YRC Worldwide Inc
10990 Roe Avenue
Overland Park, KS 66211

May 23, 2013

**RECEIVED**
*By Alameda County Environmental Health at 3:21 pm, May 23, 2013*

To Whom It May Concern:

Attached is the "Former Roadway Express – 1708 Wood St., Oakland – Metals Review" for the former YRC Inc. (formerly known as Roadway Express) d.b.a. YRC Freight, property located at 1708 Wood Street in Oakland, CA 94607, Fuel Leak Case No. RO 0000039. I declare, under penalty of perjury, that the information and/or recommendations contained in the attached report are true and correct to the best of my knowledge.

YRC Freight is a subsidiary of YRC Worldwide Inc., and as Manager – Environmental Services and Properties of YRC Freight, I have been charged by YRC Worldwide Inc., to represent YRC Freight.

Sincerely,

Ruben D. Byerley
Manager – Environmental Services and Properties
YRC Freight

May 23, 2013

Keith Nowell
Hazardous Materials Specialist
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway
Alameda, CA 94502

Re: Former Roadway Express- 1708 Wood St, Oakland- Metals Review

Dear Mr. Nowell:

On behalf of YRC Inc. (YRC), Burns & McDonnell Engineering Company, Inc. (Burns & McDonnell) has prepared this memorandum to evaluate metals concentrations in soil and groundwater at the subject site located at 1708 Wood Street, Oakland, CA (Site) (see Figure 1 and Figure 2). The facility is currently occupied by Three Rivers Trucking as a trucking facility. This letter has been prepared in response to conversations between yourself and Mr. Ruben Byerley (YRC Freight: Manager-Environmental Services & Properties) regarding the potential sources of the metals concentrations in soil and groundwater observed at the Site; including nearby sites with environment impacts, historical uses of the Site, and naturally occurring (background) concentrations.

YRC operated the facility as a trucking terminal comprised of a dock, office, and a storage building. Preventative maintenance on tractors was performed in the central-eastern portion of the Site. Major mechanical repairs were not performed on Site (i.e. grinding, welding, machining).

Introduction

The Site is located in an area that has been utilized for heavy industrial purposes for more than fifty years. The potential for environmental impacts associated with nearby sites affecting the media at the Site, particularly groundwater, is likely. Nearby sites potentially contributing to metals contamination in soil and groundwater are presented in Table 1, and select sites are shown on Figure 1.

Historical uses of the Site include industrial (roofing, furniture warehousing, sheet metal, and iron works) and automotive (McKinley Perkins Petroleum, historical underground storage tanks [USTs], and California Motor Express) (ACC Environmental Consultants [ACC], 2011).

Background concentrations of metals in soil from nine Bay Area sites were summarized in the *Feasibility Study, Hookston Station, Pleasant Hill, California* (Environment Resources Management [EMR], 2006) and are included in Appendix A as EMR Table A-2, *Comparison of Background Concentrations of Metals in Bay Area Soils*. A summary of additional background

soil and groundwater data used in the evaluation presented in this letter is presented in Appendix A as Table A-1, *Background Concentrations of Metals in Soil and Groundwater,* and is based on the following publications:

- *Ambient Soil Concentrations Technical Memorandum, United States Army Reserve Center, Rio Vista, California* (ARCADIS Geraghty & Miller, Inc., 2000);
- *Inorganic Chemicals in Ground Water and Soil: Background Concentrations at California Air Force Bases* (Hunter, Davis, and Roach, 2005); and
- *Analysis of Background Distributions in Metals in Soil at the Lawrence Berkeley National Laboratory* (LBNL) (LBNL, 2009) (this publication is an update of the LBNL data referenced in EMR Table A-2).

Site soil and groundwater data evaluated are included in Table 2 through Table 5 (soil) and Table 6 through Table 8 (groundwater). Data included in Table 2 through Table 8 were presented in the following documents:

- *Site Investigation, Roadway Express, Inc., 1708 Wood Street, Oakland California* (Site Investigation) (Burns & McDonnell, 2008a);
- *Draft Phase II ESA – Limited Soil and Groundwater Investigation, Roadway/YRC Worldwide – 1708 Wood Street, Oakland, California* (Phase II ESA) (ACC, 2011); and
- *Underground Storage Tank & Oil Water Separator Removal Report, YRC Enterprise Services, Inc., Former Roadway Express Facility, 1708 Wood Street, Oakland, CA* (Removal Report) (Burns & McDonnell, 2012).

Site soil and groundwater data were compared to San Francisco Regional Water Quality Control Board Environmental Screening Levels (ESLs) for Commercial/Industrial Land Use where groundwater is not a current or potential source of Drinking Water.

Soil

Soil data evaluated were collected as grab samples using direct-push sampling techniques during investigation activities (Site Investigation and Phase II ESA) and using excavation sampling techniques during removal activities (Removal Report).

Results presented in the Site Investigation (Burns & McDonnell, 2008a) for four borings (BM-1, BM-7, BM-8, and BM-9; see Figure 3 and Figure 4) sampled for metals analysis indicated ESL exceedances in soil for arsenic, ranging from 2.8 micrograms per kilogram (mg/kg) to 5.4 mg/kg (see Table 2). These concentrations are within the background range for arsenic of 1.2 mg/kg to 42 mg/kg (see Appendix A Table A-1).

Results presented in the Phase II ESA (ACC, 2011) for borings sampled for metals analysis indicated ESL exceedances in soil for arsenic (ten borings), copper (one boring), lead (two

borings), and zinc (one boring), as indicated in Table 3. Phase II ESA boring locations are presented in Appendix B, ACC Figure 1. The arsenic concentrations ranged from 4.2 mg/kg to 11 mg/kg, within the background range for arsenic of 1.2 mg/kg to 42 mg/kg. Boring SB-1 exceeded the ESL for copper, lead, and zinc (copper [270 mg/kg] and lead [780 mg/kg] were detected near the ESLs of 230 mg/kg and 750 mg/kg, respectively). Boring SB-1 was located at the western perimeter of the Site, west of the northwest corner USTs and associated excavation (Appendix B, Figure 1). Soil samples from Boring SB-1 were collected from 2.5-3.0 feet below ground surface (bgs). Nearby Borings SB-2 and SB-3 did not show similar ESL exceedances. During the UST excavation, it was noted that multiple debris items (including rusted metal ties, plate sheet metal, corrugated tin sheets, bricks, and beverage bottles) were observed at a depth of one to one and a half feet bgs (Burns & McDonnell, 2012). Based on the historical uses of the Site, nearby sites, and location of the Boring SB-1 (outside of the northwest corner UST area), it is probable that metal impacts at Boring SB-1 are not related to YRC activities at the Site. Boring SB-12 exceeded the ESL for lead. Boring SB-12 was located east of Monitoring Well MW-5, outside of the oil water separator (OWS) excavation extent and the central-eastern UST excavation extent. Soil samples from Boring SB-12 were collected from 2.0-2.5 feet bgs (refusal unexpectedly encountered at 3 feet bgs). Nearby Boring SB-11 (north of Boring SB-12) exhibited elevated lead concentrations (but below the ESL) compared to other soil samples at the Site, suggesting that the areas of lead impact are limited. During the OWS excavation, it was noted that multiple debris items (including rusted metal ties, plate sheet metal, corrugated tin sheets, bricks, and beverage bottles) were observed at a depth of one to one and a half feet bgs (Burns & McDonnell, 2012). Based on the historical uses of the Site, nearby sites, and location of the Boring SB-12 (outside of the OWS and central-eastern UST area), it is probable that lead impact at Boring SB-12 is not related to YRC activities at the Site.

Results presented in the Removal Report (Burns & McDonnell, 2012) for one sample location from the OWS excavation (OWS-2NE3 [and resample of that location, OWS-NEA3], see Figure 4) sampled for metals analysis indicated ESL exceedances in soil for zinc in both samples and cadmium in OWS-NEA3 (see Table 4). Samples at these locations were collected from three feet bgs. Nearby sample location OWS-3E3 and Phase II ESA Borings SB-11 and SB-12 exhibited elevated zinc and cadmium concentrations (but below the respective ESLs) compared to other Site samples, suggesting that the area of zinc and cadmium impact is limited. During the OWS excavation, it was noted that multiple debris items (including rusted metal ties, plate sheet metal, corrugated tin sheets, bricks, and beverage bottles) were observed at a depth of one to one and a half feet bgs (Burns & McDonnell, 2012). Based on the historical uses of the Site, nearby sites, and the apparent limited extent of the zinc and cadmium impact, the source of the zinc and cadmium impact is uncertain. Zinc impacts are commonly associated with electroplating, galvanizing, and refining and smelting activities. Cadmium impacts are commonly associated with metal plating and smelting activities.

Results presented in the Removal Report (Burns & McDonnell, 2012) for four deep soil samples (15.6-16 feet bgs, collected from the floor of the northwest corner UST area excavation) exhibited metals concentrations that were below ESLs, indicating the vertical extent of metals impact is limited (see Table 5). This is consistent with data from the *Additional Site Assessment Report, Roadway Express, Inc., 1708 Wood Street, Oakland, California* (Additional Site Assessment Report) (Burns & McDonnell, 2008b), which indicated that the clayey Bay Mud layer encountered at a depth of approximately 15 feet bgs limits the vertical migration of contaminants.

Groundwater

Groundwater data evaluated were collected as grab samples using temporary well (installed with direct-push equipment) sampling techniques during investigation activities (Site Investigation and Phase II ESA) and using open pit sampling techniques during removal activities (Removal Report). Groundwater samples collected for the Site Investigation and Removal Report were not filtered at the time of collection and represent total metals concentrations. Groundwater samples collected for the Phase II ESA were filtered at the time of collection and represent dissolved metals concentrations.

Results presented in the Site Investigation for four borings (BM-1, BM-7, BM-8, and BM-9; see Figure 3 and Figure 4) sampled for metals analysis indicated ESL exceedances in groundwater for multiple constituents (see Table 6). The boring locations of BM-7, BM-8, and BM-9 were within the northwest corner USTs excavation area (USTs removed in 2011) and BM-1 was near the central-eastern UST excavation area (UST removed in 1987) (Burns & McDonnell, 2012). The Leaking Underground Fuel Tanks (LUFT) 5 metals (cadmium, chromium, lead, nickel, and zinc) exceeded ESLs at the four borings, with the exception of cadmium at BM-7 and BM-8 and chromium at BM-8. Several additional metals also exceeded their respective ESLs (cobalt, copper, and vanadium in the four borings; antimony in BM-1; and arsenic and barium in BM-1 and BM-9). The groundwater sample results presented in the Site Investigation are representative of total (unfiltered) metals concentrations collected as grab samples from temporary wells. The presence of additional metals constituents beyond the LUFT 5 metals suggests the metals impact may be from sources other than the USTs. The elevated concentrations may be largely related to suspended particulates and colloids, rather than dissolved metals species, because most metals tend to be far more concentrated in clays and colloids than in dissolved form.

Results presented in the Phase II ESA for borings sampled for metals analysis (see Table 7) indicated ESL exceedances in groundwater at four borings (SB-1, SB-10, SB-11, and SB-17, see Appendix B, ACC Figure 1). Boring SB-1 exceeded the ESL for arsenic. Boring SB-1 was

located at the western perimeter of the Site, west of the northwest corner USTs and associated excavation. Nearby Borings SB-2, SB-4, and SB-6 did not show similar ESL exceedances for groundwater. During the UST excavation, it was noted that multiple debris items (including rusted metal ties, plate sheet metal, corrugated tin sheets, bricks, and beverage bottles) were observed at a depth of one to one and a half feet bgs (Burns & McDonnell, 2012). Based on the historical uses of the Site, nearby sites, and location of Boring SB-1 (outside of the northwest corner UST area), it is probable that metal impacts in groundwater at Boring SB-1 are not related to YRC activities at the Site. Boring SB-17 was located at the northeastern corner of the Site to evaluate the potential of impacted groundwater migrating onto the Site. Cobalt, copper, lead, mercury, nickel, vanadium, and zinc exceeded ESLs at Boring SB-17. Based on the historical uses of the Site, nearby sites, and location of Boring SB-17 (upgradient perimeter of Site), it is probable that metals impacts at SB-17 are not related to YRC activities at the Site. Boring SB-10 exceeded the ESL for beryllium, cobalt, and nickel, and Boring SB-11 exceeded the ESL for nickel. Borings SB-10 and SB-11 were in the vicinity of Boring SB-12 and Removal Report soil sample locations OWS-2NE3 and OWS-NEA-3 which may be in an area impacted by historical uses or nearby sites. Cobalt and nickel concentrations in Boring SB-10 and the nickel concentration in SB-11 were below the background concentrations of 25 micrograms per liter (µg/L) (cobalt) and 455 µg/L (nickel), as indicated in Appendix A Table A-1. There was no background concentration established for beryllium in groundwater in the samples evaluated for the background study. Boring SB-10 was the only sample location at the Site where beryllium was detected in groundwater. The groundwater sample results presented in the Phase II ESA are representative of dissolved (filtered) metals concentrations collected as grab samples from temporary wells.

Results presented in the Removal Report for five samples from the northwest corner UST excavation and OWS excavation sampled for metals analysis (see Table 8) indicated ESL exceedances in groundwater for lead, nickel, and zinc in five samples and cadmium and chromium in one sample (WTank Grab). The samples (WTank Grab and ETank Grab) collected from the UST excavation were noted to have been in contact with the USTs and shoring prior to UST removal (Burns & McDonnell, 2012), and may not be representative of the groundwater conditions. The groundwater sample results presented in the Removal Report are representative of total (unfiltered) metals concentrations collected as grab samples from open excavations. Additionally, a second round of groundwater samples were not collected from the excavation as the temporary wells installed showed no recharge of groundwater after a 24 hour period. The potential sources (USTs, and OWS and associated piping) of the metals impact were removed and soil samples collected from below the USTs, the OWS, and OWS cleanout line did not exceed ESLs.

Conclusions

Evaluation of metals concentrations in soil and groundwater at the Site suggests that metals impacts may be attributed to nearby sites, historical use, or background concentrations, specifically:

- During the UST and OWS excavations in 2011, it was noted that multiple debris items (including rusted metal ties, plate sheet metal, corrugated tin sheets, bricks, and beverage bottles), *likely associated with non-YRC historical activities at the site(?)*, were observed at a depth of one to one and a half feet bgs (Burns & McDonnell, 2012); YRC performed preventative maintenance on Site, major mechanical repairs were not performed on Site.
- Arsenic concentrations in soil are within the range of background concentrations observed at other sites in the Bay Area and in California;
- Metal impacted soil and groundwater at the west perimeter of the Site are likely attributed to non-YRC (?) historical uses of the Site or nearby sites;
- Lead impact in soil in the central-eastern portion of the Site is limited in extent and likely attributed to non-YRC? historical uses of the Site or nearby sites;
- Groundwater data from the Site Investigation and Removal Report are representative of total (unfiltered) metals concentrations collected as grab samples collected from temporary wells and open excavations, respectively. Observed metals concentrations in these samples may be largely related to suspended clay particulates and colloids, not only dissolved metals species. Groundwater data from the Phase II ESA are representative of dissolved (filtered) metals concentrations collected as grab samples from temporary wells.
- Cadmium and zinc impacts in soil near the northeast corner of the OWS pit are limited in extent and the source of these impacts is uncertain;
- Metals impacts in groundwater at borings within the northwest corner USTs excavation area and near the central-eastern UST excavation area may be attributed to non-YRC? historical uses of the Site or nearby sites due to the presence of additional metals beyond the LUFT 5 metals (typically not related to LUFT releases);
- Cobalt and nickel impacts in groundwater near the OWS pit are comparable to background concentrations; beryllium impact may be related to non-YRC? historical use or nearby sites;
- Metals impacted groundwater at the east perimeter of the Site is likely attributed to impacted groundwater migrating onto the Site from nearby upgradient(?) sites with environmental impacts;
- Groundwater samples collected from the northwest corner UST excavation were noted to have been in contact with the USTs and shoring prior to UST removal and may not be representative of the groundwater conditions. Additionally, a second round of groundwater samples were not collected from this location as the temporary wells installed showed no recharge of groundwater after a 24 hour period.

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If you have any questions or comments regarding this evaluation of metals in soil an groundwater at the Site, please contact either of the undersigned,

Sincerely,

PROFESSIONAL GEOLOGIST
SIMON GEORGE BARBER
No. 8907
5/31/14
STATE OF CALIFORNIA

David Barker
Project Geologist- Environmental Group

Simon Barber P.G. QSP/D
Geologist- Environmental Group

Attachments:
Figures
Figure 1 – Site Location Map
Figure 2 – Site Map
Figure 3 – Northwest Corner UST Area Sample Locations
Figure 4 – Central Eastern (OWS) Area Sample Locations

Tables
Table 1 – RWQCB and DTSC Metals Sites within ½-Mile Radius of 1708 Wood Street
Table 2 – Summary of CAM 17 Metals in Shallow Soil (≤3 m bgs) (December 2007)
Table 3 – Summary of CAM 17 Metals in Shallow Soil (≤3 m bgs) (February 2011)
Table 4 – Summary of LUFT 5 Metals in Shallow Soil (≤3 m bgs) (October-November 2011)
Table 5 – Summary of LUFT 5 Metals in Deep Soil (≥3 m bgs) (October 2011)
Table 6 – Summary of CAM 17 Metals in Groundwater (December 2007)
Table 7 – Summary of Metals in Groundwater (February 2011)
Table 8 – Summary of LUFT 5 Metals in Groundwater (October-November 2011)

Appendices
Appendix A – Summary of Background Concentrations
Appendix B – ACC Figure 1

cc: Ruben Byerley- YRC Freight
Steve Shinners- YRC Freight

Cherrie McCaulou- SF Bay-RWQCB

# TABLES

**TABLE 1**

**RWQCB and DTSC Metals Sites within ½-Mile Radius of 1708 Wood Street**
**YRC Enterprise Services, Inc. - Roadway Express Facility**
**1708 Wood Street, Oakland, California**

| SITE NAME | GLOBAL ID | FACILITY ID | CLEANUP STATUS | ADDRESS | CITY | METALS OF CONCERN | HISTORICAL USE/ACTIVITY |
|---|---|---|---|---|---|---|---|
| 14TH STREET APARTMENTS (AKA IRON HORSE) | SL0600197637 | | COMPLETED - CASE CLOSED | | | ARSENIC, LEAD | |
| A. BERCOVICH 18TH STREET | 1420131 | 1420131 | CERTIFIED O&M - LAND USE RESTRICTIONS ONLY | 1639 18TH STREET | OAKLAND | LEAD | MANUFACTURING - SMELTING AND REFINING OPERATIONS; MANUFACTURING - PAINT; RECYCLING - SCRAP METAL/METAL SALVAGE |
| ACME GALVANIZING | T10000001503 | | OPEN - ASSESSMENT & INTERIM REMEDIAL ACTION | 1655 17TH | OAKLAND | LEAD | |
| ALTA PLATING & CHEMICAL CORP. | 70000088 | 70000088 | INACTIVE - NEEDS EVALUATION | 1433 18TH STREET | OAKLAND | NICKEL, ZINC | METAL PLATING |
| BNSF WOOD STREET YARD | 1400017 | 1400017 | CERTIFIED O&M - LAND USE RESTRICTIONS ONLY | WOOD STREET & WEST GRAND AVENUE | OAKLAND | ARSENIC | RAILROAD RIGHT-OF-WAY |
| CENTRAL STATION VILLAGE | SL0600180308 | | COMPLETED - CASE CLOSED | 1401-1599 WOOD STREET | OAKLAND | LEAD | |
| GAINES PROPERTY | 1750030 | 1750030 | CERTIFIED | 1795 11TH STREET | OAKLAND | LEAD | JUNKYARD; RECYCLING - SCRAP METAL |
| GLOBE METALS | T0600191528 | | OPEN - INACTIVE | 1820 10TH ST | OAKLAND | LEAD | |
| LDS TRUCKING | 1420127 | 1420127 | CERTIFIED | 2233 WOOD STREET | OAKLAND | LEAD | TRUCK REPAIR SHOP; RETAIL SERVICE STATION |
| MANDELA PARKWAY CORRIDOR | 1410118 | 1410118 | CERTIFIED | MANDELA PARKWAY BETWEEN 34TH AND 8TH STS | OAKLAND | LEAD | HIGHWAY RIGHT-OF-WAY |
| MANDELA GRAND | 60000433 | 60000433 | INACTIVE - NEEDS EVALUATION | MANDELA PARKWAY AND WEST GRAND | OAKLAND | LEAD, CADMIUM AND COMPOUNDS | |
| OAKLAND ARMY BASE | 1970006 | 1970006 | ACTIVE | 2475-D WEST 12TH STREET | OAKLAND | ARSENIC, LEAD, MANGANESE AND COMPOUNDS, MERCURY, SILVER, TOTAL CHROMIUM | MULTIPLE: LANDFILLS; BATTERY STORAGE; EQUIPMENT / INSTRUMENT REPAIR; JUNKYARD; MANUFACTURING; METAL FINISHING; PAINT/DEPAINT FACILITY; RAIL ROAD MAINTENANCE SHOP; RECYCLING; SERVICE STATION; SHIPYARD; WAREHOUSING; MAINTENANCE/CLEANING; OTHER |
| NEW OAKLAND FIRE STATION #3 | 1920063 | 1920063 | CERTIFIED | CENTER AND 14TH STREET | OAKLAND | LEAD | |
| RELIANCE UPHOLSTERY SUPPLY | 70000082 | 70000082 | CERTIFIED | 1614 CAMPBELL STREET | OAKLAND | | WAREHOUSING; LIGHT BULB MANUFACTURING; COTTON MILL |
| SOUTHERN PACIFIC OAKLAND / SOUTHERN PACIFIC TRANSPORTATION COMPANY | 1400001 / SLT2O193296 | 1400001 | REFER: RWQCB / OPEN - INACTIVE | 1707 WOOD STREET | OAKLAND | ARSENIC, LEAD | FOUNDRY; MANUFACTURING - LUMBER/WOOD PRODUCTS; RAIL ROAD MAINTENANCE SHOP; VEHICLE MAINTENANCE |
| TKG CALIFORNIA STORAGE | 60000712 | 60000712 | CERTIFIED O&M - LAND USE RESTRICTIONS ONLY | 2450 MANDELA PARKWAY | OAKLAND | CHROMIUM III, LEAD | FUEL - VEHICLE STORAGE/ REFUELING; MACHINE SHOP; METAL FINISHING/METAL COATING; WAREHOUSING |
| WEST RECYCLER BIN STORAGE | 1890018 | 1890018 | REFER: RWQCB | 1405 WOOD STREET | OAKLAND | ARSENIC, LEAD, CADMIUM AND COMPOUNDS, MOLYBDENUM | EQUIPMENT/INSTRUMENT REPAIR; VEHICLE MAINTENANCE |
| WILLOW PARK | 1990028 | 1990028 | NO FURTHER ACTION | 1368 WILLOW STREET | OAKLAND | ARSENIC, LEAD | AUTOMOBILE GARAGES; MULTI-TENANT RESIDUAL STRUCTURE; MISCELLANEOUS STORED OBJECTS AND VEHICLES |

Source: California State Water Resources Control Board GeoTracker, retrieved from http://geotracker.waterboards.ca.gov/#

Notes:

DTSC - Department of Toxic Substances Control

RWQCB - Regional Water Quality Control Board

**TABLE 2**
**Summary of CAM 17 Metals in Shallow Soil (≤3 m bgs) (December 2007)**
**YRC Enterprise Services, Inc. - Roadway Express Facility**
**1708 Wood Street, Oakland, California**

| Boring ID | | BM-1 | BM-7 | BM-8 | BM-9 |
|---|---|---|---|---|---|
| Sample Depth (feet bgs) | | 8 | 6 | 7 | 5 |
| Date Collected | | 12/10/2007 | 12/10/2007 | 12/10/2007 | 12/10/2007 |
| Metal | California Tier 1 ESL (mg/kg) | mg/kg | mg/kg | mg/kg | mg/kg |
| Antimony | 40 | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Arsenic | 1.6 | **5.1** | **3.2** | **5.4** | **2.8** |
| Barium | 1,500 | **21** | **34** | **54** | **94** |
| Beryllium | 8 | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Cadmium | 7.4 | **1.4** | 1.0 U | 1.0 U | 1.0 U |
| Chromium | 750 | **44** | **50** | **42** | **31** |
| Cobalt | 80 | **14** | **8.0** | **5.3** | **7.7** |
| Copper | 230 | **19** | **23** | **36** | **28** |
| Lead | 750 | **6.0** | **9.6** | **49** | **22** |
| Mercury | 10 | 0.050 U | 0.050 U | **0.25** | 0.050 U |
| Molybdenum | 40 | 1.0 U | **1.4** | 1.0 U | 1.0 U |
| Nickel | 150 | **65** | **37** | **26** | **25** |
| Selenium | 10 | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| Silver | 40 | 1.0 U | 1.0 U | 1.0 U | 1.0 U |
| Thallium | 16 | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| Vanadium | 200 | **36** | **41** | **35** | **33** |
| Zinc | 600 | **51** | **61** | **100** | **70** |

Notes:
Detections presented in bold
Concentrations exceeding California Tier 1 ESL are highlighted
bgs - below ground surface
California Tier 1 ESL - Commercial/Industrial Land Use Only, Groundwater is not a Current or Potential Source of Drinking Water
CAM - California Administrative Manual
ESL - Environmental Screening Level
m - meters
mg/kg - milligrams per kilogram
U - not detected above laboratory reporting limit

Source: *Underground Storage Tank & Oil Water Separator Removal Report* (Burns & McDonnell, 2012)

**TABLE 3**
**Summary of CAM 17 Metals in Shallow Soil (≤3 m bgs) (February 2011)**
**YRC Enterprise Services, Inc. - Roadway Express Facility**
**1708 Wood Street, Oakland, California**

| Boring ID | | SB-1 | SB-2 | SB-3 | SB-4 | SB-5 | SB-6 | SB-7 | SB-8 | SB-11 | SB-12 | SB-13 | SB-14 | SB-15 | SB-16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Depth (feet bgs) | | 2.5 - 3.0 | 2.5 - 3.0 | 2.0 - 2.5 | 2.0 - 2.5 | 2.0 - 2.5 | 2.0 - 2.5 | 2.5 - 3.0 | 1.5 - 2.0 | 2.0 - 2.5 | 2.0 - 2.5 | 1.5 - 2.0 | 14.5 - 16 | 2.0 - 2.5 | 2.0 - 2.5 |
| Date Collected | | 2/15/2011 | 2/15/2011 | 2/15/2011 | 2/15/2011 | 2/15/2011 | 2/15/2011 | 2/16/2011 | 2/17/2011 | 2/16/2011 | 2/16/2011 | 2/16/2011 | 2/16/2011 | 2/16/2011 | 2/17/2011 |
| Metal | California Tier 1 ESL (mg/kg) | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg |
| Arsenic | 1.6 | **11** | **4.8** | **4.4** | **8.6** | **5** | 3.8 U | **4.5** | 3.9 U | **7.8** | **5.9** | **4.3** | 4.2 U | 2.0 U | **4.2** |
| Barium | 1,500 | **1,000** | **77** | **21** | **13** | **34** | **85** | **120** | **160** | **76** | **270** | **110** | **87** | **110** | **130** |
| Beryllium | 8 | 0.38 U | 0.38 U | 0.42 U | 0.42 U | 0.41 U | 0.38 U | 0.4 U | 0.39 U | 0.42 U | 0.38 U | 0.42 U | 0.42 U | 0.39 U | 0.4 U |
| Cadmium | 7.4 | **3.3** | 0.48 U | 0.53 U | 0.52 U | 0.52 U | 0.48 U | 0.5 U | 0.49 U | **1.1** | **1.1** | 0.53 U | 0.53 U | 0.49 U | 0.5 U |
| Chromium | 750 | **49** | **39** | **40** | **42** | **48** | **49** | **81** | **59** | **39** | **43** | **45** | **26** | **46** | **35** |
| Cobalt | 80 | **10** | **5.5** | **5** | **3.7** | **5.1** | **4.4** | **10** | **7.7** | **7.7** | **9** | **5.8** | **4** | **7.5** | **6** |
| Copper | 230 | **270** | **23** | **16** | **21** | **26** | **18** | **23** | **14** | **36** | **27** | **22** | 6.3 U | **28** | **41** |
| Lead | 750 | **780** | **44** | **18** | **3.2** | **8.5** | **19** | **15** | **9.9** | **420** | **1,300** | **110** | **4.4** | **250** | **340** |
| Molybdenum | 40 | 1.9 U | 1.9 U | 2.1 U | 3.4 | 2.1 U | 1.9 U | 2.0 U | 2.0 U | 2.1 U | 1.9 U | 2.1 U | 2.1 U | 2.0 U | 2.0 U |
| Nickel | 150 | **60** | **31** | **31** | **24** | **33** | **34** | **100** | **59** | **44** | **37** | **32** | **18** | **34** | **29** |
| Silver | 40 | **1** | 0.95 U | 1.1 U | 1.0 U | 1.0 U | 0.95 U | 1.0 U | 0.98 U | 1.0 U | 0.95 U | 1.1 U | 1.1 U | 0.98 U | 0.99 U |
| Vanadium | 200 | **25** | **32** | **29** | **33** | **35** | **34** | **31** | **20** | **17** | **28** | **34** | **16** | **28** | **26** |
| Zinc | 600 | **1,200** | **120** | **48** | **100** | **130** | **47** | **60** | **36** | **210** | **290** | **100** | **12** | **100** | **250** |
| Mercury | 10 | **0.67** | **0.097** | **0.037** | **0.12** | **0.15** | **0.043** | **0.062** | **1.1** | **0.27** | **0.1** | **0.043** | **0.033** | **0.38** | **0.18** |

Notes:
Detections presented in bold
Concentrations exceeding California Tier 1 ESL are highlighted
bgs - below ground surface
California Tier 1 ESL - Commercial/Industrial Land Use Only, Groundwater is not a Current or Potential Source of Drinking Water
CAM - California Administrative Manual
ESL - Environmental Screening Level
m - meters
mg/kg - milligrams per kilogram
U - not detected above laboratory reporting limit

Source: *Draft Phase II EDA - Limited Soil and Groundwater Investigation* (ACC, 2011)

**TABLE 4**
**Summary of LUFT 5 Metals in Shallow Soil (≤3 m bgs) (October-November 2011)**
**YRC Enterprise Services, Inc. - Roadway Express Facility**
**1708 Wood Street, Oakland, California**

| Boring ID | | OWS-1N3 | Dup-1 (OWS-1N3) | OWS-2NE3 | OWS-3E3 | OWS-4S3.6 | OWS-5W3 |
|---|---|---|---|---|---|---|---|
| Sample Depth (feet bgs) | | 3 | 3 | 3 | 3 | 3.6 | 3 |
| Date Collected | | 10/27/2011 | 10/27/2011 | 10/27/2011 | 10/27/2011 | 10/27/2011 | 10/27/2011 |
| Comments | | North Sidewall | North Sidewall | Northeast Sidewall | East Sidewall | South Sidewall | West Sidwall |
| Metal | California Tier 1 ESL (mg/kg) | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg |
| Cadmium | 7.4 | 0.92 U | 0.93 U | **5.0** | **2.0** | 0.89 U | 0.91 U |
| Chromium | 750 | **30.0** | **32.3** | **29.6** | **30.5** | **29.8** | **32.6** |
| Lead | 750 | **57.0** | **260** | **171** | **412** | **184** | **58.8** |
| Nickel | 150 | **35.0** | **67.1** | **42.5** | **76.6** | **36.7** | **25.9** |
| Zinc | 600 | **102** | **184** | **1,710** | **539** | **155** | **51.3** |

| Boring ID | | OWS-6F4 | OWS-11-3A | OWS NEA-3 | OWSL-1-4 | OWSL-2-3 | OWSL-3-4 |
|---|---|---|---|---|---|---|---|
| Sample Depth (feet bgs) | | 4 | 4.6 | 3 | 4 | 3 | 4 |
| Date Collected | | 10/27/2011 | 11/3/2011 | 11/9/2011 | 11/9/2011 | 11/9/2011 | 11/9/2011 |
| Comments | | OWS Floor | OWS-6F4 Resample | OWS-2NE3 Resample | Oil Water Line | Oil Water Line | Oil Water Line |
| Metal | California Tier 1 ESL (mg/kg) | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg |
| Cadmium | 7.4 | 0.97 U | 0.97 U | **12.1** | 1.0 U | 0.91 U | 0.95 U |
| Chromium | 750 | **45.3** | **43.8** | **37.1** | **53.2** | **51.2** | **47.0** |
| Lead | 750 | **70.4** | **4.7** | **59.0** | **6.6** | **28.2** | **21.4** |
| Nickel | 150 | **27.2** | **22.0** | **39.3** | **31.9** | **41.6** | **33.6** |
| Zinc | 600 | **98.9** | **31.5** | **1,990** | **56.8** | **100** | **81.6** |

| Boring ID | | OWSL-4-2 | SW1-E3 | SW2-N5 | SW3-W4B | SW4-W3.6 |
|---|---|---|---|---|---|---|
| Sample Depth (feet bgs) | | 2 | 3 | 5 | 4 | 3.6 |
| Date Collected | | 11/9/2011 | 11/18/2011 | 11/18/2011 | 11/18/2011 | 11/18/2011 |
| Comments | | Oil Water Line | Sidewalk- East sidewall | Sidewalk-North Sidewall | Sidewalk-NW Sidewall | Sidewalk-NW Sidewall |
| Metal | California Tier 1 ESL (mg/kg) | mg/kg | mg/kg | mg/kg | mg/kg | mg/kg |
| Cadmium | 7.4 | 0.99 U | 0.93 U | 0.93 U | 0.89 U | 0.90 U |
| Chromium | 750 | **40.0** | **28.5** | **52.4** | **50.6** | **41.8** |
| Lead | 750 | **53.9** | **3.2** | **7.4** | **5.8** | **197.0** |
| Nickel | 150 | **43.4** | **16.6** | **61.2** | **54.1** | **43.8** |
| Zinc | 600 | **85.0** | **28.0** | **56.1** | **50.8** | **180** |

Notes:
Detections presented in bold
Concentrations exceeding California Tier 1 ESL are highlighted
bgs - below ground surface
California Tier 1 ESL - Commercial/Industrial Land Use Only, Groundwater is not a Current or Potential Source of Drinking Water
ESL - Environmental Screening Level
LUFT - Leaking Underground Fuel Tanks
m - meters
mg/kg - milligrams per kilogram
U - not detected above laboratory reporting limit

Source: *Underground Storage Tank & Oil Water Separator Removal Report* (Burns & McDonnell, 2012)

**TABLE 5**
**Summary of LUFT 5 Metals in Deep Soil (≥3 m bgs) (October 2011)**
**YRC Enterprise Services, Inc. - Roadway Express Facility**
**1708 Wood Street, Oakland, California**

| Boring ID | | West-W16 | West-E16 | East-W15.6 | East-E16 |
|---|---|---|---|---|---|
| Sample Depth (feet bgs) | | 16 | 16 | 15.6 | 16 |
| Date Collected | | 10/31/2011 | 10/31/2011 | 10/31/2011 | 10/31/2011 |
| Comments | | West UST-West End | West UST-East End | East UST-West End | East UST-East End |
| Metal | California Tier 1 ESL (mg/kg) | mg/kg | mg/kg | mg/kg | mg/kg |
| Cadmium | 39 | 0.88 U | 0.89 U | 0.93 U | 0.90 U |
| Chromium | 5,000 | **51.8** | **47.9** | **49.6** | **46.3** |
| Lead | 750 | **5.6** | **5** | **5.3** | **3.9** |
| Nickel | 260 | **49.2** | **45.3** | **47.9** | **37** |
| Zinc | 5,000 | **44.5** | **41** | **43.8** | **35.7** |

Notes:
Detections presented in bold
Concentrations exceeding California Tier 1 ESL are highlighted
bgs - below ground surface
California Tier 1 ESL - Commercial/Industrial Land Use Only, Groundwater is not a Current or Potential Source of Drinking Water
ESL - Environmental Screening Level
LUFT - Leaking Underground Fuel Tanks
m - meters
mg/kg - milligrams per kilogram
U - not detected above laboratory reporting limit

Source: *Underground Storage Tank & Oil Water Separator Removal Report* (Burns & McDonnell, 2012)

**TABLE 6**
**Summary of CAM 17 Metals in Groundwater (December 2007)**
**YRC Enterprise Services, Inc. - Roadway Express Facility**
**1708 Wood Street, Oakland, California**

| Boring ID | | BM-1 | BM-7 | BM-8 | BM-9 |
|---|---|---|---|---|---|
| Sample Depth (feet bgs) | | 8 | 6 | 7 | 5 |
| Date Collected | | 12/10/2007 | 12/10/2007 | 12/10/2007 | 12/10/2007 |
| Metal | California Tier 1 ESL (µg/L) | µg/L | µg/L | µg/L | µg/L |
| Antimony | 30 | **63** | 10 U | 10 U | **11** |
| Arsenic | 36 | **430** | **31** | **11** | **72** |
| Barium | 1,000 | **5,600** | **270** | **94** | **2,400** |
| Beryllium | 0.53 | 5.0 U | 5.0 U | 5.0 U | 5.0 U |
| Cadmium | 0.25 | **16** | 2.0 U | 2.0 U | **7** |
| Chromium | 180 | **5,500** | **270** | **110** | **610** |
| Cobalt | 3 | **610** | **42** | **15** | **170** |
| Copper | 3.1 | **2,900** | **110** | **45** | **640** |
| Lead | 2.5 | **9,200** | **83** | **30** | **860** |
| Mercury | 0.025 | 0.2 U | 0.2 U | 0.2 U | 0.2 U |
| Molybdenum | 240 | 5.0 U | **5.0** | 5.0 U | **22** |
| Nickel | 8.2 | **3,500** | **220** | **75** | **500** |
| Selenium | 5 | 20 U | 20 U | 20 U | 20 U |
| Silver | 0.19 | 5.0 U | 5.0 U | 5.0 U | 5.0 U |
| Thallium | 4 | 20 U | 20 U | 20 U | 20 U |
| Vanadium | 19 | **4,000** | **230** | **90** | **580** |
| Zinc | 81 | **7,200** | **260** | **87** | **1,500** |

Notes:
Detections presented in bold
Concentrations exceeding California Tier 1 ESL are highlighted
Concentrations presented represent total metals (unfiltered) data
bgs - below ground surface
California Tier 1 ESL - Commercial/Industrial Land Use Only, Groundwater is not a Current or Potential Source of Drinking Water
CAM - California Administrative Manual
ESL - Environmental Screening Level
m - meters
µg/L - micrograms per liter
U - not detected above laboratory reporting limit

Source: *Underground Storage Tank & Oil Water Separator Removal Report* (Burns & McDonnell, 2012)

**TABLE 7**
**Summary of Metals in Groundwater (February 2011)**
**YRC Enterprise Services, Inc. - Roadway Express Facility**
**1708 Wood Street, Oakland, California**

| Boring ID | | SB-1 | SB-2 | SB-3 | SB-4 | SB-6 | SB-7 | SB-10 | SB-11 | SB-16 | SB-17 | SB-18 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sample Depth (feet bgs) | | 7 - 12 | 7 - 12 | 7 - 12 | 7 - 12 | 7 - 12 | 7 - 12 | 7 - 12 | 7 - 12 | 7 - 12 | 7 - 12 | 7 - 12 |
| Date Collected | | 2/15/2011 | 2/15/2011 | 2/15/2011 | 2/15/2011 | 2/16/2011 | 2/17/2011 | 2/16/2011 | 2/16/2011 | 2/17/2011 | 2/17/2011 | 2/17/2011 |
| Metal | California Tier 1 ESL (µg/L) | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L |
| Arsenic | 36 | **130** | 10 U | NA | 10 U | 10 U | 10 U | 10 U | 10 U | **11** | 10 U | 10 U |
| Barium | 1,000 | **130** | **65** | NA | **77** | **110** | **53** | **460** | **240** | **110** | **240** | **36** |
| Beryllium | 0.53 | 2.0 U | 2.0 U | NA | 2.0 U | 2.0 U | 2.0 U | **2.9** | 2.0 U | 2.0 U | 2.0 U | 2.0 U |
| Cadmium | 0.25 | 2.5 U | 2.5 U | NA | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U | 2.5 U |
| Chromium | 180 | 10 U | 10 U | NA | 10 U | 10 U | 10 U | 10 U | 10 U | 10 U | **88** | 10 U |
| Cobalt | 3 | 2.0 U | **2.4** | NA | 2.0 U | 2.0 U | 2.0 U | **4** | 2.0 U | 2.0 U | **18** | 2.0 U |
| Copper | 3.1 | 20 U | 20 U | NA | 20 U | 20 U | 20 U | 20 U | 20 U | 20 U | **70** | 20 U |
| Lead | 2.5 | 5.0 U | 5.0 U | NA | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | 5.0 U | **100** | 5.0 U |
| Mercury | 0.025 | 0.2 U | 0.2 U | NA | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | 0.2 U | **0.29** | 0.2 U |
| Molybdenum | 240 | 10 U | **11** | NA | 10 U | **11** | 10 U | **14** | 10 U | 10 U | 10 U | 10 U |
| Nickel | 8.2 | 10 U | 10 U | NA | 10 U | 10 U | 10 U | **11** | **68** | 10 U | **59** | 10 U |
| Vanadium | 19 | 10 U | 10 U | NA | 10 U | 10 U | **10** | 10 U | 10 U | 10 U | **76** | 10 U |
| Zinc | 81 | **56** | **25** | NA | 20 U | **31** | 20 U | **22** | **26** | **27** | **240** | 20 U |

Notes:
Detections presented in bold
Concentrations exceeding California Tier 1 ESL are highlighted
Concentrations presented represent dissolved metals (filtered) data
bgs - below ground surface
California Tier 1 ESL - Commercial/Industrial Land Use Only, Groundwater is not a Current or Potential Source of Drinking Water
ESL - Environmental Screening Level
m - meters
µg/L - micrograms per liter
U - not detected above laboratory reporting limit

Source: *Draft Phase II ESA - Limited Soil and Groundwater Investigation* (ACC, 2011)

**TABLE 8**
**Summary of LUFT 5 Metals in Groundwater (October-November 2011)**
**YRC Enterprise Services, Inc. - Roadway Express Facility**
**1708 Wood Street, Oakland, California**

| Boring ID | | OWS-GW | CO Water | CO Water-2 | WTank Grab | ETank Grab |
|---|---|---|---|---|---|---|
| Sample Depth (feet bgs) | | 5 | 3 | 3 | 13 | 11 |
| Date Collected | | 10/27/2011 | 11/9/2011 | 11/18/2011 | 10/31/2011 | 10/31/2011 |
| Comments | | Oil Water Pit | Oil Water Line | Oil Water Line | West Tank- West End | East Tank- East End |
| Metal | California Tier 1 ESL (µg/L) | µg/L | µg/L | µg/L | µg/L | µg/L |
| Cadmium | 0.25 | 2.0 U | 2.0 U | 2.0 U | **14.7** | 2.0 U |
| Chromium | 180 | 10 U | **13.0** | **80.4** | **866** | **54.6** |
| Lead | 2.5 | **121** | **80.4** | **311** | **2,050** | **38.0** |
| Nickel | 8.2 | **52.4** | **19.0** | **54.2** | **1,010** | **59.6** |
| Zinc | 81 | **121** | **102** | **388** | **3,070** | **167** |

Notes:
Detections presented in bold
Concentrations exceeding California Tier 1 ESL are highlighted
Concentrations presented represent total metals (unfiltered) data
bgs - below ground surface
California Tier 1 ESL - Commercial/Industrial Land Use Only, Groundwater is not a Current or Potential Source of Drinking Water
ESL - Environmental Screening Level
LUFT - Leaking Underground Fuel Tanks
m - meters
µg/L - micrograms per liter
U - not detected above laboratory reporting limit

Source: *Underground Storage Tank & Oil Water Separator Removal Report* (Burns & McDonnell, 2012)

# FIGURES


LEGEND

- SIGNIFIES A CLOSED SITE
- LEAKING UNDERGROUND TANK CLEANUP SITES
- OTHER CLEANUP SITES
- MILITARY SITES
- DTSC CLEANUP SITES

NOTE:

SOURCE: HTTP//GEOTRACKER.WATERBOARDS.CA.GOV

N

0 1200' 2400'

SCALE IN FEET

Burns & McDonnell SINCE 1898

Figure 1

SITE LOCATION MAP
ROADWAY EXPRESS
1708 WOOD STREET
OAKLAND, CA

COPYRIGHT © 2013 BURNS & McDONNELL ENGINEERING COMPANY, INC.

H:\Projects\YRC Enterprise Services Inc\YRCW Oakland, CA\Site Closure\Metals_Site\Figures\YRC Oakland Fig 1_Jan2012.dgn

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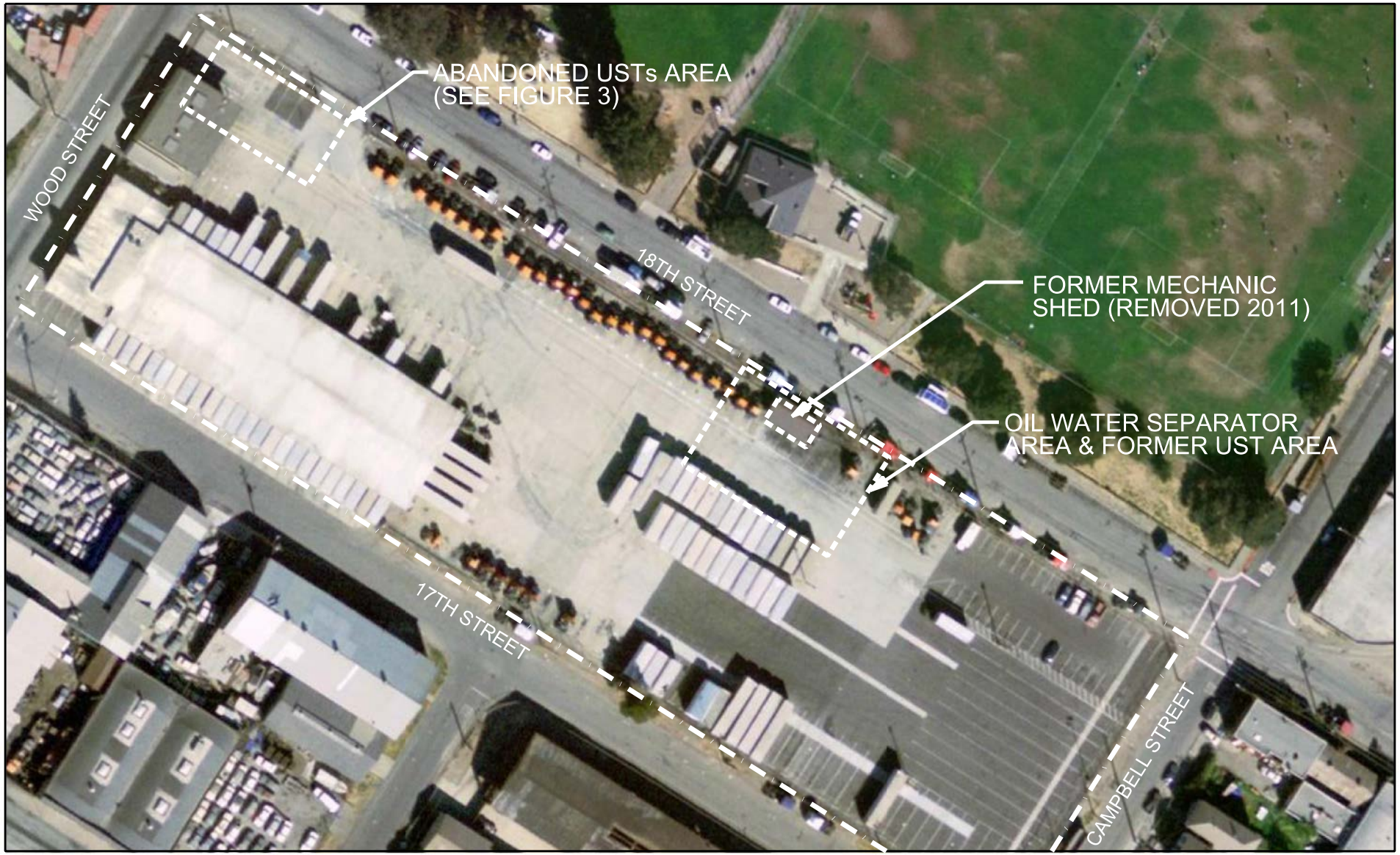


Figure 2

SITE MAP
ROADWAY EXPRESS
1708 WOOD STREET
OAKLAND, CA

\\Wccadd\data\SFODATA\Projects\YRC Enterprise Services Inc\YRCW Oakland, CA\ustn\site\Jan2012\YRC Oakland Fig 2_Jan2012.dgn Jan 26, 2012 OSHELDON

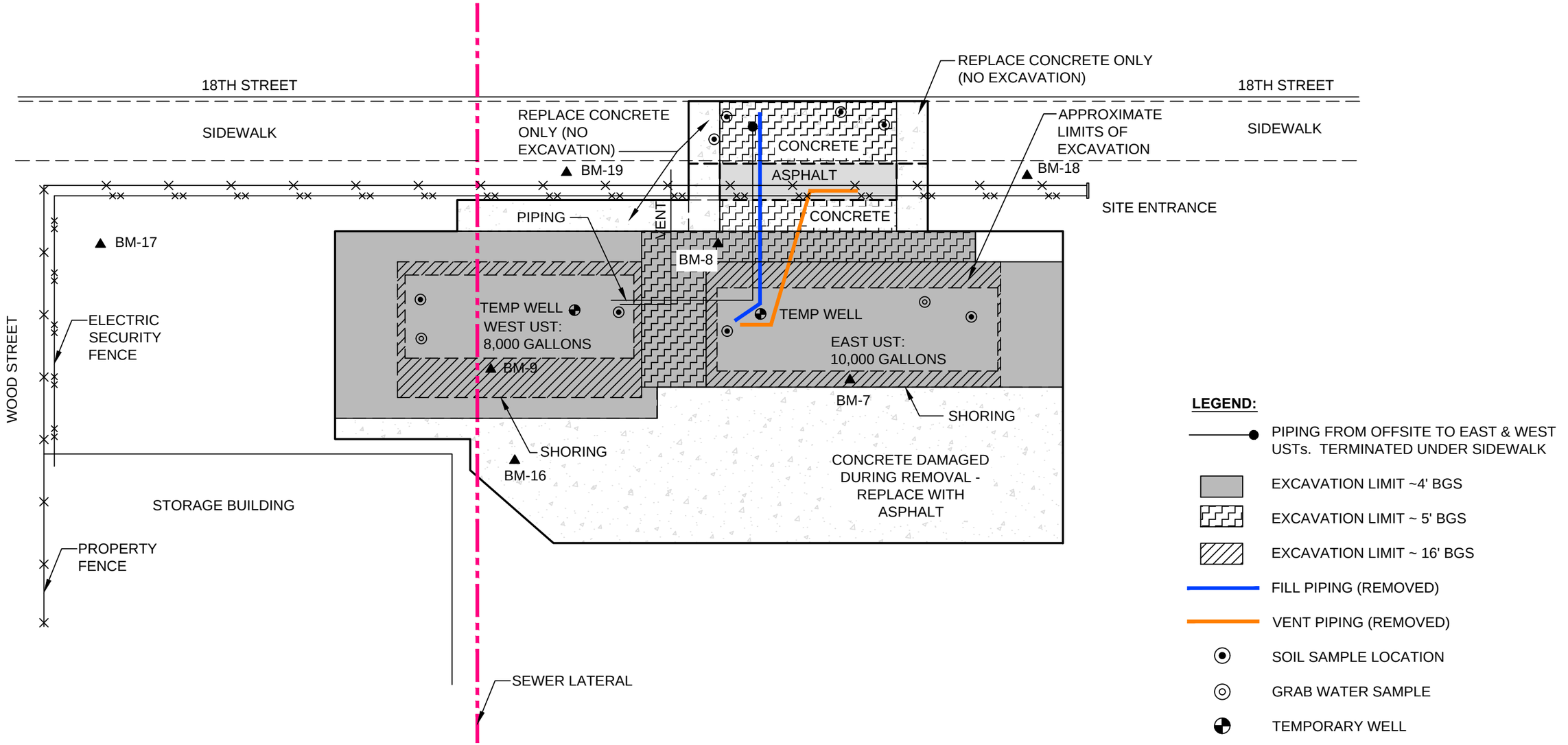


Figure 3
NORTHWEST CORNER
UST AREA SAMPLE
LOCATONS
1708 WOOD STREET
YRC SERVICES INC.

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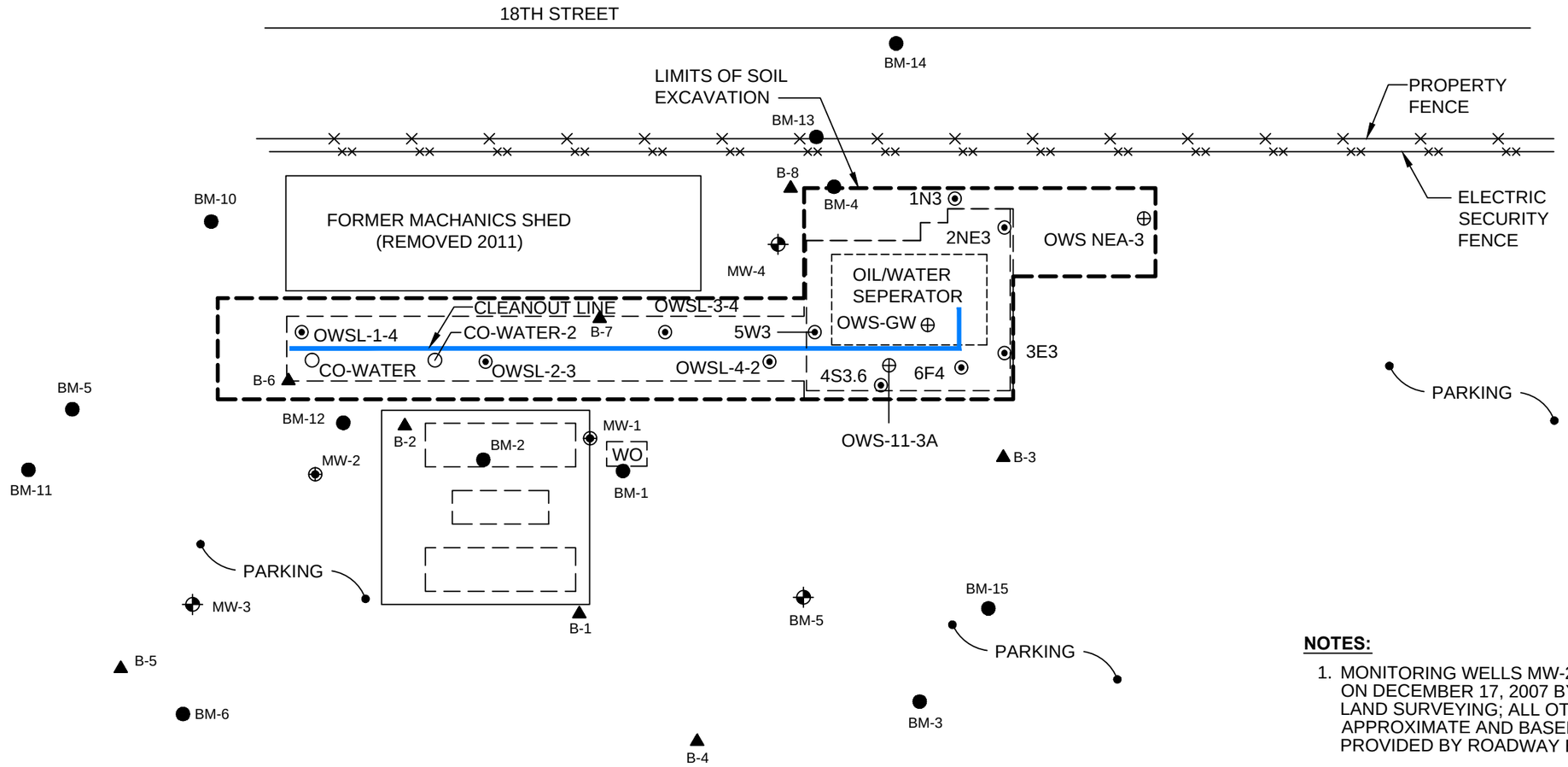


**LEGEND:**

- SOIL SAMPLE LOCATION
- GROUNDWATER RESAMPLE LOCATION
- SOIL RESAMPLE LOCATIONS
- SOIL BORING (BURNS & McDONNELL, DECEMBER 2007 AND AUGUST 2008)
- EXISTING MONITORING WELL
- REMOVED MONITORING WELL
- SOIL BORING (BCON ENVIRONMENTAL, JULY 1997)
- CLEANOUT LINE
- EXCAVATION LIMITS/CONCRETE REPLACEMENT
- OWS — OIL/WATER SEPARATOR
- ORIGINAL EXCAVATION
- WO — WASTE OIL UST REMOVED 1987 (LOCATION APPROXIMATE)
- UST & ISLANDS REMOVED 1987

**NOTES:**

1. MONITORING WELLS MW-2 THROUGH MW-5 SURVEYED ON DECEMBER 17, 2007 BY LUK AND ASSOCIATES LAND SURVEYING; ALL OTHER LOCATIONS ARE APPROXIMATE AND BASED ON INFORMATION PROVIDED BY ROADWAY EXPRESS.
2. LOCATION OF UNDERGROUND UTILITIES IS APPROXIMATE AND BASED ON USA MARKINGS AND FIELD OBSERVATIONS.
3. 10,000 GALLON GASOLINE AND DIESEL UST REMOVED 1987
   2,000 GALLON WASTE OIL REMOVED 1987
   OIL WATER SEPARATOR & CLEAN OUT LINE REMOVED NOVERBER 2011

N

0 10' 20'

SCALE IN FEET

Figure 4
SITE PLAN
CENTRAL EASTERN (OWS) AREA SAMPLE LOCATIONS
1708 WOOD STREET
YRC SERVICES INC.

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# APPENDIX A

**Summary of Background Concentrations**

**Table A-1**
**Background Concentrations of Metals in Soil and Groundwater**

**EMR Table A-2**
**Comparison of Background Concentrations of Metals in Bay Area Soils**

Table A-1
Background Concentrations of Metals in Soil and Groundwater
YRC Enterprise Services, Inc. - Roadway Express Facility
1708 Wood Street
Oakland, California

| Study | Comments | Antimony | Arsenic | Barium | Beryllium | Cadmium | Chromium | Cobalt | Copper | Lead | Mercury | Molybdenum | Nickel | Selenium | Silver | Thallium | Vanadium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SOIL (mg/kg)** | | | | | | | | | | | | | | | | | | |
| LBNL, 2009 | other units | < 6 | 24 | 410 | 1.0 | 5.6 | 120 | 25 | 63 | -- | 0.42 | 4.8 | 272 | 4.9 | 2.9 | 10 | 90 | 140 |
| | Great Valley Group | -- | 42 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | all | -- | -- | -- | -- | -- | -- | -- | -- | 43 | -- | -- | -- | -- | -- | -- | -- | -- |
| | > 5 feet depth | -- | -- | -- | -- | -- | -- | -- | -- | 24 | -- | -- | -- | -- | -- | -- | -- | -- |
| ARCADIS Geraght & Miller, Inc., 2000 | | 0.22 | 9.1 | 224 | 0.7 | 0.3 | 118 | 22 | 88 | 50 | 0.9 | 2.4 | 124 | 0.19 | 0.14 | 0.33 | 84 | 221 |
| Hunter, Davis, and Roach, 2005 | | 12.5 | 12.7 | 320.0 | 1.1 | 2.3 | 49.4 | 22.0 | 53.3 | 25.0 | 0.3 | 20.0 | 41.5 | 11.0 | 2.1 | 25.0 | 88.3 | 104.0 |
| | 0-3 feet | 12.0 | 12.6 | 316.0 | 1.1 | 2.7 | 48.9 | 21.0 | 52.7 | 59.2 | 0.2 | 20.3 | 38.8 | 10.5 | 2.0 | 25.0 | 88.0 | 125.0 |
| | 3-15 feet | 13.0 | 15.0 | 357.0 | 1.1 | 2.5 | 49.9 | 20.7 | 56.0 | 20.0 | 0.3 | 21.0 | 41.8 | 11.0 | 2.0 | 25.0 | 86.0 | 93.2 |
| | >15 feet | 12.5 | 10.0 | 257.0 | 1.2 | 1.8 | 49.6 | 24.3 | 51.5 | 11.7 | 0.3 | 20.0 | 43.8 | 11.5 | 2.4 | 25.0 | 90.7 | 99.6 |
| | Minimum | 0.22 | 9.1 | 224 | 0.7 | 0.3 | 48.9 | 20.7 | 51.5 | 11.7 | 0.2 | 2.4 | 38.8 | 0.19 | 0.14 | 0.33 | 84 | 93.2 |
| | Maximum | 13 | 42 | 410 | 1.2 | 5.6 | 120 | 25 | 88 | 59.2 | 0.9 | 21 | 272 | 11.5 | 2.9 | 25 | 90.7 | 221 |
| | Minimum (EMR Table A-2) | 1.5 | 1.2 | 41 | 0.29 | 0.27 | 10 | 6.5 | 5.4 | 4.8 | 0.07 | 0.33 | 16 | < 0.25 | 0.2 | < 0.25 | 22 | 33 |
| | Maximum (EMR Table A-2) | 7.1 | 31 | 411 | 1.1 | 3.3 | 142 | 25.5 | 100 | 65 | 0.6 | 11.4 | 144 | 7 | 2.2 | 42.5 | 90 | 282 |
| | Background Range (Soil) | 0.22 - 13 | 1.2 - 42 | 41 - 411 | 0.29 - 1.2 | 0.27 - 5.6 | 10 - 142 | 6.5 - 25.5 | 5.4 - 100 | 4.8 - 65 | 0.07 - 0.9 | 0.33 - 21 | 16 - 272 | 0.19 - 115 | 0.14 - 2.9 | 0.33 - 42.5 | 22 - 90.7 | 33 - 282 |
| **GROUNDWATER (µg/L)** | | | | | | | | | | | | | | | | | | |
| Hunter, Davis, and Roach, 2005 | | 146 | 35 | 630 | -- | 6 | 810 | 25 | 50 | 50 | 0.5 | 79 | 455 | 31 | 15 | 200 | 110 | 220 |

Notes:
mg/kg - milligrams per kilogram
µg/L - micrograms per liter
ARCADIS Geraghty & Miller, Inc., 2000 - ARCADIS Geraghty & Miller, Inc. *Ambient Soil Concentrations Technical Memorandum, United States Army Reserve Center, Rio Vista, California* . December , 2000.
Hunter, Davis, and Roach, 2005 - Philip M. Hunter, Brian K. Davis, and Frank Roach. *Inorganic Chemicals in Ground Water and Soil: Background Concentrations at California Air Force Bases* . March 10, 2005.
LBNL, 2009 - Lawrence Berkeley National Laboratory Environmental Restoration Program. *Analysis of Background Distributions of Metals in Soil at Lawrence Berkeley National Laboratory* . June, 2002; Revised April, 2009.

*Table A-2*
*Comparison of Background Concentrations of Metals in Bay Area Soils*
*Hookston Station*
*Pleasant Hill, California*

| Study | Number of Samples | Formation | Calculation | Antimony | Arsenic | Barium | Bery-llium | Cadmium | Chromium | Cobalt | Copper | Lead | Mercury | Molyb-denum | Nickel | Selenium | Silver | Thallium | Vana-dium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LBNL, 1995 | 498 | -- | 95% UCL | 5.5 | 19.1 | 323.6 | 1.0 | 2.7 | 99.6 | 22.2 | 69.4 | 16.1 | 0.4 | 7.4 | 119.8 | 5.6 | 1.8 | 27.1 | 74.3 | 106.1 |
| | 97 | Colluvium & Fill | 95% UCL | 5.9 | 14 | 358.8 | 0.9 | 1.5 | 91.4 | 22 | 59.6 | 14.5 | 0.3 | 3.2 | 120.2 | 5.6 | 1.7 | 42.5 | 78.2 | 91.5 |
| | 97 | Great Valley Group | 95% UCL | 6.3 | 31 | 248.5 | 1.0 | 3.2 | 59 | 25.5 | 99.7 | 21.5 | 0.6 | 3.8 | 69.7 | 4.8 | 2.2 | 8.7 | 69.3 | 135.9 |
| | 101 | Moraga Formation | 95% UCL | 6.1 | 9.3 | 154.1 | 0.8 | 2.6 | 142.2 | 23.1 | 54.1 | 8.9 | 0.3 | 3.8 | 100.4 | 4.7 | 2.0 | 38.9 | 90.1 | 84.7 |
| | 184 | Orinda Formation | 95% UCL | 5.2 | 17.8 | 411.2 | 1.1 | 3.3 | 95.2 | 20.6 | 66.9 | 14.8 | 0.3 | 11.4 | 144.3 | 7.0 | 1.9 | 19.8 | 69.3 | 98.3 |
| | 13 | San Pablo Group | 95% UCL | 7.1 | 15.7 | 280 | 0.8 | 2.9 | 78.6 | 22 | 40.9 | 10.3 | 0.4 | 3.7 | 125.9 | 4.9 | 1.5 | 10.9 | 36.2 | 97.7 |
| BMWC, 1994 | < 150 | Fill | Geometric mean | 1.98 | 4.32 | 40.6 | 0.29 | 0.43 | 16.32 | 6.45 | 5.44 | 4.79 | 0.07 | 0.76 | 42.85 | 1.36 | 0.35 | -- | 22.19 | 32.90 |
| | | Fill | Geometric std. dev. | 1.74 | 1.83 | 1.62 | 1.47 | 2.05 | 9.38 | 1.71 | 6.62 | 2.93 | 1.76 | 1.98 | 1.50 | 2.93 | 1.57 | -- | 1.54 | 1.54 |
| Scott, 1991 | ~150 | Alluvium | Arithmetic mean | -- | 2.86 | -- | 0.88 | -- | 51.28 | -- | 35.63 | 11.43 | -- | -- | 73.53 | -- | -- | -- | -- | 65.27 |
| | | | Std. dev. | -- | 2.61 | -- | 0.55 | -- | 20.77 | -- | 11.85 | 4.66 | -- | -- | 27.15 | -- | -- | -- | -- | 17.55 |
| MLH, 1991 | -- | Off-Site Background (2 Rounds) | Arithmetic mean | -- | 8.3 | -- | -- | 1.0 | 10.0 | -- | 22 | 32.4 | 0.14 | -- | 16 | -- | -- | -- | -- | 65 |
| | 23 | | | -- | < 4.1 | -- | -- | < 0.9 | 16.4 | -- | 7.2 | 61 | < 0.11 | -- | 18 | -- | -- | -- | -- | 67.2 |
| D&M, 1989a | 4 | Upgradient | Arithmetic mean | -- | 5.15 | 115 | -- | -- | 42.5 | 10 | 17.5 | 13.3 | 0.5 | -- | 42.5 | -- | -- | -- | 35 | 37.5 |
| D&M, 1989b | 26 | Upgradient | Arithmetic mean | -- | 1.9 | 127.3 | -- | -- | 44.6 | 11.5 | 17.7 | < 10 | 0.2 | -- | 45.4 | -- | -- | -- | 36.2 | 41.9 |
| SECD, 1992 | 5 | Clay / Loam | Arithmetic mean | 2.5 | 8.48 | 228 | 0.5 | 0.83 | 72.6 | 9.53 | 37 | 65 | 0.14 | 1.74 | 43 | < 0.25 | < 0.25 | < 0.25 | 46.9 | 281.6 |
| PRC, 1996 | 20 | Fill | 95% UCL | 1.5 | 8.4 | 145 | 0.72 | 0.27 | 95 | 16 | 72 | 59 | 0.6 | 0.33 | 96 | -- | 0.2 | -- | 70 | 152 |
| Author Unknown | 10 | Background Soil | Arithmetic mean | -- | 1.2 | 125 | 0.35 | -- | 33.4 | 8.8 | 22.7 | 7.4 | -- | -- | 22.5 | -- | -- | -- | 27.8 | 39.9 |
| | | | Std. dev. | -- | 1.8 | 145 | 0.17 | -- | 6.5 | 3.1 | 16.7 | 2.1 | -- | -- | 15.7 | -- | -- | -- | 6.3 | 16.4 |
| | | **Background Concentration Ranges** | | **1.5 - 7.1** | **1.2 - 31** | **41 - 411** | **0.29 - 1.1** | **0.27 - 3.3** | **10 - 142** | **6.5 - 25.5** | **5.4 - 100** | **4.8 - 65** | **0.07 - 0.6** | **0.33 - 11.4** | **16 - 144** | **<0.25 - 7** | **0.2 - 2.2** | **<0.25 - 42.5** | **22 - 90** | **33 - 282** |

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UCL = Upper confidence level

# APPENDIX B

**ACC Figure 1**


Soil and Groundwater Sample Collected

Groundwater Sample Collected

Soil Sample Collected

Title ***Sample Location Map***
***1708 Wood Street***
***Oakland, California***

| | |
|---|---|
| **Figure Number: 1** | Drawn By: JS |
| Project Number: 6470-034.01 | Date:2/6/11 |

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