL of 19. Zinc concentrations exceeded its ESL of 81 ug/l in MW-4 at 98 ug/l.

1.6.5.2 Soil Vapor Probe Sampling Results

Temporary soil vapor probes were emplaced adjacent to each of the six groundwater monitoring wells to a depth of 5 feet bgs. Soil vapor samples detected the presence of VOCs in each of the six probe locations. The results are presented in **Table 1-6b**. Only one detection was reported at a concentration exceeding the RWQCB environmental screening level for shallow soil at a commercial or industrial land use site.

PCE was detected at 3,400 ug/m^3 in the probe adjacent to MW-5. This concentration exceeded the Table E commercial/industrial ESL of 1,400 ug/m^3 established for PCE. CDM (2005) subsequently conducted an analysis using the Johnson & Ettinger model (See Section 4.2.2.3) for predicting soil gas intrusion potential into buildings that concluded that the concentrations of VOCs reported in the April 2004 soil gas samples were unlikely to pose significant risk to potential future onsite workers.

1.6.6 Former Vehicle Wash Rack Groundwater Monitoring

In July 2004 and January 2005, CDM collected groundwater samples from the six monitoring wells installed around the former vehicle wash rack. The groundwater sampling work was conducted with oversight by DTSC. The six groundwater samples collected in each of the two sampling events were analyzed for VOCs, sVOCs including PAHs, and metals. Sampling locations are shown on **Figure 1-8**. Sampling results from the January 2005 sampling event are summarized in **Table 1-7** and discussed below.

VOCs detected in groundwater included cis-1,2,-DCE, trans-1,2-DCE, PCE, TCE and vinyl chloride. Pyrene (in one sample) and various metals were also detected. Constituents detected at concentrations exceeding their respective ESLs included:

- Vinyl chloride was detected in MW-1 at a concentration of 41 ug/l. This concentration exceeds the ESL of 3.8 ug/l.
- Copper concentrations, ranging from 3.5 to 23 ug/l exceeded the 3.1 ug/l ESL in samples from MW-1, MW-2, MW-4 and MW-6.

- Lead concentrations, ranging from 2.7J to 12 ug/l in samples from MW-2, MW-4 and MW-6, exceeded the 2.5 ug/l ESL.
- Mercury concentrations, ranging from 0.081 to 0.28 ug/l, exceeded the 0.012 ESL in three samples.
- Nickel exceeded its 8.2 ug/l ESL in samples from MW-2 and MW-5, at concentrations of 12 ug/l and 16 ug/l, respectively.
- Vanadium concentrations of 59 ug/l in MW-2 and 21 ug/l in MW-5 exceeded the 19 ug/l ESL.
- Silver was detected at concentrations that exceeded its ESL, however, the data quality of these results is suspect due to silver contamination also detected in the method blank.

1.6.7 Site-Wide Site Inspection

In November/December 2004, GEOLOGICA (2005) collected soil and groundwater samples at 67 locations across the HWD property as part of a CERCLA Site Inspection conducted on behalf of EBMUD with DTSC oversight. During the November/December 2004 Site Inspection field program, GEOLOGICA installed and sampled six groundwater monitoring wells (EMW-1 through EMW-6), collected surficial soil samples for metals and sVOCs including PAHs at 9 locations (S-1 through S-9) across the property, collected surficial soil samples for lead analysis at 13 locations, advanced borings at 53 locations (PV-1 to PV-18, UT-1 to UT-9, 1101-1 to 1101-4, DS-3, VR-1 to VR-3, GR-1 and GR-2, VR-1 and VR-2, TR-1 to TR-3, 1064-1 and 1064-2, HMS-1 and HMS-2, RS-1 to RS-3 and RS-5) for soil sample collection and analysis and collected groundwater "grab" samples at 16 (1101-2, 1101-3, 1101-4, DS-3, VR-1, VR-2, VR-3, GR-1, GR-2, HMS-1, HMS-2, VW-1, VW-2, TR-3, 1064-2, and RS-4) of the 53 soil boring locations. Soil and groundwater samples were analyzed for a list of analytes that included petroleum hydrocarbons, VOCs, sVOCs including PAHs, PCBs, chlorinated pesticides and herbicides, and metals.

Surface soil sampling locations are shown on **Figure 1-9a**. Surface soil sampling results are summarized in **Table 1-8a** and summarized in Section 1.6.7.1 below. Subsurface soil and groundwater sampling locations are shown on **Figure 1-9b**. Subsurface soil sampling results are summarized in **Tables 1-8b** through **1-8h** and discussed in Section 1.6.7.2 below. SI groundwater sampling results are summarized in **Table 1-8i** and discussed in Section 1.6.7.3 below.

1.6.7.1 SI Surficial Soil Sampling Results

During the site wide SI, soil samples collected at nine locations (S-1 through S-9) around the property randomly selected to be representative of ambient background conditions were tested for semi-volatile organic compounds and 17 priority pollutant metals. The metals antimony, arsenic, barium, beryllium, cadmium, chromium (total), cobalt, copper, lead, mercury (inorganic), molybdenum, nickel, selenium, silver, thallium, vanadium, and

zinc were detected in one or more of the surficial soil samples collected at the site. With the exception of arsenic and lead, none of the detected metals concentrations exceeded their respective commercial/industrial PRGs. Findings with respect to arsenic and lead were:

- Arsenic was detected in one soil sample (S-5-3) from location S-5 in the fenced compound east of building 1070 at an estimated concentration of 6.1 mg/kg, above the California-modified commercial/industrial PRG of 0.25 mg/kg. Arsenic was not detected in the other eight surficial soil samples above method reporting limits of 1.98 to 2.02 mg/kg. The arsenic value detected is within the range of naturally occurring concentrations (2 to 11 mg/kg) reported in the Kearney Foundation Study (University of California, 1996).
- Lead was detected in all nine of the background samples and the duplicate sample (S-5-3) at concentrations ranging from 21 to 3,250 mg/kg. With the exception of the lead concentration of 3,250 mg/kg in sample S-4-1 collected immediately south of the building identified as the Safety Patrol Shack (**Figure 1-9a**), none of the lead detections exceeded the commercial/industrial PRG of 800 mg/kg.

- The semi-volatile organic compounds benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, butylbenzyl phthalate, chrysene, di-n-octyl phthalate, fluoranthene, phenanthrene, and pyrene were detected in one or more of the surficial soil samples at concentrations ranging from 0.12 to 0.52 mg/kg. With the exception of the benzo(a)pyrene concentration in one sample, none of the detected concentrations of semi-volatile organic compounds exceed their respective commercial/industrial PRGs.

- The benzo(a)pyrene concentration of 0.52 mg/kg in sample S-3-1 collected in the northeast corner of the fenced compound east of building 1070 exceeds the commercial/industrial PRG of 0.21 mg/kg.

1.6.7.2 SI Subsurface Soil Sampling Results

Results of the SI soil sampling and analysis program indicated exceedances of EPA Region 9 Industrial/Commercial PRGs for lead, arsenic, manganese, and several carcinogenic PAHs at a number of locations across the site. Constituent detected at concentrations above their respective PRGs, ESLs (petroleum hydrocarbons only), or DTSC remediation threshold for Total benzo(a)pyrene equivalent values included:

- **Lead.** Lead was detected in 129 of 134 soil samples collected in the November/December 2004 SI field program at concentrations ranging from 2.61 to 4,730 mg/kg with a mean concentration of approximately 150 mg/kg. The lead concentrations in four widely separated samples, surficial soil sample S-4-1 (3,250 mg/kg), and subsurface soil samples TR-2-4’-1 (1,400 mg/kg), VW-1-5’-1 (1,320 mg/kg) and UT-9-9’-1 (4,730 mg/kg) exceeded the industrial/commercial PRG of 800 mg/kg and substantially exceeded the mean lead concentration at the site.

- **Manganese.** Manganese was detected in all 97 soil samples analyzed for this constituent during the SI at concentrations ranging from 121 to 32,500 mg/kg with a mean concentration (excluding the result from sample UT-9-9'-1) of just over 500 mg/kg. The manganese concentration in the sample collected at a depth of 9 ft bgs in boring UT-9 of 32,500 mg/kg was the only value identified in the SI above the commercial/industrial PRG of 19,458 mg/kg. The manganese detection in boring UT-9 was further investigated in Supplemental SI sampling activities described in Section 1.6.8.

- **Arsenic.** Arsenic was detected in 22 of 120 soil samples analyzed for this constituent during the SI at concentrations ranging from 1.89 to 13.7 mg/kg with a mean detected concentration of approximately 4.75 mg/kg at scattered locations and depths across the site. All of the detected concentrations of arsenic at the site exceed the EPA Region 9 commercial/industrial PRG of 0.25 mg/kg. However, the arsenic values detected are generally within the range of naturally occurring concentrations (2 to 11 mg/kg) for soils in California reported in the Kearney Foundation Study (Bradford et al., 1996).

- **Carcinogenic PAHs.** One or more of the carcinogenic PAHs benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k) fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene were detected in 78 out of 119 soil samples submitted for this analysis from the November/December 2004 field program. Detected concentrations of the cPAHs ranged from 0.007 to 7.1 mg/kg. No correlation was identified between cPAH detections and detections of gasoline, diesel, or motor oil in site soil samples indicating that the PAH detections are most likely not the result of accidental spills or releases of fuel products on the property. PAH concentrations generally appeared to be higher in deeper soil samples compared to near surface and surficial soil samples suggesting that the detections are associated with the fill placed at the site rather than specific surface spills or releases.

  Calculated values of total benzo(a)pyrene toxic equivalents for soil samples collected during the November/December 2004 SI identified four areas with cPAHs concentrations significantly above the DTSC soil remediation threshold of 1 mg/kg. These were comprised of samples from borings PV-3, PV-4, and PV-18 in the building 1064 parking area and a sample from boring HMS-1, near the building 1084 hazardous material storage area. Calculated total benzo(a)pyrene toxic equivalent values for samples from these four areas ranged from 1.3 to 8.2 mg/kg. Additional borings were subsequently advanced adjacent to, and 5 ft north, southeast, and southwest of each of these locations during the Supplemental SI field program in April 2005.

- **Petroleum Hydrocarbons.** The SI indicated that petroleum hydrocarbons were not a major environmental concern at the site. Petroleum hydrocarbons quantified as diesel were detected in 93 of 120 samples analyzed at concentrations ranging from 1 to 400 mg/kg with a mean of approximately 28 mg/kg. Petroleum hydrocarbons quantified as motor oil were detected in 12 of 100 samples analyzed at concentrations ranging

from 100 to 1,200 mg/kg. Gasoline was only detected at low estimated concentrations (less than 0.1 mg/kg) in 10 of 120 samples analyzed. No PRGs have been established for petroleum hydrocarbons. Motor oil was detected in samples PV-7-5.5'-1 and PV-8-5.5'-1 collected in the southwest corner of the building 1064 parking area at concentrations of 1,200 and 1,200 mg/kg, respectively, slightly above the RWQCB commercial/industrial ESL of 1,000 mg/kg.

1.6.7.3 SI Groundwater Sampling Results

Groundwater samples were collected from 16 "grab" soil boring sample locations and 6 groundwater monitoring wells during the SI field program (**Figure 1-9b**). Laboratory analytical testing indicated the presence of petroleum hydrocarbons, VOCs, metals, PAHs, chlorinated pesticides and semi-volatile organic compounds. Groundwater at the site was found to be characterized by high to very high natural Total Dissolved Solids concentrations ranging from 660 to 21,000 mg/L as well as concentrations of chloride, sulfate, and manganese above secondary drinking water standards.

- **Petroleum Hydrocarbons.** Diesel was detected in the shallow zone monitoring well samples at concentrations ranging from 9 to 59 ug/L using the California Leaking Underground Storage Tank (CAL LUFT) Manual GC/MS method. The analyst flagged the results as atypical (T flag in Table 1-8i) potentially indicating product weathering in the subsurface. Diesel was reported at a concentration of 1,200 ug/L in a field duplicate sample from well EMW-4 (EMW-4-W-3) analyzed using the EPA 8015 GC/FID Method. Because there is some overlap between diesel and motor oil carbon ranges reported for the field duplicate sample and the GC/FID is less capable of distinguishing fuel products from natural organic matter, the GC/MS results are considered more credible. Gasoline and motor oil were not detected in the shallow zone wells above method reporting limits of 10 and 650 ug/L, respectively.

- **VOCs.** Several VOCs, notably tetrachloroethene at 9.4 and 12 ug/L, trichloroethene at 0.95 ug/L, and cis-1,2-dichloroethene at 1.8 ug/L were detected in well EMW-4 northeast of the former vehicle wash rack in the building 1070 yard. Low estimated concentrations of VOCs including benzene and cis-1,2-dichloroethene were detected in groundwater "grab" samples from boring 1101-3 near building 1101 and in boring GR-2 near the former vehicle grease rack west of building 1084. None of the detected concentrations of VOCs in groundwater exceeded their respective Table B ESLs.

- **Chlorinated Pesticides.** Several chlorinated pesticides including 4,4-DDE, chlorothalonil, and heptachlor were detected at trace concentrations in monitoring wells EMW-3, EMW-4, and EMW-5. Concentrations of 4,4'-DDE, dieldrin, endrin, heptachlor, heptachlor epoxide, and methoxychlor slightly exceeded their respective Table B ESLs but were only detected in one groundwater sample of seven tested, at estimated concentrations ranging from 0.014 to 0.037 ug/L. The analytical results for this sample were not confirmed by analysis of a duplicate sample from the same well suggesting that the results are an analytical artifact.

- **Semi-Volatile Organic Compounds.** Several PAHs including naphthalene, 2-methylnaphthalene, benzo(a)pyrene, benzo(b)fluoranthene and others were detected in up to 11 of the 27 groundwater samples tested. PAHs were detected at concentrations above their respective Table B ESLs near the hazardous materials storage sheds (borings HMS-1 and HMS-2), north of the railroad maintenance area on Engineer Road (well EMW-5), and near the west end of building 1064 (well EMW-6). Several phthalates and related compounds were detected in groundwater samples collected during the SI but were also detected in laboratory control blank samples.

- **Metals.** Metals including antimony, arsenic, barium, cadmium, chromium, cobalt, copper, lead, molybdenum, nickel, selenium, silver, thallium, vanadium, and, zinc were detected in one or more of the groundwater samples collected during the SI field program. Several metals including barium, cobalt, manganese, vanadium, and zinc were detected in 80% or more of the samples tested. As listed in **Table 1-8i**, concentrations of antimony, barium, cadmium, cobalt, copper, lead, mercury, nickel, selenium, thallium, vanadium, and zinc in one or more of the groundwater samples exceeded their respective Table B ESLs.

1.6.7.4 Summary of Site Wide SI Findings

Results of analysis of groundwater samples collected during the SI indicated the widespread presence of elevated concentrations of metals and dissolved solids in site groundwater as well as concentrations of organic compounds including petroleum hydrocarbons and PAHs. No specific sources of groundwater contamination were identified. Based on these results, groundwater underlying the site cannot be used for drinking water purposes without extensive treatment. Consequently, in discussions with DTSC, no further groundwater characterization data needs were identified.

Results of analysis of soil samples collected during the SI indicated the presence of concentrations of metals, petroleum hydrocarbons, and PAHs at several locations on the property. In particular, concentrations of lead and cPAHs in eight soil sampling locations (TR-2, VW-1, UT-9, HMS-1, PV-3, PV-4, PV-18, and S-4) exceeded identified screening levels. Furthermore, the soil sampling results indicated significant heterogeneity. As a result, in discussions with DTSC it was determined that advancing additional confirmatory borings and step out borings was needed to confirm the presence of and horizontal and vertical extent of impacts at these eight locations. The supplemental SI field program conducted to collect these data is discusses below.

1.6.8 Supplemental SI Field Program

In April 2005, four to eight additional borings were advanced at eight of the November/ December 2004 sampling locations (TR-2, VW-1, UT-9, HMS-1, PV-3, PV-4, PV-18, and S-4) to confirm the SI sampling results and evaluate the lateral extent of cPAH and lead impacts in site soil (GEOLOGICA, 2005). Supplemental SI sampling locations are shown on **Figure 1-10**. Soil sampling results are discussed below and summarized in **Tables 1-9a** and **1-9b**.

As summarized in **Table 1-9a**, substantially lower cPAH concentrations were identified in samples collected in April 2005 in step out borings near SI boring locations PV-3 and HMS-1 indicating that the November/December 2004 sampling results for these locations were not representative of bulk soil conditions. The supplemental borings advanced in April 2005 confirmed the presence of cPAH-impacted soil at the following locations:

- The PV-4 boring location and 5 ft southwest in the depth interval 0 to 2 ft bgs.

- The PV-18 boring location and 5 ft southeast and southwest in the depth interval 4 to 6 ft bgs.

The supplemental borings advanced in April 2005 confirmed the presence of lead-impacted soil at the following locations (**Table 1-9b**):

- Below the platform-mounted transformers behind building 1064 and at least 5 ft southeast and southwest of the eastern utility pole between depths of 3 to 6 ft bgs.

- The VW-1 boring location and 5 ft southeast and southwest in the depth interval 4 to 6 ft bgs.

- The UT-9 boring location and 5 ft north in the depth interval 8 to 10 ft bgs.

1.6.9 Summary of Previous Environmental Investigation Findings

Based on the results of soil sampling conducted at the site and comparison to relevant applicable environmental screening levels, six areas with cPAH- and lead-impacted soil were carried forward for potential remedial action. These included:

- Soil below the platform-mounted transformers behind building 1064;
- The vicinity of SI boring locations PV-4, PV-18 in the building 1064 parking area, and,
- The vicinity of SI boring locations VW-1 and UT-9 in the building 1070 yard.

In addition, although the lead concentrations in supplemental soil samples collected near SI sampling location S-4 were below the EPA PRG of 800 mg/kg, the S-4 lead area was retained for remedial action because of the presence of a nearby source of lead (flaking lead-based paint from the Safety Patrol Shack).

1.7 Cleanup Actions Completed

Cleanup actions have been conducted at several locations at the site and are summarized below. These include:

- Building 1070 UST Closure – December 2005
- Former Vehicle Wash Rack (IR Site 1) Removal Action – May 2003

- Lead- and cPAH-impacted Soil Removal Action - November 2005

Cleanup actions completed at the site are discussed below. **Figure 1-11a** shows the location of cleanup actions completed at the site to date.

1.7.1 Building 1070 UST Closure

The Navy Public Works Center, San Francisco Bay Environmental Department (Navy, 1996) removed an out-of-use 1,000-gallon underground storage tank (UST) formerly located approximately 300 yards southeast of Building 1070 in December 1995 (Figure 1-9a). The tank was believed to have previously stored waste oil. The tank was empty at the time of removal. There was no associated piping connected to the tank. During UST removal activities, approximately 60 cubic yards (cy) of soil was removed and disposed of as hazardous waste. Following removal of the UST, two soil samples collected from the north and south ends of the excavation and a sample of groundwater present in the excavation were analyzed for petroleum hydrocarbons, VOCs, metals, and semi-volatile organic compounds (SVOCs). Low concentrations of BTEX, TPH, and several metals were detected in the soil and groundwater samples. However, because none of the constituent concentrations detected in confirmation soil and groundwater samples collected following removal of the UST exceeded regulatory cleanup levels, the Alameda County Department of Environmental Health (ACDEH) approved closure of the UST excavation with no further action required (ACDEH, 1996). Based on the approval by ACDEH to close the UST with no further action, this site was not carried forward to the site wide FS discussed in Section 5.

1.7.2 Building 1070 Vehicle Wash Rack Closure

The Building 1072 Vehicle Wash Rack (VWR) was formerly used to wash vehicles and engine components (CDM, 2005a) and may have been used for repainting vehicles. The VWR formerly consisted of a concrete pad that drained to an oil water separator (OWS). Use of the VWR reportedly ceased before USAR took control of the property in the early 1970's.

In May 2003, the USAR conducted an Interim Removal Action (IRA) that consisted of excavating the concrete pad, oil water separator, associated piping, and adjacent soil (CDM, 2004). Pursuant to the DTSC-approved Removal Action Work Plan dated April 25, 2003 for soil, the USAR removed and shipped offsite for disposal approximately 900 cy of TPH- and solvent-impacted soil during the IRA. Removal activities were documented in the Removal Action Report dated March 25, 2004. The area formerly occupied by the Vehicle Wash Pad is currently covered with soil and gravel. Following removal of the Vehicle Wash Pad and underlying soil, a total of 13 soil samples (L1 through L12 and a duplicate sample) were collected from the bottom and sidewalls of the excavation to confirm that remedial cleanup goals had been met. Confirmation sampling locations are illustrated on **Figure 1-11b**.

As shown on **Table 1-10a**, CDM (2004) identified concentrations of arsenic, lead, and tetrachloroethene (PCE) above 2002 EPA Region 9 PRGs. However, only arsenic

concentrations in the confirmation soil samples exceeded the 2002 commercial/industrial PRGs. The arsenic concentrations identified, ranged from 1.5 to 7.9 mg/kg, within normal background concentrations for this constituent in California soil. EPA subsequently revised PRGs for some constituents in February 2005 with the result that the tetrachloroethene concentration of 2,500 ug/kg in sample L8-1-7 collected in the northwest corner of the excavation exceeded the 2005 commercial/industrial PRG of 1,300 ug/kg.

1.7.3 Lead- and cPAH-impacted Soil Removal Action

Based on discussions with DTSC and EBMUD following completion of the supplemental SI sampling activities in April 2005, the USAR engaged Environmental Chemical Corporation (ECC) to remove lead or cPAH impacted soil and/or to evaluate the lateral and vertical extent of impacts from these constituents at the six locations identified in the SI/supplemental SI field programs. In November 2005, ECC advanced soil test pits at six locations as shown on **Figure 1-11a** (ECC, 2005). The test pits locations were selected based on the results of the supplemental SI sampling program conducted in April 2005 that identified areas having confirmed concentrations of lead or cPAHs above screening levels of 800 mg/kg for lead and 1 mg/kg for benzo(a)pyrene toxic equivalent (BaPtox) values. Soil confirmation sampling locations are shown on **Figure 1-11c**. Confirmation sampling results are summarized in **Table 1-10b** and discussed below.

The results of November 2005 test pit exploration program can be summarized as follows:

- Lead was not detected above the 800 mg/kg screening level in confirmation samples from the S-4 and B1064 test pits. The B1064 test pit was advanced to a depth of 8 ft bgs over an area of approximately 24 ft by 40 ft behind building 1064. The excavation encompassed the area from the edge of the building north to the fence line and from the western utility pole east past the location of boring TR-2-A (Figure 1-11c). The S-4 test pit was advanced to a depth of 1 ft bgs over an area of approximately 20 ft by 50 ft south of the Safety Patrol Shack immediately south of the southern fence line.

- Lead was detected at concentrations ranging from 894 to 2,490 mg/kg, above the 800 mg/kg screening level, in bottom and north, east, and west sidewall samples collected from the UT-9 test pit. The UT-9 test pit was advanced to a depth of 10 ft bgs over an area of approximately 10 ft by 10 ft near the center of the building 1070 yard. The lead concentration, 709 mg/kg, in the south sidewall sample was below the screening level.

- Lead was detected at concentrations of 1,770 and 1,560 mg/kg, above the 800 mg/kg screening level, in the north and south sidewall samples collected from the VW-1 test pit. The VW-1 test pit was advanced to a depth of 6 ft bgs over an area of approximately 10 ft by 10 ft near the northeast corner of the building 1070 yard. The lead concentrations in the floor sample and east and west sidewall samples of 315, 746, and 741 mg/kg, respectively, were below the screening level.

- B(a)P was detected at concentrations of 510 ug/kg in the south sidewall sample and 1,100 ug/kg (520 ug/kg in field duplicate) in the floor sample from the PV-4 test pit, above the EPA Region 9 PRG for B(a)P of 210 ug/kg. B(a)P concentrations in the north, east, and west sidewall samples ranged from less than 24 to 190 ug/kg, below the B(a)P PRG. The PV-4 test pit was advanced to a depth of 2 ft bgs over an area of approximately 10 ft by 10 ft near the west end of the building 1064 parking area. Although the samples from the PV-4 test pit were only tested for B(a)P, the concentrations of additional carcinogenic PAHs (e.g., chrysene) potentially present are unlikely to exceed the 1 mg/kg action level for benzo(a)pyrene toxic equivalent values.
- B(a)P was detected at concentrations ranging from 680 to 2,700 ug/kg in the bottom and sidewall samples from the PV-18 test pit, above the EPA PRG. The PV-18 test pit was advanced to a depth of 8 ft bgs over an area of approximately 10 ft by 10 ft near the east end of the building 1064 parking area. Although the samples from the PV-18 test pit were only tested for B(a)P, because the B(a)P concentrations in the samples from the north and west sidewalls exceeded 1 mg/kg, benzo(a)pyrene toxic equivalent values for these samples exceeded the 1 mg/kg action level identified by the DTSC.

Based on these testing results the DTSC determined that additional soil quality evaluation was needed near the PV-18, UT-9, and VW-1 test pits. In addition, the DTSC requested confirmation and/or evaluation of the extent of lead impacted soil near boring SB-11 advanced by CDM in 2001 in which lead was detected at a concentration of 1,520 mg/kg, above the EPA PRG of 800 mg/kg, in the sample (SS-11) collected at a depth of 7 ft bgs. These data gaps were carried forward to the RI discussed in Section 2.

SECTION 1
TABLES

Table 1-1

Heroic War Dead United States Army Reserve Center, Oakland, California
Remedial Investigation/Feasibility Study

Geologica (2004/2005) Site Inspection - Summary of Groundwater Elevation Data

	December 1, 2004(4)		December 15/16, 2004		February 16, 2005(5)	
	Depth to Groundwater	Groundwater Elevation	Depth to Groundwater	Groundwater Elevation	Depth to Groundwater	Groundwater Elevation
	Intermediate (0.5 ft MSL) Tide		Prior to Sampling		Low (-2.5 ft MSL) Tide	
Well ID	(feet bgs)	(feet MSL)	(feet bgs)	(feet MSL)	(feet bgs)	(feet MSL)
EMW-1(3)	7.13	-2.04	6.98	-1.89	6.85	-1.76
EMW-2(3)	5.17	0.35	4.51	1.01	4.11	1.41
EMW-3(3)	4.96	4.22	4.67	4.51	3.15	6.03
EMW-4(3)	5.14	4.23	4.82	4.55	3.90	5.47
EMW-5(3)	5.62	2.73	5.41	2.94	4.62	3.73
EMW-6(3)	4.19	4.20	3.89	4.50	2.97	5.42

Notes:

1) State plane coordinates.
2) Mean sea level (MSL) datum.
3) 2-inch-diameter PVC casing with 10-foot of 0.010-inch machine-slotted PVC screen.
4) Measured between 09:38 and 09:52; high tide at 8:40.
5) Measured between 15:42 and 15:56; low tide at 15:40.

Table 1-2
Sensitive Species Near the Oakland USARC (Heroic War Dead)

Common Name	Federal Status	California Status	Approximate Habitat Location Relative to Subject Site(s)
Salt-marsh harvest mouse	Endangered	Endangered	500 ft North
California clapper rail	Endangered	Endangered	500 ft North
California black rail	Species of Concern	NC	500 ft North

NC – Not Classified
Federal Species of Concern – Former Category 2 candidate species; existing information indicates a listing may be warranted, but for which substantial biological information to support a proposed rules is lacking. Species under this classification have no official protective legal status; however, there is a good possibility that the respective species may be reclassified once further data is received.

From Parsons (1999) Preliminary Assessment

Table 1-3

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Summary of Woodward-Clyde April 1998 Soil Sampling Results

		Building 1070 Vehicle Wash Rack Area							Building 1064 Transformer Area			Building 1084 Grease Rack Area							EPA Region 9 Commercial/ Industrial
		Background Samples			SO101	SO102	SO103	SO104	SO105	SO106		Background Samples		SO201	SO202	SO203		SO204	
Sample ID		SO101BG	SO101BG-A	SO102BG	SO101SA	SO102SA	SO103SA	SO104SA	SO105SA	SO106FD	SO106SA	SO201BG	SO202BG	SO201SA	SO202SA	SO203FD	SO203SA	SO204SA	
Date Collected		4/9/98	4/10/98	4/10/98	4/10/98	4/10/98	4/10/98	4/10/98	4/9/98	4/9/98	4/9/98	4/9/98	4/9/98	4/10/98	4/10/98	4/10/98	4/10/98	4/10/98	PRGs
Analyte	**Units**	3'-5'	3'-5'	3'-5'	3'-5'	3'-5'	3'-5'	3'-5'	3'-5'	3'-5'	3'-5'	3'-5'	3'-5'	3'-5'	3'-5'	3'-5'	3'-5'	3'-5'	
Petroleum Hydrocarbons																			
Gasoline C7-C12	mg/Kg	1.3 U	1.1 U	1.2 U	**4**	1.2 U	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	400(B)
Diesel C12-C22	mg/Kg	**190 J**	**9.5 J**	**30 J**	**3.1 J**	**48 J**	**300 J**	**120 J**	**720**	**510 J**	**270 J**	**130 J**	**180 J**	**79 J**	**14 J**	1.1 UJ	**23 J**	1.1 UJ	**500(B)**
Volatile Organic Compounds[2]																			
Acetone	ug/Kg	**27**	22 U	23 U	11000 U	580 U	43 U	21 U	25 U	24 U	22 U	24 U	**29**	22 U	22 U	21 U	21 U	23 U	54,000,000
Tetrachloroethene (PCE)	ug/Kg	6.3 U	5.4 U	5.8 U	**67,000**	**13,000**	**330**	**96**	**28**	**15**	**24**	6.1 U	5.6 U	5.6 U	5.4 U	5.3 U	5.3 U	5.7 U	**1,300**
Trichloroethene (TCE)	ug/Kg	6.3 U	5.4 U	5.8 U	2700 U	**170**	11 U	**4.3**	6.2 U	6.1 U	5.4 U	6.1 U	5.6 U	5.6 U	5.4 U	5.3 U	5.3 U	5.7 U	110
Polychlorinated Biphenyls																			
All Arochlors	ug/Kg	15-30 U	-	-	-	-	-	-	15 U	15 U	13 U	-	-	-	-	-	-	-	varies
Metals																			
Antimony	mg/Kg	3.8 UJ	3.1 UJ	3.5 UJ	3.3 UJ	**11 J**	3.2 UJ	3.1 UJ	**88 J**	**5.5 J**	3.2 UJ	3.5 UJ	3.2 UJ	3.3 UJ	3.3 UJ	3 UJ	3.1 UJ	3.3 UJ	410
Arsenic	mg/Kg	**7.8 J**	**5 J**	**4.8 J**	**2.9 J**	**8.2 J**	**4.9 J**	**3.8 J**	**16 J**	**13 J**	**5.4 J**	**4.2**	**5.3**	**4.9**	**5.2**	**1.2**	**0.89**	**3.5**	**0.25(CA Mod)**
Barium	mg/Kg	**63 J**	**100 J**	**100 J**	**140 J**	**230 J**	**160 J**	**28 J**	**1,900 J**	**800 J**	**330 J**	**46 J**	**180 J**	**130 J**	**30 J**	**31 J**	**12 J**	**28 J**	67,000
Beryllium	mg/Kg	**0.42**	**0.34**	**0.36**	**0.27**	**0.3**	**0.45**	**0.18**	**0.35**	**0.39**	**0.41**	**0.22**	**0.55**	**0.39**	**0.22**	**0.33**	**0.15**	**0.23**	1,900
Cadmium	mg/Kg	**0.54 J**	**1.3 J**	0.12 UJ	**0.53 J**	**0.71 J**	0.11 UJ	0.1 UJ	**17 J**	**12 J**	**3.4 J**	**0.56**	**0.58**	0.11 U	0.11 U	0.1 U	0.1 U	0.11 U	450
Chromium[3]	mg/Kg	**45 J**	**34 J**	**32 J**	**27 J**	**41 J**	**51 J**	**29 J**	**50 J**	**59 J**	**30 J**	**32 J**	**48 J**	**56 J**	**3.1 J**	0.5 UJ	**3.1 J**	**2.9 J**	450
Cobalt	mg/Kg	**10**	**9.6**	**6.1**	**8.3**	**11**	**11**	**7.3**	**11**	**12**	**10**	**6.6**	**9.1**	**11**	**3.1**	**3.4**	**3.8**	**4.5**	1,900
Copper	mg/Kg	**31 J**	**150 J**	**58 J**	**42 J**	**300 J**	**31 J**	**17 J**	**2,200 J**	**1,600 J**	**280 J**	**25 J**	**49 J**	**56 J**	**6.1 J**	**4 J**	**2.2 J**	**5.8 J**	41,000
Lead	mg/Kg	**28 J**	**110 J**	**95 J**	**65 J**	**4,900 J**	**20 J**	**8.4 J**	**2,300 J**	**1,000 J**	**290 J**	**36**	**43**	**86**	**8.2**	**3.4**	**2.6**	**6.6**	**800**
Mercury	mg/Kg	**0.12 J**	**0.3 J**	**0.22 J**	0.1 UJ	**0.25 J**	0.099 UJ	0.1 UJ	**0.8 J**	**1.9 J**	**0.92 J**	**0.56 J**	**0.71 J**	0.094 UJ	**1.2 J**	0.1 UJ	0.089 UJ	**0.56 J**	310
Molybdenum	mg/Kg	**1.6 J**	1 UJ	1.2 UJ	**1.9 J**	**1.5 J**	**1.8 J**	1 UJ	**12 J**	**4.2 J**	**1.2 J**	1.2 U	**1.2**	**1.6**	1.1 U	1 U	**1.6**	1.1 U	5,100
Nickel	mg/Kg	**53 J**	**45 J**	**25 J**	**65 J**	**72 J**	**79 J**	**29 J**	**77 J**	**74 J**	**42 J**	**31**	**45**	**60**	**3.1**	**1.7**	**2.5**	**3.7**	20,000
Selenium	mg/Kg	0.32 U	0.26 U	0.29 U	0.27 U	0.28 U	0.27 U	0.26 U	0.3 U	0.29 U	0.27 U	0.29 U	0.27 U	0.27 U	0.27 U	0.25 U	0.26 U	0.27 U	5,100
Silver	mg/Kg	0.63 UJ	0.52 UJ	0.58 UJ	0.54 UJ	**1.1 J**	0.54 UJ	0.52 UJ	**3.2 J**	**3 J**	0.54 UJ	0.58 U	0.54 U	0.55 U	0.54 U	0.5 U	0.52 U	0.55 U	5,100
Thallium[4]	mg/Kg	0.32 U	**13**	**9.3**	**7.1**	**13**	**13**	**6.2**	0.3 U	0.29 U	0.27 U	**0.95**	0.27 U	**12**	**11**	**9.8**	**10**	**12**	67
Vanadium	mg/Kg	**39**	**25**	**31**	**63**	**45**	**36**	**23**	**28**	**33**	**29**	**25 J**	**45 J**	**47 J**	**11 J**	**12 J**	**32 J**	**23 J**	1,000
Zinc	mg/Kg	**78 J**	**2,400 J**	**180 J**	**85 J**	**800 J**	**78 J**	**44 J**	**2,400 J**	**1,600 J**	**510 J**	**83**	**95**	**110**	**80**	**85**	**70**	**83**	100,000

Notes:

[1] Noncancer endpoint value

[2] Constituents detected in one or more samples listed.

[3] PRG for total chromium.

[4] Thallic oxide PRG as PRG for elemental thallium has not been developed

J = Estimated value.

- = Not analyzed.

U = Analyte was not detected above reporting limit.

UJ = Reporting limit is estimated. Analyte was not detected above reporting limit.

B = SFB RWQCB Table B ESL for commercial/industrial land use.

4 Constituent in bold face type detected at concentration above MRL.

720 Constituent detected at concentration above applicable screening level.

CA Mod = California-modified PRG.

Table 1-4a

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Summary of Parsons Engineering October 1999 Soil Sampling Results

		WR-B1	WR-B2		WR-B3		WR-B4		WR-B5		WR-B6		WR-B7			WR-B8			WR-B9		WR-B10		WR-B11	WR-OWS		EPA Region 9 PRGs(1)
Sample Location		USARCO-WR-B1-2	USARCO-WR-B2-2 (1)	USARCO-WR-B2-8	USARCO-WR-B3-2	USARCO-WR-B3-8	USARCO-WR-B4-2	USARCO-WR-B4-8	USARCO-WR-B5-2	USARCO-WR-B5-8	USARCO-WR-B6-2 (2)	USARCO-WR-B6-8	USARCO-WR-B7-2	USARCO-WR-B7-8	USARCO-WR-B99-8 (B7-8 dup)	USARCO-WR-B8-2	USARCO-WR-B8-7	USARCO-WR-B8-8 (B8-7 dup)	USARCO-WR-B9-2	USARCO-WR-B9-8	USARCO-WR-B10-2	USARCO-WR-B10-8	USARCO-WR-B11-2	USARCO-WR-OWS-3	USARCO-WR-OWS-5	Commercial/ Industrial
Sample Depth (ft)	Units	2.5	3	7.5	2.5	8.5	2.5	7.5	2.5	7.5	2.5	6.5	2.5	7.5	8	3	6.5	7.5	2.5	6.5	2.5	7	2.5	3	4.5	
Petroleum Hydrocarbons																										
Gasoline	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,000	3,000	400(B)
Diesel	mg/kg	190	390J	ND	280J	ND	19	ND	28J	15	930	440	ND	ND	ND	470J	ND	ND	200J	ND	ND	ND	ND	1,640	2,700	500(B)
Oil	mg/kg	110	1,700	ND	1,500	ND	62	ND	310	63	220	1,440	190	ND	ND	1,900	16	ND	4,700	ND	220	300	20	1,000	1,400	1000(B)
Volatile Organic Compounds																										
Ethylbenzene	ug/kg	ND	ND	ND	ND	ND	ND	ND	17J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	16,000J	14,000J	400,000
Xylenes	ug/kg	ND	ND	ND	ND	ND	ND	ND	130	ND	ND	ND	ND	ND	ND	ND	ND	ND	6	ND	ND	ND	ND	43,000J	58,000	420,000
PCE	ug/kg	ND	190	18	151	ND	140	198	100	ND	ND	54	ND	29	9	110	41	26	18	10	10	10	100	180,000	560,000	1,300
TCE	ug/kg	ND	5.4	ND	3	ND	2	19	ND	ND	ND	ND	ND	ND	ND	3	ND	ND	ND	ND	ND	ND	ND	11,000J	20,000	6,500 CA Mod
1,1,1-TCA	ug/kg	ND	60	ND	4J	ND	11	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	30,000	240,000	1,200,000
1,1-DCA	ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20,000	1,700,000
1,4-DCB	ug/kg	ND	ND	ND	ND	ND	ND	ND	11J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,900
Napthalene	ug/kg	ND	ND	ND	ND	ND	ND	ND	20J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4,200
cis-1,2-DCE	ug/kg	ND	ND	ND	ND	ND	ND	8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	150,000
Metals																										
Antimony	mg/kg	ND	ND	ND	ND	ND	ND	ND	7	7.6J	ND	7.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	410
Arsenic	mg/kg	4	2.7	2.6	3.9	3	3	2.8	4.6	8	13.8	9	4.8	4.5	3.1	3.3	3.7	3.5	2.8	4.5	7.7	4.1	6.2	4.6	5.7	0.25(CA Mod)
Barium	mg/kg	134	65.4	14	112	12.2	75.6	11.1	121	30	393	196	133	20.1	10.2	93.8	22.2	13.4	70.1	14.1	140	78.3	196	109	133	67,000
Beryllium	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,900
Cadmium	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.1	3	450
Chromium	mg/kg	15.6	36.5	26	15.8	22.8	61.5	31.4	61.5	694	81.2	58	80.9	37.9	29.5	20.3	30.1	31.6	40.6	30.9	57.3	16.1	91.3	60.8	49.4	450
Cobalt	mg/kg	8.6	8.7	6.2	10.7	5.7	15.2	7.2	12.3	12.3	19.2	9.9	17.7	10.8	6.5	10.5	7.1	6.9	18	8.9	13.3	6.4	17.7	9.1	10.4	1,900
Copper	mg/kg	18.7	17.3	3.7	37.3	2.8	27.5	3.8	74.6	12.5	41	255	31.5	7.8	3.4	36.6	6.9	4.3	40.8	4.7	332	20.4	41.2	98.2	72.9	41,000
Lead	mg/kg	32.8	13.5	2.2	8.7	1.8	5.6	2.6	343	9.5	11.4	385	13	10.1	2	11	13.8	2.4	11.4	2.9	252	16.4	9.6	274	208	800
Mercury	mg/kg	1.2	0.069	0.061	0.058	ND	0.12	0.06	0.36	0.065	0.13	0.55	0.082	0.037	ND	0.093	0.33	ND	0.062	ND	0.3	0.34	0.11	0.13	0.32	310
Molybdenum	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5,100
Nickel	mg/kg	23.8	48.3	26.7	24.2	25.7	76.4	30.4	52	54.1	113	42.2	97.4	45.2	25.6	29.3	30.3	28.8	33.6	38.2	58	18.3	110	38.1	49	20,000
Selenium	mg/kg	5.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5,100
Silver	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5,100
Thallium	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	67
Vanadium	mg/kg	20.4	36.4	19.9	52.8	18.4	48.1	26.1	48.9	41.1	53.5	50.1	53.2	32.2	67.9	43.1	23.7	22.6	89.6	25.3	52.2	20.3	60.7	29.2	34.7	1,000
Zinc	mg/kg	93.1	41.1	14.8	52	15.6	47.9	20.2	202	52.2	94.3	507	72.8	37.8	17.3	52.2	38.8	20.6	63.7	28.4	247	107	79.4	330	199	100,000

Notes:

J = Estimated value.

- = Not analyzed.

ND = Analyte was not detected above reporting limit.

CA Mod = California-modified PRG.

B = SFB RWQCB Table B ESL for commercial/industrial land use.

Table 1-4b

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Summary of Parsons Engineering October 1999 Groundwater Sampling Results

Exploration	Units	B-2	B-2 DUP	B-3	B-4	B-5	B-6	B-7	B-8	B-9	B-10	SF RWQCB		
Sample ID		USARCO-WR-B2	USARCO-WR-B99	USARCO-WR-B3	USARCO-WR-B4	USARCO-WR-B5	USARCO-WR-B6	USARCO-WR-B7	USARCO-WR-B8	USARCO-WR-B9	USARCO-WR-B10	Ground Water ESLs(1)	CAL EPA(2)	EPA Drinking Water MCL(3)
Date Sampled		Oct-1999	Oct-1999	Oct-1999	Oct-1999	Oct-1999	Oct-1999	Oct-1999	Oct-1999	Oct-1999	Oct-1999			
Petroleum Hydrocarbons														
Gasoline Range Organics	ug/l	ND	ND	**1,090**	**600**	ND	ND	ND	**70**	ND	ND	**500**	-	-
Diesel Range Organics	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	640	100(1,T&O)	-
Motor Oil Composite (C21-C32)	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	640	-	-
Volatile Organic Compounds [4]														
Trichloroethene	ug/l	**0.6**	ND	**919**	**32**	ND	ND	ND	**135**	ND	ND	**360**	5	5
Tetrachloroethene	ug/l	ND	ND	**1,420**	**24**	ND	ND	ND	**78**	ND	ND	120	5	5
1,1-Dichloroethane	ug/l	**3.2**	**4.1**	ND	ND	ND	ND	**2.3**	**8.7**	ND	ND	47	5	5
cis-1,2-Dichloroethene	ug/l	**9.3**	**8**	**590**	**71**	ND	ND	**4.8**	**341**	ND	ND	590	6	70
trans-1,2-Dichloroethene	ug/l	**1.6**	ND	**450**	**52**	ND	ND	ND	**99**	ND	ND	590	10	100
Vinylchloride	ug/l	**4.5**	**7.2**	**2,230**	**114**	ND	ND	ND	**660**	ND	ND	**3.8**	0.5	2
CCR Title 22 Metals (Total)														
Antimony	ug/l	ND	ND	ND	ND	**368**	ND	<120	<120	<120	<120	**30**	6	6
Arsenic	ug/l	ND	ND	**74.5**	**23.1**	**99.1**	**84.5**	**36**	**30.4**	**29.6**	**55.9**	**36**	50	10
Barium	ug/l	**82.3**	**117**	**587**	**135**	**546**	**456**	**289**	**406**	**271**	**246**	**1,000**	1,000	2,000
Beryllium	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.7	4	4
Cadmium	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**2.2**	5	5
Chromium (Hex + Trivalent)	ug/l	**30.8**	**65.4**	**506**	**124**	**43,800**	**207**	**215**	**171**	**165**	**241**	**180**	50	100
Cobalt	ug/l	ND	ND	**108**	ND	**119**	ND	**51.5** J	ND	ND	**50.5** J	**3**	-	-
Copper	ug/l	ND	ND	**147**	**39.4**	**350**	**548**	**97**	**80.9**	**85.8**	**143**	**3.1**	1,300	1,000(II)
Lead	ug/l	**8.3**	**14.6**	**214**	**33.2**	**241**	**656**	**184**	**222**	**135**	**128**	**2.5**	15	**15**
Mercury	ug/l	**0.21**	ND	**0.38**	**0.29**	**2**	**1.1**	**0.53**	**0.26**	**0.3**	**0.82**	**0.012**	2	2
Molybdenum	ug/l	ND	ND	**23.5**	ND	**21.5** J	**34.9**	ND	ND	**15.6** J	ND	240	-	-
Nickel	ug/l	ND	**52.3**	**452**	**118**	**641**	**162**	**205**	**167**	**162**	**220**	**8.2**	100	-
Selenium	ug/l	ND	ND	**45.8**	**11.6**	**53.5**	**29.2**	**20.4**	**15.2**	**26.6**	**29**	**5**	50	50
Silver	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.19	100(II)	100(II)
Thallium	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	20	2	**2**
Vanadium	ug/l	ND	ND	**317**	**86.7**	**660**	**105**	**166**	**121**	**117**	**212**	**19**	50(1,CSAL)	-
Zinc	ug/l	**36.8**	**51.9**	**994**	**133**	**868**	**1,090**	**325**	**280**	**243**	**503**	**81**	5,000(II)	5,000(II)

Notes:

(1)	SFRWQCB Table B, groundwater Environmental Screening Level (ESL) protective of groundwater and surface water where groundwater is not current or potential source of drinking water.
(2)	California Environmental Protection Agency, Regional Water Quality Control Board, Central Valley Region, "A Compilation of Water Quality Goals", August 2003. California Deparment of Health Services Primary Maximum Contaminant Level unless otherwise noted.
(3)	United States Environmental Protection Agency, Drinking Water Maximum Contaminant Levels (MCLs), January 2005. Value cited is Primary MCL unless otherwise noted.
(4)	Only constituents detected in at least one sample listed, see laboratory report appendices for complete list of analytes and detection limits.
(1,T&O)	California Environmental Protection Agency, Regional Water Quality Control Board, Central Valley Region, "A Compilation of Water Quality Goals", August 2003. Taste & Odor Threshold.
(1,CSAL)	California Environmental Protection Agency, Regional Water Quality Control Board, Central Valley Region, "A Compilation of Water Quality Goals", August 2003. California State Action Level for Drinking Water.
(II)	Secondary drinking water maximum contaminant level based on taste and aesthetics.
7.89	Boldface type indicates constituent detected at concentration noted.
47.3	Concentration exceeding SF RWQCB Table B ESL.
ND	Analyte not detected
J	Estimated value, quantitation does not meet SOP criteria

Table 1-4c

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Summary of Parsons Engineering October 1999 Soil Gas Sampling Results

	Units													
Exploration		B-1	B-2	B-3	B-4	B-5	B-6	B-7	B-8		B-9	B-10	B-11	SF RWQCB
Sample ID		USARCO-WR-B1	USARCO-WR-B2	USARCO-WR-B3	USARCO-WR-B4	USARCO-WR-B5	USARCO-WR-B6	USARCO-WR-B7	USARCO-WR-B8	USARCO-WR-B99 (dup)	USARCO-WR-B9	USARCO-WR-B10	USARCO-WR-B10	Soil gas ESL
Date Sampled		Oct-1999	Oct-1999	Oct-1999	Oct-1999	Oct-1999	Oct-1999	Oct-1999	Oct-1999	Oct-1999	Oct-1999	Oct-99	Oct-1999	
olatile Organic Compounds														
Trichloroethene	ug/m3	**4,200**	**2,100**	**15,000**	**3,400**	**163**	**461**	**391**	**14,900**	**13,900**	**1,100**	**163**	ND	**4,100**
Tetrachloroethene	ug/m3	**48,000**	**136,000**	**265,000**	**53,300**	**4,200**	**2,100**	**18,600**	**149,000**	**135,000**	**26,700**	**3,500**	**7,200**	**1,400**
1,1-Dichloroethane	ug/m3	**8,900**	**300**	**800**	ND	ND	ND	ND	ND	ND	ND	ND	ND	**5,000**
cis-1,2-Dichloroethene	ug/m3	**28,400**	**92**	**1,960**	**440**	ND	ND	ND	**1,080**	**1,000**	ND	ND	ND	**20,000**
trans-1,2-Dichloroethene	ug/m3	**11,400**	ND	**400**	**840**	ND	ND	ND	**400**	**400**	ND	ND	ND	41,000
benzene	ug/m3	**130**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	290
ethyl-benzene	ug/m3	**660**	**130**	**90**	**40** J	ND	ND	ND	**130**	**130**	ND	**660**	ND	1,200,000
toluene	ug/m3	ND	ND	**355**	**39** J	**154**	**31** J	ND	**420**	**290**	ND	**80**	**135**	180,000
xylenes	ug/m3	**2,900**	**710**	**530**	**260** J	**400**	**31** J	ND	**780**	**830**	ND	**3,900**	**250**	410,000
Vinyl chloride	ug/m3	ND	ND	ND	**2,300**	ND	ND	ND	ND	ND	ND	ND	ND	**110**

Notes:

(ESL)	SFB RWQCB Table E-2, Shallow Soil Gas Screening Levels for Evaluation of Potential Vapor Intrustion Concerns, Commercial/Industrial Land Use, February 2005.
7.89	Boldface type indicates constituent detected at concentration noted.
47.3	Concentration exceeding SF RWQCB ESL.
ND	Analyte not detected
J	Estimated value, quantitation does not meet SOP criteria

Table 1-5a

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Summary of CDM August 2001 Soil Sampling Results

Soil Boring Location		SB-01		SB-02		SB-03		SB-04		SB-05	SB-06		SB-07	SB-08	SB-09		SB-10		SB-11			EPA Region 9 PRGs(1)
Sample ID		01-IR01-SS01-1-2	01-IR01-SS01-1-7	01-IR01-SS02-1-2	01-IR01-SS02-1-7	01-IR01-SS03-1-2	01-IR01-SS03-1-7	01-IR01-SS04-1-2	01-IR01-SS04-1-7	01-IR01-SS05-1-2	01-IR01-SS06-1-2	01-IR01-SS06-1-7	01-IR01-SS07-1-2	01-IR01-SS08-1-2	01-IR01-SS09-1-2	01-IR01-SS09-1-7	01-IR01-SS10-1-2	01-IR01-SS10-1-7	01-IR01-SS11-1-2	01-IR01-SS11-3-2	01-IR01-SS11-1-7	Commercial/ Industrial
Depth of Sample	(feet bgs)	2	7	2	7	2	7	2	7	2	2	7	2	2	2	7	2	7	2	2	7	
Petroleum Hydrocarbons																						
TVPH	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.068 J	ND	ND	ND	1.2 J	ND	0.13 J	ND	ND	ND	400(B)
Diesel	mg/kg	140	16	19	ND	560	ND	77	92	840	800	ND	17	46	ND	48	5.9 J	48	ND	160	62	500(B)
Motor Oil	mg/kg	1,900	38 J	49 J	ND	2,400	ND	220	330	510	1,700	ND	42 J	200	ND	260	ND	87 J	ND	600	170	1,000(B)
Volatile Organic Compounds																						
1,1,1-TCA	ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,200,000
1,1-DCA	ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,700,000
MEK	ug/kg	ND	7.8 J	12 J	13 J	ND	ND	47 J	ND	ND	7.3 J	7.3 J	ND	ND	4.5 J	ND	ND	9.7 J	ND	15 J	ND	110,000,000
Acetone	ug/kg	ND	35 J	58 J	64 J	ND	ND	230 J	16 J	ND	40 J	33 J	ND	ND	27	21 J	11 J	35 J	27 J	75 J	6.6 J	54,000,000
Benzene	ug/kg	ND	ND	ND	ND	ND	ND	4.6 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.5	1,400
Carbon Disulfide	ug/kg	ND	1.3 J	ND	12	ND	ND	2.3 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.5 J	ND	4.2 J	ND	720,000
cis-1,2-DCE	ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,500
PCE	ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	16	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,300
Toluene	ug/kg	ND	ND	ND	ND	ND	ND	2.3 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5,200
Trans-1,2-DCE	ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	230,000
TCE	ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6,500 CA Mod
Semi-volatile Organic Compounds																						
Benzo(b)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	370 J	ND	ND	ND	2,100
Benzo(g,h,i)perylene	ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	310 J	ND	ND	ND	-
Benzo(a)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	320 J	ND	ND	ND	210
Fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	210 J	ND	ND	ND	22,000,000
Indeno(1,2,3-cd)pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	220 J	ND	ND	ND	2,100
Pyrene	ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	570	ND	ND	ND	29,000,000
Chlorinated Pesticides(2)																						
Beta-BHC	ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.3 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	-
Heptachlor Epoxide	ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	65U J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	190
4,4'-DDD	ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10,000
4,4'-DDE	ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	18 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,000
4,4'-DDT	ug/kg	ND	ND	ND	ND	ND	1.1 J	ND	ND	110	ND	ND	57	360 J	ND	ND	12 J	3.9 J	ND	ND	ND	7,000
Alpha-Chlordane	ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	77J	ND	ND	23 J	ND	ND	ND	ND	ND	ND	ND	ND	6500 as chlordane
Gamma-Chlordane	ug/kg	ND	ND	3.7 J	ND	ND	ND	ND	ND	61	6.5J	ND	19 J	ND	ND	ND	ND	ND	0.6 J	ND	ND	6500 as chlordane
Polychlorinated Biphenyls and Polynuclear Aromatic Hydrocarbons																						
PCBs	ug/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	740
Acenaphthylene	ug/kg	ND	ND	ND	ND	ND	ND	130 J	1,700 J	ND	ND	ND	ND	ND	ND	ND	ND	100 J	ND	ND	ND	-
Phenanthrene	ug/kg	ND	16 J	28	ND	ND	ND	ND	4,800	14 J	23	9.7 J	30 J	ND	ND	ND	42	15 J	5.8 J	ND	60 J	-
Fluoranthene	ug/kg	ND	ND	66	ND	ND	ND	ND	8,500	ND	ND	22 J	ND	ND	ND	2,100	150	ND	ND	ND	ND	22,000,000
Pyrene	ug/kg	ND	ND	45	6.8 J	ND	ND	ND	5,000 R	120J	ND	25 J	36 J	53 J	32	1,600	89	42	ND	ND	38 J	29,000,000
Benzo(a)anthracene	ug/kg	ND	11 J	26	ND	ND	ND	ND	920	ND	30	6.4 J	ND	ND	27	660	56	9 J	ND	ND	ND	2,100
Benzo(g,h,i)perylene	ug/kg	ND	18 J	33	3.4 J	ND	ND	30	1,100	16 J	27	3.6 J	ND	ND	26	230 J	42	60	ND	350J	190 J	-
Indeno(1,2,3-cd)pyrene	ug/kg	120	14	59	ND	ND	ND	25	1,300	19 J	65	ND	56 J	71 J	51	600	49	34	ND	ND	200 J	2,100

Table 5a

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Summary of CDM August 2001 Soil Sampling Results

Soil Boring Location		SB-01		SB-02		SB-03		SB-04		SB-05	SB-06		SB-07	SB-08	SB-09		SB-10		SB-11			EPA Region 9 PRGs(1)
Sample ID		01-IR01-SS01-1-2	01-IR01-SS01-1-7	01-IR01-SS02-1-2	01-IR01-SS02-1-7	01-IR01-SS03-1-2	01-IR01-SS03-1-7	01-IR01-SS04-1-2	01-IR01-SS04-1-7	01-IR01-SS05-1-2	01-IR01-SS06-1-2	01-IR01-SS06-1-7	01-IR01-SS07-1-2	01-IR01-SS08-1-2	01-IR01-SS09-1-2	01-IR01-SS09-1-7	01-IR01-SS10-1-2	01-IR01-SS10-1-7	01-IR01-SS11-1-2	01-IR01-SS11-3-2	01-IR01-SS11-1-7	Commercial/ Industrial
Depth of Sample	(feet bgs)	2	7	2	7	2	7	2	7	2	2	7	2	2	2	7	2	7	2	2	7	
Chrysene	ug/kg	ND	**16**	**39**	ND	ND	ND	ND	**2,000**	**19 J**	**29**	**7.3 J**	**47 J**	**55 J**	**39**	**740**	**57**	**15**	**2.1 J**	**44 J**	**130 J**	13,000
Benzo(b)fluoranthene	ug/kg	ND	**19 J**	**71**	**24 J**	ND	ND	**24 J**	**1,600**	**19 J**	**58**	**6.9 J**	**99 J**	**140 J**	**75**	**1,100**	**65**	**22 J**	ND	ND	**320**	2,100
Benzo(k)fluoranthene	ug/kg	ND	ND	ND	ND	ND	ND	ND	**990**	ND	**23**	ND	ND	ND	ND	ND	**34**	ND	ND	ND	ND	21,000
Benzo(a)pyrene	ug/kg	ND	**24**	**35**	**11 J**	ND	ND	**7.5 J**	**1,900**	**19 J**	ND	**7.3 J**	ND	ND	**17**	**170**	**64**	ND	ND	ND	**250 J**	**210**
Dibenzo(a,h)anthracene	ug/kg	ND	ND	ND	ND	ND	ND	ND	**1,100**	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**210**
Metals																						
Antimony	mg/kg	ND	ND	ND	ND	ND	ND	**17.1 J**	ND	ND	ND	ND	ND	ND	**4.72 J**	ND	**6.43 J**	ND	ND	ND	**32.5 J**	410
Arsenic	mg/kg	**2.19**	**2.88**	**4.92**	**9.31**	**2.28**	**2.72**	**18.1**	**6.05**	**3.5**	**6.29**	**6.17**	**8.38 J**	**4.27**	**8.93**	**3.91**	**5**	**6.58**	**5.05 J**	**7.45 J**	**11.6**	**0.25(CA Mod)**
Barium	mg/kg	**73.6**	**143**	**187**	**51**	**100**	**9.62**	**178**	**115**	**166**	**158**	**39.2**	**150 J**	**110**	**240**	**532**	**215**	**124**	**249 J**	**126 J**	**325**	67,000
Beryllium	mg/kg	0.133 U J	0.496 U J	0.563 U J	0.501 U J	0.119 U J	0.105 U J	0.358 U J	0.342 U J	0.483 U J	0.317 U J	0.213 U J	0.337 U J	0.249 U J	0.452 U J	0.363 U J	0.356 U J	0.357 U J	0.663 U J	0.274 U J	0.208 U J	1,900
Cadmium	mg/kg	0.399 U J	ND	0.936 U J	ND	ND	ND	ND	0.265 U J	ND	0.547 U J	ND	0.588 U J	0.315 U J	0.842 U	0.543 U J	0.916 U	ND	ND	ND	1.74 U	450
Chromium	mg/kg	**19.4**	**33.7**	**70.5**	**73.3**	**19.5**	**23.2**	**50.9**	**41.7**	**52.7**	**45**	**180**	**42.1 J**	**32.8 J**	**54.8**	**28.4**	**67.3 J**	**56.1 J**	**82.8 J**	**35.6 J**	**74.5 J**	450
Cobalt	mg/kg	**7.5**	**7.64**	**14.5**	**15.8**	**4.84**	**5.97**	**10.4**	**9.15**	**12.8**	**9.01**	**11.5**	**8.97**	**10.1**	**12.7**	**7.39**	**9.97**	**10.4**	**16.1**	**6.63**	**7.56**	1,900
Copper	mg/kg	**67.6**	**45.4**	**41.9**	**41.6**	**17.2**	**3.68**	**145**	**39.7**	**33.5**	**129**	**15.3**	**60.1**	**67.1**	**226**	**28.7**	**223**	**19.7**	**34.9**	**28**	**18,500**	41,000
Lead	mg/kg	**54.2**	**52.3**	**10.6**	**8.53**	**11.2**	**2.24**	**21.2**	**53.3**	**9.07**	**242**	**9.32**	**142 J**	**52.9**	**419**	**31.7**	**785**	**99.7**	**6.75 J**	**78.8 J**	**1,520**	**800**
Mercury	mg/kg	**0.223**	**0.706**	**0.131**	**0.070 J**	**0.035 J**	ND	**0.028 J**	**0.043 J**	**0.094 J**	**0.241**	**0.059 J**	**0.302**	**0.094 J**	**0.289**	**0.214**	**0.169**	**0.130 J**	**0.039 J**	**0.065 J**	**0.219**	310
Molybdenum	mg/kg	2.27 U J	2.48 U J	1.94 U J	2.25 U J	1.11 U J	1.42 U J	3.11 U J	1.86 U J	1.19 U J	2.86 U J	1.59 U J	1.61 U J	1.35 U J	1.93 U J	3 U J	1.93 U J	**1.15 U J**	1.26 U J	ND	2.49 U J	5,100
Nickel	mg/kg	**20.7**	**34**	**109**	**82.5**	**34.7**	**29.1**	**69.2**	**50.6**	**78.6**	**57.9**	**52.4**	**44.6**	**85.2**	**65.4**	**33**	**59.3**	**56.7**	**113 J**	**27.3 J**	**93.3**	20,000
Silver	mg/kg	ND	ND	ND	ND	ND	ND	**1.43**	**2.86**	ND	0.971 U J	ND	0.739 U J	ND	1.34 U	ND	2.96 U	0.96 U J	ND	ND	**6.65**	5,100
Vanadium	mg/kg	**39.2**	**30.1**	**41**	**61.8**	**27.4**	**16.8**	**56.5**	**26.7**	**32.6**	**49.9**	**30.9**	**36.6**	**131**	**43**	**27.4**	**30.1**	**35.6**	**44**	**31.3**	**35.1**	1,000
Zinc	mg/kg	**67.5**	**76.7**	**63.3**	**69.8**	**48.8**	**16.2**	**385**	**238**	**60.6**	**338**	**52.9**	**158**	**72.4**	**525**	**165**	**624**	**67.6**	**67.5**	**90.4**	**4,040**	100,000

Notes:
J = Estimated value.
- = Not analyzed or not established.
ND = Analyte was not detected above reporting limit.
B = SFB RWQCB Table B ESL for commercial/industrial land use.

4	Constituent in bold face type detected at concentration above MRL.
720	Constituent detected at concentration above applicable screening level.

CA Mod = California-modified PRG.
Only constituents detected in at least one sample listed.

Table 1-5b

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Summary of CDM August 2001 Groundwater Sampling Results

Method	Analyte	Units	Building 1070 Area										
Exploration			SB-01	SB-03	SB-04	SB-07	SB-07	SB-08	SB-09	SB-11	SF RWQCB Ground Water ESLs	CAL EPA(1)	EPA Drinking Water MCL(2)
Sample ID			01-IR01-GW01-1-10	01-IR01-GW02-1-10	01-IR01-GW03-1-10	01-IR01-GW05-1-8	01-IR01-GW05-3-8	01-IR01-GW04-1-10	01-IR01-GW06-1-10	01-IR01-GW08-1-10			
Date Sampled			Aug-2001	Aug-2001	Aug-2001	Aug-2001	Aug-2001	Aug-2001	Aug-2001	Aug-2001			
Petroleum Hydrocarbons													
8015B	Gasoline Range Organics	mg/L	ND	ND	ND	ND	ND	ND	**0.0067** J	ND	0.5	-	-
8015B	Diesel Range Organics	mg/L	**O.52**	**0.4** J	**1.1**	**0.14** J	**0.19** J	**0.14** J	**1.4**	**0.51**	**0.64**	100(1,T&O)	-
8015B	Motor Oil Composite (C21-C32)	mg/L	**0.34** J	**0.41** J	**0.71** J	**0.13** J	**0.26** J	**0.42** J	**1.4**	**0.41** J	**0.64**	-	-
Volatile Organic Compounds [3]													
8260B	Acetone	ug/L	ND	ND	ND	ND	ND	ND	ND	**11** J	1500	20,000(1,T&O)	-
8260B	Carbon Disulfide	ug/L	ND	ND	ND	ND	ND	ND	ND	**18**	-	-	
Chlorinated Pesticides[3]													
EPA 8081A	4,4'-DDD	ug/L	ND	ND	ND	ND	ND	ND	ND	**0.26** J	-		
EPA 8081A	Beta-BHC	ug/L	ND	ND	**0.034** J	ND	ND	ND	ND	ND	-		
Semi-Volatile Organic Compounds[3]													
EPA 8270C	Benzo(b)Fluoranthene	ug/L	ND	ND	ND	ND	ND	ND	ND	**0.097** J	**0.029**	-	-
EPA 8270C	Benzoic Acid	ug/L	ND	ND	ND	**8.4** J	ND	ND	ND	**18**	-	-	-
EPA 8270C	Bis(2-Ethylhexyl)Phthalate	ug/L	ND	ND	ND	ND	ND	**3.4** J	ND	ND	32	4	6
EPA 8270C	Chrysene	ug/L	**0.055** J	ND	ND	ND	ND	ND	ND	ND	**0.35**	-	-
EPA 8270C	Indeno(1,2,3-cd)Pyrene	ug/L	**0.057** J	ND	ND	ND	ND	ND	ND	ND	**0.029**	-	-
EPA 8270C	Phenanthrene	ug/L	**0.12** J	ND	ND	ND	ND	ND	ND	ND	4.6	-	-
Polychlorinated Biphenyls[4]													
EPA 8082	PCBs	ug/l	ND	ND	ND	ND	ND	ND	ND	ND	0.014	0.5	0.5
Dissolved Metals [5]													
EPA 6010	Arsenic	mg/L	ND	**0.00845** J	ND	ND	ND	**ND**	ND	ND	0.036	0.05	0.01
EPA 6010B	Barium	mg/L	**0.223**	**0.0702**	**2.65**	**0.613**	**0.62**	**0.0467**	**5.28**	**0.395**	**1.00**	1	2
EPA 6010	Chromium (total)	mg/L	ND	**0.00325** UJ	ND	ND	ND	ND	**0.00334** UJ	**0.017**	0.1800	0.05	0.1
EPA 6010B	Cobalt	mg/L	ND	ND	ND	ND	ND	ND	**0.00603** J	ND	**0.003**	-	-
EPA 6010B	Copper	mg/L	**0.00448** J	**0.00163** J	ND	ND	**0.00206** UJ	ND	**0.00243** J	**0.00584** J	**0.0031**	1.3	1.0(II)

Table 1-5b

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Summary of CDM August 2001 Groundwater Sampling Results

Method	Analyte	Units	Building 1070 Area										
Exploration			SB-01	SB-03	SB-04	SB-07	SB-07	SB-08	SB-09	SB-11	SF RWQCB		EPA Drinking Water MCL(2)
Sample ID			01-IR01-GW01-1-10	01-IR01-GW02-1-10	01-IR01-GW03-1-10	01-IR01-GW05-1-8	01-IR01-GW05-3-8	01-IR01-GW04-1-10	01-IR01-GW06-1-10	01-IR01-GW08-1-10	Ground Water ESLs	CAL EPA(1)	
Date Sampled			Aug-2001	Aug-2001	Aug-2001	Aug-2001	Aug-2001	Aug-2001	Aug-2001	Aug-2001			
EPA 6010B	Lead	mg/L	**0.00376** J	ND	ND	**0.00558** J	**0.00558** J	ND	ND	**0.0704**	**0.0025**	0.015	0.015
EPA 6010	Molybdenum	mg/L	**0.00819** J	**0.00875** J	**0.0235** J	**0.0183** J	**0.018** J	ND	**0.0068** J	ND	0.2400	-	-
EPA 6010B	Thallium	mg/L	ND	ND	**0.00483** UJ	**0.00466** UJ	ND	ND	ND	ND	0.0200	0.002	0.002
EPA 6010	Vanadium	mg/L	**0.0054 J**	**0.00511 J**	ND	ND	**0.0036 J**	ND	**0.00394 J**	**0.00766** J	0.019	0.050(1,CSAL)	-
EPA 6010B	Zinc	mg/L	ND	**0.00821**	**0.00477**	**0.0171**	**0.0135**	ND	**0.00825**	**0.105**	0.0810	5.0(II)	5(II)

Notes:

ESLs	SFRWQCB Table B, groundwater Environmental Screening Level (ESL) protective of groundwater and surface water where groundwater is not current or potential source of drinking water.
(1)	California Environmental Protection Agency, Regional Water Quality Control Board, Central Valley Region, "A Compilation of Water Quality Goals", August 2003. California Deparment of Health Services Primary Maximum Contaminant Level unless otherwise noted.
(2)	United States Environmental Protection Agency, Drinking Water Maximum Contaminant Levels (MCLs), January 2005. Value cited is Primary MCL unless otherwise noted.
(3)	Only constituents detected in at least one sample listed, see laboratory report appendices for complete list of analytes and detection limits.
(1,T&O)	California Environmental Protection Agency, Regional Water Quality Control Board, Central Valley Region, "A Compilation of Water Quality Goals", August 2003. Taste & Odor Threshold.
(1,CSAL)	California Environmental Protection Agency, Regional Water Quality Control Board, Central Valley Region, "A Compilation of Water Quality Goals", August 2003. California State Action Level for Drinking Water.
(II)	Secondary drinking water maximum contaminant level based on taste and aesthetics.
7.89	Boldface type indicates constituent detected at concentration noted.
47.3	Concentration exceeding SF RWQCB Table B ESL.
ND	Analyte not detected
-	Not analyzed or not established.
J	Estimated value, quantitation does not meet SOP criteria

Table 1-6a

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Summary of CDM April 2004 Groundwater Sampling Results

Method	Analyte	Units	CDM Groundwater Results, April 2004									
Exploration			MW-1	MW-1 DUP	MW-2	MW-3	MW-4	MW-5	MW-6	SF RWQCB Ground Water ESLs	CAL EPA(1)	EPA Drinking Water MCL(2)
Sample ID												
Date Sampled			Apr-2004	Apr-2004	Apr-2004	Apr-2004	Apr-2004	Apr-2004	Apr-2004			
Volatile Organic Compounds [4]												
8260	Acetone	ug/l	**2.5 J**	**2.7 J**	**4.3 J**	**2.7 J**	9 U	9 U	9 U	1500	20,000(1,T&O)	-
8260	Benzene	ug/l	**1.1**	**1.10**	**0.11 J**	0.05 U	0.25 U	0.25 U	0.25 U	46	1	
8260	Chloroform	ug/l	0.07 U	**0.089 J**	**0.19 J**	**0.29 J**	0.35 U	0.35 U	0.35 U	330	100	80
8260	1,1-DCA	ug/l	**0.66 J**	**0.66 J**	**0.96 J**	**0.47 J**	0.2 U	0.2 U	0.2 U	47	5	5
8260	cis-1,2,-DCE	ug/l	**39**	**40**	**5.5**	**2.4**	0.45 U	0.45 U	0.45 U	590	6	70
8260	trans-1,2-DCE	ug/l	**2.9**	**3.00**	**3.1**	0.09 U	0.45 U	0.45 U	0.45 U	590	10	100
8260	PCE	ug/l	0.08 U	0.08 U	**15**	0.08 U	0.4 U	0.4 U	0.4 U	120	5	5
8260	1,1,1-TCA	ug/l	0.05 U	0.05 U	**0.17 J**	0.05 U	0.25 U	0.25 U	0.25 U	62	200	200
8260	TCE	ug/l	0.06 U	0.06 U	**4.1**	0.06 U	0.3 U	0.3 U	0.3 U	360	5	5
8260	Toluene	ug/l	0.07 U	0.07 U	0.07 U	0.07 U	0.35 U	**0.37 J**	0.35 U	130	150	1,000
8260	Vinylchloride	ug/l	**50**	**50**	**4.2**	0.18 J	0.3 U	0.3 U	0.3 U	**3.8**	0.5	2
Polynuclear Aromatic Hydrocarbons												
8310	Fluoranthene	ug/l	0.018 U	**0.094 J**	0.019 U	0.019 U	0.018 U	0.018 U	0.018 U	8	-	-
8310	Pyrene	ug/l	0.017 U	0.017 U	**0.093 J**	0.018 U	0.017 U	**0.11**	0.017 U	2	-	-
Semi-Volatile Organic Compounds												
8270	Di-n-butyl phthalate	ug/l	1.1 U	1.2 U	1.4 U	1.2 U	10 U	10 U	**2.3 J**	-	-	-
8270	Diethyl phthalate	ug/l	0.42 U	**2.6 J**	**2.6 J**	0.45 U	**3.3 J**	**2.5 J**	**2.7 J**	**1.5**	-	-
Metals (Dissolved)												
6010	Antimony	ug/l	24 U	24 U	24 U	24 U	**58 J**	24 U	24 U	**30**	6	6
6010	Arsenic	ug/l	21 U	21 U	100 U	21 U	21 U	21 U	21 U	36	50	10
6010	Barium	ug/l	**20**	**17**	**55**	**52**	**800**	**80**	**90**	1,000	1,000	2,000
6010	Beryllium	ug/l	**0.25 J**	0.16 U	**0.45 J**	**0.16 J**	**0.26 J**	0.16 U	0.16 U	2.7	4	4
6010	Cadmium	ug/l	2.1 U	2.1 U	2.1 U	2.1 U	2.3 U	2.1 U	3.4 U	2.2	5	5
6010	Chromium	ug/l	**16**	**8.9 J**	**38**	**30**	**19**	**16**	6 U	180	50	100
6010	Cobalt	ug/l	**4.9 J**	2.8 U	**8.1**	**5.9 J**	**5.5 J**	2.8 U	2.8 U	**3**	-	-
6010	Copper	ug/l	**7.7 J**	**4.5 J**	**23**	**48**	**22**	5.9 U	4.1 U	**3.1**	1,300	1,000(II)
6010	Lead	ug/l	**19 J**	18.0 U	**24 J**	**21 J**	**27 J**	18 U	18 U	**2.5**	15	15
6010	Manganese	ug/l	**180**	**160.0**	**590**	**720**	**200**	**560**	**700**	-	50 (II)	50 (II)
7470	Mercury	ug/l	0.032 U	0.032 U	**0.16 J**	**0.1 J**	0.032 U	**0.2**	0.032 U	**0.012**	2	2
6010	Molybdenum	ug/l	7.8 U	7.8 U	**16 J**	7.8 U	20	7.8 U	7.8 U	240	-	-
6010	Nickel	ug/l	**17 J**	6.5 U	**39**	**37**	**21 R**	6.5 U	9.7 U	**8.2**	100	-
6010	Selenium	ug/l	16 U	16 U	16 U	100 U	16 U	16 U	16 U	5	50	50
6010	Silver	ug/l	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	0.19	100(II)	100(II)
6010	Thallium	ug/l	100 UJ	100 UJ	100 UJ	100 UJ	16 U	100 UJ	16 U	20	2	2
6010	Vanadium	ug/l	**18**	**13**	**40**	**33**	**15**	**27**	**9.4 J**	**19**	50(1,CSAL)	-
6010	Zinc	ug/l	**35**	**27**	**59**	**70**	**98**	**19 J**	**30**	**81**	5,000(II)	5,000(II)

Notes:

ESLs	SFRWQCB Table B, groundwater Environmental Screening Level (ESL) protective of groundwater and surface water where groundwater is not current or potential source of drinking water.
(1)	California Environmental Protection Agency, Regional Water Quality Control Board, Central Valley Region, "A Compilation of Water Quality Goals", August 2003. California Deparment of Health Services Primary Maximum Contaminant Level unless otherwise noted.
(2)	United States Environmental Protection Agency, Drinking Water Maximum Contaminant Levels (MCLs), January 2005. Value cited is Primary MCL unless otherwise noted.
	Only constituents detected in at least one sample listed.
(1,T&O)	California Environmental Protection Agency, Regional Water Quality Control Board, Central Valley Region, "A Compilation of Water Quality Goals", August 2003. Taste & Odor Threshold.
(1,CSAL)	California Environmental Protection Agency, Regional Water Quality Control Board, Central Valley Region, "A Compilation of Water Quality Goals", August 2003. California State Action Level for Drinking Water.
(II)	Secondary drinking water maximum contaminant level based on taste and aesthetics.
7.89	Boldface type indicates constituent detected at concentration noted.
47.3	Concentration exceeding SF RWQCB Table B ESL.
U	Analyte not detected
J	Estimated value, quantitation does not meet SOP criteria
R	Value rejected during data validation process.

Table 1-6b

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Summary of CDM April 2004 Soil Gas Sampling Results

	Concentrations in ug/m^3								
Analyte	MW-1		MW-2		MW-3	MW-4	MW-5	MW-6	RWQCB ESL
				duplicate					
Acetone	**14**		**130**	**100**	**160**	**24**	**81**	**100**	**1,800,000**
Benzene	2.8	U	**21**	**9.3**	**2.9**	2.2 U	6.4 U	**9.8**	**290**
1,3-Butadiene	1.9	U	1.7 U	1.8 U	1.7 U	1.6 U	**5.4**	**8.8**	NA
2-Butanone	2.6	U	**17**	**5.7**	**15**	2.1 U	**19**	**26**	NA
Carbon Disulfide	2.7	U	**4**	**4.5**	**2.8**	2.2 U	6.2 U	**14**	NA
Chloroform	4.2	U	**8.3**	**8.8**	3.8 U	3.4 U	9.8 U	4 U	1,100
Cumene (isopropylbenzene)	4.3	U	**16**	4 U	**7.5**	**24**	**13**	**11**	NA
Cyclohexane	3	U	**45**	**40**	2.6 U	2.4 U	6.9 U	**3.4**	NA
1,1-Dichloroethane (1,1-DCA)	3.5	U	**31**	**33**	3.1 U	2.8 U	**14**	3.3 U	5,000
1,1-DCE	3.4	U	**12**	**6.2**	3.1 U	2.8 U	**27**	3.2 U	120,000
cis-1,2-DCE	3.4	U	**23**	**24**	3.1 U	2.8 U	8 U	3.2 U	20,000
trans-1,2-DCE	3.4	U	**22**	**22**	3.1 U	2.8 U	8 U	3.2 U	41,000
Ethylbenzene	3.8	U	**11**	**12**	3.4 U	**3.1**	8.7 U	**5.9**	1,200,000
4-Ethyltoluene	4.3	U	**6.6**	**7.7**	**4.4**	**6.3**	9.9 U	**7.7**	NA
Freon 11	4.9	U	**53**	**56**	4.3 U	4 U	11 U	4.6 U	NA
Heptane	3.6	U	**25**	**26**	**45**	2.9 U	8.2 U	**3.6**	NA
Hexane	3.1	U	**52**	**49**	**64**	2.5 U	7.1 U	**4.5**	NA
Styrene	3.7	U	3.4 U	3.5 U	3.3 U	3 U	8.6 U	**5.2**	NA
Tetrachloroethene	**19**		**620**	**780**	**47**	4.8 U	**3400**	**92**	**1,400**
Tetrahydrofuran	2.6	U	**29**	**24**	**23**	**5.2**	**92**	**77**	NA
Toluene	3.3	U	**40**	**32**	**16**	**16**	**27**	**32**	180,000
1,1,1-Trichloroethane	4.7	U	**110**	**120**	16 U	3.8 U	**2300**	**5.9**	1,300,000
Trichloroethene	4.7	U	**36**	**40**	4.2 U	3.8 U	**160**	4.4 U	4,100
1,2,4-Trimethylbenzene	4.3	U	**7.1**	4 U	4.2 U	4.9	9.9 U	**7.8**	NA
1,3,5-Trimethylbenzene	4.3	U	**5.1**	**6.4**	**3.8**	3.5 U	9.9 U	4 U	NA
2,2,4-Trimethylpentane	4	U	**9.7**	3.8 U	3.6 U	3.3 U	9.4 U	3.8 U	NA
m,p-Xylene	3.8	U	**19**	**19**	**9.2**	**12**	**13**	**20**	**410,000**
o-Xylene	3.8	U	**8.4**	**9.4**	3.4 U	**4.9**	8.7 U	**6.7**	410,000

Notes:

(ESL)	SFB RWQCB Table E-2, Shallow Soil Gas Screening Levels for Evaluation of Potential Vapor Intrustion Concerns, Commercial/Industrial Land Use, February 2005.
7.89	Boldface type indicates constituent detected at concentration noted.
47.3	Concentration exceeding SF RWQCB ESL.
U	Analyte not detected
NA	ESL not establised for this constituent.

Table 1-7

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Summary of CDM January 2005 Groundwater Sampling Results

Method	Analyte	Units										
Exploration			MW-1		MW-2	MW-3	MW-4	MW-5	MW-6	SF RWQCB		
Sample ID			MW-1	MW-1 DUP	MW-2	MW-3	MW-4	MW-5	MW-6	Ground Water ESLs	CAL EPA(1)	EPA Drinking Water MCL(2)
Volatile Organic Compounds [4]												
8260	Acetone	ug/l	19 U	19 U	19 U	19 U	19 U	19 U	19 U	1500	20,000(1,T&O)	-
8260	Benzene	ug/l	1 U	1.0 U	1.0 U	1 U	1 U	1 U	1 U	46	1	
8260	Chloroform	ug/l	1 U	1.0 U	1 U	1 U	1 U	1 U	1 U	330	100	80
8260	1,1-DCA	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	47	5	5
8260	cis-1,2,-DCE	ug/l	**32**	**32**	**3.1 J**	0.9 U	0.9 U	0.9 U	0.9 U	590	6	70
8260	trans-1,2-DCE	ug/l	**2.4 J**	**2.40 J**	**6.8 J**	1.2 U	1.2 U	1.2 U	1.2 U	590	10	100
8260	PCE	ug/l	1.1 U	1.1 U	**6.1 J**	1.1 U	1.1 U	1.1 U	1.1 U	120	5	5
8260	1,1,1-TCA	ug/l	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	62	200	200
8260	TCE	ug/l	0.9 U	0.9 U	**2.5 J**	0.9 U	0.9 U	0.9 U	0.9 U	360	5	5
8260	Toluene	ug/l	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	130	150	1,000
8260	Vinyl chloride	ug/l	**41**	**41**	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	**3.8**	0.5	2
Polynuclear Aromatic Hydrocarbons												
8310	Fluoranthene	ug/l	0.019 U	0.018 U	0.017 U	0.018 U	0.018 U	0.018 U	0.018 U	8	-	-
8310	Pyrene	ug/l	0.018 U	0.017 U	**0.064**	0.017 U	0.017 U	0.017 U	0.017 U	2	-	-
Semi-Volatile Organic Compounds												
8270	Di-n-butyl phthalate	ug/l	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.1 U	1.3 U	-	-	-
8270	Diethyl phthalate	ug/l	0.43 U	0.44 U	0.41 U	0.42 U	0.41 u	0.41 U	0.48 U	1.5	-	-
Metals												
6010	Antimony	ug/l	4.2 U	4.2 U	4.2 U	4.2 U	**50**	4.2 U	4.2 U	**30**	6	6
6010	Arsenic	ug/l	3.8 U	3.8 U	**100**	3.8 U	3.8 U	**9.1**	3.8 U	**36**	50	10
6010	Barium	ug/l	**22**	**23**	**18**	**30**	**1,500**	**47**	**82**	**1,000**	1,000	2,000
6010	Beryllium	ug/l	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	2.7	4	4
6010	Cadmium	ug/l	0.34 U	0.34 U	**1 J**	0.34 U	0.34 U	**0.7 J**	0.34 U	2.2	5	5
6010	Chromium	ug/l	**5**	**5.5**	**16**	**4.6 J**	**6.2**	**19**	**3.5 J**	180	50	100
6010	Cobalt	ug/l	0.89 U	0.89 U	**3 J**	**1.1 J**	0.89 U	**3.9 J**	0.89 U	3	-	-
6010	Copper	ug/l	**5 J**	**5.1 J**	**23**	**2.4 J**	**7.1 J**	10 U	**3.5 J**	**3.1**	1,300	1,000(II)
6010	Lead	ug/l	2.1 U	2.1 U	**12**	2.1 U	**8.5**	9.8	**2.7 J**	2.5	15	15
6010	Manganese	ug/l	**420**	**430.0**	**200**	**1,400**	**200**	**810**	**500**	-	50 (II)	50 (II)
7470	Mercury	ug/l	0.063 U	**0.12 J**	**0.28**	0.063 U	0.063 U	**0.081 J**	0.063 U	**0.012**	2	2
6010	Molybdenum	ug/l	1 U	1 U	**32**	**2.5 J**	**12 J**	**5.4 J**	**1.8 J**	240	-	-
6010	Nickel	ug/l	**4.8**	**4.9**	**12**	**3.6**	**5.1 J**	**16**	**3.7 J**	**8.2**	100	-
6010	Selenium	ug/l	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	4.6 U	5	50	50
6010	Silver	ug/l	5.4 BJ	7.6 BJ	**2.7 J**	3.8 BJ	1.3 U	1.7 BJ	1.3 BJ	0.19	100(II)	100(II)
6010	Thallium	ug/l	4.7 J	3.1 U	3.1 U	3.1 U	**8.3**	3.1 U	3.1 U	20	2	2
6010	Vanadium	ug/l	**5.9 J**	**6.5 J**	**59**	**3.9 J**	**5 J**	**21**	**11**	**19**	50(1,CSAL)	-
6010	Zinc	ug/l	**7.3 J**	**7.9 J**	**31**	**5 J**	**27**	**22 J**	3.7 U	81	5,000(II)	5,000(II)

Notes:

ESLs	SFRWQCB Table B, groundwater Environmental Screening Level (ESL) protective of groundwater and surface water where groundwater is not current or potential source of drinking water.
(1)	California Environmental Protection Agency, Regional Water Quality Control Board, Central Valley Region, "A Compilation of Water Quality Goals", August 2003. California Deparment of Health Services Primary Maximum Contaminant Level unless otherwise noted.
(2)	United States Environmental Protection Agency, Drinking Water Maximum Contaminant Levels (MCLs), January 2005. Value cited is Primary MCL unless otherwise noted.
	Only constituents detected in at least one sample listed.
(1,T&O)	California Environmental Protection Agency, Regional Water Quality Control Board, Central Valley Region, "A Compilation of Water Quality Goals", August 2003. Taste & Odor Threshold.
(1,CSAL)	California Environmental Protection Agency, Regional Water Quality Control Board, Central Valley Region, "A Compilation of Water Quality Goals", August 2003. California State Action Level for Drinking Water.
(II)	Secondary drinking water maximum contaminant level based on taste and aesthetics.
7.89	Boldface type indicates constituent detected at concentration noted.
47.3	Concentration exceeding SF RWQCB Table B ESL.
U	Analyte not detected
J	Estimated value, quantitation does not meet SOP criteria

Table 1-8a

Heroic War Dead United States Army Reserve Center, Oakland, California
Remedial Investigation/Feasibility Study

Summary of November/December 2004 Site Inspection Surficial Soil Sample Testing Results

			Building Surfical Lead Samples														Surficial Soil Background Samples										EPA Region 9 PRGs(1)	
		Units	Building 1060			Building 1070			Building 1073 (labeled KB 88)		Building 1084	Building 1086					S-1	S-2	S-3	S-4	S-5		S-6	S-7	S-8	S-9		Commercial/
Analytical Method	Sample ID		1060-E-1	1060-N-1	1060-S-1	1070-S-1	1070-S-3(3)	1070-W-1	1073-NW-1	1073-SE-1	1084-S-1	1086-E-1	1086-N-1	1086-NW-1	1086-S-1	1086-W-1	S-1-1	S-2-1	S-3-1	S-4-1	S-5-1	S-5-3(3)	S-6-1	S-7-1	S-8-1	S-9-1	Residential	Industrial
	Semi-Volatile Organic Compounds(2)																											
EPA 8270C	**Benzo(A)Anthracene**	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.09 U	0.09 U	**0.48**	**0.22**	0.09 U	1.3 U	0.09 U	0.09 U	0.09 U	0.09 U	0.6	2.1
EPA 8270C	**Benzo(A)Pyrene**	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.09 U	0.09 U	**0.52**	0.09 U	**0.15**	1.3 U	0.09 U	0.09 U	0.09 U	0.09 U	0.06	0.21
EPA 8270C	**Benzo(B)Fluoranthene**	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.09 U	0.09 U	**0.35**	0.09 U	0.09 U	-	0.09 U	0.09 U	0.09 U	0.09 U	0.38	1.28
EPA 8270C	Bis(2-Ethylhexyl)Phthalate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6 U	0.6 U	0.6 U	**2.9**	0.6 U	1.3 U	0.6 U	0.6 U	0.6 U	0.6 U	35	123
EPA 8270C	Butylbenzyl Phthalate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	1.3 U	0.09 U	0.09 U	0.09 U	**0.12**	12,221	100,000
EPA 8270C	**Chrysene**	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.06 U	0.06 U	**0.21**	**0.28**	0.06 U	1.3 U	0.06 U	0.06 U	0.06 U	0.06 U	3.8(CA Mod)	13(CA Mod)
EPA 8270C	**Dibenzo(A,H)Anthracene**	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.09 U	0.09 U	0.09 U	0.09 U	0.09 U	1.3 U	0.09 U	0.09 U	0.09 U	0.09 U	0.06	0.21
EPA 8270C	Di-N-Octyl Phthalate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.09 U	0.09 U	0.09 U	**0.37**	0.09 U	1.3 U	0.09 U	0.09 U	0.09 U	0.09 U	2,444	24,624
EPA 8270C	**Fluoranthene**	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.09 U	0.09 U	**0.32**	**0.29**	0.09 U	1.3 U	0.09 U	0.09 U	0.09 U	0.09 U	2,294	22,000
EPA 8270C	**Indeno(1,2,3-Cd)Pyrene**	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	1.3 U	0.21 U	0.21 U	0.21 U	0.21 U	1	2
EPA 8270C	Phenanthrene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.09 U	0.09 U	0.09 U	**0.16**	0.09 U	1.3 U	0.09 U	0.09 U	0.09 U	0.09 U	-	-
EPA 8270C	Pyrene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.09 U	0.09 U	**0.28**	**0.32**	0.09 U	1.3 U	0.09 U	0.09 U	0.09 U	0.09 U	2,316	29,126
	Metals																											
EPA 6010B	Antimony	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**14** *	**6.6**	**10**	**174**	**10**	5.4 U	**6.99**	**5.33**	**4.71**	**4.63**	31	410
EPA 6010B	Arsenic	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.98 U	2.02 U	2.01 U	2.01 U	2.02 U	**6.1** J	2 U	2.02 U	2 U	2.02 U	0.06(CA Mod)	0.25(CA Mod)
EPA 6010B	Barium	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**56.7**	**189**	**182**	**298**	**135**	**89**	**91**	**87.8**	**77.9**	**96.7**	5,400	67,000
EPA 6010B	Beryllium	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.17**	**0.32**	**0.51**	**0.118**	**0.34**	**0.27**	**0.14**	**0.14**	**0.24**	**0.2**	150	1,900
EPA 6010B	Cadmium	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.099 U	**2.26**	0.1 U	**7.74**	0.101 U	**0.82** J	0.1 U	0.101 U	0.1 U	0.101 U	37	450
EPA 6010B	Chromium (Total)	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**38.9** *	**35.1**	**68.9**	**150**	**48.9**	**32**	**35.6**	**37.7**	**62.1**	**56.4**	210	450
EPA 6010B	Cobalt	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**6.53**	**10.5**	**14**	**10.7**	**12.7**	**7.5**	**11.6**	**13**	**9.72**	**8.91**	900	1,900
EPA 6010B	Copper	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**13.8**	**22.4**	**63.6**	**75.1**	**43.5**	**31**	**49.1**	**51.3**	**17.3**	**27.8**	3,100	41,000
EPA 6010B	Lead	mg/kg	**119**	**140**	**172**	**177**	**110**	**98.3**	**253**	**225**	**130**	**59.6**	**45.4**	**37.8**	**58.9**	**34.1**	**23** *	**21**	**137**	**3,250**	**86.2**	**58**	**90.2**	**84.9**	**29.1**	**44.2**	150(CA Mod)	**800**
EPA 7471	Mercury	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.25**	0.04 U	**0.13**	**0.35**	**0.27**	**0.19**	**0.09**	**0.11**	**0.13**	**0.14** *	23	310
EPA 6010B	Molybdenum	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.9**	**1.21**	**2.33**	**5.13**	**1.91**	**1** J	**2.33**	**1.34**	0.9 U	**1.91**	390	5,100
EPA 6010B	Nickel	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**30.9**	**42.8**	**73.7**	**41.5**	**62.1**	**40**	**32.2**	**31.9**	**48.3**	**48.6**	1,600	20,000
EPA 6010B	Selenium	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.97 U,*	**4.35**	**11.4**	**11.3**	**10.9**	8.9 U	**11.8**	**9.24**	**7.27**	**7.36**	390	5,100
EPA 6010B/7761	Silver	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.26**	**0.06**	**0.31**	**2.9**	**0.44**	0.62 U	**0.09**	**0.15**	**0.17**	**0.73**	390	5,100
EPA 6010B	Thallium	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.97 U	**6.56**	**6.78**	**4.85**	**4.64**	8.9 U	4 U	**7.81**	**6.03**	4.05 U	5.2	67
EPA 6010B	Vanadium	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**30.9** *	**43**	**55.2**	**48.2**	**39**	**27**	**76**	**63**	**40.6**	**38.7**	78	1,000
EPA 6010B	Zinc	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**58.5**	**104**	**219**	**2,570**	**216**	**150**	**201**	**154**	**85.5**	**135**	23,000	100,000

Notes:

(1)	United States Environmental Protection Agency, Region 9, Preliminary Remediation Goals (PRGs) protective of soil direct contact, 2004.
(2)	Only constituents detected in at least one sample listed, see laboratory report appendices for complete list of analytes and detection limits.
(3)	Field duplicate sample.
(CA Mod)	California-modified PRG.
119	Boldface type indicates constituent detected at concentration noted.
0.21	Concentration exceeding EPA Region 9 commercial/industrial direct contact PRG.
U	Analyte not detected
J	Estimated value, quantitation does not meet SOP criteria
*	Laboratory Duplicate value outside of control limits
-	Regulatory limit not established or sample not analyzed for this constituent.

geologica

Table 1-8b

Heroic War Dead United States Army Reserve Center, Oakland, California
Remedial Investigation/Feasibility Study

Summary of November/December 2004 Site Inspection Perimeter Monitoring Well Soil Sample Testing Results

Constituent	Analytical Method	Units	EMW-1		EMW-2		EMW-3		EMW-4			EMW-5		EMW-6		EPA Region 9 PRGs(1)	
Sample ID			EMW-1/2.5'/-1	EMW-1/6.5'/-1	EMW-2/1'/-1	EMW-2/7'/-1	EMW-3/1'/-1	EMW-3/4'/-1	EMW-4/1'/-1	EMW-4/1'/-3(3)	EMW-4/5'/-1	EMW-5/1'/-1	EMW-5/4'/-1	EMW-6/1'/-1	EMW-6/5'/-1	Residential	Commercial/ Industrial
Sample Depth, ft			2.5	6.5	1	7	1	4	1		5	1	4	1	5		
Petroleum Hydrocarbons																	
Gasoline	California LUFT ManualGC/MS	mg/kg	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**0.041** J	10 U	10 U	10 U	10 U	10 U	100(4)	400(4)
Diesel	California LUFT Manual	mg/kg	1 U	**1.2** T	**1.6** T	**2.3** T	1 U	**1.8**	**39** T	**230** FID	10 U	**89**	**10** T	1 U	1 U	500(4)	500(4)
Motor Oil	California LUFT Manual	mg/kg	100 U	100 U	100 U	100 U	100 U	100 U	2000 U	**630** FID	1000 U	1000 U	1000 U	100 U	100 U	500(4)	1000(4)
Volatile Organic Compounds(2)																	
Methylene Chloride	EPA 8260B	mg/kg	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	**1.1** J	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	9.1	20.5
Tetrachloroethene	EPA 8260B	mg/kg	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	**0.74**	**0.065**	**0.052**	0.028 U	0.028 U	0.028 U	0.028 U,N	0.48	1.3
Chlorinated Pesticides(2)																	
4,4'-DDD	EPA 8081A	mg/kg	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	0.011 U	**0.016** J	0.011 U,N	**0.0343**	0.011 U	0.011 U	0.011 U	2.4	10
4,4'-DDE	EPA 8081A	mg/kg	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	0.004 U	**0.0096** J	0.004 U,N	0.004 U	0.004 U	0.004 U	0.004 U	1.7	7
4,4'-DDT	EPA 8081A	mg/kg	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	**0.033**	0.012 U,N	0.012 U	0.012 U	0.012 U	0.012 U	1.7	7
Semi-Volatile Organic Compounds(2)																	
Anthracene	EPA 8270C	mg/kg	0.009 U	**0.013**	0.09 U	**0.035**	0.09 U	0.009 U	0.09 U	2.6 U	0.09 U	0.09 U	0.09 U	0.009 U	0.009 U	21,896	100,000
Benzo(a)Anthracene	EPA 8270C	mg/kg	0.009 U	**0.12**	0.09 U	**0.19**	0.09 U	0.009 U	0.09 U	2.6 U	0.09 U	**0.13**	0.09 U	0.009 U	0.009 U	0.6	2.1
Benzo(a)Pyrene	EPA 8270C	mg/kg	0.009 U	**0.51**	0.09 U	**0.87**	0.09 U	0.009 U	0.09 U	2.6 U	0.09 U	0.09 U	0.09 U	0.009 U	0.009 U	0.06	0.21
Benzo(b)Fluoranthene	EPA 8270C	mg/kg	0.009 U	**0.34**	0.09 U	**0.59**	0.09 U	0.009 U	0.09 U	-	0.09 U	0.09 U	0.09 U	0.009 U	0.009 U	0.38	1.28
Benzo(ghi)Perylene	EPA 8270C	mg/kg	0.009 U	**0.48**	0.09 U	**0.73**	0.09 U	0.009 U	0.09 U	2.6 U	0.09 U	0.09 U	0.09 U	0.009 U	0.009 U	-	-
Benzo(k)Fluoranthene	EPA 8270C	mg/kg	0.009 U	**0.16**	0.09 U	**0.5**	0.09 U	0.009 U	0.09 U	5.3 U	0.09 U	0.09 U	0.09 U	0.009 U	0.009 U	0.38(CA Mod)	1.3(CA Mod)
Bis(2-Ethylhexyl)Phthalate	EPA 8270C	mg/kg	**0.22**	**2.1**	0.6 U	**0.16**	0.6 U	**0.21**	0.6 U	2.6 U	**2.9**	0.6 U	**0.64**	**0.4**	**0.24**	35	123
Chrysene	EPA 8270C	mg/kg	0.006 U	**0.18**	0.06 U	**0.29**	0.06 U	0.006 U	0.06 U	2.6 U	0.06 U	**0.27**	0.06 U	**0.013**	0.006 U	3.8(CA Mod)	13(CA Mod)
Di-N-Butyl Phthalate	EPA 8270C	mg/kg	0.03 U	0.03 U	0.3 U	**0.044**	0.3 U	0.03 U	0.3 U	2.6 U	0.3 U	0.3 U	0.3 U	**0.032**	**0.035**	-	-
Fluoranthene	EPA 8270C	mg/kg	0.009 U	**0.29**	0.09 U	**0.48**	0.09 U	0.009 U	0.09 U	2.6 U	0.09 U	**0.23**	0.09 U	0.009 U	0.009 U	2,294	22,000
Indeno(1,2,3-cd)Pyrene	EPA 8270C	mg/kg	0.021 U	**0.35**	0.21 U	**0.7**	0.21 U	0.021 U	0.21 U	2.6 U	0.21 U	0.21 U	0.21 U	0.021 U	0.021 U	0.6	2.1
Isophorone	EPA 8270C	mg/kg	0.009 U	0.009 U	0.09 U	0.009 U	0.09 U	0.009 U	**0.35**	2.6 U	**0.91**	0.09 U	0.09 U	0.009 U	0.009 U	512	512
Naphthalene	EPA 8270C	mg/kg	0.021 U	**0.022**	0.21 U	**0.053**	0.21 U	0.021 U	0.21 U	2.6 U	0.21 U	0.21 U	0.21 U	0.021 U	0.021 U	1.7(CA Mod)	4.2(CA Mod)
Phenanthrene	EPA 8270C	mg/kg	0.009 U	**0.07**	0.09 U	**0.12**	0.09 U	0.009 U	0.09 U	2.6 U	0.09 U	**0.11**	0.09 U	0.009 U	0.009 U	-	-
Pyrene	EPA 8270C	mg/kg	0.009 U	**0.82**	0.09 U	**2**	0.09 U	0.009 U	0.09 U	2.6 U	0.09 U	**0.22**	0.09 U	**0.011**	0.009 U	2,316	29,126
Metals																	
Antimony	EPA 6010B	mg/kg	**11.8**	**12.4**	**8.01**	**11.8**	**13.1**	**9.14**	**10.7**	5.1 U	**5.2**	**11.8**	**7.28**	**11.1**	**7.17**	31	410
Arsenic	EPA 6010B	mg/kg	2.02 U	1.96 U	2.01 U	2.05 U	1.98 U	2 U	2 U	**6.9** J	1.99 U	2.01 U	2.02 U	2.02 U	2.02 U	0.06(CA Mod)	0.25(CA Mod)
Barium	EPA 6010B	mg/kg	**209**	**41.2** *	**37.8**	**61.9**	**32.2**	**59.6**	**149**	**81**	**36.9**	**134**	**102**	**94.9**	**79**	5,400	67,000
Beryllium	EPA 6010B	mg/kg	**0.573**	**0.387**	**0.293**	**0.423**	0.0198 U	**0.256**	**0.457**	**0.3**	**0.108**	**0.409**	**0.332**	**0.411**	**0.17** *	150	1,900
Cadmium	EPA 6010B	mg/kg	0.101 U	0.0982 U	0.101 U	0.103 U	0.0992 U	0.1 U	0.1 U	0.85 U	0.0994 U	0.101 U	0.101 U	0.101 U	0.101 U	37	450
Chromium	EPA 6010B	mg/kg	**29.9**	**68.2**	**4.81**	**81.8**	**23.4**	**5.17**	**72.4**	**37**	**23.6**	**57.3**	**15.6**	**63.7**	**33.6** *	210	450
Cobalt	EPA 6010B	mg/kg	**13.4**	**12.8**	**4.94**	**14**	**26.6**	**6.08**	**15.3**	**9.9**	**6.83**	**13.2**	**5.5**	**14.1**	**8.19**	900	1,900
Copper	EPA 6010B	mg/kg	**43.8**	**27.5**	**13.4**	**30.5**	**107**	**19.7**	**30.7**	**27**	**12.1**	**34.9**	**28.4**	**31.9**	**42.7** *	3,100	41,000
Lead	EPA 6010B	mg/kg	**11.1**	**12.6** *	**13.1**	**16.6**	**2.61**	**11.5**	**11.8**	**21**	**18.8**	**40.5**	**41.6**	**27.7**	**60.6** *	150(CA MOD)	800
Manganese	EPA 6010B	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	1,762	19,458

Table 1-8b

Heroic War Dead United States Army Reserve Center, Oakland, California
Remedial Investigation/Feasibility Study

Summary of November/December 2004 Site Inspection Perimeter Monitoring Well Soil Sample Testing Results

Constituent	Analytical Method	Units	EMW-1		EMW-2		EMW-3		EMW-4			EMW-5		EMW-6		EPA Region 9 PRGs(1)	
Sample ID			EMW-1/2.5'/-1	EMW-1/6.5'/-1	EMW-2/1'/-1	EMW-2/7'/-1	EMW-3/1'/-1	EMW-3/4'/-1	EMW-4/1'/-1	EMW-4/1'/-3(3)	EMW-4/5'/-1	EMW-5/1'/-1	EMW-5/4'/-1	EMW-6/1'/-1	EMW-6/5'/-1	Residential	Commercial/ Industrial
Sample Depth, ft			2.5	6.5	1	7	1	4	1		5	1	4	1	5		
Mercury	EPA 7471	mg/kg	**0.18**	**0.11**	**0.35**	**0.24**	**0.16** N	**0.3**	**0.065**	**0.063**	0.04 U	**0.4**	**0.29**	**0.28**	**0.077**	23	310
Molybdenum	EPA 6010B	mg/kg	**1.91**	**1.94**	**1.31**	0.924 U	**1.52**	**1.38**	**1.29**	**0.54** J	0.895 U	**1.22**	**2.28**	**1.48**	0.907 U	390	5,100
Nickel	EPA 6010B	mg/kg	**33.4**	**64.4**	**2.77**	**75.3**	**18.5**	**5.37**	**86.2**	**44**	**28.2**	**55.5**	**9.09**	**76.1**	**39.1**	1,600	20,000
Selenium	EPA 6010B	mg/kg	**12.6**	**7.08** *	**8.44**	**12.3**	**24.3**	**9.48**	**11.7**	8.5 U	**6.58**	**9.16**	**9.81**	**10.7**	4.03 U,*	390	5,100
Silver	EPA 6010B/7761	mg/kg	2.02 U	1.96 U	2.01 U	2.05 U	1.98 U	2 U	**0.05**	0.59 U	**0.03**	**0.2**	**0.07**	**0.28**	**0.05**	390	5,100
Thallium	EPA 6010B	mg/kg	4.03 U	3.93 U	4.02 U	**7.04**	**8.01**	4.01 U	4 U	8.5 U	3.98 U	**4.43**	**4.46**	**5.92**	4.03 U	5.2	67
Vanadium	EPA 6010B	mg/kg	**36.6**	**56.6**	**13.2**	**65.5**	**180**	**9.6**	**56.5**	**57**	**100**	**47.6**	**21.3**	**46.8**	**36.3**	78	1,000
Zinc	EPA 6010B	mg/kg	**89.6**	**67.9**	**101**	**79.6**	**38.1**	**121**	**66.1**	**51**	**42.5**	**116**	**130**	**72**	**73.3**	23,000	100,000

Notes:

(1)	United States Environmental Protection Agency, Region 9, Preliminary Remediation Goals (PRGs) protective of soil direct contact, 2004.
(2)	Only constituents detected in at least one sample listed, see laboratory report appendices for complete list of analytes and detection limits.
(3)	Field duplicate sample.
(4)	SF RWQCB Table B commercial/industrial ESL.
(CA MOD)	California-modified PRG.
119	Boldface type indicates constituent detected at concentration noted.
0.21	Concentration exceeding EPA Region 9 commercial/industrial direct contact PRG.
FID	Analysis by GC/FID.
U	Analyte not detected
J	Estimated value, quantitation does not meet SOP criteria
*	Laboratory Duplicate value outside of control limits
B	Analyte detected in method blank
T	Diesel/Gasoline pattern is atypical
-	Regulatory limit not established or sample not analyzed for this constituent.
N	Spike recovery outside of control limits

Table 1-8c

Heroic War Dead United States Army Reserve Center, Oakland, California
Remedial Investigation/Feasibility Study

Summary of November/December 2004 Site Inspection Building 1064 Area Soil Sample Testing Results

			Sump Explorations				Platform-Mounted Transformer Area						
Constituent	Analytical Method	Units	1064-1		1064-2		TR-1	TR-2	TR-3			EPA Region 9 PRGs(1)	
Sample ID			1064-1'-1	1064-4'-1	1064-2-1'-1	1064-2-5'-1	TR-1-4'-1	TR-2-4'-1	TR-3-1'-1	TR-3-1'-3(3)	TR-3-5'-1		
Sample Depth, ft			1	4	1	5	4	4	1		5	Residential	Commercial/ Industrial
Petroleum Hydrocarbons													
Gasoline	California LUFT ManualGC/MS	mg/kg	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**0.034** J	10 U	100(4)	400(4)
Diesel	California LUFT Manual	mg/kg	**1.5**	**2.8**	**1.8**	**2.8**	**4.2**	**32**	**4.7** T	**120** FID	**8.8** T	500(4)	500(4)
Motor Oil	California LUFT Manual	mg/kg	100 U	100 U	100 U	100 U	100 U	**150** T	100 U	-	**340** T	500(4)	1000(4)
Volatile Organic Compounds(2)													
2-Butanone	EPA 8260B	mg/kg	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.0017 U	0.75 U	22,311	113,264
Acetone	EPA 8260B	mg/kg	1.5 U	1.5 U,N	1.5 U	1.5 U	1.5 U,N	1.5 U	1.5 U	0.0042 U	1.5 U	14,127	54,321
Bromomethane	EPA 8260B	mg/kg	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U	0.0019 U	0.052 U	3.9	13.1
Iodomethane	EPA 8260B	mg/kg	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	-	0.12 U	-	-
Methylene Chloride	EPA 8260B	mg/kg	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	**0.002** J	0.018 U	9.1	20.5
Tetrachloroethene	EPA 8260B	mg/kg	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U,N	**0.2**	**0.2**	**0.0054**	0.028 U	0.48	1.31
Semi-Volatile Organic Compounds(2)													
Acenaphthene	EPA 8270C	mg/kg	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.018 U	0.021 U	3,682	29,219
Acenaphthylene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.017 U	0.009 U	-	-
Anthracene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	**0.013**	0.009 U	0.12 U	0.009 U	21,896	100,000
Benzo(a)Anthracene	EPA 8270C	mg/kg	**0.029**	**0.055**	0.009 U	**0.009**	**0.078**	**0.066**	0.009 U	0.11 U	0.009 U	0.6	2.1
Benzo(a)Pyrene	EPA 8270C	mg/kg	**0.067**	**0.067**	0.009 U	0.009 U	**0.14**	**0.1**	**0.13**	0.12 U	**0.12**	0.06	0.21
Benzo(b)Fluoranthene	EPA 8270C	mg/kg	**0.072**	**0.06**	0.009 U	0.009 U	**0.14**	**0.12**	0.009 U	0.2 U	**0.051**	0.38	1.28
Benzo(ghi)Perylene	EPA 8270C	mg/kg	**0.043**	0.009 U	0.009 U	0.009 U	0.009 U	**0.031**	0.009 U	0.1 U	0.009 U	-	-
Benzo(k)Fluoranthene	EPA 8270C	mg/kg	**0.064**	**0.071**	0.009 U	0.009 U	**0.1**	**0.087**	0.009 U	-	**0.015**	0.38(CA Mod)	1.3(CA Mod)
Bis(2-Ethylhexyl)Phthalate	EPA 8270C	mg/kg	0.06 U	0.06 U	**0.081**	0.06 U	0.06 U	0.06 U	0.06 U	0.11 U	0.06 U	35	123
Chrysene	EPA 8270C	mg/kg	**0.059**	**0.1**	0.006 U	**0.008**	**0.12**	**0.13**	**0.087**	0.11 U	**0.13**	3.8(CA Mod)	13(CA Mod)
Dibenzo(a,h)Anthracene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.096 U	0.009 U	0.06	0.21
Diethyl Phthalate	EPA 8270C	mg/kg	0.009 U	**0.009**	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.022 U	0.009 U	48,882	100,000
Fluoranthene	EPA 8270C	mg/kg	**0.016**	**0.074**	0.009 U	**0.018**	**0.14**	**0.063**	**0.012**	0.11 U	**0.019**	2,294	22,000
Fluorene	EPA 8270C	mg/kg	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.12 U	0.021 U	2,747	26,281
Indeno(1,2,3-cd)Pyrene	EPA 8270C	mg/kg	**0.062**	**0.035**	0.021 U	0.021 U	**0.041**	0.021 U	0.021 U	0.1 U	0.021 U	0.6	2.1
Naphthalene	EPA 8270C	mg/kg	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.047 U	0.021 U	1.7(CA Mod)	4.2(CA Mod)
Phenanthrene	EPA 8270C	mg/kg	0.009 U	**0.06**	0.009 U	**0.02**	**0.06**	**0.049**	**0.016**	0.11 U	**0.031**	-	-
Pyrene	EPA 8270C	mg/kg	**0.032**	**0.074** N	0.009 U	0.045	**0.23** N	**0.12**	**0.033**	0.018 U	**0.05**	2,316	29,126
Polychlorinated Biphenyls(2)													
All Constituents	EPA 8082	mg/kg	0.0027 U	0.0027 U,N	0.0027 U	0.0027 U	0.0027 U	0.0027 U	0.0027 U	0.0098 U	0.0027 U	0.05	0.19
Metals													
Antimony	EPA 6010B	mg/kg	**8.12**	**3.36**	**5.05**	**5.58**	**27.2**	**29.2**	**10.4**	1.2 U	**8.11**	31	410
Arsenic	EPA 6010B	mg/kg	1.93 U	1.96 U	1.96 U	1.85 U	1.98 U	1.94 U	1.95 U	2.2 U	1.98 U	0.06(CA Mod)	0.25(CA Mod)
Barium	EPA 6010B	mg/kg	**115**	**81.3**	**139**	**52.8**	**230**	**406**	**201**	**240**	**325**	5,400	67,000
Beryllium	EPA 6010B	mg/kg	**0.417**	0.0196 U	**0.453**	**0.035**	**0.319**	**0.458**	**0.405**	**0.37**	**0.324**	150	1,900
Cadmium	EPA 6010B	mg/kg	0.0965 U	0.0978 U	0.0982 U	**0.254**	**2.34**	**5.17**	**0.305**	**0.59** J	**0.198**	37	450
Chromium	EPA 6010B	mg/kg	**70.8**	**43.7**	**87.7**	**34.9**	**72.8**	**73.3**	**58.7**	**32**	**43.5**	210	450
Cobalt	EPA 6010B	mg/kg	**14.9**	**12.4**	**14.3**	**6.68**	**13.8**	**13.5**	**12.5**	**11**	**13.7**	900	1,900
Copper	EPA 6010B	mg/kg	**27**	**33.7**	**23.3**	**18.6**	**393**	**638**	**80.5**	**44**	**75.6**	3,100	41,000
Lead	EPA 6010B	mg/kg	**256**	**42.5**	**12.2**	**110**	**345**	**1,400**	**194**	**41**	**184**	150(CA Mod)	**800**
Manganese	EPA 6010B	mg/kg	**563**	**485**	**570**	**238**	**487**	**688**	**790**	**850**	**993**	1,762	19,458
Mercury	EPA 7471	mg/kg	**0.065**	**0.064**	**0.066**	**0.062**	**0.82**	**0.58**	**0.31**	**0.2**	**0.25**	23	310
Molybdenum	EPA 6010B	mg/kg	**1.15**	**4.55**	**1.34**	**0.917**	**2.88**	**3.06**	**2.78**	**0.5** J	**1.96**	390	5,100
Nickel	EPA 6010B	mg/kg	**80.4**	**105**	**91**	**33.5**	**71.7**	**68.8**	**56.9**	**52**	**47.1**	1,600	20,000
Selenium	EPA 6010B	mg/kg	**11.1**	**8.89**	**12.4**	**8.57**	**15.3**	**14.9**	**16.2**	1.8 U	**15.6**	390	5,100
Silver	EPA 6010B/7761	mg/kg	**0.11**	**0.09**	1.96 U	1.85 U	1.98 U	1.94 U	1.95 U	0.082 U	1.98 U	390	5,100
Thallium	EPA 6010B	mg/kg	3.86 U	3.91 U	**5.85**	3.7 U	**4.62**	**7.02**	3.91 U	1.1 U	3.95 U	5.2	67
Vanadium	EPA 6010B	mg/kg	**118**	**896**	**128**	**219**	**101**	**139**	**126**	**50**	**107**	78	1,000
Zinc	EPA 6010B	mg/kg	**67.5**	**122**	**60.1**	**107**	**360**	**459**	**244**	**83**	**220**	23,000	100,000

Notes:

(1)	United States Environmental Protection Agency, Region 9, Preliminary Remediation Goals (PRGs) protective of soil direct contact, 2004.
(2)	Only constituents detected in at least one sample listed, see laboratory report appendices for complete list of analytes and detection limits.
(3)	Field duplicate sample.
(4)	SF RWQCB Table B commercial/industrial ESL.
(CA MOD)	California-modified PRG.
119	Boldface type indicates constituent detected at concentration noted.
0.21	Concentration exceeding EPA Region 9 commercial/industrial direct contact PRG.
FID	Analysis by GC/FID.
U	Analyte not detected
J	Estimated value, quantitation does not meet SOP criteria
*	Laboratory Duplicate value outside of control limits
B	Analyte detected in method blank
T	Diesel/Gasoline pattern is atypical
-	Regulatory limit not established or sample not analyzed for this constituent.
N	Spike recovery outside of control limits

Table 1-8d

Heroic War Dead United States Army Reserve Center, Oakland, California
Remedial Investigation/Feasibility Study

Summary of November/December 2004 Site Inspection Building 1060 Parking Area Soil Sample Testing Results

Constituent	Analytical Method	Units	PV-1			PV-2		PV-3		PV-4		PV-5		PV-6		PV-7		PV-8		PV-9		PV-10		PV-11		PV-12		PV-13		PV-14	
Sample ID			PV-1-1'-1	PV-1-5.5'-1	PV-1-5.5'-3(2)	PV-2-1'-1	PV-2-5.5'-1	PV-3-1'-1	PV-3-5.5'-1	PV-4-1'-1	PV-4-5.5'-1	PV-5-1'-1	PV-5-5.5'-1	PV-6-1'-1	PV-6-5.5'-1	PV-7-1'-1	PV-7-5.5'-1	PV-8-1'-1	PV-8-5.5'-1	PV-9-1'-1	PV-9-5.5'-1	PV-10-1'-1	PV-10-5.5'-1	PV-11-1'-1	PV-11-5.5'-1	PV-12-1'-1	PV-12-5.5'-1	PV-13-1'-1	PV-13-5.5'-1	PV-14-1'-1	PV-14-5.5'-1
Sample Depth, ft			1	5.5		1	5.5	1	5.5	1	5.5	1	5.5	1	5.5	1	5.5	1	5.5	1	5.5	1	5.5	1	5.5	1	5.5	1	5.5	1	5.5
Sample Collection Date																															
Petroleum Hydrocarbons																															
Gasoline	California LUFT ManualGC/MS	mg/kg	10 U	10 U	0.031 J,HT04	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Diesel	California LUFT Manual	mg/kg	27	38 T	54 FID	19	42 T	12	10 U	15	9.8	1.1 T	3.9 T	1.8 T	1.5	21	94	12	400	31	4.3 T	13	2.4	1 U	51	11	4.9 T	2.6	7.2	14	2.2
Motor Oil	California LUFT Manual	mg/kg	160	1000 U	-	500 U	1000 U	100 U	1000 U	100 U	100 U	100 U	100 U	100 U	100 U	1000 U	1,200	1000 U	1,200	1000 U	100 U	100 U	100 U	100 U	1000 U	100	100 U	100 U	100 U	110 T	100 U
Volatile Organic Compounds(3)																															
2-Butanone	EPA 8260B	mg/kg	0.75 U	0.75 U	0.002 J	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Acetone	EPA 8260B	mg/kg	1.5 U	1.5 U	0.021 J	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U,N	1.5 U	1.5 U	1.5 U,N	1.5 U	1.5 U	1.5 U,N	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
Benzene	EPA 8260B	mg/kg	0.012 U	0.012 U	0.00027 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.11	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U
Bromomethane	EPA 8260B	mg/kg	0.5 B	0.56 B	0.0019 U	0.62 B	0.7 B	0.56 B	0.58 B	0.63 B	0.54 B	0.58 B	0.51 B	0.52 B	0.55 B	0.052 U	0.052 U	0.052 U	0.052 U	0.52 B	0.44 B	0.59 B	0.54 B	0.54 B	0.58 B	0.68 B	0.63 B	0.052 U	0.052 U	0.052 U	0.052 U
Carbon Disulfide	EPA 8260B	mg/kg	0.025 U	0.025 U	0.002 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Iodomethane	EPA 8260B	mg/kg	0.57 B	0.65 B	-	0.76 B	1 B	0.76 B	0.77 B	0.8 B	0.73 B	0.9 B	0.68 B	0.66 B	0.77 B	0.12 U	0.12 U	0.12 U	0.12 U	0.66 B	0.59 B	0.84 B	0.68 B	0.8 B	0.96 B	1.1 B	0.99 B	0.12 U	0.12 U	0.12 U	0.12 U
Methylene Chloride	EPA 8260B	mg/kg	0.018 U	0.018 U	0.0025 J	0.018 U,N	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U
Trichloroethene	EPA 8260B	mg/kg	0.012 U	0.012 U	0.00043 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U
Vinyl Chloride	EPA 8260B	mg/kg	0.018 U	0.018 U	0.00046 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U
Semi-Volatile Organic Compounds(3)																															
2-Cresol	EPA 8270C	mg/kg	0.021 U	0.15	0.027 U	0.021 U	0.021 U	0.21 U	0.21 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.21 U	0.21 U	0.021 U	0.21 U	0.21 U	0.021 U	0.21 U	0.021 U	0.21 U	0.021 U	0.021 U	0.021 U	0.021 U
2-Methylnaphthalene	EPA 8270C	mg/kg	0.048	0.043	0.028 U	0.03 U	0.03 U	0.3 U	0.3 U	0.057	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.033	0.03 U	0.3 U	0.3 U	0.03 U	0.3 U	0.3 U	0.03 U	0.3 U	0.03 U	0.3 U	0.03 U	0.03 U	0.03 U	0.03 U
3-,4-Methylphenol	EPA 8270C	mg/kg	0.009 U	0.009 U	-	0.009 U	0.009 U	0.09 U	0.09 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.09 U	0.09 U	0.009 U	0.09 U	0.09 U	0.009 U	0.09 U	0.03	0.09 U	0.009 U	0.009 U	0.009 U	0.009 U
Acenaphthene	EPA 8270C	mg/kg	0.021 U	0.021 U	0.018 U	0.021 U	0.021 U	0.21 U	0.21 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.21 U	0.21 U	0.021 U	0.21 U	0.21 U	0.021 U	0.21 U	0.021 U	0.21 U	0.021 U	0.021 U	0.021 U	0.021 U
Acenaphthylene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.017 U	0.009 U	0.009 U	0.09 U	0.09 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.09 U	0.09 U	0.009 U	0.09 U	0.09 U	0.009 U	0.09 U	0.009	0.09 U	0.009 U	0.01	0.01	0.009 U
Anthracene	EPA 8270C	mg/kg	0.016	0.055	0.12 U	0.009	0.009 U	0.09 U	0.09 U	0.052	0.009 U	0.009 U	0.01	0.009 U	0.009 U	0.009 U	0.014	0.01	0.09 U	0.09 U	0.033	0.09 U	0.09 U	0.009 U	0.09 U	0.069	0.09 U	0.009 U	0.015	0.021	0.009 U
Benzo(a)Anthracene	EPA 8270C	mg/kg	0.12	0.17	0.11 U	0.14	0.035	0.09 U	1.8	0.45	0.012	0.009 U	0.009 U	0.039	0.013	0.009 U	0.11	0.16	0.09 U	0.09 U	0.12	0.1	0.09 U	0.009 U	0.33	0.16	0.09 U	0.009 U	0.12	0.13	0.009 U
Benzo(a)Pyrene	EPA 8270C	mg/kg	0.21	0.22	0.12 U	0.3	0.051	0.18	5.5	0.89	0.009 U	0.009 U	0.009 U	0.083	0.025	0.009 U	0.009 U	0.2	0.09 U	0.09 U	0.37	0.09 U	0.09 U	0.009 U	0.54	0.25	0.09 U	0.009 U	0.27	0.24	0.009 U
Benzo(b)Fluoranthene	EPA 8270C	mg/kg	0.28	0.28	0.2 U	0.44	0.069	0.29	7.1	1.1	0.025	0.009 U	0.009 U	0.097	0.034	0.009 U	0.009 U	0.32	0.09 U	0.09 U	0.25	0.23	0.09 U	0.009 U	0.82	0.22	0.09 U	0.009 U	0.18	0.2	0.009 U
Benzo(ghi)Perylene	EPA 8270C	mg/kg	0.054	0.042	0.1 U	0.087	0.009 U	0.09 U	6	0.9	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.09 U	0.09 U	0.38	0.09 U	0.09 U	0.009 U	0.09 U	0.12	0.09 U	0.009 U	0.28	0.23	0.009 U
Benzo(k)Fluoranthene	EPA 8270C	mg/kg	0.22	0.21	-	0.28	0.054	0.15	4.4	0.86	0.009 U	0.009 U	0.009 U	0.061	0.018	0.009 U	0.009 U	0.19	0.09 U	0.09 U	0.22	0.11	0.09 U	0.009 U	0.09 U	0.22	0.09 U	0.009 U	0.16	0.17	0.009 U
Bis(2-Ethylhexyl)Phthalate	EPA 8270C	mg/kg	0.16	0.91	0.11 U	0.06 U	0.24	0.6 U	0.6 U	0.06 U	0.06 U	0.06 U	0.07	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.6 U	0.6 U	0.06 U	0.6 U	6.2	0.06 U	0.6 U	0.06 U	0.6 U	0.06 U	0.06 U	0.06 U	0.06 U
Butylbenzyl Phthalate	EPA 8270C	mg/kg	0.009 U	0.009 U	0.11 U	0.049	0.009 U	0.09 U	0.09 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.09 U	0.09 U	0.009 U	0.09 U	0.09 U	0.014	0.09 U	0.009 U	0.09 U	0.009 U	0.009 U	0.009 U	0.009 U
Chrysene	EPA 8270C	mg/kg	0.26	0.36	0.11 U	0.29	0.096	0.15	3.6	0.84	0.021	0.006 U	0.006 U	0.087	0.026	0.77	0.64	0.47	2.1	0.06 U	0.17	0.21	0.06 U	0.006 U	0.67	0.32	0.06 U	0.008	0.14	0.16	0.006 U
Dibenzo(a,h)Anthracene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.096 U	0.009 U	0.009 U	0.09 U	1.8	0.26	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.09 U	0.09 U	0.009 U	0.09 U	0.09 U	0.009 U	0.09 U	0.009 U	0.09 U	0.009 U	0.013	0.012	0.009 U
Dibenzofuran	EPA 8270C	mg/kg	0.03 U	0.03 U	0.13 U	0.03 U	0.03 U	0.3 U	0.3 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.3 U	0.3 U	0.03 U	0.3 U	0.3 U	0.03 U	0.3 U	0.03 U	0.3 U	0.03 U	0.03 U	0.03 U	0.03 U
Diethyl Phthalate	EPA 8270C	mg/kg	0.009 U	0.009 U	0.022 U	0.009 U	0.009 U	49	1.9	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.09 U	0.09 U	0.009 U	1.5	1.3	0.009 U	5.7	0.009 U	2.2	0.009 U	0.009 U	0.009 U	0.009 U
Di-N-Butyl Phthalate	EPA 8270C	mg/kg	0.03 U	0.041	0.074 U	0.03 U	0.03 U	0.3 U	0.3 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.3 U	0.3 U	0.03 U	0.3 U	0.3 U	0.03 U	0.3 U	0.03	0.3 U	0.03 U	0.03 U	0.03 U	0.03 U
Fluoranthene	EPA 8270C	mg/kg	0.11	0.4	0.11 U	0.11	0.089	0.12	0.88	0.49	0.009 U	0.009 U	0.066	0.045	0.031	0.051	0.098	0.11	0.09 U	0.09 U	0.22	0.1	0.09 U	0.009 U	0.5	0.24	0.09 U	0.009 U	0.14	0.18	0.009 U
Fluorene	EPA 8270C	mg/kg	0.021 U	0.03	0.12 U	0.021 U	0.021 U	0.21 U	0.21 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.21 U	0.21 U	0.021 U	0.21 U	0.21 U	0.021 U	0.21 U	0.026	0.21 U	0.021 U	0.021 U	0.021 U	0.021 U
Indeno(1,2,3-cd)Pyrene	EPA 8270C	mg/kg	0.045	0.032	0.1 U	0.075	0.021 U	0.21 U	6.1	0.88	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.21 U	0.21 U	0.23	0.21 U	0.21 U	0.021 U	0.21 U	0.12	0.21 U	0.021 U	0.17	0.16	0.021 U
Isophorone	EPA 8270C	mg/kg	0.009 U	0.009 U	0.018 U	0.009 U	0.009 U	0.09 U	0.09 U	0.033	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.09 U	0.09 U	0.009 U	0.09 U	0.09 U	0.009 U	0.09 U	0.027	0.09 U	0.009 U	0.009 U	0.009 U	0.009 U
Naphthalene	EPA 8270C	mg/kg	0.038	0.091	0.047 U	0.037	0.021 U	0.21 U	0.21 U	0.11	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.21 U	0.21 U	0.021 U	0.21 U	0.21 U	0.021 U	0.21 U	0.06	0.21 U	0.021 U	0.021 U	0.021 U	0.021 U
Phenanthrene	EPA 8270C	mg/kg	0.08	0.33	0.11 U	0.076	0.064	0.09 U	0.36	0.25	0.009 U	0.009 U	0.03	0.009 U	0.027	0.093	0.12	0.063	0.09 U	0.09 U	0.057	0.09 U	0.09 U	0.009 U	0.33	0.19	0.09 U	0.009 U	0.039	0.041	0.009 U
Pyrene	EPA 8270C	mg/kg	0.19	0.55	0.018 U	0.19	0.19	0.13	1.4	0.57	0.017	0.009 U	0.075	0.065	0.039	0.36	0.6	0.38 N	1.1	0.09 U	0.56	0.16	0.09 U	0.009 U	0.74	0.42	0.09 U	0.011 N	0.34	0.36	0.009 U
Metals																															
Antimony	EPA 6010B	mg/kg	4.28	11.5	4 J	14.7	5.15	7.1	3.73	6.46	7.89	5.2	3.96	7.74	3.03	6.73	9.1	7.31	6.18	4.89	7.26	5.41	1.77	5.7	8.26	18.4	30.6	4.25	6.95	6.33 *	7.71
Arsenic	EPA 6010B	mg/kg	1.88 U	3.1	5.7 J	1.72 U	3.51	1.77 U	1.76 U	1.88 U	4.19	1.93 U	1.94 U	1.96 U	1.98 U	1.92 U	3.13 U	1.94 U	2.65 U	1.95 U	1.96 U	1.99 U	1.88 U	2.4	2.29	1.97 U	1.89	1.82 U	1.62 U	1.85 U	1.92 U
Barium	EPA 6010B	mg/kg	88.8	243	75	152	151	148	24.3	135	316	115	152	127	82.3	117	108	125	115	154	73.8	130	54	139	147	242	187	152	111	136 *	67.8
Beryllium	EPA 6010B	mg/kg	0.198	0.377	0.29	0.3	0.501	0.444	0.072	0.47	0.447	0.48	0.427	0.451	0.319	0.36	0.334	0.29	0.204	0.339	0.355	0.403	0.327	0.496	0.585	0.302	0.452	0.44	0.418	0.383	0.472
Cadmium	EPA 6010B	mg/kg	0.262 *	0.921	0.53 J	0.161	0.158	0.0886 U	0.0879 U	0.0942 U	1.03	0.0967 U	0.0971 U	0.098 U	0.223	0.0962 U	0.157 U	0.0971 U	0.133 U	0.0973 U	0.0978 U	0.0994 U	0.0938 U	0.1 U	1.94	0.791	0.319	0.0911 U	0.081 U	0.0926 U	0.503
Chromium	EPA 6010B	mg/kg	39.7	40.9	33	53.5	49.4	65.1	11.7	70.9	50	70.4	33.8	67.8	50.9	53.6	44.5	39.4	45	57.4	50.2	49.6	45.7	62.1	46.5	63.4	53.9	44.9	49.1	61.9	81
Cobalt	EPA 6010B	mg/kg	10.3	10.7	7.9	11.3	10.7	14.2	4.73	15.3	11.7	15.6	7.47	15.5	12.2	14.1	10.9	10.9	11.3	11.6	8.75	11.3	11.4	17	10.1	11	11	14.5	12.1	12.9	16.3
Copper	EPA 6010B	mg/kg	22.7 *	107	33	54.6	40.3	46.2	11	24	81.4	27.3	19.7	27.8	21.8	20.1	29.9	25.3 *	10.7	31	15.4	25.8	22.8	22	123	69.4	71.8	15.7	18.3	32.6	30
Lead	EPA 6010B	mg/kg	16.1 *	300	66	202	91.5	48.6	9.32	6.64	261	7.16	11.1	17.6	8.74	15.2	82.8	42.9 *	16.2	41.4	21.6	30.5	15.4	8.47	264	430	634	17.9	19.9	46.3	28.8
Manganese	EPA 6010B	mg/kg	432	391	350	458	315	496	121	376	452	455	223	467	399	363	376	459	535	462	380	705	306	364	1,780	523	2,550	289	505	494	258
Mercury	EPA 7471	mg/kg	0.12	0.19	0.037	0.26	0.12	0.13	0.04 U	0.058	0.36	0.056	0.12	0.081	0.064	0.83 N	0.28 N	0.04 U	0.099	0.13	0.37	0.13	0.054	0.04	0.42	0.24	0.48	0.08	0.32	0.31	0.42
Molybdenum	EPA 6010B	mg/kg	0.847 U	1.13	1.2 J	1.64	1.28	1.13	0.791 U	0.847 U	1.83	1.12	1.13	0.882 U	1.38	0.969	1.41 U	0.92 *	1.6	1.11	1.32	1.05	1.29	0.9 U	1.23	2.69	1.8	0.973	1.38	1.87	1.91
Nickel	EPA 6010B	mg/kg	51.2	40.7	40	56.1	53.9	73.8	11.1	80.1	52.2	82.6	29.2	80.8	54.9	68.1	44.6	49.8	45	57	43.2	52.9	51	78.9	29.4	57.1	51.1	49.3	44.5	65.7	80.5
Selenium	EPA 6010B	mg/kg	4.52	5.13	1.7 U	4.67	6.96	8.07	3.52 U	8.21	3.81 U	5.38	4.17	9.05	4.51	11.1	17.7	11.8 *	20.1	4.3	11.3	3.98 U	5.93	6.7	7.7	5.11	7.1	10.4	13.4	17.5 *	14.5
Silver	EPA 6010B/7761	mg/kg	0.08	0.24	1.7	0.53	0.08	0.13	0.04	0.03	0.13	0.03	0.08	0.05	0.07	1.92 U	3.13 U	1.94 U	2.65 U	0.07	0.11	0.1	0.06	0.03	0.15	0.44	0.09	0.12	0.19	0.13	0.35
Thallium	EPA 6010B	mg/kg	3.77 U	3.96 U	0.98 U	3.44 U	3.29 U	3.55 U	3.52 U	3.77 U	3.81 U	3.87 U	3.88 U	3.92 U	3.97 U	6.97	6.49	3.88 U	5.3 U	3.89 U	4.56	3.98 U	3.75 U	4 U	3.87 U	3.94 U	3.51 U	4.95	3.24 U	3.7 U	5.97
Vanadium	EPA 6010B	mg/kg	85.1	79.1	30	94.2	97.6	111	30.4	124	101	108	67.4	113	88.8	86.9	92.7	93	118	91.9	137	93.2	85.8	100	83.1	90	114	80.8	103	102	130
Zinc	EPA 6010B	mg/kg	65	207	190	195	181	113	19.6	50.9	213	52.8	41.9	87.6	55.6	53.8	149	88.3	69.2	96.5	86.2	75.6	71.7	80.3	4,210	683	1390	47.7	73	86.5	121

Notes:

(1)	United States Environmental Protection Agency, Region 9, Preliminary Remediation Goals (PRGs) protective of soil direct contact, 2004.
(2)	Field duplicate sample.
(3)	Only constituents detected in at least one sample listed, see laboratory report appendices for complete list of analytes and detection limits.
(4)	SF RWQCB Table B commercial/industrial ESL.
(CA MOD)	California-modified PRG.
119	Boldface type indicates constituent detected at concentration noted.
0.21	Concentration exceeding EPA Region 9 commercial/industrial direct contact PRG.
FID	Analysis by GC/FID.
U	Analyte not detected
J	Estimated value, quantitation does not meet SOP criteria
*	Laboratory Duplicate value outside of control limits
B	Analyte detected in method blank
T	Diesel/Gasoline pattern is atypical
-	Regulatory limit not established or sample not analyzed for this constituent.
N	Spike recovery outside of control limits

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Table 1-8d

Heroic War Dead United States Army Reserve Center, Oakland, California
Remedial Investigation/Feasibility Study

Summary of Building 1060 Parking Area Soil Sample Testing Results - Continued

Constituent	Analytical Method	Units	PV-15		PV-16		PV-17			PV-18		EPA Region 9 PRGs(1)	
Sample ID			PV-15-1'-1	PV-15-5.5'-1	PV-16-1'-1	PV-16-5.5'-1	PV-17-1'-1	PV-17-5.5'-1	PV-17-5.5'-3(2)	PV-18-1'-1	PV-18-5.5'-1	Residential	Commercial/ Industrial
Sample Depth, ft			1	5.5	1	5.5	1	5.5		1	5.5		
Sample Collection Date													
Petroleum Hydrocarbons													
Gasoline	California LUFT ManualGC/MS	mg/kg	10 U	10 U	10 U	10 U	10 U	10 U	**0.032** J	10 U	10 U	100(4)	400(4)
Diesel	California LUFT Manual	mg/kg	**2.6**	**6.6**	**4.6**	1 U	1 U	**8.6**	**76** FID	**2.7**	**15**	500(4)	500(4)
Motor Oil	California LUFT Manual	mg/kg	100 U	100 U	100 U	100 U	100 U	100 U	-	100 U	**210**	500(4)	**1000(4)**
Volatile Organic Compounds(3)													
2-Butanone	EPA 8260B	mg/kg	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	**0.0042** J	0.75 U	0.75 U	22,311	113,264
Acetone	EPA 8260B	mg/kg	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	**0.028** J	1.5 U	1.5 U	14,127	54,321
Benzene	EPA 8260B	mg/kg	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.00027 U	0.012 U	0.012 U	0.6	1.4
Bromomethane	EPA 8260B	mg/kg	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U	0.0019 U	0.052 U	0.052 U	3.9	13.1
Carbon Disulfide	EPA 8260B	mg/kg	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.002 U	0.025 U	0.025 U	355	720
Iodomethane	EPA 8260B	mg/kg	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	-	0.12 U	0.12 U	-	-
Methylene Chloride	EPA 8260B	mg/kg	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.00023 U	0.018 U	0.018 U	9.1	20.5
Trichloroethene	EPA 8260B	mg/kg	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.00043 U	0.012 U	**0.082**	2.9(Ca MOD)	6.5(CA MOD)
Vinyl Chloride	EPA 8260B	mg/kg	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.00046 U	0.018 U	**0.32**	0.08	0.75
Semi-Volatile Organic Compounds(3)													
2-Cresol	EPA 8270C	mg/kg	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.21 U	0.027 U	0.021 U	0.021 U	-	-
2-Methylnaphthalene	EPA 8270C	mg/kg	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.3 U	0.028 U	0.03 U	**0.24**	-	-
3-,4-Methylphenol	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.09 U	-	0.009 U	0.009 U	61	616
Acenaphthene	EPA 8270C	mg/kg	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.21 U	0.018 U	0.021 U	**0.069**	3,682	29,219
Acenaphthylene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.09 U	0.017 U	0.009 U	0.009 U	-	-
Anthracene	EPA 8270C	mg/kg	0.009 U	0.009 U	**0.009**	0.009 U	0.009 U	0.09 U	0.12 U	0.009 U	**0.13**	21,896	100,000
Benzo(a)Anthracene	EPA 8270C	mg/kg	**0.045**	**0.15**	**0.073**	0.009 U	**0.02**	**0.1**	0.11 U	**0.042**	**1.2**	0.6	2.1
Benzo(a)Pyrene	EPA 8270C	mg/kg	**0.051**	**0.23**	**0.11**	0.009 U	**0.06**	**0.31**	0.12 U	**0.057**	**1.2**	0.06	**0.21**
Benzo(b)Fluoranthene	EPA 8270C	mg/kg	**0.044**	**0.22**	**0.099**	0.009 U	**0.03**	**0.19**	0.2 U	**0.066**	**1.5**	0.38	**1.28**
Benzo(ghi)Perylene	EPA 8270C	mg/kg	**0.025**	**0.15**	**0.093**	0.009 U	0.009 U	0.09 U	0.1 U	**0.032**	**0.55**	-	-
Benzo(k)Fluoranthene	EPA 8270C	mg/kg	**0.037**	**0.2**	**0.09**	0.009 U	**0.038**	**0.26**	-	**0.053**	**1.2**	0.38(CA Mod)	1.3(CA Mod)
Bis(2-Ethylhexyl)Phthalate	EPA 8270C	mg/kg	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.6 U	0.11 U	0.06 U	**0.086**	35	123
Butylbenzyl Phthalate	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.09 U	0.11 U	0.009 U	0.009 U	12,221	100,000
Chrysene	EPA 8270C	mg/kg	**0.07**	**0.24**	**0.1**	0.006 U	**0.042**	**0.17**	0.11 U	**0.069**	**1.7**	3.8(CA Mod)	13(CA Mod)
Dibenzo(a,h)Anthracene	EPA 8270C	mg/kg	0.009 U	**0.033**	0.009 U	0.009 U	0.009 U	0.09 U	0.096 U	0.009 U	**0.039**	**0.06**	**0.21**
Dibenzofuran	EPA 8270C	mg/kg	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.3 U	0.13 U	0.03 U	**0.059**	145	1,563
Diethyl Phthalate	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.009 U	**0.009**	0.09 U	0.022 U	0.009 U	0.009 U	48,882	100,000
Di-N-Butyl Phthalate	EPA 8270C	mg/kg	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.3 U	0.074 U	0.03 U	0.03 U	-	-
Fluoranthene	EPA 8270C	mg/kg	**0.086**	**0.16**	**0.1**	0.009 U	0.009 U	**0.11**	0.11 U	**0.059**	**1.8**	2,294	22,000
Fluorene	EPA 8270C	mg/kg	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.21 U	0.12 U	0.021 U	**0.13**	2,747	26,281
Indeno(1,2,3-cd)Pyrene	EPA 8270C	mg/kg	0.021 U	**0.12**	**0.065**	0.021 U	0.021 U	0.21 U	0.1 U	**0.022**	**0.48**	**0.6**	**2.1**
Isophorone	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.09 U	0.018 U	0.009 U	0.009 U	512	512
Naphthalene	EPA 8270C	mg/kg	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.21 U	0.047 U	0.021 U	**0.2**	1.7(CA Mod)	4.2(CA Mod)
Phenanthrene	EPA 8270C	mg/kg	**0.035**	**0.045**	**0.036**	0.009 U	**0.011**	0.09 U	0.11 U	**0.042**	**0.79**	-	-
Pyrene	EPA 8270C	mg/kg	**0.13**	**0.2**	**0.18**	0.009 U	**0.022**	**0.38**	**0.079** J	**0.085**	**1.7**	2,316	29,126
Metals													
Antimony	EPA 6010B	mg/kg	**6.65**	**407**	**7.94**	**4.8**	**9.36** *	**6.63**	1.1 U	**6.05**	**5.33**	31	410
Arsenic	EPA 6010B	mg/kg	1.95 U	1.96 U	1.99 U	1.95 U	1.93 U	2.1 U	**4.6** J	1.93 U	1.92 U	0.06(CA Mod)	**0.25(CA Mod)**
Barium	EPA 6010B	mg/kg	**74.9**	**233**	**138**	**60.3**	**163**	**71.1**	**54**	**153**	**122**	5,400	67,000
Beryllium	EPA 6010B	mg/kg	**0.338**	**0.292**	**0.414**	**0.315**	**0.424**	**0.344**	**0.29**	**0.274**	**0.2**	150	1,900
Cadmium	EPA 6010B	mg/kg	0.0975 U	**2.23**	0.0994 U	0.0973 U	0.0965 U	0.105 U	**0.34** J	**0.633**	**0.21**	37	450
Chromium	EPA 6010B	mg/kg	**60.8**	**207**	**70.3**	**49.3**	**71.8**	**37.8**	**28**	**40.5**	**35.7**	210	450
Cobalt	EPA 6010B	mg/kg	**12.4**	**9.78**	**13**	**10**	**14.2**	**8.09**	**6.1**	**8.46**	**6.76**	900	1,900
Copper	EPA 6010B	mg/kg	**20**	**515**	**22.4**	**17.3**	**22.6**	**12.7**	**16**	**51.8**	**81.8**	3,100	41,000
Lead	EPA 6010B	mg/kg	**14.6**	**477**	**26.4**	**16.2**	**25.5**	**14.6**	**14**	**240**	**64.8**	150(CA MOD)	800
Manganese	EPA 6010B	mg/kg	**323**	**909**	**383**	**393**	**586**	**652**	**420**	**405**	**244**	1,762	19,458
Mercury	EPA 7471	mg/kg	**0.074**	**0.1**	**0.13**	**0.44**	**0.13**	**0.56**	**0.15**	**0.22**	**0.11**	23	310
Molybdenum	EPA 6010B	mg/kg	**2.48**	**2.8**	**1.24**	**1.3**	**1.77** *	**1.7**	**0.83** J	**1.48**	**1.57**	390	5,100
Nickel	EPA 6010B	mg/kg	**59.9**	**99.7**	**68.5**	**44.2**	**70**	**32.3**	**28**	**40.3**	**45.6**	1,600	20,000
Selenium	EPA 6010B	mg/kg	**10.5**	**18.8**	**16.4**	**9.26**	**15.7**	**13.5**	1.6 U	**11.2**	**12.3**	390	5,100
Silver	EPA 6010B/7761	mg/kg	**0.08**	**0.32**	**0.05**	**0.08**	1.93 U	2.1 U	0.072 U	**0.19**	**0.08**	390	5,100
Thallium	EPA 6010B	mg/kg	3.9 U	3.92 U	3.98 U	**4.28**	**4**	**5.97**	0.96 U	3.86 U	3.84 U	5.2	67
Vanadium	EPA 6010B	mg/kg	**109**	**126**	**112**	**97.7**	**115**	**81.2**	**25**	**63.7**	**60.3**	78	1,000
Zinc	EPA 6010B	mg/kg	**66.2**	**725**	**67.2**	**75**	**67.2**	**101**	**61**	**449**	**101**	23,000	100,000

Notes:

(1)	United States Environmental Protection Agency, Region 9, Preliminary Remediation Goals (PRGs) protective of soil direct contact, 2004.
(2)	Field duplicate sample.
(3)	Only constituents detected in at least one sample listed, see laboratory report appendices for complete list of analytes and detection limits.
(4)	SF RWQCB Table B commercial/industrial ESL.
(CA MOD)	California-modified PRG.
119	Boldface type indicates constituent detected at concentration noted.
0.21	Concentration exceeding EPA Region 9 commercial/industrial direct contact PRG.
FID	Analysis by GC/FID.
U	Analyte not detected
J	Estimated value, quantitation does not meet SOP criteria
*	Laboratory Duplicate value outside of control limits
B	Analyte detected in method blank
T	Diesel/Gasoline pattern is atypical
-	Regulatory limit not established or sample not analyzed for this constituent.
N	Spike recovery outside of control limits

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Table 1-8e

Heroic War Dead United States Army Reserve Center, Oakland, California
Remedial Investigation/Feasibility Study

Summary of November/December 2004 Site Inspection Building 1060 Rail Spur Area Soil Sample Testing Results

Constituent	Analytical Method	Units	RS-1	RS-2	RS-2	RS-3	RS-4	RS-4	RS-5	EPA Region 9 PRGs(1)	
Sample ID			RS-1-4'-1	RS-2-4'-1	RS-2-4'-3(2)	RS-3-4'-1	RS-4-5'-1	RS-4-5'-3(2)	RS-5-4'-1	Residential	Commercial/ Industrial
Sample Depth, ft			4	4		4	5		4		
Petroleum Hydrocarbons											
Gasoline	California LUFT ManualGC/MS	mg/kg	10 U	10 U	**0.027** H,J	10 U	10 U	**0.03** J	10 U	100(4)	400(4)
Diesel	California LUFT Manual	mg/kg	**1.3** T	**1.7** T	**8.7** FID	**1**	**4.7**	**25** FID	1 U	500(4)	500(4)
Motor Oil	California LUFT Manual	mg/kg	100 U	100 U	-	100 U	100 U	-	100 U	500(4)	1000(4)
Volatile Organic Compounds(3)											
Acetone	EPA 8260B	mg/kg	1.5 U	1.5 U	0.0042 U	1.5 U	1.5 U	**0.011** J	1.5 U	14,127	54,321
Bromomethane	EPA 8260B	mg/kg	**0.53** B	**0.55** B	0.0019 U	0.052 U	0.052 U	0.0019 U	0.052 U	3.9	13.1
Iodomethane	EPA 8260B	mg/kg	**0.58** B	**0.78** B	-	0.12 U	0.12 U	-	0.12 U	-	-
Methylene Chloride	EPA 8260B	mg/kg	0.018 U,N	0.018 U	0.00023 U	0.018 U	0.018 U	**0.00093** J	0.018 U	9.1	20.5
Chlorinated Pesticides(3)											
4,4'-DDD	EPA 8081A	mg/kg	-	-	-	-	-	-	-	2.4	10
4,4'-DDE	EPA 8081A	mg/kg	-	-	-	-	-	-	-	1.7	7
4,4'-DDT	EPA 8081A	mg/kg	-	-	-	-	-	-	-	1.7	7
Semi-Volatile Organic Compounds(3)											
Anthracene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.12 U	0.009 U	0.09 U	0.12 U	0.009 U	21,896	100,000
Benzo(a)Anthracene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.11 U	0.009 U	0.09 U	0.11 U	0.009 U	0.6	2.1
Benzo(a)Pyrene	EPA 8270C	mg/kg	0.009 U	**0.012**	0.12 U	0.009 U	**0.15**	0.12 U	0.009 U	0.06	0.21
Benzo(b)Fluoranthene	EPA 8270C	mg/kg	0.009 U	**0.024**	0.2 U	0.009 U	**0.15**	0.2 U	0.009 U	0.38	1.28
Benzo(ghi)Perylene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.1 U	0.009 U	0.09 U	0.1 U	0.009 U	-	-
Benzo(k)Fluoranthene	EPA 8270C	mg/kg	0.009 U	0.009 U	-	0.009 U	0.09 U	-	0.009 U	0.38(CA Mod)	1.3(CA Mod)
Bis(2-Ethylhexyl)Phthalate	EPA 8270C	mg/kg	0.06 U	0.06 U	0.11 U	0.06 U	0.6 U	0.11 U	0.06 U	35	123
Butylbenzyl Phthalate	EPA 8270C	mg/kg	0.009 U	0.009 U	0.11 U	0.009 U	0.09 U	0.11 U	0.009 U	12,221	100,000
Chrysene	EPA 8270C	mg/kg	0.006 U	**0.011**	0.11 U	0.006 U	**0.15**	0.11 U	0.006 U	3.8(CA Mod)	13(CA Mod)
Dibenzo(a,h)Anthracene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.096 U	0.009 U	0.09 U	0.096 U	0.009 U	0.06	0.21
Diethyl Phthalate	EPA 8270C	mg/kg	0.009 U	0.009 U	0.022 U	**0.013** B	0.09 U	0.022 U	**0.01**	48,882	100,000
Fluoranthene	EPA 8270C	mg/kg	0.009 U	**0.02**	0.11 U	0.009 U	**0.1**	0.11 U	0.009 U	2,294	22,000
Indeno(1,2,3-cd)Pyrene	EPA 8270C	mg/kg	0.021 U	0.021 U	0.1 U	0.021 U	0.21 U	0.1 U	0.021 U	0.6	2.1
Naphthalene	EPA 8270C	mg/kg	0.021 U	0.021 U	0.047 U	0.021 U	0.21 U	0.047 U	0.021 U	1.7(CA Mod)	4.2(CA Mod)
Phenanthrene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.11 U	0.009 U	0.09 U	0.11 U	0.009 U	-	-
Pyrene	EPA 8270C	mg/kg	**0.017** N	**0.042**	0.018 U	0.009 U	**0.12**	0.018 U	0.009 U	2,316	29,126
Polychlorinated Biphenyls(3)											
Aroclor 1254	EPA 8082	mg/kg	0.0027 U	0.0027 U	-	0.0027 U	0.0027 U	0.0098 U	0.0027 U	0.05	0.19
Chlorinated Herbides(3)											
Mcpp	EPA 8151A	mg/kg	**2.04** J	-	20 U	20 U	-	-	20 U	-	-
Metals											
Antimony	EPA 6010B	mg/kg	**4.44**	**6.38**	1.2 U	**2.23**	0.942 U	1.4 U	**3.16**	31	410
Arsenic	EPA 6010B	mg/kg	1.94 U	1.9 U	**12**	**8.5**	1.88 U	**5.6** J	1.98 U	**0.06(CA Mod)**	**0.25(CA Mod)**
Barium	EPA 6010B	mg/kg	**36.6**	**53.5**	**25**	**33.7**	**83**	**47**	**49.3**	5,400	67,000
Beryllium	EPA 6010B	mg/kg	**0.245**	**0.259**	**0.18**	**0.266**	**0.384**	**0.34**	**0.32**	150	1,900
Cadmium	EPA 6010B	mg/kg	0.0969 U	0.0952 U	**0.049** J	0.0912 U	0.0942 U	**0.44** J	0.0992 U	37	450
Chromium	EPA 6010B	mg/kg	**4.62**	**43**	**4.3**	**7.84**	**40**	**19**	**5.8**	210	450
Cobalt	EPA 6010B	mg/kg	**4.5**	**7.98**	**2.9**	**4.87**	**10.1**	**5.4**	**4.84**	900	1,900
Copper	EPA 6010B	mg/kg	**8.65**	**17.2**	**12**	**15.1**	**18.3**	**14**	**15.2**	3,100	41,000
Lead	EPA 6010B	mg/kg	**9.7**	**12.4**	**6.3**	**22.6**	**14.7**	**10**	**4.96**	150(CA MOD)	800
Manganese	EPA 6010B	mg/kg	**781**	**397**	**460**	**877**	**453**	**400**	**735**	1,762	19,458
Mercury	EPA 7471	mg/kg	**0.57**	**0.28**	**0.2**	**0.6**	**0.62**	**0.33**	**0.68**	23	310
Molybdenum	EPA 6010B	mg/kg	0.872 U	**1.14**	**0.73** J	**1.41**	**0.931**	0.57 U	**1.82**	390	5,100
Nickel	EPA 6010B	mg/kg	**3.49**	**33.3**	**4.7**	**3.69**	**35.2**	**21**	**2.79**	1,600	20,000
Selenium	EPA 6010B	mg/kg	**11.3**	**12.4**	1.8 U	**9.7**	**10.6**	2.2 U	**12.3**	390	5,100
Silver	EPA 6010B/7761	mg/kg	**0.05**	**0.07**	0.081 U	**0.04**	**0.07**	0.096 U	**0.1**	390	5,100
Thallium	EPA 6010B	mg/kg	**5**	3.81 U	1.1 U	**5.91**	3.77 U	1.3 U	**6.7**	5.2	67
Vanadium	EPA 6010B	mg/kg	**6.47**	**32.8**	**12**	**50.1**	**81.1**	**20**	**75.2**	78	1,000
Zinc	EPA 6010B	mg/kg	**121**	**85**	**94**	**130**	**115**	**82**	**130**	23,000	100,000

Notes:

(1)	United States Environmental Protection Agency, Region 9, Preliminary Remediation Goals (PRGs) protective of soil direct contact, 2004.
(2)	Field duplicate sample.
(3)	Only constituents detected in at least one sample listed, see laboratory report appendices for complete list of analytes and detection limits.
(4)	SF RWQCB Table B commercial/industrial ESL.
(CA MOD)	California-modified PRG.
119	Boldface type indicates constituent detected at concentration noted.
0.21	Concentration exceeding EPA Region 9 commercial/industrial direct contact PRG.
FID	Analysis by GC/FID.
U	Analyte not detected
J	Estimated value, quantitation does not meet SOP criteria
*	Laboratory Duplicate value outside of control limits
B	Analyte detected in method blank
T	Diesel/Gasoline pattern is atypical
-	Regulatory limit not established or sample not analyzed for this constituent.
N	Spike recovery outside of control limits

Table 1-8f

Heroic War Dead United States Army Reserve Center, Oakland, California
Remedial Investigation/Feasibility Study

Summary of November/December 2004 Site Inspection Building 1070 Area Soil Sample Testing Results

			Former UST	Former Vehicle Wash Rack								
Constituent	Analytical Method	Units	UST-1	VW-1		VW-2		VW-3a			EPA Region 9 PRGs(1)	
Sample ID			UST-1-6'	VW-1-1'-1	VW-1-5'-1	VW-2-1'-1	VW-2-5'-1	VW-3a-1'-1	VW-3a-5'-1	VW-3a-5'-3(2)		
Sample Depth, ft			6	1	5	1	5	1	5		Residential	Commercial/ Industrial
Petroleum Hydrocarbons												
Gasoline	California LUFT ManualGC/MS	mg/kg	10 U	10 U	10 U	10 U	10 U	10 U	10 U	**0.025** J,HT04	100(4)	400(4)
Diesel	California LUFT Manual	mg/kg	**85** T	**9.8**	**4.7** T	**33**	**39**	1 U	**2.7**	**42** FID	500(4)	500(4)
Motor Oil	California LUFT Manual	mg/kg	1000 U	100 U	100 U	**170**	**370**	100 U	100 U	-	500(4)	1000(4)
Volatile Organic Compounds(3)												
2-Butanone	EPA 8260B	mg/kg	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	**0.0018** J	22,311	113,264
Acetone	EPA 8260B	mg/kg	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	**0.018** J	14,127	54,321
Bromomethane	EPA 8260B	mg/kg	**0.53** B	**0.52** B	**0.67** B	**0.62** B	**0.51** B	**0.56** B	**0.57** B	0.0019 U	3.9	13.1
Carbon Disulfide	EPA 8260B	mg/kg	**0.09**	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.002 U	355	720
Iodomethane	EPA 8260B	mg/kg	**0.72** B	**0.71** B	**0.89** B	**0.75** B	**0.58** B	**0.85** B	**0.8** B	-	-	-
Methylene Chloride	EPA 8260B	mg/kg	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	**0.001** J	9.1	20.5
Naphthalene	EPA 8260B	mg/kg	0.025 U	0.025 U	0.025 U	**0.22**	**0.08**	0.025 U	0.025 U	0.0014 U	1.7(CA Mod)	4.2(CA Mod)
Tetrachloroethene	EPA 8260B	mg/kg	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.028 U	0.00049 U	0.48	1.31
Trichloroethene	EPA 8260B	mg/kg	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.012 U	0.00043 U	2.9(CA Mod)	6.5(CA Mod)
Vinyl Chloride	EPA 8260B	mg/kg	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.00046 U	0.08	0.75
Chlorinated Pesticides(3)												
4,4'-DDD	EPA 8081A	mg/kg	-	-	-	-	-	-	-	-	2.4	10
4,4'-DDE	EPA 8081A	mg/kg	-	-	-	-	-	-	-	-	1.7	7
4,4'-DDT	EPA 8081A	mg/kg	-	-	-	-	-	-	-	-	1.7	7
Semi-Volatile Organic Compounds(3)												
2,4-Dinitrotoluene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.018 U	122	1,231
2-Cresol	EPA 8270C	mg/kg	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.027 U	-	-
2-Methylnaphthalene	EPA 8270C	mg/kg	**0.043**	0.03 U	0.03 U	0.03 U	**0.13**	0.03 U	0.03 U	0.028 U	-	-
3-,4-Methylphenol	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	-	61	616
4-Nitrophenol	EPA 8270C	mg/kg	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.021 U	-	-
Acenaphthene	EPA 8270C	mg/kg	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.018 U	3,682	29,219
Anthracene	EPA 8270C	mg/kg	**0.024**	**0.032**	0.009 U	**0.022**	0.009 U	0.009 U	**0.015**	0.12 U	21,896	100,000
Benzo(a)Anthracene	EPA 8270C	mg/kg	**0.049**	**0.075**	0.009 U	**0.06**	**0.039**	0.009 U	0.009 U	0.11 U	0.6	2.1
Benzo(a)Pyrene	EPA 8270C	mg/kg	**0.056**	**0.11**	**0.021**	**0.075**	**0.06**	0.009 U	0.009 U	0.12 U	0.06	0.21
Benzo(b)Fluoranthene	EPA 8270C	mg/kg	**0.074**	**0.19**	**0.032**	**0.099**	**0.085**	0.009 U	0.009 U	0.2 U	0.38	1.28
Benzo(ghi)Perylene	EPA 8270C	mg/kg	0.009 U	**0.03**	0.009 U	**0.028**	**0.015**	0.009 U	0.009 U	0.1 U	-	-
Benzo(k)Fluoranthene	EPA 8270C	mg/kg	**0.033**	**0.14**	**0.015**	**0.086**	**0.056**	0.009 U	0.009 U	-	0.38(CA Mod)	1.3(CA Mod)
Bis(2-Ethylhexyl)Phthalate	EPA 8270C	mg/kg	**0.079**	**0.14**	**0.061**	0.06 U	**0.096**	0.06 U	0.06 U	0.11 U	35	123
Butylbenzyl Phthalate	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	**0.011**	0.009 U	0.009 U	0.009 U	0.11 U	12,221	100,000
Chrysene	EPA 8270C	mg/kg	**0.15**	**0.23**	**0.047**	**0.12**	**0.12**	0.006 U	**0.012**	0.11 U	3.8(CA Mod)	13(CA Mod)
Dibenzo(a,h)Anthracene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.096 U	0.06	0.21
Dibenzofuran	EPA 8270C	mg/kg	0.03 U	0.03 U	0.036	0.03 U	**0.051**	0.03 U	0.03 U	0.13 U	145	1,563
Dimethyl Phthalate	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.009 U	**0.019**	0.009 U	0.009 U	0.017 U	100,000	100,000
Fluoranthene	EPA 8270C	mg/kg	**0.084**	**0.14**	**0.068**	**0.12**	**0.066**	0.009 U	**0.014**	0.11 U	2,294	22,000
Fluorene	EPA 8270C	mg/kg	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.12 U	2,747	26,281
Indeno(1,2,3-cd)Pyrene	EPA 8270C	mg/kg	0.021 U	**0.025**	0.021 U	**0.024**	0.021 U	0.021 U	0.021 U	0.1 U	0.6	2.1
Isophorone	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.018 U	512	512
Naphthalene	EPA 8270C	mg/kg	**0.13**	0.021 U	**0.058**	0.021 U	**0.12**	0.021 U	0.021 U	0.047 U	1.7(CA Mod)	4.2(CA Mod)
N-Nitrosodiphenylamine	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.025 U	99	352
Phenanthrene	EPA 8270C	mg/kg	**0.09**	**0.057**	**0.12**	**0.062**	**0.089**	0.009 U	**0.014**	0.11 U	-	-
Phenol	EPA 8270C	mg/kg	**0.063**	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.037 U	18,331	100,000
Pyrene	EPA 8270C	mg/kg	**0.12**	**0.18**	**0.039**	**0.12**	**0.085**	0.009 U	**0.034**	0.018 U	2,316	29,126
Metals												
Antimony	EPA 6010B	mg/kg	**7.23**	**11.4**	**89.5**	**13.4**	**75.9**	**11.4**	**10.1**	**1.8** J	31	410
Arsenic	EPA 6010B	mg/kg	1.86 U	1.96 U	1.74 U	1.9 U	1.92 U	1.78 U	1.97 U	**3.5** J	0.06(CA Mod)	0.25(CA Mod)
Barium	EPA 6010B	mg/kg	**93.6**	**199**	**746**	**184**	**148**	**174**	**83.6**	**66**	5,400	67,000
Beryllium	EPA 6010B	mg/kg	**0.275**	**0.567**	**0.271**	**0.479**	**0.253**	**0.48**	**0.358**	**0.24**	150	1,900
Cadmium	EPA 6010B	mg/kg	0.0929 U	0.0978 U	6.63	0.0951 U	**0.115**	0.0888 U	0.0984 U	**0.21** J	37	450
Chromium	EPA 6010B	mg/kg	**50.6**	**93.2**	**96.7**	**76.6**	**47.9**	**90.8**	**64.3**	**26**	210	450
Cobalt	EPA 6010B	mg/kg	**9.1**	**16.6**	**15.9**	**13.9**	**9.65**	**15**	**12.3**	**8**	900	1,900
Copper	EPA 6010B	mg/kg	**27.8**	**55.2**	**3,610**	**55**	**40.7**	**63.9**	**42.1**	**100**	3,100	41,000
Lead	EPA 6010B	mg/kg	**88**	**110**	**1,320**	**133**	**103**	**94.2**	**50.9**	**37**	150(CA Mod)	800
Manganese	EPA 6010B	mg/kg	**299**	**549**	**1,300**	**530**	**361**	**486**	**358**	**520**	1,762	19,458
Mercury	EPA 7471	mg/kg	**0.56**	**0.13**	**0.26**	**0.15**	**0.19**	**0.25**	**0.6**	**0.34**	23	310
Molybdenum	EPA 6010B	mg/kg	**1.53**	**1.32**	**5.25**	**1.71**	**0.965**	**1.79**	**1.22**	**2.8**	390	5,100
Nickel	EPA 6010B	mg/kg	**49.9**	**109**	**123**	**82.9**	**38.7**	**72.1**	**59**	**26**	1,600	20,000
Selenium	EPA 6010B	mg/kg	**10.7**	**16.5**	**18.8**	**12.3**	**13**	**18**	**18**	1.6 U	390	5,100
Silver	EPA 6010B/7761	mg/kg	1.86 U	1.96 U	1.74 U	1.9 U	1.92 U	**0.51**	**0.5**	0.072 U	390	5,100
Thallium	EPA 6010B	mg/kg	3.72 U	3.91 U	3.48 U	3.8 U	3.83 U	**3.62**	3.94 U	0.96 U	5.2	67
Vanadium	EPA 6010B	mg/kg	**50.2**	**55**	**56.4**	**53.8**	**46.5**	**60.7**	**59.1**	**38**	78	1,000
Zinc	EPA 6010B	mg/kg	**118**	**156**	**3,920**	**160**	**317**	**125**	**184**	**93**	23,000	100,000

Notes:

(1)	United States Environmental Protection Agency, Region 9, Preliminary Remediation Goals (PRGs) protective of soil direct contact, 2004.
(2)	Field duplicate sample.
(3)	Only constituents detected in at least one sample listed, see laboratory report appendices for complete list of analytes and detection limits.
(4)	SF RWQCB Table B commercial/industrial ESL.
(CA Mod)	California-modified PRG.
119	Boldface type indicates constituent detected at concentration noted.
0.21	Concentration exceeding EPA Region 9 commercial/industrial direct contact PRG.
FID	Analysis by GC/FID.
U	Analyte not detected
J	Estimated value, quantitation does not meet SOP criteria
*	Laboratory Duplicate value outside of control limits
B	Analyte detected in method blank
T	Diesel/Gasoline pattern is atypical
-	Regulatory limit not established or sample not analyzed for this constituent.
N	Spike recovery outside of control limits

Table 1-8g

Heroic War Dead United States Army Reserve Center, Oakland, California
Remedial Investigation/Feasibility Study

Summary of November/December 2004 Site Inspection Building 1084 and Building 1101 Area Soil Sample Testing Results

			Building 1084 Trench Drain System							Former Vehicle Grease Rack			
Constituent	Analytical Method	Units	VR-1		VR-2			VR-3		GR-1	GR-1	GR-2	GR-2
Sample ID			VR1-1'-1	VR1-5'-1	VR-2-1'-1	VR-2-1'-3(2)	VR-2-5'-1	VR-3-1'-1	VR-3-5'-1	GR1-1'-1	GR1-5'-1	GR2-1'-1	GR2-5'-1
Sample Depth, ft			1	5	1		5	1	5	1	5	1	5
Petroleum Hydrocarbons													
Gasoline	California LUFT ManualGC/MS	mg/kg	10 U	10 U	10 U	**0.018** J	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Diesel	California LUFT Manual	mg/kg	1 U	**2.6**	1 U	**26** FID	**1.7**	1 U	**15**	1 U	1 U	1 U	**19**
Motor Oil	California LUFT Manual	mg/kg	100 U	100 U	100 U	-	100 U	100 U	1000 U	100 U	100 U	100 U	100 U
Volatile Organic Compounds(3)													
Acetone	EPA 8260B	mg/kg	1.5 U	1.5 U	1.5 U	**0.0052** J	1.5 U	1.5 U,N	1.5 U	1.5 U	1.5 U	1.5 U,N	1.5 U
Bromomethane	EPA 8260B	mg/kg	0.052 U	0.052 U	0.052 U	0.0019 U	0.052 U	0.052 U,N	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U
Iodomethane	EPA 8260B	mg/kg	0.12 U	0.12 U	0.12 U	-	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U
Methylene Chloride	EPA 8260B	mg/kg	0.018 U	0.018 U	0.018 U	**0.0019** J	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U
Chlorinated Pesticides(3)													
All Constituents	EPA 8081A	mg/kg	0.004 - 0.012 U	-	-	-	-	0.004 - 0.012 U	-	-	-	-	-
Semi-Volatile Organic Compounds(3)													
Acenaphthylene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.017 U	0.09 U	0.009 U	0.09 U	0.009 U	0.009 U	0.009 U	0.09 U
Anthracene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.12 U	0.09 U	0.009 U	0.09 U	0.009 U	0.009 U	0.009 U	0.09 U
Benzo(a)Anthracene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.11 U	0.09 U	0.009 U	**0.14**	0.009 U	0.009 U	0.009 U	**0.19**
Benzo(a)Pyrene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.12 U	**0.15**	0.009 U	0.09 U	0.009 U	0.009 U	0.009 U	**0.6**
Benzo(b)Fluoranthene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.2 U	0.09 U	0.009 U	0.09 U	0.009 U	0.009 U	0.009 U	**0.61**
Benzo(ghi)Perylene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	**0.11** J	0.09 U	0.009 U	0.09 U	0.009 U	0.009 U	0.009 U	**0.42**
Benzo(k)Fluoranthene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	-	**0.09**	0.009 U	0.09 U	0.009 U	0.009 U	0.009 U	**0.36**
Bis(2-Ethylhexyl)Phthalate	EPA 8270C	mg/kg	0.06 U	0.06 U	0.06 U	0.11 U	0.6 U	0.06 U	0.6 U	0.06 U	0.06 U	0.06 U	0.6 U
Butylbenzyl Phthalate	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.11 U	0.09 U	0.009 U	0.09 U	0.009 U	0.009 U	0.009 U	0.09 U
Chrysene	EPA 8270C	mg/kg	0.006 U	**0.007**	0.006 U	0.11 U	**0.1**	0.006 U	**0.33**	0.006 U	0.006 U	0.006 U	**0.42**
Dibenzo(a,h)Anthracene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	**0.13** J	0.09 U	0.009 U	0.09 U	0.009 U	0.009 U	0.009 U	0.09 U
Diethyl Phthalate	EPA 8270C	mg/kg	**0.012**	**0.013**	**0.01**	0.022 U	**0.11**	**0.014** B	**0.2** B	**0.011**	**0.012**	**0.01**	0.09 U
Fluoranthene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.11 U	0.09 U	0.009 U	**0.19**	0.009 U	0.009 U	0.009 U	**0.22**
Fluorene	EPA 8270C	mg/kg	0.021 U	0.021 U	0.021 U	0.12 U	0.21 U	0.021 U	0.21 U	0.021 U	0.021 U	0.021 U	0.21 U
Indeno(1,2,3-cd)Pyrene	EPA 8270C	mg/kg	0.021 U	0.021 U	0.021 U	0.1 U	0.21 U	0.021 U	0.21 U	0.021 U	0.021 U	0.021 U	0.21 U
Naphthalene	EPA 8270C	mg/kg	0.021 U	0.021 U	0.021 U	0.047 U	0.21 U	0.021 U	0.21 U	0.021 U	0.021 U	0.021 U	0.21 U
Phenanthrene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.11 U	0.09 U	0.009 U	**0.14**	0.009 U	0.009 U	0.009 U	**0.17**
Pyrene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	**0.05** J	**0.11**	0.009 U	**0.25**	0.009 U,N	0.009 U	0.009 U	**0.33**
Polychlorinated Biphenyls(3)													
Aroclor 1254	EPA 8082	mg/kg	0.0027 U	0.0027 U	0.0027 U	0.033 U	0.0027 U	-	-	**0.011**	0.0027 U	0.0027 U	0.0027 U
Inorganics													
Formaldehyde	EPA 8315A	mg/kg	-	-	-	-	-	-	-	-	-	-	-
Metals													
Antimony	EPA 6010B	mg/kg	**5.09**	**8.2**	**5.25**	1 U	**2.02**	**4.95**	**1.27**	**6.9**	**3.08**	**5.61**	**1.41**
Arsenic	EPA 6010B	mg/kg	1.9 U	1.64 U	1.93 U	**3.4** J	**5.39**	2.02 U	1.87 U	1.81 U	1.61 U	1.83 U	1.62 U
Barium	EPA 6010B	mg/kg	**91.5**	**357**	**39.3**	**31**	**201**	**31.7**	**182**	**22.5**	**41.1**	**96**	**70.7**
Beryllium	EPA 6010B	mg/kg	0.019 U	**0.09**	0.0193 U	**0.093**	**0.335**	0.0202 U	**0.492**	0.0181 U	**0.265**	0.0183 U	**0.208**
Cadmium	EPA 6010B	mg/kg	0.0949 U	0.0818 U	0.0965 U	**0.24** J	0.0967 U	0.101 U	0.0935 U	0.0903 U	0.0806 U	0.0916 U	0.081 U
Chromium	EPA 6010B	mg/kg	**29.1**	**49.4**	**28**	**20**	**47.6**	**27.6**	**52.7**	**25.1**	**2.17**	**44.1**	**37.3**
Cobalt	EPA 6010B	mg/kg	**33.8**	**26.9**	**29.1**	**14**	**16.8**	**28.2**	**13.3**	**29.8**	**5.9**	**30.2**	**5.94**
Copper	EPA 6010B	mg/kg	**199**	**97.1**	**143**	**78**	**270**	**106**	**61.3**	**179**	**11.1**	**104**	**26.3**
Lead	EPA 6010B	mg/kg	0.949 U	0.818 U	**7.42**	**5.7**	**32.8**	1.01 U	**132**	0.903 U	**5.98**	0.916 U	**40.1**
Manganese	EPA 6010B	mg/kg	**720**	**746**	**621**	**370**	**680**	**642**	**446**	**682**	**777**	**603**	**305**
Mercury	EPA 7471	mg/kg	**0.16**	**0.27**	**0.13**	**0.075**	**0.1**	**0.12**	**0.65**	**0.18**	**0.35**	**0.16**	**0.096**
Molybdenum	EPA 6010B	mg/kg	**1.62**	**1.46**	**1.65**	0.42 U	**4.41**	**0.982**	**1.21**	**1.31**	**1.11**	**1.64**	**1.29**
Nickel	EPA 6010B	mg/kg	**17.9**	**23.1**	**17.8**	**13**	**42.3**	**17.6**	**47.3**	**15.5**	**0.578**	**21.2**	**31.4**
Selenium	EPA 6010B	mg/kg	**22.2**	**19**	**16.6**	1.6 U	**8.59**	**21.8**	**13.5**	**18.5**	**9.01**	**20.3**	**7.2**
Silver	EPA 6010B/7761	mg/kg	**0.04**	**0.04**	**0.05**	**0.1**	**0.08**	**0.04**	**0.12**	**0.05**	0.03 U	**0.04**	**0.08**
Thallium	EPA 6010B	mg/kg	**8.01**	**6.91**	**5.98**	0.95 U	**10.9**	**9.39**	**5.53**	**5.34**	**8.63**	**8.77**	**4.11**
Vanadium	EPA 6010B	mg/kg	**390**	**273**	**319**	**75**	**86.5**	**317**	**114**	**367**	**74.9**	**302**	**51.3**
Zinc	EPA 6010B	mg/kg	**30.1**	**38.7**	**46**	**31**	**184**	**33**	**112**	**28**	**112**	**27.4**	**78.4**

Notes:

(1)	United States Environmental Protection Agency, Region 9, Preliminary Remediation Goals (PRGs) protective of soil direct contact, 2004.
(2)	Field duplicate sample.
(3)	Only constituents detected in at least one sample listed, see laboratory report appendices for complete list of analytes and detection limits.
(4)	SF RWQCB Table B commercial/industrial ESL.
(CA Mod)	California-modified PRG.
119	Boldface type indicates constituent detected at concentration noted.
0.21	Concentration exceeding EPA Region 9 commercial/industrial direct contact PRG.
FID	Analysis by GC/FID.
U	Analyte not detected
J	Estimated value, quantitation does not meet SOP criteria
*	Laboratory Duplicate value outside of control limits
B	Analyte detected in method blank
T	Diesel/Gasoline pattern is atypical
-	Regulatory limit not established or sample not analyzed for this constituent.
N	Spike recovery outside of control limits

Table 1-8g

Heroic War Dead United States Army Reserve Center, Oakland, California
Remedial Investigation/Feasibility Study

Summary of November/December 2004 Site Inspection Building 1084 and Building 1101 Area Soil Sample Testing Results (continued)

			Hazardous Materials Storage Area					Diesel Spill			Building 1101		
Constituent	Analytical Method	Units	HMS-1	HMS-1	HMS-1	HMS-2	HMS-2	DS-3	DS-3	DS-3	1101-1	EPA Region 9 PRGs(1)	
Sample ID			HMS-1-1'-1	HMS-1-1'-3(2)	HMS-1-5'-1	HMS-2-1'-1	HMS-2-5'-1	DS-3-1'-1	DS-3-15'-1	DS-3-5'-1	1101-1'-1		
Sample Depth, ft			1		5	1	5	1	15	5	1	Residential	Commercial/ Industrial
Petroleum Hydrocarbons													
Gasoline	California LUFT ManualGC/MS	mg/kg	10 U	**0.028** J	10 U	10 U	10 U	10 U	10 U	10 U	10 U	100(4)	400(4)
Diesel	California LUFT Manual	mg/kg	**1.9**	**14** FID	**2.9**	**1.9**	**2.2**	**11**	**19**	**1.9**	2.7	500(4)	500(4)
Motor Oil	California LUFT Manual	mg/kg	100 U	-	100 U	100 U	100 U	100 U	100 U	100 U	100 U	500(4)	1000(4)
Volatile Organic Compounds(3)													
Acetone	EPA 8260B	mg/kg	1.5 U	**0.0055** J	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	14,127	54,321
Bromomethane	EPA 8260B	mg/kg	0.052 U	0.0019 U	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U	**0.052 U**	3.9	13.1
Iodomethane	EPA 8260B	mg/kg	0.12 U	-	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	0.12 U	-	-
Methylene Chloride	EPA 8260B	mg/kg	0.018 U	**0.0026** J	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	9.1	20.5
Chlorinated Pesticides(3)													
All Constituents	EPA 8081A	mg/kg	-	-	-	-	-	-	-	-	-	varies	varies
Semi-Volatile Organic Compounds(3)													
Acenaphthylene	EPA 8270C	mg/kg	0.09 U	0.017 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	-	-
Anthracene	EPA 8270C	mg/kg	0.09 U	0.12 U	**0.025**	0.009 U	0.009 U	0.009 U	**0.013**	0.009 U	**0.009**	21,896	100,000
Benzo(a)Anthracene	EPA 8270C	mg/kg	**0.39**	**0.21** J	**0.04**	0.009 U	**0.009**	**0.039**	**0.067**	**0.013**	**0.043**	0.6	2.1
Benzo(a)Pyrene	EPA 8270C	mg/kg	**1.5**	**0.47**	**0.071**	**0.011**	**0.023**	0.009 U	**0.13**	**0.032**	**0.05**	**0.06**	**0.21**
Benzo(b)Fluoranthene	EPA 8270C	mg/kg	**2.2**	0.2 U	**0.036**	**0.013**	**0.018**	0.009 U	**0.12**	**0.028**	**0.046**	**0.38**	**1.28**
Benzo(ghi)Perylene	EPA 8270C	mg/kg	**2.4**	**0.55**	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	-	-
Benzo(k)Fluoranthene	EPA 8270C	mg/kg	**0.93**	-	**0.047**	0.009 U	**0.014**	0.009 U	**0.046**	**0.038**	0.049	0.38(CA Mod)	1.3(CA Mod)
Bis(2-Ethylhexyl)Phthalate	EPA 8270C	mg/kg	0.6 U	0.11 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06	35	123
Butylbenzyl Phthalate	EPA 8270C	mg/kg	0.09 U	0.11 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	**0.012**	0.019	12,221	100,000
Chrysene	EPA 8270C	mg/kg	**0.93**	**0.39**	**0.075**	**0.013**	**0.019**	**0.099**	**0.11**	**0.023**	0.09	3.8(CA Mod)	13(CA Mod)
Dibenzo(a,h)Anthracene	EPA 8270C	mg/kg	**0.38**	**0.22** J	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.009 U	0.06	**0.21**
Diethyl Phthalate	EPA 8270C	mg/kg	0.09 U	0.022 U	**0.012**	**0.012**	**0.01**	**0.017** B	**0.026** B	**0.019** B	**0.01**	48,882	100,000
Fluoranthene	EPA 8270C	mg/kg	**0.22**	**0.11** J	**0.075**	0.009 U	**0.018**	**0.067**	**0.1**	**0.019**	0.085	2,294	22,000
Fluorene	EPA 8270C	mg/kg	0.21 U	0.12 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	2,747	26,281
Indeno(1,2,3-cd)Pyrene	EPA 8270C	mg/kg	**2.1**	**0.46**	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.6	2.1
Naphthalene	EPA 8270C	mg/kg	0.21 U	0.047 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	0.021 U	1.7(CA Mod)	4.2(CA Mod)
Phenanthrene	EPA 8270C	mg/kg	0.09 U	0.11 U	**0.039**	0.009 U	**0.012**	0.009 U	**0.059**	**0.01**	**0.084**	-	-
Pyrene	EPA 8270C	mg/kg	**0.34**	**0.15** J	**0.12**	**0.011**	**0.03** N	**0.14**	**0.33**	**0.046**	**0.068**	2,316	29,126
Polychlorinated Biphenyls(3)													
Aroclor 1254	EPA 8082	mg/kg	0.0027 U	0.033 U	0.0027 U	0.0027 U	0.0027 U	-	0.0027 U	-	0.0027 U	0.05	0.19
Inorganics													
Formaldehyde	EPA 8315A	mg/kg	-	-	-	-	-	-	-	-	**5.2**	9,166	100,000
Metals													
Antimony	EPA 6010B	mg/kg	**1.38**	**1.3** J	**1.22**	**4.4**	**1.95**	**6.83**	**3.57**	**4.26**	**6** *	31	410
Arsenic	EPA 6010B	mg/kg	1.87 U	**4.7** J	1.54 U	2 U	1.62 U	1.7 U	**3.66**	1.71 U	1.93 U	0.06(CA Mod)	**0.25(CA Mod)**
Barium	EPA 6010B	mg/kg	**64.5**	**120**	**91.2**	**111**	**171**	**79.8**	**44.9**	**68**	**92**	5,400	67,000
Beryllium	EPA 6010B	mg/kg	**0.201**	**0.4**	**0.419**	0.02 U	**0.49**	0.017 U	**0.296**	**0.295**	**0.386**	150	1,900
Cadmium	EPA 6010B	mg/kg	0.0936 U	**0.48** J	0.0772 U	0.0998 U	0.0808 U	0.0852 U	**0.156**	0.0856 U	0.0965 U	37	450
Chromium	EPA 6010B	mg/kg	**27** *	**33**	**56.7**	**31.9**	**62.8**	**30.1**	**47.6**	**67**	**25.6**	210	450
Cobalt	EPA 6010B	mg/kg	**6.68**	**9**	**10.5**	**28.5**	**15.5**	**19.8**	**9**	**10.7**	**8.07**	900	1,900
Copper	EPA 6010B	mg/kg	**26.4**	**18**	**16.7**	**129**	**23**	**110**	**27.6**	**11.2**	**19.2**	3,100	41,000
Lead	EPA 6010B	mg/kg	**11.5** *	**14**	**6.32**	**4.99**	**11.2**	**13.6**	**44.1**	**8.48**	**27.3**	150(CA Mod)	800
Manganese	EPA 6010B	mg/kg	**429**	**240**	**379**	**656**	**341**	**607**	**167**	**253**	**1020** *,N	1,762	19,458
Mercury	EPA 7471	mg/kg	**0.044**	**0.13**	**0.05**	**0.21**	**0.059**	**0.15**	**0.82**	**0.11**	**0.29**	23	310
Molybdenum	EPA 6010B	mg/kg	**2.63**	**0.82** J	**1.97**	**1.8**	**1.46**	**1.15**	**0.912**	**1.16**	**1.32**	390	5,100
Nickel	EPA 6010B	mg/kg	**20.7**	**49**	**46.5**	**22**	**66.8**	**20.6**	**42.2**	**51.7**	**20.6**	1,600	20,000
Selenium	EPA 6010B	mg/kg	**8.44** *	1.6 U	**9.04**	**18.7**	**9.79**	**21.9**	**10.1**	**10.4**	**6.67**	390	5,100
Silver	EPA 6010B/7761	mg/kg	**0.03**	**0.036** J	**0.06**	**0.05**	**0.06**	**0.08**	**0.34**	**0.06**	**0.06**	390	5,100
Thallium	EPA 6010B	mg/kg	**3.95**	0.95 U	**4.34**	**8.43**	3.23 U	**5.51**	**4.99**	3.42 U	3.86 U	5.2	67
Vanadium	EPA 6010B	mg/kg	**75.7**	**31**	**115**	**285**	**106**	**268**	**79.9**	**99.7**	**78**	78	1,000
Zinc	EPA 6010B	mg/kg	**43**	**42**	**53.3**	**36.1**	**68.9**	**67.4**	**111**	**51.2**	**149** *	23,000	100,000

Notes:

(1)	United States Environmental Protection Agency, Region 9, Preliminary Remediation Goals (PRGs) protective of soil direct contact, 2004.
(2)	Field duplicate sample.
(3)	Only constituents detected in at least one sample listed, see laboratory report appendices for complete list of analytes and detection limits.
(4)	SF RWQCB Table B commercial/industrial ESL.
(CA Mod)	California-modified PRG.
119	Boldface type indicates constituent detected at concentration noted.
0.21	Concentration exceeding EPA Region 9 commercial/industrial direct contact PRG.
FID	Analysis by GC/FID.
U	Analyte not detected
J	Estimated value, quantitation does not meet SOP criteria
*	Laboratory Duplicate value outside of control limits
B	Analyte detected in method blank
T	Diesel/Gasoline pattern is atypical
-	Regulatory limit not established or sample not analyzed for this constituent.
N	Spike recovery outside of control limits

Table 1-8h

Heroic War Dead United States Army Reserve Center, Oakland, California
Remedial Investigation/Feasibility Study

Summary of November/December 2004 Site Inspection Utility Alignment Boring Soil Sampling Results

Constituent		Units	UT-1	UT-3	UT-4	UT-5		UT-6		UT-7
Sample ID			UT-1-9'-1	UT-3-9'-1	UT-4-9'-1	UT-5-9'-1	UT-5-9'-3(2)	UT-6-9'-1	UT-6-9'-3(2)	UT-7-9'-1
Sample Depth, ft	Analytical Method		9	9	9	9		9		9
Petroleum Hydrocarbons										
Gasoline	California LUFT ManualGC/MS	mg/kg	10 U	10 U	10 U	10 U	**0.043** J,HT04	10 U	0.016 U	10 U
Diesel	California LUFT ManualGC/MS	mg/kg	**11**	**6.8** T	**6.2** T	**38** T	**260** FID	**6.6**	**73** FID	**6.8** T
Motor Oil	California LUFT ManualGC/MS	mg/kg	100 U	100 U	100 U	1000 U	-	100 U	-	100 U
Volatile Organic Compounds(3)										
2-Butanone	EPA 8260B	mg/kg	0.75 U	0.75 U	0.75 U	0.75 U	0.0017 U	0.75 U	**0.006** J	0.75 U
Acetone	EPA 8260B	mg/kg	1.5 U	1.5 U	1.5 U	1.5 U	**0.039** J	1.5 U	**0.037** J	1.5 U
Bromomethane	EPA 8260B	mg/kg	0.052 U	**0.58** B	**0.49** B	**0.62** B	0.0019 U	0.052 U	0.0019 U	**0.52** B
Carbon Disulfide	EPA 8260B	mg/kg	0.025 U	0.025 U	0.025 U	0.025 U	0.002 U	0.025 U	0.002 U	0.025 U
Iodomethane	EPA 8260B	mg/kg	0.12 U	**0.76** B	**0.59** B	**1** B	-	0.12 U	-	**0.77** B
Methylene Chloride	EPA 8260B	mg/kg	0.018 U	0.018 U	0.018 U	0.018 U	**0.0023** J	0.018 U	0.00023 U	0.018 U
Naphthalene	EPA 8260B	mg/kg	0.025 U	0.025 U	0.025 U	0.025 U	0.0014 U	0.025 U	0.0014 U	0.025 U
Semi-Volatile Organic Compounds(3)										
2,4-Dinitrotoluene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.09 U	0.018 U	0.009 U	0.018 U	0.009 U
2-Cresol	EPA 8270C	mg/kg	0.021 U	0.021 U	0.021 U	0.21 U	0.027 U	0.021 U	0.027 U	0.021 U
2-Methylnaphthalene	EPA 8270C	mg/kg	0.03 U	0.03 U	0.03 U	0.3 U	0.028 U	0.03 U	0.028 U	0.03 U
3-,4-Methylphenol	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.09 U	-	0.009 U	-	0.009 U
4-Nitrophenol	EPA 8270C	mg/kg	0.21 U	0.21 U	0.21 U	2.1 U,N	0.021 U	0.21 U	0.021 U	0.21 U
Acenaphthene	EPA 8270C	mg/kg	0.021 U	0.021 U	**0.03**	0.21 U	0.018 U	0.021 U	0.018 U	0.021 U
Acenaphthylene	EPA 8270C	mg/kg	0.009 U	0.009 U	**0.1**	0.09 U	0.017 U	0.009 U	0.017 U	0.009 U
Anthracene	EPA 8270C	mg/kg	**0.033**	**0.015**	**0.21**	0.09 U	0.12 U	**0.033**	0.12 U	**0.018**
Benzo(a)Anthracene	EPA 8270C	mg/kg	**0.21**	**0.081**	**1.3**	0.31	0.11 U	**0.14**	0.11 U	**0.13**
Benzo(a)Pyrene	EPA 8270C	mg/kg	**0.81**	**0.22**	**2.9**	**1.3**	**0.23** J	**0.32**	**0.18** J	**0.26**
Benzo(b)Fluoranthene	EPA 8270C	mg/kg	**0.57**	**0.22**	**2**	**1**	0.2 U	**0.27**	0.2 U	**0.28**
Benzo(ghi)Perylene	EPA 8270C	mg/kg	**0.63**	**0.067**	**1**	**0.8**	**0.26** J	**0.41**	**0.21** J	**0.13**
Benzo(k)Fluoranthene	EPA 8270C	mg/kg	**0.56**	**0.17**	**1.9**	**0.44**	-	**0.23**	-	**0.21**
Bis(2-Ethylhexyl)Phthala	EPA 8270C	mg/kg	0.06 U	**0.06**	0.06 U	0.6 U	0.11 U	0.06 U	0.11 U	0.06 U
Butylbenzyl Phthalate	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.09 U	0.11 U	0.009 U	0.11 U	0.009 U
Chrysene	EPA 8270C	mg/kg	**0.37**	**0.13**	**1.7**	**0.61**	**0.12** J	**0.22**	**0.12** J	**0.18**
Dibenzo(a,h)Anthracene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.094	0.09 U	0.096 U	0.009 U	0.096 U	0.009 U
Dibenzofuran	EPA 8270C	mg/kg	0.03 U	0.03 U	0.03 U	0.3 U	0.13 U	0.03 U	0.13 U	0.03 U
Diethyl Phthalate	EPA 8270C	mg/kg	**0.023** B	0.009 U	0.009 U	**2.2**	0.022 U	**0.016**	0.022 U	0.009 U
Fluoranthene	EPA 8270C	mg/kg	**0.4**	**0.22**	**2.9**	**0.65**	**0.22** J	**0.27**	0.17 J	**0.26**
Fluorene	EPA 8270C	mg/kg	0.021 U	0.021 U	0.033	0.21 U	0.12 U	0.021 U	0.12 U	0.021 U
Indeno(1,2,3-cd)Pyrene	EPA 8270C	mg/kg	**0.5**	**0.046**	**0.77**	**0.35**	**0.17** J	**0.28**	0.15 J	**0.099**
Naphthalene	EPA 8270C	mg/kg	**0.047**	**0.027**	**0.18**	0.21 U	0.047 U	0.021 U	0.047 U	**0.026**
Phenanthrene	EPA 8270C	mg/kg	**0.13**	**0.054**	**0.59**	**0.18**	0.11 U	**0.11**	0.11 U	**0.078**
Pyrene	EPA 8270C	mg/kg	**1.9**	**0.6** N	**8**	**2.1** N	**0.52**	**0.77**	**0.43**	**0.57**
Metals										
Antimony	EPA 6010B	mg/kg	**7.64**	**7.94**	**6.44**	**7.86** *	**1.3** J	**8.02**	**1.2** J	**7.29**
Arsenic	EPA 6010B	mg/kg	2 U	1.79 U	1.72 U	1.96 U,*	**7** J	1.8 U	**7.1** J	1.76 U
Barium	EPA 6010B	mg/kg	**67.1**	**77.7**	**45.8**	**67.3**	**41**	**85.1**	**39**	**368**
Beryllium	EPA 6010B	mg/kg	**0.477**	**0.471**	**0.356**	**0.328**	**0.35**	**0.527**	**0.27**	**0.361**
Cadmium	EPA 6010B	mg/kg	0.1 U	0.0894 U	0.0861 U	0.0982 U	0.37 J	0.0898 U	0.21 U	0.0879 U
Chromium	EPA 6010B	mg/kg	**78.8**	**80.1**	**57.6**	**67.9**	**42**	**86.4**	**43**	**51.8**
Cobalt	EPA 6010B	mg/kg	**10.4**	**11.7**	**10.5**	**8.91**	**6.9**	**14.1**	**4.8**	**10.2**
Copper	EPA 6010B	mg/kg	**26.7**	**32.4**	**28.9**	**32.3**	**30**	**36.4**	**22**	**69.2**
Lead	EPA 6010B	mg/kg	**25.6**	**27.1**	**21.7**	**98.4**	**26**	**42.8**	**30**	**172**
Manganese	EPA 6010B	mg/kg	**194**	**272**	**315**	**201**	**220**	**225**	**160**	**488**
Mercury	EPA 7471	mg/kg	**0.31**	**0.34**	**0.27**	**0.32**	**0.25**	**0.37**	**0.24**	**0.21**
Molybdenum	EPA 6010B	mg/kg	0.9 U	**1.36**	**1**	**2.54**	**0.83** J	**2.01**	**0.75** J	**1.53**
Nickel	EPA 6010B	mg/kg	**65**	**64.1**	**54.6**	**51.1**	**40**	**72.5**	**34**	**40**
Selenium	EPA 6010B	mg/kg	**16.5**	**12.8**	**15.3**	**5.71**	1.6 U	**18**	1.8 U	**13.5**
Silver	EPA 6010B/7761	mg/kg	**0.14**	**0.19**	**0.13**	**0.25**	0.072 U	1.8 U	0.082 U	1.76 U
Thallium	EPA 6010B	mg/kg	4 U	3.58 U	3.44 U	3.93 U	0.96 U	**4.65**	1.1 U	3.52 U
Vanadium	EPA 6010B	mg/kg	**145**	**64.9**	**45.8**	**127**	**36**	**151**	**36**	**56.8**
Zinc	EPA 6010B	mg/kg	**76.1**	**85.1**	**73.7**	**73.8**	**69**	**94.7**	**42**	**231**

Notes:

(1)	United States Environmental Protection Agency, Region 9, Preliminary Remediation Goals (PRGs) protective of soil direct contact, 2004.
(2)	Field duplicate sample result.
(3)	Only constituents detected in at least one sample listed, see laboratory report appendices for complete list of analytes and detection limits.
(4)	SF RWQCB Table B commercial/industrial ESL.
(CA Mod)	California-modified PRG.
119	Boldface type indicates constituent detected at concentration noted.
0.21	Concentration exceeding EPA Region 9 commercial/industrial direct contact PRG.
U	Analyte not detected.
J	Estimated value, quantitation does not meet SOP criteria
FID	Petroleum Hydrocarbon analysis by EPA Method 8015 GC/FID.
*	Laboratory Duplicate value outside of control limits
B	Analyte detected in method blank
T	Diesel/Gasoline pattern is atypical
-	Regulatory limit not established or sample not analyzed for this constituent.
N	Spike recovery outside of control limits
R	Spike out of calibration range.

Table 1-8h

Heroic War Dead United States Army Reserve Center, Oakland, California
Remedial Investigation/Feasibility Study

Summary of November/December 2004 Site Inspection Utility Alignment Boring Soil Sampling Results (continued)

Constituent		Units	UT-8	UT-9	UT-10	UT-11	UT-12	UT-13	UT-14	EPA Region 9 PRGs(1)	
Sample ID			UT-8-9'-1	UT-9-9'-1	UT-10-9'-1	UT-11-9'-1	UT-12-9'-1	UT-13-9'-1	UT-14-9'-1		
Sample Depth, ft	Analytical Method		9	9	9	9	9	9	9	Residential	Commercial/ Industrial
Petroleum Hydrocarbons											
Gasoline	California LUFT ManualGC/MS	mg/kg	10 U	10 U	10 U	10 U	10 U	10 U	10 U	100(4)	400(4)
Diesel	California LUFT ManualGC/MS	mg/kg	**2.4**	**190**	**6**	**8.8**	**4.7**	**5**	**65**	500(4)	500(4)
Motor Oil	California LUFT ManualGC/MS	mg/kg	100 U	**380**	100 U	100 U	100 U	100 U	**330** T	500(4)	1000(4)
Volatile Organic Compounds(3)											
2-Butanone	EPA 8260B	mg/kg	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	22311	113264
Acetone	EPA 8260B	mg/kg	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U,N	1.5 U	1.5 U	14127	54321
Bromomethane	EPA 8260B	mg/kg	0.052 U	**0.54** B	0.052 U	**0.65** B	0.052 U,N	0.052 U	**0.72** B	3.9	13.1
Carbon Disulfide	EPA 8260B	mg/kg	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	355	720
Iodomethane	EPA 8260B	mg/kg	0.12 U	**0.66** B	0.12 U	**0.92** B	0.12 U	0.12 U	**0.88** B	-	-
Methylene Chloride	EPA 8260B	mg/kg	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	0.018 U	9.1	20.5
Naphthalene	EPA 8260B	mg/kg	0.025 U	**12**	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	1.7(CA Mod)	**4.2(CA Mod)**
Semi-Volatile Organic Compounds(3)											
2,4-Dinitrotoluene	EPA 8270C	mg/kg	0.009 U	**0.65**	0.009 U	0.009 U	0.009 U	0.009 U	-	122	1231
2-Cresol	EPA 8270C	mg/kg	0.021 U	**0.051**	0.021 U	0.021 U	0.021 U	0.021 U	-	-	-
2-Methylnaphthalene	EPA 8270C	mg/kg	0.03 U	**1.1**	0.03 U	0.03 U	0.03 U	0.03 U	-	-	-
3-,4-Methylphenol	EPA 8270C	mg/kg	0.009 U	**0.014**	0.009 U	0.009 U	0.009 U	0.009 U	-	61	616
4-Nitrophenol	EPA 8270C	mg/kg	0.21 U	**0.26**	0.21 U	0.21 U	0.21 U,N	0.21 U	-	-	-
Acenaphthene	EPA 8270C	mg/kg	0.021 U	**0.99**	0.021 U	0.021 U	0.021 U	0.021 U	-	3682	29219
Acenaphthylene	EPA 8270C	mg/kg	0.009 U	0.009 U	0.009 U	0.009 U	**0.02**	**0.036**	-	-	-
Anthracene	EPA 8270C	mg/kg	0.009 U	**0.3**	**0.037**	**0.014**	**0.061**	**0.11**	-	21896	100000
Benzo(a)Anthracene	EPA 8270C	mg/kg	0.009 U	**0.41**	**0.13**	**0.071**	**0.3**	**0.45**	-	0.62	2.1
Benzo(a)Pyrene	EPA 8270C	mg/kg	0.009 U	**0.26**	**0.46**	**0.2**	**1.3**	**1.9**	-	0.06	**0.21**
Benzo(b)Fluoranthene	EPA 8270C	mg/kg	0.009 U	**0.32**	**0.35**	**0.16**	**0.88**	**1.5**	-	0.38	**1.28**
Benzo(ghi)Perylene	EPA 8270C	mg/kg	0.009 U	**0.16**	**0.39**	**0.064**	**0.99**	**1.5**	-	-	-
Benzo(k)Fluoranthene	EPA 8270C	mg/kg	0.009 U	**0.22**	**0.29**	**0.14**	**0.82**	**1**	-	0.38(CA Mod)	**1.3(CA Mod)**
Bis(2-Ethylhexyl)Phthala	EPA 8270C	mg/kg	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	**0.15**	-	35	123
Butylbenzyl Phthalate	EPA 8270C	mg/kg	**0.012**	**0.028**	0.009 U	0.009 U	0.009 U	0.009 U	-	12221	100000
Chrysene	EPA 8270C	mg/kg	**0.015**	0.006 U	**0.18**	**0.1**	**0.51**	**0.68**	-	3.8(CA Mod)	13(CA Mod)
Dibenzo(a,h)Anthracene	EPA 8270C	mg/kg	0.009 U	**0.018**	0.009 U	0.009 U	**0.05**	**0.12**	-	0.06	0.21
Dibenzofuran	EPA 8270C	mg/kg	0.03 U	**0.58**	0.03 U	0.03 U	0.03 U	0.03 U	-	145	1563
Diethyl Phthalate	EPA 8270C	mg/kg	**0.016** B	0.009 U	**0.02** B	0.009 U	**0.02** B	**0.02** B	-	48882	100000
Fluoranthene	EPA 8270C	mg/kg	0.009 U	**1.6**	**0.27**	**0.14**	**0.65**	**1**	-	2294	22000
Fluorene	EPA 8270C	mg/kg	0.021 U	**0.67**	0.021 U	0.021 U	0.021 U	**0.027**	-	2747	26281
Indeno(1,2,3-cd)Pyrene	EPA 8270C	mg/kg	0.021 U	**0.11**	**0.26**	**0.043**	**0.79**	**1.2**	-	0.62	2.1
Naphthalene	EPA 8270C	mg/kg	0.021 U	**8.7**	**0.027**	0.021 U	**0.066**	**0.12**	-	1.7(CA Mod)	**4.2(CA Mod)**
Phenanthrene	EPA 8270C	mg/kg	0.009 U	**1.6**	**0.08**	**0.034**	**0.16**	**0.28**	-	-	-
Pyrene	EPA 8270C	mg/kg	**0.016**	**1.2**	**1.1**	**0.5**	**2.9** N	**4.3**	-	2316	29126
Metals											
Antimony	EPA 6010B	mg/kg	**4.61**	**127**	**5.08**	**7.12**	**5.86** *	**9.44**	**4.76**	31	410
Arsenic	EPA 6010B	mg/kg	1.95 U	**13.7**	**3.4**	1.66 U	1.94 U,*	2.07 U	1.81 U	0.06(CA Mod)	**0.25(CA Mod)**
Barium	EPA 6010B	mg/kg	**44.4**	**267** *	**50.5**	**58.7**	**54** *	**65.3**	**44.3**	5400	67000
Beryllium	EPA 6010B	mg/kg	**0.26**	**0.199** *	**0.419**	**0.403**	**0.421**	**0.485**	**0.341**	150	1900
Cadmium	EPA 6010B	mg/kg	0.0977 U	**10.3**	0.11 U	0.0831 U	0.0971 U	0.104 U	0.0906 U	37	450
Chromium	EPA 6010B	mg/kg	**5.93**	**93.1**	**71.8**	**72.4**	**68.3**	**79.9**	**65.4**	210	450
Cobalt	EPA 6010B	mg/kg	**3.42**	**19.8**	**11.8**	**12.3**	**11.6**	**12.4**	**12.1**	900	1900
Copper	EPA 6010B	mg/kg	**1.98**	**3,640** *,N,R	**30.2**	**28.6**	**30.7**	**28.7**	**22.3**	3100	41000
Lead	EPA 6010B	mg/kg	**8.16**	**4,730** N,R	**30.5**	**23.5**	**24.5**	**34**	**8.09**	150(CA MOD)	**800**
Manganese	EPA 6010B	mg/kg	**649**	**32,500** N,R	**397**	**253**	**302**	**300**	**261**	1762	**19458**
Mercury	EPA 7471	mg/kg	**0.3**	**0.078**	**0.37**	**0.31**	**0.27**	**0.29**	**0.77**	23	310
Molybdenum	EPA 6010B	mg/kg	0.879 U	**11.2**	**1.64**	**1.42**	**1.88**	**1.54**	**2.19**	390	5100
Nickel	EPA 6010B	mg/kg	**2.83**	**117**	**65.5**	**62.3**	**62.9**	**74.2**	**58.3**	1600	20000
Selenium	EPA 6010B	mg/kg	**10.4**	**94.5**	**11.8**	**12.9**	**16.1**	**9.99**	**12.1**	390	5100
Silver	EPA 6010B/7761	mg/kg	0.03 U	9.51 U	**0.25**	1.66 U	**0.18**	**0.19**	**0.15**	390	5100
Thallium	EPA 6010B	mg/kg	5.31	19 U	**8.82**	3.32 U	**6.78**	**5.09**	3.62 U	5.2	67
Vanadium	EPA 6010B	mg/kg	**51.7**	**171**	**126**	**61.2**	**123** *	**139**	**51.3**	78	1000
Zinc	EPA 6010B	mg/kg	**92.2**	**32,400** N,R	**101**	**81.8**	**93.4**	**104**	**63.6**	23000	100000

Notes:

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FID	Petroleum Hydrocarbon analysis by EPA Method 8015 GC/FID.
*	Laboratory Duplicate value outside of control limits
B	Analyte detected in method blank
T	Diesel/Gasoline pattern is atypical
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N	Spike recovery outside of control limits
R	Spike out of calibration range.

Table 1-8i

Heroic War Dead United States Army Reserve Center, Oakland, California
Remedial Investigation/Feasibility Study

Summary of November/December 2004 Site Inspection Groundwater Analytical Testing Results

Method	Analyte	Units	Building 1101					Engineer Road Diesel Spill Area	Building 1084 Trench System			Former Vehicle Grease Rack			Hazardous Material Storage Area		
Exploration			1101-2	1101-3		1101-4	Unknown Vault	DS-3	VR-1	VR-2	VR-3	GR-1	GR-2		HMS-1		HMS-2
Sample ID			1101-2-W-1	1101-3-W-1	1101-3-W-3(3)	1101-4-W-1	UV-1-1	DS-3-W-1	VR1-W-1	VR-2-W-1	VR-3-W-1	GR1-W-1	GR2-W-1	GR2-W-3(3)	HMS-1-W-1	HMS-1-W-3(3)	HMS-2-W-1
Date Sampled																	
	Petroleum Hydrocarbons																
8015B	Gasoline Range Organics	ug/L	10 U	10 U	**18** J	10 U	10 U	-	10 U	10 U	10 U	10 U	10 U	**16** CC05	10 U	**28** J	10 U
8015B	Diesel Range Organics	ug/L	**32** T	**30**	**850** FID	**17** T	**11** T	-	**35** T	**53**	**200**	**21** T	**120**	**1,800** FID	**18**	**400**	**7.5** T
8015B	Motor Oil Composite (C21-C32)	ug/L	650 U	650 U	-	650 U	650 U	-	650 U	650 U	650 U	650 U	650 U	-	650 U	-	650 U
	Volatile Organic Compounds[4]																
8260B	Acetone	ug/l	60 U	60 U	1.9 U	60 U	60 U,N	-	60 U	60 U	60 U	60 U,N	60 U	1.9 U	60 U	1.9 U	60 U
8260B	Benzene	ug/l	0.5 U	0.5 U	**0.19** J	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.96** J	0.5 U	0.1 U	0.5 U
8260B	Ethyl Benzene	ug/l	0.8 U	0.8 U	**0.38** J	0.8 U	0.8 U	-	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.1 U	0.8 U	0.1 U	0.8 U
8260B	O-Xylene	ug/l	1.1 U	1.1 U	**0.43** J	1.1 U	1.1 U	-	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0.1 U	1.1 U	0.1 U	1.1 U
8260B	Carbon Disulfide	ug/l	1 U	1 U	**2.5** J	1 U	1 U,N	-	1 U	1 U	1 U	1 U	1 U	2.4 U	1 U	**2.4** J	1 U
8260B	Chloromethane	ug/l	1 U	1 U	0.15 U	1 U	1 U	-	1 U	1 U	1 U	1 U,N	1 U	**0.34** J	1 U	0.15 U	1 U
8260B	Naphthalene	ug/l	1 U	1 U	0.09 U	1 U	1 U	-	1 U	1 U	1 U	1 U	1 U	**0.25** J	1 U	0.09 U	1 U
8260B	1,1,1-Trichloroethane	ug/l	0.8 U	0.8 U	0.11 U	0.8 U	0.8 U	-	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.11 U	0.8 U	0.11 U	0.8 U
8260B	1,1-Dichloroethane	ug/l	0.7 U	0.7 U	0.08 U	0.7 U	0.7 U	-	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.08 U	0.7 U	0.08 U	0.7 U
8260B	Tetrachloroethene	ug/l	1.1 U	1.1 U	0.11 U	1.1 U	1.1 U	-	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0.11 U	1.1 U	0.11 U	1.1 U
8260B	Trichloroethene	ug/l	0.5 U	0.5 U	0.09 U	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.09 U	0.5 U	0.09 U	0.5 U
8260B	Cis-1,2-Dichloroethene	ug/l	0.5 U	0.5 U	**0.14** J	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.23** J	0.5 U	0.09 U	0.5 U
8260B	Trans-1,2-Dichloroethene	ug/l	1.4 U	1.4 U	0.12 U	1.4 U	1.4 U	-	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	0.12 U	1.4 U	0.12 U	1.4 U
	Chlorinated Pesticides[4]																
EPA 8081A	4,4'-DDE	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPA 8081A	Aldrin	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPA 8081A	Alpha Bhc	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPA 8081A	Chlorothalonil	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPA 8081A	Dieldrin	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPA 8081A	Endrin	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPA 8081A	Endrin Aldehyde	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPA 8081A	Gamma Bhc	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPA 8081A	Heptachlor	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPA 8081A	Heptachlor Epoxide	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EPA 8081A	Methoxychlor	ug/l	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Semi-Volatile Organic Compounds[4]																
EPA 8270C	2-Methylnaphthalene	ug/l	0.38 U	0.38 U	1.3 U	0.38 U	0.38 U	-	4 U	8 U	2 U	2.7 U	0.4 U	1.3 U	0.41 U	1.3 U	0.42 U
EPA 8270C	3-,4-Methylphenol	ug/l	0.094 U	0.094 U	-	0.094 U	0.094 U	-	1 U	2 U	0.5 U	0.67 U	0.099 U	-	0.1 U	-	0.1 U
EPA 8270C	2,4-Dinitrotoluene	ug/l	0.094 U	0.094 U	**2.9** J	0.094 U	0.094 U	-	1 U	2 U	0.5 U	0.67 U	0.099 U	0.78 U	0.1 U	0.78 U	0.1 U
EPA 8270C	Acenaphthene	ug/l	**0.98**	0.19 U	**3.1** J	0.19 U	0.19 U	-	2 U	4 U	1 U	1.3 U	0.2 U	1.1 U	0.2 U	1.1 U	0.21 U
EPA 8270C	Anthracene	ug/l	0.094 U	0.094 U	0.57 U	0.094 U	0.094 U	-	1 U	2 U	0.5 U	0.67 U	0.099 U	0.57 U	0.1 U	0.57 U	0.1 U
EPA 8270C	Benzo(a)Anthracene	ug/l	0.094 U	0.094 U	0.42 U	0.094 U	0.094 U	-	1 U	2 U	0.5 U	0.67 U	0.099 U	0.42 U	**0.24**	0.42 U	**0.11**
EPA 8270C	Benzo(a)Pyrene	ug/l	0.094 U	0.094 U	0.83 U	0.094 U	0.094 U	-	1 U	2 U	0.5 U	0.67 U	0.099 U	0.83 U	0.1 U	0.83 U	0.1 U
EPA 8270C	Benzo(b)Fluoranthene	ug/l	0.094 U	0.094 U	1.1 U	0.094 U	0.094 U	-	1 U	2 U	0.5 U	0.67 U	0.099 U	1.1 U	**0.74**	1.1 U	0.1 U
EPA 8270C	Benzo(k)Fluoranthene	ug/l	0.094 U	0.094 U	-	0.094 U	0.094 U	-	1 U	2 U	0.5 U	0.67 U	0.099 U	-	**0.3**	-	0.1 U
EPA 8270C	Benzo(Ghi)Perylene	ug/l	0.094 U	0.094 U	0.61 U	0.094 U	0.094 U	-	1 U	2 U	0.5 U	0.67 U	0.099 U	0.61 U	**0.42**	0.61 U	0.1 U
EPA 8270C	Benzoic Acid	ug/l	0.94 U	0.94 U	3.7 U	0.94 U	0.94 U	-	10 U	20 U	9.2	6.7 U	0.99 U	**6.1** J	1 U	3.7 U	**1**
EPA 8270C	Bis(2-Ethylhexyl)Phthalate	ug/l	**3.3** B	0.47 U	2.7 U	**0.96** B	**0.54** B	-	5 U	**13** B	**3.8** B	**3.8** B	**0.74** B	2.7 U	**0.64** B	2.7 U	**0.62** B
EPA 8270C	Butylbenzyl Phthalate	ug/l	**0.34** B	**0.17** B	2.6 U	**0.25** B	**0.12** B	-	1 U	2 U	1.2	0.67 U	**0.2**	2.6 U	**0.16**	2.6 U	**0.14**
EPA 8270C	Chrysene	ug/l	0.047 U	0.047 U	0.43 U	0.047 U	0.047 U	-	0.5 U	1 U	0.25 U	0.33 U	0.05 U	0.43 U	**0.5**	0.43 U	**0.18**
EPA 8270C	Dibenzofuran	ug/l	0.28 U	0.28 U	1.1 U	0.28 U	0.28 U	-	3 U	6 U	1.5 U	2 U	0.3 U	1.1 U	0.31 U	1.1 U	0.31 U
EPA 8270C	Diethyl Phthalate	ug/l	**0.45** B	**0.49** B	0.4 U	0.53 B	**0.094**	-	**4.6** B	**7.2** B	**2** B	**2.5** B	**0.46** B	0.4 U	**0.47** B	0.4 U	**0.52** B
EPA 8270C	Di-N-Butyl Phthalate	ug/l	**0.25** B	0.19 U	1.1 U	0.26 B	0.19 U	-	2 U	4 U	1 U	1.3 U	0.2 U	1.1 U	0.2 U	1.1 U	0.21 U
EPA 8270C	Di-N-Octyl Phthalate	ug/l	0.094 U	0.094 U	0.77 U	0.094 U	0.094 U	-	1 U	2 U	**0.65**	0.67 U	0.099 U	0.77 U	0.1 U	0.77 U	0.1 U
EPA 8270C	Fluoranthene	ug/l	0.094 U	0.094 U	0.42 U	**0.094**	0.094 U	-	1 U	2 U	0.5 U	0.67 U	0.099 U	0.42 U	**0.32**	0.42 U	0.1 U
EPA 8270C	Fluorene	ug/l	0.19 U	0.19 U	0.99 J	0.19 U	0.19 U	-	2 U	4 U	1 U	1.3 U	**0.25**	0.95 U	0.2 U	0.95 U	0.21 U
EPA 8270C	Indeno(1,2,3-cd)Pyrene	ug/l	0.19 U	0.19 U	0.58 U	0.19 U	0.19 U	-	2 U	4 U	1 U	1.3 U	0.2 U	0.58 U	**0.47**	0.58 U	0.21 U
EPA 8270C	Naphthalene	ug/l	**0.61**	0.19 U	1.5 U	0.19 U	0.19 U	-	2 U	4 U	**1.4**	1.3 U	**0.26**	1.5 U	**0.34**	1.5 U	0.21 U
EPA 8270C	Pentachlorophenol	ug/l	1.9 U	1.9 U	2.9 U	1.9 U	1.9 U	-	20 U	40 U	10 U	13 U	2 U	2.9 U	2 U	2.9 U	2.1 U
EPA 8270C	Phenanthrene	ug/l	0.094 U	0.094 U	0.53 U	0.094 U	0.094 U	-	1 U	2 U	0.5 U	0.67 U	**0.35**	0.53 U	**0.51**	0.53 U	**0.1**
EPA 8270C	Phenol	ug/l	0.19 U	0.19 U	0.46 U	0.19 U	0.19 U	-	2 U	4 U	1 U	1.3 U	0.2 U	0.46 U	0.2 U	0.46 U	0.21 U
EPA 8270C	Pyrene	ug/l	**0.13**	0.094 U	0.27 U	**0.18**	0.094 U	-	1 U	2 U	0.5 U	0.67 U	**0.15**	0.27 U	**0.45**	0.27 U	**0.18**
	Polychlorinated Biphenyls[4]																
EPA 8082	All Arochlors	ug/l	0.02 U	0.02 U	0.95 U	0.02 U	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U,C-01	0.38 U,C-01	0.02 U	0.36 U	0.02 U
	Dissolved Metals[5]																
EPA 6010	Antimony	ug/l	**38.5**	**29.8**	24 U	16.5 U	16.5 U	**45.8**	**31.2**	**43.6**	**32.7**	16.5 U	16.5 U	24 U	16.5 U	48 U	16.5 U
EPA 6010	Arsenic	ug/l	7.7 U	**10**	**22** J	7.7 U	7.7 U	**22.7**	**7.93**	**25.4**	**14.7**	7.7 U	**18.7**	21 U	7.7 U	43 U	**10.3**
EPA 6010B	Barium	ug/l	**433**	**58.8**	**57**	**37.9**	**37.5**	**46.9**	**119**	**258**	**195**	**32.6**	**107**	**100**	**157**	**340**	**236**
EPA 6010	Cadmium	ug/l	1.1 U	1.1 U	2.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	2.1 U	1.1 U	4.2 U	1.1 U
EPA 6010	Chromium (total)	ug/l	6.6 U	6.6 U	2.7 U	6.6 U	6.6 U	6.6 U	6.6 U	6.6 U	6.6 U	6.6 U	6.6 U	2.7 U	6.6 U	5.3 U	6.6 U
EPA 6010B	Cobalt	ug/l	**17.4**	**6.79**	**3.2** J	**7.35**	**3.67**	**11.4**	**14.5**	**21.1**	**7.67**	**4.11**	**3.28**	2.8 U	**7.12**	**5.7** J	**6.9**
EPA 6010B	Copper	ug/l	5.5 U	5.5 U	2.6 U	5.5 U	5.5 U	5.5 U	5.5 U	5.5 U	5.5 U	5.5 U	5.5 U	**2.6** J	5.5 U	**6.2** J	5.5 U
EPA 6010B	Lead	ug/l	**25.1**	**18.2**	18 U	13.2 U	13.2 U	13.2 U	**16.9**	**18.2**	13.2 U	13.2 U	13.2 U	18 U	13.2 U	36 U	13.2 U
EPA 200.7; 6010B	Manganese	ug/l	-	-	-	-	0.44 U	**15**	**1,890**	**1,200**	**308**	**558**	**29.6**	-	**138**	-	**188**
EPA 245.1; 7470	Mercury (inorganic)	ug/l	**0.025**	**0.025**	**0.047** J	0.02 U	0.02 U	**0.024**	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.038** J	0.02 U	**0.043** J	0.02 U
EPA 6010	Molybdenum	ug/l	3.3 U	**3.8**	7.8 U	3.3 U	3.3 U	**23.2**	3.3 U	**16.1**	**53.4**	3.3 U	**14.6**	**17** J	**4.77**	**24** J	3.3 U
EPA 6010B	Nickel	ug/l	**10.1**	**6.1**	12 U	**5.04**	4.4 U	**15**	**18.8**	**12.8**	4.4 U	4.4 U	4.4 U	12 U	**6.74**	25 U	**8.13**
EPA 6010	Selenium	ug/l	**30.5**	26.4 U	16 U	26.4 U	26.4 U	**26.6**	26.4 U	26.4 U	26.4 U	26.4 U	26.4 U	16 U	26.4 U	32 U	26.4 U
EPA 7761; 200.7; 6010B	Silver	ug/l	6.24 U	6.24 U	2.8 U	6.24 U	0.06 U	0.06 U	0.06 U	0.06 U	**0.06**	**0.08**	0.06 U	1 U	0.06 U	1 U	0.06 U
EPA 6010B	Thallium	ug/l	**323**	**29.8**	16 U	**47.3**	19.8 U	19.8 U	**56.8**	**35.1**	**86.5**	**96**	19.8 U	16 U	**58.1**	32 U	**74.3**
EPA 6010	Vanadium	ug/l	**7.08**	**5.18**	**5.2** J	3.3 U	3.3 U	**59.5**	**13.6**	**19.9**	**5.47**	**4.41**	**11.7**	**9.4** J	**644**	**380**	**209**
EPA 6010B	Zinc	ug/l	**7.89**	**6.1**	5.5 U	**3.93**	**10.4**	**8.15**	**25.8**	**10.1**	**9.67**	3.3 U	**4.01**	5.5 U	**4.1**	11 U	**8.15**
	Inorganic Parameters et al																
EPA 300.0	**Nitrate as N**	mg/l	-	5.9 U	1 U	-	-	-	-	5.9 U,H	-	5.9 U,H	-	-	**8.9** H	**6.9** HT-01	-
EPA 8315A	**Formaldehyde**	ug/L	10 U	10 U	60 U	10 U	-	-	-	-	-	-	-	-	-	-	-
EPA 160.1	**Total Dissolved Solids**	mg/l	-	**6,100**	**7,400**	-	-	-	-	**19,000**	-	**1,700**	-	-	**670** *	**910**	**900**
EPA 300.0	**Chloride**	mg/l	-	**3,000**	**3,400**	-	-	-	-	**9,500**	-	**510**	-	-	**45**	**47**	-
EPA 300.0	**Sulfate as SO4**	mg/l	-	15 U	**7.9**	-	-	-	-	**71**	-	**63**	-	-	**49**	**36**	-

Notes:

(TblB)	SFRWQCB Table B, groundwater Environmental Screening Level (ESL) protective of groundwater and surface water where groundwater is not current or potential source of drinking water.
(1)	California Environmental Protection Agency, Regional Water Quality Control Board, Central Valley Region, "A Compilation of Water Quality Goals", August 2003. California Deparment of Health Services Primary Maximum Contaminant Level unless otherwise noted.
(2)	United States Environmental Protection Agency, Drinking Water Maximum Contaminant Levels (MCLs), January 2005. Value cited is Primary MCL unless otherwise noted
(3)	Field duplicate sample analyzed by Sequoia Analytical of Petaluma, CA; all other analyses by EBMUD laboratory, Oakland, CA.
(4)	Only constituents detected in at least one sample listed, see laboratory report appendices for complete list of analytes and detection limits.
(1,T&O)	California Environmental Protection Agency, Regional Water Quality Control Board, Central Valley Region, "A Compilation of Water Quality Goals", August 2003. Taste & Odor Threshold.
(Tot)	Value as total xylenes.
(1,CSAL)	California Environmental Protection Agency, Regional Water Quality Control Board, Central Valley Region, "A Compilation of Water Quality Goals", August 2003. California State Action Level for Drinking Water.
(II)	Secondary drinking water maximum contaminant level based on taste and aesthetics.
7.89	Boldface type indicates constituent detected at concentration noted.
9,500	Concentration exceeding secondary, taste or aesthestic-based drinking water maximum contaminant level.
47.3	Concentration exceeding SF RWQCB Table B ESL.
U	Analyte not detected
T	Diesel/Gasoline pattern is atypical
N	Spike recovery outside of control limits
J	Estimated value, quantitation does not meet SOP criteria
B	Analyte detected in method blank
*	Laboratory Duplicate value outside of control limits
N	Spike recovery outside of control limits
H,HT-01	Analyzed past hold time

Table 1-8i

Heroic War Dead United States Army Reserve Center, Oakland, California
Remedial Investigation/Feasibility Study

Summary of November/December 2004 Site Inspection Groundwater Analytical Testing Results (continued)

Method	Analyte	Units	Building 1070 Area			Building 1064	Platform-Mounted Transformers	Locomotive Maintenance Area	Perimeter Monitoring Wells									
Exploration			VW-1	VW-2	UST-1	1064-2	TR-3	RS-4	EMW-1	EMW-2	EMW-3	EMW-4		EMW-5	EMW-6	SF RWQCB Ground Water(TblB)	CAL EPA(1)	EPA Drinking Water MCL(2)
Sample ID			VW-1-W-1	VW-2-W-1	UST-1-W-1	1064-2-W-1	TR-3-W-1	RS-6-W-1	EMW-1-W-1	EMW-2-W-1	EMW-3-W-1	EMW-4-W-1	EMW-4-W-3(3)	EMW-5-W-1	EMW-6-W-1			
	Petroleum Hydrocarbons																	
8015B	Gasoline Range Organics	ug/L	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	500	-	-
8015B	Diesel Range Organics	ug/L	**41**	**110** T	**100** T	**20** T	**11** T	**41** T	**53** T	**40** T	**9** T	**59** T	**1,200** FID	**110** T	**46** T	**640**	100(1,T&O)	-
8015B	Motor Oil Composite (C21-C32)	ug/L	650 U	**1300**	650 U	650 U	650 U	650 U	650 U	650 U	650 U	650 U	-	650 U	650 U	**640**	-	-
	Volatile Organic Compounds[4]																	
8260B	Acetone	ug/l	60 U	60 U	60 U	60 U,N	60 U	60 U	60 U	60 U	60 U	60 U	**1.9** J	60 U	60 U	1500	20,000(1,T&O)	-
8260B	Benzene	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.1 U	0.5 U	0.5 U	46	1	
8260B	Ethyl Benzene	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.1 U	0.8 U	0.8 U	290	300	
8260B	O-Xylene	ug/l	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	0.1 U	1.1 U	1.1 U	13 Tot	1,750(Tot)	
8260B	Carbon Disulfide	ug/l	1 U	1 U	1 U	1 U,N	1 U	1 U	1 U	1 U	1 U	1 U	2.3 U	1 U	1 U	-	-	
8260B	Chloromethane	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	0.15 U	1 U	1 U	170	-	
8260B	Naphthalene	ug/l	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	**0.55** J	1 U	**25**	**24**	170(1,CSAL)	-
8260B	1,1,1-Trichloroethane	ug/l	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	**0.38** J	0.8 U	0.8 U	62	200	200
8260B	1,1-Dichloroethane	ug/l	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	**0.47** J	0.7 U	0.7 U	47	5	-
8260B	Tetrachloroethene	ug/l	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	**9.4**	**12**	1.1 U	1.1 U	120	5	5
8260B	Trichloroethene	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.95** J	0.5 U	0.5 U	360	5	5
8260B	Cis-1,2-Dichloroethene	ug/l	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**1.8**	0.5 U	0.5 U	590	6	70
8260B	Trans-1,2-Dichloroethene	ug/l	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	**0.12** J	1.4 U	1.4 U	590	10	100
	Chlorinated Pesticides[4]																	
EPA 8081A	4,4'-DDE	ug/l	-	-	-	-	-	-	0.004 U	0.004 U	0.004 U	0.004 U	**0.014** J	0.004 U	0.004 U	**0.001**	-	-
EPA 8081A	Aldrin	ug/l	-	-	-	-	-	-	0.004 U	0.004 U	0.004 U	0.004 U	**0.012** J	0.004 U	0.004 U	0.13	0.002(1,CSAL)	-
EPA 8081A	Alpha Bhc	ug/l	-	-	-	-	-	-	0.003 U	0.003 U	0.003 U	0.003 U	**0.012** J	0.003 U	0.003 U	-	0.015(1,CSAL)	-
EPA 8081A	Chlorothalonil	ug/l	-	-	-	-	-	-	0.001 U	0.001 U	**0.0025**	0.001 U	**-**	**0.003**	0.001 U	-	-	-
EPA 8081A	Dieldrin	ug/l	-	-	-	-	-	-	0.002 U	0.002 U	0.002 U	0.002 U	**0.014** J	0.002 U	0.002 U	**0.0019**	0.002(1,CSAL)	-
EPA 8081A	Endrin	ug/l	-	-	-	-	-	-	0.006 U	0.006 U	0.006 U	0.006 U	**0.02** J	0.006 U	0.006 U	**0.0023**	2	2
EPA 8081A	Endrin Aldehyde	ug/l	-	-	-	-	-	-	0.023 U	0.023 U	0.023 U	0.023 U	**0.025** J	0.023 U	0.023 U	-	-	-
EPA 8081A	Gamma Bhc	ug/l	-	-	-	-	-	-	0.009 U	0.009 U	0.009 U	0.009 U	**0.013** J	0.009 U	0.009 U	-	0.2	-
EPA 8081A	Heptachlor	ug/l	-	-	-	-	-	-	0.003 U	0.003 U	0.003 U	0.003 U	**0.037** J	0.003 U	0.003 U	**0.0038**	0.01	0.4
EPA 8081A	Heptachlor Epoxide	ug/l	-	-	-	-	-	-	0.083 U	0.083 U	0.083 U	0.083 U	**0.015** J	0.083 U	0.083 U	**0.0038**	0.01	0.2
EPA 8081A	Methoxychlor	ug/l	-	-	-	-	-	-	0.04 U	0.04 U	0.04 U	0.04 U	**0.021** J	0.04 U	0.04 U	**0.019**	30	40
	Semi-Volatile Organic Compounds[4]																	
EPA 8270C	2-Methylnaphthalene	ug/l	0.38 U	0.38 U	0.71 U	0.4 U	0.4 U	2 U	0.38 U	0.37 U	0.38 U	0.38 U	1.3 U	0.38 U	**2.2**	**2.1**	-	-
EPA 8270C	3-,4-Methylphenol	ug/l	**0.33**	**0.64**	0.18 U	0.1 U	0.099 U	0.5 U	0.094 U	0.093 U	0.094 U	0.094 U	-	**0.87**	0.093 U	-	-	-
EPA 8270C	2,4-Dinitrotoluene	ug/l	0.094 U	0.094 U	0.18 U	0.1 U	0.099 U	0.5 U	0.094 U	0.093 U	0.094 U	0.094 U	0.78 U	0.094 U	0.093 U	120	-	
EPA 8270C	Acenaphthene	ug/l	**0.34**	0.19 U	0.36 U	0.2 U	0.2 U	1 U	0.19 U	0.19 U	0.19 U	0.19 U	1.1 U	0.19 U	**2.8**	23	-	-
EPA 8270C	Anthracene	ug/l	0.094 U	0.094 U	0.18 U	0.1 U	0.099 U	0.5 U	0.094 U	0.093 U	0.094 U	0.094 U	0.57 U	0.094 U	**0.19**	0.73	-	-
EPA 8270C	Benzo(a)Anthracene	ug/l	0.094 U	**0.35**	0.18 U	0.1 U	0.099 U	0.5 U	0.094 U	0.093 U	0.094 U	0.094 U	0.42 U	0.094 U	**0.25**	**0.027**	-	-
EPA 8270C	Benzo(a)Pyrene	ug/l	0.094 U	0.094 U	0.18 U	0.1 U	0.099 U	0.5 U	0.094 U	0.093 U	0.094 U	0.094 U	0.83 U	0.094 U	**0.32**	**0.014**		0.2
EPA 8270C	Benzo(b)Fluoranthene	ug/l	0.094 U	0.094 U	0.18 U	0.1 U	0.099 U	0.5 U	0.094 U	0.093 U	0.094 U	0.094 U	1.1 U	**0.12**	**0.98**	**0.029**	-	-
EPA 8270C	Benzo(k)Fluoranthene	ug/l	0.094 U	0.094 U	0.18 U	0.1 U	0.099 U	0.5 U	0.094 U	0.093 U	0.094 U	0.094 U	-	0.094 U	**0.68**	**0.4**	-	-
EPA 8270C	Benzo(Ghi)Perylene	ug/l	0.094 U	0.094 U	0.18 U	0.1 U	0.099 U	0.5 U	0.094 U	0.093 U	0.094 U	0.094 U	0.61 U	0.094 U	0.093 U	**0.1**	-	
EPA 8270C	Benzoic Acid	ug/l	**2.1**	**18**	**8.6**	1 U	0.99 U	6	0.94 U	0.93 U	0.94 U	0.94 U	3.7 U	**5.3**	**2.6**	-	-	-
EPA 8270C	Bis(2-Ethylhexyl)Phthalate	ug/l	**0.57** B	**1.1** B	**1** B	**0.94** B	**1.8** B	**7** B	0.47 U	**0.9** B	0.47 U	**0.57** B	2.7 U	**1.6** B	**2.1** B	32	4	6
EPA 8270C	Butylbenzyl Phthalate	ug/l	**0.46** B	**0.33** B	**0.66** B	**0.63** B	**0.41** B	**1.8** B	**0.11** B	**0.093** B	**0.13** B	0.094 U	2.6 U	**0.2** B	**1.8** B	-	-	-
EPA 8270C	Chrysene	ug/l	**0.23**	**0.46**	0.089 U	0.05 U	0.05 U	0.25 U	0.047 U	0.047 U	0.047 U	0.047 U	0.43 U	**0.066**	**0.49**	**0.35**	-	-
EPA 8270C	Dibenzofuran	ug/l	0.28 U	0.28 U	0.54 U	0.3 U	0.3 U	1.5 U	0.28 U	0.28 U	0.28 U	0.28 U	1.1 U	0.28 U	**1.5**	-	-	-
EPA 8270C	Diethyl Phthalate	ug/l	**0.39** B	**0.57** B	**0.61** B	**0.69** B	**0.62** B	**2.9** B	**0.094**	**0.1**	0.094 U	**0.094**	0.4 U	**0.13**	**0.12**	**1.5**	-	-
EPA 8270C	Di-N-Butyl Phthalate	ug/l	**0.41** B	**0.31** B	**0.66** B	**0.48** B	**0.36** B	**1.2** B	0.19 U	0.19 U	0.19 U	0.19 U	1.1 U	0.19 U	**0.54**	-	-	-
EPA 8270C	Di-N-Octyl Phthalate	ug/l	0.094 U	0.094 U	0.18 U	0.1 U	0.099 U	0.5 U	0.094 U	0.093 U	0.094 U	0.094 U	0.77 U	0.094 U	**1.1**	-	-	-
EPA 8270C	Fluoranthene	ug/l	**0.27**	**0.5**	0.18 U	0.1 U	0.099 U	0.5 U	0.094 U	0.093 U	0.094 U	0.094 U	0.42 U	**0.12**	**0.36**	8	-	-
EPA 8270C	Fluorene	ug/l	0.19 U	0.19 U	0.36 U	0.2 U	0.2 U	1 U	0.19 U	0.19 U	0.19 U	0.19 U	0.95 U	0.19 U	**2.2**	3.9	-	-
EPA 8270C	Indeno(1,2,3-cd)Pyrene	ug/l	0.19 U	0.19 U	0.36 U	0.2 U	0.2 U	1 U	0.19 U	0.19 U	0.19 U	0.19 U	0.58 U	0.19 U	**0.31**	**0.029**	-	-
EPA 8270C	Naphthalene	ug/l	**0.72**	**0.89**	0.36 U	0.2 U	0.2 U	1 U	0.19 U	0.19 U	0.19 U	0.19 U	1.5 U	0.19 U	**22**	24	170(1,CSAL)	-
EPA 8270C	Pentachlorophenol	ug/l	1.9 U	1.9 U	3.6 U	2 U	**5.1**	10 U	1.9 U	1.9 U	1.9 U	1.9 U	2.9 U	1.9 U	1.9 U	7.9		1
EPA 8270C	Phenanthrene	ug/l	**0.58**	**0.44**	0.18 U	0.1 U	0.099 U	0.5 U	0.094 U	0.093 U	0.094 U	0.094 U	0.53 U	**0.15**	**2.7**	4.6	-	-
EPA 8270C	Phenol	ug/l	0.19 U	0.19 U	0.36 U	0.2 U	0.2 U	1 U	**1**	0.19 U	0.19 U	0.19 U	0.46 U	**0.95**	0.19 U	1,300	-	-
EPA 8270C	Pyrene	ug/l	**0.31**	**0.89**	0.18 U	0.1 U	0.099 U	0.5 U	0.094 U	0.093 U	0.094 U	0.094 U	0.27 U	**0.32**	**0.5**	2	-	-
	Polychlorinated Biphenyls[4]																	
EPA 8082	All Arochlors	ug/l	-	-	-	0.02 U	0.02 U	0.02 U	-	-	-	-	-	-	-	0.014	0.5	0.5
	Metals[5]																	
EPA 6010	Antimony	ug/l	**23.2**	**18.1**	**40.3**	16.5 U	16.5 U	-	**17.7**	16.5 U	16.5 U	16.5 U	24 U	16.5 U	16.5 U	**30**	6	6
EPA 6010	Arsenic	ug/l	**23.2**	7.7 U	7.7 U	**11.9**	**14.3**	-	7.7 U	7.7 U	7.7 U	7.7 U	21 U	7.7 U	7.7 U	36	50	10
EPA 6010B	Barium	ug/l	**80.7**	**790**	**2,200**	**111**	**172**	-	**78.4**	**113**	**55.3**	**17.7**	**16**	**170**	**119**	**1,000**	1,000	2,000
EPA 6010	Cadmium	ug/l	1.1 U	1.1 U	**3.12**	1.1 U	1.1 U	-	1.1 U	1.1 U	1.1 U	1.1 U	2.1 U	1.1 U	1.1 U	**2.2**	5	5
EPA 6010	Chromium (total)	ug/l	6.6 U	6.6 U	**106**	6.6 U	6.6 U	-	6.6 U	6.6 U	6.6 U	6.6 U	2.7 U	6.6 U	6.6 U	180	50	100
EPA 6010B	Cobalt	ug/l	**26.3**	**6.96**	**19.1**	**5.73**	**8.06**	-	**15.1**	**16**	**5.16** N	**8.83**	2.8 U	**18.3**	**8.94**	**3**	-	-
EPA 6010B	Copper	ug/l	5.5 U	5.5 U	5.5 U	5.5 U	5.5 U	-	5.5 U	5.5 U	5.5 U	5.5 U	**3.2** J	5.5 U	5.5 U	**3.1**	1,300	1,000(II)
EPA 6010B	Lead	ug/l	13.2 U	13.2 U	**48.2**	13.2 U	13.2 U	-	**15.1**	**19.7**	13.2 U	13.2 U	18 U	**21.4**	13.2 U	**2.5**	15	**15**
EPA 200.7; 6010B	Manganese	ug/l	**4,260**	**357**	**334,000**	**834**	**1,050**	-	**513**	**404**	**1,430**	**482**	**440**	**2,950**	**1,680**	-	**50(II)**	**50(II)**
EPA 245.1; 7470	Mercury (inorganic)	ug/l	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	-	0.02 U	0.02 U	**0.022**	0.02 U	**0.038** J	0.02 U	0.02 U	**0.012**	2	2
EPA 6010	Molybdenum	ug/l	**45.4**	**11.9**	**11.5**	3.3 U	3.3 U	-	**5.81**	**3.44**	3.3 U	**4.43**	7.8 U	**3.59**	**5.04**	240	-	-
EPA 6010B	Nickel	ug/l	**97.7**	4.4 U	**31.1**	4.4 U	4.4 U	-	4.4 U	4.4 U	4.4 U	4.4 U	12 U	4.4 U	4.4 U	**8.2**	100	-
EPA 6010	Selenium	ug/l	26.4 U	26.4 U	**194**	26.4 U	26.4 U	-	**29**	**30.9**	26.4 U	26.4 U	16 U	**36.7**	26.4 U	**5**	50	50
EPA 7761; 200.7; 6010B	Silver	ug/l	6.24 U	6.24 U	624 U	0.06 U	0.06 U	-	0.06 U	0.06 U	0.06 U	**0.11**	-	0.06 U	**0.14**	0.19	100(II)	100(II)
EPA 6010B	Thallium	ug/l	19.8 U	**27**	19.8 U,N,*	**60.8**	**20.2**	-	**20.5**	**111**	19.8 U	19.8 U	16 U	**113**	19.8 U	**20**	2	**2**
EPA 6010	Vanadium	ug/l	3.3 U	3.3 U	**90.7**	**32.4**	3.3 U	-	**5.86**	**6.78**	3.3 U	**7.51**	**7.1** J	**6.53**	**10.4**	**19**	50(1,CSAL)	-
EPA 6010B	Zinc	ug/l	**256**	**4.68**	**161**	**3.71**	**18.1**	-	**8.14**	**9.27**	3.3 U	**4.58**	5.5 U	**13.3**	**7.78**	**81**	5,000(II)	5,000(II)
	Inorganic Parameters et al																	
EPA 300.0	**Nitrate as N**	mg/l	5.9 U	-	-	-	-	-	5.9 U	5.9 U	30 U	30 U	**12**	30 U	30 U	-	**10**	**10**
EPA 8315A	**Formaldehyde**	ug/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100(1,CSAL)	**-**
EPA 160.1	**Total Dissolved Solids**	mg/l	**5,300**	-	-	-	-	-	**15,000**	**21,000**	**660**	**1,800**	**1,700**	**19,000**	**1,600**	-	**500(II)**	**500(II)**
EPA 300.0	**Chloride**	mg/l	**2,600**	-	-	-	-	-	**7,800**	**11,000**	**210**	**570**	**610**	**10,000**	**500**	-	**250(II)**	**250(II)**
EPA 300.0	**Sulfate as SO4**	mg/l	**500**	-	-	-	-	-	**93**	**23**	**110**	**140**	**180**	**150**	75 U	-	**250(II)**	**250(II)**

Notes:

(TblB)	SFRWQCB Table B, groundwater Environmental Screening Level (ESL) protective of groundwater and surface water where groundwater is not current or potential source of drinking water.
(1)	California Environmental Protection Agency, Regional Water Quality Control Board, Central Valley Region, "A Compilation of Water Quality Goals", August 2003. California Deparment of Health Services Primary Maximum Contaminant Level unless otherwise noted.
(2)	United States Environmental Protection Agency, Drinking Water Maximum Contaminant Levels (MCLs), January 2005. Value cited is Primary MCL unless otherwise noted
(3)	Field duplicate sample analyzed by Sequoia Analytical of Petaluma, CA; all other analyses by EBMUD laboratory, Oakland, CA.
(4)	Only constituents detected in at least one sample listed, see laboratory report appendices for complete list of analytes and detection limits.
(1,T&O)	California Environmental Protection Agency, Regional Water Quality Control Board, Central Valley Region, "A Compilation of Water Quality Goals", August 2003. Taste & Odor Threshold.
(Tot)	Value as total xylenes.
(1,CSAL)	California Environmental Protection Agency, Regional Water Quality Control Board, Central Valley Region, "A Compilation of Water Quality Goals", August 2003. California State Action Level for Drinking Water.
(II)	Secondary drinking water maximum contaminant level based on taste and aesthetics.
7.89	Boldface type indicates constituent detected at concentration noted.
9,500	Concentration exceeding secondary, taste or aesthestic-based drinking water maximum contaminant level.
47.3	Concentration exceeding SF RWQCB Table B ESL.
U	Analyte not detected
T	Diesel/Gasoline pattern is atypical
N	Spike recovery outside of control limits
J	Estimated value, quantitation does not meet SOP criteria
B	Analyte detected in method blank
*	Laboratory Duplicate value outside of control limits
N	Spike recovery outside of control limits
H,HT-01	Analyzed past hold time

Table 1-9a

Heroic War Dead United States Army Reserve Center, Oakland, California
Remedial Investigation/Feasibility Study

Summary of April 2005 Supplemental SI Carcinogenic Polynuclear Aromatic Hydrocarbon Testing Results

					Concentration in mg/kg							
Boring	Sample ID	Lab Sample No.	Date Collected	Sample Depth, ft bgs	Benzo(A) Anthracene	Benzo(A) Pyrene	Benzo(B) Fluoranthene	Benzo(K) Fluoranthene	Chrysene	Dibenzo(A,H) Anthracene	Indeno(1,2,3-Cd) Pyrene	Total B(a)P Equivalent(1)
EPA Region 9 Commercial/ Industrial PRG					**2.1**	**0.21**	**1.28**	**1.3(CA Mod)**	13(CA Mod)	**0.21**	**2.1**	**1**
Building 1064 Area - SI Boring PV-3												
PV-3	PV-3-1'-1	L116830-15	12/1/04	1	0.09 U	**0.18**	**0.29**	**0.15**	**0.15**	0.09 U	0.21 U	**0.26**
PV-3	PV-3-5.5'-1	L116830-16	12/1/04	5.5	**1.8**	**5.5**	**7.1**	**4.4**	**3.6**	**1.8**	**6.1**	**8.2**
PV-3-R	PV-3-R-4'-1	L119620-4	4/13/05	4 - 6	**0.03**	**0.048**	**0.082**	**0.042**	**0.071**	0.009 U	0.021 U	**0.07**
	PV-3-R-4'-3(2)	L119620-5	4/13/05	4 - 6	0.11 U,J	0.5 U,J	0.61 U,J	0.27 U,J	0.2 U,J	0.11 U,J	0.084 U,J	0.33 U,J
PV-3-A	PV-3-A-4'-1	L119620-1	4/13/05	4 - 6	**0.05**	0.045 U	**0.12**	0.045 U	0.03 U	0.045 U	0.1 U	**0.09**
PV-3-B	PV-3-B-4'-1	L119620-2	4/13/05	4 - 6	**0.085**	0.045 U	0.045 U	0.045 U	**0.24**	0.045 U	0.1 U	**0.09**
PV-3-C	PV-3-C-4'-1	L119620-3	4/13/05	4 - 6	**0.63**	**0.62**	**0.42**	**0.44**	**0.88**	0.009 U	**0.1**	**0.79**
Building 1064 Area - SI Boring PV-4												
PV-4	PV-4-5.5'-1	L116830-17	12/1/04	5.5	**0.012**	0.009 U	**0.025**	0.009 U	**0.021**	0.009 U	0.021 U	**0.01**
PV-4	PV-4-1'-1	L116830-16	12/1/04	1	**0.45**	**0.89**	**1.1**	**0.86**	**0.84**	**0.26**	**0.88**	**1.3**
PV-4-R	PV-4-R-0'-1	L119631-4	4/14/05	0 - 2	**0.61**	**1**	**1.2**	**1.1**	**1.3**	**0.33**	**0.75**	**1.5**
PV-4-A	PV-4-A-0'-1	L119631-1	4/14/05	0 - 2	0.009 U	0.009 U	0.009 U	0.009 U	0.006 U	0.009 U	0.021 U	0.02 U
PV-4-B	PV-4-B-0'-1	L119631-2	4/14/05	0 - 2	**0.24**	**0.34**	**0.36**	**0.22**	**0.33**	0.045 U	0.1 U	**0.5**
PV-4-C	PV-4-C-0'-1	L119631-3	4/14/05	0 - 2	**0.6**	**1.2**	**1.3**	**1.2**	**1.2**	**0.35**	**0.83**	**1.7**
Building 1064 Area - SI Boring PV-18												
PV-18	PV-18-1'-1	L116830-11	12/1/04	1	**0.042**	**0.057**	**0.066**	**0.053**	**0.069**	0.009 U	**0.022**	**0.1**
PV-18	PV-18-5.5'-1	L116830-12	12/1/04	5.5	**1.2**	**1.2**	**1.5**	**1.2**	**1.7**	**0.039**	**0.48**	**1.7**
PV-18-R	PV-18-R-4'-1	L119633-4	4/14/05	4 - 6	**0.62**	**0.98**	**1.2**	**0.76**	**1.2**	0.045 U	0.1 U	**1.3**
	PV-18-R-4'-3(2)	L119633-5	4/14/05	4 - 6	**0.44** J	**0.91** J	**1.2** J	**0.37** J	**0.63** J	1.2 U	**0.66** J	**1.7**
PV-18-A	PV-18-A-4'-1	L119633-1	4/14/05	4 - 6	**0.36**	**0.32**	**0.37**	**0.33**	**0.78**	0.009 U	**0.17**	**0.5**
PV-18-B	PV-18-B-4'-1	L119633-2	4/14/05	4 - 6	**0.8**	**1.5**	**1**	**1.1**	**1.5**	0.045 U	**0.37**	**1.9**
PV-18-C	PV-18-C-4'-1	L119633-3	4/14/05	4 - 6	**4.4**	**4.4**	**5**	**4.6**	**6.2**	**0.36**	**2.6**	**6.3**
Building 1084 - Hazardous Materials Storage Area - SI Boring HMS-1												
HMS-1	HMS-1-5'-1	L116899-2	12/3/04	5	**0.04**	**0.071**	**0.036**	**0.047**	**0.075**	0.009 U	0.021 U	**0.1**
HMS-1	HMS-1-1'-1	L116899-2	12/3/04	1	**0.39**	**1.5**	**2.2**	**0.93**	**0.93**	**0.38**	**2.1**	**2.2**
HMS-1	HMS-1-1'-3(2)	L116899-2	12/3/04	1	**0.21** J	**0.47**	0.2 U	-	**0.39**	**0.22** J	**0.46**	**0.6**
HMS-1-R	HMS-1-R-0'-1	L119621-4	4/13/05	0 - 2	0.009 U	0.009 U	**0.04**	**0.028**	**0.049**	0.009 U	0.021 U	**0.02**
	HMS-1-R-0'-3(2)	L119621-5	4/13/05	0 - 2	0.11 U,J	0.5 U,J	0.61 U,J	0.27 U,J	0.2 U,J	0.11 U,J	0.084 U,J	0.33 U,J
HMS-1-A	HMS-1-A-1	L119621-1	4/13/05	0 - 2	0.045 U	0.045 U	0.045 U	0.045 U	**0.16**	0.045 U	0.1 U	0.09 U
HMS-1-B	HMS-1-B-1	L119621-2	4/13/05	0 - 2	0.009 U	0.009 U	**0.033**	0.009 U	**0.032**	0.009 U	0.021 U	**0.02**
HMS-1-C	HMS-1-C-1	L119621-3	4/13/05	0 - 2	0.009 U	0.009 U	0.009 U	0.009 U	**0.014**	0.009 U	0.021 U	**0.02**

Notes:

(1) Calculated as sum of 1 x benzo(a)pyrene concentration + 0.1 x benzo(a)anthracene concentration + 0.1 x benzo(b)fluoranthene concentration + 0.1 x benzo(k)fluoranthene concentration + 0.01 x chrysene concentration + 0.4 x dibenz(a,h)anthracene concentration + 0.1 x indeno(1,2,3-cd)pyrene concentration. Value equal to one half the method reporting limit used for analytes not detected in a sample.

(2) Field duplicate sample.

0.21 Concentration exceeding EPA Region 9 PRG for commercial/industrial land use.

1.5 Concentration exceeding DTSC remediation threshold for calculated total benzo(a)pyrene equivalent values.

U Analyte not detected.

J Estimated concentration below normal method reporting limit.

(CA Mod) California-modified PRG.

Table 1-9b

Heroic War Dead United States Army Reserve Center, Oakland, California
Remedial Investigation/Feasibility Study

Summary of April 2005 Supplemental SI Lead and Manganese Testing Results

Platform-Mounted Transformer Area

Boring	Sample ID	Date Collected	Sample Depth, ft bgs	Lead Concentration, mg/kg		Manganese Concentration, mg/kg
SO105	SO105SA	4/9/98	3 - 5	**2,300**	J	-
S0105-R	S0105-R-3'-1	4/14/05	3 - 5	**1,530**		-
	S0105-R-6'-1		6 - 8	**1,690**		-
SO106	SO106SA	4/9/98	3 - 5	**290**	J	-
	SO106FD(1)		3 - 5	**1,000**	J	-
TR-1	TR-1-4'-1	12/2/04	4	**345**		**487**
TR-2	TR-2-4'-1	12/2/04	4	**1,400**		**688**
TR-2-R	TR-2-R-3'-1	4/14/05	3 - 5	**2,160**		-
	TR-2-R-6'-1		6 - 8	**288**		-
TR-2-A	TR-2-A-3'-1	4/14/05	3 - 5	**2,370**		-
TR-2-B	TR-2-B-3'-1	4/14/05	3 - 5	**1,090**		-
TR-2-C	TR-2-C-3'-1	4/14/05	3 - 5	**102**		-
WEP	WEP-3'-1	4/14/05	3 - 5	**222**		-
TR-3	TR-3-1'-1	12/2/04	1	**194**		**790**
	TR-3-1'-3(1)			**41**		**850**
	TR-3-5'-1		5	**184**		**993**

Engineer Road - Surficial Soil Sample S-4

S-4	S-4-1	11/30/04	0 - 0.5	**3,250**		-
S-4-R	S-4-R-0'-1	4/14/05	0 - 0.5	**480**		-
	S-4-R-0'-3(2)			**640**		-
	S-4-R-.5'-1		0.5 - 1	**675**		-
S-4-A	S-4-A-0'- 0.5'	4/14/05	0 - 0.5	**273**		-
	S-4-A-0.5'-1		0.5 - 1	**229**		-
S-4-B	S-4-B-0'- 0.5'	4/14/05	0 - 0.5	**254**		-
	S-4-B-0.5'-1		0.5 - 1	**194**		-
S-4-C	S-4-C-0'- 0.5'	4/14/05	0 - 0.5	**142**		-
	S-4-C-0.5'-1		0.5 - 1	**120**		-
S-4-D	S-4-D-0'- 0.5'	4/14/05	0 - 0.5	**406**		-
	S-4-D-0.5'-1		0.5 - 1	**333**		-
S-4-E	S-4-E-0'- 0.5'	4/14/05	0 - 0.5	**171**		-
	S-4-E-0.5'-1		0.5 - 1	**173**		-
S-4-F	S-4-F-0'- 0.5'	4/14/05	0 - 0.5	**378**		-
	S-4-F-0.5'-1		0.5 - 1	**278**		-
S-4-G	S-4-G-0'- 0.5'	4/14/05	0 - 0.5	**54.7**		-
	S-4-G-0.5'-1		0.5 - 1	**109**	*	-

Building 1070 Compound - SI Boring VW-1

VW-1	VW-1-1'-1	11/30/04	1	**110**		**549**
	VW-1-5'-1		5	**1,320**		**1,300**
VW-1-R	VW-1-R-4'-1	4/13/05	4 - 6	**3,410**		-
	VW-1-R-4'-3(1)			**830**		-
VW-1-A	VW-1-A-4'-1	4/13/05	4 - 6	**611**		-
VW-1-B	VW-1-B-4'-1	4/13/05	4 - 6	**2,150**		-
VW-1-C	VW-1-C-4'-1	4/13/05	4 - 6	**1,650**		-

Building 1070 Compound - SI Boring UT-9

UT-9	UT-9-9'-1	11/30/04	9	**4,730**	N,R	**32,500**
UT-9-R	UT-9-R-8'-1	4/13/05	8 - 10	**142**		**929**
	UT-9-R-8'-3(1)			**65**		-
UT-9-A	UT-9-A-1	4/13/05	8 - 10	**5,430**		**14,300**
UT-9-B	UT-9-B-1	4/13/05	8 - 10	**482**		**3,530**
UT-9-C	UT-9-C-1	4/13/05	8 - 10	**38.8**		**413**

Notes:

2,300	Concentration exceeding EPA Region 9 PRG of 800 mg/kg.
32,500	Concentration exceeding EPA Region 9 PRG of 19,458 mg/kg.
U	Analyte not detected.
J	Estimated concentration below normal method reporting limit.
(1)	Field duplicate sample.
N	Spike recovery outside of control limits
R	Spike out of calibration range.
*	Laboratory Duplicate value outside of control limits.

Table 1-10a

May 2003 Vehicle Wash Rack Excavation Soil Sample Results Exceeding PRGS

Analyte	Units	2002 USEPA Region IX Residential/ Industrial PRGs	Sample Identification Numbers and Results							
			03IR1-L1-1-3	03IR1-L2-1-7	03IR1-L3-1-4	03IR1-L4-1-5	03IR1-L5-1-7	03IR1-L6-1-5	03IR1-L7-1-4	03IR1-L8-1-7
METALS										
Arsenic	mg/kg	0.39/1.6	**2.2**	**3.6**	**1.5**	**6.2**	**4.0**	**4.4**	**2.5**	**7.9**
Lead	mg/kg	400/750	7.8	180	2.2	44	29	150	3.3	**540**
VOLATILE ORGANIC COMPOUNDS										
PCE	mg/kg	1.5/3.4	**2.5**	0.23	0.41	Non detect	0.0043	Non detect	0.03	Non detect

Analyte	Units	2002 USEPA Region IX Residential/ Industrial PRGs	Sample Identification Numbers and Results				
			03IR1-L9-1-5	03IR1-L10-1-7	03IR1-L11-1-7	03IR1-L12-1-7	03IR1-L15-3-7
METALS							Duplicate of L2
Arsenic	mg/kg	0.39/1.6	**2.4**	**2.1**	**2.6**	**1.8**	**3.5**
Lead	mg/kg	400/750	16	7.1	1.8	1.7	120
VOLATILE ORGANIC COMPOUNDS							
PCE	mg/kg	1.5/3.4	0.086	Non detect	0.066	0.054	1.1

Notes:

Bold type is for the PRG exceedances.

mg/kg = milligrams per kilogram
PRG = Preliminary Remediation Goal
PCE = tetrachloroethene
USEPA = Unites States Environmental Protection Agency

March 2004

Data from CDM (2004) Removal Action Report

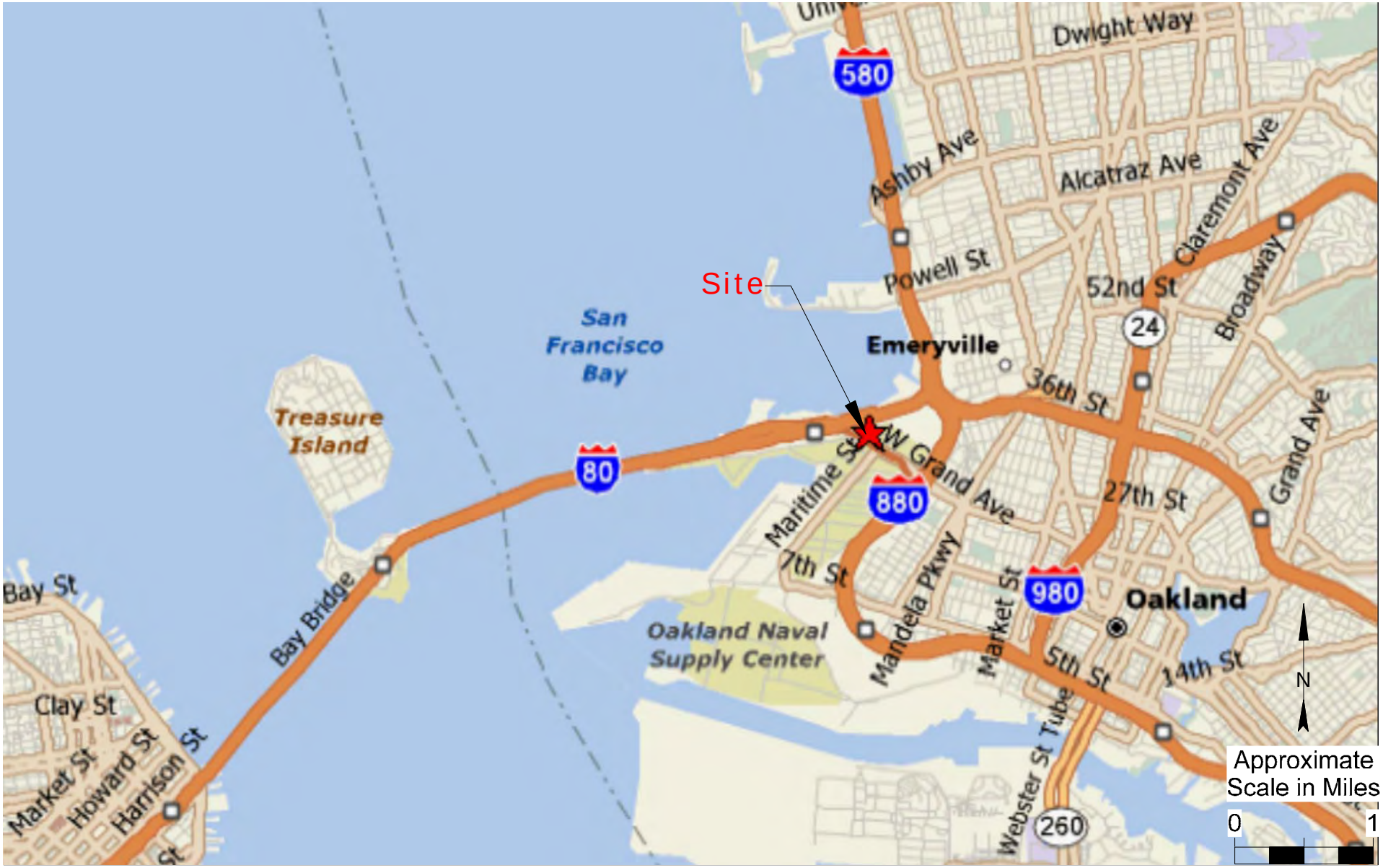
Table 1-10b
Excavation Confirmation Analytical Results
Soil Excavations
Heroic War Dead U.S. Army Reserve Center
Oakland, CA

Count	Sample ID No.	Area	Floor or Sidewall	Depth (Feet)	Emax Batch No.	Metals (mg/kg) Total Lead	Metals (mg/kg) Total Manganese	PAHs (µg/kg) Benzo(a)pyrene	Date sampled	Date data received	NOTES
						800	19,458	210			Cleanup Goal
1	PV18-SC-01	PV-18	Sidewall - South	7	-	-	-	-	11/30/2005	-	Sample jar broke in transit.
2	PV18-SC-02	PV-18	Sidewall - West	7	05L012A	-	-	**1,700**	11/30/2005	12/6/2005	
3	PV18-SC-03	PV-18	Sidewall - North	7	05L012A	-	-	**2,700**	11/30/2005	12/6/2005	
4	PV18-SC-04	PV-18	Sidewall - East	7	05L012A	-	-	**680**	11/30/2005	12/6/2005	
5	PV18-SC-05	PV-18	Floor	8	05L012A	-	-	**720**	11/30/2005	12/6/2005	
6	PV4-SC-01	PV-4	Sidewall - South	1	-	-	-	-	11/30/2005	-	Sample jar broke in transit.
7	PV4-SC-02	PV-4	Sidewall - West	1	05L012A	-	-	190	11/30/2005	12/6/2005	
8	PV4-SC-03	PV-4	Sidewall - North	1	05L012A	-	-	<24	11/30/2005	12/6/2005	
9	PV4-SC-04	PV-4	Sidewall - East	1	05L012A	-	-	<24	11/30/2005	12/6/2005	
10	PV4-SC-05	PV-4	Floor	2	05L012A	-	-	**1,100**	11/30/2005	12/6/2005	
11	PV4-SC-05D	PV-4	Floor	2	-	-	-	-	11/30/2005	-	Sample jar broke in transit. Field Duplicate.
12	VW1-SC-01	VW-1	Sidewall - South	5	05L012	**1,560**	-	-	11/30/2005	12/2/2005	
13	VW1-SC-02	VW-1	Sidewall - West	5	05L012	741	-	-	11/30/2005	12/2/2005	
14	VW1-SC-03	VW-1	Sidewall - North	5	05L012	**1,770**	-	-	11/30/2005	12/2/2005	
15	VW1-SC-04	VW-1	Sidewall - East	5	05L012	746	-	-	11/30/2005	12/2/2005	
16	VW1-SC-05	VW-1	Floor	6	05L012	315	-	-	11/30/2005	12/2/2005	
17	UT9-SC-01	UT-9	Sidewall - South	9	05L011	709	4,090	-	11/30/2005	12/5/2005	
18	UT9-SC-02	UT-9	Sidewall - West	9	05L011	**1,660**	9,060	-	11/30/2005	12/5/2005	
19	UT9-SC-03	UT-9	Sidewall - North	9	05L011	**1,320**	3,010	-	11/30/2005	12/5/2005	
20	UT9-SC-04	UT-9	Sidewall - East	9	05L011	**2,490**	3,670	-	11/30/2005	12/5/2005	
21	UT9-SC-05	UT-9	Floor	10	05L011	**894**	7,700	-	11/30/2005	12/5/2005	
22	UT9-SC-05D	UT-9	Floor	10	05L011	**1,560**	7,250	-	11/30/2005	12/5/2005	Field Duplicate.
23	Equipment Rinsate				05L011	<0.01	<0.01	<9.4	12/1/2005	12/2/2005	
24	PV18-SC-01R	PV-18	Sidewall - South	7	05L047	-	-	**800**	12/6/2005	12/7/2005	Resample.
25	PV4-SC-01R	PV-4	Sidewall - South	1	05L047	-	-	**510**	12/6/2005	12/7/2005	Resample.
26	PV4-SC-05DR	PV-4	Floor	2	05L047	-	-	**510**	12/6/2005	12/7/2005	Resample. Field Duplicate.
27	B1064-SC-01	B 1064	Sidewall - South	4.5	05L072	773	-	-	12/7/2005	12/12/2005	
28	B1064-SC-02	B 1064	Sidewall - West	6	05L072	133	-	-	12/7/2005	12/12/2005	
29	B1064-SC-03	B 1064	Sidewall - North	6	05L072	91.3	-	-	12/8/2005	12/12/2005	
30	B1064-SC-04	B 1064	Sidewall - East	6	05L072	151	-	-	12/8/2005	12/12/2005	
31	B1064-SC-05	B 1064	Floor - West	8	05L072	43.5	-	-	12/7/2005	12/12/2005	
32	B1064-SC-06	B 1064	Floor - East	8	05L072	92.3	-	-	12/8/2005	12/12/2005	
33	B1064-SC-06D	B 1064	Floor - East	8	05L072	160	-	-	12/8/2005	12/12/2005	Field Duplicate.
34	S4-SC-01	S-4	Floor - West	1	05L072	32.2	-	-	12/8/2005	12/12/2005	
35	S4-SC-02	S-4	Floor - East	1	05L072	177	-	-	12/8/2005	12/12/2005	
36	Equipment Rinsate				05L072	<0.01	-	-	12/8/2005	12/12/2005	

Note: Concentration values highlighted in bold exceed cleanup goal.

Data from ECC (2005).

SECTION 1
FIGURES



geologica

San Francisco, Californa

Remedial Investigation/Feasibility Study

Heroic War Dead

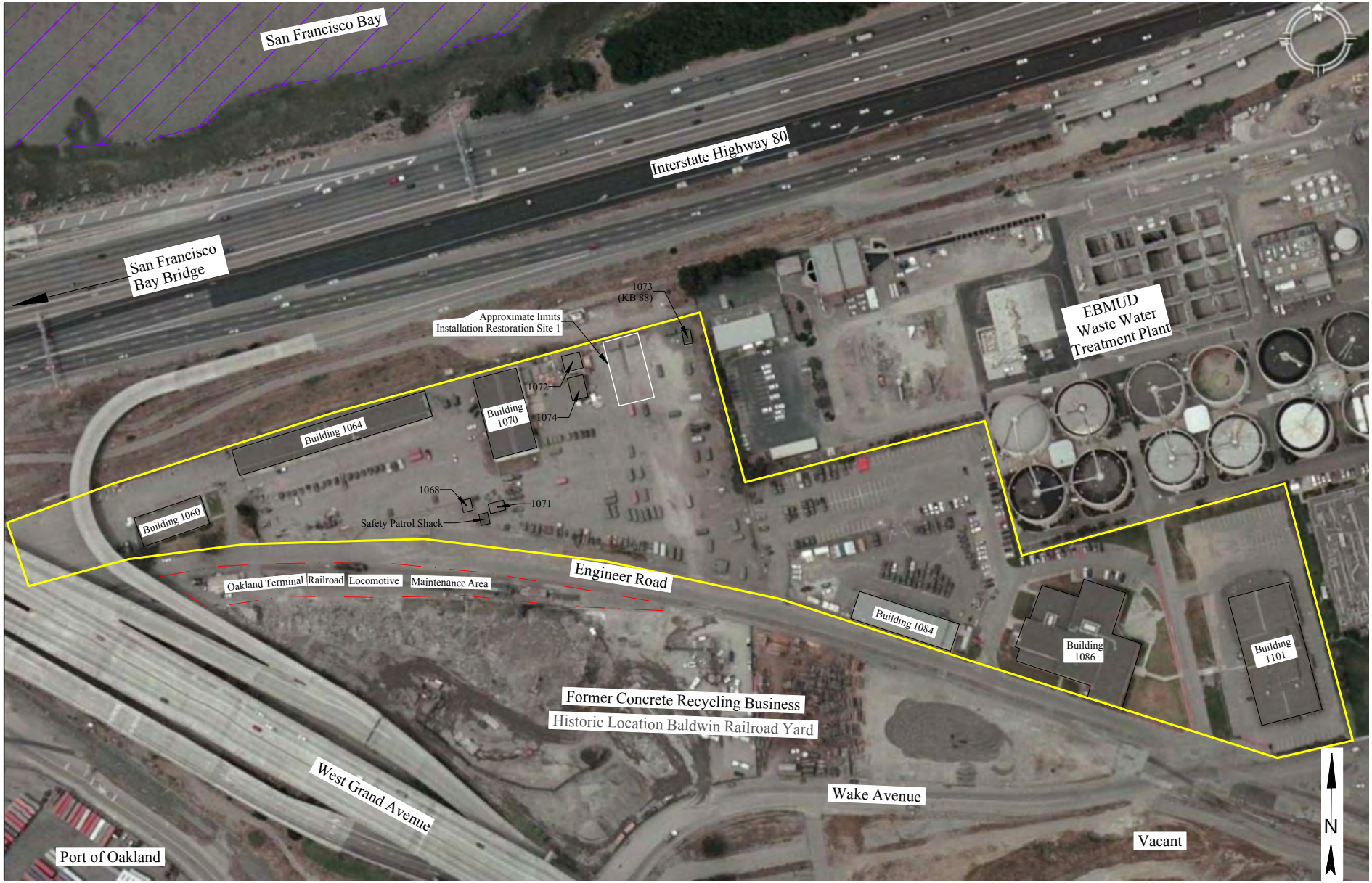
United States Army Reserve Center Oakland

Oakland, California

Site Location Map

Figure 1-1

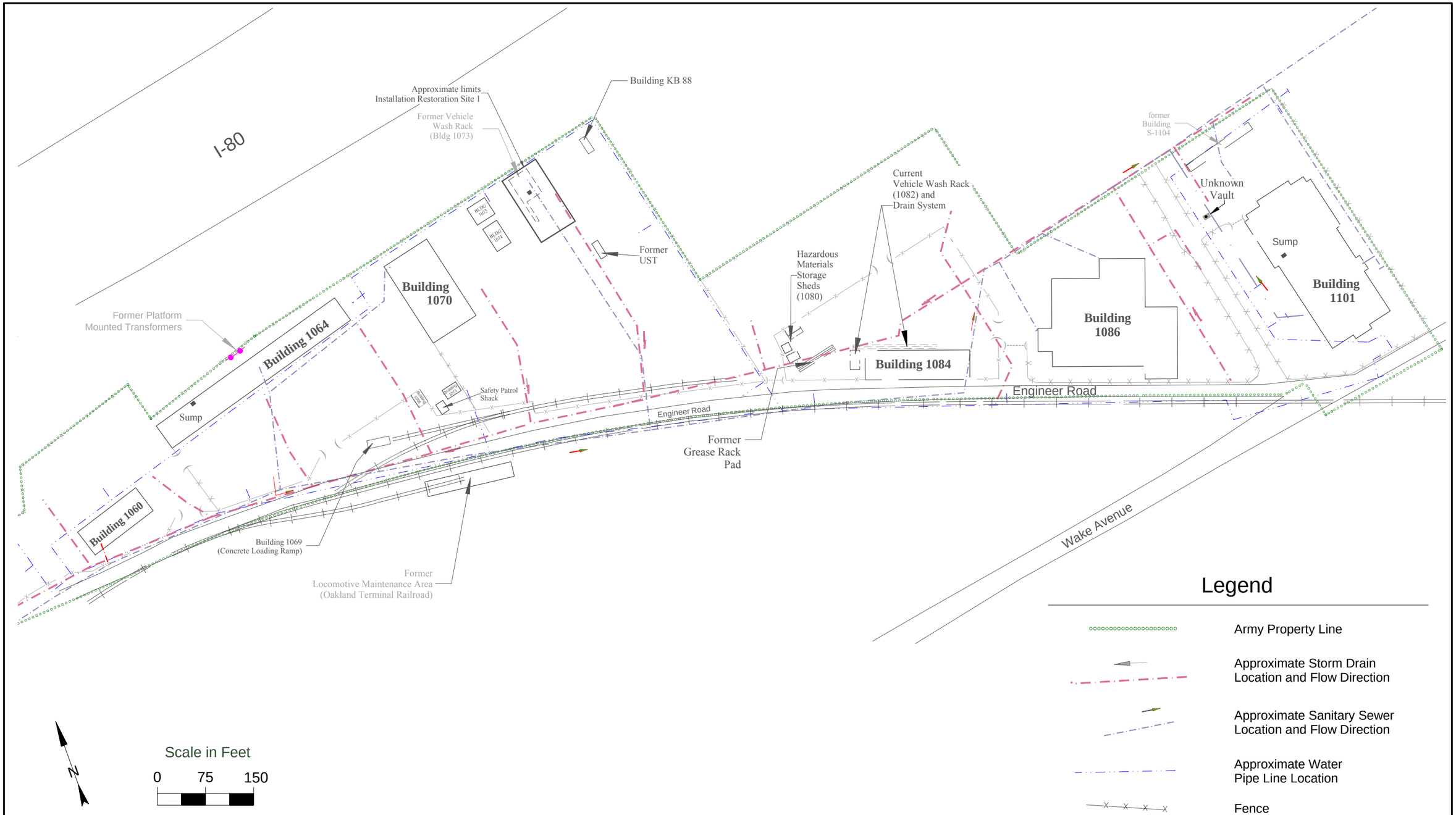
SiteLocation.TCW



Not to Scale

geologica	Remedial Investigation/Feasibility Study **Heroic War Dead** **United States Army Reserve Center Oakland** Oakland, California	Site Vicinity Map
San Francisco, California		**Figure 1-2**

SiteVicinity.TCW



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Remedial Investigation/Feasibility Study

Heroic War Dead

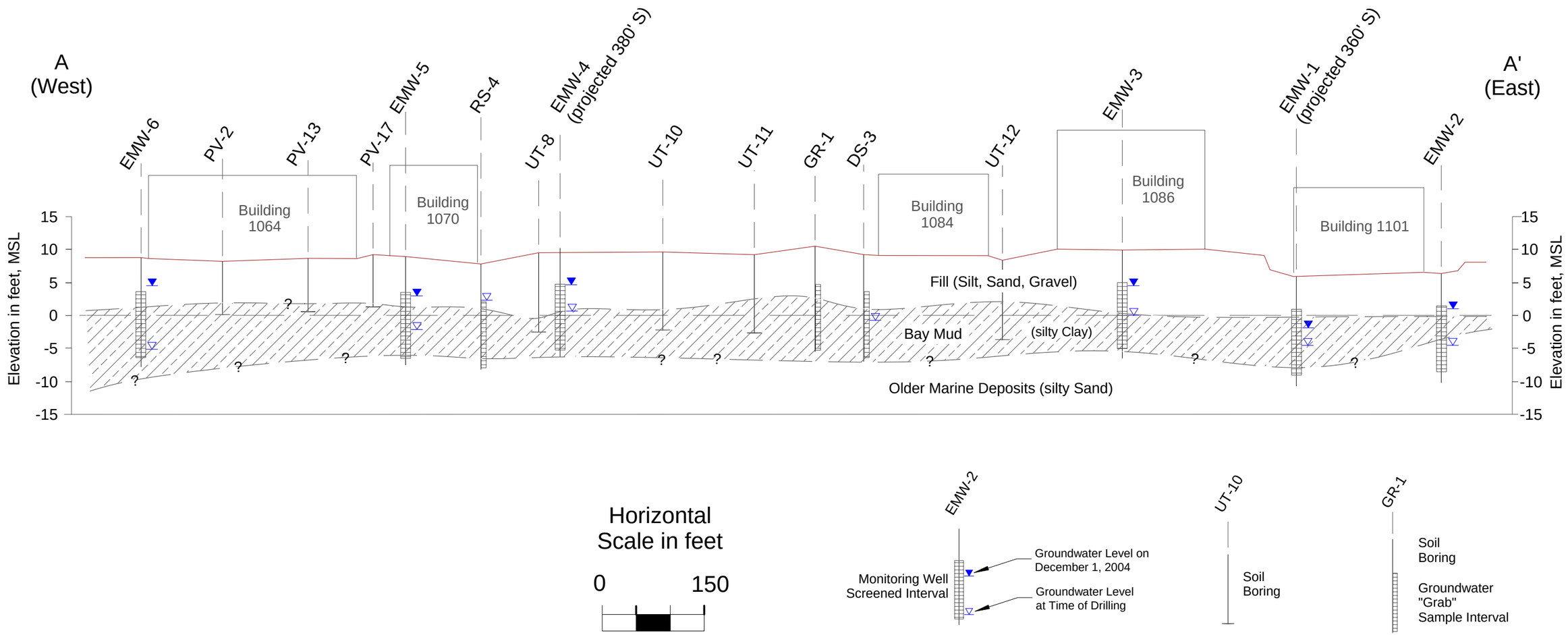
United States Army Reserve Center Oakland

Oakland, California

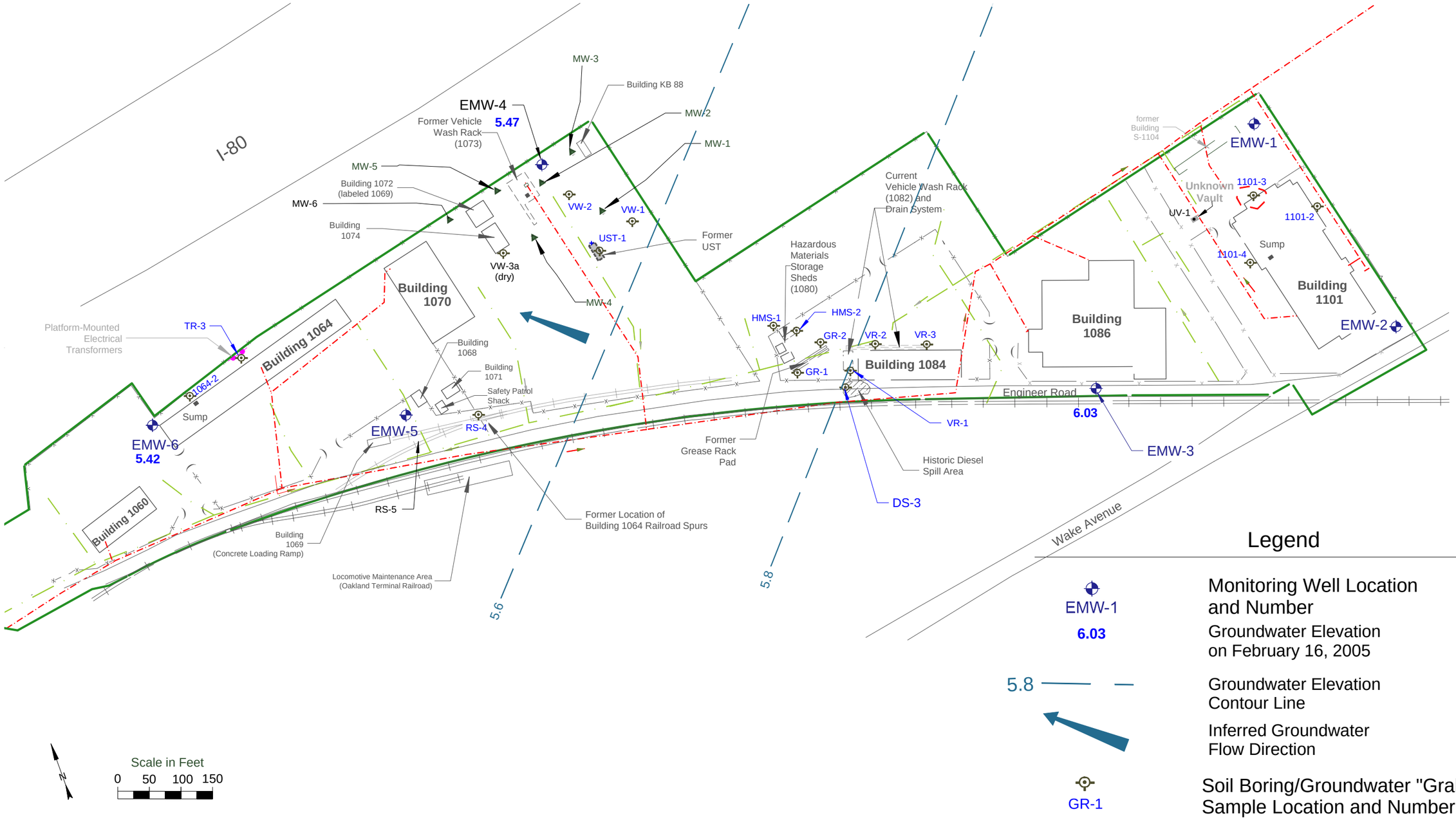
Site Layout with Approximate Underground Utility Locations

Figure 1-3

PrevInvestigations.TCW



geologica	Remedial Investigation/Feasibility Study **Heroic War Dead** **United States Army Reserve Center Oakland**	Schematic Subsurface Cross Section A - A'
San Francisco, California	Oakland, California	**Figure 1-4**



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Remedial Investigation/Feasibility Study

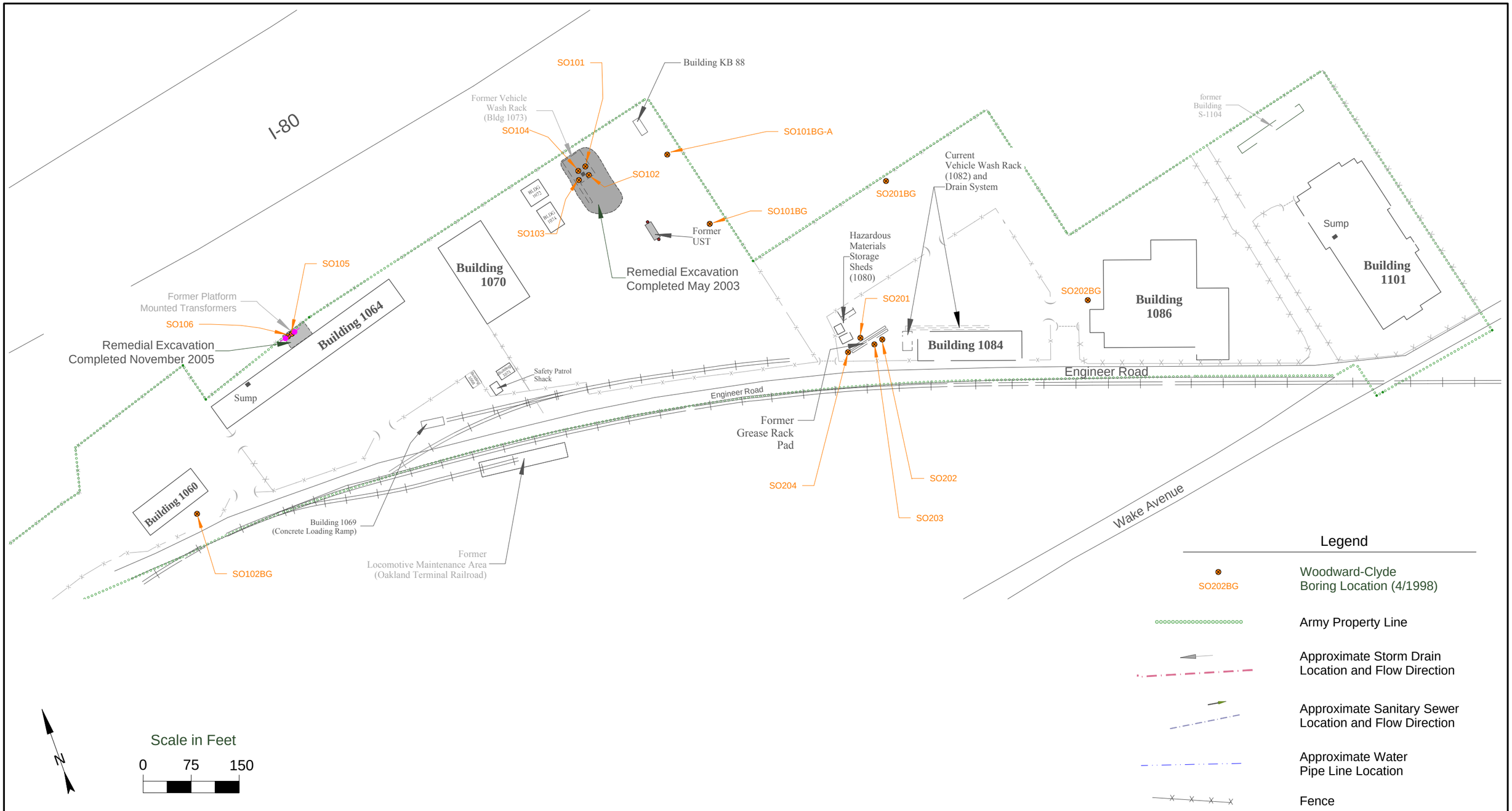
Heroic War Dead

United States Army Reserve Center Oakland

Oakland, California

Groundwater Elevation Contour Map
February 16, 2005

Figure 1-5



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Remedial Investigation/Feasibility Study

Heroic War Dead

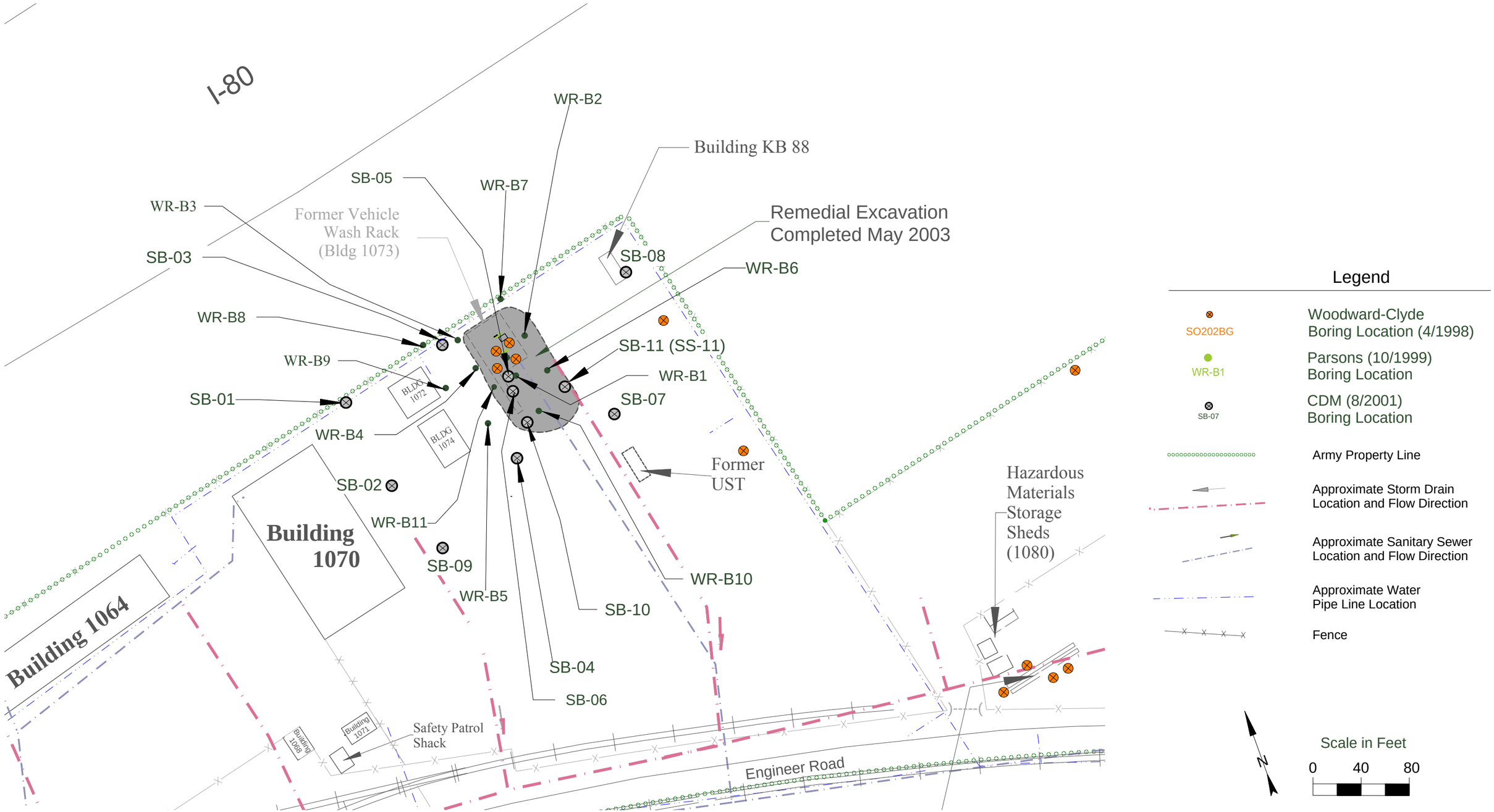
United States Army Reserve Center Oakland

Oakland, California

Woodward-Clyde
April 1998 Soil Sampling Locations

Figure 1-6

PrevInvestigations.TCW/Woodie



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Remedial Investigation/Feasibility Study

Heroic War Dead

United States Army Reserve Center Oakland

Oakland, California

Former Vehicle Wash Rack
Investigation Borings
Parsons, 1999 and CDM, 2001

Figure 1-7

Legend

SO202BG	Woodward-Clyde Boring Location (4/1998)
WR-B1	Parsons (10/1999) Boring Location
SB-07	CDM (8/2001) Boring Location
MW-4	Monitoring Well Installed by CDM (4/2004)
	Soil Gas Sampling Location CDM (4/2004)

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Remedial Investigation/Feasibility Study

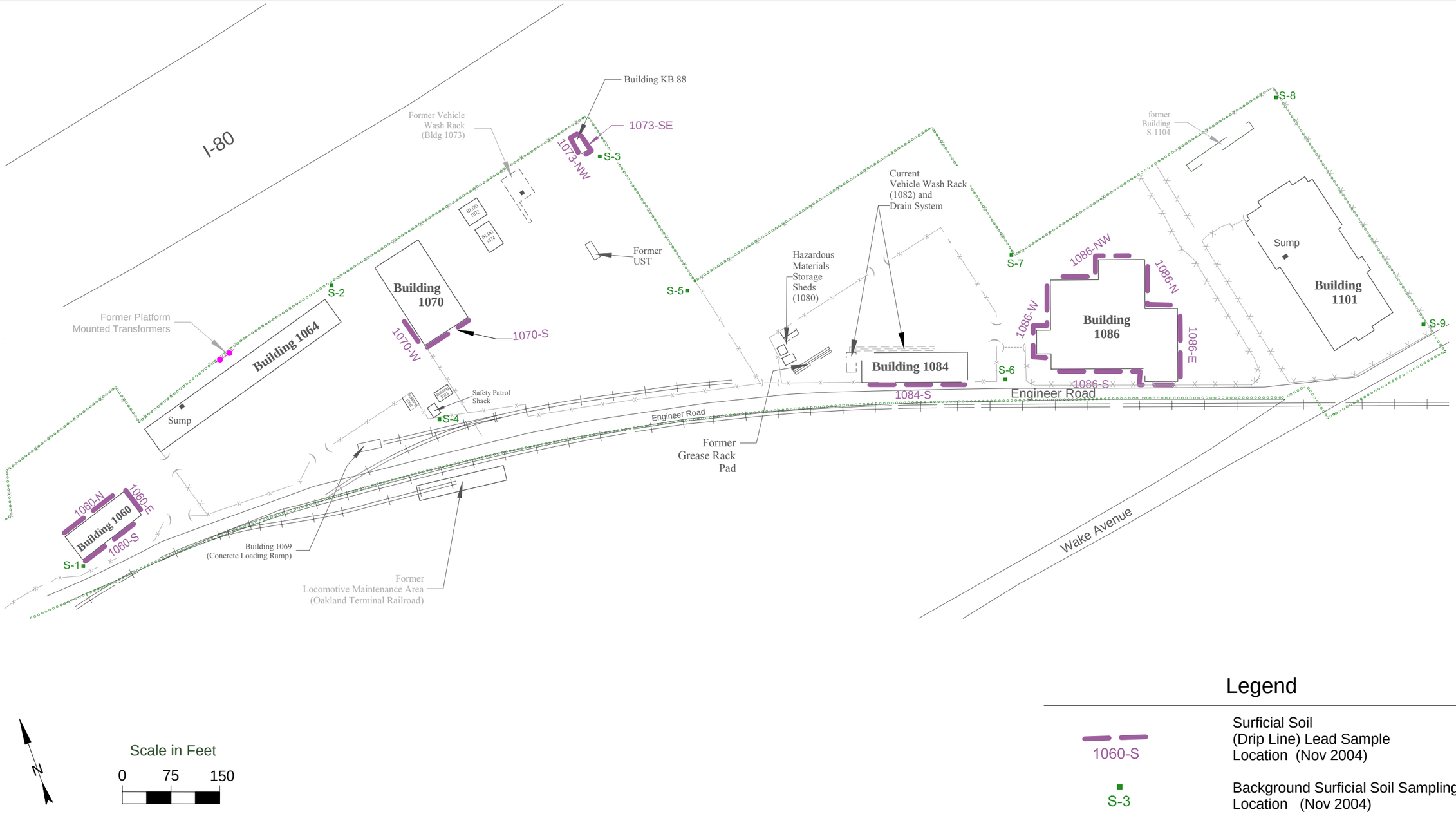
Heroic War Dead

United States Army Reserve Center Oakland

Oakland, California

CDM 2004 Groundwater Monitoring Well and Soil Gas Sampling Locations

Figure 1-8



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Remedial Investigation/Feasibility Study

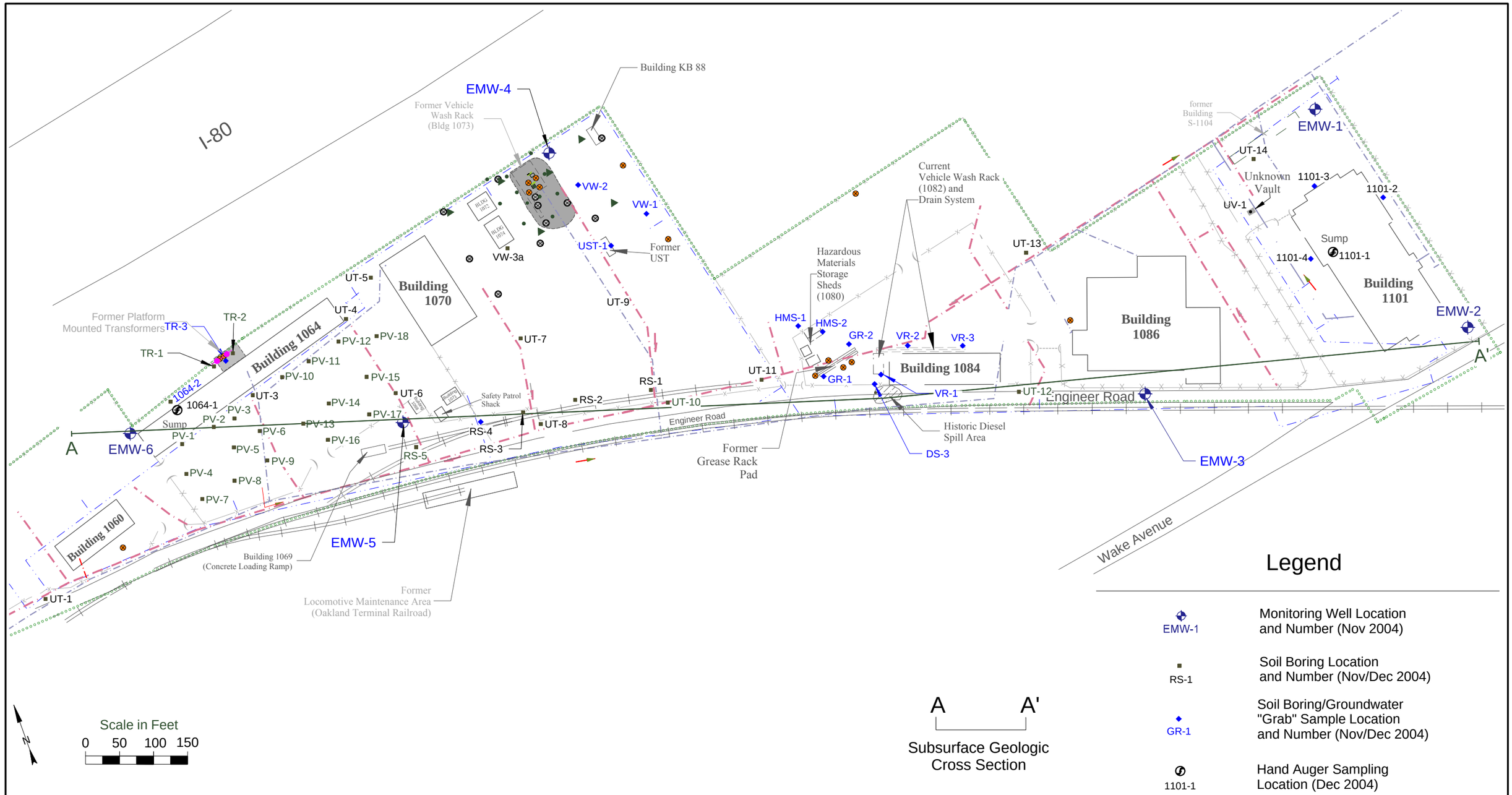
Heroic War Dead

United States Army Reserve Center Oakland

Oakland, California

Geologica 2004
Surficial Soil Sampling Locations

Figure 1-9a



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Remedial Investigation/Feasibility Study

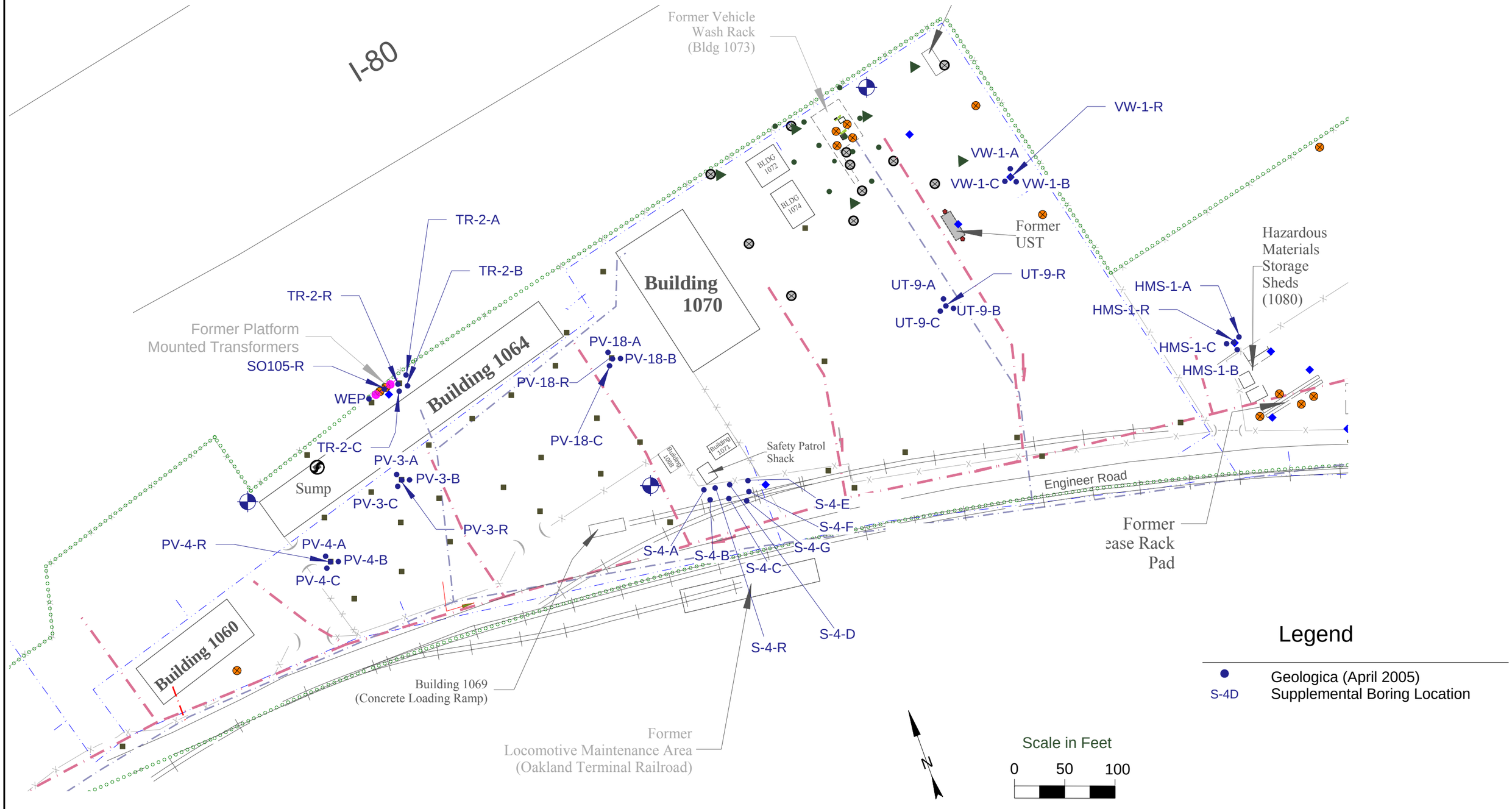
Heroic War Dead

United States Army Reserve Center Oakland

Oakland, California

Geologica 2004 Subsurface Soil and Groundwater Sampling Locations

Figure 1-9b



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Remedial Investigation/Feasibility Study

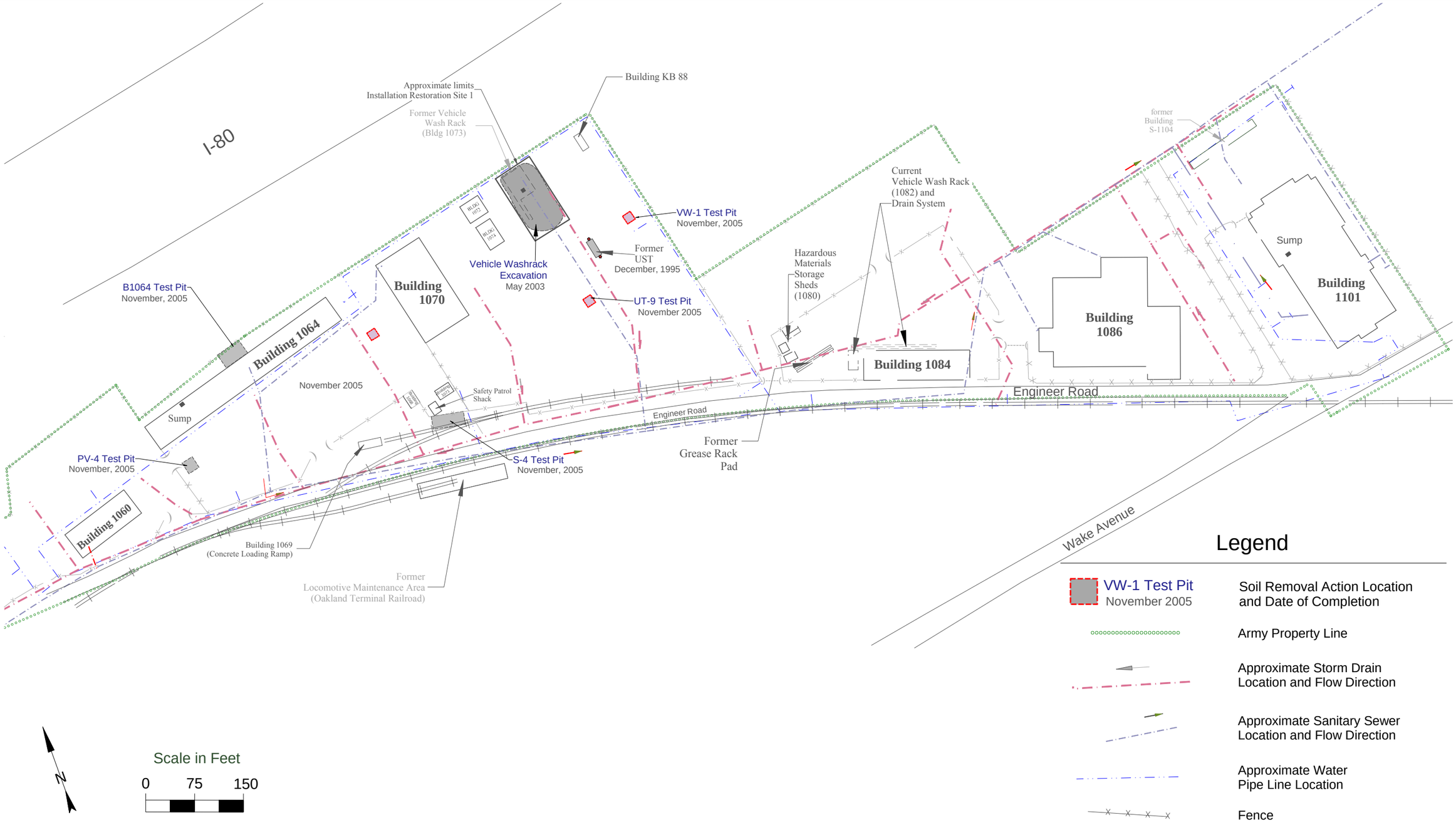
Heroic War Dead

United States Army Reserve Center Oakland

Oakland, California

Geologica April 2005 Supplemental Subsurface Soil Sampling Locations

Figure 1-10



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Remedial Investigation/Feasibility Study

Heroic War Dead

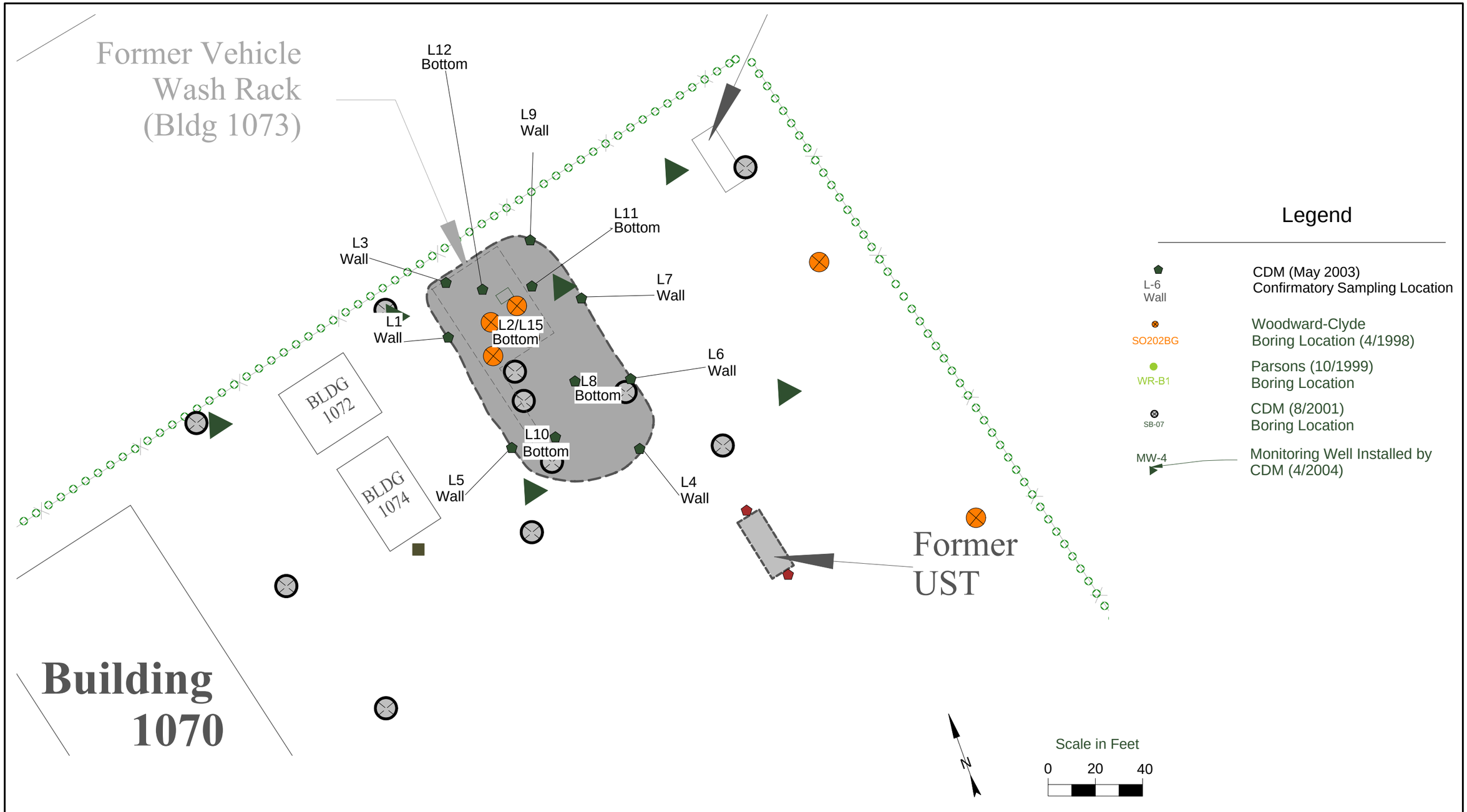
United States Army Reserve Center Oakland

Oakland, California

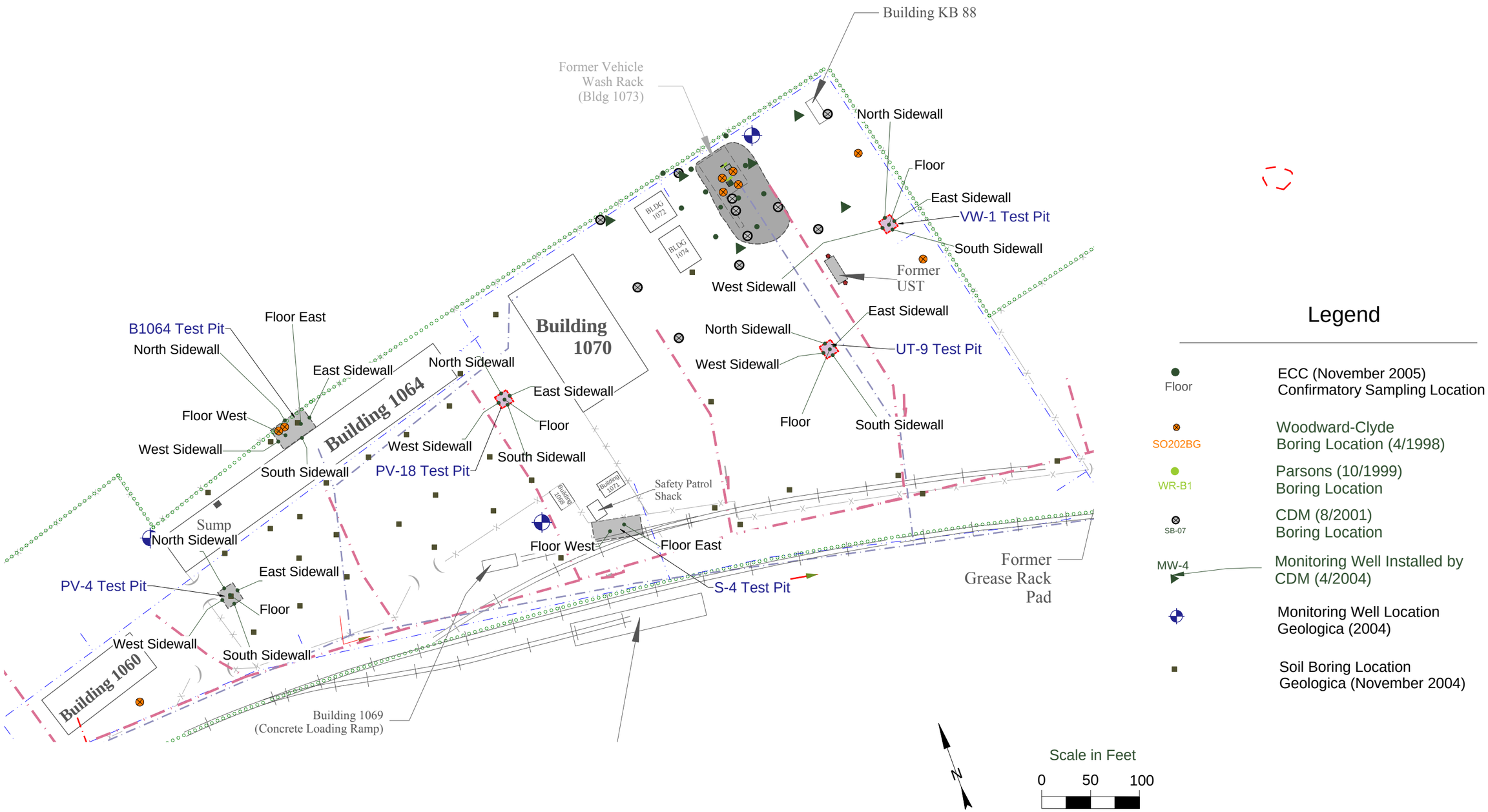
Soil Cleanup Action Locations

Figure 1-11a

PrevInvestigations.TCW



geologica San Francisco, California	Remedial Investigation/Feasibility Study **Heroic War Dead** **United States Army Reserve Center Oakland** Oakland, California	Former Vehicle Wash Rack (IR Site 1) Interim Removal Action Confirmatory Sampling Locations **Figure 1-11b**



geologica

San Francisco, California

Remedial Investigation/Feasibility Study

Heroic War Dead

United States Army Reserve Center Oakland

Oakland, California

Test Pit Sampling Locations (ECC, 2005)

Figure 1-11c

2. Remedial Investigation

Soil quality investigations were conducted at the site in September and October 2006 to further evaluate the horizontal and vertical extent of apparently elevated lead concentrations in soil in three areas within the building 1070 yard and to further investigate the horizontal and vertical extent of apparently elevated cPAH concentrations in soil in a portion of the building 1064 yard. Boring locations are shown on **Figure 2-1**.

On September 28, 2006 soil borings were advanced using direct push drilling equipment as follows:

- **SS-11 Lead Area -** Three borings (SS11-1, SS11-3, and SS11-4) were advanced to 8 ft total depth with soil sample collection and analysis for total lead between 6 and 8 ft. A total of 4 soil samples including one field duplicate were collected from borings advanced at the SS-11 location and 20 ft southeast and southwest of the SS-11 location.

- **UT-9 Lead Area -** Eight borings (UT9-1 through UT9-8) were advanced to 10 ft total depth with soil sample collection and analysis for total lead between 3 and 5 ft; and, 8 and 10 ft. A total of 17 soil samples including one field duplicate were collected from three borings advanced on roughly 10 ft centers west and east of UT-9 excavation; and two borings advanced on 10 ft centers north of UT-9 excavation.

- **VW-1 Lead Area -** Six borings (VW1-1 through VW1-6) were advanced to 6 ft total depth with soil sample collection and analysis for total lead between 2 and 4 ft; and, 4 and 6 ft. A total of 13 soil samples including one field duplicate were collected from three borings advanced on roughly 10 ft centers north and three borings south of the test pit advanced in November 2005.

- **PV-18 PAH Area.** Twelve borings (PV18-1 through PV18-12) were advanced to 8 ft total depth with soil sample collection and analysis for seven carcinogenic PAHs between 2 and 4 ft; and, 5 and 8 ft. A total of 26 soil samples including two field duplicates were collected from borings advanced on roughly 10 ft centers south, east, west, and north of previous test pit footprint, then stepped out in a second ring 15 ft from the first.

Following receipt and review of the laboratory testing results from the September 2006 field program and discussion with DTSC, a total of 36 additional soil borings were advanced using direct push drilling equipment on October 25 and 26, 2006 (**Figure 2-1**). The purpose of the October 2006 field program was to further evaluate the horizontal and vertical extent of lead and PAH impacted soil in the building 1064 and 1070 yards as follows:

- **PV-18 PAH Area.** Four additional soil borings (PV18-13 through PV18-16) were advanced to depths of 8 ft bgs south of the borings advanced near the PV-18 test pit. Two soil samples were collected from each boring at depths of 3.5 and 7.5 ft. A total of 22 soil samples including two field duplicate samples were submitted for analyses for seven carcinogenic PAHs.
- **VW-1 Lead Area -** Thirteen borings (VW1-7 through VW1-14, VW1-16, VW1-17, VW1-18, VW1-26, and VW1-27) were advanced to 9 ft total depth with soil sample collection and analysis for total lead at depths of 2.5, 4.5 and 8.5 ft bgs. A total of 43 soil samples including four field duplicate samples were collected from borings advanced over an area of approximately 75 ft wide (east to west) and 180 ft long (north to south) around the VW-1 test pit advanced in November 2005.
- **UT-9 Lead Area –** Nineteen borings (UT9-9 through UT9-17 and UT9-19 through UT9-28) were advanced to 9 ft total depth with soil sample collection and analysis for total lead at depths of 2.5, 4.5, and 8.5 ft bgs. A total of 61 soil samples including four field duplicate samples were collected from borings advanced over an area of approximately 100 ft wide (east to west) and 100 ft long (north to south) around the UT-9 test pit.

Boring locations are shown on **Figure 2-1**.

2.1 Field Procedures

This section describes field procedures for the RI field program.

2.1.1 Borehole Clearance and Subsurface Structures Evaluation

Prior to conducting drilling activities, GEOLOGICA coordinated with USAR and EBMUD staff to arrange site access and mark borehole and sampling locations, review available as-built blueprints and contact Underground Services Alert (USA) to help establish the approximate locations of subsurface utilities within the investigation area. On September 28 and October 19, 2006, Cruz Brothers Locators of Petaluma, California cleared each drilling location using electromagnetic line locating methods (inductive and conductive) and/or ground penetrating radar. Information provided by the USAR, utility locating services, and local utility districts was used to develop a site plan showing locations of pertinent subsurface features including sanitary and storm sewer locations. Approximate locations of subsurface storm and sanitary sewers and water pipelines are shown on **Figure 2-1**. During the course of the borehole clearance program, the locations of some explorations were adjusted slightly to reduce the potential for contacting buried utilities.

2.1.2 Drilling and Sampling Procedures

The direct push explorations were advanced by Resonant Sonic International of Woodland, California using a truck-mounted direct push/vibratory hammer (GeoProbeTM) drilling rig. Soil samples were retrieved in continuous four-foot intervals during direct push probe advancement by withdrawing the probe rod and removing the 1.5-inch-diameter polyethylene liner attached to the tip. For each boring, the entire

sample collected from each four-foot long, polyethylene tube was screened for visual and olfactory signs of contamination. All soil samples were classified according to the Unified Soil Classification System (USCS). Sampling procedures, sample labeling, custody, and transport were conducted as described in the approved SI Work Plan (GEOLOGICA, 2004) as modified in an addendum (No. 2) to the SI Work Plan dated September 21, 2006. Field boring logs are presented in Appendix A.

2.1.3 Field Screening Procedures for Lead

Field screening for lead was performed during the October 2006 RI field program using field screening kits obtained from HybriVet Systems, Inc. (HybriVet) of Natick, MA. The HybriVet LeadCheck™ field screening kits were used in an attempt to identify the need for and direction of supplemental step out borings while the direct push exploration program was being conducted. The field screening procedure consisted of the following steps: 1) an approximately 1 oz sample of soil from the direct push sample liner was placed in a dedicated zip lock plastic bag; 2) the bagged soil was mixed for approximately 1 minute by manual manipulation; then 3) an approximately 5 gm subsample was collected from the homogenized soil sample using a dedicated plastic scoop provided with the sample kit taking care to exclude rocks, debris, and foreign objects; 4) the 5 gm subsample was placed in a dedicated plastic sample bottle provided with the kit; 5) an ampoule of extraction reagent (acid) provided with the kit was transferred into the plastic sample bottle, capped, and shaken for approximately one minute to thoroughly mix the soil and extraction reagent; 6) the mixture was allowed to incubate for at least one hour at ambient temperature until solids settled to the bottom of the container; 7) a dedicated plastic eye dropper was used to draw off the liquid from the top of the soil/fluid mixture; 8) 2 to 3 drops of the extract were placed in each of two wells in a plastic sample test tray; 8) an ampoule containing the lead indicator compound was crushed and one to two drops of indicator were placed in the wells in the sample test tray. After allowing the extract and indicator to react for at least 10 minutes at ambient temperature, the presence of lead at concentrations above the screening kit threshold of 400 mg/kg was evaluated by visual inspection. Samples with strong pink-purple color change were judged to have lead present at concentrations greater than 400 mg/kg; samples with little or no color change (the indicator fluid is yellow-orange) were judged to have less than 400 mg/kg lead.

2.1.4 Boring Abandonment Procedures

At the completion of soil sampling activities, each boring was backfilled with neat cement grout. If present at the drilling location, asphalt paving was repaired by backfilling with asphalt.

2.1.5 Investigation Derived Waste Management

Two drums of soil cuttings and three drums of equipment decontamination purge water were accumulated during the RI field program. Drums of investigation derived waste were hand labeled with date of generation, sampling locations, and contractor and placed in the building 1070 yard pending receipt and review of laboratory analytical testing results.

2.2 Laboratory Analytical Testing Procedures

Soil samples were collected in precleaned containers provided by the EBMUD analytical laboratory located at the EBMUD Wastewater Treatment Plant on Engineer Road in Oakland. A total of 139 soil samples (including 11 field duplicates) were submitted to the EBMUD laboratory for total lead analysis using EPA Method 6010B and 35 soil samples (including 3 field duplicates) were submitted for analysis for seven cPAHs (benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene) using EPA Method 8270.

2.3 Results

Results of the September and October 2006 field sampling programs are discussed below. Boring locations are shown on **Figure 2-1**. Analytical testing results are summarized in **Tables 2-1** through **2-3**. Laboratory analytical testing results and a discussion of analytical data quality are presented in Appendix B.

2.3.1 Soil and Groundwater Conditions

Soils encountered during the RI field program generally consisted of silt, sand, gravel fill overlying native marine deposits. The source of the fill soil is unknown. In some locations the fill soil appeared to consist of reworked Bay Mud deposits; however, bits of wood, fragments of metal and glass, were frequently observed in the building 1064 and 1070 yards. In addition, small amounts of clinker or slag-like material were encountered in several locations in the UT-9 and VW-1 explorations. The fill horizon ranged in thickness from 5 to 8 feet. As was observed previously, the contact with the underlying marine sequence was generally marked by a transition from the relatively non-cohesive, sandy fill soil to a plastic, gray-black, silty clay/clayey silt. Groundwater was encountered at depths of 5 to 7 ft bgs during the September and October 2006 field programs. No wells were completed and existing wells were not sampled during this field program.

2.3.2 Soil Chemical Testing Results

This section discusses results of field screening and laboratory chemical analyses of soil samples collected during the September and October 2006 field programs.

2.3.2.1 Laboratory Data Quality

With the exception of indeno(1,2,3-cd)pyrene analysis results which were qualified as estimated concentrations due to laboratory surrogate recovery issues, the laboratory analyses from the September and October 2006 field programs were found to be acceptable for the purposes of this RI/FS.

One issue identified in the data quality review involves the high Relative Percent Difference (RPD) between primary and duplicate sample results for both PAHs and lead. The RPD between primary and duplicate sample results for analyses for the seven cPAHs

ranged from 3% to 95% with an average of value of 53%. Because the samples for which field duplicates were collected in this area had low cPAH detections near the method reporting limits for these analytes, these results are not unexpected given frequently high natural variability in soil sample results. The calculated RPD between primary and duplicate sample results for analyses for lead in soil samples collected in the building 1070 yard ranged from 1 to 194%. Lead was detected in all samples submitted for this analysis. However, in contrast to the results for organics testing, the RPD of samples with low lead concentrations tended to be low, e.g., sample VW1-18/8.5 (31.1 mg/kg) and its duplicate VW1-18/8.5/3 (48.1 mg/kg) were reasonably comparable. However, the RPD of samples with high lead concentrations tended to be very high, e.g., sample VW1-1/4 (38,600 mg/kg) and its duplicate VW1-1/4/3 (806 mg/kg). The lack of precision in field duplicate samples for lead analyses is believed to be related to analytical sample volume and the presence of particle associated lead, possibly paint chips, sand blasting grit, or lead debris in the fill. All of the samples analyzed were prepared using standard SW 846 procedures for preparation and extraction. Given the high RPD between field duplicates, it may be necessary in the future to collect somewhat larger volume samples and homogenize individual samples thoroughly before extraction and analysis to improve duplicate sample precision.

2.3.2.2 Field LeadCheck™ Screening Results

Field screening results generally yielded comparable results for samples that the analytical laboratory subsequently found contained less than 400 mg/kg lead, but had a high false negative rate with respect to samples which the analytical laboratory found had lead concentrations greater than 400 mg/kg lead and which did not generate a color change with the field lead test kits. This is believed to be the result of two matrix related issues: 1) sample variability noted in samples analyzed by the fixed laboratory related to the presence of discrete particulate associated lead; and 2) poor efficiency for the field extraction procedure. The first issue might be addressed by homogenizing samples more thoroughly and sieving to remove non-soil materials and gravel. The second issue relates to the high moisture content of the fine-grained soils encountered at the site, and the presence of wood debris, organic matter, and shell fragments that tend to neutralize the acid extractant used for the field screening test. The field screening kits were used to identify several additional boring locations based on positive test results. One proposed boring (UT-18) was not completed based on what turned out to be a false negative result. The field screening kit results were not used to identify areas for any other purpose.

2.3.2.3 SS-11 Area Sample Results

As shown on **Figure 2-1**, the SS-11 boring location is believed to have been excavated out during remedial activities for the former vehicle wash rack. However, because the excavation sidewalls were sloped to maintain stability, there was some concern on the part of DTSC that not all of the soil potentially impacted by lead had been removed. One boring (SS11-1) was advanced at the location of boring SS-11, and two borings were advanced approximately and 20 ft southeast (SS11-3) and southwest (SS11-4) of the SS-11 location. Lead was detected at concentrations ranging from 37.9 to 150 mg/kg in the three primary samples (SS11-1/6, SS11-3/6, and SS11-4/6) and one duplicate soil sample (SS11-1/6/3) collected in this area (see Table 2-1). None of the lead concentrations

detected in the September 2006 soil samples exceeded the 800 mg/kg action level identified by DTSC. Based on these results, no further action is needed for the SS-11 area.

2.3.2.4 PV-18 Area Sample Results

A total of 16 soil borings were advanced in September and October 2006 to evaluate the horizontal and vertical extent of cPAH-impacted soil identified near the PV-18 test pit excavation (**Figure 2-1**). As summarized in **Table 2-1**, all seven cPAHs were detected in one or more of the soil samples collected near the PV-18 test pit at concentrations ranging from 0.072 mg/kg (dibenzo(a,h)anthracene) to 15 mg/kg (benzo(b)fluoranthene). Calculated benzo(a)pyrene toxic equivalent values ranged from 0.1 to 14.45 mg/kg. Total benzo(a)pyrene toxicity equivalent values calculated for each sample collected in the September and October 2006 field programs and selected results from previous sampling programs are schematically illustrated on **Figure 2-2**. It should be noted that values posted for sidewall and bottom samples collected from the PV-18 test pit are for benzo(a)pyrene alone, no other PAHs were analyzed for during the November 2005 field program (ECC, 2006). As highlighted in **Table 2-1** and illustrated on **Figure 2-2**, total benzo(a)pyrene equivalent values in four of the September/October 2006 soil samples exceeded the 1 mg/kg action level identified by DTSC including the shallow samples from borings PV18-9, PV18-12, and PV18-14 and the deep sample from boring PV18-3. Three of the samples with cPAH exceedances (PV18-9/2, PV18-12/2, and PV18-14/3) were collected in the 2 ft to 4 ft depth interval above the groundwater table at the site. The third sample (PV18-3/5) was a composite sample collected from the 5 ft to 8 ft depth interval which was at and below the groundwater table. Samples collected below the groundwater table are presumed to be below the soil zone likely to be encountered by typical construction activities at the site.

2.3.2.5 VW-1 Area Sample Results

A total of 19 soil borings were advanced in September and October 2006 to evaluate the horizontal and vertical extent of lead-impacted soil identified near the VW-1 test pit excavation (**Figure 2-1**). As summarized in **Table 2-2**, lead was detected at concentrations ranging from 7.07 to 38,600 mg/kg in the 43 soil samples (including four field duplicate samples) collected in this area. Lead concentrations in 20 of the soil samples collected in this area in September and October 2006 exceeded the 800 mg/kg screening level. The locations, depths, and lead concentrations in soil samples collected near the VW-1 test pit are schematically illustrated on **Figure 2-3**.

2.3.2.6 UT-9 Area Sample Results

A total of 27 soil borings were advanced in September and October 2006 to evaluate the horizontal and vertical extent of lead-impacted soil identified near the UT-9 test pit excavation (**Figure 2-1**). As summarized in **Table 2-3**, lead was detected at concentrations ranging from 4.33 to 84,300 mg/kg in the 78 soil samples (including five field duplicate samples) collected in this area. Lead concentrations in 27 of the soil samples collected in this area in September and October 2006 exceeded the 800 mg/kg

screening level. The locations, depths, and lead concentrations in soil samples collected near the UT-9 test pit are schematically illustrated on **Figure 2-3**.

2.4 Summary of Site Wide RI Findings

Findings of the September/October 2006 RI field program can be summarized as follows:

- Samples collected from the PV-18 test pit and nearby borings indicated the presence of cPAHs in soil at concentrations above the DTSC's screening level of 1 mg/kg. As a result, the PV-18 test pit and associated borings were designated an Area of Concern (AOC) to be carried through the site wide FS discussed in Section 5 below. As a result of the relatively wide spacing between borings advanced during the 2006 remedial investigation and previous investigations, the southern extent of elevated concentrations of PAH-impacted soil in the building 1064 yard was approximated as the southern property line of the HWD. Advancement of additional borings to refine the estimate of the southern extent of PAH-impacted soil in this area is recommended.
- Soil samples collected near the UT-9 and VW-1 test pits contained lead at concentrations greater than the 800 mg/kg screening level. As a result, this area was designated as an Area of Concern (AOC) to be carried forward to the site wide FS. The area of lead-impacted soil appears to be confined to the building 1070 yard; however, there remain gaps of roughly 50 ft north of the RI borings and up to 100 to 150 ft west, south, and southeast of the RI borings with no or limited sampling coverage which may conservatively overestimate the area of lead-impacted soil. Consequently, advancement of additional borings to refine the estimated volume of lead-impacted soil is recommended.
- None of the soil samples collected at the SS-11 boring location and nearby contained lead at concentrations above the EPA PRG of 800 mg/kg; consequently, it was concluded that this location is not an AOC.

SECTION 2
TABLES

Table 2-1
USAR Heroic War Dead Site

Remedial Investigation Sampling Results
PV-18 and SS-11 Areas

			Concentration in mg/kg								
Boring	Sample ID	Depth Interval, ft bgs	Lead	Benzo(a) Anthracene	Benzo(a) Pyrene	Benzo(b) Fluoranthene	Benzo(k) Fluoranthene	Chrysene	Dibenzo (a,h) Anthracene	Indeno (1,2,3-cd) Pyrene	Total Benzo(a) Pyrene Toxic Equivalent[1]
SS-11 Area											
SS11-1	SS11-1/6	6'-8'	**42.7**	-	-	-	-	-	-	-	-
	SS11-1/6/3(dup)		**38.8**	-	-	-	-	-	-	-	-
SS11-3	SS11-3/6	6'-8'	**37.9**	-	-	-	-	-	-	-	-
SS11-4	SS11-4/6	6'-8'	**150**	-	-	-	-	-	-	-	-
PV-18 Area											
PV18-1	PV18-1/2	2'-4'	-	0.058 U	**0.12**	**0.13**	**0.13**	**0.14**	0.044 UJ	**0.083 J**	**0.17**
	PV18-1/5	5'-8'	-	**0.15**	**0.23**	**0.14**	**0.18**	**0.25**	0.044 UJ	**0.17 J**	**0.31**
PV18-2	PV18-2/2	2'-4'	-	**0.12**	**0.14**	**0.14**	**0.15**	**0.18**	0.044 UJ	**0.1 J**	**0.20**
	PV18-2/5	5'-8'	-	**0.089**	**0.13**	**0.13**	**0.13**	**0.15**	0.044 UJ	**0.079 J**	**0.18**
PV18-3	PV18-3/2	2'-4'	-	**0.11**	**0.12**	**0.12**	**0.13**	**0.15**	0.044 UJ	**0.11 J**	**0.18**
	PV18-3/5	5'-8'	-	**2.2**	**2.8**	**2.4**	**2.3**	**3.2**	0.44 UJ	**1.7 J**	**3.78**
PV18-4	PV18-4/2	2'-4'	-	**0.11**	**0.13**	**0.16**	**0.15**	**0.19**	0.044 UJ	**0.061 J**	**0.19**
	PV18-4/5	5'-8'	-	0.058 U	**0.11**	**0.13**	**0.15**	**0.2**	0.044 UJ	**0.087 J**	**0.16**
PV18-5	PV18-5/2	2'-4'	-	**0.21**	**0.29**	**0.29**	**0.26**	**0.39**	0.044 UJ	**0.19 J**	**0.40**
	PV18-5/5	5'-8'	-	**0.3**	**0.76**	**0.62**	**0.57**	**0.46**	0.044 UJ	**0.55 J**	**0.98**
	PV18-5/5/3(dup)		-	**0.15**	**0.29**	**0.25**	**0.24**	**0.21**	0.044 UJ	**0.21 J**	**0.39**
PV18-6	PV18-6/2	2'-4'	-	**0.26**	**0.55**	**0.45**	**0.49**	**0.38**	**0.089**	**0.34 J**	**0.74**
	PV18-6/5	5'-8'	-	**0.26**	**0.56**	**0.47**	**0.42**	**0.38**	0.044 UJ	**0.38 J**	**0.73**
PV18-7	PV18-7/2	2'-4'	-	**0.065**	**0.089**	**0.09**	**0.09**	**0.089**	0.044 UJ	**0.065 J**	**0.13**
	PV18-7/5	5'-8'	-	**0.1**	**0.14**	**0.12**	**0.13**	**0.15**	0.044 UJ	**0.11 J**	**0.20**
PV18-8	PV18-8/2	2'-4'	-	**0.19**	**0.23**	**0.23**	**0.23**	**0.25**	0.044 UJ	**0.18 J**	**0.32**
	PV18-8/5	5'-8'	-	0.058 U	0.051 U	0.042 U	0.063 U	0.053 U	0.044 UJ	0.042 UJ	0.044 U
PV18-9	PV18-9/2	2'-4'	-	**9**	**9.5**	**15**	**12**	**12**	**1.4**	**6.7 J**	**14.45**
	PV18-9/5	5'-8'	-	**0.23**	**0.34**	**0.32**	**0.24**	**0.44**	**0.072**	**0.34 J**	**0.49**
	PV18-9/5/3(dup)		-	**0.27**	**0.34**	**0.33**	**0.33**	**0.46**	**0.085**	**0.43 J**	**0.51**
PV18-10	PV18-10/2	2'-4'	-	**0.15**	**0.14**	**0.14**	**0.13**	**0.2**	0.044 UJ	**0.095 J**	**0.20**
	PV18-10/5	5'-8'	-	**0.21**	**0.21**	**0.25**	**0.2**	**0.35**	0.044 UJ	**0.16 J**	**0.30**
PV18-11	PV18-11/2	2'-4'	-	0.058 U	0.051 U	0.042 U	0.063 U	0.053 U	0.044 UJ	0.042 UJ	0.044 U
	PV18-11/5	5'-8'	-	**0.15**	**0.34**	**0.44**	**0.3**	**0.21**	0.044 UJ	**0.3 J**	**0.47**
PV18-12	PV18-12/2	2'-4'	-	**3.9**	**7.3**	**6.9**	**6**	**6.4**	**1.5**	**5.5 J**	**10.19**
	PV18-12/5	5'-8'	-	**0.14**	**0.28**	**0.29**	**0.25**	**0.18**	0.044 UJ	**0.19 J**	**0.38**
PV18-13	PV18-13/3	3.5'-4'	-	**0.061**	**0.075**	**0.09**	**0.079**	**0.11**	0.044 UJ	0.042 UJ	**0.11**
	PV18-13/7	7.5'-8'	-	**0.29**	**0.49**	**0.58**	**0.79**	**0.37**	0.088 UJ	**0.27 J**	**0.70**
PV18-14	PV18-14/3	3.5'-4'	-	**5.3**	**11**	**11**	**11**	**8.1**	**1.6**	**6.2 J**	**14.44**
	PV18-14/7	7.5'-8'	-	**0.065**	**0.13**	**0.12**	**0.15**	**0.085**	0.044 UJ	**0.1 J**	**0.18**
PV18-15	PV18-15/3	3.5'-4'	-	0.058 U	**0.065**	**0.087**	**0.076**	**0.084**	0.044 UJ	0.042 UJ	**0.10**
	PV18-15/7	7.5'-8'	-	0.058 U	**0.097**	**0.093**	**0.089**	**0.095**	0.044 UJ	**0.066 J**	**0.13**
PV18-16	PV18-16/3	3.5'-4'	-	**0.071**	**0.12**	**0.1**	**0.1**	**0.076**	0.044 UJ	**0.11 J**	**0.17**
	PV18-16/7	7.5'-8'	-	**0.071**	**0.12**	**0.1**	**0.1**	**0.076**	0.044 UJ	**0.11 J**	**0.17**
	PV18-16/7/3(dup)		-	0.058 U	**0.07**	**0.055**	**0.069**	0.053 U	0.044 UJ	**0.068 J**	**0.10**

Notes:

1-Calculated as sum of 1 x benzo(a)pyrene concentration + 0.1 x benzo(a)anthracene concentration + 0.1 x benzo(b)fluoranthene concentration + 0.1 x benzo(k)fluoranthene concentration + 0.01 x chrysene concentration + 0.4 x dibenz(a,h)anthracene concentration + 0.1 x indeno(1,2,3-cd)pyrene concentration.
Value equal to one half the method reporting limit used for analytes not detected in a sample.
0.044 U Analyte not detected above the reported value. Value represents the method reporting limit.
14.44 Sample result above Total benzo(a)pyrene toxic equivalent value of 1 mg/kg.
/3(dup) = Field duplicate sample. For example SS11-1/6/3 is a duplicate of SS11-1/6

Table 2-2
USAR Heroic War Dead Site

Remedial Investigation Sampling Results
VW-1 Area

Boring	Sample ID	Sample Collection Date	Depth, ft bgs	Lead Concentration, mg/kg	
VW1-1	VW1-1/2	9/29/2006	2'-4'	**935**	
	VW1-1/4	9/29/2006	4'-6'	**38,600**	
	VW1-1/4/3(dup)	9/29/2006		**806**	
VW1-2	VW1-2/2	9/29/2006	2'-4'	409	
	WV1-2/4	9/29/2006	4'-6'	**2,570**	*
VW1-3	VW1-3/2	9/29/2006	2'-4'	681	
	VW1-3/4	9/29/2006	4'-6'	**6,960**	
VW1-4	VW1-4/2	9/29/2006	2'-4'	381	
	VW1-4/4	9/29/2006	4'-6'	337	
VW1-5	VW1-5/2	9/29/2006	2'-4'	**1,090**	
	VW1-5/4	9/29/2006	4'-6'	71.6	
VW1-6	VW1-6/2	9/29/2006	2'-4'	**1,370**	
	VW1-6/4	9/29/2006	4'-6'	220	
VW1-7	VW1-7/2.5	10/25/2006	2.5'-3'	172	N
	VW1-7/4.5	10/25/2006	4.5'-5'	609	
	VW1-7/8.5	10/25/2006	8.5'-9'	269	
VW1-8	VW1-8/2.5	10/25/2006	2.5'-3'	495	
	VW1-8/4.5	10/25/2006	4.5'-5'	420	
	VW1-8/8.5	10/25/2006	8.5'-9'	**4,580**	
VW1-9	VW1-9/2.5	10/25/2006	2.5'-3'	456	
	VW1-9/4.5	10/25/2006	4.5'-5'	130	
	VW1-9/8.5	10/25/2006	8.5'-9'	**10,000**	
VW1-10	VW1-10/2.5	10/25/2006	2.5'-3'	181	
	VW1-10/4.5	10/25/2006	4.5'-5'	**4,410**	*
	VW1-10/4.5/3(dup)	10/25/2006		**932**	
	VW1-10/8.5	10/25/2006	8.5'-9'	43.7	
VW1-11	VW1-11/2.5	10/25/2006	2.5'-3'	95.5	
	VW1-11/4.5	10/25/2006	4.5'-5'	15	
	VW1-11/8.5	10/25/2006	8.5'-9'	**8,520**	
VW1-12	VW1-12/2.5	10/25/2006	2.5'-3'	**1,120**	
	VW1-12/4.5	10/25/2006	4.5'-5'	37.8	
	VW1-12/8.5	10/25/2006	8.5'-9'	**29,000**	
VW1-13	VW1-13/2.5	10/25/2006	2.5'-3'	**6,590**	
	VW1-13/4.5	10/25/2006	4.5'-5'	**1,180**	*
	VW1-13/8.5	10/25/2006	8.5'-9'	**3,510**	
VW1-14	VW1-14/2.5	10/25/2006	2.5'-3'	415	
	VW1-14/2.5/3(dup)	10/25/2006		378	
	VW1-14/4.5	10/25/2006	4.5'-5'	118	
	VW1-14/8.5	10/25/2006	8.5'-9'	29.7	
VW1-16	VW1-16/2.5	10/26/2006	2.5'-3'	116	
	VW1-16/4.5	10/26/2006	4.5'-5'	**1,470**	
	VW1-16/8.5	10/26/2006	8.5'-9'	**9,420**	
VW1-17	VW1-17/2.5	10/26/2006	2.5'-3'	120	N
	VW1-17/4.5	10/26/2006	4.5'-5'	483	
	VW1-17/8.5	10/26/2006	8.5'-9'	564	
VW1-18	VW1-18/2.5	10/26/2006	2.5'-3'	244	
	VW1-18/4.5	10/26/2006	4.5'-5'	87.9	
	VW1-18/8.5	10/26/2006	8.5'-9'	31.1	
	VW1-18/8.5/3(dup)	10/26/2006		48.1	
VW1-26	VW1-26/2.5	10/26/2006	2.5'-3'	6.81	
	VW1-26/2.5/3(dup)	10/26/2006		15.9	
	VW1-26/4.5	10/26/2006	4.5'-5'	407	
	VW1-26/8.5	10/26/2006	8.5'-9'	23.2	
VW1-27	VW1-27/2.5	10/26/2006	2.5'-3'	7.07	
	VW1-27/4.5	10/26/2006	4.5'-5'	**1,120**	
	VW1-27/8.5	10/26/2006	8.5'-9'	339	

Notes:
N = Spike recovery outside of control limits.
* = Laboratory duplicate sample result outside of control limits.
/3(dup) = Field duplicate sample.
2,140 Sample result above lead screening level of 800 mg/kg.

Table 2-3
USAR Heroic War Dead Site

Remedial Investigation Sampling Results
UT-9 Area

Boring	Sample ID	Sample Collection Date	Depth, ft bgs	Lead Concentration, mg/kg	
UT9-1	UT9-1/3	9/28/2006	3'-5'	130	
	UT9-1/8	9/28/2006	8'-10'	87.9	*
UT9-2	UT9-2/3	9/28/2006	3'-5'	115	
	UT9-2/8	9/28/2006	8'-10'	513	
UT9-3	UT9-3/3	9/28/2006	3'-5'	50.9	
	UT9-3/8	9/28/2006	8'-10'	**2,140**	
UT9-4	UT9-4/3	9/28/2006	3'-5'	111	
	UT9-4/8	9/28/2006	8'-10'	**3,410**	
	UT9-4/8/3(dup)			**5,160**	
UT9-5	UT9-5/3	9/28/2006	3'-5'	52.5	
	UT9-5/8	9/28/2006	8'-10'	**844**	
UT9-6	UT9-6/3	9/28/2006	3'-5'	**916**	*
	UT9-6/8	9/28/2006	8'-10'	**1,240**	
UT9-7	UT9-7/3	9/28/2006	3'-5'	125	
	UT9-7/8	9/28/2006	8'-10'	**2,670**	
UT9-8	UT9-8/3	9/28/2006	3'-5'	147	
	UT9-8/8	9/28/2006	8'-10'	**3,900**	
UT9-9	UT9-9/2.5	10/25/2006	2.5'-3'	11.2	
	UT9-9/4.5	10/25/2006	4.5'-5'	**16,600**	
	UT9-9/8.5	10/25/2006	8.5'-9'	77.6	
UT9-10	UT9-10/2.5	10/25/2006	2.5'-3'	21.4	
	UT9-10/4.5	10/25/2006	4.5'-5'	**4,880**	
	UT9-10/8.5	10/25/2006	8.5'-9'	**1,460**	
UT9-11	UT9-11/2.5	10/25/2006	2.5'-3'	29.3	
	UT9-11/4.5	10/25/2006	4.5'-5'	289	
	UT9-11/8.5	10/25/2006	8.5'-9'	**84,300**	
UT9-12	UT9-12/2.5	10/25/2006	2.5'-3'	66.7	
	UT9-12/4.5	10/25/2006	4.5'-5'	60.5	
	UT9-12/8.5/3(dup)	10/25/2006	8.5'-9'	**10,200**	
	UT9-12/8.5			**13,200**	
UT9-13	UT9-13/2.5	10/25/2006	2.5'-3'	525	
	UT9-13/4.5	10/25/2006	4.5'-5'	63.9	
	UT9-13/8.5	10/25/2006	8.5'-9'	**5,450**	
UT9-14	UT9-14/2.5	10/25/2006	2.5'-3'	21.1	
	UT9-14/4.5	10/25/2006	4.5'-5'	64.6	
	UT9-14/8.5	10/25/2006	8.5'-9'	**1,860**	
UT9-15	UT9-15/2.5	10/25/2006	2.5'-3'	129	
	UT9-15/4.5	10/25/2006	4.5'-5'	50.3	
	UT9-15/4.5/3(dup)			**3,340**	*
	UT9-15/8.5	10/25/2006	8.5'-9'	153	
UT9-16	UT9-16/2.5	10/26/2006	2.5'-3'	12.7	
	UT9-16/4.5	10/26/2006	4.5'-5'	149	

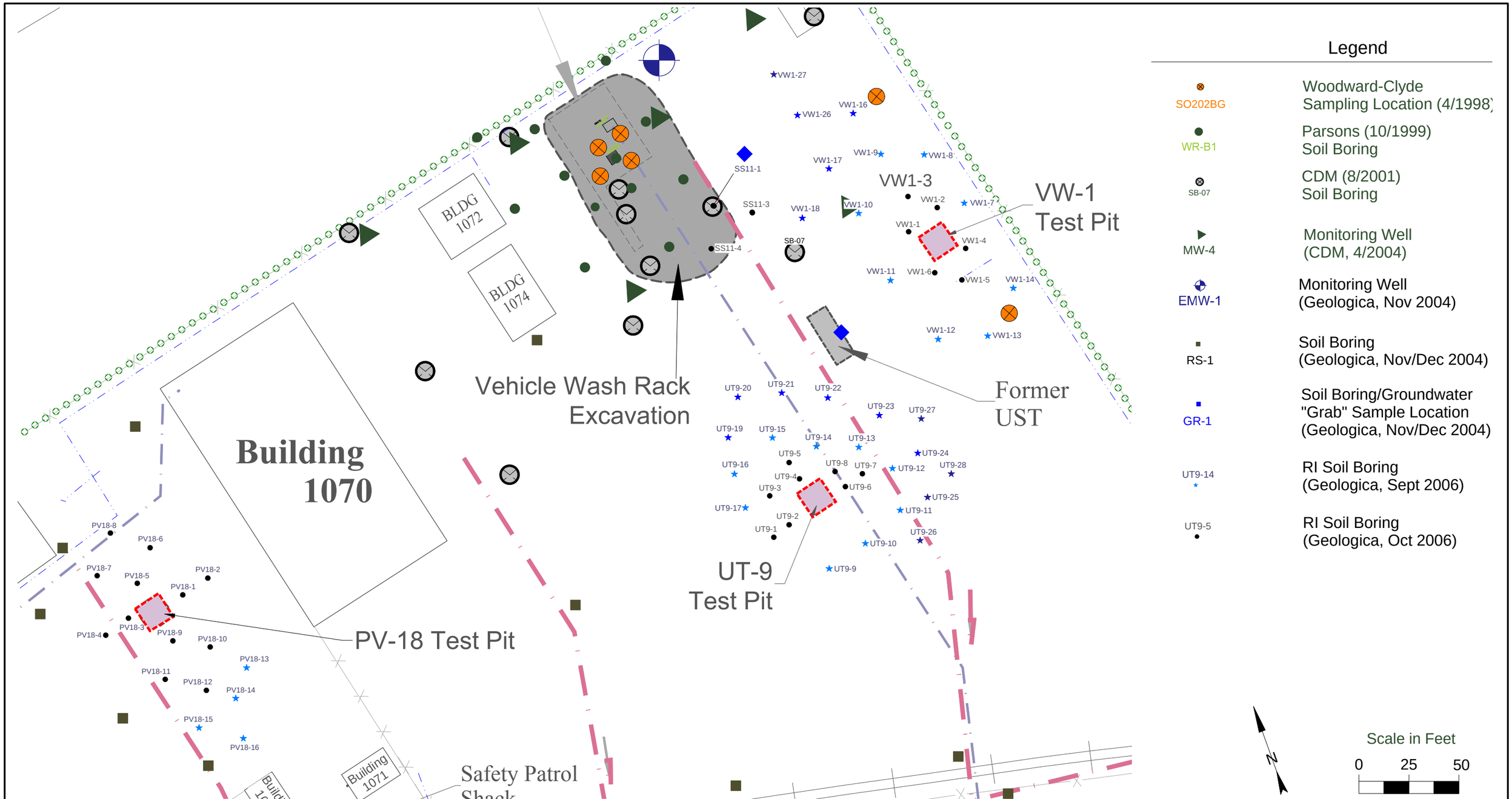
Table 2-3
USAR Heroic War Dead Site

Remedial Investigation Sampling Results
UT-9 Area

Boring	Sample ID	Sample Collection Date	Depth, ft bgs	Lead Concentration, mg/kg	
	UT9-16/8.5	10/26/2006	8.5'-9'	**3,850**	
UT9-17	UT9-17/2.5	10/26/2006	2.5'-3'	89.7	
	UT9-17/4.5	10/26/2006	4.5'-5'	**2,130**	
	UT9-17/8.5	10/26/2006	8.5'-9'	**5,800**	
UT9-19	UT9-19/2.5/3(dup)	10/26/2006	2.5'-3'	229	
	UT9-19/2.5			687	
	UT9-19/4.5	10/26/2006	4.5'-5'	4.33	
	UT9-19/8.5	10/26/2006	8.5'-9'	**15,200**	
UT9-20	UT9-20/2.5	10/26/2006	2.5'-3'	21.6	
	UT9-20/4.5	10/26/2006	4.5'-5'	63.2	
	UT9-20/8.5	10/26/2006	8.5'-9'	**10,700**	
UT9-21	UT9-21/2.5	10/26/2006	2.5'-3'	77.7	
	UT9-21/4.5	10/26/2006	4.5'-5'	95.2	
	UT9-21/8.5	10/26/2006	8.5'-9'	**2,310**	
UT9-22	UT9-22/2.5	10/26/2006	2.5'-3'	88.6	*,N
	UT9-22/4.5	10/26/2006	4.5'-5'	**1,150**	
	UT9-22/8.5	10/26/2006	8.5'-9'	**6,390**	
UT9-23	UT9-23/2.5	10/26/2006	2.5'-3'	75.5	
	UT9-23/4.5	10/26/2006	4.5'-5'	21.7	
	UT9-23/8.5	10/26/2006	8.5'-9'	**3,920**	*
	UT9-23/8.5/3(dup)			**7,960**	
UT9-24	UT9-24/2.5	10/26/2006	2.5'-3'	76.2	
	UT9-24/4.5	10/26/2006	4.5'-5'	69	
	UT9-24/8.5	10/26/2006	8.5'-9'	**9,350**	
UT9-25	UT9-25/2.5	10/26/2006	2.5'-3'	33.8	
	UT9-25/4.5	10/26/2006	4.5'-5'	308	
	UT9-25/8.5	10/26/2006	8.5'-9'	158	
UT9-26	UT9-26/2.5	10/26/2006	2.5'-3'	29.1	
	UT9-26/4.5	10/26/2006	4.5'-5'	34.3	
	UT9-26/8.5	10/26/2006	8.5'-9'	**3,630**	
UT9-27	UT9-27/2.5	10/26/2006	2.5'-3'	38.7	*
	UT9-27/4.5	10/26/2006	4.5'-5'	31.5	
	UT9-27/8.5	10/26/2006	8.5'-9'	35.4	
UT9-28	UT928/2.5	10/26/2006	2.5'-3'	61.8	
	UT9-28/4.5	10/26/2006	4.5'-5'	24.7	
	UT9-28/8.5	10/26/2006	8.5'-9'	**1,810**	

Notes:
N = Spike recovery outside of control limits.
* = Laboratory duplicate sample result outside of control limits.
/3(dup) = Field duplicate sample.
2,140 Sample result above lead screening level of 800 mg/kg.

SECTION 2
FIGURES



geologica

San Francisco, California

Remedial Investigation/Feasibility Study

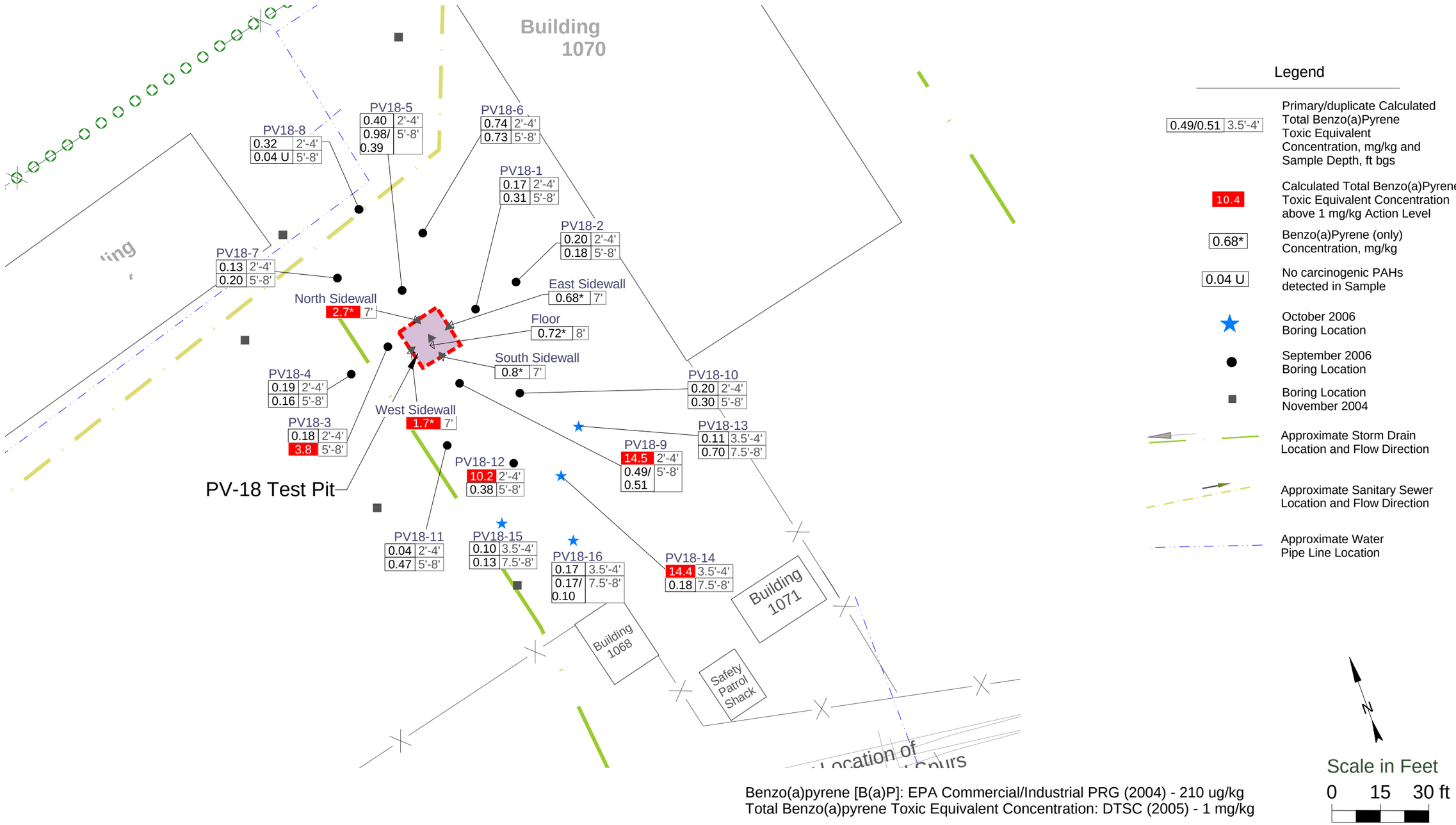
Heroic War Dead

United States Army Reserve Center Oakland

Oakland, California

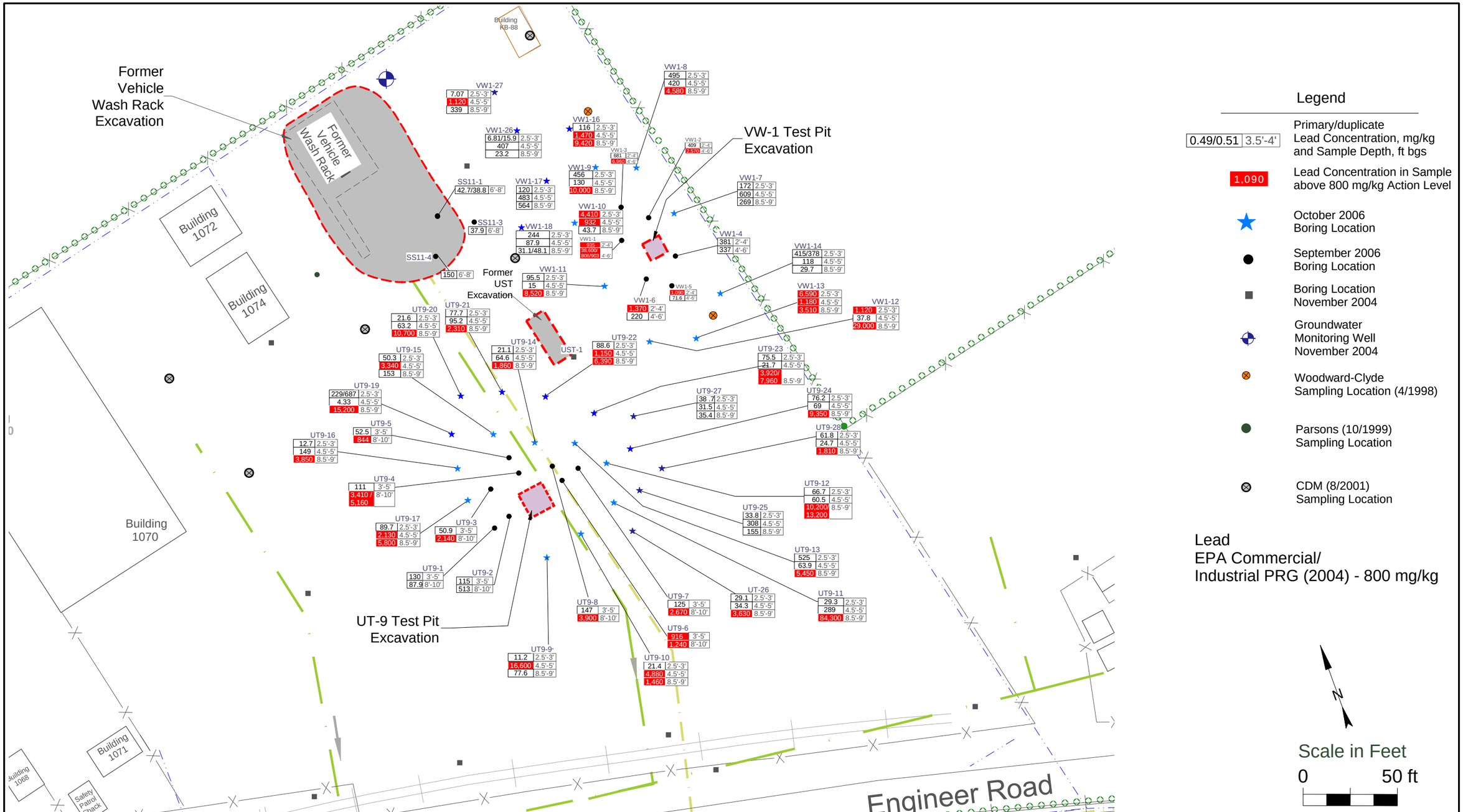
November/December 2006
Remedial Investigation
Boring Locations

Figure 2-1



Benzo(a)pyrene [B(a)P]: EPA Commercial/Industrial PRG (2004) - 210 ug/kg
Total Benzo(a)pyrene Toxic Equivalent Concentration: DTSC (2005) - 1 mg/kg

geologica	**Heroic War Dead** **United States Army Reserve Center Oakland**	PAH Concentrations in Soil September/October 2006 Remedial Investigation
San Francisco, California	Oakland, California	**Figure 2-2**



geologica

San Francisco, California

Heroic War Dead

United States Army Reserve Center Oakland

Oakland, California

Lead Concentrations in Soil
September/October 2006
Remedial Investigation

Figure 2-3

3. Nature and Extent of Contamination

Results of the preliminary studies discussed in Section 1 and the site wide Remedial Investigation described in Section 2 indicated the presence of a number of potential contaminants of concern (COCs), several media of concern at the site, several limited contaminant-impacted areas, as well as several site-wide contamination issues.

3.1 Media of Concern

Media of concern at the site consist of surface soil, subsurface soil, soil vapor, and groundwater. The site is not in direct contact with any surface water body. Stormwater runoff from the site is captured and routed to a subsurface stormwater drainage system that discharges to San Francisco Bay. Stormwater runoff is not considered to pose significant current or future risk to human health or the environment because minimal impacts to surficial soil were identified. Groundwater from the site also potentially discharges to San Francisco Bay north and west of the property.

3.2 Contaminants of Concern (COCs)

As part of this RI/FS, a final screening and evaluation process was conducted for the contaminants of potential concern identified in Section 1 and 2. The objective of this evaluation was to determine which contaminants of potential concern were actual COCs based on the:

- Risk or hazard presented by the compound.
- Concentration of the compound relative to background concentrations.
- Frequency with which each substance was detected.
- Potential for a compound present in soil to affect ground water.
- Whether the compound will be addressed in the remedy for another compound or media.

3.2.1 Risk or Hazard Presented by Constituents

The risk or hazard posed by potential COCs was evaluated by comparison to several established screening criteria for the media of concern identified in Section 3.1.

- EPA Region 9 Preliminary Remediation Goals (PRGs) were used to qualitatively assess the risk or hazard posed by constituents detected in soil other than petroleum hydrocarbons. The significance of detected concentrations of petroleum hydrocarbons in soil samples was evaluated using SFB RWQCB Table B soil screening level ESLs.

- The SFB RWQCB Table E shallow soil gas screening level ESLs were used to evaluate the significance of constituent detections in soil vapor samples.

- The SFB RWQCB Table B groundwater screening level ESLs were used to evaluate the significance of constituent detections in groundwater samples.

Tables 3-1, **3-2**, and **3-3** summarize the constituents identified in soil, soil vapor, and groundwater, respectively, in one or more samples at concentrations above the risk-based screening criteria listed above.

3.3 Constituent Concentration Relative to Background

If a compound was detected in an environmental media at the HWD site but was reported at concentrations within the range of natural background concentrations, it was not considered to be a COC. Sections below discuss observations regarding soil and groundwater. No naturally occurring compounds were detected in soil vapor samples collected at the site.

3.3.1 Background Soil Quality

In soil, one constituent, arsenic, was dropped from consideration as a COC for this reason. Arsenic was detected in all 17 of the Woodward-Clyde PA/SI (1999) soil samples, all 23 of the Parsons (2000) soil samples, all 20 of the CDM 2001 vehicle wash rack RI (2004a) soil samples, 24 of the 126 soil samples collected at the site during the 2004/2005 SI. The detected arsenic concentrations exceeded the California-modified PRG of 0.25 mg/kg in all cases. Arsenic was detected in locations distributed across the site and at various depths with no apparent correlation to specific site activities. Based on the high detection frequency, arsenic appears to be characteristically present in site soil. The range of arsenic concentrations detected of 0.89 to 18.1 mg/kg, is within the natural background range reported by Bradford et al. (1996) to be representative of background conditions in California. Consequently, arsenic was not carried forward as a COC.

Lead and PAHs were also detected in locations distributed across the site and at various depths generally without any apparent correlation to specific site activities. The source of the PAHs detected at the HWD property is unknown but does not appear to be associated with any process operations or activities on the property but may in fact be present as a contaminant in fill placed at the site in the early 1940's. With the exception of lead-containing paint chips observed near the former Safety Patrol shack on the north side of Engineer Road, the majority of the lead detections appear to be related to fill soil placed at the site prior to the USAR's occupancy of the facility.

3.3.2 Background Groundwater Quality

Concentrations of organic compounds detected in groundwater samples collected at the site are presumed to be related to human activities. However, many metals occur naturally in groundwater. The metals arsenic, cadmium, barium, zinc, antimony,

selenium, nickel, vanadium, copper, mercury, thallium, lead, and cobalt were detected in one or more groundwater samples collected at the site during the November/December 2004 SI and January 2005 groundwater sampling events at concentrations above their respective ESLs. With the exception of elevated concentrations of lead and barium detected in several samples collected in the building 1070 yard, the metals detections appear to be related to dissolution of metals naturally present in soil at the site.

3.3.3 Constituent Detection Frequency

The frequency with which each substance was detected was selected as a screening criterion because it reflects the fact that for a substance to have been detected frequently, it is likely to be both persistent in the environment and relatively widespread. The potential for human exposure is directly related to these parameters as well as to the tendency of the contaminant to migrate within and between environmental media. Infrequently detected contaminants in soil, soil vapor, and ground water were not considered as COCs. On this basis, several constituents were eliminated as COCs:

- Naphthalene was only detected in 3 of 50 samples tested for this constituent, with just one detection over the ESL of 24 ug/L.

- 4,4'-DDE, dieldrin, endrin, heptachlor, heptachlor epoxide, and methoxychlor were only detected in 1 of 7 samples tested for chlorinated pesticides. Although the detected concentrations slightly exceeded their respective ESLs, the low detection frequency indicated that these constituents are not significant COCs for the site.

3.3.4 Potential for a Constituent in Soil to Affect Groundwater

Constituents detected in groundwater that were also detected in soil were presumed to have significant potential for migration from soil to groundwater. As this constituted many of the constituents of potential concern detected at the site, no constituents were screened out based on this criterion. However, benzo(a)pyrene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, benzo(a)anthracene, and benzo(b)fluoranthene were retained as COCs despite low detection frequencies in groundwater because these compounds were identified as COCs in soil and have some potential for leaching to groundwater.

3.3.5 Potential for Remediation with Collocated Constituents

A final COC screening criterion was the potential for a compound to be addressed in the remedy for another compound or media. For example, manganese was detected in soil at concentrations of up to 32,500 mg/kg in the building 1070 yard. The high manganese detection was collocated with lead at 4,730 mg/kg, which exceeds the EPA PRG of 800 mg/kg. Because lead was carried through as a COC based on its frequency of detection and high relative risk, elevated manganese concentrations were collocated with elevated lead concentrations, and manganese and lead have similar fate and mobility in soil, the

remedy for lead-impacted soil will address manganese. Consequently, manganese was not retained as a COC.

3.3.6 Identified COCs

Tables **3-1** through **3-3** list potential COCs for each of the identified media of concern at the site, screening criteria process factors, and the results of the COC screening process. Identified COCs for each media of concern are discussed below.

- **Soil –** Constituents retained as COCs for soil included lead, the PAHs benzo(a)pyrene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, benzo(a)anthracene, dibenzo(a,h)Anthracene, and benzo(b)fluoranthene, PCE, diesel and motor oil.

- **Soil Vapor –** One COC, PCE, was identified for soil vapor.

- **Groundwater -** Constituents retained as COCs for site groundwater include diesel and motor oil, PCE and vinyl chloride, the PAHs benzo(a)pyrene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, benzo(a)anthracene, and benzo(b)fluoranthene and the metals barium and lead.

3.4 Potential Sources and Release Areas

A number of potential source areas were investigated at the site during the pre-RI and RI sampling and analysis programs. These include the location of the former UST in the building 1070 yard, the former 1072 vehicle wash rack, associated underground utility alignments, electrical transformers formerly located on a raised platform behind building 1064, railroad tracks and a locomotive maintenance area along Engineer Road south of building 1064, vehicle grease racks formerly located west of building 1084, vehicle maintenance in building 1084, possible formaldehyde use in building 1101, and soil along the drip line of and adjacent to buildings painted with lead containing materials.

3.4.1 Source Areas

Two confirmed releases were identified for which putative sources could be identified. These consisted of:

- Chlorinated solvents, VOCs, and petroleum hydrocarbons identified in soil and groundwater near the former vehicle wash rack (IR Site 1); and,

- Lead in surficial soil adjacent to peeling lead-based paint observed on the Safety Patrol Shack on the north side of Engineer Road south of building 1064.

Potentially impacted soil associated with the former vehicle wash rack was addressed by performance of a soil removal action in 2003 (CDM, 2004) as discussed in Section 1.7.2 Lead impacted soil associated with overland migration of paint chips from the Safety

Patrol Shack was addressed by a soil removal action completed in 2005 (ECC, 2006) as discussed in Section 1.7.3.

3.4.2 Release Areas

Several areas of contaminant-impacted soil were identified for which there was no confirmed evidence of a particular source, release, or generating operation. These include:

- Lead and VOC impacted soil identified beneath the platform-mounted transformers on the north side of building 1064 (Woodward-Clyde, 1999, GEOLOGICA, 2005). This area was addressed by a soil removal action completed in 2005 (ECC, 2006) as discussed in Section 1.7.3.

- PAH-impacted soil identified at SI boring PV-18 in the east end of the building 1064 parking area and extending south towards the Safety Patrol Shack;

- An isolated detection of PAH-impacted soil southwest of the former vehicle wash rack in the building 1070 yard; and,

- Areas of lead-impacted soil in the central and northeast parts of the building 1070 yard near the VW-1 and UT-9 test pits.

3.5 Nature and Extent of Soil Contaminants

Constituents detected in soil samples collected during the RI and pre-RI environmental investigations included petroleum hydrocarbons, VOCs, chlorinated pesticides, semi-volatile organic compounds, and a number of metals. As discussed in Section 1.7, several focused soil removal actions were completed during the course of environmental investigations at the site. Consequently, the principal constituents detected in soil at residual concentrations above EPA Region 9 commercial/industrial PRGs, or SFB RWQCB Table B ESLs consisted of arsenic, lead, TPH as diesel and motor oil, PCE, and PAHs. The extents of soil areas impacted by these constituents are discussed below.

3.5.1 Lead Distribution in Soil

As discussed in Sections 1 and 2, lead was detected in a number of soil samples collected at the site with the highest concentrations detected in samples collected below the former platform-mounted electrical transformers on the north side of building 1064, in surface soil south of the Safety Patrol Shack, and in the central and northeast corner of the building 1070 yard. As discussed previously, lead-impacted soil below the platform-mounted transformers and south of the Safety Patrol Shack was removed in 2005 (ECC, 2006). Remaining areas with lead detections above the EPA Region 9 commercial/ industrial PRG of 800 mg/kg are illustrated on **Figure 3-1**. The source of the lead is unknown but appears to be associated with fill soil placed at the site in the early 1940's.

3.5.2 Distribution of PAHs in Soil

A number of polynuclear aromatic hydrocarbons (PAHs) including benzo(a)pyrene, chrysene, naphthalene, benzo(a)anthracene and others were detected in soil samples collected at the HWD property (see **Figure 3-2**). PAHs were detected in soil samples collected across the property at all depth intervals although generally higher concentrations were seen in samples collected below the fill horizon in presumed native tidal sediments. Higher PAH concentrations were also detected in an area in the east end of the building 1064 yard near the PV-18 test pit and south as shown on **Figure 3-3**, in confirmation samples from the south sidewall and floor of the PV-4 test pit, and in one sample collected from boring SB-04 near the southwest corner of the former vehicle wash rack. The source of the PAHs detected at the HWD property is unknown but does not appear to be associated with any process operations or activities on the property but may in fact be present as a contaminant in fill placed at the site in the early 1940's.

3.5.3 Petroleum Hydrocarbon Distribution in Soil

Petroleum hydrocarbons quantified at diesel or motor oil were detected at low concentrations at a number of boring locations across the property. EPA has not established PRGs for TPH. TPH as diesel or motor oil were detected in two areas at the site above SFB RWQCB Table B commercial/industrial ESLs of 500 and 1,000 mg/kg, respectively. The detections included samples collected at 5.5 ft bgs in borings PV-7 and PV-8 in the southwest corner of the building 1064 yard and several samples collected west of the former vehicle wash rack on the northern edge of the building 1070 yard. Detected concentrations ranged from 560 mg/kg as diesel to 4,700 mg/kg as motor oil (**Figure 3-4**).

3.5.4 PCE Distribution in Soil

Tetrachloroethene (PCE) was detected in several soil samples collected during the 2004 SI field program below the former platform-mounted electrical transformers on the north side of building 1064 and in samples collected during 1999 and 2001 site investigations of the former vehicle wash rack. However, soil removal actions were completed at the vehicle wash rack area (CDM, 2004) and below the former platform-mounted electrical transformers in November 2005 (ECC, 2006). Consequently, the only location with a PCE detection in soil above the current (2004) EPA Region 9 commercial/industrial PRG of 1,300 ug/kg was a soil sample (L-1) collected from the northwest corner of the vehicle wash rack excavation in May 2003 at a concentration of 2,500 ug/kg (**Figure 3-4**). The PCE concentration in the L-1 sample was below the PRG in effect in 2003. The extent of PCE impacted soil is believed to be limited because sample L-1 was collected from the sidewall of a remedial excavation and in close proximity to a number of nearby borings with low or not detected PCE concentrations.

3.6 Nature and Extent of Groundwater Contaminants

Sections below discuss findings with respect to groundwater quality at the site. Groundwater samples were collected from 23 locations across the property in November/December 2004 during the site wide SI (GEOLOGICA, 2005). In addition, as discussed in Section 1, groundwater samples were collected near the former vehicle wash rack in October 1999 from 11 sampling locations, in August 2001 from 7 sampling locations, and in April and July 2004 and January 2005 from six dedicated monitoring wells. Because the October 1999 and August 2001 groundwater sampling events occurred before completion of the vehicle wash rack soil removal action in May 2003, they are considered best used for evaluating groundwater quality prior to the soil cleanup action. The groundwater sampling data from November/December 2004 SI field program and January 2005 groundwater monitoring well sampling event are considered most relevant to evaluating groundwater conditions across the property and are discussed in detail below. The locations and concentrations of Constituents of Concern detected in one or more groundwater samples at concentrations above SFB RWQCB Table B ESLs are schematically illustrated on **Figure 3-5**. Concentrations of metals, petroleum hydrocarbons, and other constituents detected in groundwater did not conform to a pattern typically observed with point sources of these constituents but rather reflect dissolution of these constituents at multiple locations across the property and potentially on adjacent properties upgradient (south) of the HWD property.

3.6.1 Petroleum Hydrocarbons

Motor oil was detected in one groundwater "grab" sample of 23 "grab" and monitoring well samples collected across the site in November/December 2004. The isolated detection of motor oil at 1,300 ug/L in boring VW-2, upgradient (south) of three permanent groundwater monitoring wells (MW-2, MW-3, and EMW-4) indicates a limited areal extent (**Figure 3-5**).

Diesel was detected at concentrations ranging from 7.5 to 200 ug/L (below the Table B ESL of 500 ug/L) in groundwater "grab" samples collected from borings advanced near the building 1084 vehicle wash rack drain system (VR-1, VR-2, VR-3), the former vehicle grease rack (GR-1 and GR-2), and hazardous materials storage sheds (HMS-1 and HMS-2).

3.6.2 VOCs

VOCs were detected in groundwater samples collected near the former vehicle grease rack (boring GR-2), the north end of building 1101 (boring 1101-3), and near the former vehicle wash rack (wells MW-1 through MW-5 and EMW-4). As discussed in Section 1, constituents detected included tetrachloroethene, 1,1,1-trichloroethane, benzene, ethyl benzene, and xylenes, trichloroethene and cis-1,2-dichloroethene. VOC concentrations in groundwater samples collected near the former vehicle wash rack decreased over the period of monitoring (April 2004 to January 2005). The only VOC detected at concentrations above Table B ESLs in the November/December 2004 SI field program and January 2005 IR Site 1 monitoring program was vinyl chloride in well MW-1 at 41 ug/L (see **Figure 3-5**).

3.6.3 PAHs

PAHs including benzo(a)pyrene, benzo(b)fluoranthene and others were detected in up to seven of 34 groundwater samples tested. As shown on **Figure 3-5**, PAHs were detected near the hazardous materials storage sheds (borings HMS-1 and HMS-2), north of the railroad maintenance area on Engineer Road (well EMW-5), in two locations in the building 1070 yard (borings VW-1 and VW-2) and near the west end of building 1064 (well EMW-6).

3.6.4 Metals

As discussed in Section 3.3, barium and lead were retained as COCs for site groundwater. Barium was detected virtually all of the groundwater samples collected at the site at concentrations ranging from 16 to 2,000 ug/L in the November/December 2004 SI field program and January 2005 IR Site 1 monitoring program. Only the barium concentrations in a "grab" groundwater sample collected from boring UST-1 near the former UST and from well MW-4 south of the former vehicle wash rack in the building 1070 yard exceeded the Table B ESL of 1,000 ug/L indicating a limited area of exceedance. Lead was detected in 12 of the 32 groundwater samples collected during the 2004/2005 field programs at concentrations exceeding the Table B ESL of 2.5 ug/L. As shown on **Figure 3-6**, lead was detected at concentrations above the ESL in monitoring well and grab groundwater samples collected near Building 1101 (on the presumed upgradient side of the site); in two grab groundwater sample locations near Building 1084; in well EMW-5 south of the Building 1064 parking area; and in monitoring well samples around the former vehicle wash rack and former UST in the Building 1070 yard. Significantly, lead was not detected above a method reporting limit of 13 ug/L in grab groundwater samples from borings TR-3 or 1064-2 which were advanced in or near the B1064 test pit excavation completed in November 2005 to remove lead impacted soil behind Building 1064 (ECC, 2006). Groundwater sampling data from the Building 1084 area and the former vehicle wash rack area indicated significant attenuation of lead concentrations within a short travel distance in groundwater. This attenuation may be the result of adsorption to soil and/or precipitation of insoluble lead compounds. Lead concentrations decreased from 16.9 and 18.2 ug/L in borings VR-1 and VR-2 to not detected (less than 13 ug/L) in borings GR-1 and GR-2, 100 ft down gradient (northwest). Similarly lead concentrations decreased from 48.2 ug/L in boring UST-1 to values of 2.7 to 12 ug/L in wells MW-6, MW-4, MW-5, and MW-2. Similar attenuation behavior was observed for barium in groundwater.

Lead and other metals commonly partition strongly to soil, limiting their solubility and rate of migration with groundwater. Published soil-water partitioning values for lead, e.g., Ecology (2001) of 10,000 L/kg, indicate lead migration rates more than 10,000 times slower than groundwater flow. Site specific soil-water partitioning coefficients for lead were not measured but can be inferred from soil and groundwater sampling results, for example for data collected near boring VW-1 in the 1070 yard. Lead was not detected above a reporting limit of 13 ug/L in the grab groundwater sample from boring VW-1.

Lead concentrations in soil samples collected below the water table near boring VW-1 ranged from 29 mg/kg in boring VW1-14 to 10,000 mg/kg in boring VW1-9. The lowest soil-water partitioning coefficient indicated by these data is approximately 2,200 L/kg (29 mg/kg divided by 13 ug/L) indicating a lead migration potential more than 2,000 times slower than groundwater flow. This calculation is consistent with the observed attenuation of lead concentrations in site groundwater discussed above.

3.7 Nature and Extent of Soil Vapor Contaminants

Two rounds of soil vapor sampling were conducted at the site. One round involving the collection of soil gas samples at 11 locations near the former vehicle wash rack in the building 1070 yard was conducted in October 1999 (Parsons, 2000). Results of the October 1999 sampling event are discussed in Section 1.6.3 and summarized in **Table 1-4c**. VOCs including tetrachloroethene, cis-1,2-dichloroethene, and vinyl chloride were detected at concentrations of up to 265,000 ug/m^3. Sampling locations are shown on **Figure 1-7**. A second round of soil gas sampling was conducted in April 2004, after removal of the vehicle wash rack and associated VOC-impacted soil (CDM, 2005c). The second round of soil gas sampling involved collection of soil gas samples at 6 locations adjacent to groundwater monitoring wells constructed near the former vehicle wash rack (**Figure 1-7**). VOCs including PCE, 1,1,1-trichloroethane, and TCE were detected at concentrations of up to 3,400 ug/m^3. With the exception of the PCE concentration in one sample, no constituents were detected above SFB RWQCB soil gas ESLs. PCE was detected in the vapor probe near MW-5 at a concentration of 3,400 ug/m^3, above the ESL of 1,400 ug/m^3. The highest concentrations of VOCs in soil gas were identified in the probes advanced near monitoring wells MW-2 and MW-5. VOCs have only been detected at trace concentrations in groundwater samples collected from well MW-5 (**Tables 1-6a** and **1-7**); however, the soil gas probe advanced near well MW-5 was located within 15 ft of the excavation confirmation soil sample (L1) with the highest detected concentrations of VOCs during the May 2003 removal action (**Table 1-10a**). No soil quality data were identified for well boring MW-2; however, the highest concentrations of PCE detected in the groundwater sampling program for the former vehicle wash rack were in well MW-2. Based on these findings, the presence of VOCs in soil gas appears to be related to residual concentrations of these constituents in soil on the northwest edge of the vehicle wash rack excavation and in groundwater on the northeast edge of the excavation. Because the principal source of these constituents, the former vehicle wash rack and associated VOC-impacted soil, has been removed from the property, the VOC concentrations detected in soil gas in April 2004 likely represent the highest concentrations likely to occur. As a result of natural attenuation processes, lower concentrations are expected in the future.

SECTION 3
TABLES

Table 3-1
Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

COC Screening Results for Soil

Constituents	Number of Samples Analyzed	Number of Detections	Number of Screening Level Exceedances	Significant Risk or Hazard	Detected Concentration Above Background	Detection Frequency	Potential for Constituent in Soil to Affect Groundwater	Addressed in Remedy for Another Compound	Retained as COC
Petroleum Hydrocarbons									
Gasoline	116	17	0	No	Yes	15%	No	No	No
Diesel	116	99	6	>ESL	Yes	85%	Yes	No	**Yes**
Motor Oil	108	17	2	>ESL	Yes	16%	Yes	No	**Yes**
Volatile Organic Compounds									
2-Butanone	116	5	0	No	Yes	4%	No	No	No
Acetone	116	11	0	No	Yes	9%	No	No	No
Benzene	116	1	0	No	Yes	1%	No	No	No
Bromomethane	116	40	0	No	Yes	34%	No	No	No
Carbon Disulfide	116	1	0	No	Yes	1%	No	No	No
1,1-Dichloroethane	116	0	0	No	Yes	0%	No	No	No
cis-1,2-Dichloroethene	116	0	0	No	Yes	0%	No	No	No
trans-1,2-Dichloroethene	116	0	0	No	Yes	0%	No	No	No
Iodomethane	116	39	0	No	Yes	34%	No	No	No
Methylene Chloride	116	7	0	No	Yes	6%	No	No	No
Naphthalene	116	3	1	>PRG	Yes	3%	No	cPAHs	No
Tetrachloroethene (PCE)	116	6	0	No	Yes	5%	Yes	No	**Yes**
Trichloroethene (TCE)	116	1	0	No	Yes	1%	No	No	No
Vinyl Chloride	116	1	0	No	Yes	1%	No	No	No
Chlorinated Pesticides									
4,4'-DDD	15	2	0	No	Yes	13%	No	No	No
4,4'-DDE	15	1	0	No	Yes	7%	No	No	No
4,4'-DDT	15	1	0	No	Yes	7%	No	No	No
Chlorinated Herbicides	4	1	0	No	Yes	25%	No	No	No
Polychlorinated Biphenyls	31	0	0	No	No	0%	No	No	No
Semi-Volatile Organics									
2,4-Dinitrotoluene	125	1	0	No	Yes	1%	No	No	No
2-Cresol	125	2	0	No	Yes	2%	No	No	No
2-Methylnaphthalene	125	8	0	No	Yes	6%	No	No	No
3-,4-Methylphenol	125	2	0	No	Yes	2%	No	No	No
4-Nitrophenol	125	1	0	No	Yes	1%	No	No	No
Acenaphthene	125	4	0	No	Yes	3%	No	No	No
Acenaphthylene	125	7	0	No	Yes	6%	No	No	No
Anthracene	125	35	0	No	Yes	28%	No	No	No
Benzo(a)Anthracene	153	82	1	>PRG	Yes	54%	Yes	No	**Yes**
Benzo(a)Pyrene	153	83	38	>PRG	Yes	54%	Yes	No	**Yes**
Benzo(b)Fluoranthene	153	82	11	>PRG	Yes	54%	Yes	No	**Yes**
Benzo(ghi)Perylene	153	44	0	No	Yes	29%	No	No	No
Benzo(k)Fluoranthene	153	80	5	>PRG	Yes	52%	Yes	No	**Yes**
Bis(2-Ethylhexyl)Phthalate	153	23	0	No	Yes	15%	No	No	No
Butylbenzyl Phthalate	153	7	0	No	Yes	5%	No	No	No
Chrysene	153	104	0	No	Yes	68%	Yes	cPAHs*	**Yes**
Dibenzo(a,h)Anthracene	153	21	12	>PRG	Yes	14%	Yes	No	**Yes**
Dibenzofuran	153	3	0	No	Yes	2%	No	No	No
Diethyl Phthalate	153	35	0	No	Yes	23%	No	No	No
Dimethyl Phthalate	153	0	0	No	Yes	0%	No	No	No
Di-N-Butyl Phthalate	153	5	0	No	Yes	3%	No	No	No
Di-N-Octyl Phthalate	153	1	0	No	Yes	1%	No	No	No
Fluoranthene	153	71	0	No	Yes	46%	No	No	No
Fluorene	153	6	0	No	Yes	4%	No	No	No
Indeno(1,2,3-cd)Pyrene	153	52	3	>PRG	Yes	34%	Yes	No	**Yes**
Isophorone	153	4	0	No	Yes	3%	No	No	No
Naphthalene	153	21	1	>PRG	Yes	14%	Yes	cPAHs	No
N-Nitrosodiphenylamine	153	0	0	No	Yes	0%	No	No	No
Phenanthrene	153	59	0	No	Yes	39%	No	No	No
Phenol	153	1	0	No	Yes	1%	No	No	No
Pyrene	153	84	0	No	Yes	55%	No	No	No
Metals									
Antimony	126	118	0	No	No	94%	Yes	No	No
Arsenic	126	24	24	>PRG	No	19%	Yes	No	No
Barium	126	126	0	No	No	100%	Yes	No	No
Beryllium	126	117	0	No	No	93%	Yes	No	No
Cadmium	126	33	0	No	No	26%	Yes	No	No
Chromium	126	126	0	No	No	100%	Yes	No	No
Cobalt	126	126	0	No	No	100%	Yes	No	No
Copper	126	126	0	No	No	100%	Yes	No	No
Lead	187	182	20	>PRG	Yes	97%	Yes	No	**Yes**

Table 3-1
Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

COC Screening Results for Soil

Manganese	125	115	1	>PRG	Yes	92%	Yes	Lead	No
Mercury	126	122	0	No	No	97%	Yes	No	No
Molybdenum	126	111	0	No	No	88%	Yes	No	No
Nickel	126	126	0	No	No	100%	Yes	No	No
Selenium	126	107	0	No	No	85%	Yes	No	No
Silver	126	85	0	No	No	67%	Yes	No	No
Thallium	126	45	0	No	No	36%	Yes	No	No
Vanadium	126	126	0	No	No	100%	Yes	No	No
Zinc	126	126	0	No	No	100%	Yes	No	No

Notes:
cPAHs = Benzo(a)pyrene et al
* = Retained because it is one of seven carcinogenic PAHs included in total benzo(a)pyrene toxic equivalent calculation.
Data from November/December 2004 site wide Site Inspection and April 2005 Supplemental SI, Geologica, 2005.

Table 3-2
Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

COC Screening Results for Soil Vapor

Constituents	Number of Samples Analyzed	Number of Detections	Number of Screening Level Exceedances	Significant Risk or Hazard	Detected Concentration Above Background	Detection Frequency	Addressed in Remedy for Another Compound	Retained as COC
Acetone	7	7	0	No	Yes	100%	No	No
Benzene	7	4	0	No	Yes	57%	No	No
1,3-Butadiene	7	2	0	No	Yes	29%	No	No
2-Butanone	7	5	0	No	Yes	71%	No	No
Carbon Disulfide	7	4	0	No	Yes	57%	No	No
Chloroform	7	2	0	No	Yes	29%	No	No
Cumene (isopropylbenzene)	7	5	0	No	Yes	71%	No	No
Cyclohexane	7	3	0	No	Yes	43%	No	No
1,1-Dichloroethane (1,1-DCA)	7	3	0	No	Yes	43%	No	No
1,1-DCE	7	3	0	No	Yes	43%	No	No
cis-1,2-DCE	7	2	0	No	Yes	29%	No	No
trans-1,2-DCE	7	2	0	No	Yes	29%	No	No
Ethylbenzene	7	4	0	No	Yes	57%	No	No
4-Ethyltoluene	7	5	0	No	Yes	71%	No	No
Freon 11	7	2	0	No	Yes	29%	No	No
Heptane	7	4	0	No	Yes	57%	No	No
Hexane	7	4	0	No	Yes	57%	No	No
Styrene	7	1	0	No	Yes	14%	No	No
Tetrachloroethene (PCE)	7	6	1	>ESL	Yes	86%	No	**Yes**
Tetrahydrofuran	7	6	0	No	Yes	86%	No	No
Toluene	7	6	0	No	Yes	86%	No	No
1,1,1-Trichloroethane	7	4	0	No	Yes	57%	No	No
Trichloroethene	7	3	0	No	Yes	43%	No	No
1,2,4-Trimethylbenzene	7	3	0	No	Yes	43%	No	No
1,3,5-Trimethylbenzene	7	3	0	No	Yes	43%	No	No
2,2,4-Trimethylpentane	7	1	0	No	Yes	14%	No	No
m,p-Xylene	7	6	0	No	Yes	86%	No	No
o-Xylene	7	4	0	No	Yes	57%	No	No

Data from Former Vehicle Wash Rack Monitoring Well Installation Program, CDM, 2004.

Table 3-3
Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

COC Screening Results for Groundwater

Constituents	Number of Samples Analyzed	Number of Detections	Number of Screening Level Exceedances	Significant Risk or Hazard	Detected Concentration Above Background	Detection Frequency	Addressed in Remedy for Another Compound	Retained as COC
Petroleum Hydrocarbons								
Gasoline	35	4	0	No	Yes	11%	No	No
Diesel	36	35	3	>ESL	Yes	97%	No	**Yes**
Motor Oil	32	10	1	>ESL	Yes	31%	No	**Yes**
Volatile Organic Compounds								
Acetone	50	7	0	No	Yes	14%	No	No
Benzene	50	5	0	No	Yes	10%	No	No
Bromomethane	50	0	0	No	No	0%	No	No
Carbon Disulfide	50	3	0	No	Yes	6%	No	No
Chloroform	50	3	0	No	Yes	6%	No	No
Chloromethane	50	1	0	No	Yes	2%	No	No
1,1-Dichloroethane	50	5	0	No	Yes	10%	No	No
cis-1,2-Dichloroethene	50	10	0	No	Yes	20%	No	No
trans-1,2-Dichloroethene	50	7	0	No	Yes	14%	No	No
Ethylbenzene	50	2	0	No	Yes	4%	No	No
Iodomethane	50	0	0	No	No	0%	No	No
Methylene Chloride	50	0	0	No	No	0%	No	No
Toluene	50	1	0	No	Yes	2%	No	No
1,1-Trichloroethane	50	2	0	No	Yes	4%	No	No
Trichloroethene (TCE)	50	3	0	No	Yes	6%	No	No
o-Xylene	50	1	0	No	Yes	2%	No	No
Naphthalene	50	3	1	>ESL	Yes	6%	No	No
Tetrachloroethene (PCE)	50	4	1	>ESL	Yes	8%	No	**Yes**
Vinyl Chloride	50	5	5	>ESL	Yes	10%	No	**Yes**
Chlorinated Pesticides								
4,4'-DDT	7	0	0	No	No	0%	No	No
Aldrin	7	1	0	No	Yes	14%	No	No
Alpha Bhc	7	1	0	No	Yes	14%	No	No
Chlorothalonil	7	2	0	No	Yes	29%	No	No
Endrin Aldehyde	7	1	0	No	Yes	14%	No	No
Gamma Bhc	7	1	0	No	Yes	14%	No	No
4,4'-DDE	7	1	1	>ESL	Yes	14%	No	No
Dieldrin	7	1	1	>ESL	Yes	14%	No	No
Endrin	7	1	1	>ESL	Yes	14%	No	No
Heptachlor	7	1	1	>ESL	Yes	14%	No	No
Heptachlor Epoxide	7	1	1	>ESL	Yes	14%	No	No
Methoxychlor	7	1	1	>ESL	Yes	14%	No	No
4,4'-DDD	7	0	0	No	No	0%	No	No
Polychlorinated Biphenyls	17	0	0	No	No	0%	No	No
Semi-Volatile Organics								
2,4-Dinitrotoluene	50	1	0	No	Yes	2%	No	No
2-Cresol	50	0	0	No	No	0%	No	No
3-,4-Methylphenol	50	3	0	No	Yes	6%	No	No
4-Nitrophenol	50	0	0	No	No	0%	No	No
Acenaphthene	50	4	0	No	Yes	8%	No	No
Acenaphthylene	50	0	0	No	No	0%	No	No
Anthracene	50	1	0	No	Yes	2%	No	No
Bis(2-Ethylhexyl)Phthalate	50	20	0	No	Yes	40%	No	No
Butylbenzyl Phthalate	50	18	0	No	Yes	36%	No	No
Dibenzo(a,h)Anthracene	50	0	0	No	No	0%	No	No
Dibenzofuran	50	1	0	No	Yes	2%	No	No
Dimethyl Phthalate	50	0	0	No	Yes	0%	No	No
Di-N-Butyl Phthalate	50	9	0	No	Yes	18%	No	No
Di-N-Octyl Phthalate	50	2	0	No	Yes	4%	No	No
Fluoranthene	50	7	0	No	Yes	14%	No	No
Fluorene	50	3	0	No	Yes	6%	No	No
Isophorone	50	0	0	No	Yes	0%	No	No
Naphthalene	50	7	0	No	Yes	14%	No	No
N-Nitrosodiphenylamine	50	0	0	No	No	0%	No	No
Pentachlorophenol	50	1	0	No	Yes	2%	No	No
Phenanthrene	50	8	0	No	Yes	16%	No	No
Phenol	50	2	0	No	Yes	4%	No	No

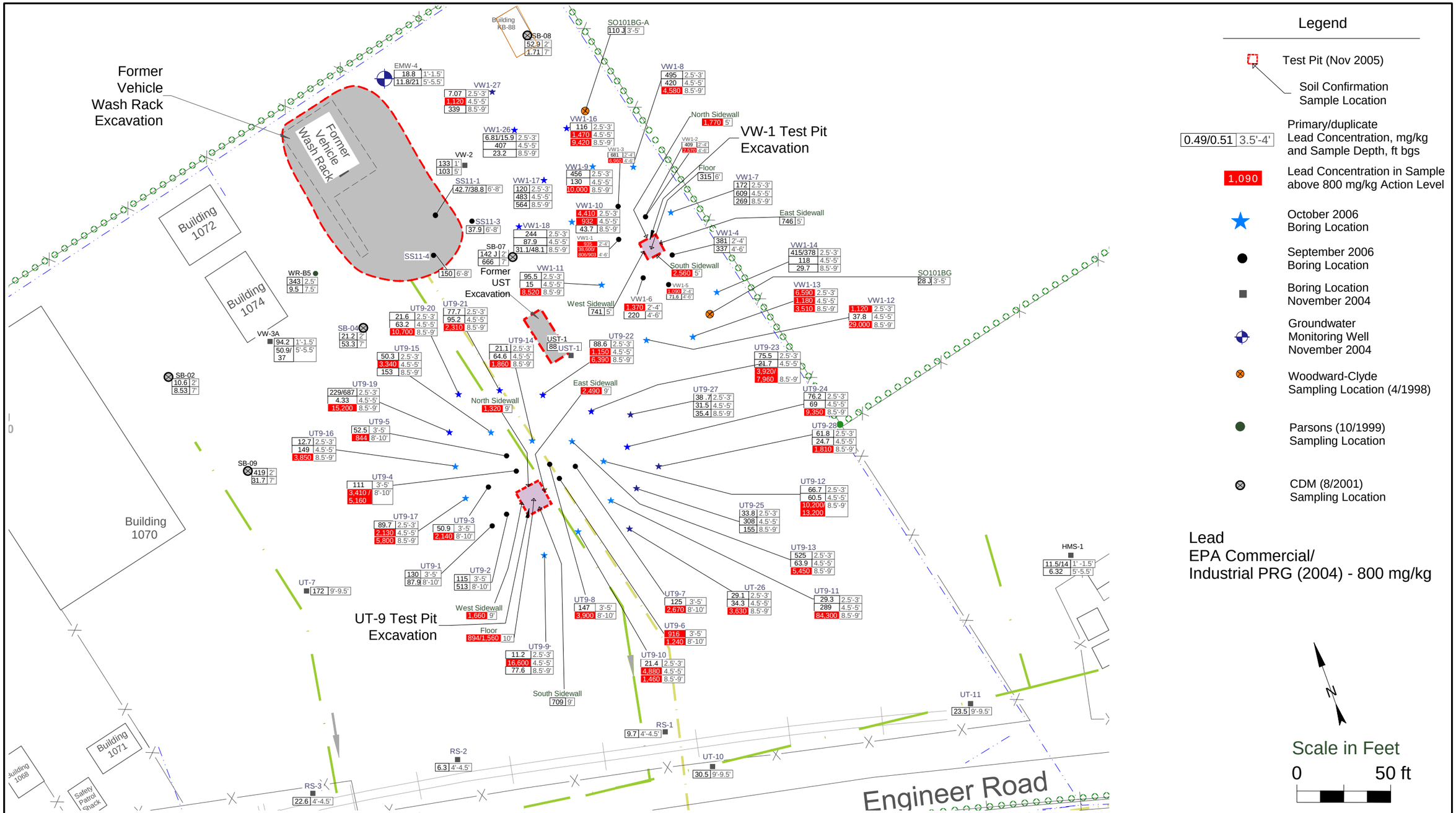
Table 3-3
Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

COC Screening Results for Groundwater

Constituents	Number of Samples Analyzed	Number of Detections	Number of Screening Level Exceedances	Significant Risk or Hazard	Detected Concentration Above Background	Detection Frequency	Addressed in Remedy for Another Compound	Retained as COC
Pyrene	50	11	0	No	Yes	22%	No	No
2-Methylnaphthalene	50	1	1	>ESL	Yes	2%	No	No
Benzo(a)Pyrene	50	1	1	>ESL	Yes	2%	No	**Yes**
Benzo(ghi)Perylene	50	1	1	>ESL	Yes	2%	No	No
Benzo(k)Fluoranthene	50	2	1	>ESL	Yes	4%	No	**Yes**
Chrysene	50	7	3	>ESL	Yes	14%	No	**Yes**
Indeno(1,2,3-cd)Pyrene	50	2	3	>ESL	Yes	4%	No	**Yes**
Benzo(a)Anthracene	50	4	4	>ESL	Yes	8%	No	**Yes**
Benzo(b)Fluoranthene	50	4	4	>ESL	Yes	8%	No	**Yes**
Diethyl Phthalate	50	26	6	No*	No*	52%	No	No
Metals								
Arsenic	50	14	1	>ESL	No	28%	No	No
Beryllium	50	4	0	No	No	8%	No	No
Chromium	50	15	0	No	No	30%	No	No
Manganese	50	34	0	No	Yes	68%	No	No
Molybdenum	50	28	0	No	No	56%	No	No
Silver	50	5	0	No	No	10%	No	No
Cadmium	50	3	1	>ESL	No	6%	No	No
Barium	50	50	2	>ESL	Yes	100%	No	**Yes**
Zinc	50	41	2	>ESL	No	82%	No	No
Antimony	50	12	7	>ESL	No	24%	No	No
Selenium	50	6	6	>ESL	No	12%	No	No
Nickel	50	21	8	>ESL	No	42%	No	No
Vanadium	50	40	9	>ESL	No	80%	No	No
Copper	50	19	7	>ESL	No	38%	No	No
Mercury	50	14	12	>ESL	No	28%	No	No
Thallium	50	16	15	>ESL	No	32%	No	No
Lead	50	19	11	>ESL	Yes	38%	No	**Yes**
Cobalt	50	31	26	>ESL	No	62%	No	No

* Probable lab contaminant

SECTION 3
FIGURES



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San Francisco, California

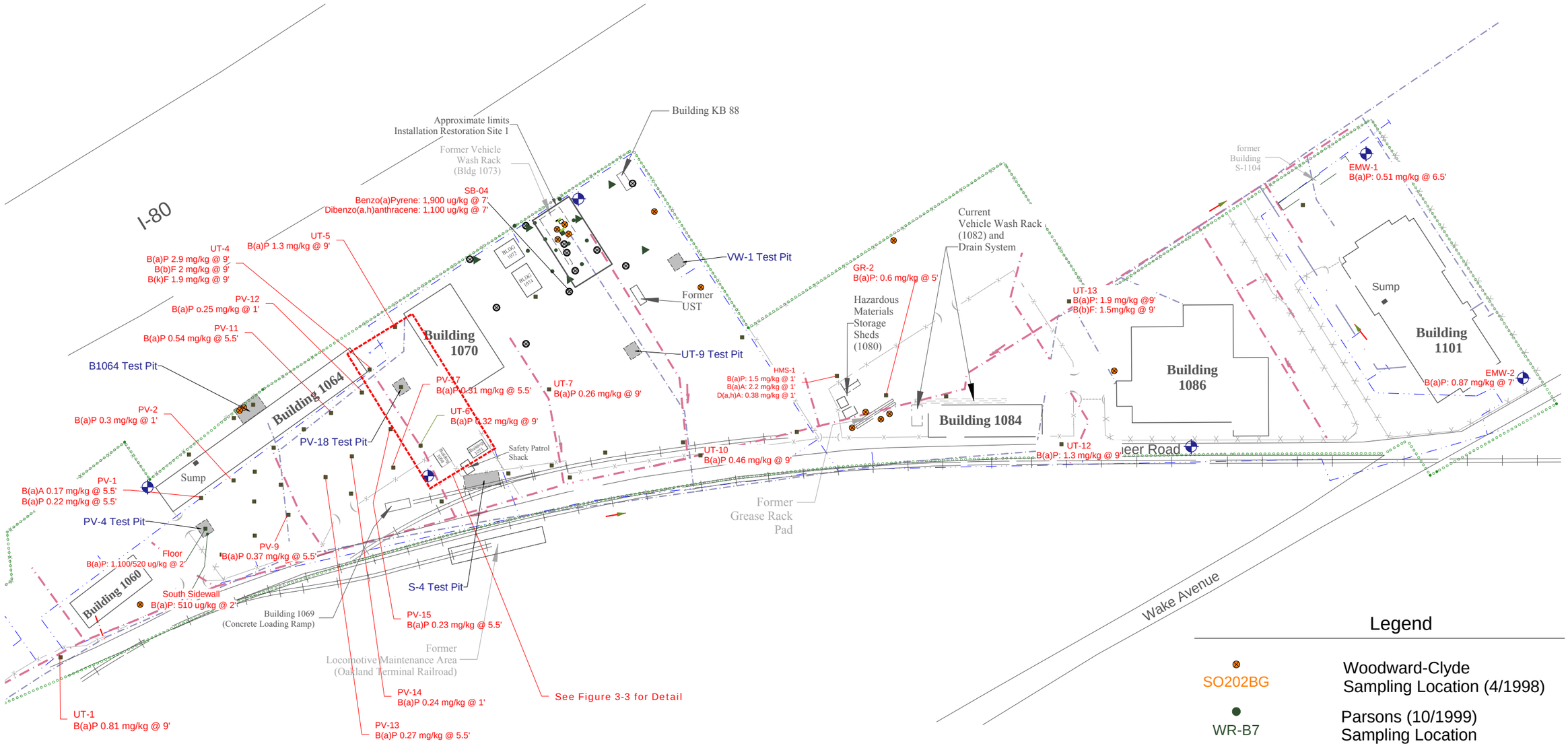
Heroic War Dead

United States Army Reserve Center Oakland

Oakland, California

Lead Concentrations in Soil in Building 1070 Yard

Figure 3-1



Benzo(a)pyrene [B(a)P]: EPA Commercial/Industrial PRG (2004) - 210 ug/kg
Dibenzo(a,h)Anthracene [D(a,h)A]: EPA Commercial/Industrial PRG (2004) - 210 ug/kg
Benzo(a)Anthracene [B(a)A]: EPA Commercial/Industrial PRG (2004) - 2,100 ug/kg
Benzo(b)Fluoranthene [B(b)F]: EPA Commercial/Industrial PRG (2004) - 2,100 ug/kg
Benzo(k)Fluoranthene [B(k)F]: EPA Commercial/Industrial PRG (2004) - 1,300 ug/kg

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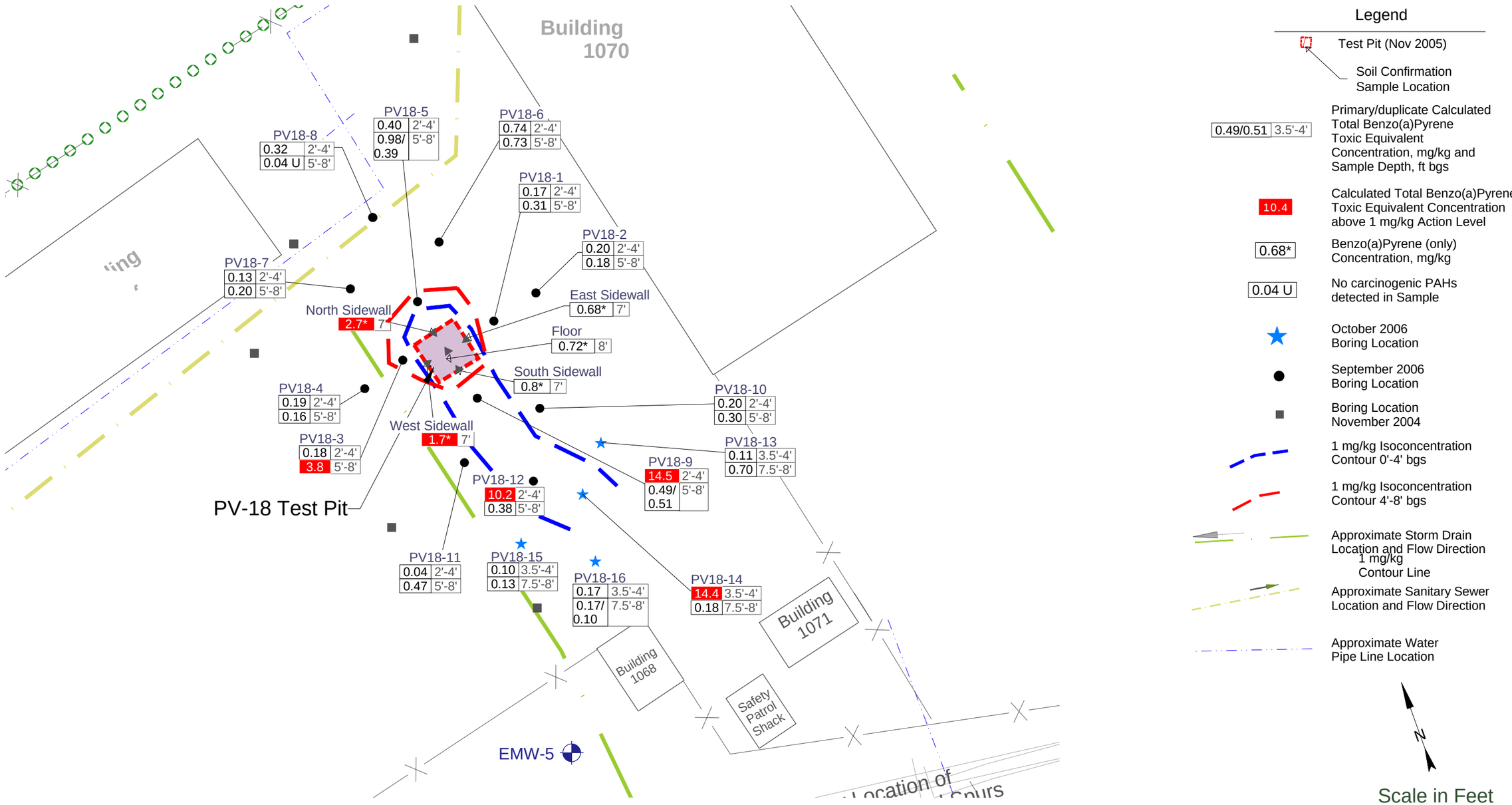
Oakland, California

PAH Detections in Soil Greater than PRGs

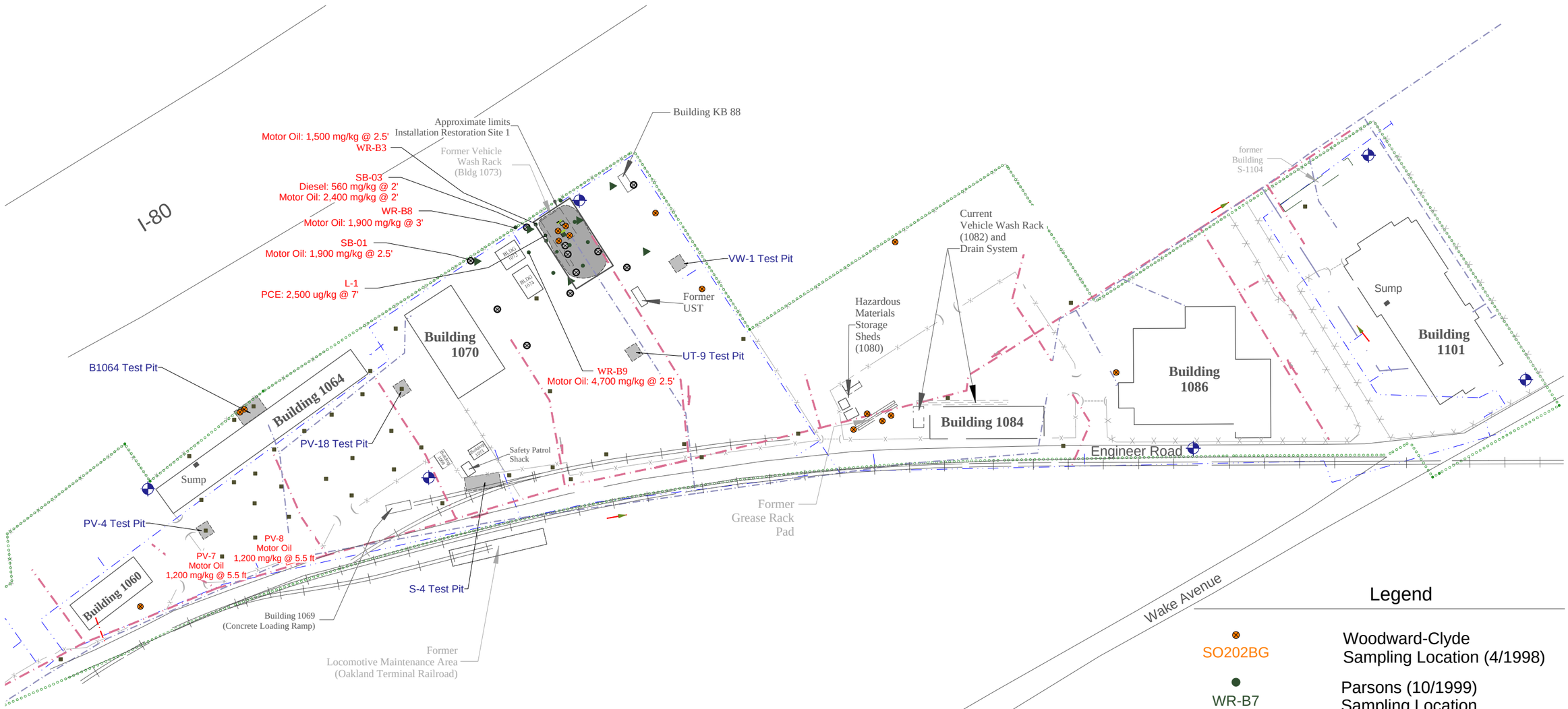
Figure 3-2

PrevInvestigations.TCW



Benzo(a)pyrene [B(a)P]: EPA Commercial/Industrial PRG (2004) - 210 ug/kg
Total Benzo(a)pyrene Toxic Equivalent Concentration: DTSC (2005) - 1 mg/kg

geologica	**Heroic War Dead** **United States Army Reserve Center Oakland** Oakland, California	Calculated Total Benzo(a)Pyrene Toxic Equivalent Concentrations near PV-18 Test Pit
San Francisco, California		**Figure 3-3**



Tetrachloroethene (PCE): EPA Commercial/Industrial PRG (2004) - 1,300 ug/kg
Diesel: SFB RWQCB Table B ESL (2005) - 500 mg/kg
Motor Oil: SFB RWQCB Table B ESL (2005) - 1,000 mg/kg

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Remedial Investigation/Feasibility Study

Heroic War Dead

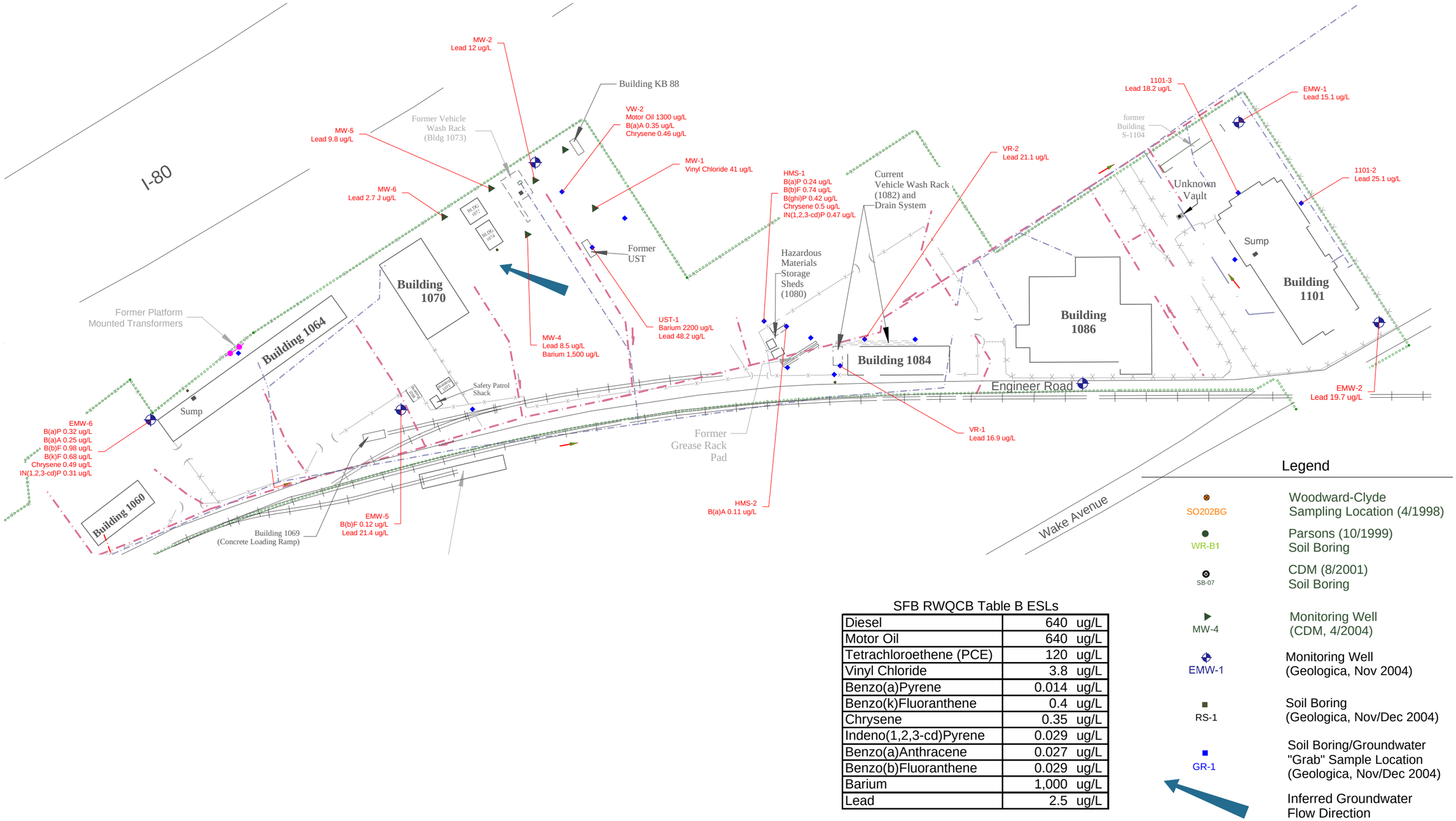
United States Army Reserve Center Oakland

Oakland, California

TPH and VOC Detections in Soil Greater than PRGs or ESLs

Figure 3-4

PrevInvestigations.TCW



SFB RWQCB Table B ESLs

Diesel	640	ug/L
Motor Oil	640	ug/L
Tetrachloroethene (PCE)	120	ug/L
Vinyl Chloride	3.8	ug/L
Benzo(a)Pyrene	0.014	ug/L
Benzo(k)Fluoranthene	0.4	ug/L
Chrysene	0.35	ug/L
Indeno(1,2,3-cd)Pyrene	0.029	ug/L
Benzo(a)Anthracene	0.027	ug/L
Benzo(b)Fluoranthene	0.029	ug/L
Barium	1,000	ug/L
Lead	2.5	ug/L

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Remedial Investigation/Feasibility Study

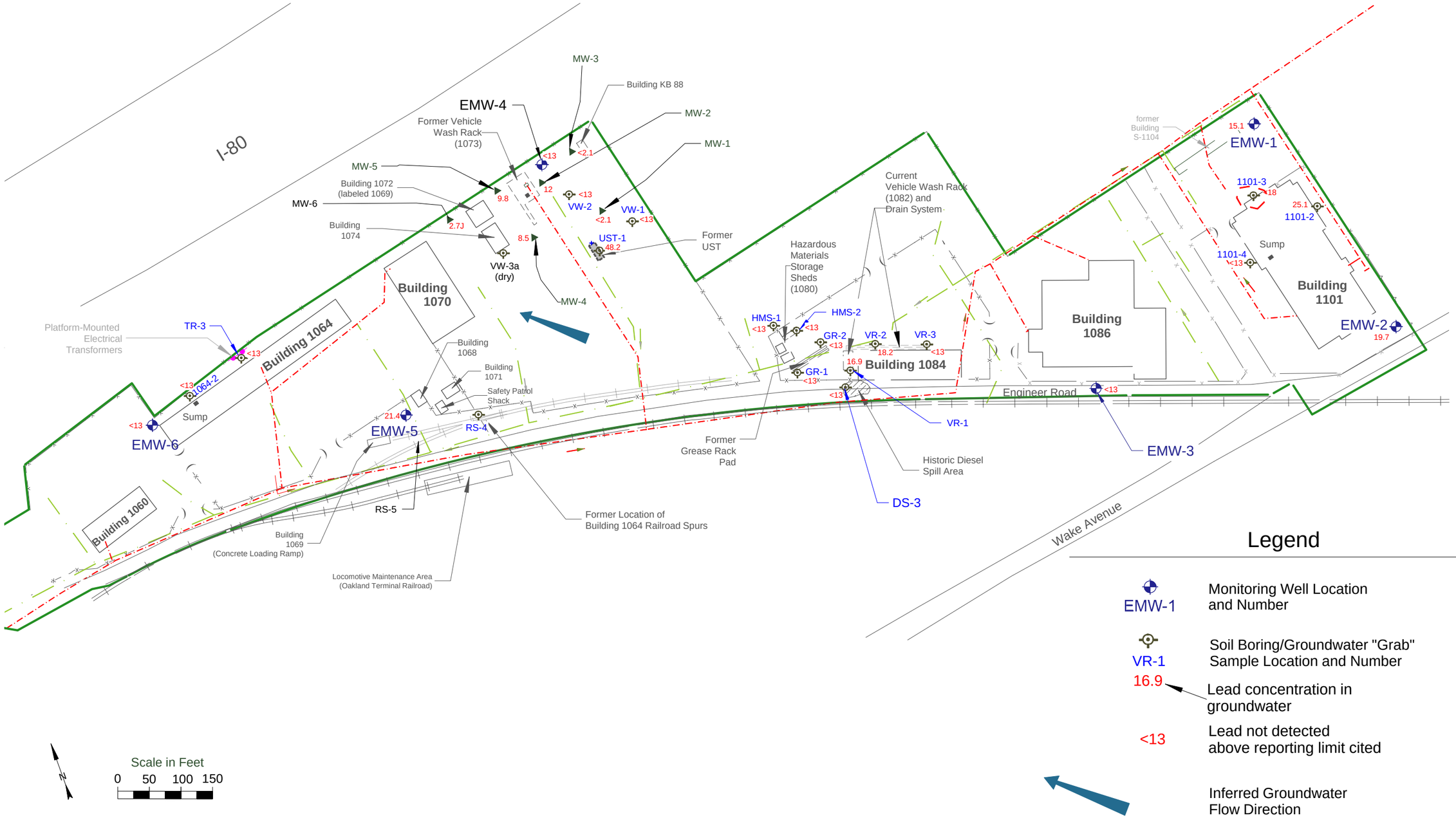
Heroic War Dead

United States Army Reserve Center Oakland

Oakland, California

Groundwater Sampling Locations with COC Detections above ESLs

Figure 3-5



Legend

EMW-1	Monitoring Well Location and Number
VR-1	Soil Boring/Groundwater "Grab" Sample Location and Number
16.9	Lead concentration in groundwater
<13	Lead not detected above reporting limit cited
	Inferred Groundwater Flow Direction

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Remedial Investigation/Feasibility Study

Heroic War Dead

United States Army Reserve Center Oakland

Oakland, California

Lead Concentrations in Groundwater
November 2004 / January 2005

Figure 3-6

4. Human Health and Ecological Risk Assessments

The USAR has conducted several risk related studies to evaluate health risk concerns at the site. Section 4.1 discusses potential receptors, exposure pathways and relevant regulatory screening levels. The scope and findings of human and ecological health risk studies conducted for the site are discussed in Section 4.2.

4.1 Human Health Risk Evaluation

A human health risk assessment evaluates linkages between contaminant sources and release mechanisms, contaminant toxicity, potential exposure pathways to potential sensitive receptors, and resulting risk to human health. Contaminant sources and release mechanisms are discussed in Section 3 of this report. Potential receptors and exposure pathways are discussed in Sections 4.1.1 and 4.1.2 below. Contaminant toxicity and resulting risk to human health are evaluated by comparison to potentially applicable environmental screening levels in Section 4.1.3.

4.1.1 Potential Receptors

The area surrounding the HWD property is heavily industrial. It is unlikely that the property itself or adjacent parcels will ever be used for unrestricted purposes such as residences, childcare centers, or health care facilities. The HWD site is expected to be acquired by EBMUD and used for expansion of its wastewater treatment plant; therefore, current or future commercial/industrial workers and, intermittently, construction workers represent the populations potentially at risk.

4.1.2 Potential Exposure Pathways

Potential exposure pathways at the site include:

- Ingestion and dermal contact with contaminated soil;
- Contaminants leaching from soil to groundwater;
- Ingestion of contaminated groundwater;
- Contaminants volatilizing from soil and/or groundwater to soil vapor and thereby migrating into structures; and
- Groundwater migration to surface water.

Each of these pathways is discussed below.

4.1.2.1 Incidental Ingestion and Dermal Contact with Contaminated Soil

Construction workers may be exposed via incidental ingestion and dermal contact with soil, or via inhalation of particulates released from soil during trenching or other invasive activities. Commercial/industrial workers may also be exposed via incidental ingestion and dermal contact with soil, although most of the areas will likely be covered by

asphalt/concrete pavement, buildings, or other structures, thereby preventing contact with underlying soil. These exposure pathways could become complete for both current and likely future use scenarios for the site. No site-specific data exists regarding current or likely future exposure frequency or exposure duration; therefore, the exposure assumptions used in US EPA Region 9's PRG table for commercial/industrial workers are considered sufficiently conservative for application to this site.

4.1.2.2 Soil Leaching to Groundwater

A number of constituents were detected in both soil and groundwater samples collected at the site thus indicating a potential for constituents present in soil to leach to groundwater. Current and future exposure pathways for soil leaching to groundwater are therefore considered complete. However, with the exception of sparingly soluble VOCs and petroleum hydrocarbons, most of the constituents detected in soil samples collected at the site have low leaching potential because of their high soil-water partitioning coefficients and corresponding low aqueous solubilities. For example, lead has been detected in soil at concentrations as high as 84,000 mg/kg during the RI field program while the highest lead concentration reported in groundwater was 48.2 ug/L. Similarly, the PAH benzo(a)pyrene was detected at concentrations as high as 11 mg/kg in soil, while the highest concentration detected in groundwater was 0.32 ug/L.

4.1.2.3 Ingestion of Contaminated Groundwater

As discussed in Section 1.3.2.4, the population within a 4-mile radius of the Oakland USAR Center derives its potable drinking water supply from municipal water provided by the EBMUD. Field investigations indicated that site groundwater is characterized by relatively high TDS concentrations ranging from 660 to 21,000 mg/L, above the State and Federal Secondary Drinking Water Standard of 500 mg/L. In addition, concentrations of cobalt, manganese, thallium, and chloride were detected above primary and secondary drinking standards. Soils encountered below the water table at the site were characterized by high clay and silt content and low permeability; consequently, the shallow water-bearing zone likely yields groundwater at low rates. Given these factors, it is unlikely that groundwater at the site could be used for drinking water, irrigation, or even industrial supply purposes without treatment. Current exposure pathways associated with contaminated groundwater are therefore incomplete. This pathway was retained for consideration because treatment could conceivably allow beneficial use of site groundwater at some time in the future.

4.1.2.4 Inhalation of Contaminants in Indoor Air

Soil gas sampling near the former vehicle wash rack completed by Parsons Engineers in 1999 before the IR Site 1 soil removal action indicated the presence of elevated concentrations of VOCs in soil gas. However, following the removal of impacted soil at the IR Site 1 in 2003, additional soil gas sampling conducted in April 2004 revealed the presence of low residual concentrations of VOCs with just one constituent, PCE, exceeding relevant regulatory screening levels (CDM, 2005c). Because some residual

levels of VOCs were detected in soil gas, indoor air could become contaminated through migration of soil gas through building foundations and floor slabs into indoor spaces in structures near the former vehicle wash rack. Commercial/industrial workers and construction workers could be exposed through inhalation exposure of VOCs released from the residual contamination into indoor air. As a result, this exposure pathway is complete. An analysis of the risk posed by vapor intrusion into indoor air is discussed in Section 4.2.

4.1.2.5 Groundwater Migration and Discharge to Surface Water

As noted previously, the site is located approximately 500 ft south of San Francisco Bay and approximately 1200 ft east of the easternmost extent of the Oakland Outer Harbor (Figure 1-1). Generally northwesterly groundwater flow across the site towards San Francisco Bay was identified. COCs in groundwater consist of VOCs, metals, and petroleum hydrocarbons. While the VOCs and petroleum hydrocarbons may be present in site groundwater as a result of historic activities on the site, metals detected in site groundwater are believed to be related to leaching from fill soil placed below the current position of the water table in the early 1930's and 1940's. Given the long flow path to potential discharge areas along the margin of San Francisco Bay, VOCs and petroleum hydrocarbons detected in site groundwater are likely to experience significant attenuation by way of microbial transformation, partitioning to soil, and dilution resulting from precipitation infiltration and tidal fluctuations near the shoreline. Metals detected in site groundwater are unlikely to migrate to San Francisco Bay at significant concentrations because of attenuation from partitioning to soil, and dilution resulting from precipitation infiltration and tidal fluctuations near the shoreline. Consequently, the exposure pathway associated with groundwater migration from the site and discharge to surface water is incomplete now and is likely to remain incomplete in the future.

4.1.2.6 Summary of Complete or Reasonably Expected to Be Complete Exposure Pathways

Based on this discussion, the following Exposure Pathways were retained for evaluation in the FS:

- Ingestion and dermal contact with contaminated soil;
- Soil leaching to groundwater;
- Inhalation of Contaminants in Indoor Air and,
- Ingestion of contaminated groundwater.

4.1.3 Comparison to Relevant Regulatory Screening Levels

This section discusses the use of relevant regulatory standards, screening levels, and cleanup levels developed as regulatory policy to evaluate the need for remedial action at the HWD site. Sections below discuss screening levels for soil and groundwater.

4.1.3.1 Soil Screening Criteria

For constituents other than petroleum hydrocarbons, the EPA Region 9 Preliminary Remediation Goals (PRGs) were developed by EPA to be used as risk-based tools for evaluating and cleaning up contaminated sites. They are not enforceable standards. Although the Region 9 PRGs are "to be considered" criteria, DTSC may a make risk management decision to adopt PRGs as site-specific cleanup targets when a DTSC-approved health risk assessment is unavailable and the list of chemicals of concern is limited.

The PRGs contained in the Region 9 PRG table (EPA, 2004) are generic as they are calculated without site-specific information using standard risk assessment methodology. The Region 9 PRGs combine current human health toxicity values with standard exposure factors to estimate contaminant concentrations in soil, air, and water that are considered by USEPA to be health protective of human exposures (including sensitive sub-populations), over a lifetime. The PRG chemical concentrations correspond to fixed levels of risk (i.e. either a one-in one million [10^{-6}] cancer risk or a non-cancer hazard quotient of 1) in soil, air, and water. In most cases, where a substance causes both cancer and non-cancer (systemic) effects, the 10^{-6} cancer risk will result in the more stringent criterion and is therefore preferentially used in the Region 9 PRG table.

The Region 9 PRGs for direct contact pathways (i.e. ingestion, dermal contact, and inhalation), provide soil cleanup screening levels for one of the exposure pathways identified for HWD site. If the exposure pathways and exposure scenarios are properly accounted for in the PRG calculations, the PRGs may be used as cleanup goals. Conversely, if important exposure routes exist at a site that are not covered in the standard calculations, (i.e., ingestion of contaminants via plant, meat, or dairy products), a risk assessment specific to these additional pathways may be necessary. Application of PRGs established for regular, frequent direct contact exposure is a conservative approach for industrial site workers (i.e., employees of the USAR or EBMUD) since residual contamination is several feet below ground. For construction workers, exposure would be possible only in an excavation scenario which presumably would be of short duration and infrequent.

Environmental Screening Levels (ESLs) protective of soil when groundwater is NOT a current or potential source of drinking water developed by the California Regional Water Quality Control Board (CRWQCB), San Francisco Bay Region, as listed in Table B in SFB RWQCB (2005) were used to evaluate the potential significance of petroleum hydrocarbon detections with respect to possible impacts on human health and the environment.

4.1.3.2 Groundwater Screening Criteria

EPA Region 9 has developed PRGs for protection of tap water quality (EPA, 2004). However, as discussed in Section 4.1.2.3 the high salinity and ambient background for several problematic metals including manganese and thallium make application of drinking water quality standards to groundwater underlying the HWD property inappropriate. Instead, RWQCB ESLs protective of groundwater and surface water when

groundwater is NOT a current or potential source of drinking water, as listed in Table B in SFB RWQCB (2005) were used to evaluate the potential significance of constituent detections with respect to possible impacts on human health and the environment. Because groundwater encountered beneath the site is not a current or potential source of drinking water and institutional controls to prevent groundwater use will be imposed as a condition for transfer of ownership of the property, this evaluation of groundwater quality was mainly directed at addressing indoor-air (VOCs) and nuisance concerns (petroleum hydrocarbons) as well as protection of adjacent surface water quality in San Francisco Bay using the groundwater ESLs developed by the SFB RWQCB for shallow soils within 3 meters of ground surface when groundwater is not a current or potential source of drinking water assuming potential discharge of groundwater into a marine or estuary surface water system.

4.2 Supplemental Risk Assessments and Risk Evaluations

The health risk studies completed by the USAR include:

- An ecological risk scoping assessment conducted to evaluate the residual ecological risk at IR Site 1;
- An evaluation of potential future risks from inhalation exposure related to residual VOCs detected in soil vapor samples collected near the former vehicle washrack using the Johnson and Ettinger (J&E) model (CDM, 2005a); and,
- A limited human health risk assessment was performed to evaluate the health implications of constituents detected in soil onsite to construction and industrial site workers (USACHPPM, 2007).

4.2.1 IR Site 1 Ecological Risk Scoping Assessment

The ecological risk scoping assessment (CDM, 2005a) involved screening soil confirmation sampling results from the May 2003 vehicle wash rack soil removal action against soil ecological screening values as well as screening the April and July 2004 groundwater monitoring well sampling results (wells MW-1 through MW-6 inclusive) against surface water ecological screening values.

4.2.1.1 Pathway Assessment

CDM (2005a) evaluated two primary exposure pathways:

- **Ecological Pathways to Aquatic Receptors.** CDM concluded that there are no clearly documented pathways for chemicals detected at IR Site 1 to come into contact with aquatic ecological receptors found in the habitats of San Francisco Bay. They noted that while it is possible that COCs could migrate with groundwater that then discharges as surface water in the bay, the possibility that site related contaminants

would occur at concentrations detrimental to ecological receptors is remote. If a COC was transported to the bay via groundwater, the concentrations would be significantly reduced due to the mixing with infiltrating precipitation along the travel path as well as mixing in the discharge area. CDM concluded that the ecological pathway from contaminants to aquatic receptors is therefore incomplete.

- **Ecological Pathways to Terrestrial Receptors.** CDM noted that contaminated soils (i.e., all stained contaminated soil) at IR Site 1 were removed from the site in May 2003 to the satisfaction of California DTSC (CDM, 2004). The residual chemicals detected during confirmatory sampling are now buried beneath 3 to 7 feet of clean fill. In addition, a cover of a combination of asphalt and/or gravel is now on top of the clean fill. CDM concluded that since the contaminated soil had been removed and the residual soils covered, the ecological pathway from contaminants to terrestrial receptors is also incomplete.

4.2.1.2 Screening Assessment

Even though there were no demonstrated complete ecological pathways, CDM performed a screening of groundwater and soil data in order to be extremely conservative. For this, a quantitative risk value was calculated by comparing the maximum detected values (including J-qualified data) for the April and July 2004 groundwater monitoring well sample results and the post removal confirmatory soil samples to readily available ecological screening values. For surface water, these consisted of:

- U.S. Environmental Protection Agency (USEPA) Region 4 ecological screening values (USEPA, 2001),
- USEPA Region 5 ecological data quality level (EDQL) screening values (USEPA, 1999),
- Tier II values as reported by Suter and Tsao 1996,
- USEPA's National Recommended Water Quality Criteria (NRWQC) (USEPA, 2002), and
- USEPA's Ecotox Threshold Values (USEPA, 1996).

For soil, ecological screening values were developed from the following sources:

- USEPA Region 4 Ecological Screening Values (USEPA 2001);
- USEPA Region 5 EDQL screening values (USEPA 1999);
- Oak Ridge National Laboratory (ORNL) soil phytotoxicity screening values (Efroymson, et al. 1997a);
- ORNL microorganisms screening values (Efroymson, et al. 1997b);
- ORNL earthworms screening values (Efroymson, et al. 1997b); and
- U.S. Fish and Wildlife Service (USFWS), moderate soil contamination that requires additional study (Beyer 1990).

See CDM (2005) Appendix B for a complete discussion of sources and application of ecological screening values.

4.2.1.3 Ecological Risk Screening Results

The CDM risk screening assessment concluded that residual concentrations of metals, semi-volatile organic compounds, and VOCs posed no significant risk to ecological receptors. This was because:

- The maximum or average concentrations of the majority of the constituents detected were below published ecological risk screening values;
- Residual concentrations of COCs identified in site groundwater are unlikely to migrate to San Francisco Bay at concentrations of ecological significance; and,
- Soil containing residual concentrations of COCs above applicable ecological risk screening values were covered with 2 to 7 ft of clean fill at the conclusion of the vehicle wash rack removal action.

The results of the Ecological Risk Scoping Assessment (CDM, 2005a) are not directly applicable to the rest of the HWD property because with the exception of VOCs, higher concentrations of COCs have been identified outside the former vehicle wash rack area. However, the conclusion that the property as a whole poses little risk to ecological receptors appears reasonable given the following factors:

- The nearest ecological receptors are on the north side of the Interstate 80 freeway, 500 ft north of the site;
- Generally low COC concentrations were identified in near surface soil; the highest COC concentrations were generally observed in soil below 4 ft bgs which is inaccessible to most terrestrial flora and fauna; and
- COCs detected in site groundwater are unlikely to migrate to San Francisco Bay at ecologically significant concentrations due to mixing and dilution along the flow path and at the discharge area as well as very high attenuation as a result of partitioning to soil.

4.2.2 IR Site 1 Soil Vapor Intrusion Risk Evaluation

CDM (2005a) conducted an analysis of potential inhalation exposure from vapor intrusion of subsurface VOC contamination into indoor air at building 1072 located to the northwest of the former vehicle wash rack IR Site 1. CDM modeled VOC transport from the subsurface to indoor air using the USEPA spreadsheet model (Windows TM - Excel) for the Johnson and Ettinger (J&E) vapor intrusion model as modified by the Human and Ecological Division (HERD) of Office of Environmental Health Hazard Assessment (OEHHA) for OEHHA human health criteria (USEPA 2001). The model (HERD_Soil_Gas_Screening_Model_2005.xls) estimates potential indoor air concentrations by calculating the flux of chemicals through a foundation.

4.2.2.1 Initial Screening

CDM first compared maximum concentrations of 28 VOCs detected in one or more of the soil gas samples collected from shallow (5 ft bgs) vapor probes installed during the April 2004 field program adjacent to groundwater monitoring wells MW-1 through MW-6 in the building 1070 yard to guidance values and standards used to screen data for potential impacts to human health. Although the site is industrial, CDM also reviewed residential criteria for comparison. Guidance values from the following sources were considered:

- San Francisco Regional Water Quality Control Board environmental screening levels (ESLs) for soil gas (SFB RWQCB, 2005);
- OEHHA soil gas screening values based on soil gas intrusion (OEHHA 2004); and
- California Environmental Protection Agency (CalEPA) California human health screening levels (CHHSLs) for soil gas (CalEPA 2005).

CDM concluded that only tetrachloroethene (PCE), detected at a maximum concentration of 3,400 ug/m^3, exceeded the guidance criteria identified above, that is, the SFB RWQCB Table E industrial ESL of 1,400 ug/m^3, the OEHHA soil gas screening value of 550 ug/m^3, and the CalEPA human health screening level of 603 ug/m^3 industrial land use. Based on the detection of PCE in soil gas in one sample at a concentration greater than potentially applicable screening levels, CDM elected to perform a more detailed evaluation of the potential risk to indoor air using the J&E vapor intrusion model.

4.2.2.2 Parameters Used in J&E Modeling

J& E model input parameters included the physical/chemical properties of the contaminants of potential concern. CDM reported that they used chemical properties (such as air and water diffusivities and Henry's law constants) from default values identified in the model, researched values for inclusion in the model or calculated values using the references provided in the user's guide for the J&E Model (USEPA 2003). The model also requires soil properties such as permeability, porosity, water-filled porosity, and bulk density. Because site-specific physical parameter data for soils were not available, CDM used default values corresponding to common soil types similar to the soil types encountered in the site borings. The vapor intrusion model does not require site-specific building characteristics. It assumes an average vapor flow rate of 5 liters per minute based on USEPA and DTSC indoor air guidance. The model also assumes an exposure frequency and duration for a residential receptor. Although the site is industrial and expected to be used only for industrial purposes in the future, these parameters assuming a residential receptor were not changed to represent an industrial scenario. A summary of the parameters used in the model is provided in CDM (2005a).

4.2.2.3 Results of Vapor Intrusion Modeling

Using the maximum PCE concentration detected in soil gas at the site in 2004 of 3,400 ug/m^3, CDM calculated the cancer risk for exposure to soil gas near the former vehicle

wash rack to be 5.0 x 10^{-6}, which is within the 10^{-4} to 10^{-6} risk management range. The hazard index for exposure to soil gas at the site was calculated to be 0.056, which falls below 1.0 and thus within the acceptable range. The total cancer risk and hazard index refer only to exposure to VOCs for inhalation of soil gas in indoor air.

It should be noted that soil gas samples have only been collected in the vicinity of the former vehicle wash rack (Parsons, 2000; CDM, 2005a). However, VOCs were not detected in soil or groundwater samples collected at any other location on the property at concentrations high enough to warrant evaluation using this process. It should also be noted that substantially higher VOC concentrations were detected in soil gas near the former vehicle wash rack during the October 1999 field program conducted by Parsons (2000). The soil gas samples collected by Parsons preceded the removal of the vehicle wash rack and oil water separator and associated petroleum- and solvent-impacted soil in May 2003. As demonstrated by the results of analysis of samples collected in April 2004, after removal of the vehicle wash rack, the IR Site 1 removal action was effective in substantially reducing soil gas impacts. Based on the results of the 2004 soil gas sampling and subsequent vapor intrusion modeling analysis using the J&E model, it appears that VOC concentrations in soil gas do not pose unacceptable risk to human health and the environment. Consequently, soil gas was not carried forward for action in the site wide FS.

4.2.3 Site Wide Limited Human Health Risk Assessment

The U.S. Army Center for Health Promotion and Preventative Medicine (USACHPPM) conducted a human health risk assessment (HRA) for the entire HWD property for constituents detected in soil. The following material was excerpted from the draft final human health risk assessment (draft final HRA) report (USACHPPM, 2007).

"This site is being evaluated for expansion of the adjacent EBMUD wastewater treatment facility onto this site. As such, any construction or industrial use of the site needs to have this risk assessment performed to ensure that chemical constituents at the site do not pose any adverse health effects to the users. At present, users of this site consist of USAR personnel, visitors and trespassers. Based on the intended future use of the site, industrial worker and construction worker scenarios are evaluated. Environmental samples from the site consist of surficial and sub-surficial soil. Exposures at this site would then be limited to contact with the soil (incidental ingestion, inhalation of fugitive dust, and dermal contact). It is assumed that the exposure for industrial workers and a construction worker will be a more sensitive indicator of site risks than the limited exposure of either site visitors or trespassers."

4.2.3.1 Methodology

"Using the Human Health Risk Assessment Guidance for Superfund methodology (EPA, 1989) outlined by the U.S. Environmental Protection Agency (EPA) and the California Environmental Protection Agency, Supplemental Guidance for Human Health

Multimedia Risk Assessments of Hazardous Sites and Permitted Facilities (CalEPA, 1992), a risk assessment was performed for soil contact to future construction workers and industrial workers at the site. Surface and subsurface soil samples were collected from the site at various locations including identified "hot spot" locations. Appendix B" of the draft final risk assessment report (USACHPPM, 2007) "contains the full text for the risk assessment."

4.2.3.2 Risk Evaluation for PAHs and Metals

"The total carcinogenic risk levels for both industrial and construction workers were found to be within the levels considered safe by the EPA at the site. The total carcinogenic risk levels ranged from 2×10^{-5} for the industrial worker to 3×10^{-5} for the construction worker. These carcinogenic risks are within the EPA's acceptable range of 1×10^{-4} to 1×10^{-6} (EPA, 1989). The total hazard index or noncarcinogenic risk ranged from 0.29 for the industrial worker to 0.96 for the construction worker. These site hazard index values do not exceed the EPA's benchmark level of 1 (EPA, 1989). This indicates that exposure to this soil does not pose a health risk to site personnel or site construction workers."

4.2.3.3 Risk Evaluation for Lead

"Health risks from lead exposure were evaluated using the EPA Adult Lead Model. Results of this model show the 95th percentile blood lead levels for the adult receptors at the site are above the EPA threshold criteria of 10 μg/dL for both heterogeneous and homogeneous populations; however, the homogeneous population estimate just slightly exceeds the criteria. A homogeneous population consists of individuals having similar socioeconomic and ethnic characteristics living within a relatively small geographic area, while a heterogeneous population is made up of people with different ethnic and socioeconomic backgrounds living in distinct geographic areas (EPA, 2003b). Results for the estimated fetal blood concentrations show that the criterion is not exceeded for a homogeneous population while blood lead levels are elevated for a heterogeneous population. However, when looking at the estimated adult central tendency blood concentrations, the site is well under the EPA threshold. Our assessment includes subsurface soil data because it assumes that the lead contamination at some point will come to the surface which makes this assessment an overestimate of risk."

4.2.3.4 Conclusions

"The risk evaluation performed for this assessment determined that industrial and construction exposures to the HWD USAR Center pose no unacceptable risk. The risk evaluation performed using the U.S. Environmental Protection Agency Adult Lead Model found a slight risk associated with lead exposure to industrial and construction workers at the site. However, since all of the elevated sample levels were detected at a depth of 2 feet or greater below the surface, the lead exposure to industrial workers would be unlikely and the lead exposure to construction workers would be very minimal. The Construction worker is more likely to be exposed at the site than the industrial worker

due to most of the area being paved or covered with clean fill or concrete after construction is finished. Based on the conservative assumptions used in this risk assessment the estimated risk for the site is likely an overestimate."

"Because of the limitations and assumptions inherent in risk assessment, this assessment must not be used as an absolute determination of the probability of health effects from the possible exposures at this site. The risk evaluation was focused on estimating potential environmental exposures and may not represent an actual exposure or risk at the site. This assessment should only be used as guidance for making decisions about the site."

4.2.3.5 DTSC Comments on Draft Final Risk Assessment

The DTSC Human and Ecological Risk Division (HERD) staff reviewed the draft final (draft final HRA) for the HWD site and summarized their comments on the risk assessment in a memo dated March 27, 2007 (DTSC, 2007). In the March 27, 2007 memo, HERD stated that they did not agree with the conclusion of the draft final HRA that the site does not pose an unacceptable risk to both construction and industrial workers. HERD noted that table 6.4 of the draft final HRA showed that total cancer risk calculated for the industrial worker was 3E-05, above the typical acceptable risk level for industrial sites of 1E-05. The total cancer risk calculated for the construction worker was 9E-05, which, HERD noted is essentially at 1E-04, and concluded that a remedial action was warranted. HERD stated that the primary contributors to the calculated total cancer risk were polycyclic aromatic hydrocarbons (PAHs).

HERD stated that they disagreed with the conclusion in the draft final HRA that there was a slightly elevated risk associated with lead exposure to industrial and construction workers. The final draft HHRA noted that since all of the elevated lead concentrations were detected at a depth of 2 ft or greater bgs, lead exposure to industrial workers would be unlikely and lead exposure to construction workers would be minimal. HERD stated that the construction worker could potentially be exposed to soil at depths deeper than two feet bgs, i.e., 10 or 15 ft bgs and thus be exposed to higher concentrations of lead.

HERD concluded that the analysis presented in the draft final HRA using the EPA Adult Lead Model (ALM) likely under predicted potential blood lead levels in industrial and construction workers. This conclusion was based on the use of a lower soil adherence factor for construction workers than is cited in Cal/EPA DTSC, 2000, the use of lower daily soil ingestion rates than is recommended for industrial and construction workers based on EPA, 2003, and the use of the arithmetic average lead concentration for the site of 1,459 mg/kg as the exposure concentration. HERD concluded that the predicted blood lead levels would be clearly higher if the soil ingestion rates used in the ALM analysis were raised to be consistent with the values used for the other COPCs. HERD also noted that the predicted blood lead levels could be potentially even higher if each of the lead "hot spots" (that is, locations with lead concentrations of up to 84,000 mg/kg) was evaluated as distinct exposure areas instead of considering the entire 17 acre site as a single exposure area as was done in the ALM analysis.

5. Feasibility Study

The purpose of this site wide Feasibility Study is to develop and evaluate alternatives for remedial action at the HWD property in accordance with CERCLA/SARA. The Feasibility Study process began with the identification of remedial action objectives (RAOs) based on a review of Applicable or Relevant and Appropriate Requirements (ARARs). General response actions and potential remedial technologies and associated process options appropriate to the site were then identified and screened based on their applicability, effectiveness, implementability, and cost. The technologies that were retained from the screening process were assembled into alternatives for contaminant remediation, risk reduction, and risk management. Finally, the alternatives were evaluated against the U.S. EPA evaluation criteria. This Feasibility Study will provide the basis for a subsequent Remedial Action Plan (RAP) in which a remedy is proposed for regulatory agency and public comment.

5.1 Previous Feasibility Studies

On behalf of the USAR, CDM (2005b) completed a draft groundwater feasibility study (FS) report for specific application to IR Site 1, aka the former vehicle wash rack and surrounding area. The vehicle wash rack FS was developed to address residual concentrations of several VOCs including PCE, cis-1,2-DCE, trans-1,2-DCE, vinyl chloride, and benzene and the metals antimony and barium in groundwater as well as PCE detected in soil vapor samples collected during the vehicle wash rack RI (CDM, 2004). The exposure routes evaluated in the vehicle wash rack FS included:

- Ingestion of contaminants in groundwater; and,
- Inhalation of contaminants in indoor air.
- The receptors of concern were identified as future industrial workers at the site.

The RAO proposed for groundwater at IR Site 1 was:

- Prevent human exposure to groundwater containing VOCs and metals at concentrations that exceed screening criteria as defined by State of California MCLs and EPA Region 9 PRGs.

CDM (2005b) noted that RAOs for protecting human health are expressed as both an exposure route (and media) and a contaminant level (or range) because protectiveness may be achieved by reducing exposure as well as by reducing contaminant concentration levels. Remedial alternatives that achieve protectiveness through either or both of these mechanisms were subsequently evaluated in the vehicle wash rack FS.

In addition to the No Action alternative, the vehicle wash rack FS evaluated the following potential response options for achieving RAOs for the IR 1 site:

- Institutional Controls;
- Monitoring, Containment;
- In Situ Treatment; and
- Groundwater Pump and Treat.

Of these, Containment, In Situ Treatment, and Groundwater Pump and Treat were dropped from further consideration. The vehicle wash rack FS stated that containment was not retained as a technology for implementation at IR Site 1 because it does not meet the RAOs as a stand alone technology. In addition, it would be moderately difficult to implement both technically and administratively, and it would have a high cost relative to other technologies considered for IR Site 1. In situ treatment was not retained as a technology to be implemented for remediation of IR Site 1 groundwater because it would not be protective of human health and the environment if implemented as a stand-alone remedy. The vehicle wash rack FS also noted that neither process option considered (enhanced anaerobic bioremediation or in situ oxidation) would remediate the metals present in IR Site 1 groundwater. Finally, the vehicle wash rack FS dropped groundwater pump and treat as a technology to be implemented for remediation of IR Site 1 groundwater because it was uncertain whether it would be protective of human health and the environment. In addition, the report noted that groundwater pump and treat may be difficult to implement, and its costs are projected to be high compared to other technologies being considered.

After completing a screening process in accordance with CERCLA guidance, the remedial alternatives developed for IR Site 1 consisted of the following:

(1) No action;
(2) Institutional controls; and
(3) Institutional controls with groundwater monitoring.

The vehicle wash rack FS evaluated the three remedial alternatives against the seven of the nine National Contingency Plan (NCP) screening criteria (the final two NCP criteria, state and community acceptance are evaluated after submittal of the FS). The results of this screening were:

- Alternatives 2 and 3, but not Alternative 1, provide overall protection of human health and the environment and are compliant with identified ARARs;
- Alternatives 2 and 3 were judged to have moderate and high long-term effectiveness and permanence, respectively, while Alternative 1 was judged to have low effectiveness;
- All three alternatives provide a low degree of reduction in contaminant toxicity, mobility, or volume since none of them involve treatment;
- Short-term effectiveness was judged to be low for Alternative 1, but moderate and high for Alternatives 2 and 3, respectively;
- All three alternatives were considered to be readily implementable; and,

- The net present worth cost of the three alternatives was estimated to be zero for Alternative 1, $206,000 for Alternative 2, and $532,000 for Alternative 3.

The draft vehicle wash rack FS did not identify a recommended remedial alternative for IR Site 1.

Because IR Site 1 is located within the property limits of the HWD site and is therefore physically within the area of concern addressed by the site wide FS discussed in sections below, and because COCs for the IR Site 1 are essentially a subset of COCs identified for the site wide FS, the Remedial Action Objectives and scope of the site wide FS are intended to address environmental concerns identified for IR Site 1. As such, it is intended that IR Site 1 be carried forward and addressed in the site wide FS rather than as a separate regulated entity.

5.2 ARARs and Remedial Action Objectives

Remedial action objectives are specific goals for protecting human health and the environment. They are developed by evaluating ARARs that protect human health and the environment and the results of remedial investigations, including the human health and ecological risk assessments. ARARs are discussed below, followed by the RAOs for the HWD property.

5.2.1 Identification of Potential ARARs

CERCLA Section 121 (d)(2)(A) requires that remedial actions meet any federal standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate. CERCLA Section 121 (d)(2)(A)(ii) requires state ARARs to be met if they are more stringent than federal requirements. In addition, the National Contingency Plan, published in 40 Code of Federal Regulations (CFR) Part 300, requires that local ordinances, unpromulgated criteria, advisories, or guidance that do not meet the definition of ARARs but that may assist in the development of remedial objectives be listed as “to be considered”.

Based on CERCLA guidance, there are three types of ARARs:

- **Chemical-Specific Requirements** – These define acceptable exposure concentrations or water quality standards.
- **Location-Specific Requirements** – These may restrict the nature of remediation activities at sensitive or hazard-prone locations such as active fault zones, wildlife habitat and flood plains.
- **Action-Specific Requirements** – These may control activities and/or technology.

The three types of ARARs are described below.

5.2.2 Chemical-Specific ARARs

Chemical-specific ARARs include risk-based requirements and federal, state, and local requirements.

5.2.2.1 Risk-Based Requirements

Chapter 40 CFR 300.430(e)(i)(A)(2) states that excess cancer risks greater than one in ten thousand (10^{-4}) are unacceptable, while excess cancer risk between 10^{-4} and one in one million (10^{-6}) may require risk management. Chapter 40 CFR Part 300 also indicates that "the 10^{-6} risk level shall be used as the point of departure for determining remediation goals for alternatives when ARARs are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure."

5.2.2.2 Federal and State ARARs

California and federal ARARs for COCs in ground water are listed in **Tables 1-4b, 1-5b, 1-6a, 1-7, and 1-8i**. For groundwater, California and federal ARARs consist of the California Department of Health Services (DHS) drinking water Maximum Contaminant Levels (MCLs), and federal drinking water MCLs. There are no drinking water-supply wells on or near the HWD property and groundwater at the site is unlikely to be used for drinking water purposes because of its high TDS and the likely low yields of wells completed in the shallow water-bearing zone.

5.2.2.3 To Be Considered Criteria

To be considered criteria identified for the HWD site included remedial action screening levels developed by EPA Region 9 and the SFB RWQCB as well as remedial action levels identified by the DTSC as a matter of policy.

For soil, to be considered criteria included the EPA Region 9 Preliminary Remediation Goals (PRGs) for industrial/commercial land use for non-petroleum hydrocarbons and metals and SFB RWQCB Table B ESLs for petroleum hydrocarbons. EPA PRGs and SFB RWQCB ESLs, where established for analytes detected at the site, are listed in Tables 1-3, 1-4a, 1-5a, 1-8a through 1-8h, 1-9, and 1-10 of this report. Derivation of the EPA Region 9 PRGs and SFB RWQCB Table B ESLs is discussed in EPA (2004) and SFB RWQCB (2005), respectively.

Based on extensive review of hazardous waste management sites in the San Francisco Bay area, the DTSC has concluded that PAHs are ubiquitous in bay margin sediments and fill soils comprised in whole or in part of reworked bay sediments. DTSC has adopted residential and industrial PAH cleanup targets based on an arithmetic average benzo(a)pyrene toxic equivalent value of 0.62 mg/kg for a data set, and a maximum benzo(a)pyrene toxic equivalent value of 1 mg/kg at any location without active remediation. The benzo(a)pyrene toxic equivalent value is computed as the toxicity-weighted sum of the concentrations of seven carcinogenic PAHs consisting of

benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k) fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. The benzo(a)pyrene toxicity equivalent value is calculated for a soil sample as follows:

- The reported concentrations of the cPAHs, benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k) fluoranthene, chrysene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene were multiplied by toxicity equivalency weighting factors (CalEPA, 1994) of 1, 0.1, 0.1, 0.1, 0.01, 0.4, and 0.1, respectively.
- A value equal to one half of the method reporting limit was used for analytes that were not detected in a sample.
- The BaPtox equivalent was then calculated as the sum of the weighted concentrations of the seven cPAHs for each sample.

For soil gas, to be considered criteria included SFB RWQCB Table E shallow soil gas screening levels for evaluation of potential vapor intrusion concerns for commercial/ industrial land use. SFB RWQCB Table E ESLs, where established for analytes detected at the site, are listed in **Tables 1-4c and 1-6b** of this report.

For groundwater, to be considered criteria included SFB RWQCB Table B ESLs protective of groundwater and surface water where groundwater is not current or potential source of drinking water. SFB RWQCB Table B ESLs, where established for analytes detected at the site, are listed in **Tables 1-4b, 1-5b, 1-6a, 1-7, and 1-8i** of this report.

5.2.3 Location-Specific ARARs

Several location-specific ARARs are potentially applicable to the site.

5.2.3.1 Faults

California location standards for permitted hazardous waste transfer, treatment, storage, and disposal facilities (22 CCR 66264.18[a]) prohibit location of new treatment, storage, and disposal facilities, or substantial modification of existing facilities, within 200 ft of a Holocene (active) fault. The site is not located within 200 ft of any active faults.

5.2.3.2 Wilderness Areas, Wildlife Refuges, and Scenic Rivers

No area within or near the HWD site is designated as a federal wilderness area, wildlife refuge, or scenic river.

5.2.3.3 Floodplains and Wetlands

22 CCR 66264.18(b)(1) states that treatment, storage, and disposal facilities within a 100-year floodplain must be designed, constructed, operated, and maintained to prevent

washout of any hazardous waste by a 100-year flood. However, there are no floodplains within the HWD property vicinity. No areas that meet the California and federal definition of wetlands have been identified at or near the property.

5.2.3.4 Historical Sites and Archaeological Findings

No archaeological investigations have been conducted but no evidence of buried cultural artifacts has been observed at the site.

5.2.4 Action-Specific ARARs

The HWD Site is planned for transfer to a non-federal entity, that is, EBMUD. Each of the active remedial alternatives discussed in Section 5.6 include institutional controls to protect human health through land-use restrictions. For these alternatives, the provisions of 22 CCR 67391.1, Requirements for Land Use Covenants apply. Additional action-specific ARARs address treatment, transportation, and disposal of hazardous waste. Sections 5.4, 5.5, and 5.6 include discussions of ARAR compliance for specific technologies and cleanup activities.

5.3 Remedial Action Objectives

The National Contingency Plan specifies that remedial action objectives be developed which address: (1) contaminants of concern, (2) media of concern, (3) potential exposure pathways, and (4) preliminary remediation levels.

Preliminary remedial action objectives for the HWD property Feasibility Study are:

For Human Health Protection:

- Prevent human ingestion of lead in soil at concentrations greater than the EPA Region 9 commercial/industrial PRG of 800 mg/kg or cPAHs above a benzo(a)pyrene toxic equivalent value of 1 mg/kg;
- Prevent human ingestion of ground water containing contaminant concentrations above the State and federal MCLs and/or more stringent RWQCB water quality ESLs.

For Environmental Protection:

- Ensure existing contaminant conditions do not change so as to threaten wildlife populations and vegetation communities.

The development of these goals involves ARARs and the results of the focused human and ecological risk assessment conducted for the former vehicle washrack Interim Remedial Measure. Potential remedial action alternatives that are consistent with these objectives, site conditions, anticipated land-use, ecological and public health requirements, and good engineering practice will be evaluated.

5.4 General Response Actions

Since the inception of CERCLA in 1980, the US EPA has found that certain categories of sites share similar characteristics, including types of contaminants present, past disposal practices, affected environmental media, and preferred remedial technologies. Various initiatives have been undertaken to incorporate this information and streamline the CERCLA FS process based on historical patterns of CERCLA remedy selection and site performance data. For the typical FS process, rather than evaluating a universe of potentially applicable options, a select group of feasible remedial process options was identified. General Response Actions describe those actions that can potentially achieve the RAOs established in Section 5.2. These actions are intended to:

- Reduce or prevent potential exposure to,
- Control the migration of, and/or,
- Destroy or detoxify the contaminants of concern identified in Section 3.

Nine General Response Actions have been identified for the lead and cPAH impacted areas identified at the site. These consist of:

- No Further Action
- Risk and Hazard Management
- Monitoring
- Monitored Natural Attenuation
- Source Isolation
- Extraction with Ex-situ Treatment
- In situ Treatment
- Removal and Treatment or Disposal
- Innovative Technologies

Table 5-1 summarizes the potential response actions for each RAO. For the discussion below, some response actions have been combined since they are, in practice, integrated.

5.4.1 No Further Action

In CERCLA feasibility studies, a no-action alternative provides a basis for comparison with other remedial actions. All ongoing activities would cease under this response. Natural degradation, dispersion, adsorption, dilution, and volatilization are the only processes that would take place, and will occur regardless of intervention.

5.4.2 Risk and Hazard Management

Risk and hazard management may include institutional, administrative, and ventilation controls, as well ecological resource surveys, and can be used as a General Response Action to mitigate or prevent exposure to contaminated media. This General Response Action is used primarily in areas where risk exceeds 10^{-6}, and may be acceptable as the sole response action when the risk falls in the 10^{-6} to 10^{-4} risk range. This General

Response Action may also be used when hazard management measures can adequately protect human health or ecological receptors from exposure to hazards that might otherwise exceed a Hazard Index of one. Risk and hazard management may commonly be employed in conjunction with other actions, such as monitoring or active responses.

- **Institutional/Administrative Controls -** Institutional and administrative controls may be used as a means of risk management to restrict some or all access to, and thereby mitigate exposure to, hazards in a contaminated area. These controls can involve a range of measures, from simply posting signs and installing fences, to regulated restrictions on the use of property. Also included are the use of operational safety procedures, which would be developed for all construction activities that may involve contact with soil and/or groundwater, to ensure worker safety and the proper handling of all hazardous materials, e.g., by means of a soil and groundwater management plan. Administrative measures can have the effect of limiting human activities or access or restricting use of contaminated water. These measures help to mitigate potential exposure pathways.

  The following administrative controls are already in place at the HWD Site and are expected to be maintained:

  - Site access is restricted and controlled by fencing and a full time security force.
  - Building occupancy and land use is controlled by the USAR.
  - There are no drinking water wells on property. Any new water supply wells of any kind must be permitted by Alameda County and the state Department of Water Resources which most likely would not grant a permit for this purpose, given existing site environmental conditions.

  Institutional/administrative controls can reliably and inexpensively prevent exposure to COCs, however they are effective only while maintained and do not provide a permanent remedy. Also, these management actions do not reduce toxicity, mobility, or volume of contaminants. However, they were retained for inclusion as components of remedial alternatives.

5.4.3 Monitoring

Although not considered a ground water response or remedial technology, monitoring is included in all groundwater remedial alternatives except for the baseline no-action case. Monitoring is essential for evaluating the effectiveness of the remedial action and to determine when relevant remedial action objectives are met including MCLs and water quality objectives. Monitoring is defined as the routine, periodic sampling and analysis of contaminated media not associated with the operation and optimization of remediation systems. Monitoring consists of collecting ground water samples from existing monitor wells and measurement of water elevations to:

- Track changes in plume concentrations and size that result from remediation or natural processes.
- Evaluate the effectiveness of the remedial actions.
- Determine when cleanup standards are achieved.
- Detect any future releases of contaminants.

With the exception of VOCs identified in groundwater near the former vehicle wash rack in the Building 1070 yard, no specific constituent groundwater contamination plumes were identified at the site. As discussed in Section 3, concentrations of metals, petroleum hydrocarbons, and other constituents detected in groundwater did not conform to a pattern typically observed with point sources of these constituents but rather reflect dissolution of these constituents at multiple locations across the property and potentially on adjacent properties upgradient (south) of the HWD property. The USAR has concluded that the source of VOCs observed near the former vehicle wash rack was removed during the 2003 Interim Remedial Action (CDM, 2004) and that natural attenuation processes have largely attenuated VOC concentrations in groundwater to below levels of concern (CDM, 2005a).

5.4.4 Monitored Natural Attenuation

Monitored natural attenuation has been recognized as an option for reducing contaminant toxicity and volume, and has proven effective for certain contaminants (e.g., fuel hydrocarbons and VOCs). In the monitored natural attenuation General Response Action, risk reduction occurs through natural degradation or decay, sorption, volatilization, or evapotranspiration. Attenuation may also occur from dilution and dispersion, although these mechanisms may not be appropriate as the only remediation processes. Monitored natural attenuation is potentially applicable to VOCs including tetrachloroethene, petroleum hydrocarbons, PAHs, and metals. Natural degradation or decay are more likely to be significant factors for VOCs and petroleum hydrocarbons and to a lesser extent, PAHs. Attenuation processes for metals including lead primarily consist of sorption/ion exchange, dilution, dispersion, diffusion, and/or precipitation related to redox change (from reducing to oxidizing conditions), or changes in pH (generally lower solubility at near neutral pH).

Under this response action, monitoring data would be collected and reviewed to determine the natural decline of contaminant concentrations in ground water and/or to identify increases in contaminant concentrations related to changes in site geochemical conditions or other factors. Monitored natural attenuation would be instituted in conjunction with a specific monitoring plan for upgradient, near-source/interior plume, and guard wells. Monitored natural attenuation requires that there is no threat to environmental media from an active source. Human health must also be protected. Thus, for a monitored natural attenuation remedy to be acceptable, an engineered remedy might need to be implemented to prevent future chemicals leaching from soil. Risk and hazard management would also be implemented to prevent exposure until contaminants have attenuated to health-protective levels. Natural attenuation may be demonstrated through a

variety of lines of evidence, including static or diminishing plume concentration contours, detection of chemical breakdown products, or detection or formation of geochemical indicators or compounds. Monitored natural attenuation was not retained as a remedial alternative component the primary constituents of concern, lead and cPAHs are not subject to natural attenuation in a reasonable timeframe and exposure to secondary COCs including VOCs and petroleum hydrocarbons can reasonably be mitigated using alternative measures such as groundwater use restrictions.

5.4.5 Source Isolation

Containment technologies and/or processes are those where the primary objective is not to remove contaminant mass, but to prevent contamination from migrating. Containment technologies could be used to physically isolate contaminated soil or render the soil impermeable, preventing water from entering the impacted areas and leaching contaminants. Barrier methods, which include slurry walls, grout curtains, and ground (cryogenic) freezing, could be used to create an impermeable zone around the impacted soil. These barriers would prevent lateral ground water flow into or out of the contaminant impacted area. Slurry walls and grout curtains were retained because they are implementable and cost-effective. Soil freezing was not retained because it would be expensive to implement, is an unproven technology, and probably would not be consistent with future land use.

Soil caps minimize the infiltration of rain water through contaminated soil waste and subsequent leaching of contaminants to underlying ground water. However, capping by itself will be ineffective in preventing ground water table rise during the winter rainy season and subsequent contact with contaminated soil. Placement of an engineered cap over any portion of the property would effectively preclude development of that portion of the property thus limiting future land uses. Because contaminants are left in place, barrier systems such as capping would have to be accompanied by a groundwater performance monitoring program.

5.4.6 Extraction and Ex situ Treatment

Extraction and ex situ treatment was evaluated as a general response action for contaminated: 1) groundwater, and 2) soil.

5.4.6.1 Groundwater Extraction and Treatment

Removal and treatment of contaminated ground water would involve extraction followed by treatment and discharge of the treated water. Ground water would be extracted by pumping from wells, trenches, or sumps. Several factors complicate the application of this technology to the contaminants identified in groundwater at the HWD site:

- Soil permeability is likely to be low, limiting groundwater recovery rates and increasing the number of extraction points, wells, or trenches needed to contain areas with contaminated groundwater.
- Groundwater elevation fluctuates several feet between summer dry season and winter rainy season conditions indicating a corresponding fluctuation in groundwater treatment volumes.
- Because groundwater is characterized by elevated TDS and the presence of a number of potentially toxic metals and organic compounds, a relatively complex, expensive treatment system would need to be implemented.
- The principal contaminants of concern, that is, lead and PAHs, have high soil-water partitioning coefficients indicating that once initiated, extraction and treatment might need to continue indefinitely.
- Because of the presence of substantial thicknesses of readily compressible Bay Mud deposits, groundwater extraction would likely result in differential consolidation of site soils potentially disrupting utilities, roadways, and foundations of structures.

Because of these issues with implementation and uncertain treatment costs, groundwater extraction and treatment was not retained for the FS.

5.4.6.2 Soil Excavation and Onsite Treatment

This technology involves excavating impacted soil with treatment onsite. Treated soil would then be to the excavation or transported to an off-site permitted disposal facility. Organics could potentially be treated by thermal desorption/oxidation. Metals impacted soils could be treated using solvent washing methods or stabilized using Portland cement, polymers, or other chemical additives. The generally fine-grained soil encountered at the site could complicate on-site treatment options because the high moisture content and need to defloculate clay size particles to assure uniform treatment would diminish the effectiveness of thermal oxidation for organics and impede mixing for solvent washing for metals. Onsite soil treatment technologies are generally only cost effective for large volumes of impacted soil. Because of treatment concerns and high cost, this technology was not retained for further evaluation.

5.4.7 In situ Treatment

In situ treatment methods destroy, immobilize, or convert contaminants in soil to less toxic compounds. Possible in situ methods are insitu oxidation (for PAHs), and solidification or stabilization for metals and organics.

- **Solidification/Stabilization** – Solidification technologies encapsulate the waste to form a stable solid material. Stabilization technologies reduce the potential hazard from a waste by converting the contaminants to less soluble, mobile, or toxic forms, for example by reducing hexavalent chrome to its less toxic, less mobile trivalent form. Solidification and stabilization can be accomplished with inorganic or polymer binders. The most common inorganic binder is Portland cement. The application of

solidification/ stabilization technologies is more complicated for organic contaminants.

- **Chemical Oxidation** – Chemical oxidation the use of oxidation/reduction (redox) reactions to chemically convert hazardous compounds to nonhazardous or less toxic compounds that are more stable, less mobile, or inert. Commonly used oxidizers include Fenton's Reagent, ozone, and sodium or potassium permanganate. The desired end products of chemical oxidation of organic contaminants are carbon dioxide and water.

5.4.8 Removal and Disposal

Source removal involves a complex process of locating, characterizing, excavating, treating, and/or disposing of contaminated waste, soil, rock, and/or debris. Excavation may include partial or total waste removal as necessary to control contaminant sources and prevent further releases to the environment. Excavated source material would be transported to an off-site permitted facility for treatment, destruction, and/or disposal. Because excavation and offsite disposal is a readily implemented technology applicable to metals and organics, it was retained for the FS.

5.4.9 Innovative Technologies

Although we evaluated several innovative technologies in the screening process, most are not considered technically feasible at this time and were not used in the development of remediation alternatives. Electrochemical chemical technologies including electrokinetic treatment methodologies, and phytoremediation were briefly considered and ruled out. Phytoremediation is a promising emerging technology that would utilize plants for removing or destroying contaminants insitu but was ruled out for this site because its use would be inconsistent with planned land use, among other concerns. Electrophoresis involves the use of low voltage electrical currents to enhance deliver of necessary nutrients to indigenous bacteria to increase degradation of organic contaminants and/or the use of low voltage electrical currents to control the migration/transport of inorganic constituents including metals. Both of these applications are currently at the laboratory/pilot scale field testing stage and not proven in large scale field applications.

5.5 Identification and Screening of Technology Types and Process Options

This section describes the process by which potential remedial technologies were screened for use at the HWD site.

5.5.1 Identification and Screening of Technologies

This report evaluates one or more technologies that were considered to be potentially viable for each General Response Action. These technologies were evaluated against four criteria:

- Applicability,
- Effectiveness,
- Implementability, and
- Cost.

In the first step of the technology screening process, technologies were evaluated for their applicability to the media and contaminants of concern at the site. **Table 5-2** lists the General Response Actions and technologies by the media and contaminants of concern at the site to which they apply. The applicable technologies were evaluated to determine their effectiveness in remediating the media and contaminants of concern given the technologies' limitations. The applicable and effective technologies were then assessed for the implementability of the technology given specific site conditions. The technologies considered to be implementable were retained for an evaluation of the cost of the technology.

Tables 5-3a, **5-3b**, and **5-3c** summarize the screening and evaluation of General Response Actions, technology types, and process options available for the remedial alternatives for vadose zone/surface soil, subsurface soil, and ground water, respectively. The first column of **Tables 5-3a**, **5-3b**, and **5-3c** lists the General Response Actions. Listed with each General Response Action are one or more technologies that are considered potentially viable. These tables document the reasons for retaining or eliminating a technology from further consideration, based on the criteria of applicability, effectiveness, implementability, and cost. The last column indicates whether the technology was retained for consideration in the development of the remediation modules.

5.5.2 Evaluation and Selection of Representative Technologies

Through the development and screening of General Response Actions and remedial technologies, numerous actions and technologies have been retained. **Table 5-4** summarizes the retained technologies for surface/vadose zone soil, subsurface soil, and ground water at the HWD site for specific COCs. At least one technology from each retained General Response Action or class of response action was incorporated into the alternative remedies assembled in Section 5.6. Retained technologies that were incorporated into the remedial alternatives were chosen based on applicability, implementability, effectiveness, cost, site-specific requirements, and professional experience, and judgment.

5.6 Development and Screening of Alternatives

In this section, remedial alternatives are presented that address COCs in media of concern at the HWD site. Each of the remedial alternatives was developed from retained technologies and response actions described in Section 5.5. To develop these remedial alternatives, retained technologies and response actions were combined based on applicability, implementability, effectiveness, cost, site- and area-specific requirements, and best professional judgment. Because of the short time-frame for decision making and ready availability of standard remedial technologies, no innovative technologies were retained for further consideration. In some cases, it may be appropriate to specify a general remedial strategy for the HWD site in this RI/FS but defer selection of specific technologies until the Remedial Design document (EPA, 1996). This is mainly the case for in situ treatment using solidification or stabilization technologies for which site specific bench scale testing is needed to refine treatment costs. Some remediation-specific details are presented in this RI/FS for purposes of costing and strategy presentation. The actual site- and technology-specific details will be based on additional data and design criteria presented in the HWD Remedial Design report. The HWD remedial alternatives consist of a combination of selected technologies and actions, as described above and summarized in **Table 5-5**, along with their total estimated costs. Detailed cost estimates for alternatives are presented in Appendix C. Consistent with the National Oil and Hazardous Substances Pollution Contingency Plan, DTSC will reevaluate remediation performance, effectiveness, feasibility, and protectiveness every five years. Based on the outcome of these evaluations, the required level of cleanup, remedial actions, and project life may be redefined.

5.6.1 Development of Alternatives

Seven remedial alternatives were assembled to meet remedial action objectives and address COCs identified in surface/vadose zone soil, subsurface soil, and ground water at the HWD site. The main COCs identified in surface/vadose zone and subsurface soil consisted of cPAHs and lead. As discussed in Section 3, residual concentrations of VOCs, TPH, and metals other than lead will be addressed by remedial action for cPAHs and lead. COCs in site groundwater consisted of VOCs, TPH, metals, and PAHs. As shown in **Table 5-5**, the remedial alternatives were formulated to address these contaminants using different combinations of technologies that were retained in the screening process. For example, Alternatives 2, 3, 4, 5, and 6 all include the same exposure control measures for risk and hazard management and Alternatives 3, 4, 5, and 6 all include groundwater monitoring.

The cost estimates provided for each alternative are limited to 30 years due to: (1) uncertainty regarding the total time required to achieve at least MCLs, and (2) the difficulty in accurately estimating annual costs in the far future. A 30-year timeframe allows reasonable cost comparisons between remedial alternatives for that time period. Because of their high soil-water partitioning coefficients and natural resistance to degradation or transformation, lead or cPAHs identified in site soil may continue to need to be managed as hazardous materials beyond the 30 year time frame.

The alternatives evaluated in the FS for surface/vadose zone soil, subsurface soil, and groundwater were:

- Alternative 1: No Action
- Alternative 2: Soil Excavation and Offsite Disposal
- Alternative 3: Limited Soil Excavation and Offsite Disposal
- Alternative 4: Limited Excavation and In situ Treatment
- Alternative 5: Limited Excavation and Containment
- Alternative 6: Limited Excavation and Capping
- Alternative 7: Institutional Controls

The remedial alternatives developed for the site are described below.

5.6.2 Alternative 1—No Further Action

A no-action alternative is generally required by EPA guidance to provide a baseline for comparison to other remedial alternatives and is the postulated basis of the baseline risk assessment. Under a no-action response, all monitoring and maintenance activities at the HWD site would cease. There are no costs associated with the no-action alternative.

5.6.3 Alternative 2—Soil Excavation and Offsite Disposal

This alternative consists of two components:

A) Exposure control through risk and hazard management; and,

B) (inclusive) Soil excavation and offsite disposal.

Potential contaminant exposures would be mitigated by implementing risk and hazard management measures at the site including fencing and signage to restrict access to potentially contaminated areas to industrial and commercial workers, land use restrictions to prevent residential development without further remedial action, a soil management plan to control exposure to potentially contaminated soil during any excavation activities at the site (e.g., during underground utility installation), groundwater development restrictions to prevent use of site groundwater for drinking water purposes. Currently, while the site is under USAR operational control, and afterwards under EBMUD's management, unauthorized access to the entire site is/will be restricted by fencing, gates, and a security patrol system. As part of preparation of the RAP for the site, a deed covenant will be developed and filed with the City of Oakland planning department and DTSC that will restrict land use at the site to commercial/industrial and prohibit construction and operation of drinking water supply wells on the property. Also, a soil and groundwater management plan will be prepared as an appendix to the RAP that will describe health & safety procedures, personnel protective equipment (PPE), soil, groundwater, and ambient air monitoring procedures, and contaminated soil and groundwater handling and disposal procedures to be implemented prior to specified activities at the site. Activities covered in the soil and groundwater management plan include but are not limited to soil excavation for any purpose, construction of any site

feature below the water table, and/or disturbances to any cap or engineered barrier installed at the site. All current and successive property owners will be required to comply with the Implementation and Enforcement Plan, which in general would include conducting visual inspections of the Site to ensure compliance with the Covenant, and submitting written reports to DTSC. For cost estimation purposes, it was assumed that monitoring and maintenance of the institutional control measures would be implemented annually for 30 years.

Alternative 2 will include removal of cPAH-impacted soil in the vadose zone and in subsurface soil to a depth of 8 ft bgs identified in the building 1064 yard as well as removal of lead-impacted soil in the vadose zone and to a depth of 10 ft bgs identified in the building 1070 yard. The targeted remedial action objectives for the soil removal will entail excavation and offsite disposal of lead- and cPAH-impacted soil above action levels of 800 mg/kg and 0.62 mg/kg, respectively. The areas identified for remedial action under this alternative are illustrated on **Figure 5-1**. Under this alternative, excavation is planned near building 1064 to remove cPAH impacted soil to a depth of 9 ft bgs over an area of approximately 1,150 sf surrounding the PV-18 test pit area and to a depth of 5 ft bgs over an area of approximately 1,850 sf southeast of the PV-18 test pit. Excavation would be conducted to depths as great as 10 ft bgs in the building 1070 yard. The excavations in the building 1070 yard encompass a total area of approximately 38,000 sf. Because there is uncertainty in the lateral extent of soil containing lead above the action level of 800 mg/kg, Alternative 2 includes a line item for costs for additional drilling and soil sampling to better refine the extent of contamination. Based on existing soil sampling data, it is anticipated that the upper 3 ft of the soil column in some portions of the work areas may be suitable for reuse on site. For cost estimation purposes, we estimated that one half of the shallow soil volume could be reused onsite. Reuse of soil from the site would be contingent on approval from DTSC, and, for metals impacted soil, analysis using the California Waste Extraction Test (W.E.T.). Based on previous testing results using the TCLP procedure (Parsons, 1999), it is anticipated that lead impacted soil will classify as hazardous waste.

The total estimated cost of this alternative was $6,762,000 as listed in **Table 5-5**. Backup material for the FS cost estimates is presented in Appendix C.

5.6.4 Alternative 3—Limited Soil Excavation and Offsite Disposal

This alternative consists of four components:

A) Exposure control through risk and hazard management;

B) Excavation and offsite disposal of cPAH-impacted soil;

C) Excavation and offsite disposal of lead-impacted soil in the vadose zone in the building 1070 yard; and

D) Groundwater Monitoring.

This alternative would consist of implementing risk and hazard management measures at the site as described for Alternative 2, removal of cPAH-impacted soil in the vadose zone

and in subsurface soil to a depth of up to 9 ft bgs identified in the building 1064 yard as described for Alternative 2, removal of lead-impacted soil in the vadose zone only (to a depth of 4 ft bgs) identified in the building 1070 yard, plus initiation of a groundwater monitoring program. **Figure 5-2** illustrates the location of areas to be excavated. Alternative 3 provides for the removal and offsite disposal of cPAH-impacted soil identified in a relatively small area between buildings 1064 and 1070 combined with removal of lead-impacted soil in the upper 4 ft of the soil column in the building 1070 yard with the greatest potential for exposure to construction workers and other workers at the site. Lead-impacted soil identified at depths greater than 4 ft in this area would have a minimum of 4 ft of clean fill cover/or clean existing soil to minimize exposure to onsite workers.

Because there is considerable uncertainty in the lateral extent of soil containing lead above the action level of 800 mg/kg, Alternative 3 includes a line item for costs for additional drilling and soil sampling to better refine the extent of contamination. However, the amount of additional soil characterization needed for this alternative is considered to be less than the level of effort required for Alternative 2 because shallow soils have been more intensively investigated in the 1070 yard than deeper soil. Because lead-impacted soil would be left in-place below depths of 4 ft, a groundwater quality detection monitoring program would be initiated to identify changes in geochemical conditions and indications of increased contaminant leaching that might adversely affect downgradient ecological receptors. In the event that changes in groundwater quality were indicated at some point in the future, remedial action might need to be taken to contain groundwater or treat/remove the residual source.

The cost estimate for this alternative includes installation of three new monitoring wells along the north and west sides of the building 1070 yard to serve as downgradient monitoring points as well as installation of three new background/upgradient monitoring wells along the south and east boundary of the 1070 yard (**Figure 5-2**). Sampling and water level measurements of the six new wells and one existing well, EMW-4, would be conducted on a biannual basis. Groundwater samples would be tested for metals, VOCs, and TPH as well as geochemical indicator parameters including oxidation/reduction potential, pH, salinity, and dissolved oxygen concentration. The cost of groundwater monitoring for a 30 year period was evaluated for the FS. All current and successive property owners would be required to comply with the Implementation and Enforcement Plan, which in general would include conducting visual inspections of the Site to ensure compliance with the Covenant, and submitting written reports to DTSC. For cost estimation purposes, it was assumed that monitoring and maintenance of the institutional control measures would be implemented annually for 30 years. The total estimated cost of this alternative was $1,867,400 as listed in **Table 5-5**. Backup material for the FS cost estimates is presented in Appendix C.

5.6.5 Alternative 4—Limited Excavation and In situ Treatment

This alternative consists of four components:

A) Exposure control through risk and hazard management;

B) Excavation and offsite disposal of cPAH-impacted soil;

C) In situ treatment of lead-impacted soil in the building 1070 yard; and

D) Groundwater Monitoring.

This alternative would consist of implementing risk and hazard management measures at the site as described for Alternative 2, removal of cPAH-impacted soil as described in Alternative 3, and in situ solidification of lead-impacted soil in the vadose zone and in subsurface soil to a depth of 10 ft bgs identified in the building 1070 yard. A 5 year performance monitoring system would be implemented in conjunction with this remedial alternative to confirm the effectiveness of the lead/metals treatment program. Treatment of soil using a Portland cement additive was assumed for the FS cost evaluation. A bench scale test and field scale pilot test would be needed to be conducted to identify site specific treatment parameters. The groundwater monitoring program would include installation of six new monitoring wells, with sampling of seven monitoring wells on a biannual basis for metals. **Figure 5-3** illustrates the anticipated excavation and in situ treatment areas. Under this alternative an area of approximately 38,500 sf in the building 1070 yard would be treated to depths of between 4 and 6 ft bgs. Because there is considerable uncertainty in the lateral extent of soil containing lead above the action level of 800 mg/kg, Alternative 4 includes a line item for costs for additional drilling and soil sampling to better refine the extent of contamination. The amount of additional soil characterization needed for this alternative is considered to be on the same order as the effort anticipated for Alternative 2 because the treatment area is comparable to the proposed excavation area for Alternative 2. The total estimated cost of this alternative was $3,111,000 as listed in **Table 5-5**. Backup material for the FS cost estimates is presented in Appendix C.

5.6.6 Alternative 5—Limited Excavation and Containment

This alternative consists of four components:

A) Exposure control through risk and hazard management;

B) Excavation and offsite disposal of cPAH-impacted soil;

C) Capping and slurry wall construction to contain lead-impacted soil in the building 1070 yard; and

D) Groundwater Monitoring.

This alternative consists of implementing risk and hazard management measures at the site as described for Alternative 2, removal of cPAH-impacted soil as described in Alternative 3, and containment of the lead-impacted soil in the building 1070 yard using a combination of an engineered cap and a hydraulic barrier in the form of a slurry wall (**Figure 5-4**). The engineered cap would be comprised of a combination of seam-sealed HDPE, geotextile fabric to provide strength, and asphalt paving to allow for use of the area for vehicle parking. The surface of the cap would be sloped to divert precipitation runoff to a stormwater collection system. Alternative 5 includes a hydraulic barrier

system to prevent water from entering the lead-impacted soil area from the sides. Under this alternative, a continuous slurry wall approximately 2 ft wide would be constructed around the lead-impacted soil area by trenching and pumping of a grout slurry to create a continuous wall of low permeability material that would enclose the lead-impacted soil. There is insufficient site data to ensure that a continuous low permeability aquitard layer underlies the area of lead-impacted soil. However, the combination of low permeability bay mud deposits identified at the site and advancing the slurry wall to a depth of approximately 5 ft below the lead-impacted zone should be sufficient to impede groundwater flow. Because the cap would be designed to reduce precipitation infiltration by 99% or more, the potential for mobilizing contaminants inside the containment cell would be greatly reduced.

The groundwater monitoring program would include installation of six new monitoring wells outside the containment cell and two groundwater monitoring wells inside the containment cell. The eight new wells and one existing well, EMW-4, would be sampled on a biannual basis for metals, as well as geochemical parameters that potentially influence metals mobility including pH, oxidation/reduction potential, salinity, and dissolved oxygen concentration. **Figure 5-4** illustrates the anticipated excavation and in situ treatment areas. Under this alternative cap and slurry wall system would be constructed to contain an area of approximately 55,000 sf in the building 1070 yard. Because there is considerable uncertainty in the lateral extent of soil containing lead above the action level of 800 mg/kg, Alternative 5 includes additional drilling and soil sampling to better refine the extent of contamination.

Soil in this area contains significant amounts of natural organic matter as well as wood waste and other biodegradable materials. Capping this area could incidentally contain a volume of soil with methane gas generation potential. Consequently, this alternative includes a field investigation of the methane gas generation potential of saturated soil in this area. Investigation of the methane gas generation potential would consist of advancing soil gas probes at up to six locations within the capped area for analysis for methane prior to remedial construction and post construction methane gas monitoring to assess whether methane gas is accumulating beneath the cap.

The amount of additional soil characterization needed for this alternative is considered to be on the same order as the effort anticipated for Alternative 2 because the treatment area is comparable to the proposed excavation area for Alternative 2. All current and successive property owners will be required to comply with the Implementation and Enforcement Plan, which in general would include conducting visual inspections of the Site to ensure compliance with the Covenant, and submitting written reports to DTSC. For cost estimation purposes, it was assumed that monitoring and maintenance of the institutional control measures would be implemented annually for 30 years. The total estimated cost of this alternative was approximately $1,449,000 as listed in **Table 5-5**. Backup material for the FS cost estimates is presented in Appendix C.

5.6.7 Alternative 6—Limited Excavation and Capping

The selected remedial action, Alternative 6 (limited excavation and capping), involves the following elements:

A) Institutional controls;

B) Excavation and offsite disposal of carcinogenic polynuclear aromatic hydrocarbon- (cPAH)-impacted soil;

C) Capping lead-impacted soil in the building 1070 yard; and

D) Groundwater Monitoring.

Each of these elements is described in more detail below.

5.6.7.1 Institutional Controls

Alternative 6 includes institutional controls that will impose appropriate limitations on the entire HWD property since hazardous materials, hazardous wastes or constituents, or hazardous substances will remain at the HWD property at levels that are not suitable for unrestricted use of the land after implementation of this remedy. Potential contaminant exposures would be mitigated by implementing risk and hazard management measures via administrative controls and a land use covenant.

Currently, while the site is under USAR operational control, and afterwards under EBMUD's management, unauthorized access to the entire site is/will be restricted administratively by fencing with warning signs, gates, and a security patrol system.

A Covenant to Restrict Use of Property, Environmental Restrictions (Covenant) would be recorded with the Alameda County Assessor's Office. The Covenant would (a) prohibit sensitive land uses, (b) specify soil management requirements, (c) prohibit construction of groundwater wells or extraction of groundwater on the property for all purposes without DTSC's approval, (d) specify construction dewatering requirements, and (e) include and require compliance with the Implementation and Enforcement Plan. Such institutional controls would apply to the entire HWD property. Additional soil management requirements are also necessary for the lead-impacted soil in the Building 1070 Yard. A soil and groundwater management plan would be prepared as an appendix to the site Remedial Action Work Plan that will describe health & safety procedures, personnel protective equipment (PPE), soil, groundwater, and ambient air monitoring procedures, and contaminated soil and groundwater handling and disposal procedures to be implemented prior to specified activities at the site.

5.6.7.2 Excavation and Offsite Disposal of cPAH-impacted Soil

The second element of the Alternative 6 would consist of removal of cPAH-impacted soil in the vadose zone and in subsurface soil to a depth of 9 ft bgs identified in the Building 1064 Yard. The targeted remedial action objectives for the soil removal will entail excavation and offsite disposal of cPAH-impacted soil above a benzo(a)pyrene toxic

equivalent value of 0.62 mg/kg based on the arithmetic average of the data set, and a maximum benzo(a)pyrene toxic equivalent value of 1 mg/kg at any location. The areas identified for remedial action under this alternative are illustrated on **Figure 5-5**. Under this alternative, excavation would be conducted near Building 1064 to remove cPAH-impacted soil to a depth of 9 ft bgs over an area of approximately 1,150 sf surrounding the PV-18 test pit area and to a depth of 5 ft bgs over an area of approximately 1,850 sf southeast of the PV-18 test pit. After collection and analysis of confirmation samples, the excavation will be backfilled with imported clean fill materials.

Investigative activities completed during the 2006 Remedial Investigation (GEOLOGICA, 2007) indicated uncertainty in the southern extent of cPAH-impacted soil that will be further investigated during implementation of this RAP. Procedures for implementation of this element of the RAP will be detailed in the Remedial Action Work Plan.

5.6.7.3 Capping of Lead-impacted Soil

The third element of this remedial alternative consists of construction of a pavement cap at the Building 1070 Yard to prevent dermal contact or ingestion of lead-impacted soils. The surface of the cap would be sloped to divert precipitation runoff to a stormwater collection system. The main purpose of the cap would be to prevent worker contact with lead-impacted soil; however, paving the unpaved portion of the Building 1070 Yard would reduce precipitation infiltration and reduce the potential for mobilizing residual contaminants in soil.

Under this alternative, the cap would be constructed to contain an area of approximately 55,000 sf at the Building 1070 Yard as depicted on **Figure 5-5**. Because there is uncertainty in the lateral extent of soil containing lead above the action level of 800 mg/kg, Alternative 6 includes additional drilling and soil sampling to refine the extent of contamination. Upon receipt of additional soil sampling results, expansion of the proposed capping area may be necessary.

Procedures for implementation of this element of the RAP and specifications for the cap construction will be detailed in the Remedial Action Work Plan.

5.6.7.4 Groundwater Monitoring

Alternative 6 also includes a groundwater monitoring program at the Building 1070 Yard. Because lead-impacted soil would be left in-place, a groundwater quality detection monitoring program will be initiated to identify changes in geochemical conditions and indications of increased contaminant leaching that might adversely affect downgradient ecological receptors. In the event that changes in groundwater quality were indicated at some point in the future, remedial action might need to be taken to contain groundwater or treat/remove the residual source. Depending on the availability and condition of existing monitoring wells in the area, this alternative includes installation of up to three new monitoring wells along the north and west sides of the Building 1070 Yard to serve as downgradient monitoring points as well as installation of three new background/ upgradient monitoring wells along the south and east boundary of the Building 1070 Yard (**Figure 5-5**). Sampling and water level measurements of the six new wells and one existing well, EMW-4, would be conducted on a biannual basis. Groundwater samples

would be analyzed for metals, as well as geochemical indicator parameters including oxidation/reduction potential, pH, salinity, and dissolved oxygen concentration.

Procedures for implementation of this element of the RAP and specifications for monitoring well construction, well development, and groundwater monitoring procedures will be detailed in the Remedial Action Work Plan.

5.6.7.5 Implementation and Enforcement Plan

Under this alternative, all current and successive property owners would be required to comply with the Implementation and Enforcement Plan, which would include monitoring and maintenance of the institutional controls, groundwater quality monitoring, and reporting to the DTSC. It was assumed that monitoring and maintenance of the institutional control measures would be implemented on an annual basis for 30 years. A 30-year timeframe allows reasonable cost comparisons between remedial alternatives for that time period. Because of their high soil-water partitioning coefficients and natural resistance to degradation or transformation, soils impacted with lead or cPAHs at the site may require management as hazardous substances beyond the 30-year time frame.

For cost estimation purposes, it was assumed that monitoring and maintenance of the institutional control measures would be implemented annually for 30 years. The total estimated cost of this alternative was approximately $922,400 as listed in **Table 5-5**. Backup material for the FS cost estimates is presented in Appendix C.

5.6.8 Alternative 7—Institutional Controls

This alternative consists of two components:

A) A land use covenant; and,

B) An implementation and enforcement plan.

Based on the intended future use of the site, industrial and construction worker scenarios were evaluated in the health risk assessment (USACHPPM, 2007). The health risk assessment indicated that the risks posed from exposures to soil are acceptable, except for a potential minimal risk from lead based on the results of the U.S. EPA Adult Lead Model. However, since all elevated soil concentrations (i.e., up to 84,300 mg/kg for lead and up to 14.45 mg/kg for benzo(a)pyrene equivalent) were detected at depths of 2 feet or greater below ground surface, the USAR believes that the exposure to industrial workers would be unlikely and the exposure to construction workers would be minimal.

In this alternative, potential contaminant exposures would be mitigated by implementing institutional controls at the site including fencing and signage to restrict access to contaminated areas to industrial and commercial workers, land use restrictions to prevent residential development, and groundwater development restrictions to prevent use of site groundwater for all purposes. During planned future construction, workers may have minimal short-term exposures to potentially contaminated soil or groundwater

during any excavation activities at the site (e.g., during underground utility installation). Such exposures can be mitigated by the construction contractor through the use of best management practices, Occupational Safety and Health Administration (OSHA) training, and the use of appropriate personal protective equipment for construction workers at levels meeting the hazardous waste site cleanup requirements.

Currently, while the site is under USAR operational control, and afterwards under EBMUD's management, unauthorized access to the entire site is/will be restricted by fencing, gates, and a security patrol system. A Covenant to Restrict Use of Property, Environmental Restrictions (Covenant) will be recorded with the Alameda County Assessor's Office. The Covenant will prohibit sensitive land use, specify soil management requirements, prohibit construction of wells and/or extraction of groundwater on the property without DTSC's approval, and specify construction dewatering requirements.

All current and successive property owners will be required to comply with the Implementation and Enforcement Plan, which in general would include conducting visual inspections of the Site to ensure compliance with the Covenant, conducting groundwater quality monitoring, and submitting written reports to DTSC. The total estimated cost of this alternative was $210,400 as listed in **Table 5-5**. The cost backup for this alternative is provided in **Appendix C**, **Table C-6**.

5.7 Detailed Evaluation of Alternatives

This section presents a detailed analysis and comparison of the seven remedial alternatives developed for the HWD site.

5.7.1 Criteria and Evaluation Process

The National Oil and Hazardous Substances Pollution Contingency Plan identifies nine criteria to be used in the detailed analysis of remedial alternatives:

1) Overall protection of human health and the environment;
2) Compliance with ARARs;
3) Long-term effectiveness and permanence;
4) Reduction of toxicity, mobility, and volume;
5) Short-term effectiveness;
6) Implementability;
7) Cost;
8) State acceptance; and,
9) Community acceptance.

The first two criteria, called threshold criteria, are the most important since alternatives that do not meet them are not considered viable. Criteria 3 through 7 are called balancing criteria and are used to evaluate trade-offs among the alternatives. The last two criteria are called modifying criteria because new information or comments from

the State of California, local agencies, or the community may modify the preferred remedial action alternative or cause another alternative to be considered.

Each of these criteria is discussed below.

5.7.1.1 Overall Protection of Human Health and the Environment

This criterion addresses whether the alternative achieves and maintains protection of human health and the environment during implementation and after remediation objectives are achieved.

5.7.1.2 Compliance with ARARs

Unless a waiver is obtained, the alternative or combination of alternatives that are finally selected must comply with all location-, action-, and chemical-specific ARARs.

5.7.1.3 Long-Term Effectiveness and Permanence

This criterion evaluates how each alternative maintains protection of human health and the environment. This includes evaluating residual risk and management obligations after meeting the remedial action objectives.

5.7.1.4 Reduction of Toxicity, Mobility, and Volume

This criterion is used to evaluate if and how well each alternative reduces the toxicity, mobility, and/or volume of contaminants through treatment. It also addresses the amount of contaminants remaining on site after completion of remedial measures.

5.7.1.5 Short-Term Effectiveness

This criterion addresses the effectiveness of each alternative to protect human health and the environment during construction and implementation of each remedial action. This includes the safety of workers and the public, disruption of site and surrounding land uses, and time necessary to achieve protective measures.

5.7.1.6 Implementability

This criterion addresses the technical and administrative feasibility of each alternative including:

- Availability of goods and services;
- Flexibility of each alternative to allow additional modified remedial actions;
- Effectiveness of monitoring;
- Generation and disposal of hazardous waste; and
- Substantive permitting requirements.

5.7.1.7 Cost

Capital, operation and maintenance, monitoring, and contingency costs are estimated for each alternative and are presented as 2006 present-worth costs using a 7% discount rate. Total costs for all alternatives were estimated within an accuracy of +50% and –30% in accordance with EPA guidance (2000) and are presented in **Table 5-5**. Detailed costs for each alternative are presented in Appendix C.

The cost estimates provided for each alternative are limited to 30 years due to: (1) uncertainty regarding the total time required to achieve MCLs, and (2) the difficulty in accurately estimating annual costs in the far future. A 30-year timeframe allows reasonable cost comparisons between remedial alternatives for that time period.

5.7.1.8 State Acceptance

This criterion addresses the State's comments and concerns for each potential remedy and indicates whether the State concurs with the preferred or the selected remedy. This assessment may not be completed until comments on RI/FS are received, but it may be discussed to the extent possible in the draft Remedial Action Plan.

5.7.1.9 Community Acceptance

A public meeting will be held after the draft HWD site wide RI/FS is published to present and receive public comments on the proposed remedial alternatives. A summary of the remedial alternatives and the preferred remedies will be published in the draft Remedial Action Plan. A public meeting will be held during the 30-day comment period for the draft Remedial Action Plan to receive formal comments from the public. Public comments will be considered in the selection of the remedy. Public comments made during the public meeting and 30-day comment period will be addressed in the Responsiveness Summary of the Remedial Action Plan.

5.7.2 Detailed Analysis of Alternatives

This section evaluates how each alternative addresses the first seven EPA criteria specified by the National Oil and Hazardous Substances Pollution Contingency Plan. Evaluations of State and community acceptance will be addressed in the final Remedial Action Plan at the conclusion of the 30-day public comment period. **Table 5-6** summarizes the results of a detailed analysis of the remedial alternatives in meeting the evaluation criteria.

5.7.2.1 Evaluation of Alternative 1—No Action

Alternative 1 is intended to provide a baseline to compare to other alternatives. Under a no action response, all environmental response activities at the HWD site, including monitoring, would cease.

- **Overall Protection of Human Health and the Environment and Compliance with ARARs.** Because COCs were identified at the site that could be encountered by construction workers and other site workers in routine activities, Alternative 1 may not protect human health and the environment. Furthermore, with no safeguards in place to prevent residential development in the future, more significant exposures and greater risk could be incurred were current land use to change given the long residence time of the principal COCs.
- **Long-Term Effectiveness and Reduction in Toxicity, Mobility, and Volume.** The long-term effectiveness and permanence of this alternative relies solely on natural attenuation to reduce contaminant concentrations and to restrict the mobility and reduce the toxicity and volume of cPAHs, lead, and other metals as well as VOCs and petroleum hydrocarbons in soil and groundwater. It is likely that without source control measures for the cPAH AOCs in the building 1064 and 1070 yards, and the lead AOC in the building 1070 yard, this may not be achieved in a reasonable timeframe.
- **Short-Term Effectiveness.** Since there would be no remediation-related construction occurring under Alternative 1, there would be no impact to human or ecological receptors and therefore it would be effective in the short-term.
- **Implementability.** This alternative is readily implementable.
- **Cost.** There are no costs associated with this alternative.

5.7.2.2 Evaluation of Alternative 2—Soil Excavation and Offsite Disposal

The objectives of remedial Alternative 2 are to:

- Remove and properly dispose of soil containing COCs in two key areas, the building 1064 cPAH AOC and the building 1070 lead AOC; and,
- Control exposure to residual COCs in soil and groundwater through risk and hazard management.

This section evaluates how Alternative 2 addresses the first seven EPA criteria.

- **Overall Protection of Human Health and the Environment.** This alternative reduces risk of exposure to cPAHs, lead, and other collocated COCs by dermal contact or ingestion. By removing a significant mass of COCs present in site soil it

also reduces contaminant mass loading by leaching from soil to groundwater, potentially leading to improvement in site groundwater quality.

- **Compliance with ARARs.** This alternative would reduce and control human exposure to COCs by implementing land use and groundwater development restrictions and by removing lead- and cPAH-impacted soil. Because of ambient background conditions, groundwater may still not meet ARARs.

- **Long-Term Effectiveness.** This alternative would be effective in permanently removing COCs in the identified cPAH and lead soil AOCs. This would eliminate the potential for exposure to lead and cPAHs associated with these AOCs and reduce the mass loading of these constituents to underlying groundwater. Because of the presence of metals and other COCs as ambient background constituents in site groundwater, long term restrictions on groundwater development would still be needed.

- **Reduction in Toxicity, Mobility, and Volume.** This alternative would reduce COC mobility by removing leachable constituents from vadose and saturated zone soil in the building 1064 and 1070 cPAH and lead AOCs. On a global scale, this alternative will not reduce the toxicity or volume of contaminants as the waste would be transported and redeposited at a different location (a controlled, licensed landfill). Landfill disposal restrictions may require the stabilization of lead-impacted soil prior to burial, thus accomplishing further reduction in contaminant toxicity.

- **Short-Term Effectiveness.** Soil excavation activities would result in increased short term potential for contaminant exposure to onsite workers and impact to ecological receptors during excavation as contaminated waste would be brought to the surface, handled, and transported to a disposal location. Consequently, a higher level of exposure control than is currently implemented at the site would be needed to prevent short term exposures. Especially if construction proceeded during the summer dry season, dust control measures would need to be taken to prevent migration of fugitive dust potentially containing COCs from the work area. In the winter rainy season, a vehicle wash program might be needed to prevent offsite transport of COCs entrained in wet soil/mud with construction vehicles.

- **Implementability.** Institutional controls associated with the site risk management plan including land and use and groundwater development restrictions are readily implemented. Excavation and offsite disposal of soil as is contemplated for the building 1064 and 1070 cPAH and lead AOCs has been conducted at the site on several occasions in the past and could be implemented for this alternative. However, one complicating factor is that the excavations proposed for Alternative 2 would extend below the typical depth (~5 to 6 ft) at which groundwater has been encountered at the site. Consequently, depending on the rate of excavation advancement and backfilling, construction duration, weather, time of year, and other factors, construction dewatering might be needed to provide reasonable working

conditions. Drying of soil removed from below the permanent water table might also be needed. Water produced from excavations would need treatment before disposal.

- **Cost.** The estimated present worth cost to excavate and properly dispose of cPAH- and lead-impacted soil identified in the building 1064 and building 1070 AOCs, additional borings to verify AOC extent, imposition of land use and groundwater development restrictions, development of a soil management plan for remaining potentially impacted soils, and 30 years of site management was $6,762,000. This cost estimate does not include potential costs associated with construction dewatering, if needed, to implement the soil excavation plan, or costs for treating produced groundwater. The need for, and scope of dewatering during excavation is highly dependent on the time of year construction proceeds, as well as the timing and duration of excavation advancement activities.

5.7.2.3 Alternative 3 - Limited Soil Excavation and Offsite Disposal

The objectives of remedial Alternative 3 are to:

- Remove and properly dispose of soil containing cPAHs at concentrations above the DTSC's action level for total benzo(a)pyrene toxic equivalents of 1 mg/kg in the building 1064 cPAH AOC and to remove and dispose of vadose zone soil (soil to 4 ft bgs) containing lead above the EPA PRG of 800 mg/kg in the building 1070 lead AOC;
- Control exposure to residual COCs in soil and groundwater through risk and hazard management; and,
- Implement a groundwater quality monitoring program to identify the need for further remedial action, if any, in the future as a result of changes in geochemical conditions or other factors that could lead to increased mobility of COCs at the site.

This section evaluates how Alternative 3 addresses the first seven EPA criteria.

- **Overall Protection of Human Health and the Environment.** This alternative reduces risk of exposure to cPAHs, lead, and other collocated COCs by dermal contact or ingestion. By removing a significant mass of COCs present in site soil it also reduces contaminant mass loading by leaching from soil to groundwater, potentially leading to improvement in site groundwater quality. Because Alternative 3 does not include removal of lead-impacted soil identified below the water table in the building 1070 yard, it is not as protective of groundwater quality nor does it reduce the potential for contact with deeper lead-impacted soil as effectively as Alternative 2.

- **Compliance with ARARs.** This alternative would reduce and control human exposure to COCs by implementing land use and groundwater development

restrictions and by removing lead- and cPAH-impacted soil. Because of ambient background conditions, groundwater may still not meet ARARs.

- **Long-Term Effectiveness.** This alternative would be effective in permanently removing COCs in the identified cPAH AOCs and vadose zone lead AOC. This would eliminate the potential for exposure to lead and cPAHs associated with these AOCs and reduce the mass loading of these constituents to underlying groundwater. Because of the presence of metals and other COCs as ambient background constituents in site groundwater, long term restrictions on groundwater development would still be needed. Because lead-impacted soil would be left below the water table in the building 1070 yard, this alternative would not be as effective as Alternative 2 in reducing contaminant mass loading to groundwater.

- **Reduction in Toxicity, Mobility, and Volume.** This alternative would reduce COC mobility by removing leachable constituents from vadose and saturated zone soil in the building 1064 and 1070 cPAH and lead AOCs. On a global scale, this alternative will not reduce the toxicity or volume of contaminants as the waste would be transported and redeposited at a different location (a controlled, licensed landfill). Landfill disposal restrictions may require the stabilization of lead-impacted soil prior to burial, thus accomplishing further reduction in contaminant toxicity.

- **Short-Term Effectiveness.** Soil excavation activities would result in increased short term potential for contaminant exposure to onsite workers and impact to ecological receptors during excavation as contaminated waste would be brought to the surface, handled, and transported to a disposal location. Consequently, a higher level of exposure control than is currently implemented at the site would be needed to prevent short term exposures. Because it involves removal of a smaller volume of soil, it would have less short-term impact than Alternative 2.

- **Implementability.** Institutional controls associated with the site risk management plan including land and use and groundwater development restrictions are readily implemented. Excavation and offsite disposal of soil as is contemplated for the building 1064 and 1070 cPAH and lead AOCs has been conducted at the site on several occasions in the past and could be implemented for this alternative. Because this alternative does not involve excavation below the water table in the building 1070 yard, it would be easier to implement than Alternative 2.

- **Cost.** The estimated present worth cost to excavate and properly dispose of cPAH- and lead-impacted soil identified in the building 1064 and building 1070 AOCs, additional borings to verify AOC extent, imposition of land use and groundwater development restrictions, development of a soil management plan for remaining potentially impacted soils, and 30 years of site management with a biannual groundwater quality monitoring was $1,867,400.

5.7.2.4 Alternative 4 - Limited Excavation and In situ Treatment

The objectives of remedial Alternative 4 are to:

- Remove and properly dispose of soil containing cPAHs at concentrations above the DTSC's action level for total benzo(a)pyrene toxic equivalents of 1 mg/kg in the building 1064 cPAH AOC;
- Reduce the toxicity and mobility of lead and other COCs identified in vadose and saturated zone soil in the building 1070 yard by implementing an in situ treatment action;
- Control exposure to residual COCs in soil and groundwater through risk and hazard management; and,
- Implement a groundwater quality monitoring program to identify the need for further remedial action, if any, in the future as a result of changes in geochemical conditions or other factors that could lead to increased mobility of COCs at the site.

This section evaluates how Alternative 4 addresses the first seven EPA criteria.

- **Overall Protection of Human Health and the Environment.** This alternative reduces risk of exposure to cPAHs, lead, and other collocated COCs by dermal contact or ingestion. By removing a significant mass of COCs present in site soil in the building 1064 yard and solidifying a large volume of soil containing COCs in the building 1070 yard, it also reduces contaminant mass loading by leaching from soil to groundwater, potentially leading to improvement in site groundwater quality.

- **Compliance with ARARs.** This alternative would reduce and control human exposure to COCs in all affected media by implementing land use and groundwater development restrictions and by removing cPAH-impacted soil and treating lead-impacted soil to reduce its toxicity. Because of ambient background conditions, groundwater may still not meet ARARs.

- **Long-Term Effectiveness.** This alternative would be effective in permanently removing COCs in the identified cPAH AOCs and stabilizing lead and other COCs in the lead AOC. This would eliminate the potential for exposure to lead and cPAHs associated with these AOCs and reduce the mass loading of these constituents to underlying groundwater. Because of the presence of metals and other COCs as ambient background constituents in site groundwater, long term restrictions on groundwater development would still be needed. Under this alternative, short term groundwater quality monitoring for a 5 yr period following construction is recommended to verify the effectiveness of the solidification process.

- **Reduction in Toxicity, Mobility, and Volume.** This alternative would reduce COC mobility by removing leachable constituents from vadose and saturated zone soil in the building 1064 cPAH AOC. It would also reduce the mobility and toxicity of more than 20,000 tons of lead-impacted soil in the building 1070 AOC.

- **Short-Term Effectiveness.** Soil excavation activities in the building 1064 yard and soil mixing activities in the building 1070 yard would result in increased short term potential for contaminant exposure to onsite workers and impact to ecological receptors during excavation as contaminated waste would be brought to the surface, handled, and transported to a disposal location. Because it involves removal of a smaller volume of soil, this alternative would have less short-term impact than Alternative 2 or 3. Consequently, a higher level of exposure control than is currently implemented at the site would be needed to prevent short term exposures.

- **Implementability.** Institutional controls associated with the site risk management plan including land and use and groundwater development restrictions are readily implemented. Excavation and offsite disposal of soil as is contemplated for the building 1064 cPAH AOCs is readily implemented for this alternative. Solidfication of soils containing significant fines content (Bay Mud and reworked Bay Mud) may require bench scale and/or pilot scale testing to identify treatment parameters.

- **Cost.** The estimated present worth cost to excavate and properly dispose of cPAH-impacted soil identified in the building 1064 AOC, additional borings to verify AOC extent, solidification of lead-impacted soil in the building 1074 yard, imposition of land use and groundwater development restrictions, development of a soil management plan for remaining potentially impacted soils, 30 years of site management, and 5 years of biannual groundwater quality monitoring was $3,111,000.

5.7.2.5 Alternative 5 - Limited Excavation and Containment

The objectives of remedial Alternative 5 are to:

- Remove and properly dispose of soil containing cPAHs at concentrations above the DTSC's action level for total benzo(a)pyrene toxic equivalents of 1 mg/kg in the building 1064 cPAH AOC;
- Reduce the mobility of lead and other COCs identified in vadose and saturated zone soil in the building 1070 yard by implementing an in situ containment action;
- Control exposure to residual COCs in soil and groundwater through risk and hazard management; and,
- Implement a groundwater quality monitoring program to identify the need for further remedial action, if any, in the future as a result of changes in geochemical conditions or other factors that could lead to increased mobility of COCs at the site.

This section evaluates how Alternative 5 addresses the first seven EPA criteria.

- **Overall Protection of Human Health and the Environment.** This alternative reduces risk of exposure to cPAHs, lead, and other collocated COCs by dermal contact, ingestion, and transport in groundwater.

- **Compliance with ARARs.** This alternative would reduce and control human exposure to COCs by implementing land use and groundwater development restrictions and by removing cPAH-impacted soil and containing lead-impacted soil on site to reduce the potential for contact with or migration of lead. Because of ambient background conditions, groundwater may still not meet ARARs.

- **Long-Term Effectiveness.** This alternative would be effective in permanently removing COCs in the identified cPAH AOCs. Provided the cap and slurry wall were regularly maintained, this alternative would be effective over the long term in preventing exposure to lead and other COCs in the building 1070 lead AOC. Because of the presence of metals and other COCs as ambient background constituents in site groundwater, long term restrictions on groundwater development would still be needed. Under this alternative, long term groundwater quality monitoring is recommended to verify the performance of the cap/slurry wall system.

- **Reduction in Toxicity, Mobility, and Volume.** This alternative would reduce COC mobility by removing leachable constituents from vadose and saturated zone soil in the building 1064 cPAH AOC and reduce the mobility of and the potential for direct contact with lead and other COCs in the building 1070 lead AOC.

- **Short-Term Effectiveness.** Soil excavation activities in the building 1064 yard and slurry wall construction activities in the building 1070 yard would result in increased short term potential for contaminant exposure to onsite workers and impact to ecological receptors during excavation as contaminated waste would be brought to the surface, handled, and transported to a disposal location. Because it involves removal of a smaller volume of soil, this alternative would have less short-term impact than Alternative 2 or 3. Consequently, a higher level of exposure control than is currently implemented at the site would be needed to prevent short term exposures.

- **Implementability.** Institutional controls associated with the site risk management plan including land and use and groundwater development restrictions are readily implemented. Excavation and offsite disposal of soil as is contemplated for the building 1064 cPAH AOCs is readily implemented for this alternative. Construction of a slurry wall and capping the identified area of lead-impacted soil in the building 1070 yard is readily implementable.

- **Cost.** The estimated present worth cost to excavate and properly dispose of cPAH-impacted soil identified in the building 1064 AOC, additional borings to verify AOC extent, construction of a cap and slurry wall to contain lead-impacted soil in the building 1074 yard, imposition of land use and groundwater development restrictions, development of a soil management plan for remaining potentially impacted soils, 30 years of site management, and 30 years of biannual groundwater quality monitoring

was $1,449,000. Construction of an engineered cap in a portion of the building 1070 yard may preclude use of that area for other purposes such as construction of buildings or other structures. The effective cost of loss of use of this area is not considered in the present worth analysis for this alternative.

5.7.2.6 Alternative 6 – Limited Excavation and Capping

The objectives of remedial Alternative 6 are to:

- Remove and properly dispose of soil containing cPAHs at concentrations above the DTSC's action level for total benzo(a)pyrene toxic equivalents of 1 mg/kg in the building 1064 cPAH AOC;
- Reduce the exposure to lead and other COCs identified in vadose and saturated zone soil in the building 1070 yard by constructing a pavement cap over the area;
- Control exposure to residual COCs in soil and groundwater through risk and hazard management; and,
- Implement a groundwater quality monitoring program to identify the need for further remedial action, if any, in the future as a result of changes in geochemical conditions or other factors that could lead to increased mobility of COCs at the site.

This section evaluates how Alternative 6 addresses the first seven EPA criteria.

- **Overall Protection of Human Health and the Environment.** This alternative reduces risk of exposure to cPAHs, lead, and other collocated COCs by dermal contact, ingestion, and transport in groundwater.

- **Compliance with ARARs.** This alternative would reduce and control human exposure to COCs by implementing land use and groundwater development restrictions and by removing cPAH-impacted soil and capping lead-impacted soil on site to reduce the potential for contact with lead. Because of ambient background conditions, groundwater may still not meet ARARs.

- **Long-Term Effectiveness.** This alternative would be effective in permanently removing COCs in the identified cPAH AOCs. Provided the cap was regularly maintained, this alternative would be effective over the long term in preventing exposure to lead and other COCs in the building 1070 lead AOC. Because of the presence of metals and other COCs as ambient background constituents in site groundwater, long term restrictions on groundwater development would still be needed. Under this alternative, long term groundwater quality monitoring is recommended to verify the performance of the cap.

- **Reduction in Toxicity, Mobility, and Volume.** This alternative would reduce COC mobility by removing leachable constituents from vadose and saturated zone soil in the building 1064 cPAH AOC and reduce the mobility of and the potential for direct contact with lead and other COCs in the building 1070 lead AOC.

- **Short-Term Effectiveness.** Soil excavation activities in the building 1064 yard and soil mixing activities in the building 1070 yard would result in increased short term potential for contaminant exposure to onsite workers and impact to ecological receptors during excavation as contaminated waste would be brought to the surface, handled, and transported to a disposal location. Because it involves removal of a smaller volume of soil, this alternative would have less short-term impact than Alternative 2 or 3. Consequently, a higher level of exposure control than is currently implemented at the site would be needed to prevent short term exposures.

- **Implementability.** Institutional controls associated with the site risk management plan including land and use and groundwater development restrictions are readily implemented. Excavation and offsite disposal of soil as is contemplated for the building 1064 cPAH AOCs is readily implemented for this alternative. Capping the identified area of lead-impacted soil in the building 1070 yard is readily implementable.

- **Cost.** The estimated present worth cost to excavate and properly dispose of cPAH-impacted soil identified in the building 1064 AOC, additional borings to verify AOC extent, construction of a pavement cap to contain lead-impacted soil in the building 1074 yard, imposition of land use and groundwater development restrictions, development of a soil management plan for remaining potentially impacted soils, 30 years of site management, and 30 years of biannual groundwater quality monitoring was $922,400. Construction of a pavement cap in a portion of the building 1070 yard may preclude use of that area for other purposes such as construction of buildings or other structures. The effective cost of loss of use of this area is not considered in the present worth analysis for this alternative.

5.7.2.7 Alternative 7 – Institutional Controls

The objectives of remedial Alternative 7 are to:

- Control exposure to residual contaminants of concern (COCs) in soil and groundwater through risk and hazard management.

This section evaluates how Alternative 7 addresses the first seven criteria.

- **Overall Protection of Human Health and the Environment.** This alternative reduces risk of exposure to carcinogenic polynuclear aromatic hydrocarbons (cPAHs), lead, and other collocated COCs by dermal contact or ingestion by preventing or controlling contact with potentially contaminated media. Attenuation of biodegradable COCs, particularly volatile organic compounds (VOCs) and petroleum hydrocarbons (TPH) will slowly reduce contaminant mass loading under this alternative, potentially leading to improvement in site groundwater quality.

- **Compliance with ARARs.** This alternative would reduce and control human exposure to COCs in all affected media by implementing land use and groundwater development restrictions. Because of ambient background conditions, groundwater may still not meet ARARs.

- **Long-Term Effectiveness.** So long as the institutional controls identified for this alternative remain in place, this alternative would be effective in preventing and/or controlling human exposure to COCs in soil and groundwater. The RAP will implement monitoring procedures and compliance measures for a 30 year period following approval of the RAP. Because it does not include groundwater quality monitoring, this alternative may not be responsive to the RAO for environmental protection in that there is no provision for identification of possible changes in groundwater quality that may adversely impact sensitive ecological receptors.

- **Reduction in Toxicity, Mobility, and Volume.** In the short term, this alternative would not reduce the toxicity, mobility or volume of COCs at the site. In the long term, several COCs, mainly the VOCs and TPH would be transformed to less mobile, less toxic compounds by natural attenuation processes.

- **Short-Term Effectiveness.** This alternative would be effective immediately in controlling and preventing exposures to COCs identified in soil and groundwater at the site. Because this alternative does not involve any soil excavation activities, it would result in less short term potential for contaminant exposure to onsite workers and impact to ecological receptors than alternatives that require excavation wherein contaminated waste would be brought to the surface, handled, and transported to a disposal location.

- **Implementability.** Institutional controls associated with the site risk management plan including land use and groundwater development restrictions are readily implemented.

- **Cost.** The estimated present worth cost to impose institutional controls and 30 years of site management was $210,400.

5.7.3 Discussion of Remedial Alternatives

With the exception of the No Action alternative, all of the remedial alternatives developed for this FS meet the objective of mitigating worker exposure to COCs identified in soil at the site by dermal contact or ingestion for the 30 year design period of the FS, or longer. The USAR has concluded that constituents detected in soil at the site pose little risk to construction or industrial workers on the property. This conclusion is mainly based on the low probability of contact with contaminated soil or groundwater if

institutional controls are adhered to and the low health risk from soil left in place based on the results of the human health risk assessment conducted by USACHPPM. Consequently, the USAR has stated that the institutional controls laid out in Alternative 7 are sufficiently protective of human health and the environment with no further soil removal, treatment, or isolation needed.

The DTSC has concluded that soil in portions of the site poses unacceptable risk to construction and industrial site workers and that institutional controls alone are insufficiently protective of human health. The DTSC's conclusions are mainly based on the risk assessment finding that total carcinogenic risk posed by carcinogenic PAHs in soil in the building 1064 yard exceeds the 1E-05 risk threshold commonly employed at commercial/ industrial properties, and, the conclusion by DTSC's Human and Ecological Risk Division staff that lead impacted soil at the site poses greater risk to human health than indicated by the blood lead modeling analysis conducted by USACHPPM. In addition, DTSC has previously indicated that soil sampling data developed for the site wide RI discussed in section 2 of this report indicated the presence of carcinogenic PAHs and lead in soil at concentrations above remedial action thresholds commonly employed by DTSC at Bay area cleanup sites. Also, DTSC has expressed concern with respect to the potential future mobilization of metals detected in site soil and groundwater as a result of changes in geochemical or other environmental conditions at the site which are not addressed by institutional controls alone. Consequently, DTSC has indicated that that Alternative 6 had a high likelihood of selection and successful implementation. This is because in addition to the institutional controls prescribed for Alternative 7, Alternative 6, involves removal of PAH-impacted soil in the building 1064 yard, construction of a pavement cap to create a physical barrier to contact with lead-impacted soil in the building 1070 yard, and long-term groundwater monitoring to detect potential adverse changes in site groundwater quality.

SECTION 5
TABLES

Table 5-1

Heroic War Dead United States Army Reserve Center Oakland Remedial Investigation/Feasibility Study

Potential General Response Actions To Achieve Remedial Action Objectives At The HWD Site

Remedial Action Objective	Potential General Response Actions
For Human Health Protection:	
o Prevent human ingestion of lead in soil at concentrations greater than the EPA Region 9 commercial/industrial PRG of 800 mg/kg or cPAHs above a benzo(a)pyrene toxic equivalent value of 1 mg/kg;	-No Further Action -Risk and Hazard Management -Source Isolation -In situ Treatment -Removal and Treatment or Disposal
o Prevent human ingestion of ground water containing contaminant concentrations above the State and federal MCLs and/or more stringent RWQCB water quality ESLs.	-No Further Action -Risk and Hazard Management -Monitoring -Monitored Natural Attenuation -Source Isolation -Extraction with Ex-situ Treatment
For Environmental Protection:	
o Ensure existing contaminant conditions do not change so as to threaten wildlife populations and vegetation communities.	-No Further Action -Risk and Hazard Management -Monitoring -Source Isolation -Extraction with Ex-situ Treatment -In situ Treatment -Removal and Treatment or Disposal

Table 5-2

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Potential General Response Actions And Technologies By Contaminant And Media

	Vadose Zone/Surface Soil		Subsurface Soil		Groundwater	
Contaminant	General Response Action	Technology	General Response Action	Technology	General Response Action	Technology
Lead	No Further Action	-None	No Further Action	-None	No Further Action	-None
	Risk and Hazard Management	-Institutional Controls/Engineered Controls (fencing, signage, land use restrictions, soil management plan)	Risk and Hazard Management	-Institutional Controls/Engineered Controls (fencing, signage, land use restrictions, soil management plan)	Risk and Hazard Management	-Institutional Controls (water supply well ban, land use restrictions, signage)
	Source Isolation	-Engineered Cap	Source Isolation	-Engineered Cap -Slurry wall -Grout curtain	Source Isolation	-Engineered Cap -Slurry wall -Grout curtain
	N/A		N/A		Monitoring	– Ground water sampling and analysis; water level measurement
	In Situ Treatment	-Solidification using cement -Stabilization using fly ash, phosphate additives	In Situ Treatment	-Solidification using cement -Stabilization using fly ash, phosphate additives	In Situ Treatment	-Sulfide precipitation
	Removal and Treatment or Disposal	-Soil excavation -Offsite disposal -Onsite treatment and reemplacement	Removal and Treatment or Disposal	-Soil excavation -Offsite disposal -Onsite treatment and reemplacement	Extraction and Ex Situ Treatment	-Carbon adsorption
cPAHs	No Further Action	-None	No Further Action	-None	No Further Action	-None

Table 5-2

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Potential General Response Actions And Technologies By Contaminant And Media

	Vadose Zone/Surface Soil		Subsurface Soil		Groundwater	
Contaminant	General Response Action	Technology	General Response Action	Technology	General Response Action	Technology
	Risk and Hazard Management	-Institutional Controls/Engineered Controls (fencing, signage, land use restrictions, soil management plan)	Risk and Hazard Management	-Institutional Controls/Engineered Controls (fencing, signage, land use restrictions, soil management plan)	Risk and Hazard Management	-Institutional Controls (water supply well ban, land use restrictions, signage)
	N/A		N/A		Monitoring	– Ground water sampling and analysis; water level measurement
	N/A		N/A		Monitored natural Attenuation	– Ground water sampling and analysis; MNA parameter analysis, water level measurement
	Source Isolation	-Engineered Cap	Source Isolation	-Engineered Cap -Slurry wall -Grout curtain	Source Isolation	-Engineered Cap -Slurry wall -Grout curtain
	In Situ Treatment	-Solidification using cement -insitu oxidation	In Situ Treatment	-Solidification using cement -insitu oxidation	In Situ Treatment	-insitu oxidation using ozone et al
	Removal and Treatment or Disposal	-Soil excavation -Offsite disposal -Onsite treatment and reemplacement	Removal and Treatment or Disposal	-Soil excavation -Offsite disposal -Onsite treatment and reemplacement	Extraction and Ex Situ Treatment	-Carbon adsorption
Metals other	No Further Action	-None	No Further Action	-None	No Further Action	-None

Table 5-2

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Potential General Response Actions And Technologies By Contaminant And Media

	Vadose Zone/Surface Soil		Subsurface Soil		Groundwater	
Contaminant	General Response Action	Technology	General Response Action	Technology	General Response Action	Technology
than Lead						
	N/A		N/A		Risk and Hazard Management	-Institutional Controls (water supply well ban, land use restrictions, signage)
	N/A		N/A		Monitoring	– Ground water sampling and analysis; water level measurement
	N/A		N/A		Source Isolation	-Engineered Cap -Slurry wall -Grout curtain
	N/A		N/A		In Situ Treatment	-Sulfide precipitation
					Extraction and Ex Situ Treatment	-Carbon adsorption
VOCs	No Further Action	-None	No Further Action	-None	No Further Action	-None
	Risk and Hazard Management	-Institutional Controls/Engineered Controls (fencing, signage, land use restrictions, soil management plan)	Risk and Hazard Management	-Institutional Controls/Engineered Controls (fencing, signage, land use restrictions, soil management plan)	Risk and Hazard Management	-Institutional Controls (water supply well ban, land use restrictions, signage)

Table 5-2

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Potential General Response Actions And Technologies By Contaminant And Media

	Vadose Zone/Surface Soil		Subsurface Soil		Groundwater	
Contaminant	General Response Action	Technology	General Response Action	Technology	General Response Action	Technology
VOCs cont.	N/A		N/A		Monitoring	– Ground water sampling and analysis; water level measurement
	N/A		N/A		Monitored natural Attenuation	– Ground water sampling and analysis; MNA parameter analysis, water level measurement
	Source Isolation	-Engineered Cap	Source Isolation	-Engineered Cap -Slurry wall -Grout curtain	Source Isolation	-Engineered Cap -Slurry wall -Grout curtain
	In Situ Treatment	-Solidification using cement -Stabilization using fly ash, phosphate additives	In Situ Treatment	-Solidification using cement -Stabilization using fly ash, phosphate additives	In Situ Treatment	-air sparging -insitu oxidation
	Removal and Treatment or Disposal	-Soil excavation -Offsite disposal -Onsite treatment and reemplacement	Removal and Treatment or Disposal	-Soil excavation -Offsite disposal -Onsite treatment and reemplacement	Extraction and Ex Situ Treatment	-Carbon adsorption -Thermal oxidation
TPH	No Further Action	-None	No Further Action	-None	No Further Action	-None

Table 5-2

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Potential General Response Actions And Technologies By Contaminant And Media

	Vadose Zone/Surface Soil		Subsurface Soil		Groundwater	
Contaminant	General Response Action	Technology	General Response Action	Technology	General Response Action	Technology
	Risk and Hazard Management	-Institutional Controls/Engineered Controls (fencing, signage, land use restrictions, soil management plan)	Risk and Hazard Management	-Institutional Controls/Engineered Controls (fencing, signage, land use restrictions, soil management plan)	Risk and Hazard Management	-Institutional Controls (water supply well ban, land use restrictions, signage)
	N/A		N/A		Monitoring	– Ground water sampling and analysis; water level measurement
	N/A		N/A		Monitored natural Attenuation	– Ground water sampling and analysis; MNA parameter analysis, water level measurement
	Source Isolation	-Engineered Cap	Source Isolation	-Engineered Cap -Slurry wall -Grout curtain	Source Isolation	-Engineered Cap -Slurry wall -Grout curtain
	In Situ Treatment	-Solidification using cement -Stabilization using fly ash, phosphate additives	In Situ Treatment	-Solidification using cement -Stabilization using fly ash, phosphate additives	In Situ Treatment	-air sparging -insitu oxidation
	Removal and Treatment or Disposal	-Soil excavation -Offsite disposal -Onsite treatment and reemplacement	Removal and Treatment or Disposal	-Soil excavation -Offsite disposal -Onsite treatment and reemplacement	Extraction and Ex Situ Treatment	-Carbon adsorption -Thermal oxidation

Table 5-3a

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Preliminary Response Action And Technology Screening Evaluation For Surface and Vadose Zone Soil At The HWD Site

General Response Action	Remediation technology type	Technology (process options)	Applicability	Effectiveness	Implementability	Cost	Retained?
No further action	None	Natural decay, degradation, dispersion, adsorption, dilution, and volatilization	Applicable	Limited effectiveness	Implementable	No cost	For comparison only
Risk and Hazard Management	Institutional Controls	Fencing and Signs	Applicable	Effective	Currently implemented onsite	Very low	Yes
		Land use restrictions	Applicable	Effective	Implementable	Low	Yes
		Soil management plan	Applicable	Effective	Implementable	Low-medium	Yes
Source Isolation	Engineered Barriers	Capping	Applicable	Prevents physical contact with contaminated soil; contaminant dispersion as aerosol, VOC vapor migration, and retards leaching from vadose zone. By itself does not prevent contaminant releases that result from water level rises into vadose zone.	Implementable. Limits land use for any other purpose.	Medium-high	Yes
	Hydraulic barrier	Slurry wall	Applicable	Prevents horizontal migration of contaminants; may not be effective in preventing inundation of contaminated soil in vadose zone during winter wet season	Implementable. Basal clay layer to key into not fully mapped	Medium-high	Yes
	Hydraulic barrier	Grout curtain	Applicable	Prevents horizontal migration of contaminants; may not be effective in preventing inundation of contaminated soil in vadose zone during winter wet season	Implementable. Basal clay layer to key into not fully mapped	Medium-high	Yes
In situ treatment	In situ treatment	-Solidification using cement	Applicable	Reduces leachability of COCs, reduces permeability of soil.	Implementable. Some issues with oganic containment identified. High fines content may impede mixing	Medium-high	Yes
		-Stabilization using fly ash, phosphate additives	Applicable	Reduces leachability of COCs	Implementable. Some issues with oganic containment identified. High fines content may impede mixing	Medium-high	Yes
		-insitu oxidation	Applicable	Destroys, reduces toxicity of organic COCs.	Implementable. Not effective on most metals including lead. High fines content may impede mixing	Medium-high	Yes
Extraction and Ex-situ Treatment	Ex-situ treatment	-Soil excavation, Thermal Oxidation, onsite disposal	Applicable	Effective on organics	Generally requires large volume to be cost effective	High	No
Removal and Disposal	Removal and Disposal	-Soil excavation	Applicable	Effective. Increases short-term exposure risk to excavation/transport workers.	Implementable. Excavation may require dewatering, wastewater treatment and disposal,	High	Yes
		-Offsite disposal	Applicable	Effective	Metals impacted soil may require treatment	High	Yes

Table 5-3b

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Preliminary Response Action And Technology Screening Evaluation For Subsurface Soil At The HWD Site

General Response Action	Remediation technology type	Technology (process options)	Applicability	Effectiveness	Implementability	Cost	Retained?
No further action	None	Natural decay, degradation, dispersion, adsorption, dilution, and volatilization	Applicable	Limited effectiveness	Implementable	No cost	For comparison only
Risk and Hazard Management	Institutional Controls	Fencing and Signs	Applicable	Effective	Currently implemented onsite	Very low	Yes
		Land use restrictions	Applicable	Effective	Implementable	Low	Yes
		Soil management plan	Applicable	Effective	Implementable	Low-medium	Yes
Monitoring	Groundwater Monitoring	Groundwater sample collection from permanent monitoring wells; water level measurement	Applicable	Effective for detecting further releases of contaminants due to leaching from soil	Implementable	low	Yes
Source Isolation	Engineered Barriers	Capping	Applicable	Prevents physical contact with contaminated soil; contaminant dispersion as aerosol, VOC vapor migration, and retards leaching from vadose zone. By itself does not prevent contaminant releases that result from water level rises into vadose zone.	Implementable. Limits land use for any other purpose.	Medium-high	Yes
	Hydraulic barrier	Slurry wall	Applicable	Prevents horizontal migration of contaminants; may not be effective in preventing inundation of contaminated soil in vadose zone during winter wet season	Implementable. Basal clay layer to key into not fully mapped	Medium-high	Yes
	Hydraulic barrier	Grout curtain	Applicable	Prevents horizontal migration of contaminants; may not be effective in preventing inundation of contaminated soil in vadose zone during winter wet season	Implementable. Basal clay layer to key into not fully mapped. Debris in fill may impede construction	Medium-high	No
Source Control	In situ treatment	-Solidification using cement	Applicable	Reduces leachability of COCs, reduces permeability of soil	Implementable. Some issues with oganic containment identified.	Medium-high	Yes

Table 5-3b

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Preliminary Response Action And Technology Screening Evaluation For Subsurface Soil At The HWD Site

General Response Action	Remediation technology type	Technology (process options)	Applicability	Effectiveness	Implementability	Cost	Retained?
		-Stabilization using fly ash, phosphate additives	Applicable	Reduces leachability of COCs	Implementable. Some issues with oganic containment identified.	Medium-high	Yes
		-insitu oxidation	Applicable	Destroys, reduces toxicity of organic COCs.	Implementable. Not effective on most metals including lead	Medium-high	Yes
Extraction and Ex-situ Treatment	Ex-situ treatment	-Soil excavation, Thermal Oxidation, onsite disposal	Applicable	Effective on organics	Generally requires large volume to be cost effective	High	No
Removal and Disposal	Removal and Disposal	-Soil excavation	Applicable	Effective. Increases short-term exposure risk to excavation/transport workers.	Implementable. Excavation may require dewatering, wastewater treatment and disposal, shoring	High	Yes
		-Offsite disposal	Applicable	Effective	Metals impacted soil may require treatment	High	Yes

Table 5-3c

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Preliminary Response Action And Technology Screening Evaluation For Groundwater At The HWD Site

General Response Action	Remediation technology type	Technology (process options)	Applicability	Effectiveness	Implementability	Cost	Retained?
No further action	None	Natural decay, degradation, dispersion, adsorption, dilution, and volatilization	Applicable	Limited effectiveness	Implementable	No cost	For comparison only
Risk and Hazard Management	Institutional Controls	Fencing and Signs	Applicable	Effective	Currently implemented onsite	Very low	Yes
		Deed covenant to prevent water supply well construction	Applicable	Effective	Implementable	low	Yes
Monitoring	Groundwater Monitoring	Groundwater sample collection from permanent monitoring wells; water level measurement	Applicable	Effective for detecting further releases of contaminants due to leaching from soil	Implementable	low	Yes
Monitored Natural Attenuation	Groundwater Monitoring	Groundwater sample collection from permanent monitoring wells; water level and geochemical parameter measurement	Applicable	Effective for contaminants that naturally attenuate within a reasonable timeframe (i.e., VOCs and petroleum hydrocarbon); ineffective for lead, cPAHs, other metals	Implementable	low	No
Source Isolation	Engineered Barriers	Capping	Applicable	Reduces VOC vapor migration, and retards leaching from vadose zone. By itself does not prevent contaminant releases that result from water level rises into vadose zone.	Implementable. Limits land use for any other purpose.	Medium-high	Yes
	Hydraulic barrier	Slurry wall	Applicable	Prevents horizontal migration of contaminants; may not be effective in preventing inundation of contaminated soil in vadose zone during winter wet season	Basal clay layer to key into not fully mapped	Medium-high	Yes

Table 5-3c

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Preliminary Response Action And Technology Screening Evaluation For Groundwater At The HWD Site

General Response Action	Remediation technology type	Technology (process options)	Applicability	Effectiveness	Implementability	Cost	Retained?
	Hydraulic barrier	Sheetpile wall	Applicable	Prevents horizontal migration of contaminants; may not be effective in preventing inundation of contaminated soil in vadose zone during winter wet season	Basal clay layer to key into not fully mapped. Steel degradation in saline water may be concern	Medium-high	No
	Hydraulic barrier	Grout curtain	Applicable	Prevents horizontal migration of contaminants; may not be effective in preventing inundation of contaminated soil in vadose zone during winter wet season	Implementable. Basal clay layer to key into not fully mapped. Debris in fill may impede construction	Medium-high	No
In situ Treatment	In situ treatment	-Solidification using cement	Applicable	Reduces leachability of COCs, reduces permeability of soil	Implementable. Some issues with oganic containment identified.	Medium-high	Yes
		-Stabilization using fly ash, phosphate additives	Applicable	Reduces leachability of COCs	Implementable. Some issues with oganic containment identified.	Medium-high	Yes
		-insitu oxidation	Applicable	Destroys, reduces toxicity of organic COCs.	Implementable. Not effective on most metals including lead	Medium-high	Yes
Extraction with Ex-situ Treatment	Groundwater Pump & Treat	-Groundwater extraction wells or horizontal drains	Applicable	Limited effectiveness on constituents with high soil-water partitioning coefficients, i.e., metals and PAHs	Implementable. May need to be combined with hydraulic barriers to reduce capture of offsite groundwater contamination. Compressible soils pose subsidence concern.	High	No
		-Air sparging	Applicable	Precipitation of iron, manganese and other metals may reduce effectiveness; mainly effective for VOCs, TPH	Costly to implement in environment with high metals concentrations	High	No
		-Activated carbon adsorption	Applicable	Effective	High dissolved metals content may produce significant treatment waste stream for disposal	High	No

Table 5-3c

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Preliminary Response Action And Technology Screening Evaluation For Groundwater At The HWD Site

General Response Action	Remediation technology type	Technology (process options)	Applicability	Effectiveness	Implementability	Cost	Retained?
		-Chemical precipitation	Applicable	Effective	High dissolved metals content may produce significant treatment waste stream for disposal	High	No

Table 5-4

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Retained General Response Actions and Technologies

General Response Action/Technology	Applicability to COCs
Vadose Zone/Surface Soil	
Risk and Hazard Management	
Fencing	All COCs
Signage	
Land use restrictions	
Soil management plan	
Source Isolation	
Capping	All COCs
Slurry wall	
In situ Treatment	
Solidification using cement	Lead, metals
Stabilzation using fly ash, phosphate addititives	Lead, metals
In situ oxidation	VOCs, TPH, PAHs
Removal and Disposal	
Soil excavation and offsite disposal	All COCs
Subsurface Soil	
Risk and Hazard Management	
Fencing	All COCs
Signage	
Land use restrictions	
Soil management plan	
Monitoring	
Groundwater sampling	All COCs
Source Isolation	
Capping	All COCs
Slurry wall	
In situ Treatment	
Solidification using cement	Lead, metals
Stabilzation using fly ash, phosphate addititives	Lead, metals

Table 5-4

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Retained General Response Actions and Technologies

General Response Action/Technology	Applicability to COCs
In situ oxidation	VOCs, TPH, PAHs
Removal and Disposal	
Soil excavation and offsite disposal	All COCs
Groundwater	
Risk and Hazard Management	
Fencing and Signs	All COCs
Deed covenant to prevent water supply well construction	All COCs
Monitoring	
Groundwater sample collection from permanent monitoring wells; water level measurement	All COCs
Monitored Natural Attenuation	
Groundwater sample collection from permanent monitoring wells; water level and geochemical parameter measurement	All COCs
Source Isolation	
Capping	All COCs
Slurry wall	All COCs
In situ Treatment	
-Solidification using cement	Lead, metals
-Stabilization using fly ash, phosphate additives	Lead, metals
-insitu oxidation	VOCs, TPH, PAHs
Extraction with Ex-situ Treatment	
-Groundwater extraction wells or horizontal drains	VOCs, TPH
-Air sparging	VOCs, TPH
-Activated carbon adsorption	VOCs, TPH, metals

Table 5-5

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Remedial Alternatives for the HWD Site

	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7
	No Action	Soil Excavation and Offsite Disposal	Limited Soil Excavation and Offsite Disposal	Limited Excavation and In situ Treatment	Limited Excavation and Containment	Limited Excavation and Capping	Institutional Controls
Component A	No further action for all contaminants and media of concern.	Exposure control through risk and hazard management	Exposure control through risk and hazard management	Exposure control through risk and hazard management	Exposure control through risk and hazard management	Exposure control through risk and hazard management	Exposure control through risk and hazard management
Component B		Soil excavation and offsite disposal	Excavation and offsite disposal of cPAH-impacted soil	Excavation and offsite disposal of cPAH-impacted soil	Excavation and offsite disposal of cPAH-impacted soil	Excavation and offsite disposal of cPAH-impacted soil	
Component C			Excavation and offsite disposal of lead-impacted soil in vadose zone	In situ solidification of lead-impacted soil	Capping and slurry wall to contain lead-impacted soil	Capping to prevent dermal contact with lead-impacted soil	
Component D			Groundwater Monitoring	Groundwater Monitoring	Groundwater Monitoring	Groundwater Monitoring	
Cost	$0	$6,762,075	$1,867,410	$3,110,910	$1,449,310	$922,410	$210,400

Table 5-6

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Detailed Evaluation of Remedial Alternatives

		Evaluation Criteria						
Alternative	Alternative Components	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness	Reduction in Toxicity, Mobility, and Volume	Short-Term Effectiveness	Implementability	Net Present Worth Cost
Alternative 1 - No Action	No Action	Not protective	Not Compliant	Poor	Poor	Effectively avoids remedial construction-related impacts, e.g., dust generation	Readily implemented	None
Alternative 2 - Soil Excavation and Offsite Disposal	A: Exposure control through risk and hazard management	Protective when used in conjunction with active remedies.	Compliant when used in conjunction with active remedies.	Effective when used in conjunction with active remedies; deed covenant and access restrictions must be maintained.	Poor by itself, relies on excavation for contaminant volume reduction.	Effective in preventing exposure.	Readily implemented	$6,762,075
	B: Soil excavation and offsite disposal	Reduces risk of exposure to cPAHs and lead by way of dermal contact or ingestion; reduces contaminant leaching to groundwater	cPAH and lead AOCs would be compliant with direct contact ARARs; because of ambient background conditions, groundwater may not meet ARARs	Would be effective in permanently removing COCs in identified soil AOCs.	Would reduce mobility by removing leachable constituents from vadose and saturated zone soil. Will not reduce the toxicity or volume of contaminants as the waste would be redeposited at a different location.	Increased short term potential for onsite workers and impact to ecological receptors during excavation as contaminated waste would be brought to the surface, handled, and transported to a disposal location. Higher level of exposure control needed to prevent short term exposure.	Implementable. Might require excavation dewatering and treatment and appropriate disposal of produced groundwater. Would require provisions to prevent exposure of workers during excavation, as well as transport personnel, and public during waste transport.	
Alternative 3 - Limited Soil Excavation and Offsite Disposal	A: Exposure control through risk and hazard management	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	Poor by itself, relies on excavation for contaminant volume reduction and natural attenuation for reduction in mass of residual contaminants.	Same as Alternative 2	Same as Alternative 2	$1,867,410
	B: Excavation and offsite disposal of cPAH-impacted soil	Reduces risk of exposure to cPAHs by way of dermal contact or ingestion; reduces contaminant leaching to groundwater	cPAH AOCs would be compliant with direct contact ARARs; because of ambient background conditions, groundwater may not meet ARARs	Would be effective in permanently removing COCs in identified cPAH AOCs.	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	

Table 5-6

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Detailed Evaluation of Remedial Alternatives

		Evaluation Criteria						
Alternative	Alternative Components	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness	Reduction in Toxicity, Mobility, and Volume	Short-Term Effectiveness	Implementability	Net Present Worth Cost
Alternative 3 - Limited Soil Excavation and Offsite Disposal (cont.)	C: Excavation and offsite disposal of lead-impacted soil in vadose zone	Reduces risk of exposure to lead and other metals by way of dermal contact or ingestion; reduces contaminant leaching to groundwater; by itself not protective of exposure to soil below vadose zone	Lead AOCs would be compliant with direct contact ARARs in the vadose zone; because of ambient background conditions, groundwater may not meet ARARs	Would be effective in permanently removing COCs identified in vadose zone portion of Lead AOCs.	Would reduce mobility by removing leachable constituents from vadose zone soil. Will not reduce the toxicity or volume of the excavated contaminants as the waste would be redeposited at a different location. Would not reduce toxicity, volume, or mobility of COCs left inplace in saturated zone soil.	Same as Alternative 2	Implementable. Would not need excavation dewatering. Would require provisions to prevent exposure of workers during excavation, as well as transport personnel, and public during waste transport.	
	D: Groundwater Monitoring	Used in conjunction with active remedies. Monitoring of metals & geochemical indicator parameters will assure protection of human health and the environment by providing an indication of COC release or changes in geochemical conditions conducive to enhanced COC mobility.	Monitors compliance with ARARs. Monitoring data will provide indication of natural attenuation of COCs or warning of COC mobilization resulting from change in geochemical conditions or other factors.	Helps ensure long-term effectivess of remedial alternative. Monitoring data will provide indication of natural attenuation of COCs or warning of COC mobilization resulting from change in geochemical conditions or other factors.	Monitoring data will provide indication of natural attenuation of COCs or warning of COC mobilization resulting from change in geochemical conditions or other factors.	Some short-term increased exposure to contaminated soil & groundwater by well driller will need to be managed with appropriate H&S measures.	Readily implemented	

Table 5-6

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Detailed Evaluation of Remedial Alternatives

		Evaluation Criteria						
Alternative	Alternative Components	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness	Reduction in Toxicity, Mobility, and Volume	Short-Term Effectiveness	Implementability	Net Present Worth Cost
Alternative 4 - Limited Excavation and In situ Treatment	A: Exposure control through risk and hazard management	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	Poor by itself, relies on excavation and in situ treatment for contaminant volume and mobility reduction.	Same as Alternative 2	Same as Alternative 2	$3,110,910
	B: Excavation and offsite disposal of cPAH-impacted soil	Same as Alternative 3	Same as Alternative 3	Same as Alternative 3	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	
	C: In situ solidification of lead-impacted soil	Protects human health and the environment by reducing the toxicity and mobility of lead and other COCs in lead AOC	Lead AOCs would be compliant with direct contact ARARs in the vadose and saturated zone; because of ambient background conditions, groundwater may not meet ARARs	Would be effective in permanently reducing the mobility and toxicity of COCs in the lead AOC	Would permanently reduce the toxicity and mobility of lead and other COCs but would not reduce volume.	Some Increased short term potential for exposure to remedial construction workers as some contaminated waste could be briefly brought to the surface during treatment process. Higher level of exposure control needed to prevent short term exposure. Avoids exposure to transport workers and the public.	Implementable. Would need bench scale and/or pilot testing to determine treatment parameters.	
	D: Groundwater Monitoring	Used in conjunction with active remedies. Monitoring of metals will assure protection of human health and the environment by providing an indication of whether the remedy is achieving RAOs.	Used in conjunction with active remedies. Monitoring of metals will assure compliance with ARARs by providing an indication of whether the remedy is achieving RAOs.	Helps ensure long-term effectivess of remedial alternative. Monitoring data will provide indication of natural attenuation of COCs or warning of COC mobilization resulting from change in geochemical conditions or other factors.	Monitoring data will provide indication of natural attenuation of COCs or warning of COC mobilization resulting from change in geochemical conditions or other factors.	Some short-term increased exposure to contaminated soil & groundwater by well driller will need to be managed with appropriate H&S measures.	Readily implemented	

Table 5-6

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Detailed Evaluation of Remedial Alternatives

		Evaluation Criteria						
Alternative	Alternative Components	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness	Reduction in Toxicity, Mobility, and Volume	Short-Term Effectiveness	Implementability	Net Present Worth Cost
Alternative 5 - Limited Excavation and Containment	A: Exposure control through risk and hazard management	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	Poor by itself, relies on excavation and containment of COCs for contaminant volume and mobility reduction.	Same as Alternative 2	Same as Alternative 2	$1,449,310
	B: Excavation and offsite disposal of cPAH-impacted soil	Same as Alternative 3	Same as Alternative 3	Same as Alternative 3	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	
	C: Capping and slurry wall to contain lead-impacted soil	Provides protection of human health and the environment when accompanied by cap maintenance program and groundwater monitoring	Prevents exposure to COCs in lead AOC	Effective in long-term when accompanied by cap maintenance program and groundwater monitoring.	Only reduction to contaminant volume is from natural attenuation processes. Significantly reduces horizontal migration of COCs and reduces leaching of COCs from vadose zone soil. May not prevent seasonal rise and fall of groundwater levels as a result of upward intrusion through basal clay horizon.	Some Increased short term potential for exposure to remedial construction workers as some contaminated waste could be briefly brought to the surface during treatment process. Higher level of exposure control needed to prevent short term exposure. Avoids exposure to transport workers and the public.	Implementable. Prevents/impairs some uses of parcel, e.g., building construction or underground utility routing	
	D: Groundwater Monitoring	Used in conjunction with active remedies. Monitoring of metals will assure protection of human health and the environment by providing an indication of whether the remedy is achieving RAOs.	Used in conjunction with active remedies. Monitoring of metals will assure compliance with ARARs by providing an indication of whether the remedy is achieving RAOs.	Helps ensure long-term effectivess of remedial alternative. Monitoring data will provide indication of natural attenuation of COCs or warning of COC mobilization resulting from change in geochemical conditions or other factors.	Monitoring data will provide indication of natural attenuation of COCs or warning of COC mobilization resulting from change in geochemical conditions or other factors.	Some short-term increased exposure to contaminated soil & groundwater by well driller will need to be managed with appropriate H&S measures.	Readily implemented	

Table 5-6

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Detailed Evaluation of Remedial Alternatives

		Evaluation Criteria						
Alternative	Alternative Components	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness	Reduction in Toxicity, Mobility, and Volume	Short-Term Effectiveness	Implementability	Net Present Worth Cost
Alternative 6 - Limited Excavation and Capping	A: Exposure control through risk and hazard management	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	Poor by itself, relies on excavation and containment of COCs for contaminant volume and mobility reduction.	Same as Alternative 2	Same as Alternative 2	$992,410
	B: Excavation and offsite disposal of cPAH-impacted soil	Same as Alternative 3	Same as Alternative 3	Same as Alternative 3	Same as Alternative 2	Same as Alternative 2	Same as Alternative 2	
	C: Capping to prevent dermal contact/ingestion of lead-impacted soil	Provides protection of human health and the environment when accompanied by cap maintenance program and groundwater monitoring	Prevents exposure to COCs in lead AOC	Effective in long-term when accompanied by cap maintenance program and groundwater monitoring.	Only reduction to contaminant volume is from natural attenuation processes. May reduce leaching of COCs from vadose zone soil. Will not impede contact between groundwater and lead-impacted soil.	Some Increased short term potential for exposure to remedial construction workers as some contaminated waste could be briefly brought to the surface during treatment process. Higher level of exposure control needed to prevent short term exposure. Avoids exposure to transport workers and the public.	Implementable. Prevents/impairs some uses of parcel, e.g., building construction or underground utility routing	
	D: Groundwater Monitoring	Used in conjunction with active remedies. Monitoring of metals will assure protection of human health and the environment by providing an indication of whether the remedy is achieving RAOs.	Used in conjunction with active remedies. Monitoring of metals will assure compliance with ARARs by providing an indication of whether the remedy is achieving RAOs.	Helps ensure long-term effectivess of remedial alternative. Monitoring data will provide indication of natural attenuation of COCs or warning of COC mobilization resulting from change in geochemical conditions or other factors.	Monitoring data will provide indication of natural attenuation of COCs or warning of COC mobilization resulting from change in geochemical conditions or other factors.	Some short-term increased exposure to contaminated soil & groundwater by well driller will need to be managed with appropriate H&S measures.	Readily implemented	

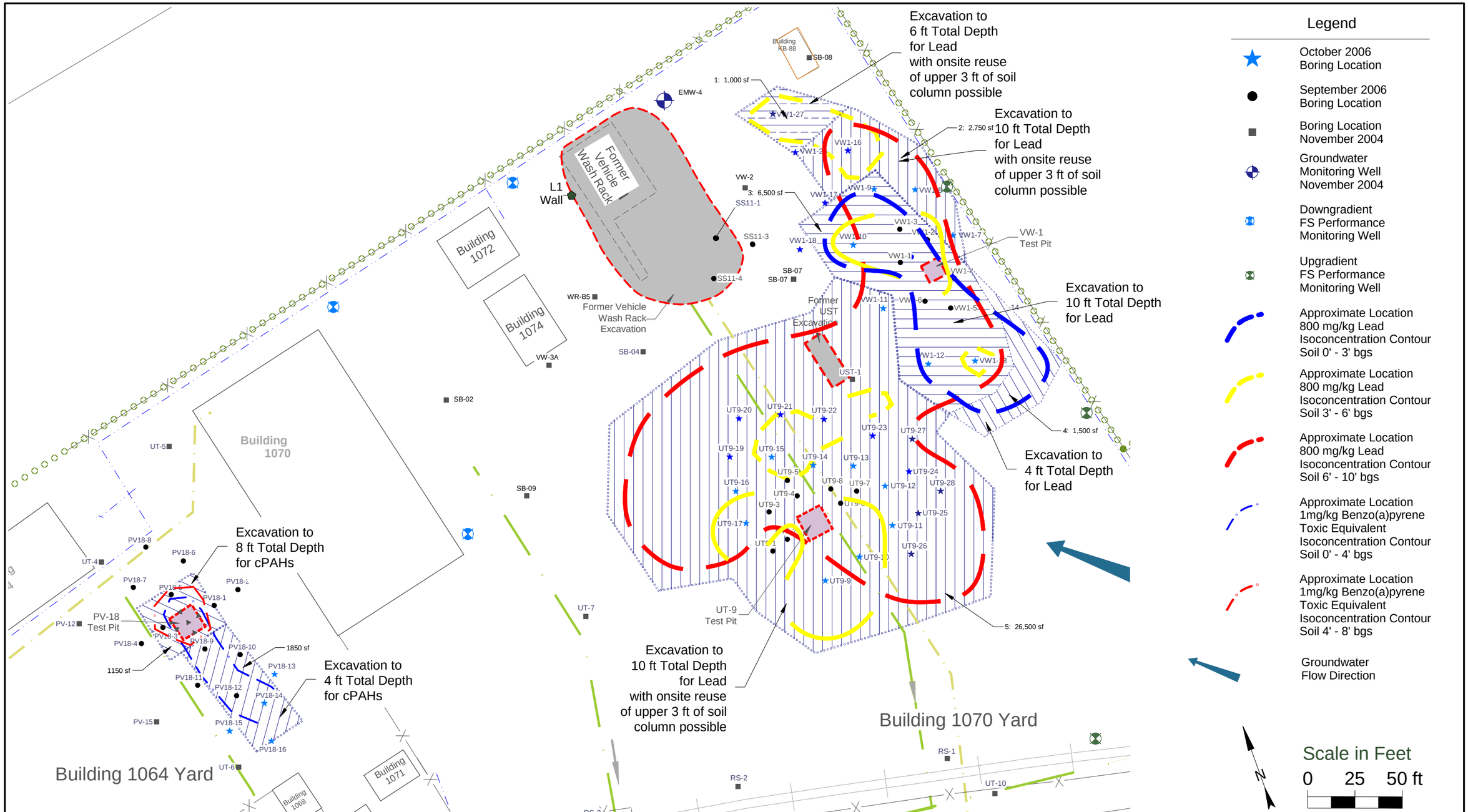
Table 5-6

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Detailed Evaluation of Remedial Alternatives

		Evaluation Criteria						
Alternative	Alternative Components	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness	Reduction in Toxicity, Mobility, and Volume	Short-Term Effectiveness	Implementability	Net Present Worth Cost
Alternative 7 - Institutional Controls	A: Exposure control through risk and hazard management	Effective in reducing/ controlling exposure to COCs.	Not compliant	Effective as long as controls are maintained	Poor by itself, relies on natural attenuation of COCs for contaminant volume and mobility reduction.	Immediately effective, avoids remedial construction-related impacts, e.g., dust generation	Readily implemented	$210,400

SECTION 5
FIGURES



geologica

San Francisco, California

Remedial Investigation/Feasibility Study

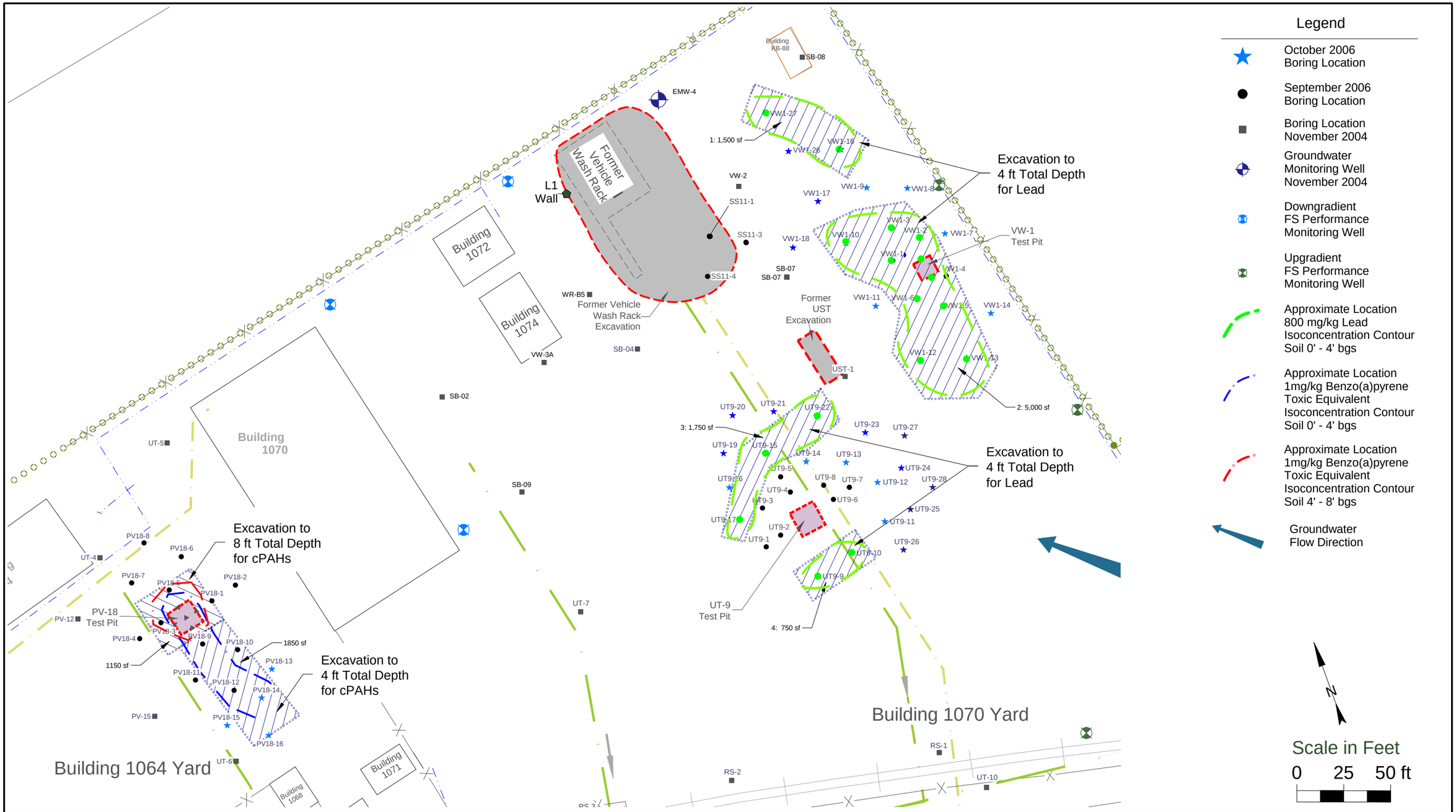
Heroic War Dead

United States Army Reserve Center Oakland

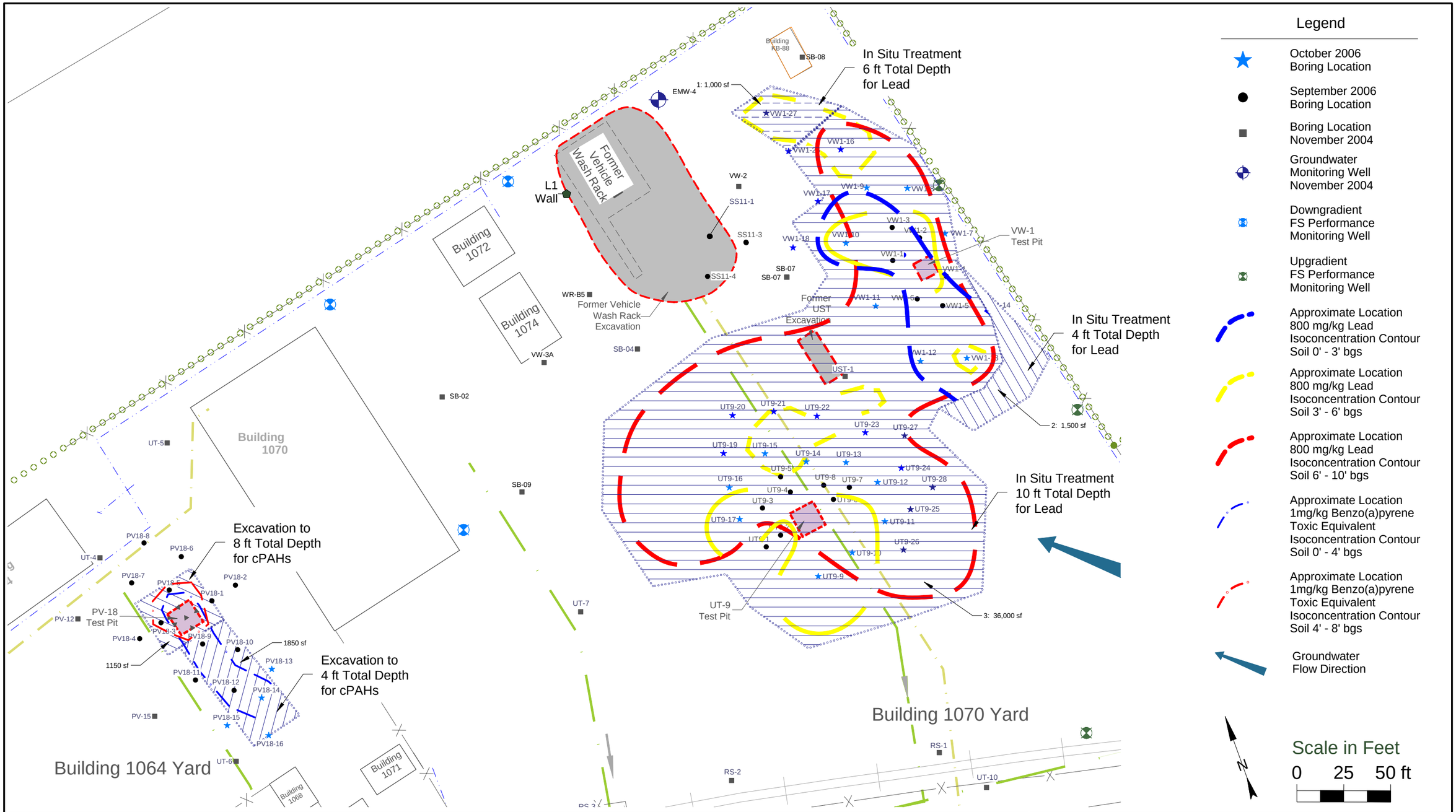
Oakland, California

Remedial Alternative 2
Soil Excavation and Offsite Disposal

Figure 5-1



geologica	Remedial Investigation/Feasibility Study **Heroic War Dead** **United States Army Reserve Center Oakland**	Remedial Alternative 3 Limited Excavation and Offsite Disposal
San Francisco, California	Oakland, California	**Figure 5-2**



geologica

San Francisco, California

Remedial Investigation/Feasibility Study

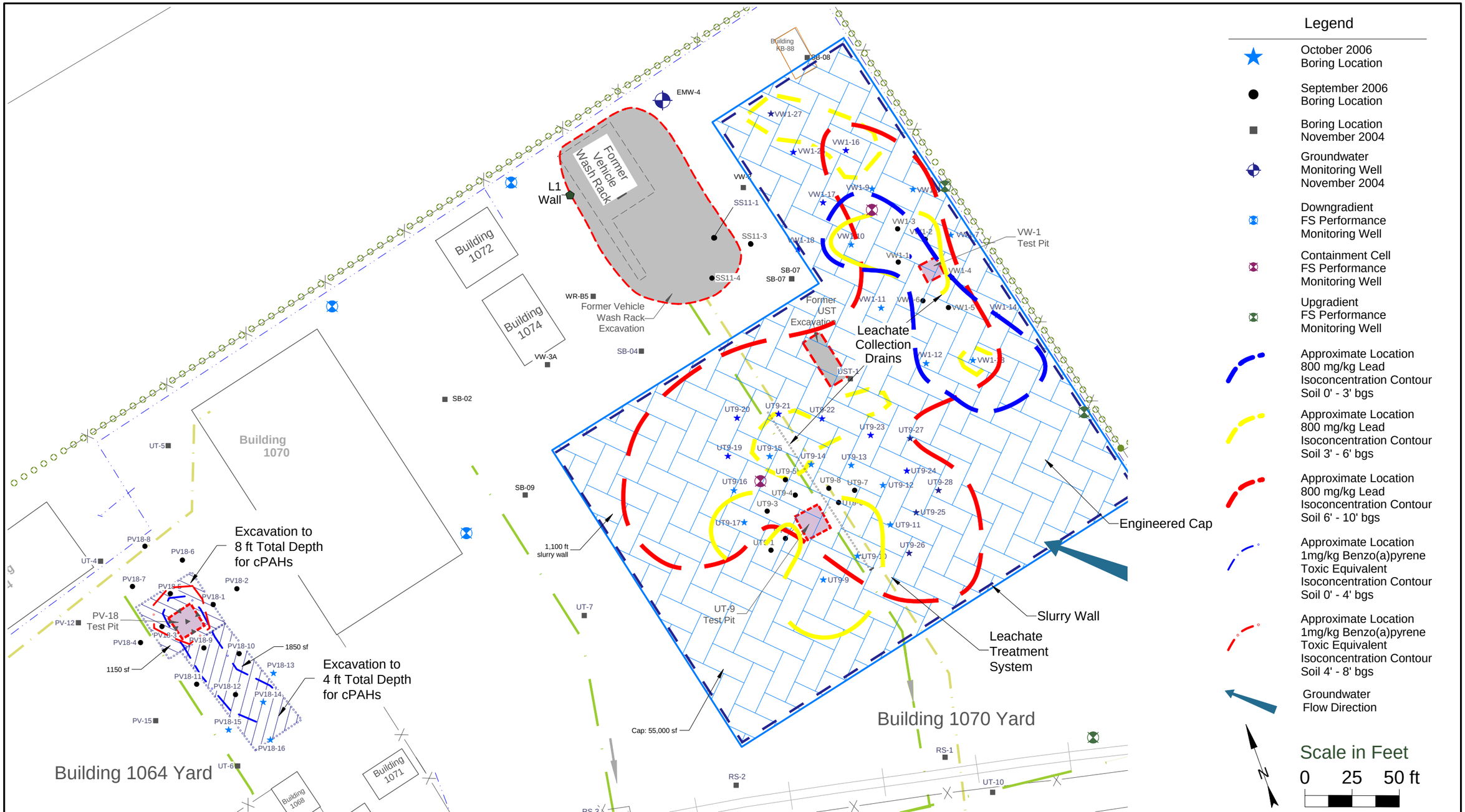
Heroic War Dead

United States Army Reserve Center Oakland

Oakland, California

Remedial Alternative 4
Limited Excavation and In Situ Treatment

Figure 5-3



geologica

San Francisco, California

Remedial Investigation/Feasibility Study

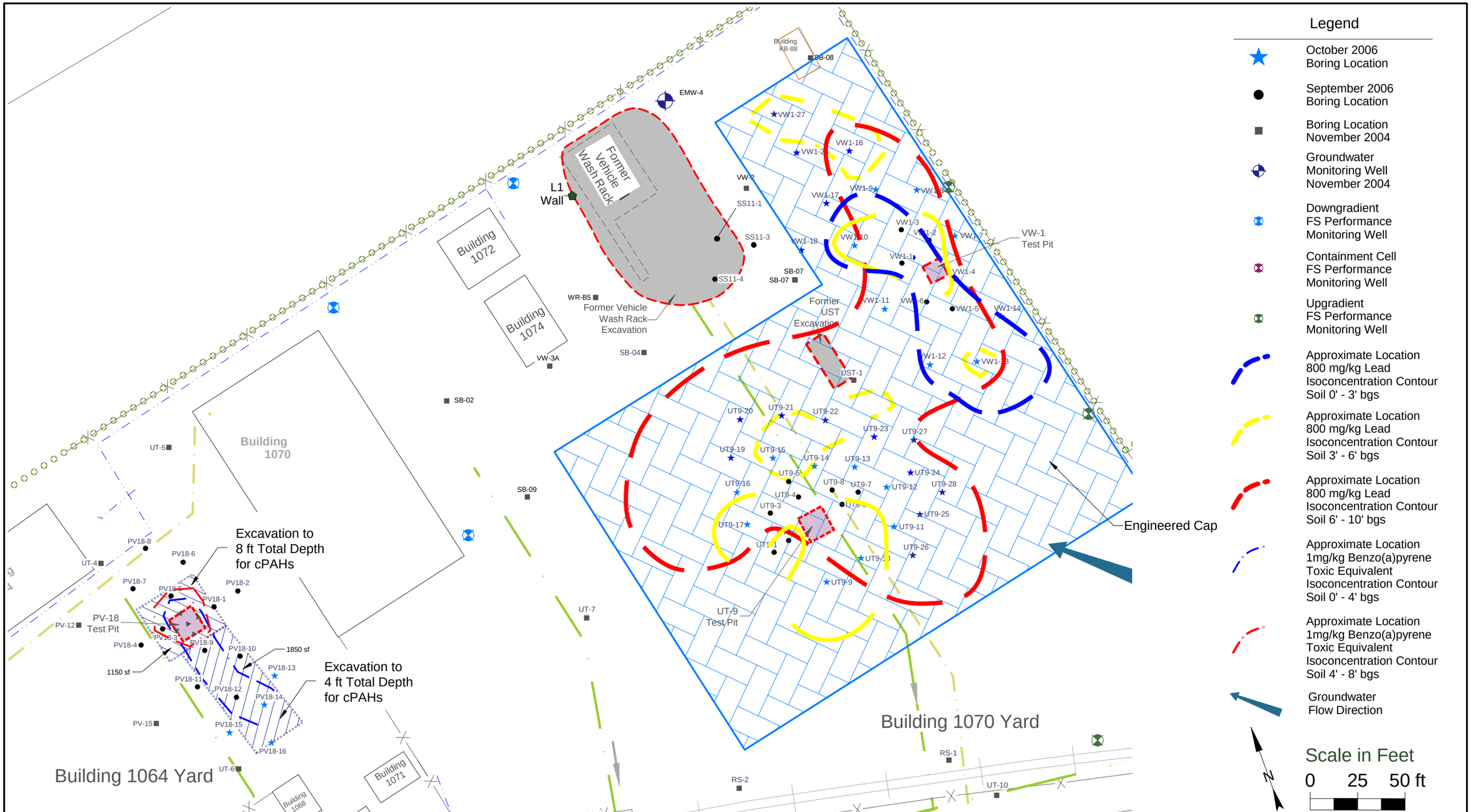
Heroic War Dead

United States Army Reserve Center Oakland

Oakland, California

Remedial Alternative 5
Limited Excavation and Capping

Figure 5-4



geologica

San Francisco, California

Remedial Investigation/Feasibility Study

Heroic War Dead

United States Army Reserve Center Oakland

Oakland, California

Remedial Alternative 6
Limited Excavation and Capping

Figure 5-5

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APPENDIX A
Field Boring Logs

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 28, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **PV18-1**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: Resonant Sonic, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	0 – 4'	0.0	1.5	Asphalt over Sand and gravel (fill), brown, dry	
		1.0	4.0	Clayey Silt, trace sea shells, black	
	4 – 8'	4.0	8.0	Clayey Silt with gravel, black	

Notes: Boring backfilled with neat cement grout.

Boring Terminated at: 8 feet

Log By: Greg Romero

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 28, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **PV18-2**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: Resonant Sonic, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	0 – 4'	0.0	1.5	Asphalt over Sand and gravel (fill), brown, dry	
		1.0	4.0	Clayey Silt, trace sea shells, black	
		4.0	6.0	Sand and gravel, brown	
	4 – 8'	6.0	8.0	Clayey fine Sand with shells, black, wet	

Notes: Boring backfilled with neat cement grout.

Boring Terminated at: 8 feet

Log By: Greg Romero

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 28, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **PV18-3**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: Resonant Sonic, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	0 – 4'	0.0	4.0	Sand and gravel (fill), brown and black	
	4 – 8'	4.0	6.0	Sand and gravel (fill), brown	
		6.0	8.0	Sand and gravel (fill), black, wet	

Notes: Bottom of boring at 8 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 28, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **PV18-4**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: Resonant Sonic, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	0 – 4'	0.0	3.0	Sand and gravel (fill), brown, TPH odor	
		3.0	4.0	Clayey sand, black	
	4 – 8'	4.0	6.0	Sand and gravel, dark brown	
		6.0	8.0	Clayey sand, black, wet	

Notes: Bottom of boring at 8 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 28, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **PV18-5**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	0 – 4'	0.0	2.0	Sand and gravel with debris, brown, slight TPH-like odor	
		2.0	4.0	Clayey sand with gravel, black	
	4 – 8'	4.0	6.0	Sand with gravel, brown	
		6.0	8.0	Sandy Clay with gravel, dark gray to black	

Notes: Bottom of boring at 8 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 28, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **PV18-6**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	0 – 4'	0.0	2.0	Sand with gravel, tan	
		2.0	4.0	Sandy Clay, with shell fragments, gray to dark black	
	4 – 8'	4.0	8.0	Clay with gravel and debris, gray to black	

Notes: Bottom of boring at 8 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 28, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **PV18-7**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	0 – 4’	0.0	2.0	Sand with gravel, tan	
		2.0	6.0	Sandy Clay with some gravel	
	4 – 8’	6.0	8.0	Clay, gray	

Notes: Bottom of boring at 8 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 28, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **PV18-8**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	0 – 4'	0.0	2.0	Sand with gravel, tan	
		2.0	4.0	Gravel and sandy clay, tan	
	4 – 8'	4.0	5.0	Sandy clay with gravel	
		5.0	7.0	Clay, dark gray	
		7.0	8.0	Sand with gravel, dark gray	

Notes: Bottom of boring at 8 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 28, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **PV18-9**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	0 – 4’	0.0	2.0	Sand with gravel, tan	
		2.0	6.0	Sandy Clay with gravel, black	
	4 – 8’	6.0	8.0	Sand with gravel, black, damp	

Notes: Bottom of boring at 8 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 28, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **PV18-10**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	0 – 4’	0.0	2.0	Sand with gravel, tan	
		2.0	3.0	Sandy clay with gravel, tan	
		3.0	4.0	Clay	
	4 – 8’	4.0	5.0	Clay with gravel	
		5.0	8.0	Sand with gravel, black, damp	

Notes: Bottom of boring at 8 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 28, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **PV18-11**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	0 – 4'	0.0	2.0	Sand with gravel, tan	
		2.0	3.0	Clay, gray	
		3.0	5.0	Coal	
	4 – 8'	5.0	6.0	Sand, black	
		6.0	8.0	Clay with some gravel, black	

Notes: Bottom of boring at 8 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 28, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **PV18-12**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	0 – 4'	0.0	2.0	Sand with gravel, tan	
		2.0	3.0	Clay, gray	
		3.0	4.0	Sand with gravel, black	
	4 – 8'	4.0	5.0	Clay, gray	
		5.0	6.0	Sand with gravel, black	
		6.0	8.0	Clay, gray, slight sulfur odor	

Notes: Bottom of boring at 8 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 25, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **PV18-13**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: Resonant Sonic, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	0 – 4'	0.0	1.0	Asphalt over Sand with gravel (fill)	
		1.0	4.0	Silty clay, dark black	
	4 – 8'	4.0	5.0	Silty Clay with gravel, black	
		5.0	7.0	Sand with gravel, black	
		7.0	8.0	Silty sand, black, wet	

Notes: Bottom of boring at 8 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 25, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **PV18-14**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	0 – 4'	0.0	1.0	Sandy clay with gravel	
		1.0	3.0	Silty clay with gravel, black	
		3.0	4.0	Silty sand with gravel, black	
	4 – 8'	4.0	6.0	Sandy Clay with gravel, black	
		6.0	8.0	Silty clay with gravel, black, wet	

Notes: Bottom of boring at 8 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 25, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **PV18-15**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	0 – 4’	0.0	1.0	Sand with gravel, brown	
		1.0	4.0	Silty Clay, with gravel, black	
	4 – 8’	4.0	6.0	Sandy Clay with little gravel, black	
		6.0	8.0	Silty Clay with gravel, black, damp	

Notes: Bottom of boring at 8 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 25, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **PV18-16**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	0 – 4'	0.0	1.0	Sand with gravel, brown	
		1.0	3.0	Sandy Clay, with little debris, sea shells, black	
		3.0	4.0	Sand with gravel, black	
	4 – 8'	4.0	8.0	Sandy Clay with gravel, black, damp	

Notes: Bottom of boring at 8 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 29, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **SS11-1**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	0 – 4'	0.0	4.0	Sand with gravel	
	4 – 8'	4.0	8.0	Clay with some gravel, black-gray	

Notes: Bottom of boring at 8 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 29, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **SS11-3**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	0 – 4’	0.0	2.0	Sandy Clay, with gravel	
		2.0	4.0	Clay, with gravel, black	
	4 – 8’	4.0	8.0	Sandy Clay, black, damp	

Notes: Bottom of boring at 8 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 29, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **SS11-4**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	0 – 4'	0.0	4.0	Sandy Clay, with gravel	
	4 – 8'	4.0	8.0	Sandy Clay with gravel, black, damp	

Notes: Bottom of boring at 8 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 28, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-1**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	0 – 4'	0.0	1.0		
		3.0	3.5	Concrete with gravel	
		3.5	4.0	Sandy clay with gravel, petroleum-like odor	
	4 – 8'	4.0	8.0	Sandy clay with gravel, stiff	
	8 – 10'	8.0	10.0		

Notes: Bottom of boring at 10 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 28, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-2**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	0 – 4’	0.0	3.0	Sand with gravel, tan	
		3.0	4.0	Clay with gravel, black, some sandy clay	
	4 – 8’	4.0	8.0	As above	
	8-10’	8.0	10.0	Clay, black, damp to wet, petroleum-like odor	

Notes: Bottom of boring at 10 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 28, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-3**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	0 – 4'	0.0	1.0	Sand with gravel, tan	
		1.0	4.0	Sandy Clay with gravel	
	4 – 8'	4.0	8.0	Sandy Clay with gravel, black	
	8-10'	8.0	10.0	Sandy clay with gravel, wet	

Notes: Bottom of boring at 10 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 28, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-4**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	0 – 4’	0.0	3.0	Sand with gravel	
		3.0	4.0	Sandy clay with gravel	
	4 – 8’	4.0	5.0	Sand and gravel	
		5.0	8.0	Clay, dark, wet	
	8-10’	8.0	10.0	Sandy clay with gravel and debris, wet	

Notes: Bottom of boring at 10 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 28, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-5**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	0 – 4'	0.0	2.0	Sand with gravel	
		2.0	4.0	Sandy clay with gravel	
	4 – 8'	4.0	6.0	Sandy Clay with gravel	
		6.0	7.0	Sand with gravel	
		7.0	8.0	Sandy clay with gravel	
	8-10'	8.0	10.0	Sandy clay, black, wet	

Notes: Bottom of boring at 10 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 28, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-6**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	0 – 4’	0.0	4.0	Gravelly sand, tan	
	4 – 8’	4.0	8.0	Sand with gravel, some clay	
	8-10’	8.0	10.0	Clay, black, wet	

Notes: Bottom of boring at 10 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 28, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-7**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	0 – 4'	0.0	4.0	Sandy clay with gravel	
	4 – 8'	4.0	5.0	Sand with gravel	
		5.0	8.0	Sandy clay with gravel, wet, petroleum-like odor	
	8-10'	8.0	10.0	Sandy clay with some gravel, black, wet	

Notes: Bottom of boring at 10 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 28, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-8**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	0-4'	0.0	4.0	Sand with gravel, tan	
	4-8'	4.0	6.0	Tan sand with gravel	
		6.0	7.0	Sandy clay with gravel, black	
	4 – 8'	7.0	8.0	Clay, wet	
	8-10'	8.0	10.0	Sandy clay with gravel, black, wet	

Notes: Bottom of boring at 10 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 25, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-9**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1-5'	1.0	5.0	Sand with gravel, brown	
		4.0	5.0	Silty Clay, with wood debris	
	5-9'	5.0	9.0	Silty clay with gravel, black	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 25, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-10**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	1-5'	1.0	5.0	Silty Sand with gravel, brown to black	
		4.0	5.0	As above with red brick fragments, glass, and metal	
	5-9'	5.0	9.0	Silty clay with glass and wood debris	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 25, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-11**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1-5'	1.0	2.0	Sand with gravel, brown-tan	
		2.0	5.0	Silty Sand with gravel	
	5-9'	5.0	9.0	Silty Sand, black, with wood fragments, strong petroleum-like odor	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 25, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-12**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1 – 5’	1.0	2.0	Sandy Clay, with gravel, brown	
		2.0	4.0	Gravel with concrete fragments	
		4.0	5.0	Silty Sand with gravel, glass fragments, black	
	5 – 9’	5.0	6.0	Clay, black	
		6.0	9.0	Silty Sand with gravel, fragments of glass, wood, wire	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 25, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-13**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1 – 5'	1.0	3.0	Sand with gravel, brown (some glass fragments 2-3')	
		3.0	4.0	Concrete	
		4.0	5.0	Silty sand, black, with gravel and wood debris	
	5 – 9'	5.0	6.0	Clay, black	
		6.0	9.0	Silty Sand with gravel, fragments of glass, wood, gravel, batteries (damp)	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 25, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-14**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: Resonant Sonic, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	1 – 5'	1.0	2.0	Sand with gravel, brown	
		2.0	3.0	Silty clay, black	
		3.0	3.5	Concrete	
		3.5	5.0	Silty clay, black, with gravel, wood, glass, hydrocarbon odor	
	5 – 9'	5.0	6.0	Clay, black	
		6.0	7.0	Sand with gravel	
		7.0	9.0	Silty clay with gravel, glass and wood debris, black (wet	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 25, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-15**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: Resonant Sonic, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	1 – 5’	1.0	2.0	Sand with gravel, brown	
		2.0	5.0	Silty clay with gravel, glass fragments, black	
	5 – 9’	5.0	9.0	Silty clay with gravel, wood and glass fragments (damp)	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 26, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-16**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: Resonant Sonic, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:	*Relative Grain Size:*
and = 35 to 50%	c = coarse
some = 20 to 35%	m = medium
little = 10 to 20%	f = fine
trace = less than 10%	

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1 – 5’	1.0	2.0	Sandy clay with gravel, brown	
		2.0	2.5	Concrete	
		2.5	5.0	Sandy clay with gravel, brick fragments, hydrocarbon odor	
	5 – 9’	5.0	6.0	Sand with gravel	
		6.0	9.0	Silty clay with gravel, glass, wood fragments, black, slight hydrocarbon odor	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 26, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-17**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1 – 5’	1.0	2.0	Sandy clay with gravel, brown	
		2.0	3.0	Clay with gravel, gray	
		3.0	5.0	Silty clay, black, wood fragments	
	5 – 9’	5.0	9.0	Silty clay with gravel, black, concrete from 7-7.5’.	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 26, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-19**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1 – 5’	1.0	2.0	Sand with gravel, brown	
		2.0	5.0	Clay with gravel, greenish brown, some shell fragments	
	5 – 9’	5.0	7.0	Clay with gravel, dark greenish brown	
		7.0	9.0	Silty clay with gravel, black, some concrete and batteries, slight hydrocarbon odor	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 26, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-20**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1 – 5’	1.0	2.0	Sand with gravel, brown	
		2.0	5.0	Sandy clay with gravel and shell fragments, black	
	5 – 9’	5.0	9.0	Sandy Clay with gravel and shell fragments, black,	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 26, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-21**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	1 - 5'	1.0	2.0	Sand with gravel and concrete, brown	
		2.0	5.0	Sandy clay with gravel, brownish black	
	5 – 9'	5.0	6.0	Sand with gravel, brown	
		6.0	9.0	Sandy clay with gravel, glass and debris, black	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 25, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-22**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1 – 5’	1.0	3.0	Sand with gravel, brown	
		3.0	5.0	Silty clay with gravel, class and metal debris, black, hydrocarbon odor	
	5 – 9’	5.0	6.0	Sandy clay with gravel, brown	
		6.0	9.0	Sandy clay with gravel, wood, black (wet)	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 26, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-23**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:	*Relative Grain Size:*
and = 35 to 50%	c = coarse
some = 20 to 35%	m = medium
little = 10 to 20%	f = fine
trace = less than 10%	

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1 – 5’	1.0	3.0	Sand with gravel, brown	
		3.0	5.0	Sandy clay with gravel, brick fragments, black	
	5 – 9’	5.0	6.5	Sand with gravel and concrete fragments, brown	
		6.5	9.0	Sandy clay with gravel, possible battery cores (damp)	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 26, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-24**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1 – 5’	1.0	3.0	Sand with gravel and concrete, brown	
		3.0	5.0	Sand with gravel and concrete, whitish gray	
	5 – 9’	5.0	6.0	Sand with gravel, brown	
		6.0	8.0	Sandy clay with gravel, black	
		8.0	9.0	Sandy silt with gravel, glass, wood fragments, black (damp)	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 26, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-25**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:	*Relative Grain Size:*
and = 35 to 50%	c = coarse
some = 20 to 35%	m = medium
little = 10 to 20%	f = fine
trace = less than 10%	

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1 - 5’	1.0	2.0	Sand with gravel, white	
		2.0	5.0	Sand with gravel and concrete, brown	
	5 – 9’	5.0	7.0	Sandy clay with gravel, brown	
		7.0	9.0	Silty clay with gravel, black, (wet), hydrocarbon odor	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 26, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-26**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	1 – 5’	1.0	3.0	Sand with gravel, white	
		3.0	5.0	Sandy clay with gravel, brown	
	5 – 9’	5.0	6.0	Sand with gravel, brown	
		6.0	7.0	Clay with gravel, black	
		7.0	9.0	Silty clay, black (damp) with gravel, glass, nails, etc	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 26, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-27**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:	*Relative Grain Size:*
and = 35 to 50%	c = coarse
some = 20 to 35%	m = medium
little = 10 to 20%	f = fine
trace = less than 10%	

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1 - 5’	1.0	2.0	Sand with gravel, brown	
		2.0	5.0	Sand with gravel, glass and debris, black	
	5 – 9’	5.0	7.0	Sand with gravel and debris, brown	
		7.0	9.0	Sandy clay with gravel, black	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 26, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **UT9-28**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:	*Relative Grain Size:*
and = 35 to 50%	c = coarse
some = 20 to 35%	m = medium
little = 10 to 20%	f = fine
trace = less than 10%	

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1 - 5’	1.0	4.0	Sand with gravel, brown	
		4.0	5.0	Sand with gravel, black	
	5 – 9’	5.0	7.0	Sand with gravel, brown	
		7.0	9.0	Silty sand with gravel, black	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 29, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **VW1-1**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	0 – 4'	0.0	2.0	Sand with gravel, tan	
		2.0	4.0	Clayey Sand, with glass, wood debris, charcoal, black & brown	
	4 – 6'	4.0	6.0	Sandy Clay with gravel, black	

Notes: Bottom of boring at 6 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 29, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **VW1-2**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	0 – 4'	0.0	2.0	Sand with gravel, brown	
		2.0	4.0	Sandy Clay, with gravel, brown	
	4 – 6'	4.0	6.0	Sandy Clay with gravel, black, damp	

Notes: Bottom of boring at 6 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 29, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **VW1-3**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	0 – 4'	0.0	2.0	Sand with gravel, tan	
		2.0	4.0	Sandy Clay, with gravel, brown	
		3.0	4.0	Sand with gravel, black	
	4 – 6'	4.0	6.0	Clay with gravel and wood debris, black	

Notes: Bottom of boring at 6 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 29, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **VW1-4**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	0 – 4'	0.0	2.0	Sand with gravel, brown	
		2.0	4.0	Sandy Clay, with gravel, some glass debris	
		3.0	4.0	Sand with gravel, black	
	4 – 6'	4.0	6.0	Sand with gravel, brown-black	

Notes: Bottom of boring at 6 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 29, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **VW1-5**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	0 – 4’	0.0	2.0	Sand with gravel, tan	
		2.0	4.0	Sandy Clay, with gravel, brown-black	
	4 – 6’	4.0	6.0	Sandy Clay with gravel, brown-black	

Notes: Bottom of boring at 6 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: September 29, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **VW1-6**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	0 – 4'	0.0	2.0	Sand with gravel, brown	
		2.0	4.0	Sandy Clay, with gravel	
	4 – 6'	4.0	6.0	Sandy Clay with gravel	

Notes: Bottom of boring at 6 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 25, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **VW1-7**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	1 – 5’	1.0	5.0	Sand with gravel	
	5 – 9’	5.0	9.0	Silty Clay with strong petroleum-like odor, black	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 25, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **VW1-8**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	1 – 5’	1.0	5.0	Sand with gravel, brown to dark brown	
	5 – 9’	5.0	9.0	Sand with gravel, brown to black, damp	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 25, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **VW1-9**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1 – 5’	1.0	5.0	Sand with gravel, brown	
	5 – 9’	5.0	7.0	Sand with gravel, brown, damp	
		7.0	9.0	Silty Sand, little gravel, black, wet	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 25, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **VW1-10**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	1 – 5’	1.0	3.0	Sand with gravel, brown	
		3.0	5.0	Sand, little gravel and organics, black	
	5 – 9’	5.0	6.0	Sand with gravel, brown	
		6.0	9.0	Clay, dark gray, damp	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 25, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **VW1-11**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1 – 5'	1.0	2.0	Sand with gravel, brown	
		2.0	5.0	Sandy Clay, little gravel with glass fragments and wood debris; red brick fragments @ 2.5'	
	5 – 9'	5.0	6.0	Sand with gravel, brown	
		6.0	8.5	Clay, dark gray	
		8.5	9.0	Silty Sand with gravel, black	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 25, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **VW1-12**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1 – 5'	1.0	2.0	Sand with gravel, brown	
		2.0	4.0	Sand, little gravel with glass fragments and wood debris	
		4.0	5.0	Clay, dark gray	
	5 – 9'	5.0	6.0	Sand with gravel, brown	
		6.0	8.5	Clay, dark gray	
		8.5	9.0	Silty Sand with gravel and wire, black	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 25, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **VW1-13**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	1 – 5’	1.0	2.0	Sand with gravel, brown	
		2.0	3.0	Sand, little gravel with glass fragments and wood debris	
		3.0	5.0	Silty Sand with gravel, black	
	5 – 9’	5.0	6.0	Sand with gravel, brown	
		6.0	9.0	Silty Clay, black, with wood debris	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 25, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **VW1-14**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.)		DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
		FROM	TO		
	1 – 5'	1.0	2.0	Sand with gravel, brown	
		2.0	5.0	Sandy Clay with gravel	
	5 – 9'	5.0	6.0	Sandy Clay, brown	
		6.0	9.0	Silty Clay to Clay, black	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 26, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **VW1-16**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1 - 5’	1.0	5.0	Sand with gravel, brown	
	5 – 9’	5.0	7.0	Sand with gravel, brown	
		7.0	9.0	Silty sand with gravel and class, black, (damp)	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 26, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **VW1-17**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: Resonant Sonic, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:	*Relative Grain Size:*
and = 35 to 50%	c = coarse
some = 20 to 35%	m = medium
little = 10 to 20%	f = fine
trace = less than 10%	

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1 - 5’	1.0	5.0	Sand with gravel, brown, concrete from 4.5-5’	
	5 – 8’	5.0	7.0	Clay with gravel, brown	
		7.0	8.0	Silty clay, black	

Notes: Boring encountered refusal at 8 feet on possible large wood debris. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 26, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **VW1-18**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1 – 5’	1.0	2.0	Sand with gravel, brown	
		2.0	5.0	Sandy clay with gravel, brown	
	5 – 9’	5.0	7.0	Sandy Clay with gravel, brown	
		7.0	9.0	Sandy clay with gravel, black	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 26, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **VW1-26**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: RSI Drilling, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1 – 5’	1.0	5.0	Sand with gravel, brown	
	5 – 9’	5.0	6.5	Sand with gravel, brown	
		6.5	9.0	Sandy Clay with gravel, grayish black, damp	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

GEOLOGICA, Inc.

SUBSURFACE INVESTIGATION LOG

Date: October 26, 2006
Geologica Project No.: EBMUD02:008
Boring I.D.: **VW1-27**

Client: EBMUD
Project Location: Heroic War Dead USAR Oakland
2400 Engineer Road
Oakland, CA
Drill Rig: Resonant Sonic, Geoprobe
Geologica Representative: Greg Romero
Client Representative: none
Others Present:
Utility Clearance by: Cruz Brothers
Sampling Method: 2-inch dia., 4 ft drive Geoprobe

LEGEND

Relative Composition:
and = 35 to 50%
some = 20 to 35%
little = 10 to 20%
trace = less than 10%

Relative Grain Size:
c = coarse
m = medium
f = fine

SAMPLE NUMBER	SAMPLE INTERVAL	DEPTH (FT.) FROM	DEPTH (FT.) TO	DESCRIPTION/SOIL CHARACTERISTICS/OBSERVATIONS (COLOR, TEXTURE, RELATIVE MOISTURE, ODOR)	
	1 – 5’	1.0	5.0	Sandy clay with gravel, brown	
	5 – 9’	5.0	7.0	Sand with gravel, brown	
		7.0	9.0	Sandy clay with gravel, black, slight hydrocarbon odor	

Notes: Bottom of boring at 9 feet. Boring backfilled with neat cement grout.

APPENDIX B

Laboratory Analytical Testing Reports

B-1 *Laboratory Data Quality Review*

Analytical data from the most recent sampling events at USAR Center Heroic War Dead Site for the Supplemental Site Investigation included analysis of soil samples for lead by EPA Method 6010B and for poly-aromatic hydrocarbons (PAHs) by EPA Method 8270 at EBMUD Laboratory, a California EPA accredited laboratory. Approximately 138 soil samples were collected and submitted in 5 sets for lead analysis. Lead results were presented in 5 laboratory reports (L130806, L130814, L131408, L131370, and L131390). Thirty-five soil samples were collected on two separate days and submitted for PAH analysis in two sets. Results were presented in 2 reports (L130787 and L131369). The data was validated for usability at a moderate (Level III) screening level. Results suggest that the laboratory analysis of lead is sufficiently accurate and precise for the project although the results are qualified mostly as a result of matrix interference. PAH results for target compounds are also sufficiently accurate for the project although matrix interference significant affected some results and the precision of dibenzo (a,h) anthracene and ideno (1,2,3cd) pyrene analysis are qualified in WG 132582.

Each laboratory report and related quality control (QC) data has been reviewed for various QC parameters appropriate for a moderate data screening level in accordance with the project QAPP. The data was also evaluated for accuracy and precision. QC parameters for lead and PAH analyses are presented in the tables below.

B-2 *Lead Results*

QC Parameters for Level III Data Validation of Lead Analysis of Soil

QC Parameter	L130806		L130814		L131408		L131370		L131390		comments
	#	OK?	#	OK?	#	OK?	#	OK?	#	OK?	
Results	17	√	17	√	17	√	26	√	61	√	1370 and 1390 are 2 and 3 separate Work Groups, respectively
Qualified Results	2	2-*	1	1-*	1	1-N	3	1-N, 2-*	4	1-N, 4-*	
Holding time exceedance	0	√	0	√	0	√	0	√	0	√	
Chain of Custody											
Case narrative	na		na		na		na		na		
Method Blank	1	nd	1	nd	2	nd	3	nd	3	nd	
Spike	1	√	1	√	2	√	3	√	3	√	
Spike dup	1	√	1	√	2	√	3	√	3	√	
Matrix spike	2	1-out 1-√	2	1-out 1-√	3	1-out 2-√	6	5-out 1-√	9	6-out 3-√	1408-out MS wasn't spiked,1390 shares MS with 1408 and 1370
Sample dup	2	out	2	1-out 1-√	3	1-out 2-√	6	4-out 2-√	9	6-out 3-√	1390 shares samp dups with 1408 and 1370
LCS	1	√	1	√	2	√	3	√	5	√	
Check std	3	√	4	√	4	√	8	√	11	√	
Field QC	1		2		2		2		4		
Dilutions	na		na		na		na		na		All samples diluted to approx 0.1-0.2

Notes: #-number of analysis, √- acceptable, out-outside of control limits, na – not available, dup-duplicate, * - qualified as a result of sample duplicate out of control limits, N-qualified as a result of spike recovery outside of control limits, nd – nondetect,

The lead results appear to be of sufficient quality to meet the objectives of the site investigation. The data was appropriately transported and analyzed within the time limits. Although some quality control parameters were outside control limits, no lead data was rejected. Therefore the data set is appropriately complete. In addition the lead results are appropriately sensitive. All results are above the 2.4 mg/kg laboratory reporting limit which is below the project QAPP reporting limit objective of 5 mg/kg.

Data was qualified as a result of matrix interference or variation. Variability of laboratory analytical quality control samples and spikes were well within acceptable limits. But quality controls which could be affected by matrix interference or variation within the soil sample (both matrix spikes and duplicate samples) were sometimes outside the control ranges. The effects of matrix variation on the accuracy and precision of the results are discussed below.

B-3 *PAH Results*

QC Parameters for Level III Data Validation of PAH Analysis of Soil

QC Parameter	L130787		comments	L13169		comments
	#	OK?		#	OK?	
Results (target analytes x samples)	7x26	√		7x9	√	
Qualified Results	28	J	From data validation			
Holding time exceedance	0	√		0	√	
Chain of Custody						
Case narrative	na			na		
Internal standards	5x26	17 out	15 pyrene out 2 chrysene out	5x9	10 out	6 of 10 are pyrene remaining 4 are chrysene
Surrogate spikes	4x26	18 out	10 of 18 out are nitrobenzene 2 out in 6 samples	4x9	11 out	7 of 11 out are nitrobenzene 2 out in 3 samples
Method blank	2	√	10 surrogates out nd for target compounds	1	√	5/6 surrogates out` nd for target analytes
Spiked blank	2	√		1	√	
Matrix spike	3	√	3 IS	1	√	2 IS compounds out

analyzed for 6 IS compounds, 6 surrogate spikes and 6 target analytes			compounds-out %R 3 surrogate compound-out %R			(%R), 1 surrogate spike out
Matrix spike duplicate analyzed for 6 IS compounds, 6 surrogate spikes and 6 target analyte	3		3 IS comp. %R-out 5 surrogate comp %R-out MS/MSD target analytes 13/18 >20% 10/18>50%	1	√	2 IS compounds out (%R) with perylene R<10%, 2 surrogate spike out
LCS	3	√	10 surrogate spikes out **2 target compounds out 1 on limit dibenzo (a,h) anthracene and ideno (1,2,3cd) pyrene analysis qualified in WG 132582**	1	√	5/6 surrogate spikes out
Check Std-analyzed for 6 IS compounds, 6 surrogate spikes and 6 target analyte spikes	9	√	5-IS compounds, 4-surrogate compounds and 3-target compounds out of control limits	3	√	1-IS compounds, 1-surrogate compounds and 3-target compounds out of control limits
Field QC	1			2		
Dilutions	1			na		

Notes: #-number of analysis, √- acceptable, out-outside of control limits, na – not available, dup-duplicate, * - qualitifed as a result of duplicate out of control limits, N-qualified as a result of spike recovery outside of control limits, nd – nondetect, IS-internal standard

PAH data is generally acceptable, however some of the QC results suggest that some of the data should be qualified specifically the dibenzo (a,h) anthracene and ideno (1,2,3cd) pyrene analysis in WG 132582 on the basis of precision.

.

All samples were appropriately received and analyzed within method time limits. The results of individual samples were evaluated by 5 internal standard compounds (IS) and 4 surrogate spike compounds. Results of the IS and spike analysis are reported with each sample as %R. Of 175 IS reported for 35 samples in 3 separate lab work groups, only 27 were out of acceptable laboratory control limits. Of these, 21 were pyrene and 6 were chrysene suggesting a systematic

issue with analysis of these compounds. However, all were within the project control limits identified in the QAPP and therefore no results are qualified based on IS sample results

Surrogate spikes were also generally within acceptable limits (29 of 280 surrogate spikes in 35 samples were out of laboratory control limits), but the majority of these exceedances (17) were for nitrobenzene. These exceedances were within the QAPP limits of acceptable % recovery for nitrobenzene so no samples were qualified as a result of the surrogate spikes.

Although the laboratory reporting limits were generally above the QAPP reporting limits, the data is considered acceptably sensitive because almost all target analytes were detected in almost all of the samples.

In method blanks, some surrogate spikes were outside laboratory control limits, but no target analytes were detected so these results do not indicate a laboratory contamination problem related to the PAH target analytes. Surrogates spikes were also outside control limits in LCS and check standards. These exceedances cannot be related to matrix interference and therefore the laboratory should provide an explanation of why these LCS and blanks to do not meet internal laboratory control limits. Except for the surrogate Terphenyl, none of these results exceed the project QAPP surrogate accuracy criteria so no data is qualified. Terphenyl results are consistently high, but data is not qualified as a result of one surrogate exceedance.

In one laboratory work group, WG132582, LCS results for two target analytes, dibenzo (a,h) antrhacene and ideno (1,2,3-cd) pyrene do not meet laboratory control limits. Therefore the sample results for these compounds analyzed within this work group are qualified as estimated.

Matrix effects on accuracy and precision of results are discussed below.

B-4 *Precision*

Precision of analytical data is assessed by evaluating the difference between duplicate samples. Analytical precision is assessed by evaluating the difference between spiked blanks, the precision of the analyzed sample relative to the whole sample is assessed by evaluating the difference between analysis of two separate preparations from the same sample, and variation in the entire sampling process is evaluating by assessing the difference between analytical results from duplicate field analyses. The precision is calculated as relative percent difference or RPD as follows:

$RPD = ((|S-D|)/(S+D)/2))*100$ S= original value, D=duplicate value.

RPD for analytical, sample preparation and field samples for lead and PAH analysis are summarized in separate tables, below.

B-4.1 **Lead Precision**

Precision of Lead Analysis of Soil Samples in Relative Percent Difference (RPD)

Lab Report No.	spike	spike dup	analytical RPD	sample	sample dup	sample RPD	field	field dup	field RPD	
control limits			20%			20%			35%	
130806	213	209	1.9	87.9	145	49	3410	5160	40.84	
				1240	1840	39				
130814	210	208	0.957	2750	3890	40.9	806	38600	191.82	
				38.8	40.7	4.78	38.8	42.7	9.5706	composite
131408	217	213	1.86	38.7	77.9	67.2	31.1	48.1	42.929	
	209	217	3.756	120	99	19.2	6.81	15.9	80.053	
				23.2	22.7	2.18				
131370	206	207	0.484	1180	1730	37.8	932	4410	130.21	
	215	208	3.31	4880	4750	2.7	378	415	9.3317	
	200	203	1.49	3340	8310	85.3				
				4.33	8.44	64.4				
13190	206	207	0.484	1180	1730	37.8	10200	13200	25.641	
	215	208	3.31	4880	4750	2.7	50.3	3340	194.07	
	199	199	0	3340	8310	85.3	229	687	100	
	217	213	1.86	88.6	122	31.7	3920	7960	68.013	
	209	217	3.756	3920	20500	136				
				38.7	77.9	67.2				
				120	99	19.2				
				23.2	22.7	2.18				
Average			**1.7**			**45**			**81**	
Range			**0 - 3.76**			**2.2 - 85.3**			**9.3 -194**	
#out of control			**0**			**8 of 13**			**8 of 11**	

The precision of the laboratory lead analysis is acceptable. The variability in the results from soil samples and sample duplicates involves analytical variability, variability within the sample or between portions of the sample and the sample preparation process. The variability of field samples and field duplicates includes analytical and sample preparation variability as well as variability between adjacent samples collected in the same boring. The similar low level of reproducibility of lead results between sample duplicates (averaging +/- 45%) and field duplicates (averaging +/- 81%) relative to the analytical process (+/- 1.7%) suggests that this high variability occurs within the sample matrix and not just within the sample preparation process. Despite this variability, the average of the samples and field sample duplicates are consistently above the lead screening level (800 mg/kg) if one value is above this level and less than the screening level only if both results are below the lead screening level. This suggests that the average value of the sample and sample duplicate is a reasonable representation of the field condition.

B-4.2 *PAH Precision*

The precision of the laboratory work separate from sample preparation is not evaluated by duplicate analyses for the SVOC results. The difference between results from separate portions of the same sample varies from negligible to over 100% with almost all values >20%. This suggests that significant variation can be expected within a sample.

SVOC	**samp**	**ms**	**msd**	**samp/ms**	**ms/msd**	**samp**	**ms**	**msd**	**samp/ms**	**ms/msd**
	130787-10			**RPD**	**RPD**	130787-20			**RPD**	**RPD**
target analytes										
benzo (a) anthracene	0.3	0.22	0.12	30.8	58.8	0.27	0.44	0.58	47.9	27.5
benzo (a) pyrene	0.76	0.54	0.26	33.8	70.0	0.34	0.64	0.78	61.2	19.7
benzo (b) flouranthene	0.62	0.5	0.3	21.4	50.0	0.33	0.48	0.57	37.0	17.1
benzo (k) flouranthene	0.57	0.41	0.29	32.7	34.3	0.33	0.5	0.58	41.0	14.8
chrysene	0.46	0.33	0.2	32.9	49.1	0.46	0.7	0.82	41.4	15.8
dibenzo(a,h) anthracene	<0.044	<0.044	<0.044			0.085	0.14	0.13		
indeno (1,2,3-cd)pyrene	0.55	0.41	0.24	29.2	52.3	0.43	0.58	0.67	29.7	14.4
	samp	**ms**	**msd**	**samp/ms**	**ms/msd**					
	130787-26			**RPD**	**RPD**					
target analytes										
benzo (a) anthracene	0.14	0.13	0.064	7.4	68.0					
benzo (a) pyrene	0.28	0.26	0.096	7.4	92.1					
benzo (b) flouranthene	0.29	0.29	0.12	0.0	82.9					
benzo (k) flouranthene	0.25	0.22	0.096	12.8	78.5					
chrysene	0.1	0.19	0.099	62.1	63.0					
dibenzo(a,h) anthracene	<0.044	<0.044	<0.044							
indeno (1,2,3-cd)pyrene	0.19	0.22	0.072	14.6	101.4					
	samp	ms	msd	**samp/ms**	**ms/msd**					
target analytes	L131369-7			**RPD**	**RPD**					
benzo (a) anthracene	0.17	0.1	0.25	51.9	85.7					
benzo (a) pyrene	0.18	0.11	0.2	48.3	58.1					
benzo (b) flouranthene	0.18	0.14	0.18	25.0	25.0					
benzo (k) flouranthene	0.25	0.32	0.15	24.6	72.3					
chrysene	0.22	0.13	0.35	51.4	91.7					
dibenzo(a,h) anthracene	<0.044	<0.044	<0.044							
indeno (1,2,3-cd)pyrene	0.088	0.063	0.15	33.1	81.7					

notes:

green-RPD between samp and ms is >20% for non-spiked target compounds

gold-RPD between md and msd is >20% for non-spiked target compounds

samp - sample

ms - matrix spike

msd - matrix spike duplicate

RPD - relative percent difference

Field Duplicates PAH by 8270 (concentrations in mg/kg)

Lab Report L130387	sample-10	dup sample-11	RPD	sample-19	dup dample-20	RPD
benzo (a) anthracene	0.3	0.15	66.67	0.23	0.27	16.00
benzo (a) pyrene	0.76	0.29	89.52	0.34	0.34	0.00
benzo (b) flouranthene	0.62	0.25	85.06	0.32	0.33	3.08
benzo (k) flouranthene	0.57	0.24	81.48	0.24	0.33	31.58
chrysene	0.46	0.21	74.63	0.44	0.46	4.44
dibenzo(a,h) anthracene	0.044U	0.044U	0.00	0.072	0.085	16.56
indeno (1,2,3-cd)pyrene	0.55	0.21	89.47	0.34	0.43	23.38
Lab Report L131369	sample-8	dup sample-9	RPD	note		
benzo (a) anthracene	0.071	0.058U	84.00	sample-19-lab sample #		
benzo (a) pyrene	0.12	0.07	52.63	sample dup-20 sample duplicate lab sample #		
benzo (b) flouranthene	0.1	0.055	58.06	RPD - relative percent difference		
benzo (k) flouranthene	0.10	0.07	36.69	yellow is >20% RPD		
chrysene	0.076	0.053U	96.59			
dibenzo(a,h) anthracene	0.044U	0.044U	0.00			
indeno (1,2,3-cd)pyrene	0.11	0.068	47.19			

Comparison of field duplicates shows a variation between samples consistent with…

B-5 *Accuracy*

Accuracy of the reported data is assessed by evaluating samples of known concentration. Analytical accuracy is evaluated by measuring check samples, laboratory control samples and spiked blanks (of laboratory solutions). Accuracy of analysis of a given matrix is evaluated by measuring matrix spikes and surrogate spikes (organic analyses). Results are presented by the laboratory as the % recovery (%R) or the % of the known concentration reported. The %R is derived as follows:

% recovery (%R) = ((A-B)/C) x 100 where A= analyzed result, B = background concentration from unspiked sample, and C = amount of spike added.

B-5.1 **Lead Accuracy**

The accuracy of lead analysis independent of matrix or sample variation can be evaluated by comparing results of check standards, laboratory control samples, method spike and method spike duplicate analysis to the expected value of the standard or spike. The accuracy of lead analysis in the sample matrix is evaluated using matrix spikes. Results are presented as the difference between the measured value and the standard or spike value as a percent of the standard.

Accuracy of Lead Analysis as % Recovery of Standards and Spikes

Accuracy % Recovery (%R)	Check std	LCS	Method spike	Method spike dup		MS
Control Limits	90-110	50-150	85-115	85-115		75-125
130806	102	118	106	104		93.5
	103					0
	105					
130814	98.2	129	105	104		581
	97.2					94.4
	98.4					
	97.8					
131408	101	112	108	106		92.3
	101	119	104	108		10.1
	101					98.3
	102					
131370	99.8	112	103	104		0
	99	119	108	104		0
	99.8	77.7	100	102		5790
	102					108
	95.4					61.6
	92.6					0
	97					
	95.4					
131390	99.8	112	103	104		0
	99	119	108	104		0
	99.8	106	99.5	99.5		5790
	102	112	108	106		108
	98.8	119	104	108		174
	94.6					2640
	93.2					92.3
	101					10.1
	101					98.3
	101					
	102					
#out of control	0	0	0	0		10/15

Grey highlights are duplicate QC data. Yellow highlights results outside QC Control Limits

Lead results indicate that those analysis performed independent of possible matrix interference are sufficiently accurate. No results of check samples, LCS, method spikes or method spike duplicates were outside control limits. Of the 15 matrix spikes performed for the 5 lab reports, 10 were out of control limits suggesting significant matrix interference or difficulty in reproducing matrix results.

B-5.2 **Organic Accuracy**

The accuracy of the PAH results is evaluated by reviewing the measured concentrations of samples with known concentrations as % recovery (%R) in laboratory control samples, and spikes in samples, matrix spikes and matrix spike duplicates.

% Recovery	lcs	samp	ms	msd	samp	ms	msd	lcs	samp	ms	msd	lcs	samp	ms	msd
		130787-10			130787-20				130787-26				L131369-7		
Internal Standard															
acenapthene	91.4	96.4	100	96.1	104	105	100	84.8	88.1	89.2	89.9	73.1	75	78	57.1
phenanthrene	84.5	88.8	92.4	88.1	100	103	99	71.4	84	86.2	89.8	66.2	68	70.4	51
chrysene	67.8	72.9	77.1	73	37	33	30.6	61.8	62.8	68.4	69.9	61	41	38.3	24
perylene	62.4	53	55.3	52	20	20	19.1	64	33.7	49.8	49	60.3	15.7	9.88	16.5
1,4-dichlorobenzene	85.8	91.2	94	90.4	99.9	100	97.2	89.4	84.9	86.9	87.6	66	70.7	73.7	54.5
naphthalene	87.6	92.8	97.2	91.9	106	110	106	78.9	89.3	90	91.7	67.5	71.4	73.9	55
surrogate															
2,4,6-tribromophenol	46	82	87	86	80	83	81	50	86	81	80	49	86	80	110
2-flourobiphenyl	73	71	69	54	72	76	77	72	80	74	65	67	78	69	100
2-flourophenol	69	63	60	40	74	76	76	72	80	65	74	69	68	96	78
P-terphenyl	120	120	120	120	200	230	230	120	130	120	120	97	150	160	270
nirtobenzene	67	50	44	37	66	68	68	63	67	55	69	62	75	66	94
phenol	76	72	67	47	78	82	80	74	87	67	78	76	86	72	110
target analytes															
benzo (a) anthracene	97							110				85			
benzo (a) pyrene	65							65				67			
benzo (b) flouranthene	72							62				67			
benzo (k) flouranthene	89							95				93			
chrysene	110							120				92			
dibenzo(a,h) anthracene	48							52				56			
indeno (1,2,3-cd)pyrene	49							50				54			

note: yellow - out of control limits, lcs-laboratory control sample, samp-sample, ms-matrix spike, msd-matrix spike duplicate

The % R of compounds in laboratory control samples (LCS) is independent of the matrix and therefore cannot be attributed to matrix interference. The recovery of target analytes in LCS suggests that the analytical results are of sufficient accuracy with the exception of dibenzo (a.h)

anthracene and indeno (1,2,3-cd) pyrene. Therefore results of these compounds associated with this LCS are qualified as estimated.

The reproducibility of results for internal standard and surrogate spike compounds in samples, matrix spikes, and matrix spike duplicates suggests that matrix interference may introduce some variability in the PAH results.

EBMUD Laboratory
Analytical Report

EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
PO Box 24055, MS 59, Oakland, CA 94623
Phone (510)287-1432 Fax (510)465-5462

California Environmental Laboratory Accreditation Program Certificate Number 1060

Laboratory Report - L130787

LSR # - B926-0609-1 Project Title: US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL INVESTIG

Report generated on: Oct 06, 2006 11:09 am

26 - Samples received by the lab on: Sep 28 2006, 11:39 am
0 - Lost Analyses
0 - Hold Time Exceedences
Turn-around-time not met

Client PM: MALLIKA RAMANATHAN Lab PM: KENNETH GERSTMAN

This is an electronic transmittal of a Laboratory Analytical Report

Samples included in this report:

Sample	Type	Collected	Site	Locator	ClientID
L130787-1	COMP	28-Sep-2006 08:42	USAR OAKLAND	MISC	PV18-1/2
L130787-2	COMP	28-Sep-2006 08:47	USAR OAKLAND	MISC	PV18-1/5
L130787-3	COMP	28-Sep-2006 08:52	USAR OAKLAND	MISC	PV18-2/2
L130787-4	COMP	28-Sep-2006 08:57	USAR OAKLAND	MISC	PV18-2/5
L130787-5	COMP	28-Sep-2006 09:04	USAR OAKLAND	MISC	PV18-3/2
L130787-6	COMP	28-Sep-2006 09:07	USAR OAKLAND	MISC	PV18-3/5
L130787-7	COMP	28-Sep-2006 09:13	USAR OAKLAND	MISC	PV18-4/2
L130787-8	COMP	28-Sep-2006 09:16	USAR OAKLAND	MISC	PV18-4/5
L130787-9	COMP	28-Sep-2006 09:22	USAR OAKLAND	MISC	PV18-5/2
L130787-10	COMP	28-Sep-2006 09:26	USAR OAKLAND	MISC	PV18-5/5
L130787-11	QCFR	28-Sep-2006 09:26	USAR OAKLAND	MISC	PV18-5/5/3
L130787-12	COMP	28-Sep-2006 09:34	USAR OAKLAND	MISC	PV18-6/2
L130787-13	COMP	28-Sep-2006 09:38	USAR OAKLAND	MISC	PV18-6/5
L130787-14	COMP	28-Sep-2006 09:45	USAR OAKLAND	MISC	PV18-7/2
L130787-15	COMP	28-Sep-2006 09:50	USAR OAKLAND	MISC	PV18-7/5
L130787-16	COMP	28-Sep-2006 09:57	USAR OAKLAND	MISC	PV18-8/2
L130787-17	COMP	28-Sep-2006 10:00	USAR OAKLAND	MISC	PV18-8/5
L130787-18	COMP	28-Sep-2006 10:08	USAR OAKLAND	MISC	PV18-9/2
L130787-19	COMP	28-Sep-2006 10:12	USAR OAKLAND	MISC	PV18-9/5
L130787-20	QCFR	28-Sep-2006 10:12	USAR OAKLAND	MISC	PV18-9/5/3
L130787-21	COMP	28-Sep-2006 10:20	USAR OAKLAND	MISC	PV18-10/2
L130787-22	COMP	28-Sep-2006 10:23	USAR OAKLAND	MISC	PV18-10/5
L130787-23	COMP	28-Sep-2006 10:33	USAR OAKLAND	MISC	PV18-11/2
L130787-24	COMP	28-Sep-2006 10:37	USAR OAKLAND	MISC	PV18-11/5
L130787-25	COMP	28-Sep-2006 10:45	USAR OAKLAND	MISC	PV18-12/2
L130787-26	COMP	28-Sep-2006 10:48	USAR OAKLAND	MISC	PV18-12/5

Legend to the laboratory qualifiers used in this report:
D - Surrogate spike outside of control limits

THIS REPORT MAY ONLY BE REPRODUCED IN ITS ENTIRETY. RESULTS CONTAINED IN THIS REPORT ARE REFLECTIVE ONLY OF THE ITEMS REQUESTED TO BE ANALYZED AND REPORTED. UNUSED PORTIONS OF SAMPLE WILL BE DISCARDED WITHIN THIRTY DAYS OF RECEIPT UNLESS OTHER ARRANGEMENTS ARE MADE BY THE CLIENT.

EBMUD Laboratory
Analytical Report

EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
PO Box 24055, MS 59, Oakland, CA 94623
Phone (510)287-1432 Fax (510)465-5462

California Environmental Laboratory Accreditation Program Certificate Number 1060

N - Spike recovery outside of control limits
U - Analyte not detected
Qualifiers for subcontract work - See textvalue for description

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Phone (510)287-1432 Fax (510)465-5462

Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-1/2
Lab ID: L130787-1 (P130377-1) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 08:42am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-1 comp of depths 2'-4 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE	U	0.058	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.13**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.13**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.12**	mg/kg	1	0.051		
CHRYSENE		**0.14**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.083**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		107	% recovery	1	1		
D10-ACENAPHTHENE		103	% recovery	1	1		
D10-PHENANTHRENE		97.4	% recovery	1	1		
D12-CHRYSENE		72.4	% recovery	1	1		
D12-PERYLENE	N	39.8	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE		63	% recovery	1			
2-FLUOROBIPHENYL		72	% recovery	1			
2,4,6-TRIBROMOPHENOL		84	% recovery	1			
D14-P-TERPHENYL		130	% recovery	1			

Run ID: R141755 / Work Group No.: WG132582
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 04-Oct-06 18:32

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-1/5
Lab ID: L130787-2 (P130377-2) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 08:47am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-1 comp of depths 5'-8 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.15**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.14**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.18**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.23**	mg/kg	1	0.051		
CHRYSENE		**0.25**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.17**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		86.9	% recovery	1	1		
D10-ACENAPHTHENE		91.0	% recovery	1	1		
D10-PHENANTHRENE		80.4	% recovery	1	1		
D12-CHRYSENE		73.2	% recovery	1	1		
D12-PERYLENE		76.0	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE	D	56	% recovery	1			
2-FLUOROBIPHENYL		68	% recovery	1			
2,4,6-TRIBROMOPHENOL		86	% recovery	1			
D14-P-TERPHENYL		110	% recovery	1			

Run ID: R141755 / Work Group No.: WG132582
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 03-Oct-06 23:10

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-2/2
Lab ID: L130787-3 (P130377-3) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 08:52am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-2 comp of depths 2'-4 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.12**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.14**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.15**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.14**	mg/kg	1	0.051		
CHRYSENE		**0.18**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.10**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		95.7	% recovery	1	1		
D10-ACENAPHTHENE		98.4	% recovery	1	1		
D10-PHENANTHRENE		92.0	% recovery	1	1		
D12-CHRYSENE		80.4	% recovery	1	1		
D12-PERYLENE		75.0	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE		65	% recovery	1			
2-FLUOROBIPHENYL		74	% recovery	1			
2,4,6-TRIBROMOPHENOL		87	% recovery	1			
D14-P-TERPHENYL		110	% recovery	1			

Run ID: R141755 / Work Group No.: WG132582
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 04-Oct-06 00:41

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-2/5
Lab ID: L130787-4 (P130377-4) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 08:57am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-2 comp of depths 5'-8 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.089**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.13**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.13**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.13**	mg/kg	1	0.051		
CHRYSENE		**0.15**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.079**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		99.7	% recovery	1	1		
D10-ACENAPHTHENE		102	% recovery	1	1		
D10-PHENANTHRENE		94.0	% recovery	1	1		
D12-CHRYSENE		82.5	% recovery	1	1		
D12-PERYLENE		69.2	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE		64	% recovery	1			
2-FLUOROBIPHENYL		71	% recovery	1			
2,4,6-TRIBROMOPHENOL		87	% recovery	1			
D14-P-TERPHENYL		120	% recovery	1			

Run ID: R141755 / Work Group No.: WG132582
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 04-Oct-06 01:27

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-3/2
Lab ID: L130787-5 (P130377-5) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 09:04am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-3 comp of depths 2'-4 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.11**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.12**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.13**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.12**	mg/kg	1	0.051		
CHRYSENE		**0.15**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.11**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		93.4	% recovery	1	1		
D10-ACENAPHTHENE		95.2	% recovery	1	1		
D10-PHENANTHRENE		89.6	% recovery	1	1		
D12-CHRYSENE		79.2	% recovery	1	1		
D12-PERYLENE		79.8	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE	D	55	% recovery	1			
2-FLUOROBIPHENYL		66	% recovery	1			
2,4,6-TRIBROMOPHENOL		77	% recovery	1			
D14-P-TERPHENYL		110	% recovery	1			

Run ID: R141755 / Work Group No.: WG132582
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 03-Oct-06 23:55

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-3/5
Lab ID: L130787-6 (P130377-6) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 09:07am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-3 comp of depths 5'-8 ' bgs

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**2.2**	mg/kg	10	0.58		
BENZO(B)FLUORANTHENE		**2.4**	mg/kg	10	0.42		
BENZO(K)FLUORANTHENE		**2.3**	mg/kg	10	0.63		
BENZO(A)PYRENE		**2.8**	mg/kg	10	0.51		
CHRYSENE		**3.2**	mg/kg	10	0.53		
DIBENZO(A,H)ANTHRACENE	U	0.44	mg/kg	10	0.44		
INDENO(1,2,3-CD)PYRENE		**1.7**	mg/kg	10	0.42		
INTERNAL STANDARD							
D8-NAPHTHALENE		92.6	% recovery	10	1		
D10-ACENAPHTHENE		87.4	% recovery	10	1		
D10-PHENANTHRENE		82.4	% recovery	10	1		
D12-CHRYSENE		52.7	% recovery	10	1		
D12-PERYLENE	N	26.1	% recovery	10	1		
SURROGATE							
D5-NITROBENZENE		72	% recovery	10			
2-FLUOROBIPHENYL	D	100	% recovery	10			
2,4,6-TRIBROMOPHENOL		92	% recovery	10			
D14-P-TERPHENYL	D	180	% recovery	10			

Run ID: R141755 / Work Group No.: WG132582
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 04-Oct-06 20:04

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
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Phone (510)287-1432 Fax (510)465-5462

Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-4/2
Lab ID: L130787-7 (P130377-7) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 09:13am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-4 comp of depths 2'-4 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.11**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.16**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.15**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.13**	mg/kg	1	0.051		
CHRYSENE		**0.19**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.061**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		88.4	% recovery	1	1		
D10-ACENAPHTHENE		91.4	% recovery	1	1		
D10-PHENANTHRENE		85.4	% recovery	1	1		
D12-CHRYSENE		73.2	% recovery	1	1		
D12-PERYLENE		53.4	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE	D	52	% recovery	1			
2-FLUOROBIPHENYL		73	% recovery	1			
2,4,6-TRIBROMOPHENOL		89	% recovery	1			
D14-P-TERPHENYL		110	% recovery	1			

Run ID: R141755 / Work Group No.: WG132582
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 04-Oct-06 02:12

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-4/5
Lab ID: L130787-8 (P130377-8) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 09:16am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-4 comp of depths 5'-8 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE	U	0.058	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.13**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.15**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.11**	mg/kg	1	0.051		
CHRYSENE		**0.20**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.087**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		88.2	% recovery	1	1		
D10-ACENAPHTHENE		96.0	% recovery	1	1		
D10-PHENANTHRENE		83.6	% recovery	1	1		
D12-CHRYSENE		71.3	% recovery	1	1		
D12-PERYLENE	N	46.8	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE		67	% recovery	1			
2-FLUOROBIPHENYL		79	% recovery	1			
2,4,6-TRIBROMOPHENOL		95	% recovery	1			
D14-P-TERPHENYL		120	% recovery	1			

Run ID: R141755 / Work Group No.: WG132582
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 04-Oct-06 14:25

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

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Laboratory Services Division
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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-5/2
Lab ID: L130787-9 (P130377-9) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 09:22am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-5 comp of depths 2'-4 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.21**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.29**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.26**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.29**	mg/kg	1	0.051		
CHRYSENE		**0.39**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.19**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		94.5	% recovery	1	1		
D10-ACENAPHTHENE		97.0	% recovery	1	1		
D10-PHENANTHRENE		90.0	% recovery	1	1		
D12-CHRYSENE		69.5	% recovery	1	1		
D12-PERYLENE	N	37.6	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE		67	% recovery	1			
2-FLUOROBIPHENYL		80	% recovery	1			
2,4,6-TRIBROMOPHENOL		94	% recovery	1			
D14-P-TERPHENYL		130	% recovery	1			

Run ID: R141755 / Work Group No.: WG132582
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 04-Oct-06 15:11

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-5/5
Lab ID: L130787-10 (P130377-10) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 09:26am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-5 comp of depths 5'-8 ' bgs

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.30**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.62**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.57**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.76**	mg/kg	1	0.051		
CHRYSENE		**0.46**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.55**	mg/kg	1	0.042		
INTERNAL STANDARD							
D4-1,4-DICHLOROBENZENE		91.2	% recovery	1	1		
D8-NAPHTHALENE		92.8	% recovery	1	1		
D10-ACENAPHTHENE		96.4	% recovery	1	1		
D10-PHENANTHRENE		88.8	% recovery	1	1		
D12-CHRYSENE		72.9	% recovery	1	1		
D12-PERYLENE		53.0	% recovery	1	1		
SURROGATE							
2-FLUOROPHENOL		63	% recovery	1			
D5-PHENOL		72	% recovery	1			
D5-NITROBENZENE	D	50	% recovery	1			
2-FLUOROBIPHENYL		71	% recovery	1			
2,4,6-TRIBROMOPHENOL		82	% recovery	1			
D14-P-TERPHENYL		120	% recovery	1			

Run ID: R141755 / Work Group No.: WG132582
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 04-Oct-06 04:29

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Laboratory Services Division
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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-5/5/3
Lab ID: L130787-11 (P130377-11) Rush - 5 working day TAT
Sample Type: QCFR (Field Replicate Grab)
Date Collected: Sep 28 2006, 09:26am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-5 QC Field Rep, comp of depths 5'-8 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.15**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.25**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.24**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.29**	mg/kg	1	0.051		
CHRYSENE		**0.21**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.21**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		95.2	% recovery	1	1		
D10-ACENAPHTHENE		95.8	% recovery	1	1		
D10-PHENANTHRENE		90.6	% recovery	1	1		
D12-CHRYSENE		72.3	% recovery	1	1		
D12-PERYLENE		51.5	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE	D	48	% recovery	1			
2-FLUOROBIPHENYL	D	57	% recovery	1			
2,4,6-TRIBROMOPHENOL		83	% recovery	1			
D14-P-TERPHENYL		130	% recovery	1			

Run ID: R141755 / Work Group No.: WG132582
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 04-Oct-06 03:43

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-6/2
Lab ID: L130787-12 (P130377-12) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 09:34am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-6 comp of depths 2'-4 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.26**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.45**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.49**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.55**	mg/kg	1	0.051		
CHRYSENE		**0.38**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE		**0.089**	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.34**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		96.1	% recovery	1	1		
D10-ACENAPHTHENE		98.1	% recovery	1	1		
D10-PHENANTHRENE		86.9	% recovery	1	1		
D12-CHRYSENE		65.2	% recovery	1	1		
D12-PERYLENE	N	37.2	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE	D	51	% recovery	1			
2-FLUOROBIPHENYL	D	57	% recovery	1			
2,4,6-TRIBROMOPHENOL		85	% recovery	1			
D14-P-TERPHENYL		130	% recovery	1			

Run ID: R141755 / Work Group No.: WG132582
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 04-Oct-06 16:14

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-6/5
Lab ID: L130787-13 (P130377-13) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 09:38am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-6 comp of depths 5'-8 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.26**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.47**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.42**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.56**	mg/kg	1	0.051		
CHRYSENE		**0.38**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.38**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		91.2	% recovery	1	1		
D10-ACENAPHTHENE		92.3	% recovery	1	1		
D10-PHENANTHRENE		86.4	% recovery	1	1		
D12-CHRYSENE		71.5	% recovery	1	1		
D12-PERYLENE		53.0	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE	D	57	% recovery	1			
2-FLUOROBIPHENYL		64	% recovery	1			
2,4,6-TRIBROMOPHENOL		82	% recovery	1			
D14-P-TERPHENYL		120	% recovery	1			

Run ID: R141755 / Work Group No.: WG132582
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 04-Oct-06 02:58

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-7/2
Lab ID: L130787-14 (P130377-14) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 09:45am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-7 comp of depths 2'-4 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.065**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.090**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.090**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.089**	mg/kg	1	0.051		
CHRYSENE		**0.089**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.065**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		101	% recovery	1	1		
D10-ACENAPHTHENE		100	% recovery	1	1		
D10-PHENANTHRENE		93.4	% recovery	1	1		
D12-CHRYSENE		70.4	% recovery	1	1		
D12-PERYLENE	N	39.0	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE	D	60	% recovery	1			
2-FLUOROBIPHENYL		66	% recovery	1			
2,4,6-TRIBROMOPHENOL		84	% recovery	1			
D14-P-TERPHENYL		130	% recovery	1			

Run ID: R141755 / Work Group No.: WG132582
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 04-Oct-06 17:00

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-7/5
Lab ID: L130787-15 (P130377-15) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 09:50am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-7 comp of depths 5'-8 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.10**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.12**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.13**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.14**	mg/kg	1	0.051		
CHRYSENE		**0.15**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.11**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		108	% recovery	1	1		
D10-ACENAPHTHENE		106	% recovery	1	1		
D10-PHENANTHRENE		103	% recovery	1	1		
D12-CHRYSENE		63.4	% recovery	1	1		
D12-PERYLENE	N	29.8	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE	D	62	% recovery	1			
2-FLUOROBIPHENYL		72	% recovery	1			
2,4,6-TRIBROMOPHENOL		81	% recovery	1			
D14-P-TERPHENYL		140	% recovery	1			

Run ID: R141755 / Work Group No.: WG132582
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 04-Oct-06 19:18

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
PO Box 24055, MS 59, Oakland, CA 94623
Phone (510)287-1432 Fax (510)465-5462

Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-8/2
Lab ID: L130787-16 (P130377-16) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 09:57am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-8 comp of depths 2'-4 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.19**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.23**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.23**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.23**	mg/kg	1	0.051		
CHRYSENE		**0.25**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.18**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		107	% recovery	1	1		
D10-ACENAPHTHENE		107	% recovery	1	1		
D10-PHENANTHRENE		102	% recovery	1	1		
D12-CHRYSENE		57.0	% recovery	1	1		
D12-PERYLENE	N	28.5	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE	D	55	% recovery	1			
2-FLUOROBIPHENYL		68	% recovery	1			
2,4,6-TRIBROMOPHENOL		79	% recovery	1			
D14-P-TERPHENYL	D	160	% recovery	1			

Run ID: R141755 / Work Group No.: WG132582
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 06-Oct-06 00:00

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-8/5
Lab ID: L130787-17 (P130377-17) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 10:00am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-8 comp of depths 5'-8 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE	U	0.058	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE	U	0.042	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE	U	0.063	mg/kg	1	0.063		
BENZO(A)PYRENE	U	0.051	mg/kg	1	0.051		
CHRYSENE	U	0.053	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE	U	0.042	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		100	% recovery	1	1		
D10-ACENAPHTHENE		99.9	% recovery	1	1		
D10-PHENANTHRENE		94.3	% recovery	1	1		
D12-CHRYSENE		68.8	% recovery	1	1		
D12-PERYLENE	N	37.3	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE		68	% recovery	1			
2-FLUOROBIPHENYL		73	% recovery	1			
2,4,6-TRIBROMOPHENOL		75	% recovery	1			
D14-P-TERPHENYL		130	% recovery	1			

Run ID: R141755 / Work Group No.: WG132582
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 04-Oct-06 17:47

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-9/2
Lab ID: L130787-18 (P130377-18) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 10:08am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-9 comp of depths 2'-4 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**9.0**	mg/kg	10	0.58		
BENZO(B)FLUORANTHENE		**15**	mg/kg	10	0.42		
BENZO(K)FLUORANTHENE		**12**	mg/kg	10	0.63		
BENZO(A)PYRENE		**9.5**	mg/kg	10	0.51		
CHRYSENE		**12**	mg/kg	10	0.53		
DIBENZO(A,H)ANTHRACENE		**1.4**	mg/kg	10	0.44		
INDENO(1,2,3-CD)PYRENE		**6.7**	mg/kg	10	0.42		
INTERNAL STANDARD							
D8-NAPHTHALENE		93.8	% recovery	10	1		
D10-ACENAPHTHENE		88.8	% recovery	10	1		
D10-PHENANTHRENE		82.6	% recovery	10	1		
D12-CHRYSENE		52.6	% recovery	10	1		
D12-PERYLENE	N	25.0	% recovery	10	1		
SURROGATE							
D5-NITROBENZENE		68	% recovery	10			
2-FLUOROBIPHENYL		91	% recovery	10			
2,4,6-TRIBROMOPHENOL		70	% recovery	10			
D14-P-TERPHENYL	D	170	% recovery	10			

Run ID: R141755 / Work Group No.: WG132582
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 04-Oct-06 20:50

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EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
PO Box 24055, MS 59, Oakland, CA 94623
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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-9/5
Lab ID: L130787-19 (P130377-19) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 10:12am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-9 comp of depths 5'-8 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.23**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.32**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.24**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.34**	mg/kg	1	0.051		
CHRYSENE		**0.44**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE		**0.072**	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.34**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		99.4	% recovery	1	1		
D10-ACENAPHTHENE		99.2	% recovery	1	1		
D10-PHENANTHRENE		95.6	% recovery	1	1		
D12-CHRYSENE	N	41.1	% recovery	1	1		
D12-PERYLENE	N	21.4	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE	D	62	% recovery	1			
2-FLUOROBIPHENYL		74	% recovery	1			
2,4,6-TRIBROMOPHENOL		82	% recovery	1			
D14-P-TERPHENYL	D	190	% recovery	1			

Run ID: R141755 / Work Group No.: WG132582
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 06-Oct-06 00:45

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-9/5/3
Lab ID: L130787-20 (P130377-20) Rush - 5 working day TAT
Sample Type: QCFR (Field Replicate Grab)
Date Collected: Sep 28 2006, 10:12am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-9 QC Field Rep, comp of depths 5'-8 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.27**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.33**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.33**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.34**	mg/kg	1	0.051		
CHRYSENE		**0.46**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE		**0.085**	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.43**	mg/kg	1	0.042		
INTERNAL STANDARD							
D4-1,4-DICHLOROBENZENE		99.9	% recovery	1	1		
D8-NAPHTHALENE		106	% recovery	1	1		
D10-ACENAPHTHENE		104	% recovery	1	1		
D10-PHENANTHRENE		100	% recovery	1	1		
D12-CHRYSENE	N	37.0	% recovery	1	1		
D12-PERYLENE	N	20.0	% recovery	1	1		
SURROGATE							
2-FLUOROPHENOL		74	% recovery	1			
D5-PHENOL		78	% recovery	1			
D5-NITROBENZENE		66	% recovery	1			
2-FLUOROBIPHENYL		72	% recovery	1			
2,4,6-TRIBROMOPHENOL		80	% recovery	1			
D14-P-TERPHENYL	D	200	% recovery	1			

Run ID: R141755 / Work Group No.: WG132582
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 06-Oct-06 01:30

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EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
PO Box 24055, MS 59, Oakland, CA 94623
Phone (510)287-1432 Fax (510)465-5462

Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-10/2
Lab ID: L130787-21 (P130377-21) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 10:20am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-10 comp of depths 2'-4 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.15**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.14**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.13**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.14**	mg/kg	1	0.051		
CHRYSENE		**0.20**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.095**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		91.9	% recovery	1	1		
D10-ACENAPHTHENE		88.6	% recovery	1	1		
D10-PHENANTHRENE		85.0	% recovery	1	1		
D12-CHRYSENE		75.3	% recovery	1	1		
D12-PERYLENE		77.2	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE		74	% recovery	1			
2-FLUOROBIPHENYL		80	% recovery	1			
2,4,6-TRIBROMOPHENOL		82	% recovery	1			
D14-P-TERPHENYL		110	% recovery	1			

Run ID: R141797 / Work Group No.: WG132668
Prep Date1: 29-SEP-06 Prep Date2: 05-OCT-06 Analyzed 05-Oct-06 18:41

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EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-10/5
Lab ID: L130787-22 (P130377-22) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 10:23am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-10 comp of depths 5'-8 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.21**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.25**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.20**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.21**	mg/kg	1	0.051		
CHRYSENE		**0.35**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.16**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		92.8	% recovery	1	1		
D10-ACENAPHTHENE		89.0	% recovery	1	1		
D10-PHENANTHRENE		86.6	% recovery	1	1		
D12-CHRYSENE		56.2	% recovery	1	1		
D12-PERYLENE	N	30.8	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE		78	% recovery	1			
2-FLUOROBIPHENYL		84	% recovery	1			
2,4,6-TRIBROMOPHENOL		92	% recovery	1			
D14-P-TERPHENYL	D	150	% recovery	1			

Run ID: R141797 / Work Group No.: WG132668
Prep Date1: 29-SEP-06 Prep Date2: 05-OCT-06 Analyzed 05-Oct-06 19:26

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-11/2
Lab ID: L130787-23 (P130377-23) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 10:33am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-11 comp of depths 2'-4 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE	U	0.058	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE	U	0.042	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE	U	0.063	mg/kg	1	0.063		
BENZO(A)PYRENE	U	0.051	mg/kg	1	0.051		
CHRYSENE	U	0.053	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE	U	0.042	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		89.0	% recovery	1	1		
D10-ACENAPHTHENE		87.4	% recovery	1	1		
D10-PHENANTHRENE		81.5	% recovery	1	1		
D12-CHRYSENE		70.3	% recovery	1	1		
D12-PERYLENE		74.6	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE		70	% recovery	1			
2-FLUOROBIPHENYL		76	% recovery	1			
2,4,6-TRIBROMOPHENOL		77	% recovery	1			
D14-P-TERPHENYL		110	% recovery	1			

Run ID: R141797 / Work Group No.: WG132668
Prep Date1: 29-SEP-06 Prep Date2: 05-OCT-06 Analyzed 05-Oct-06 14:51

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

EAST BAY MUNICIPAL UTILITY DISTRICT
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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-11/5
Lab ID: L130787-24 (P130377-24) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 10:37am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-11 comp of depths 5'-8 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.15**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.44**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.30**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.34**	mg/kg	1	0.051		
CHRYSENE		**0.21**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.30**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		93.6	% recovery	1	1		
D10-ACENAPHTHENE		88.6	% recovery	1	1		
D10-PHENANTHRENE		88.4	% recovery	1	1		
D12-CHRYSENE		65.3	% recovery	1	1		
D12-PERYLENE	N	39.5	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE		64	% recovery	1			
2-FLUOROBIPHENYL		79	% recovery	1			
2,4,6-TRIBROMOPHENOL		85	% recovery	1			
D14-P-TERPHENYL		130	% recovery	1			

Run ID: R141797 / Work Group No.: WG132668
Prep Date1: 29-SEP-06 Prep Date2: 05-OCT-06 Analyzed 05-Oct-06 20:12

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-12/2
Lab ID: L130787-25 (P130377-25) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 10:45am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-12 comp of depths 2'-4 ' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**3.9**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**6.9**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**6.0**	mg/kg	1	0.063		
BENZO(A)PYRENE		**7.3**	mg/kg	1	0.051		
CHRYSENE		**6.4**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE		**1.5**	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**5.5**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		92.8	% recovery	1	1		
D10-ACENAPHTHENE		87.4	% recovery	1	1		
D10-PHENANTHRENE		86.2	% recovery	1	1		
D12-CHRYSENE		82.0	% recovery	1	1		
D12-PERYLENE		86.3	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE		70	% recovery	1			
2-FLUOROBIPHENYL		76	% recovery	1			
2,4,6-TRIBROMOPHENOL		73	% recovery	1			
D14-P-TERPHENYL		100	% recovery	1			

Run ID: R141797 / Work Group No.: WG132668
Prep Date1: 29-SEP-06 Prep Date2: 05-OCT-06 Analyzed 05-Oct-06 15:37

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
PO Box 24055, MS 59, Oakland, CA 94623
Phone (510)287-1432 Fax (510)465-5462

Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: PV18-12/5
Lab ID: L130787-26 (P130377-26) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 10:48am Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 11:39am Sample receiver: LLAZZELL
Sample Comments: PV18-12 comp of depths 5'-8 ' bgs

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.14**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.29**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.25**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.28**	mg/kg	1	0.051		
CHRYSENE		**0.18**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.19**	mg/kg	1	0.042		
INTERNAL STANDARD							
D4-1,4-DICHLOROBENZENE		84.9	% recovery	1	1		
D8-NAPHTHALENE		89.3	% recovery	1	1		
D10-ACENAPHTHENE		88.1	% recovery	1	1		
D10-PHENANTHRENE		84.0	% recovery	1	1		
D12-CHRYSENE		62.8	% recovery	1	1		
D12-PERYLENE	N	33.7	% recovery	1	1		
SURROGATE							
2-FLUOROPHENOL		81	% recovery	1			
D5-PHENOL		87	% recovery	1			
D5-NITROBENZENE		67	% recovery	1			
2-FLUOROBIPHENYL		80	% recovery	1			
2,4,6-TRIBROMOPHENOL		86	% recovery	1			
D14-P-TERPHENYL		130	% recovery	1			

Run ID: R141797 / Work Group No.: WG132668
Prep Date1: 29-SEP-06 Prep Date2: 05-OCT-06 Analyzed 05-Oct-06 20:57

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EBMUD Laboratory
Analytical Report

EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
PO Box 24055, MS 59, Oakland, CA 94623
Phone (510)287-1432 Fax (510)465-5462

California Environmental Laboratory Accreditation Program Certificate Number 1060

Laboratory Report - L131369

LSR # - B926-0609-1 Project Title: US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL INVESTIG

Report generated on: Nov 06, 2006 09:05 am

9 - Samples received by the lab on: Oct 25 2006, 12:19 pm
0 - Lost Analyses
0 - Hold Time Exceedences
Turn-around-time not met

Client PM: MALLIKA RAMANATHAN Lab PM: KENNETH GERSTMAN

This is an electronic transmittal of a Laboratory Analytical Report

Samples included in this report:

Sample	Type	Collected	Site	Locator	ClientID
L131369-1	GRAB	25-Oct-2006 08:20	MISC	MISC	PV18-13/3
L131369-2	GRAB	25-Oct-2006 08:25	MISC	MISC	PV18-13/7
L131369-3	GRAB	25-Oct-2006 08:29	MISC	MISC	PV18-14/3
L131369-4	GRAB	25-Oct-2006 08:34	MISC	MISC	PV18-14/7
L131369-5	GRAB	25-Oct-2006 08:40	MISC	MISC	PV18-15/3
L131369-6	GRAB	25-Oct-2006 08:44	MISC	MISC	PV18-15/7
L131369-7	GRAB	25-Oct-2006 08:59	MISC	MISC	PV18-16/3
L131369-8	GRAB	25-Oct-2006 09:05	MISC	MISC	PV18-16/7
L131369-9	QCFR	25-Oct-2006 09:05	MISC	MISC	PV18-16/7/3

Legend to the laboratory qualifiers used in this report:
D - Surrogate spike outside of control limits
N - Spike recovery outside of control limits
U - Analyte not detected
Qualifiers for subcontract work - See textvalue for description

THIS REPORT MAY ONLY BE REPRODUCED IN ITS ENTIRETY. RESULTS CONTAINED IN THIS REPORT ARE REFLECTIVE ONLY OF THE ITEMS REQUESTED TO BE ANALYZED AND REPORTED. UNUSED PORTIONS OF SAMPLE WILL BE DISCARDED WITHIN THIRTY DAYS OF RECEIPT UNLESS OTHER ARRANGEMENTS ARE MADE BY THE CLIENT.

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: PV18-13/3
Lab ID: L131369-1 (P130968-1) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 08:20am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:19pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.061**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.090**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.079**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.075**	mg/kg	1	0.051		
CHRYSENE		**0.11**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE	U	0.042	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		71.6	% recovery	1	1		
D10-ACENAPHTHENE		76.5	% recovery	1	1		
D10-PHENANTHRENE		72.1	% recovery	1	1		
D12-CHRYSENE		62.4	% recovery	1	1		
D12-PERYLENE		57.3	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE	D	62	% recovery	1			
2-FLUOROBIPHENYL		71	% recovery	1			
2,4,6-TRIBROMOPHENOL		76	% recovery	1			
D14-P-TERPHENYL		110	% recovery	1			

Run ID: R142231 / Work Group No.: WG133135
Prep Date1: 01-NOV-06 Prep Date2: 30-OCT-06 Analyzed 02-Nov-06 16:26

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: PV18-13/7
Lab ID: L131369-2 (P130968-2) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 08:25am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:19pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.29**	mg/kg	2	0.12		
BENZO(B)FLUORANTHENE		**0.58**	mg/kg	2	0.084		
BENZO(K)FLUORANTHENE		**0.79**	mg/kg	2	0.13		
BENZO(A)PYRENE		**0.49**	mg/kg	2	0.1		
CHRYSENE		**0.37**	mg/kg	2	0.11		
DIBENZO(A,H)ANTHRACENE	U	0.088	mg/kg	2	0.088		
INDENO(1,2,3-CD)PYRENE		**0.27**	mg/kg	2	0.084		
INTERNAL STANDARD							
D8-NAPHTHALENE		66.2	% recovery	2	1		
D10-ACENAPHTHENE		69.4	% recovery	2	1		
D10-PHENANTHRENE		64.0	% recovery	2	1		
D12-CHRYSENE	N	49.5	% recovery	2	1		
D12-PERYLENE	N	24.8	% recovery	2	1		
SURROGATE							
D5-NITROBENZENE	D	62	% recovery	2			
2-FLUOROBIPHENYL		64	% recovery	2			
2,4,6-TRIBROMOPHENOL		72	% recovery	2			
D14-P-TERPHENYL		120	% recovery	2			

Run ID: R142231 / Work Group No.: WG133135
Prep Date1: 01-NOV-06 Prep Date2: 30-OCT-06 Analyzed 02-Nov-06 18:45

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: PV18-14/3
Lab ID: L131369-3 (P130968-3) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 08:29am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:19pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**5.3**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**11**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**11**	mg/kg	1	0.063		
BENZO(A)PYRENE		**11**	mg/kg	1	0.051		
CHRYSENE		**8.1**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE		**1.6**	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**6.2**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		71.0	% recovery	1	1		
D10-ACENAPHTHENE		73.9	% recovery	1	1		
D10-PHENANTHRENE		67.4	% recovery	1	1		
D12-CHRYSENE	N	34.8	% recovery	1	1		
D12-PERYLENE	N	14.6	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE	D	61	% recovery	1			
2-FLUOROBIPHENYL		70	% recovery	1			
2,4,6-TRIBROMOPHENOL		81	% recovery	1			
D14-P-TERPHENYL	D	170	% recovery	1			

Run ID: R142231 / Work Group No.: WG133135
Prep Date1: 01-NOV-06 Prep Date2: 30-OCT-06 Analyzed 02-Nov-06 21:03

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: PV18-14/7
Lab ID: L131369-4 (P130968-4) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 08:34am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:19pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.065**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.12**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.15**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.13**	mg/kg	1	0.051		
CHRYSENE		**0.085**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.10**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		66.9	% recovery	1	1		
D10-ACENAPHTHENE		73.0	% recovery	1	1		
D10-PHENANTHRENE		65.4	% recovery	1	1		
D12-CHRYSENE		57.2	% recovery	1	1		
D12-PERYLENE	N	47.9	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE	D	57	% recovery	1			
2-FLUOROBIPHENYL		69	% recovery	1			
2,4,6-TRIBROMOPHENOL		78	% recovery	1			
D14-P-TERPHENYL		110	% recovery	1			

Run ID: R142231 / Work Group No.: WG133135
Prep Date1: 01-NOV-06 Prep Date2: 30-OCT-06 Analyzed 02-Nov-06 17:13

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: PV18-15/3
Lab ID: L131369-5 (P130968-5) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 08:40am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:19pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE	U	0.058	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.087**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.076**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.065**	mg/kg	1	0.051		
CHRYSENE		**0.084**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE	U	0.042	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		82.6	% recovery	1	1		
D10-ACENAPHTHENE		87.4	% recovery	1	1		
D10-PHENANTHRENE		81.4	% recovery	1	1		
D12-CHRYSENE		68.6	% recovery	1	1		
D12-PERYLENE	N	49.9	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE	D	57	% recovery	1			
2-FLUOROBIPHENYL		64	% recovery	1			
2,4,6-TRIBROMOPHENOL		67	% recovery	1			
D14-P-TERPHENYL		100	% recovery	1			

Run ID: R142231 / Work Group No.: WG133135
Prep Date1: 01-NOV-06 Prep Date2: 30-OCT-06 Analyzed 02-Nov-06 17:59

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: PV18-15/7
Lab ID: L131369-6 (P130968-6) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 08:44am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:19pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE	U	0.058	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.093**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.089**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.097**	mg/kg	1	0.051		
CHRYSENE		**0.095**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.066**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		77.8	% recovery	1	1		
D10-ACENAPHTHENE		82.2	% recovery	1	1		
D10-PHENANTHRENE		75.0	% recovery	1	1		
D12-CHRYSENE	N	48.4	% recovery	1	1		
D12-PERYLENE	N	21.8	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE		77	% recovery	1			
2-FLUOROBIPHENYL		80	% recovery	1			
2,4,6-TRIBROMOPHENOL		88	% recovery	1			
D14-P-TERPHENYL		140	% recovery	1			

Run ID: R142231 / Work Group No.: WG133135
Prep Date1: 01-NOV-06 Prep Date2: 30-OCT-06 Analyzed 02-Nov-06 19:31

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: PV18-16/3
Lab ID: L131369-7 (P130968-7) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 08:59am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:19pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.17**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.18**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.25**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.18**	mg/kg	1	0.051		
CHRYSENE		**0.22**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.088**	mg/kg	1	0.042		
INTERNAL STANDARD							
D4-1,4-DICHLOROBENZENE		70.7	% recovery	1	1		
D8-NAPHTHALENE		71.4	% recovery	1	1		
D10-ACENAPHTHENE		75.0	% recovery	1	1		
D10-PHENANTHRENE		68.0	% recovery	1	1		
D12-CHRYSENE	N	41.0	% recovery	1	1		
D12-PERYLENE	N	16.5	% recovery	1	1		
SURROGATE							
2-FLUOROPHENOL		78	% recovery	1			
D5-PHENOL		86	% recovery	1			
D5-NITROBENZENE		75	% recovery	1			
2-FLUOROBIPHENYL		78	% recovery	1			
2,4,6-TRIBROMOPHENOL		86	% recovery	1			
D14-P-TERPHENYL	D	150	% recovery	1			

Run ID: R142231 / Work Group No.: WG133135
Prep Date1: 01-NOV-06 Prep Date2: 30-OCT-06 Analyzed 02-Nov-06 20:17

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: PV18-16/7
Lab ID: L131369-8 (P130968-8) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 09:05am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:19pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE		**0.071**	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.10**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.10**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.12**	mg/kg	1	0.051		
CHRYSENE		**0.076**	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.11**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		61.8	% recovery	1	1		
D10-ACENAPHTHENE		68.4	% recovery	1	1		
D10-PHENANTHRENE		63.5	% recovery	1	1		
D12-CHRYSENE		57.6	% recovery	1	1		
D12-PERYLENE		59.0	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE	D	38	% recovery	1			
2-FLUOROBIPHENYL	D	48	% recovery	1			
2,4,6-TRIBROMOPHENOL		80	% recovery	1			
D14-P-TERPHENYL		100	% recovery	1			

Run ID: R142231 / Work Group No.: WG133135
Prep Date1: 01-NOV-06 Prep Date2: 30-OCT-06 Analyzed 02-Nov-06 14:54

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: PV18-16/7/3
Lab ID: L131369-9 (P130968-9) Rush - 5 working day TAT
Sample Type: QCFR (Field Replicate Grab)
Date Collected: Oct 25 2006, 09:05am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:19pm Sample receiver: KGERSTMA
Sample Comments: field duplicate

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 8270C - Semivolatile Organics: GC/MS						Soil	
TARGET ANALYTES							
BENZO(A)ANTHRACENE	U	0.058	mg/kg	1	0.058		
BENZO(B)FLUORANTHENE		**0.055**	mg/kg	1	0.042		
BENZO(K)FLUORANTHENE		**0.069**	mg/kg	1	0.063		
BENZO(A)PYRENE		**0.070**	mg/kg	1	0.051		
CHRYSENE	U	0.053	mg/kg	1	0.053		
DIBENZO(A,H)ANTHRACENE	U	0.044	mg/kg	1	0.044		
INDENO(1,2,3-CD)PYRENE		**0.068**	mg/kg	1	0.042		
INTERNAL STANDARD							
D8-NAPHTHALENE		63.6	% recovery	1	1		
D10-ACENAPHTHENE		68.2	% recovery	1	1		
D10-PHENANTHRENE		63.3	% recovery	1	1		
D12-CHRYSENE		56.6	% recovery	1	1		
D12-PERYLENE		57.7	% recovery	1	1		
SURROGATE							
D5-NITROBENZENE	D	50	% recovery	1			
2-FLUOROBIPHENYL	D	56	% recovery	1			
2,4,6-TRIBROMOPHENOL		73	% recovery	1			
D14-P-TERPHENYL		110	% recovery	1			

Run ID: R142231 / Work Group No.: WG133135
Prep Date1: 01-NOV-06 Prep Date2: 30-OCT-06 Analyzed 02-Nov-06 15:40

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EBMUD Laboratory
Analytical Report

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California Environmental Laboratory Accreditation Program Certificate Number 1060

Laboratory Report - L130806

LSR # - B926-0609-1 Project Title: US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL INVESTIG

Report generated on: Oct 04, 2006 06:58 am

17 - Samples received by the lab on: Sep 28 2006, 03:53 pm
0 - Lost Analyses
0 - Hold Time Exceedences
Turn-around-time met

Client PM: MALLIKA RAMANATHAN Lab PM: KENNETH GERSTMAN

This is an electronic transmittal of a Laboratory Analytical Report

Samples included in this report:

Sample	Type	Collected	Site	Locator	ClientID
L130806-1	COMP	28-Sep-2006 12:52	USAR OAKLAND	MISC	UT9-1/3
L130806-2	COMP	28-Sep-2006 12:58	USAR OAKLAND	MISC	UT9-1/8
L130806-3	COMP	28-Sep-2006 13:09	USAR OAKLAND	MISC	UT9-2/3
L130806-4	COMP	28-Sep-2006 13:19	USAR OAKLAND	MISC	UT9-2/8
L130806-5	COMP	28-Sep-2006 13:30	USAR OAKLAND	MISC	UT9-3/3
L130806-6	COMP	28-Sep-2006 13:37	USAR OAKLAND	MISC	UT9-3/8
L130806-7	COMP	28-Sep-2006 13:57	USAR OAKLAND	MISC	UT9-4/3
L130806-8	COMP	28-Sep-2006 14:05	USAR OAKLAND	MISC	UT9-4/8
L130806-9	QCFR	28-Sep-2006 14:05	USAR OAKLAND	MISC	UT9-4/8/3
L130806-10	COMP	28-Sep-2006 14:11	USAR OAKLAND	MISC	UT9-5/3
L130806-11	COMP	28-Sep-2006 14:23	USAR OAKLAND	MISC	UT9-5/8
L130806-12	COMP	28-Sep-2006 14:42	USAR OAKLAND	MISC	UT9-6/3
L130806-13	COMP	28-Sep-2006 15:00	USAR OAKLAND	MISC	UT9-6/8
L130806-14	COMP	28-Sep-2006 15:08	USAR OAKLAND	MISC	UT9-7/3
L130806-15	COMP	28-Sep-2006 15:19	USAR OAKLAND	MISC	UT9-7/8
L130806-16	COMP	28-Sep-2006 15:24	USAR OAKLAND	MISC	UT9-8/3
L130806-17	COMP	28-Sep-2006 15:40	USAR OAKLAND	MISC	UT9-8/8

Legend to the laboratory qualifiers used in this report:
 * - Duplicate value outside of control limits
 Qualifiers for subcontract work - See textvalue for description

THIS REPORT MAY ONLY BE REPRODUCED IN ITS ENTIRETY. RESULTS CONTAINED IN THIS REPORT ARE REFLECTIVE ONLY OF THE ITEMS REQUESTED TO BE ANALYZED AND REPORTED. UNUSED PORTIONS OF SAMPLE WILL BE DISCARDED WITHIN THIRTY DAYS OF RECEIPT UNLESS OTHER ARRANGEMENTS ARE MADE BY THE CLIENT.

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: UT9-1/3
Lab ID: L130806-1 (P130376-1) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 12:52pm Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 03:53pm Sample receiver: LLAZZELL
Sample Comments: UT-9-1 comp of depths 3'-5' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**130**	mg/kg	.172	2.07		

Run ID: R141737 / Work Group No.: WG132601
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 03-Oct-06 10:18

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: UT9-1/8
Lab ID: L130806-2 (P130376-2) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 12:58pm Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 03:53pm Sample receiver: LLAZZELL
Sample Comments: UT-9-1 comp of depths 8'-10' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD	*	**87.9**	mg/kg	.153	1.84		

Run ID: R141737 / Work Group No.: WG132601
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 03-Oct-06 10:23

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: UT9-2/3
Lab ID: L130806-3 (P130376-3) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 01:09pm Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 03:53pm Sample receiver: LLAZZELL
Sample Comments: UT-9-2 comp of depths 3'-5' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**115**	mg/kg	.168	2.01		

Run ID: R141737 / Work Group No.: WG132601
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 03-Oct-06 10:36

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: UT9-2/8
Lab ID: L130806-4 (P130376-4) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 01:19pm Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 03:53pm Sample receiver: LLAZZELL
Sample Comments: UT-9-2 comp of depths 8'-10' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**513**	mg/kg	.133	1.59		

Run ID: R141737 / Work Group No.: WG132601
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 03-Oct-06 10:40

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LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: UT9-3/3
Lab ID: L130806-5 (P130376-5) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 01:30pm Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 03:53pm Sample receiver: LLAZZELL
Sample Comments: UT-9-3 comp of depths 3'-5' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**50.9**	mg/kg	.169	2.03		

Run ID: R141737 / Work Group No.: WG132601
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 03-Oct-06 10:53

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LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: UT9-3/8
Lab ID: L130806-6 (P130376-6) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 01:37pm Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 03:53pm Sample receiver: LLAZZELL
Sample Comments: UT-9-3 comp of depths 8'-10' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**2,140**	mg/kg	.146	1.75		

Run ID: R141737 / Work Group No.: WG132601
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 03-Oct-06 10:58

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LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: UT9-4/3
Lab ID: L130806-7 (P130376-7) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 01:57pm Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 03:53pm Sample receiver: LLAZZELL
Sample Comments: UT-9-4 comp of depths 3'-5' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**111**	mg/kg	.173	2.08		

Run ID: R141737 / Work Group No.: WG132601
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 03-Oct-06 11:02

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: UT9-4/8
Lab ID: L130806-8 (P130376-8) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 02:05pm Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 03:53pm Sample receiver: LLAZZELL
Sample Comments: UT-9-4 comp of depths 8'-10' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**3,410**	mg/kg	.182	2.18		

Run ID: R141737 / Work Group No.: WG132601
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 03-Oct-06 11:06

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: UT9-4/8/3
Lab ID: L130806-9 (P130376-9) Rush - 5 working day TAT
Sample Type: QCFR (Field Replicate Grab)
Date Collected: Sep 28 2006, 02:05pm Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 03:53pm Sample receiver: LLAZZELL
Sample Comments: UT-9-4 QC Field Rep, comp of depths 8'-10' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**5,160**	mg/kg	.123	1.47		

Run ID: R141737 / Work Group No.: WG132601
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 03-Oct-06 11:11

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: UT9-5/3
Lab ID: L130806-10 (P130376-10) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 02:11pm Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 03:53pm Sample receiver: LLAZZELL
Sample Comments: UT-9-5 comp of depths 3'-5' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**52.5**	mg/kg	.187		2.25	

Run ID: R141737 / Work Group No.: WG132601
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 03-Oct-06 11:16

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: UT9-5/8
Lab ID: L130806-11 (P130376-11) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 02:23pm Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 03:53pm Sample receiver: LLAZZELL
Sample Comments: UT-9-5 comp of depths 8'-10' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**844**	mg/kg	.157	1.89		

Run ID: R141737 / Work Group No.: WG132601
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 03-Oct-06 11:20

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: UT9-6/3
Lab ID: L130806-12 (P130376-12) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 02:42pm Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 03:53pm Sample receiver: LLAZZELL
Sample Comments: UT-9-6 comp of depths 3'-5' bgs

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**916**	mg/kg	.177	2.12		

Run ID: R141737 / Work Group No.: WG132601
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 03-Oct-06 11:24

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: UT9-6/8
Lab ID: L130806-13 (P130376-13) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 03:00pm Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 03:53pm Sample receiver: LLAZZELL
Sample Comments: UT-9-6 comp of depths 8'-10' bgs

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD	*	**1,240**	mg/kg	.175		2.1	

Run ID: R141737 / Work Group No.: WG132601
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 03-Oct-06 11:29

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: UT9-7/3
Lab ID: L130806-14 (P130376-14) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 03:08pm Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 03:53pm Sample receiver: LLAZZELL
Sample Comments: UT-9-7 comp of depths 3'-5' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**125**	mg/kg	.135	1.62		

Run ID: R141737 / Work Group No.: WG132601
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 03-Oct-06 11:51

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: UT9-7/8
Lab ID: L130806-15 (P130376-15) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 03:19pm Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 03:53pm Sample receiver: LLAZZELL
Sample Comments: UT-9-7 comp of depths 8'-10' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**2,670**	mg/kg	.156	1.87		

Run ID: R141737 / Work Group No.: WG132601
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 03-Oct-06 11:55

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Phone (510)287-1432 Fax (510)465-5462

Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: UT9-8/3
Lab ID: L130806-16 (P130376-16) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 03:24pm Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 03:53pm Sample receiver: LLAZZELL
Sample Comments: UT-9-8 comp of depths 3'-5' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**147**	mg/kg	.162	1.94		

Run ID: R141737 / Work Group No.: WG132601
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 03-Oct-06 12:00

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: UT9-8/8
Lab ID: L130806-17 (P130376-17) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 28 2006, 03:40pm Sample collector: G Romero/Geologica
Date Received: Sep 28 2006, 03:53pm Sample receiver: LLAZZELL
Sample Comments: UT-9-8 comp of depths 8'-10' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**3,900**	mg/kg	.159	1.9		

Run ID: R141737 / Work Group No.: WG132601
Prep Date1: 29-SEP-06 Prep Date2: 02-OCT-06 Analyzed 03-Oct-06 12:04

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EBMUD Laboratory

Analytical Report

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California Environmental Laboratory Accreditation Program Certificate Number 1060

Laboratory Report - L131390

LSR # - B926-0609-1 Project Title: US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL INVESTIG

Report generated on: Nov 02, 2006 11:19 am

61 - Samples received by the lab on: Oct 26 2006, 02:19 pm
0 - Lost Analyses
0 - Hold Time Exceedences
Turn-around-time met

Client PM: MALLIKA RAMANATHAN Lab PM: KENNETH GERSTMAN

This is an electronic transmittal of a Laboratory Analytical Report

Samples included in this report:

Sample	Type	Collected	Site	Locator	ClientID
L131390-1	GRAB	25-Oct-2006 13:27	MISC	MISC	UT9-9/2.5
L131390-2	GRAB	25-Oct-2006 13:29	MISC	MISC	UT9-9/4.5
L131390-3	GRAB	25-Oct-2006 13:30	MISC	MISC	UT9-9/8.5
L131390-4	GRAB	25-Oct-2006 13:38	MISC	MISC	UT9-10/2.5
L131390-5	GRAB	25-Oct-2006 13:41	MISC	MISC	UT9-10/4.5
L131390-6	GRAB	25-Oct-2006 13:45	MISC	MISC	UT9-10/8.5
L131390-7	GRAB	25-Oct-2006 13:54	MISC	MISC	UT9-11/2.5
L131390-8	GRAB	25-Oct-2006 13:57	MISC	MISC	UT9-11/4.5
L131390-9	GRAB	25-Oct-2006 14:00	MISC	MISC	UT9-11/8.5
L131390-10	GRAB	25-Oct-2006 14:25	MISC	MISC	UT9-12/2.5
L131390-11	GRAB	25-Oct-2006 14:28	MISC	MISC	UT9-12/4.5
L131390-12	GRAB	25-Oct-2006 14:32	MISC	MISC	UT9-12/8.5
L131390-13	QCFR	25-Oct-2006 14:32	MISC	MISC	UT9-12/8.5/3
L131390-14	GRAB	25-Oct-2006 14:44	MISC	MISC	UT9-13/2.5
L131390-15	GRAB	25-Oct-2006 14:47	MISC	MISC	UT9-13/4.5
L131390-16	GRAB	25-Oct-2006 14:51	MISC	MISC	UT9-13/8.5
L131390-17	GRAB	25-Oct-2006 14:59	MISC	MISC	UT9-14/2.5
L131390-18	GRAB	25-Oct-2006 15:02	MISC	MISC	UT9-14/4.5
L131390-19	GRAB	25-Oct-2006 15:06	MISC	MISC	UT9-14/8.5
L131390-20	GRAB	25-Oct-2006 15:18	MISC	MISC	UT9-15/2.5
L131390-21	GRAB	25-Oct-2006 15:21	MISC	MISC	UT9-15/4.5
L131390-22	QCFR	25-Oct-2006 15:21	MISC	MISC	UT9-15/4.5/3
L131390-23	GRAB	25-Oct-2006 15:26	MISC	MISC	UT9-15/8.5
L131390-25	GRAB	26-Oct-2006 08:17	MISC	MISC	UT9-16/2.5
L131390-26	GRAB	26-Oct-2006 08:22	MISC	MISC	UT9-16/4.5
L131390-27	GRAB	26-Oct-2006 08:25	MISC	MISC	UT9-16/8.5
L131390-28	GRAB	26-Oct-2006 08:32	MISC	MISC	UT9-17/2.5
L131390-29	GRAB	26-Oct-2006 08:35	MISC	MISC	UT9-17/4.5
L131390-30	GRAB	26-Oct-2006 08:39	MISC	MISC	UT9-17/8.5
L131390-34	GRAB	26-Oct-2006 09:26	MISC	MISC	UT9-19/2.5
L131390-35	GRAB	26-Oct-2006 09:26	MISC	MISC	UT9-19/2.5/3
L131390-36	GRAB	26-Oct-2006 09:29	MISC	MISC	UT9-19/4.5
L131390-37	GRAB	26-Oct-2006 09:33	MISC	MISC	UT9-19/8.5
L131390-38	GRAB	26-Oct-2006 09:42	MISC	MISC	UT9-20/2.5

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EBMUD Laboratory
Analytical Report

EAST BAY MUNICIPAL UTILITY DISTRICT
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California Environmental Laboratory Accreditation Program Certificate Number 1060

L131390-39	GRAB	26-Oct-2006 09:46	MISC	MISC	UT9-20/4.5
L131390-40	GRAB	26-Oct-2006 09:49	MISC	MISC	UT9-20/8.5
L131390-41	GRAB	26-Oct-2006 10:00	MISC	MISC	UT9-21/2.5
L131390-42	GRAB	26-Oct-2006 10:03	MISC	MISC	UT9-21/4.5
L131390-43	GRAB	26-Oct-2006 10:05	MISC	MISC	UT9-21/8.5
L131390-44	GRAB	26-Oct-2006 10:23	MISC	MISC	UT9-22/2.5
L131390-45	GRAB	26-Oct-2006 10:25	MISC	MISC	UT9-22/4.5
L131390-46	GRAB	26-Oct-2006 10:30	MISC	MISC	UT9-22/8.5
L131390-47	GRAB	26-Oct-2006 10:41	MISC	MISC	UT9-23/2.5
L131390-48	GRAB	26-Oct-2006 10:43	MISC	MISC	UT9-23/4.5
L131390-49	GRAB	26-Oct-2006 10:46	MISC	MISC	UT9-23/8.5
L131390-50	GRAB	26-Oct-2006 10:46	MISC	MISC	UT9-23/8.5/3
L131390-51	GRAB	26-Oct-2006 10:56	MISC	MISC	UT9-24/2.5
L131390-52	GRAB	26-Oct-2006 10:58	MISC	MISC	UT9-24/4.5
L131390-53	GRAB	26-Oct-2006 11:02	MISC	MISC	UT9-24/8.5
L131390-54	GRAB	26-Oct-2006 11:15	MISC	MISC	UT9-25/2.5
L131390-55	GRAB	26-Oct-2006 11:16	MISC	MISC	UT9-25/4.5
L131390-56	GRAB	26-Oct-2006 11:21	MISC	MISC	UT9-25/8.5
L131390-57	GRAB	26-Oct-2006 11:28	MISC	MISC	UT9-26/2.5
L131390-58	GRAB	26-Oct-2006 11:30	MISC	MISC	UT9-26/4.5
L131390-59	GRAB	26-Oct-2006 11:34	MISC	MISC	UT9-26/8.5
L131390-60	GRAB	26-Oct-2006 12:25	MISC	MISC	UT9-27/2.5
L131390-61	GRAB	26-Oct-2006 12:28	MISC	MISC	UT9-27/4.5
L131390-62	GRAB	26-Oct-2006 12:31	MISC	MISC	UT9-27/8.5
L131390-63	GRAB	26-Oct-2006 12:40	MISC	MISC	UT928/2.5
L131390-64	GRAB	26-Oct-2006 12:42	MISC	MISC	UT9-28/4.5
L131390-66	GRAB	26-Oct-2006 12:46	MISC	MISC	UT9-28/8.5

Legend to the laboratory qualifiers used in this report:
* - Duplicate value outside of control limits
N - Spike recovery outside of control limits
Qualifiers for subcontract work - See textvalue for description

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I

Site:	MISC	Miscellaneous - Unidentified Site
Locator:	MISC	Miscellaneous sample, see sample comments for location
ClientID:	UT9-9/2.5	
Lab ID:	L131390-1 (P130969-1) Rush - 5 working day TAT	
Sample Type:	GRAB (Instantaneous Grab)	
Date Collected:	Oct 25 2006, 01:27pm Sample collector: G. Romero/Geologica	
Date Received:	Oct 25 2006, 03:58pm Sample receiver: MRAIL	
Sample Comments:		

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**11.2**	mg/kg	.113	1.35		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 27-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 10:27

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-9/4.5
Lab ID: L131390-2 (P130969-2) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 01:29pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**16,600**	mg/kg	.111	1.33		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 27-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 10:31

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-9/8.5
Lab ID: L131390-3 (P130969-3) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 01:30pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**77.6**	mg/kg	.169	2.03		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 27-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 10:35

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-10/2.5
Lab ID: L131390-4 (P130969-4) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 01:38pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**21.4**	mg/kg	.136	1.63		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 27-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 10:40

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LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-10/4.5
Lab ID: L131390-5 (P130969-5) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 01:41pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**4,880**	mg/kg	.11	1.32		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 27-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 10:44

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-10/8.5
Lab ID: L131390-6 (P130969-6) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 01:45pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**1,460**	mg/kg	.105	1.27		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 27-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 10:57

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-11/2.5
Lab ID: L131390-7 (P130969-7) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 01:54pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**29.3**	mg/kg	.124	1.49		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 27-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 11:10

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-11/4.5
Lab ID: L131390-8 (P130969-8) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 01:57pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments:

Method Reference							Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML		
Method: EPA 6010B - ICAP Metals							Soil	
TARGET ANALYTES								
LEAD		**289**	mg/kg	.151		1.82		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 27-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 11:15

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-11/8.5
Lab ID: L131390-9 (P130969-9) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 02:00pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**84,300**	mg/kg	.109	1.3		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 27-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 11:19

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-12/2.5
Lab ID: L131390-10 (P130969-10) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 02:25pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**66.7**	mg/kg	.107		1.29	

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 27-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 11:23

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-12/4.5
Lab ID: L131390-11 (P130969-11) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 02:28pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**60.5**	mg/kg	.121	1.45		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 27-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 11:28

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-12/8.5
Lab ID: L131390-12 (P130969-12) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 02:32pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**13,200**	mg/kg	.178	2.14		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 27-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 11:32

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-12/8.5/3
Lab ID: L131390-13 (P130969-13) Rush - 5 working day TAT
Sample Type: QCFR (Field Replicate Grab)
Date Collected: Oct 25 2006, 02:32pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments: field duplicate

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**10,200**	mg/kg	.109	1.31		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 27-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 11:37

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-13/2.5
Lab ID: L131390-14 (P130969-14) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 02:44pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**525**	mg/kg	.125		1.5	

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 27-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 11:41

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

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Laboratory Services Division
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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-13/4.5
Lab ID: L131390-15 (P130969-15) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 02:47pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**63.9**	mg/kg	.152	1.82		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 29-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 12:17

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-13/8.5
Lab ID: L131390-16 (P130969-16) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 02:51pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**5,450**	mg/kg	.107	1.28		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 29-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 12:21

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-14/2.5
Lab ID: L131390-17 (P130969-17) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 02:59pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**21.1**	mg/kg	.125		1.5	

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 29-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 12:25

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-14/4.5
Lab ID: L131390-18 (P130969-18) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 03:02pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**64.6**	mg/kg	.103	1.24		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 29-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 12:30

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-14/8.5
Lab ID: L131390-19 (P130969-19) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 03:06pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments:

Method Reference / Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	Matrix	Tag
Method: EPA 6010B - ICAP Metals							Soil	
TARGET ANALYTES								
LEAD		**1,860**	mg/kg	.135		1.62		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 29-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 12:34

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-15/2.5
Lab ID: L131390-20 (P130969-20) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 03:18pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**129**	mg/kg	.188	2.26		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 29-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 12:39

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-15/4.5
Lab ID: L131390-21 (P130969-21) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 03:21pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**50.3**	mg/kg	.141	1.69		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 29-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 12:43

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-15/4.5/3
Lab ID: L131390-22 (P130969-22) Rush - 5 working day TAT
Sample Type: QCFR (Field Replicate Grab)
Date Collected: Oct 25 2006, 03:21pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments: field duplicate

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD	*	**3,340**	mg/kg	.18	2.16		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 29-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 12:56

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-15/8.5
Lab ID: L131390-23 (P130969-23) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 03:26pm Sample collector: G. Romero/Geologica
Date Received: Oct 25 2006, 03:58pm Sample receiver: MRAIL
Sample Comments:

Method Reference / Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix / RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**153**	mg/kg	.177	2.12		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 29-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 13:10

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-16/2.5
Lab ID: L131390-25 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 08:17am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**12.7**	mg/kg	.193	2.32		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 29-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 13:14

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-16/4.5
Lab ID: L131390-26 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 08:22am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**149**	mg/kg	.196	2.36		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 29-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 13:19

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-16/8.5
Lab ID: L131390-27 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 08:25am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference							Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML		
Method: EPA 6010B - ICAP Metals							Soil	
TARGET ANALYTES								
LEAD		**3,850**	mg/kg	.136		1.63		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 29-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 13:23

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-17/2.5
Lab ID: L131390-28 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 08:32am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**89.7**	mg/kg	.17	2.04		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 29-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 13:28

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-17/4.5
Lab ID: L131390-29 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 08:35am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference							Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML		
Method: EPA 6010B - ICAP Metals							Soil	
TARGET ANALYTES								
LEAD		**2,130**	mg/kg	.155		1.86		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 29-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 13:32

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-17/8.5
Lab ID: L131390-30 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 08:39am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference							Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML		
Method: EPA 6010B - ICAP Metals							Soil	
TARGET ANALYTES								
LEAD		**5,800**	mg/kg	.148		1.78		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 29-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 13:36

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-19/2.5
Lab ID: L131390-34 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 09:26am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**687**	mg/kg	.172	2.06		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 29-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 13:50

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-19/2.5/3
Lab ID: L131390-35 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 09:26am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**229**	mg/kg	.15	1.8		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 29-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 13:54

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-19/4.5
Lab ID: L131390-36 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 09:29am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**4.33**	mg/kg	.191	2.29		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 29-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 13:58

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-19/8.5
Lab ID: L131390-37 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 09:33am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**15,200**	mg/kg	.173	2.08		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 29-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 14:12

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-20/2.5
Lab ID: L131390-38 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 09:42am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**21.6**	mg/kg	.193	2.31		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 29-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 14:16

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
PO Box 24055, MS 59, Oakland, CA 94623
Phone (510)287-1432 Fax (510)465-5462

Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-20/4.5
Lab ID: L131390-39 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 09:46am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference							Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML		
Method: EPA 6010B - ICAP Metals							Soil	
TARGET ANALYTES								
LEAD		**63.2**	mg/kg	.114		1.37		

Run ID: R142275 / Work Group No.: WG133181
Prep Date1: 30-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 09:58

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-20/8.5
Lab ID: L131390-40 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 09:49am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**10,700**	mg/kg	.128	1.54		

Run ID: R142275 / Work Group No.: WG133181
Prep Date1: 30-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 10:03

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

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Laboratory Services Division
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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-21/2.5
Lab ID: L131390-41 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 10:00am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference							Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML		
Method: EPA 6010B - ICAP Metals							Soil	
TARGET ANALYTES								
LEAD		**77.7**	mg/kg	.134		1.6		

Run ID: R142275 / Work Group No.: WG133181
Prep Date1: 30-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 10:08

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-21/4.5
Lab ID: L131390-42 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 10:03am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**95.2**	mg/kg	.123	1.48		

Run ID: R142275 / Work Group No.: WG133181
Prep Date1: 30-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 10:12

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-21/8.5
Lab ID: L131390-43 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 10:05am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference							Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML		
Method: EPA 6010B - ICAP Metals							Soil	
TARGET ANALYTES								
LEAD		**2,310**	mg/kg	.156		1.88		

Run ID: R142275 / Work Group No.: WG133181
Prep Date1: 30-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 10:16

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-22/2.5
Lab ID: L131390-44 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 10:23am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD	***,N**	**88.6**	mg/kg	.184	2.21		

Run ID: R142275 / Work Group No.: WG133181
Prep Date1: 30-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 10:21

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-22/4.5
Lab ID: L131390-45 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 10:25am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**1,150**	mg/kg	.145	1.73		

Run ID: R142275 / Work Group No.: WG133181
Prep Date1: 30-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 10:43

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-22/8.5
Lab ID: L131390-46 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 10:30am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**6,390**	mg/kg	.162	1.94		

Run ID: R142275 / Work Group No.: WG133181
Prep Date1: 30-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 10:47

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-23/2.5
Lab ID: L131390-47 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 10:41am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**75.5**	mg/kg	.167		2	

Run ID: R142275 / Work Group No.: WG133181
Prep Date1: 30-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 10:52

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-23/4.5
Lab ID: L131390-48 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 10:43am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**21.7**	mg/kg	.203	2.43		

Run ID: R142275 / Work Group No.: WG133181
Prep Date1: 30-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 10:56

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-23/8.5
Lab ID: L131390-49 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 10:46am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference							Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML		
Method: EPA 6010B - ICAP Metals							Soil	
TARGET ANALYTES								
LEAD	*	**3,920**	mg/kg	.154		1.85		

Run ID: R142275 / Work Group No.: WG133181
Prep Date1: 30-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 11:01

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-23/8.5/3
Lab ID: L131390-50 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 10:46am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**7,960**	mg/kg	.188	2.25		

Run ID: R142275 / Work Group No.: WG133181
Prep Date1: 30-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 11:14

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-24/2.5
Lab ID: L131390-51 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 10:56am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**76.2**	mg/kg	.19	2.28		

Run ID: R142275 / Work Group No.: WG133181
Prep Date1: 30-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 11:27

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-24/4.5
Lab ID: L131390-52 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 10:58am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference							Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML		
Method: EPA 6010B - ICAP Metals							Soil	
TARGET ANALYTES								
LEAD		**69.0**	mg/kg	.207		2.48		

Run ID: R142275 / Work Group No.: WG133181
Prep Date1: 30-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 11:32

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-24/8.5
Lab ID: L131390-53 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 11:02am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference							Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML		
Method: EPA 6010B - ICAP Metals							Soil	
TARGET ANALYTES								
LEAD		**9,350**	mg/kg	.141		1.69		

Run ID: R142275 / Work Group No.: WG133181
Prep Date1: 30-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 11:36

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-25/2.5
Lab ID: L131390-54 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 11:15am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**33.8**	mg/kg	.168	2.02		

Run ID: R142275 / Work Group No.: WG133181
Prep Date1: 30-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 11:41

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-25/4.5
Lab ID: L131390-55 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 11:16am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference							Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML		
Method: EPA 6010B - ICAP Metals							Soil	
TARGET ANALYTES								
LEAD		**308**	mg/kg	.171		2.05		

Run ID: R142275 / Work Group No.: WG133181
Prep Date1: 30-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 11:45

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-25/8.5
Lab ID: L131390-56 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 11:21am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**158**	mg/kg	.131	1.58		

Run ID: R142275 / Work Group No.: WG133181
Prep Date1: 30-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 11:49

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-26/2.5
Lab ID: L131390-57 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 11:28am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**29.1**	mg/kg	.203	2.43		

Run ID: R142275 / Work Group No.: WG133181
Prep Date1: 30-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 11:54

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-26/4.5
Lab ID: L131390-58 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 11:30am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**34.3**	mg/kg	.19	2.29		

Run ID: R142275 / Work Group No.: WG133181
Prep Date1: 30-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 11:58

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-26/8.5
Lab ID: L131390-59 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 11:34am Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference							Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML		
Method: EPA 6010B - ICAP Metals							Soil	
TARGET ANALYTES								
LEAD		**3,630**	mg/kg	.196		2.36		

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 31-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 14:45

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-27/2.5
Lab ID: L131390-60 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 12:25pm Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD	*	**38.7**	mg/kg	.171		2.05	

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 31-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 14:50

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Laboratory Services Division
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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-27/4.5
Lab ID: L131390-61 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 12:28pm Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**31.5**	mg/kg	.172	2.07		

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 31-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 15:03

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-27/8.5
Lab ID: L131390-62 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 12:31pm Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**35.4**	mg/kg	.127	1.53		

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 31-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 15:07

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT928/2.5
Lab ID: L131390-63 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 12:40pm Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**61.8**	mg/kg	.206	2.47		

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 31-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 15:21

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-28/4.5
Lab ID: L131390-64 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 12:42pm Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**24.7**	mg/kg	.196	2.36		

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 31-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 15:25

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: UT9-28/8.5
Lab ID: L131390-66 Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 12:46pm Sample collector: G. Romero/Geologica
Date Received: Oct 26 2006, 02:19pm Sample receiver: MRAIL
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**1,810**	mg/kg	.158		1.9	

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 31-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 15:29

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EBMUD Laboratory
Analytical Report

EAST BAY MUNICIPAL UTILITY DISTRICT
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California Environmental Laboratory Accreditation Program Certificate Number 1060

Laboratory Report - L130814

LSR # - B926-0609-1 Project Title: US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL INVESTIG

Report generated on: Oct 06, 2006 06:49 am

17 - Samples received by the lab on: Sep 29 2006, 11:23 am
0 - Lost Analyses
0 - Hold Time Exceedences
Turn-around-time met

Client PM: MALLIKA RAMANATHAN Lab PM: KENNETH GERSTMAN

This is an electronic transmittal of a Laboratory Analytical Report

Samples included in this report:

Sample	Type	Collected	Site	Locator	ClientID
L130814-1	COMP	29-Sep-2006 08:32	USAR OAKLAND	MISC	VW1-1/2
L130814-2	COMP	29-Sep-2006 08:36	USAR OAKLAND	MISC	VW1-1/4
L130814-3	QCFR	29-Sep-2006 08:36	USAR OAKLAND	MISC	VW1-1/4/3
L130814-4	COMP	29-Sep-2006 08:42	USAR OAKLAND	MISC	VW1-2/2
L130814-5	COMP	29-Sep-2006 08:44	USAR OAKLAND	MISC	WV1-2/4
L130814-6	COMP	29-Sep-2006 08:52	USAR OAKLAND	MISC	VW1-3/2
L130814-7	COMP	29-Sep-2006 09:00	USAR OAKLAND	MISC	VW1-3/4
L130814-8	COMP	29-Sep-2006 09:23	USAR OAKLAND	MISC	VW1-4/2
L130814-9	COMP	29-Sep-2006 09:28	USAR OAKLAND	MISC	VW1-4/4
L130814-10	COMP	29-Sep-2006 09:36	USAR OAKLAND	MISC	VW1-5/2
L130814-11	COMP	29-Sep-2006 09:41	USAR OAKLAND	MISC	VW1-5/4
L130814-12	COMP	29-Sep-2006 09:48	USAR OAKLAND	MISC	VW1-6/2
L130814-13	COMP	29-Sep-2006 09:52	USAR OAKLAND	MISC	VW1-6/4
L130814-14	COMP	29-Sep-2006 10:13	USAR OAKLAND	MISC	SS11-1/6
L130814-15	QCFR	29-Sep-2006 10:13	USAR OAKLAND	MISC	SS11-1/6/3
L130814-16	COMP	29-Sep-2006 10:22	USAR OAKLAND	MISC	SS11-3/6
L130814-17	COMP	29-Sep-2006 10:35	USAR OAKLAND	MISC	SS11-4/6

Legend to the laboratory qualifiers used in this report:
 * - Duplicate value outside of control limits
 Qualifiers for subcontract work - See textvalue for description

THIS REPORT MAY ONLY BE REPRODUCED IN ITS ENTIRETY. RESULTS CONTAINED IN THIS REPORT ARE REFLECTIVE ONLY OF THE ITEMS REQUESTED TO BE ANALYZED AND REPORTED. UNUSED PORTIONS OF SAMPLE WILL BE DISCARDED WITHIN THIRTY DAYS OF RECEIPT UNLESS OTHER ARRANGEMENTS ARE MADE BY THE CLIENT.

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: VW1-1/2
Lab ID: L130814-1 (P130376-18) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 29 2006, 08:32am Sample collector: G Romero/Geologica
Date Received: Sep 29 2006, 11:23am Sample receiver: MRAIL
Sample Comments: V W-1 comp of depths 2'-4' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**935**	mg/kg	.166		2	

Run ID: R141772 / Work Group No.: WG132641
Prep Date1: 02-OCT-06 Prep Date2: 04-OCT-06 Analyzed 04-Oct-06 14:14

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: VW1-1/4
Lab ID: L130814-2 (P130376-19) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 29 2006, 08:36am Sample collector: G Romero/Geologica
Date Received: Sep 29 2006, 11:23am Sample receiver: MRAIL
Sample Comments: V W-1 comp of depths 4'-6' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**38,600**	mg/kg	.198	2.38		

Run ID: R141772 / Work Group No.: WG132641
Prep Date1: 02-OCT-06 Prep Date2: 04-OCT-06 Analyzed 04-Oct-06 14:19

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: VW1-1/4/3
Lab ID: L130814-3 (P130376-20) Rush - 5 working day TAT
Sample Type: QCFR (Field Replicate Grab)
Date Collected: Sep 29 2006, 08:36am Sample collector: G Romero/Geologica
Date Received: Sep 29 2006, 11:23am Sample receiver: MRAIL
Sample Comments: V W-1 QC Field Replicate, comp of depths 4'-6' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**806**	mg/kg	.198	2.38		

Run ID: R141772 / Work Group No.: WG132641
Prep Date1: 02-OCT-06 Prep Date2: 04-OCT-06 Analyzed 04-Oct-06 14:23

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: VW1-2/2
Lab ID: L130814-4 (P130376-21) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 29 2006, 08:42am Sample collector: G Romero/Geologica
Date Received: Sep 29 2006, 11:23am Sample receiver: MRAIL
Sample Comments: V W-2 comp of depths 2'-4' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**409**	mg/kg	.198	2.37		

Run ID: R141772 / Work Group No.: WG132641
Prep Date1: 02-OCT-06 Prep Date2: 04-OCT-06 Analyzed 04-Oct-06 14:28

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: WV1-2/4
Lab ID: L130814-5 (P130376-22) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 29 2006, 08:44am Sample collector: G Romero/Geologica
Date Received: Sep 29 2006, 11:23am Sample receiver: MRAIL
Sample Comments: V W-2 comp of depths 4'-6' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD	*	**2,570**	mg/kg	.183	2.19		

Run ID: R141772 / Work Group No.: WG132641
Prep Date1: 02-OCT-06 Prep Date2: 04-OCT-06 Analyzed 04-Oct-06 14:32

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: VW1-3/2
Lab ID: L130814-6 (P130376-23) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 29 2006, 08:52am Sample collector: G Romero/Geologica
Date Received: Sep 29 2006, 11:23am Sample receiver: MRAIL
Sample Comments: V W-3 comp of depths 2'-4' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**681**	mg/kg	.179	2.15		

Run ID: R141772 / Work Group No.: WG132641
Prep Date1: 02-OCT-06 Prep Date2: 04-OCT-06 Analyzed 04-Oct-06 14:54

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: VW1-3/4
Lab ID: L130814-7 (P130376-24) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 29 2006, 09:00am Sample collector: G Romero/Geologica
Date Received: Sep 29 2006, 11:23am Sample receiver: MRAIL
Sample Comments: V W-3 comp of depths 4'-6' bgs

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**6,960**	mg/kg	.187	2.24		

Run ID: R141772 / Work Group No.: WG132641
Prep Date1: 02-OCT-06 Prep Date2: 04-OCT-06 Analyzed 04-Oct-06 14:58

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: VW1-4/2
Lab ID: L130814-8 (P130376-25) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 29 2006, 09:23am Sample collector: G Romero/Geologica
Date Received: Sep 29 2006, 11:23am Sample receiver: MRAIL
Sample Comments: V W-4 comp of depths 2'-4' bgs

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**381**	mg/kg	.142	1.71		

Run ID: R141772 / Work Group No.: WG132641
Prep Date1: 02-OCT-06 Prep Date2: 04-OCT-06 Analyzed 04-Oct-06 15:03

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: VW1-4/4
Lab ID: L130814-9 (P130376-26) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 29 2006, 09:28am Sample collector: G Romero/Geologica
Date Received: Sep 29 2006, 11:23am Sample receiver: MRAIL
Sample Comments: V W-4 comp of depths 4'-6' bgs

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**337**	mg/kg	.162	1.94		

Run ID: R141772 / Work Group No.: WG132641
Prep Date1: 02-OCT-06 Prep Date2: 04-OCT-06 Analyzed 04-Oct-06 15:07

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: VW1-5/2
Lab ID: L130814-10 (P130376-27) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 29 2006, 09:36am Sample collector: G Romero/Geologica
Date Received: Sep 29 2006, 11:23am Sample receiver: MRAIL
Sample Comments: V W-5 comp of depths 2'-4' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**1,090**	mg/kg	.18	2.15		

Run ID: R141772 / Work Group No.: WG132641
Prep Date1: 02-OCT-06 Prep Date2: 04-OCT-06 Analyzed 04-Oct-06 15:11

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: VW1-5/4
Lab ID: L130814-11 (P130376-28) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 29 2006, 09:41am Sample collector: G Romero/Geologica
Date Received: Sep 29 2006, 11:23am Sample receiver: MRAIL
Sample Comments: V W-5 comp of depths 4'-6' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**71.6**	mg/kg	.169	2.02		

Run ID: R141772 / Work Group No.: WG132641
Prep Date1: 02-OCT-06 Prep Date2: 04-OCT-06 Analyzed 04-Oct-06 15:16

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: VW1-6/2
Lab ID: L130814-12 (P130376-29) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 29 2006, 09:48am Sample collector: G Romero/Geologica
Date Received: Sep 29 2006, 11:23am Sample receiver: MRAIL
Sample Comments: V W-6 comp of depths 2'-4' bgs

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**1,370**	mg/kg	.172	2.07		

Run ID: R141772 / Work Group No.: WG132641
Prep Date1: 02-OCT-06 Prep Date2: 04-OCT-06 Analyzed 04-Oct-06 15:20

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: VW1-6/4
Lab ID: L130814-13 (P130376-30) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 29 2006, 09:52am Sample collector: G Romero/Geologica
Date Received: Sep 29 2006, 11:23am Sample receiver: MRAIL
Sample Comments: V W-6 comp of depths 4'-6' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**220**	mg/kg	.197	2.37		

Run ID: R141772 / Work Group No.: WG132641
Prep Date1: 02-OCT-06 Prep Date2: 04-OCT-06 Analyzed 04-Oct-06 15:25

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: SS11-1/6
Lab ID: L130814-14 (P130376-32) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 29 2006, 10:13am Sample collector: G Romero/Geologica
Date Received: Sep 29 2006, 11:23am Sample receiver: MRAIL
Sample Comments: SS11-1 comp of depths 6'-8' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**42.7**	mg/kg	.199	2.39		

Run ID: R141772 / Work Group No.: WG132641
Prep Date1: 02-OCT-06 Prep Date2: 04-OCT-06 Analyzed 04-Oct-06 15:29

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: SS11-1/6/3
Lab ID: L130814-15 (P130376-33) Rush - 5 working day TAT
Sample Type: QCFR (Field Replicate Grab)
Date Collected: Sep 29 2006, 10:13am Sample collector: G Romero/Geologica
Date Received: Sep 29 2006, 11:23am Sample receiver: MRAIL
Sample Comments: SS11-1 QC Field Replicate, comp of depths 6'-8' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**38.8**	mg/kg	.141	1.69		

Run ID: R141772 / Work Group No.: WG132641
Prep Date1: 02-OCT-06 Prep Date2: 04-OCT-06 Analyzed 04-Oct-06 15:42

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: SS11-3/6
Lab ID: L130814-16 (P130376-37) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 29 2006, 10:22am Sample collector: G Romero/Geologica
Date Received: Sep 29 2006, 11:23am Sample receiver: MRAIL
Sample Comments: SS11-3 comp of depths 6'-8' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**37.9**	mg/kg	.171	2.05		

Run ID: R141772 / Work Group No.: WG132641
Prep Date1: 02-OCT-06 Prep Date2: 04-OCT-06 Analyzed 04-Oct-06 15:55

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: USAR OAKLAND U.S. Army Reserve Center Oakland, Heroic War Dead Site – 2400 Engineer Road, Oakland, CA 94607
Locator: MISC Miscellaneous Sample
ClientID: SS11-4/6
Lab ID: L130814-17 (P130376-39) Rush - 5 working day TAT
Sample Type: COMP (Mult Sample Loc Comp Collect Date is end of composite period.)
Date Collected: Sep 29 2006, 10:35am Sample collector: G Romero/Geologica
Date Received: Sep 29 2006, 11:23am Sample receiver: MRAIL
Sample Comments: SS11-4 comp of depths 6'-8' bgs

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**150**	mg/kg	.166		2	

Run ID: R141772 / Work Group No.: WG132641
Prep Date1: 02-OCT-06 Prep Date2: 04-OCT-06 Analyzed 04-Oct-06 16:00

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EBMUD Laboratory
Analytical Report

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California Environmental Laboratory Accreditation Program Certificate Number 1060

Laboratory Report - L131370

LSR # - B926-0609-1 Project Title: US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL INVESTIG

Report generated on: Nov 02, 2006 02:50 pm

26 - Samples received by the lab on: Oct 25 2006, 12:21 pm
0 - Lost Analyses
0 - Hold Time Exceedences
Turn-around-time not met

Client PM: MALLIKA RAMANATHAN Lab PM: KENNETH GERSTMAN

This is an electronic transmittal of a Laboratory Analytical Report

Samples included in this report:

Sample	Type	Collected	Site	Locator	ClientID
L131370-1	GRAB	25-Oct-2006 09:55	MISC	MISC	VW1-7/2.5
L131370-2	GRAB	25-Oct-2006 09:57	MISC	MISC	VW1-7/4.5
L131370-3	GRAB	25-Oct-2006 10:00	MISC	MISC	VW1-7/8.5
L131370-4	GRAB	25-Oct-2006 10:06	MISC	MISC	VW1-8/2.5
L131370-5	GRAB	25-Oct-2006 10:09	MISC	MISC	VW1-8/4.5
L131370-6	GRAB	25-Oct-2006 10:12	MISC	MISC	VW1-8/8.5
L131370-7	GRAB	25-Oct-2006 10:17	MISC	MISC	VW1-9/2.5
L131370-8	GRAB	25-Oct-2006 10:19	MISC	MISC	VW1-9/4.5
L131370-9	GRAB	25-Oct-2006 10:23	MISC	MISC	VW1-9/8.5
L131370-10	GRAB	25-Oct-2006 10:37	MISC	MISC	VW1-10/2.5
L131370-11	GRAB	25-Oct-2006 10:39	MISC	MISC	VW1-10/4.5
L131370-12	QCFR	25-Oct-2006 10:39	MISC	MISC	VW1-10/4.5/3
L131370-13	GRAB	25-Oct-2006 10:44	MISC	MISC	VW1-10/8.5
L131370-14	GRAB	25-Oct-2006 10:56	MISC	MISC	VW1-11/2.5
L131370-15	GRAB	25-Oct-2006 11:03	MISC	MISC	VW1-11/4.5
L131370-16	GRAB	25-Oct-2006 11:05	MISC	MISC	VW1-11/8.5
L131370-17	GRAB	25-Oct-2006 11:12	MISC	MISC	VW1-12/2.5
L131370-18	GRAB	25-Oct-2006 11:14	MISC	MISC	VW1-12/4.5
L131370-19	GRAB	25-Oct-2006 11:18	MISC	MISC	VW1-12/8.5
L131370-20	GRAB	25-Oct-2006 11:33	MISC	MISC	VW1-13/2.5
L131370-21	GRAB	25-Oct-2006 11:36	MISC	MISC	VW1-13/4.5
L131370-22	GRAB	25-Oct-2006 11:40	MISC	MISC	VW1-13/8.5
L131370-23	GRAB	25-Oct-2006 11:50	MISC	MISC	VW1-14/2.5
L131370-24	QCFR	25-Oct-2006 11:50	MISC	MISC	VW1-14/2.5/3
L131370-25	GRAB	25-Oct-2006 11:53	MISC	MISC	VW1-14/4.5
L131370-26	GRAB	25-Oct-2006 11:58	MISC	MISC	VW1-14/8.5

Legend to the laboratory qualifiers used in this report:
 * - Duplicate value outside of control limits

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EBMUD Laboratory

Analytical Report

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California Environmental Laboratory Accreditation Program Certificate Number 1060

N - Spike recovery outside of control limits
Qualifiers for subcontract work - See textvalue for description

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-7/2.5
Lab ID: L131370-1 (P131069-1) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 09:55am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference							Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML		
Method: EPA 6010B - ICAP Metals							Soil	
TARGET ANALYTES								
LEAD	**N**	**172**	mg/kg	.107		1.28		

Run ID: R142276 / Work Group No.: WG133128
Prep Date1: 26-OCT-06 Prep Date2: 29-OCT-06 Analyzed 29-Oct-06 15:40

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-7/4.5
Lab ID: L131370-2 (P131069-2) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 09:57am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference							Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML		
Method: EPA 6010B - ICAP Metals							Soil	
TARGET ANALYTES								
LEAD		**609**	mg/kg	.143		1.72		

Run ID: R142276 / Work Group No.: WG133128
Prep Date1: 26-OCT-06 Prep Date2: 29-OCT-06 Analyzed 29-Oct-06 15:53

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-7/8.5
Lab ID: L131370-3 (P131069-3) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 10:00am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference							Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML		
Method: EPA 6010B - ICAP Metals							Soil	
TARGET ANALYTES								
LEAD		**269**	mg/kg	.111		1.33		

Run ID: R142276 / Work Group No.: WG133128
Prep Date1: 26-OCT-06 Prep Date2: 29-OCT-06 Analyzed 29-Oct-06 15:58

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-8/2.5
Lab ID: L131370-4 (P131069-4) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 10:06am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**495**	mg/kg	.131	1.58		

Run ID: R142276 / Work Group No.: WG133128
Prep Date1: 26-OCT-06 Prep Date2: 29-OCT-06 Analyzed 29-Oct-06 16:02

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-8/4.5
Lab ID: L131370-5 (P131069-5) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 10:09am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference							Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML		
Method: EPA 6010B - ICAP Metals							Soil	
TARGET ANALYTES								
LEAD		**420**	mg/kg	.131		1.58		

Run ID: R142276 / Work Group No.: WG133128
Prep Date1: 26-OCT-06 Prep Date2: 29-OCT-06 Analyzed 29-Oct-06 16:15

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-8/8.5
Lab ID: L131370-6 (P131069-6) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 10:12am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**4,580**	mg/kg	.115	1.38		

Run ID: R142276 / Work Group No.: WG133128
Prep Date1: 26-OCT-06 Prep Date2: 29-OCT-06 Analyzed 29-Oct-06 16:19

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-9/2.5
Lab ID: L131370-7 (P131069-7) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 10:17am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**456**	mg/kg	.122	1.47		

Run ID: R142276 / Work Group No.: WG133128
Prep Date1: 26-OCT-06 Prep Date2: 29-OCT-06 Analyzed 29-Oct-06 16:24

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-9/4.5
Lab ID: L131370-8 (P131069-8) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 10:19am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**130**	mg/kg	.132	1.59		

Run ID: R142276 / Work Group No.: WG133128
Prep Date1: 26-OCT-06 Prep Date2: 29-OCT-06 Analyzed 29-Oct-06 16:28

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-9/8.5
Lab ID: L131370-9 (P131069-9) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 10:23am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**10,000**	mg/kg	.108	1.29		

Run ID: R142276 / Work Group No.: WG133128
Prep Date1: 26-OCT-06 Prep Date2: 29-OCT-06 Analyzed 29-Oct-06 16:33

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-10/2.5
Lab ID: L131370-10 (P131069-10) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 10:37am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference							Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML		
Method: EPA 6010B - ICAP Metals							Soil	
TARGET ANALYTES								
LEAD		**181**	mg/kg	.142		1.7		

Run ID: R142276 / Work Group No.: WG133128
Prep Date1: 26-OCT-06 Prep Date2: 29-OCT-06 Analyzed 29-Oct-06 16:37

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-10/4.5
Lab ID: L131370-11 (P131069-11) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 10:39am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD	*	**4,410**	mg/kg	.149	1.78		

Run ID: R142276 / Work Group No.: WG133128
Prep Date1: 26-OCT-06 Prep Date2: 29-OCT-06 Analyzed 29-Oct-06 16:41

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-10/4.5/3
Lab ID: L131370-12 (P131069-12) Rush - 5 working day TAT
Sample Type: QCFR (Field Replicate Grab)
Date Collected: Oct 25 2006, 10:39am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments: field duplicate

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**932**	mg/kg	.124	1.49		

Run ID: R142276 / Work Group No.: WG133128
Prep Date1: 26-OCT-06 Prep Date2: 29-OCT-06 Analyzed 29-Oct-06 16:54

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-10/8.5
Lab ID: L131370-13 (P131069-13) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 10:44am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**43.7**	mg/kg	.17	2.04		

Run ID: R142276 / Work Group No.: WG133128
Prep Date1: 26-OCT-06 Prep Date2: 29-OCT-06 Analyzed 29-Oct-06 17:07

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-11/2.5
Lab ID: L131370-14 (P131069-14) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 10:56am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**95.5**	mg/kg	.105	1.26		

Run ID: R142276 / Work Group No.: WG133128
Prep Date1: 26-OCT-06 Prep Date2: 29-OCT-06 Analyzed 29-Oct-06 17:12

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-11/4.5
Lab ID: L131370-15 (P131069-15) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 11:03am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**15.0**	mg/kg	.181	2.17		

Run ID: R142276 / Work Group No.: WG133128
Prep Date1: 26-OCT-06 Prep Date2: 29-OCT-06 Analyzed 29-Oct-06 17:16

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-11/8.5
Lab ID: L131370-16 (P131069-16) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 11:05am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**8,520**	mg/kg	.115	1.37		

Run ID: R142276 / Work Group No.: WG133128
Prep Date1: 26-OCT-06 Prep Date2: 29-OCT-06 Analyzed 29-Oct-06 17:21

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-12/2.5
Lab ID: L131370-17 (P131069-17) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 11:12am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**1,120**	mg/kg	.106	1.28		

Run ID: R142276 / Work Group No.: WG133128
Prep Date1: 26-OCT-06 Prep Date2: 29-OCT-06 Analyzed 29-Oct-06 17:25

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-12/4.5
Lab ID: L131370-18 (P131069-18) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 11:14am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**37.8**	mg/kg	.192	2.3		

Run ID: R142276 / Work Group No.: WG133128
Prep Date1: 26-OCT-06 Prep Date2: 29-OCT-06 Analyzed 29-Oct-06 17:29

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-12/8.5
Lab ID: L131370-19 (P131069-19) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 11:18am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**29,000**	mg/kg	.136	1.63		

Run ID: R142276 / Work Group No.: WG133128
Prep Date1: 26-OCT-06 Prep Date2: 29-OCT-06 Analyzed 29-Oct-06 17:34

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-13/2.5
Lab ID: L131370-20 (P131069-20) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 11:33am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**6,590**	mg/kg	.107	1.29		

Run ID: R142276 / Work Group No.: WG133128
Prep Date1: 26-OCT-06 Prep Date2: 29-OCT-06 Analyzed 29-Oct-06 17:38

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-13/4.5
Lab ID: L131370-21 (P131069-21) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 11:36am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD	*	**1,180**	mg/kg	.138	1.66		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 27-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 09:42

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-13/8.5
Lab ID: L131370-22 (P131069-22) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 11:40am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**3,510**	mg/kg	.117		1.4	

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 27-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 09:56

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-14/2.5
Lab ID: L131370-23 (P131069-23) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 11:50am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**415**	mg/kg	.127	1.53		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 27-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 10:01

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-14/2.5/3
Lab ID: L131370-24 (P131069-24) Rush - 5 working day TAT
Sample Type: QCFR (Field Replicate Grab)
Date Collected: Oct 25 2006, 11:50am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments: field duplicate

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**378**	mg/kg	.12	1.44		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 27-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 10:05

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-14/4.5
Lab ID: L131370-25 (P131069-25) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 11:53am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**118**	mg/kg	.139	1.67		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 27-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 10:18

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-14/8.5
Lab ID: L131370-26 (P131069-26) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 25 2006, 11:58am Sample collector: D Matthews/Geologica
Date Received: Oct 25 2006, 12:21pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**29.7**	mg/kg	.148	1.77		

Run ID: R142250 / Work Group No.: WG133155
Prep Date1: 27-OCT-06 Prep Date2: 30-OCT-06 Analyzed 31-Oct-06 10:22

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EBMUD Laboratory
Analytical Report

EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
PO Box 24055, MS 59, Oakland, CA 94623
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California Environmental Laboratory Accreditation Program Certificate Number 1060

Laboratory Report - L131408

LSR # - B926-0609-1 Project Title: US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL INVESTIG

Report generated on: Nov 02, 2006 11:21 am

17 - Samples received by the lab on: Oct 26 2006, 02:20 pm
0 - Lost Analyses
0 - Hold Time Exceedences
Turn-around-time met

Client PM: MALLIKA RAMANATHAN Lab PM: KENNETH GERSTMAN

This is an electronic transmittal of a Laboratory Analytical Report

Samples included in this report:

Sample	Type	Collected	Site	Locator	ClientID
L131408-1	GRAB	26-Oct-2006 13:09	MISC	MISC	VW1-16/2.5
L131408-2	GRAB	26-Oct-2006 13:10	MISC	MISC	VW1-16/4.5
L131408-3	GRAB	26-Oct-2006 13:12	MISC	MISC	VW1-16/8.5
L131408-4	GRAB	26-Oct-2006 08:48	MISC	MISC	VW1-17/2.5
L131408-5	GRAB	26-Oct-2006 08:51	MISC	MISC	VW1-7/4.5
L131408-6	GRAB	26-Oct-2006 08:53	MISC	MISC	VW1-17/8.5
L131408-7	GRAB	26-Oct-2006 09:06	MISC	MISC	VW1-18/2.5
L131408-8	GRAB	26-Oct-2006 09:09	MISC	MISC	VW1-18/4.5
L131408-9	GRAB	26-Oct-2006 09:14	MISC	MISC	VW1-18/8.5
L131408-10	QCFR	26-Oct-2006 09:14	MISC	MISC	VW1-18/8.5/3
L131408-11	GRAB	26-Oct-2006 11:46	MISC	MISC	VW1-26/2.5
L131408-12	QCFR	26-Oct-2006 11:46	MISC	MISC	VW1-26/2.5/3
L131408-13	GRAB	26-Oct-2006 11:49	MISC	MISC	VW1-26/4.5
L131408-14	GRAB	26-Oct-2006 11:51	MISC	MISC	VW1-26/8.5
L131408-15	GRAB	26-Oct-2006 13:19	MISC	MISC	VW1-27/2.5
L131408-16	GRAB	26-Oct-2006 13:21	MISC	MISC	VW1-27/4.5
L131408-17	GRAB	26-Oct-2006 13:23	MISC	MISC	VW1-27/8.5

Legend to the laboratory qualifiers used in this report:
 N - Spike recovery outside of control limits
 Qualifiers for subcontract work - See textvalue for description

THIS REPORT MAY ONLY BE REPRODUCED IN ITS ENTIRETY. RESULTS CONTAINED IN THIS REPORT ARE REFLECTIVE ONLY OF THE ITEMS REQUESTED TO BE ANALYZED AND REPORTED. UNUSED PORTIONS OF SAMPLE WILL BE DISCARDED WITHIN THIRTY DAYS OF RECEIPT UNLESS OTHER ARRANGEMENTS ARE MADE BY THE CLIENT.

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-16/2.5
Lab ID: L131408-1 (P131069-30) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 01:09pm Sample collector: G Romero/Geologica
Date Received: Oct 26 2006, 02:20pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**116**	mg/kg	.162	1.94		

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 31-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 15:34

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I

Site:	MISC	Miscellaneous - Unidentified Site
Locator:	MISC	Miscellaneous sample, see sample comments for location
ClientID:	VW1-16/4.5	
Lab ID:	L131408-2 (P131069-31) Rush - 5 working day TAT	
Sample Type:	GRAB (Instantaneous Grab)	
Date Collected:	Oct 26 2006, 01:10pm Sample collector: G Romero/Geologica	
Date Received:	Oct 26 2006, 02:20pm Sample receiver: KGERSTMA	
Sample Comments:		

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**1,470**	mg/kg	.189	2.26		

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 31-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 15:38

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-16/8.5
Lab ID: L131408-3 (P131069-32) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 01:12pm Sample collector: G Romero/Geologica
Date Received: Oct 26 2006, 02:20pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**9,420**	mg/kg	.13	1.56		

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 31-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 15:42

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-17/2.5
Lab ID: L131408-4 (P131069-33) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 08:48am Sample collector: G Romero/Geologica
Date Received: Oct 26 2006, 02:20pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD	**N**	**120**	mg/kg	.192	2.31		

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 31-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 15:47

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-7/4.5
Lab ID: L131408-5 (P131069-34) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 08:51am Sample collector: G Romero/Geologica
Date Received: Oct 26 2006, 02:20pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**483**	mg/kg	.188	2.25		

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 31-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 16:00

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

EAST BAY MUNICIPAL UTILITY DISTRICT
Laboratory Services Division
PO Box 24055, MS 59, Oakland, CA 94623
Phone (510)287-1432 Fax (510)465-5462

Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-17/8.5
Lab ID: L131408-6 (P131069-35) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 08:53am Sample collector: G Romero/Geologica
Date Received: Oct 26 2006, 02:20pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference							Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML		
Method: EPA 6010B - ICAP Metals							Soil	
TARGET ANALYTES								
LEAD		**564**	mg/kg	.207		2.48		

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 31-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 16:13

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-18/2.5
Lab ID: L131408-7 (P131069-36) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 09:06am Sample collector: G Romero/Geologica
Date Received: Oct 26 2006, 02:20pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**244**	mg/kg	.19	2.28		

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 31-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 16:17

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-18/4.5
Lab ID: L131408-8 (P131069-37) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 09:09am Sample collector: G Romero/Geologica
Date Received: Oct 26 2006, 02:20pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**87.9**	mg/kg	.134	1.6		

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 31-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 16:22

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-18/8.5
Lab ID: L131408-9 (P131069-38) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 09:14am Sample collector: G Romero/Geologica
Date Received: Oct 26 2006, 02:20pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**31.1**	mg/kg	.132	1.59		

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 31-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 16:26

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-18/8.5/3
Lab ID: L131408-10 (P131069-39) Rush - 5 working day TAT
Sample Type: QCFR (Field Replicate Grab)
Date Collected: Oct 26 2006, 09:14am Sample collector: G Romero/Geologica
Date Received: Oct 26 2006, 02:20pm Sample receiver: KGERSTMA
Sample Comments: field duplicate

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**48.1**	mg/kg	.151	1.82		

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 31-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 16:30

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-26/2.5
Lab ID: L131408-11 (P131069-62) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 11:46am Sample collector: G Romero/Geologica
Date Received: Oct 26 2006, 02:20pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**6.81**	mg/kg	.179	2.14		

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 31-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 16:35

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-26/2.5/3
Lab ID: L131408-12 (P131069-63) Rush - 5 working day TAT
Sample Type: QCFR (Field Replicate Grab)
Date Collected: Oct 26 2006, 11:46am Sample collector: G Romero/Geologica
Date Received: Oct 26 2006, 02:20pm Sample receiver: KGERSTMA
Sample Comments: field duplicate

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**15.9**	mg/kg	.189	2.27		

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 31-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 16:39

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-26/4.5
Lab ID: L131408-13 (P131069-64) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 11:49am Sample collector: G Romero/Geologica
Date Received: Oct 26 2006, 02:20pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**407**	mg/kg	.144	1.73		

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 31-OCT-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 16:44

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-26/8.5
Lab ID: L131408-14 (P131069-65) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 11:51am Sample collector: G Romero/Geologica
Date Received: Oct 26 2006, 02:20pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**23.2**	mg/kg	.124	1.49		

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 01-NOV-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 17:19

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-27/2.5
Lab ID: L131408-15 (P131069-66) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 01:19pm Sample collector: G Romero/Geologica
Date Received: Oct 26 2006, 02:20pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**7.07**	mg/kg	.166		2	

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 01-NOV-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 17:32

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-27/4.5
Lab ID: L131408-16 (P131069-67) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 01:21pm Sample collector: G Romero/Geologica
Date Received: Oct 26 2006, 02:20pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference Parameter	Qualifier	Result	Units	Dilution	MDL	Matrix RL/ML	Tag
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**1,120**	mg/kg	.178	2.14		

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 01-NOV-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 17:36

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Analytical Results Report

LSR#: B926-0609-1 US ARMY RESERVE CENTER, HEROIC WAR DEAD SITE, SUPPLEMENTAL SOIL I
Site: MISC Miscellaneous - Unidentified Site
Locator: MISC Miscellaneous sample, see sample comments for location
ClientID: VW1-27/8.5
Lab ID: L131408-17 (P131069-68) Rush - 5 working day TAT
Sample Type: GRAB (Instantaneous Grab)
Date Collected: Oct 26 2006, 01:23pm Sample collector: G Romero/Geologica
Date Received: Oct 26 2006, 02:20pm Sample receiver: KGERSTMA
Sample Comments:

Method Reference						Matrix	Tag
Parameter	Qualifier	Result	Units	Dilution	MDL	RL/ML	
Method: EPA 6010B - ICAP Metals						Soil	
TARGET ANALYTES							
LEAD		**339**	mg/kg	.201	2.41		

Run ID: R142286 / Work Group No.: WG133201
Prep Date1: 01-NOV-06 Prep Date2: 01-NOV-06 Analyzed 01-Nov-06 17:40

RL is either the client requested or regulatory mandated Reporting Limit. ML is the regulatory mandated Minimum Level

APPENDIX C

Detailed Cost Information for FS Evaluation

Table C-1

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Alternative 2 - Soil Excavation and Offsite Disposal Cost Backup

									O&M/Future Costs		
Component	**Activity**				**Quantity**	**Unit Cost**	**Units**	**Capital Cost**	**Annual Cost**	**Number of Events**	**Present Worth**
A. Exposure Control through Risk and Hazard Management											
Institutional Controls											
Fencing and signs					1	10,000	LS	10,000			
Deed covenant to prevent water supply well construction and/or residential development					1	20,000	LS	20,000			
Soil management plan with HSP											
Management Plan					1	15,000	LS	15,000			
Operation & Maintenance											
Annual Site Inspection/Reporting/Covenant Maintenance					1	10,000	LS		10,000	30	$124,090
Five Year Review					1	15,000	LS		15,000	6	$35,777
					Subtotals			$45,000			$159,868
										10% Contingency	$20,487
										Component A Total	$225,355
B. Soil Excavation and Offsite Disposal											
Work Plan					1	10,000	LS	10,000			
Additional Sampling to refine excavation volumes					1	100,000	LS	100,000			
Excavation and Disposal											
Building 1064 cPAH AOC											
Excavation Contractor					5	5,000	day	25,000			
Confirmation Sampling and Engineering Oversight					5	2,000	day	10,000			
Soil Transport & Disposal					1000	35	tons	35,000			
Site Restoration					1000	15	tons	15,000			
						20% Contingency		17,000			
							Subtotal		102,000		
Building 1070 Yard - Boring SB-04 cPAH AOC											
Confirmation sampling to define excavation volume					1	5,000	LS	5,000			
Excavation Contractor					1	5,000	day	5,000			
Confirmation Sampling and Engineering Oversight					1	2,000	day	2,000			
Soil Transport & Disposal					22	35	tons	770			
Site Restoration					22	15	tons	330			
						20% Contingency		1,620			
							Subtotal		9,720		
Building 1070 Yard Lead AOC											
Excavation Contractor					30	5,000	day	150,000			
Confirmation Sampling and Engineering Oversight					30	2,000	day	60,000			
Soil Transport & Disposal					16,000	300	tons	4,800,000 (2)			
Site Restoration					16,000	15	tons	240,000			
						20% Contingency		1,050,000			
							Subtotal		6,300,000		
Reporting					1	15,000	LS	15,000			
										Component B Total	$6,536,720
						Total Cost for Remediation Alternative 2					$6,762,075

Notes:
(1) Assumes disposal at Class II landfill
(2) Assumes disposal as hazardous waste at Class I landfill
(3) Assumes discount rate of 7%

Table C-2

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Alternative 3 - Limited Soil Excavation and Offsite Disposal with Monitoring Cost Backup

										O&M/Future Costs		
Component		**Activity**				**Quantity**	**Unit Cost**	**Units**	**Capital Cost**	**Annual Cost**	**Number of Events**	**Present Worth**
A. Exposure Control through Risk and Hazard Management												
Institutional Controls												
		Fencing and signs				1	10,000	LS	10,000			
		Deed covenant to prevent water supply well construction and/or residential development				1	20,000	LS	20,000			
Soil management plan with HSP												
		Management Plan				1	15,000	LS	15,000			
Operation & Maintenance												
		Annual Site Inspection/Reporting/Covenant Maintenance				1	10,000	LS		10,000	30	$124,100
		Five Year Review				1	15,000	LS		15,000	6	$35,800
						Subtotals			$45,000			$159,900
										10% Contingency		$20,490
										Component A Total		$225,390
B. Soil Excavation and Offsite Disposal												
Work Plan						1	10,000	LS	10,000			
Additional Sampling to refine excavation volumes						1	30,000	LS	30,000			
Excavation and Disposal												
		Building 1064 cPAH AOC										
		Excavation Contractor				5	5,000	day	25,000			
		Confirmation Sampling and Engineering Oversight				5	2,000	day	10,000			
		Soil Transport & Disposal				1000	35	tons	35,000	(1)		
		Site Restoration				1000	15	tons	15,000			
							20%	Contingency	17,000			
								Subtotal		102,000		
		Building 1070 Yard - Boring SB-04 cPAH AOC										
		Confirmation sampling to define excavation volume				1	5,000	LS	5,000			
		Excavation Contractor				1	5,000	day	5,000			
		Confirmation Sampling and Engineering Oversight				1	2,000	day	2,000			
		Soil Transport & Disposal				22	35	tons	770			
		Site Restoration				22	15	tons	330			
							20%	Contingency	1,620			
								Subtotal		9,720		
		Building 1070 Yard Lead AOC										
		Excavation Contractor				10	5,000	day	50,000			
		Confirmation Sampling and Engineering Oversight				10	2,000	day	20,000			
		Soil Transport & Disposal				3000	300	tons	900,000	(2)		
		Site Restoration				3000	15	tons	45,000			
							20%	Contingency	203,000			
								Subtotal		1,218,000		
Reporting						1	15,000	LS	15,000			
										Component B Total		$1,384,720
C. Groundwater Monitoring												
Work Plan						1	10,000	LS	10,000			
Monitoring Well Installation and Development						6	4,000	well	24,000			
Biannual Groundwater Sampling(3)						7	1,000	well		14,000	30	$173,700
Annual Reporting						1	4000	ea		4,000	30	$49,600
										Component C Total		$257,300
										Total Cost for Remediation Alternative 3		$1,867,410

Notes:
(1) Assumes disposal at Class II landfill
(2) Assumes disposal as hazardous waste at Class I landfill
(3) Assumes 6 new wells and existing well EMW-4 used for monitoring program with 30 year monitoring program
(4) Assumes discount rate of 7%

Table C-3

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Alternative 4 - Limited Soil Excavation, Insitu Treatment with Monitoring Cost Backup

										O&M/Future Costs		
Component		**Activity**				**Quantity**	**Unit Cost**	**Units**	**Capital Cost**	**Annual Cost**	**Number of Events**	**Present Worth**
A. Exposure Control through Risk and Hazard Management												
Institutional Controls												
		Fencing and signs				1	10,000	LS	10,000			
		Deed covenant to prevent water supply well construction and/or residential development				1	20,000	LS	20,000			
Soil management plan with HSP												
		Management Plan				1	15,000	LS	15,000			
Operation & Maintenance												
		Annual Site Inspection/Reporting/Covenant Maintenance				1	10,000	LS		10,000	30	$124,100
		Five Year Review				1	15,000	LS		15,000	6	$35,800
						Subtotals			$45,000			$159,900
											10% Contingency	$20,490
										Component A Total		$225,390
B. Soil Excavation and Offsite Disposal												
Work Plan						1	10,000	LS	10,000			
Additional Sampling to refine excavation volumes						1	15,000	LS	15,000			
Excavation and Disposal												
		Building 1070 Yard - Boring SB-04 cPAH AOC										
		Confirmation sampling to define excavation volume				1	5,000	LS	5,000			
		Excavation Contractor				1	5,000	day	5,000			
		Confirmation Sampling and Engineering Oversight				1	2,000	day	2,000			
		Soil Transport & Disposal				22	35	tons	770			
		Site Restoration				22	15	tons	330			
							20% Contingency		1,620			
							Subtotal			9,720		
		Building 1064 cPAH AOC										
		Excavation Contractor				5	5,000	day	25,000			
		Confirmation Sampling and Engineering Oversight				5	2,000	day	10,000			
		Soil Transport & Disposal				1000	35	tons	35,000	(1)		
		Site Restoration				1000	15	tons	15,000			
							20% Contingency		17,000			
							Subtotal			102,000		
Reporting						1	5,000	LS	5,000			
										Component B Total		$141,720
C. In Situ Treatment of Lead-Impacted Soil												
Work Plan						1	10,000	LS	10,000			
Additional Sampling to refine treatment volumes						1	85,000	LS	85,000			
Bench Scale & Pilot Testing to Determine Treatment Parameters						1	75,000	LS	75,000			
		Building 1070 Yard Lead AOC										
		Insitu Treatment Contractor				20,500	100	ton	2,050,000			
		Engineering Oversight				45	1,500	day	67,500			
							20% Contingency		423,500			
							Subtotal			2,541,000		
Reporting						1	10,000	LS	10,000			
										Component C Total		$ 2,636,000

Table C-3

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Alternative 4 - Limited Soil Excavation, Insitu Treatment with Monitoring Cost Backup

										O&M/Future Costs		
Component		**Activity**				**Quantity**	**Unit Cost**	**Units**	**Capital Cost**	**Annual Cost**	**Number of Events**	**Present Worth**
D. Groundwater Monitoring												
Work Plan						1	10,000	LS	10,000			
Monitoring Well Installation and Development						6	4,000	well	24,000			
Biannual Groundwater Sampling(2)						7	1,000	well		14,000	5	$57,400
Annual Reporting						1	4000	ea		4,000	5	$16,400
										Component D Total		$107,800

Total Cost for Remediation Alternative 4 $3,110,910

Notes:
(1) Assumes disposal at Class II landfill
(2) Assumes 6 new wells and existing well EMW-4 used for monitoring program with 5 year monitoring program
(3) Assumes discount rate of 7%

Table C-4

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Alternative 5 - Limited Soil Excavation, Containment with Monitoring Cost Backup

									O&M/Future Costs		
Component	**Activity**				**Quantity**	**Unit Cost**	**Units**	**Capital Cost**	**Annual Cost**	**Number of Events**	**Present Worth**
A. Exposure Control through Risk and Hazard Management											
Institutional Controls											
	Fencing and signs				1	10,000	LS	10,000			
	Deed covenant to prevent water supply well construction and/or residential development				1	20,000	LS	20,000			
Soil management plan with HSP											
	Management Plan				1	15,000	LS	15,000			
Operation & Maintenance											
	Annual Site Inspection/Reporting/Covenant Maintenance				1	10,000	LS		10,000	30	$124,100
	Five Year Review				1	15,000	LS		15,000	6	$35,800
					Subtotals			$45,000			$159,900
									10% Contingency		$20,490
									Component A Total		$225,390
B. Soil Excavation and Offsite Disposal											
Work Plan					1	10,000	LS	10,000			
Additional Sampling to refine excavation volumes					1	15,000	LS	15,000			
Excavation and Disposal											
	Building 1070 Yard - Boring SB-04 cPAH AOC										
	Confirmation sampling to define excavation volume				1	5,000	LS	5,000			
	Excavation Contractor				1	5,000	day	5,000			
	Confirmation Sampling and Engineering Oversight				1	2,000	day	2,000			
	Soil Transport & Disposal				22	35	tons	770			
	Site Restoration				22	15	tons	330			
						20% Contingency		1,620			
							Subtotal		9,720		
	Building 1064 cPAH AOC										
	Excavation Contractor				5	5,000	day	25,000			
	Confirmation Sampling and Engineering Oversight				5	2,000	day	10,000			
	Soil Transport & Disposal				1000	35	tons	35,000	(1)		
	Site Restoration				1000	15	tons	15,000			
						20% Contingency		17,000			
							Subtotal		102,000		
Reporting					1	5,000	LS	5,000			
									Component B Total		$141,720
C. Soil Containment											
Work Plan					1	20,000	LS	20,000			
Supplemental Field Investigation											
	Additional Sampling to refine excavation volumes				1	85,000	LS	85,000			
	Methane generation evaluation				1	25,000	LS	25,000			
							Subtotal	110,000			
Containment System Construction											
	Slurry Wall (15 ft deep by 1,100 ft perimeter)				16,500	4	sf	66,000			
	Engineered Cap				55,000	7	sf	385,000			

Table C-4

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Alternative 5 - Limited Soil Excavation, Containment with Monitoring Cost Backup

									O&M/Future Costs		
Component	**Activity**				**Quantity**	**Unit Cost**	**Units**	**Capital Cost**	**Annual Cost**	**Number of Events**	**Present Worth**
	Engineering Oversight				45	1,500	day	67,500			
						20%	Contingency	103,700			
							Subtotal	622,200			
Reporting					1	15,000	LS	15,000			
									Component C Total		767,200
D. Leachate Collection and Treatment System											
Work Plan					1	20,000	LS	20,000			
Leachate System Construction											
	Construction contractor				1	20,000	LS	20,000			
	Engineering Oversight				10	1,500	day	15,000			
							Subtotal	35,000			
Treatment System Construction											
	Construction contractor				1	50,000	LS	50,000			
	Engineering Oversight				5	1,500	day	7,500			
							Subtotal	57,500			
Leachate System Operation & Maintenance											
	Activated Carbon Replacement				2500	5	lbs/yr	12,500	12,500	30	$155,100
	Sampling, Testing System Maintenance				1	1,000	month	1,000	12,000	30	$148,900
										Subtotal	$ 304,000
Reporting											
	Leachate collection system construction report				1	15,000	LS	15,000			
	O&M Manual				1	15,000	LS	15,000			
	Quarterly Performance Monitoring				1	2,500	quarter	2,500	10,000	30	$124,100
										Subtotal	$154,100
									Component D Total		$ 570,600
E. Groundwater Monitoring											
Work Plan					1	10,000	LS	10,000			
Monitoring Well Installation and Development					8	4,000	well	32,000			
Biannual Groundwater Sampling(2)					9	1,000	well	9,000	18,000	30	$223,400
Annual Reporting					1	4000	ea		4,000	30	$49,600
									Component E Total		$315,000
									Total Cost for Remediation Alternative 5(4)		$ 1,449,310

Notes:
(1) Assumes disposal at Class II landfill
(2) Assumes 6 new wells and existing well EMW-4 used for monitoring program with 30 year monitoring program
(3) Assumes discount rate of 7%
(4) Exclusive of leachate collection and treatment

Table C-5

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Alternative 6 - Limited Soil Excavation, Capping with Monitoring Cost Backup

								O&M/Future Costs		
Component	**Activity**			**Quantity**	**Unit Cost**	**Units**	**Capital Cost**	**Annual Cost**	**Number of Events**	**Present Worth**
A. Institutional Controls										
Institutional Controls										
	Fencing and signs			1	10,000	LS	10,000			
	Deed covenant to prevent water supply well construction and/or residential development			1	20,000	LS	20,000			
Soil management plan with HSP										
	Management Plan			1	15,000	LS	15,000			
Operation & Maintenance										
	Annual Site Inspection/Reporting/Covenant Maintenance			1	10,000	LS		10,000	30	$124,100
	Five Year Review			1	15,000	LS		15,000	6	$35,800
				Subtotals			$45,000			$159,900
									10% Contingency	$20,490
								Component A Total		$225,390
B. Soil Excavation and Offsite Disposal										
Work Plan				1	10,000	LS	10,000			
Additional Sampling to refine excavation volumes				1	15,000	LS	15,000			
Excavation and Disposal										
	Building 1070 Yard - Boring SB-04 cPAH Area									
	Confirmation sampling to define excavation volume			1	5,000	LS	5,000			
	Excavation Contractor			1	5,000	day	5,000			
	Confirmation Sampling and Engineering Oversight			1	2,000	day	2,000			
	Soil Transport & Disposal			22	35	tons	770			
	Site Restoration			22	15	tons	330			
					20% Contingency		1,620			
						Subtotal		9,720		
	Building 1064 cPAH Area									
	Excavation Contractor			5	5,000	day	25,000			
	Confirmation Sampling and Engineering Oversight			5	2,000	day	10,000			
	Soil Transport & Disposal			1000	35	tons	35,000	(1)		
	Site Restoration			1000	15	tons	15,000			
					20% Contingency		17,000			
						Subtotal		102,000		
Reporting				1	5,000	LS	5,000			
								Component B Total		$141,720
C. Soil Capping										
Work Plan				1	10,000	LS	10,000			
Cap Construction										
	Pavement Cap			55,000	4	sf	220,000			
	Engineering Oversight			5	1,500	day	7,500			
					20% Contingency		45,500			

Table C-5

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Alternative 6 - Limited Soil Excavation, Capping with Monitoring Cost Backup

								O&M/Future Costs		
Component	**Activity**			**Quantity**	**Unit Cost**	**Units**	**Capital Cost**	**Annual Cost**	**Number of Events**	**Present Worth**
						Subtotal	273,000			
	Reporting			1	15,000	LS	15,000			
								Component C Total		298,000
D. Groundwater Monitoring										
	Work Plan			1	10,000	LS	10,000			
	Monitoring Well Installation and Development			6	4,000	well	24,000			
	Biannual Groundwater Sampling(2)			7	1,000	well	7,000	14,000	30	$173,700
	Annual Reporting			1	4000	ea		4,000	30	$49,600
								Component D Total		$257,300
							Total Cost for Remediation Alternative 6		$	922,410

Notes:
(1) Assumes disposal at Class II landfill
(2) Assumes 6 new wells and existing well EMW-4 used for monitoring program with 30 year monitoring program
(3) Assumes discount rate of 7%

Table C-6

Heroic War Dead United States Army Reserve Center Oakland
Remedial Investigation/Feasibility Study

Alternative 7 - Institutional Controls Cost Backup

										O&M/Future Costs		
Component		**Activity**				**Quantity**	**Unit Cost**	**Units**	**Capital Cost**	**Annual Cost**	**Number of Events**	**Present Worth**
A. Exposure Control through Risk and Hazard Management												
Institutional Controls												
Fencing and signs						1	10,000	LS	10,000			
Deed covenant to prevent water supply well construction and/or residential development						1	20,000	LS	20,000			
Operation & Maintenance												
Annual Site Inspection/Reporting/Covenant Maintenance						1	10,000	LS		10,000	30	$124,100
Five Year Review						1	15,000	LS		15,000	6	$35,800
						Subtotals			$30,000			$159,900
											10% Contingency	$20,490
											Component A Total	$210,390
											Total Cost for Remediation Alternative 7	$210,390

Notes:
(1) Assumes discount rate of 7%

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