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REMEDIAL INVESTIGATION AND FOCUSED FEASIBILITY STUDY REPORT

SOUND BATTERY
2310 EAST 11th STREET
TACOMA, WASHINGTON

Submitted by:

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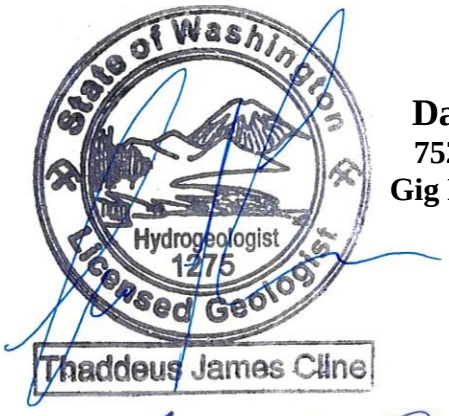

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1.0 INTRODUCTION

Farallon Consulting, L.L.C. (Farallon) has prepared this Remedial Investigation (RI) and Focused Feasibility Study (FSS) Report (RI/FFS Report) for the Sound Battery Company (Sound Battery) property at 2310 East 11th Street in Tacoma, Washington (herein referred to as the Site) (Figure 1). The RI/FFS Report provides the results of subsurface investigation of soil and groundwater conditions at the Site and the evaluation of technically feasible cleanup alternatives for the remediation of media at the Site.

In 2002, soil with concentrations of lead above Washington State Model Toxics Control Act Cleanup Regulation (MTCA) cleanup levels, as established in Chapter 173-340 of the Washington Administrative Code (WAC 173-340), was excavated from the area outside the Site building footprint and on adjacent properties under terms of an Agreed Order entered into by Sound Battery and the Washington State Department of Ecology (Ecology). According to the Cleanup Site Details report downloaded from the Ecology (2013) Toxics Cleanup Program website, the Site was removed from the Hazardous Sites List and the Site status was updated to "NFA" (No Further Action) on May 21, 2003.

Lead was detected at concentrations above MTCA Method A cleanup levels in soil and groundwater samples collected from beneath the Site building footprint in 2011. According to the Cleanup Site Details report Ecology (2013), a Site Discovery/Release Report was received in 2012, and Ecology re-opened the Site on February 21, 2012. Ecology received a Voluntary Cleanup Program (VCP) application for the Site on February 24, 2012. The Cleanup Site Details report indicates the Ecology status of the Site as "awaiting cleanup," and that Ecology has assigned Mr. Tom Middleton of the Southwest Regional office as Site Manager.

The purpose of the RI/FFS is to collect, develop, and evaluate sufficient information to select a cleanup action under WAC 173-340-360. Soil and groundwater samples were collected to delineate the nature and extent of concentrations of lead in soil and groundwater beneath the Site building foot print. The results of the RI have been used to evaluate technically feasible cleanup alternatives and provide a recommendation for a cleanup action for lead in soil and groundwater beneath the Site building footprint. The RI/FFS Report has been prepared in accordance with WAC 173-340-350.

1.1 REPORT ORGANIZATION

The RI/FFS has been prepared to meet the requirements for an RI under WAC 173-340-350(7) and a feasibility study under WAC 173-340-350(8). This report has been organized into the following sections:

- **Section 2—Site Background.** This section provides a description of the Site features and history; a brief description of the local geology and hydrogeology; and a summary of the subsurface investigations and a remedial action conducted at the Site, which provide the basis for the FFS.

- **Section 3—Remedial Investigation.** This section provides a description and summary of the results of the subsurface investigation activities conducted by Farallon at the Site on August 2 and 7, 2012.
- **Section 4—Technical Elements.** This section incorporates results from previous investigations and the August 2012 subsurface investigation to document the basis for the FFS, including identification of the media and constituents of concern, and the source of the identified contamination. The section also provides a description of the extent of affected media; a summary of cleanup action objectives; specification of cleanup standards, including cleanup levels and points of compliance; and identification of applicable or relevant and appropriate requirements (ARARs).
- **Section 5—Focused Feasibility Study.** This section presents an overview of the evaluation of potential remedial technologies, and the three cleanup alternatives assembled from the most-viable remedial technologies.
- **Section 6—Recommended Cleanup Alternative.** This section presents the cleanup alternative recommended for implementation at the Site and the rationale.
- **Section 7—Bibliography.** This section provides a list of documents pertaining to environmental investigations and cleanup at the Site.
- **Section 8—Limitations.** This section presents Farallon's standard limitations associated with conducting the work described herein and with preparing this report.

2.0 SITE BACKGROUND

Site background information is based on results from previous investigations and Site work as presented in documents available for Farallon review. Site background information was supplemented with a site reconnaissance conducted by Farallon on June 27, 2012, conversations with the City of Tacoma Planning Department, and queries of the Ecology (2013) Toxic Cleanup Program website regarding the current status of the Site. Site background information is summarized below.

2.1 SITE DESCRIPTION AND HISTORY

The Site, zoned as part of the Port Maritime and Industrial District (PMI) defined in the Tacoma Municipal Code, is located in the industrial Port of Tacoma area of the former Commencement Bay tide flats of the City of Tacoma on Puget Sound. The tideflats area was filled beginning in the early 1900s, and currently is used for a range of industrial and commercial purposes, including a major seaport (the Port of Tacoma). The Site is located approximately 0.25 mile southeast of the Sitcum Waterway Problem Area of the Commencement Bay/Near-shore Tideflats Superfund Site. The elevation of the Site is approximately 10 to 15 feet above mean sea level. The topography at the Site is flat, with a slope of less than 1 percent toward the northwest and Commencement Bay. According to EnCo Environmental Corporation (EnCo) (2011), stormwater at the Site flows as sheet runoff into the City of Tacoma storm drain system catch basins in East 11th Street and ultimately to Commencement Bay.

The Site building is a combined one- and two-story masonry structure with 12- to 14-foot-high ceilings in the first floors. The Site building contains approximately 6,125 square feet of interior space, with a roofed exterior area at the southeast corner that contains approximately 1,225 square feet. According to EnCo (2011), the landowner indicated that the original building containing approximately 2,450 square feet was constructed on the northeastern portion of the parcel in the 1940s. Sound Battery reportedly occupied the original building in 1947 for the manufacture of batteries. In 1960, a 2,450-square foot two-story addition (First Addition) was built contiguous to the southwest wall of the original building. A Second Addition was subsequently constructed, which included the approximately 1,225 square feet of interior space comprising the south corner of the current building, and approximately 1,225 square feet of covered exterior space. The original building and the First Addition were built on a concrete floor slab. The Second Addition has an asphalt floor surface. Approximately 1,000 square feet of exterior asphalt pavement surrounds the Site building, for a total of approximately 7,000 square feet of impervious surface at the Site. The area behind and southeast of the Site building and portions of both side yards are unpaved. The original building, the additions, and paved and unpaved areas are shown on Figure 2.

During a Farallon site reconnaissance on June 27, 2012, the Site building was observed to be used for storage of various pieces of equipment and fittings by the southwest-adjacent property operator. No hazardous materials were observed to be stored at the Site at that time, although some staining and corrosion was observed inside the building from prior operations in the building. Four Site monitoring wells that were present at the Site were inspected and found to be

suitable for groundwater monitoring after one of the monitoring well casings was repaired. Depth to groundwater during the June 2012 site reconnaissance was noted to be within approximately 10 feet below ground surface (bgs).

2.2 SITE GEOLOGY AND HYDROGEOLOGY

EnCo (2011) summarized geologic and hydrogeologic conditions at the Site based on published sources, historical work at the Site, and the sub-surface investigation conducted by EnCo. Land forms within this region comprise a system of glacially and fluvially sculpted features. The last glacial event occurred approximately 10,000 to 14,000 years ago, when the terminus of the Vashon Stade began to retreat from as far south as the Olympia area, leaving behind a range of glacial and alluvial recessional outwash features. The mapped soil consists of recent sand, silt, and gravel deposited in stream channels, on flood plains, and on terraces.

Samples collected from soil borings advanced at the Site are described as sand with varying silt and gravel content. Soils encountered by GeoSystems Analysis, Inc. (GeoSystems) (2002a) were logged as consisting of sand, gravel, and small- to medium-sized cobbles to about 10 feet bgs, which is underlain by sand and silt to the maximum depth investigated of approximately 14 feet bgs. EnCo (2011) encountered groundwater between approximately 6 and 7 feet bgs, and measured the groundwater flow gradient to be between 0.0013 and 0.0015 foot/foot toward the northwest.

Lithology and hydrogeologic conditions noted during the completion of the RI by Farallon in August 2012 are described in Section 3, Remedial Investigation.

2.3 SUMMARY OF PREVIOUS INVESTIGATIONS

Several soil and groundwater investigations were completed at the Site between 1991 and 2002 to evaluate Site environmental conditions and characterize the extent of lead in Site soil and groundwater. A cleanup action was implemented in 2002 that involved excavation of shallow soil from around the outside of the Site building and associated paved surfaces, and included removal of shallow soil from adjacent land parcels. Excavated soil was treated on the Site using a stabilization technology, and approximately 880 tons of treated soil was subsequently disposed of off the Site at a Resource Conservation and Recovery Act (RCRA) Subtitle D solid waste landfill. According to the Cleanup Site Details report (Ecology 2013), the Site was removed from the Hazardous Sites List in 2003, and the Site status was updated to "NFA."

In 2011 in support of a potential real estate transaction, EnCo (2011) conducted a subsurface soil and groundwater investigation inside and beneath the Site building and associated exterior paved surfaces, at which time residual lead exceeding MTCA Method A cleanup levels was detected at the Site. According to the Cleanup Site Details report (Ecology 2013), a Site Discovery/Release Report was received in 2012, and Ecology re-opened the Site on February 21, 2012. Ecology received a VCP application for the Site on February 24, 2012.

Documentation pertaining to environmental investigations at the Site that was available for review by Farallon during preparation of this RI/FFS Report included the following:

- *Sound Battery Company Remedial Investigation Progress Report (No. 4)* dated October 23, 1998, prepared by GeoSystems (1998).
- Five maps dated February 11, 2000 prepared by GeoSystems (2000b) showing soil sampling locations and total soil lead concentrations in shallow samples collected from four depth intervals between the ground surface and 2 feet bgs.
- *Feasibility Study to Evaluate Cleanup Alternatives for Soil Lead Contamination at Sound Battery Co. Tacoma, Washington,* dated July 6, 2000, prepared by GeoSystems (2000d).
- Partial document titled *Draft Work Plan for Cleanup Action* dated January 11, 2002, prepared by GeoSystems (2002a).
- Letter report regarding Compliance Monitoring Results from Cleanup Action at Sound Battery Company, Tacoma, Washington, dated April 12, 2002, prepared by GeoSystems (2002b).
- *Final Cleanup Action Report* dated July 22, 2002, prepared by GeoSystems (2002c).
- *Near Surface Soil & Groundwater Quality Investigation with Hazardous Materials Survey (Final Version), Sound Battery, 2310 East 11th Street, Tacoma, Washington 98421* dated September 7, 2011, prepared by EnCo (2011).
- Letter proposal regarding Interim Remedial Action & Feasibility Study, Sound Battery (aka Allied Battery Company Inc.), 2310 East 11th Street, Tax Parcel 2275200770, Tacoma, Pierce County WA 98421, dated May 4, 2012, prepared by EnCo (2012).

Available documents were reviewed to identify the work required to complete the RI by Farallon in August 2012, and to support the evaluation of cleanup alternatives to be considered in the FFS. Prior work conducted outside the Site building that culminated in the 2002 removal action is summarized in Section 2.3.1, Outside the Site Building Footprint. Prior work conducted beneath the Site building in 2011 and more directly relevant to the FFS is discussed in Section 2.3.2, Beneath the Site Building.

2.3.1 Outside the Site Building Footprint

A number of investigations were conducted to assess soil and groundwater conditions outside of the Site building footprint between 1991 and 2002. Prior work and results presented in available documents reviewed are summarized chronologically below.

2.3.1.1 GeoSystems 1998 Remedial Investigation Progress Report

The GeoSystems (1998) report is the fourth progress report for remedial investigation activities conducted at the Site pursuant to Enforcement Order No. DE 97TC-S137. The report presents the results of a fourth quarter groundwater quality monitoring event conducted on September 18, 1998, and also tabulates groundwater elevation data

collected between December 13, 1997 and September 18, 1998 for Site monitoring wells MW-1 through MW-4 installed at each of the four corners of the Site.

Results documented in this report include the following:

- Concentrations of detected dissolved and total lead in groundwater samples were below the current MTCA Method A groundwater cleanup level of 15 micrograms per liter (µg/l). At the time the GeoSystems (1998) report was issued, the MTCA Method A groundwater cleanup level for lead was 5 µg/l. Detected lead was measured at the analytical laboratory reporting limit of 1 µg/l.
- Field measurements indicated that groundwater pH was near neutral in all wells. Total dissolved solids, electrical conductivity, and sulfate levels were indicated to be relatively low and similar to those obtained during previous monitoring events, with slightly higher levels measured in monitoring well MW-3.
- Groundwater elevations measured during the September 1998 monitoring event were consistent with data collected during prior monitoring events. Groundwater elevations were consistently higher in monitoring wells MW-2 and MW-3 near the southeast boundary of the Site, and lower in monitoring wells MW-1 and MW-4 near the northwest boundary of the Site along East 11th Street. The groundwater flow direction was generally northwest, toward Commencement Bay. Groundwater elevation data for the four quarterly events suggest little or no tidal influence on groundwater levels, and that minor seasonal fluctuation occurs.

2.3.1.2 GeoSystems 2000 Soil Sampling Maps

The GeoSystems (2000b) set of five maps presents generalized results for shallow soil sampling conducted in a grid pattern at approximately 10-foot spacing around the Site building and on adjoining properties, including Fastco Distributors to the southwest, Collins Transport to the southeast, and Tacoma Fire Station No. 12 to the northeast. Soil samples were collected from depth intervals of 0 to 0.5 foot, 0.5 to 1 foot, 1 foot to 1.5 feet, and 1.5 to 2 feet, and were analyzed for total lead content.

Results documented on these maps include the following:

- Most sample locations on the Site exhibited total lead concentrations greater than the MTCA Method A soil cleanup level for industrial land use of 1,000 milligrams per kilogram (mg/kg) in the 0- to 1-foot depth range.
- Total lead concentrations measured at an adjoining property were compared to the MTCA Method A soil cleanup level for unrestricted land use of 250 mg/kg. Total lead in excess of 250 mg/kg was detected in the 0- to 1-foot depth range at most of the off-Site sample locations.

2.3.1.3 GeoSystems 2000 Feasibility Study

The GeoSystems (2000d) document presents a feasibility study (FS) evaluating various cleanup alternatives to remediate lead contamination in soil at the Site and on adjacent properties. The report indicated that the extent and magnitude of lead contamination in soil was estimated during a number of investigations summarized in reports prepared by GeoSystems (2000a, 2000c) that were not available for review by Farallon.

Results documented in this report include the following:

- Approximately 156 cubic yards of soil in the 0- to 1-foot depth interval at the Site was estimated to contain concentrations of lead in excess of the 1,000 mg/kg MTCA Method A soil cleanup level for industrial land use, primarily near the rear (southeastern) portion of the Site.
- Approximately 123 cubic yards of soil in the 0- to 1-foot depth interval from the adjoining properties was estimated to contain concentrations of lead in excess of the 250 mg/kg MTCA Method A soil cleanup level for unrestricted land use, immediately adjacent to the rear Site property boundary.
- Lead in soil has not adversely affected groundwater quality at the Site.

Cleanup action objectives were identified as follows:

- Site: Attain the MTCA Method A soil cleanup level for total lead and industrial land use of 1,000 mg/kg in soil;
- Adjacent Properties: Attain the MTCA Method A soil cleanup level for total lead and unrestricted land use of 250 mg/kg in soil;
- Comply with all other State and Federal laws applicable to the cleanup action; and
- Use a permanent, practicable, safe, cost-effective, and proven cleanup method.

Waste designation and treatment requirements were considered in the FS. Site soil contaminated with lead must be classified as non-dangerous waste to qualify for land disposal without pretreatment. The maximum concentration of contaminants in soil leachate samples for the toxicity characteristic identified in the Washington State Dangerous Waste Regulations as established in WAC 173-303 is 5 milligrams per liter (mg/l) for lead measured using the Toxicity Characteristic Leaching Procedure (TCLP). According to prior investigations conducted by Ecology (Science Applications International Corporation 1991) and the U.S. Environmental Protection Agency (EPA) (Ecology and Environment, Inc. 1992), reports for which were not available for review by Farallon, soil samples collected at the Site having total lead levels above 1,000 mg/kg failed the 5 mg/l TCLP requirement for lead in nearly every case. Based on this result, the GeoSystems FS assumed that soil with lead concentrations in excess of 1,000 mg/kg would classify as a dangerous waste and would require treatment prior to disposal at a Subtitle D landfill.

Six potential alternatives for cleanup of lead in soil were selected for evaluation in the FS:

- **Alternative 1—**Excavation, On-Site Stabilization with Polysilicates and/or Phosphate/Complexing Reagents, and Solid Waste Landfill Disposal;
- **Alternative 2**—Excavation, On-Site Stabilization with Portland Cement and Additives, and Solid Waste Landfill Disposal;
- **Alternative 3—**Excavation, Off-Site Stabilization, and RCRA Landfill Disposal;
- **Alternative 4—**In-situ Stabilization with Portland Cement and Additives, Soil Capping and/or Groundwater Monitoring;
- **Alternative 5—**Excavation, On-Site Soil Washing/Acid Leaching/Lead Recycling, On-Site Soil Disposal, and Groundwater Monitoring; and
- **Alternative 6—**On-Site Phytoremediation and Groundwater Monitoring.

The GeoSystems FS concluded that Cleanup Alternatives 1 and 2 ranked similarly, and that both warranted further consideration using bench-scale laboratory testing. The FS concluded that either cleanup alternative would successfully stabilize the lead in soil at the Site, and that the final cleanup alternative selection would be based solely on cost.

2.3.1.4 GeoSystems 2002 Cleanup Action Work Plan

The GeoSystems (2002a) document presents a draft cleanup action work plan to remediate lead in soil at the Site, outside the Site building, and on adjacent properties, under MTCA and pursuant to Enforcement Order No. DE97TC-S137 and Agreed Order No. DE 01TCPSR-3130. The complete document was not available for review by Farallon.

Results documented in this report include the following:

- Soil investigations demonstrated that soil containing concentrations of lead exceeding the MTCA Method A soil cleanup level for unrestricted land use of 250 mg/kg was confined primarily to the upper 1.5 feet of soil in the rear portion of the Site and the upper 1 foot of soil on the properties adjacent to the Site. It was considered highly unlikely that soil would be excavated to depths exceeding 3 feet bgs. Soil excavation would therefore be conducted solely in the vadose zone above the shallowest groundwater unit.
- Groundwater investigations showed that the uppermost groundwater unit underlying the Site occurred at a depth of approximately 6 feet bgs and had not been impacted by overlying lead contamination in soil.

Cleanup action objectives were identified as follows:

- Meet the MTCA Method A soil cleanup level for total lead and unrestricted land use (250 mg/kg);
- Use a permanent, practicable, safe, cost-effective, and proven cleanup method as specified in MTCA (WAC 173-340-360); and
- Comply with all other laws applicable to the cleanup action.

Approximately 400 cubic yards of soil would be treated by the addition of the liquid-phase lead-stabilizing agent FESI/WET, demonstrated in bench-scale laboratory testing to effectively stabilize lead in soil. Approximately 222 cubic yards would be removed from the Site, and 178 cubic yards from the adjoining properties. If results from compliance monitoring indicated that this method was not effectively stabilizing lead in soil, the alternative stabilization method using Portland cement would be used. This alternative method also was demonstrated in bench-scale laboratory testing to successfully stabilize lead in soil. Treated soil was to be transported to the Rabanco facility in southeastern Washington, a RCRA Subtitle D solid waste landfill. Excavations were to be backfilled with imported uncontaminated gravel and previously excavated clean soil. Backfill would be compacted and graded to restore original grades.

Compliance monitoring of soil excavations would demonstrate that soil exceeding the 250 mg/kg action level had been removed from the Site and adjoining properties. The monitoring methodology would include grid sampling and statistical analysis consistent with Ecology guidance.

Compliance monitoring of treated soil would demonstrate that lead in soil had been effectively stabilized by measuring lead using the TCLP method to be less than 5 mg/l, and that soil exceeding the 250 mg/kg action level had been removed from the Site and adjoining properties. The monitoring methodology would include grid sampling and statistical analysis consistent with Ecology guidance.

Compliance confirmational monitoring would consist of one groundwater monitoring event 3 months following the soil cleanup. Three additional quarterly groundwater monitoring events were planned in the event that soil was excavated beneath the water table.

The cleanup action was scheduled to be implemented in the second quarter of 2002, with groundwater compliance monitoring occurring in June 2002.

2.3.1.5 GeoSystems Cleanup Action Letter Report

The GeoSystems (2002b) document summarizes the methods and results of the cleanup action conducted outside the Site building and on adjacent properties during March 2002. The document presented a summary of compliance monitoring results from the excavation and stockpiles. Based on the compliance monitoring results, the document

requested Ecology approval to dispose of the treated soil at a RCRA Subtitle D solid waste landfill.

The following results were provided:

- It can be inferred from this document that approximately 700 cubic yards of shallow soil was removed from areas around the Site building and from adjacent areas of the surrounding three parcels. The maximum excavation depth was generally shallower than 1.5 feet, although some excavation unexpectedly occurred to a depth of 5.5 feet adjacent to the southeast wall of the Site building.
- Results of compliance monitoring at the final limits of the base of the excavation indicated that compliance monitoring statistical criteria were achieved prior to backfilling.
- Results of compliance monitoring of treated soil stockpiles indicated that compliance monitoring statistical criteria using TCLP were achieved, and that the treated soil was suitable for disposal in a Subtitle D solid waste landfill.

2.3.1.6 GeoSystems 2002 Final Cleanup Action Report

The GeoSystems (2002c) document summarizes the soil cleanup action and provides results of the post-cleanup groundwater compliance monitoring conducted in June 2002. Following Ecology review and approval of this report, written Ecology notification was requested stating that full compliance with Agreed Order No. DE-01TCPSR-3130 had been achieved. The document also included the following:

- A summary of soil cleanup activities, which included the following:
  - Excavation of soil with lead in excess of the 250 mg/kg action level.
  - Compliance performance monitoring of the excavation floor documenting compliance with the 250 mg/kg action level.
  - Backfilling of the excavation with clean imported gravel, and compaction and grading to pre-excavation topography.
  - Ex-situ treatment on the Site of excavated soil with a chemical stabilizing agent.
  - Compliance monitoring of treated soil documenting that treated soils were suitable for disposal at a Subtitle D solid waste landfill.
  - Transport and disposal of 880 tons of treated soil at the Subtitle D Pierce County Recycling, Composting, and Disposal Landfill operated by Land Recovery, Inc.
- A post-cleanup groundwater compliance monitoring summary.
  - Groundwater monitoring results indicated that dissolved and total lead were not detectable above the laboratory reporting limit of 1 µg/l in groundwater samples collected from any of the four Site monitoring wells.
  - Groundwater elevation data were consistent with the data collected in 1997 and 1998 indicating a northwest groundwater flow direction.

2.3.2 Beneath the Site Building

The EnCo (2011) document summarizes methods and results of a subsurface investigation conducted in July 2011, including the advancement of 31 shallow borings and collection of 58 soil and 2 reconnaissance groundwater samples for lead analysis. See Figure 2 for sampling locations and generalized analytical results of soil and reconnaissance samples. In contrast to the prior subsurface investigations and the 2002 cleanup action, which were performed in areas outside the Site building and according to terms of administrative orders under MTCA, the 2011 EnCo work focused on areas beneath impervious paved surfaces primarily inside the Site building that were investigated as an independent action under MTCA. The EnCo work was conducted to support planning for demolition of the Site building, and to assess the need for cleanup activities to address environmental issues beneath the Site building after the building is demolished.

The EnCo (2011) report concluded that lead in soil and groundwater samples collected from beneath paved surfaces exceeded MTCA Method A cleanup criteria in some areas. The opinion expressed in the report was, "that the source of lead contamination identified in soil and groundwater beneath the project site at the indicated locations is primarily from the former lead-acid battery manufacturing facility that started operations in 1946." Findings of the 2011 investigation are summarized in more detail below.

Constituents of Concern

- Total lead (soil and groundwater);
- Dissolved lead (groundwater); and
- pH (soil and groundwater).

Groundwater Conditions

Total lead exceeding the 15 µg/l MTCA Method A groundwater cleanup level was detected in reconnaissance groundwater samples collected at locations at both ends of a former subsurface floor drain line (Figure 2). Dissolved lead was detected at a concentration slightly exceeding the MTCA Method A groundwater cleanup level at the outlet end of the former floor drain. The reconnaissance groundwater analytical data for these two locations presented in the EnCo (2011) report are summarized below:

Inlet	
Total lead	2,160 µg/l
Dissolved lead	13.1 µg/l
Outlet	
Total lead	919 µg/l
Dissolved lead	18.9 µg/l

On July 19, 2011, groundwater was measured at a depth of approximately 6.4 feet bgs at the reconnaissance groundwater sampling locations. Groundwater samples were observed to be turbid. The four Site monitoring wells were not sampled during this investigation, although

groundwater elevations were measured in the four monitoring wells. The shallow groundwater flow direction was inferred to be northwest, with a gradient between 0.0013 and 0.0015 foot per foot, consistent with prior interpretations.

Soil Conditions

Observed soil was described as follows: 6-inch-thick concrete (in the original building and the First Addition) or 3-inch-thick asphalt (Second Addition and exterior areas) overlying 0.2 to 3 feet of sandy gravel with crushed rock, which overlays medium to coarse well-sorted sand with shells and clay down to 9 feet bgs (maximum exploration depth).

Lead-acid battery casings were observed beneath the floor surfaces of the First and Second Additions to the Site building, suggesting on-Site disposal of battery components prior to approximately 1960, when the First Addition was constructed.

Total lead analysis of soil samples collected from two locations out of the main process areas beneath the concrete floor of the original Site building indicated concentrations of total lead below 2 mg/kg, and pH near neutral. EnCo (2011) interpreted these results to be representative of "background" conditions.

Soil samples exhibited total lead concentrations in excess of the 1,000 mg/kg MTCA Method A soil cleanup level for industrial land use, in some areas beneath the Site building and associated paved surfaces, as described below (Figure 2).

Sample Interval 0.5 to 1 Foot Below Ground Surface

The area of the abandoned concrete-filled floor drain in the center of the Second Addition area of the Site building exhibited the highest soil total lead concentrations, in excess of 10,000 mg/kg, and as high as 42,300 mg/kg at the inlet of the former drain line. The other areas exhibiting soil total lead concentrations in excess of 10,000 mg/kg were outside the northeast wall of the Site building and inside the southeast wall of the interior area of the Second Addition.

Total lead concentrations in excess of the 1,000 mg/kg MTCA Method A soil cleanup level for industrial land use were measured in soil samples collected from beneath a central area of the concrete floor slab of the First Addition and beneath the asphalt floor of the Second Addition paved areas on the southeast end of the Site building.

Sample Interval Greater than 1 Foot Below Ground Surface

Total lead concentrations in excess of the 1,000 mg/kg MTCA Method A soil cleanup level for industrial land use were measured in soil samples collected from the area of the inlet of the abandoned floor drain (sample depths of 2 and 6.3 feet bgs) and along the northwest edge of the Second Addition (sample depth of 1.9 feet bgs).

3.0 REMEDIAL INVESTIGATION

In support of evaluation of potential cleanup alternatives for soil and groundwater beneath the Site building to complete the RI, Farallon conducted a subsurface investigation at the Site on August 2 and August 7, 2012, which included:

- Further assessment of the extent of lead, including leachable lead, remaining in surface and subsurface soil at the Site.
- Assessment of the extent of arsenic, cadmium, chromium, lead, mercury, copper, and zinc in surface and subsurface soil at the Site. Data for these constituents were not available from prior investigations, and analysis for these constituents may not have been conducted.
- Further assessment for the presence of metals in groundwater at the Site, following the detection of lead above the MTCA Method A groundwater cleanup level in one reconnaissance groundwater sample collected at the Site (EnCo 2011).

The MTCA Method A groundwater cleanup level and the MTCA Method A soil cleanup level for industrial land use are the screening criteria used in the EnCo (2011) investigation and in the Farallon subsurface investigation to evaluate environmental media in the RI. Use of the MTCA Method A soil cleanup level for industrial land use is appropriate because the Site meets the definition of an industrial property under WAC 173-340-200 for current and foreseeable future conditions. The Site and general vicinity are zoned PMI, an industrial classification for the area around the Port of Tacoma. Section 4.2, Cleanup Standards, presents cleanup levels and points of compliance applicable to the FFS and provides additional discussion regarding applicability of MTCA Method A soil cleanup levels for industrial land use at the Site.

A summary of the August 2012 field work and results is provided below.

3.1 SUMMARY OF FIELD WORK

Work conducted in August 2012 included the following activities:

- Advancing shallow soil borings B-1 through B-8 (Figure 2) using push-probe drilling techniques to depths up to 9 feet bgs, logging soil observations, and collecting soil samples for metals analyses to confirm results of prior work and to obtain data enabling better definition of the lateral and vertical extents of impacted soil;
- Advancing shallow soil borings HA-1 and HA-2 (Figure 2) using a hand-augur to depths up to 3.5 feet bgs, logging soil observations, and collecting soil samples for metals analyses to verify metals concentrations in shallow soil in and beneath the backfill material placed during the 2002 remedial action;
- Repairing existing monitoring well MW-2,which had a damaged riser;
- Redeveloping existing monitoring wells MW-1 through MW-4 in preparation for groundwater sampling; and

- Re-sampling monitoring wells MW-1 through MW-4 for total and dissolved metals analyses using low-flow sampling methodology to evaluate current metals concentrations in Site groundwater.

Investigation-derived waste consisting of one full drum of soil and one partially full drum of water remains on the Site.

3.2 SUMMARY OF INVESTIGATION RESULTS

Logs of Farallon's observations of subsurface conditions, including lithology, are provided in Appendix A, Boring Logs. Table 1 presents groundwater level measurements collected on August 7, 2012. Tables 2 and 3 present analytical laboratory data for groundwater and soil samples, respectively, collected by Farallon during completion of the RI. The laboratory analytical reports are provided in Appendix B. Figure 3 presents investigation results.

No field indications of contamination were observed during the field work conducted by Farallon. However, results of soil and groundwater testing confirm that there are areas beneath the Site building and associated paved surfaces where soil contains lead in excess of the MTCA Method A cleanup level for industrial land use.

Results of the groundwater and soil sampling conducted by Farallon are summarized below.

3.2.1 Groundwater

Groundwater was noted at depths ranging from approximately 6.5 to 7 feet bgs in the seven drilling locations where groundwater was encountered. Depth to groundwater at the four Site monitoring wells measured during the August 2012 field investigation varied between approximately 6 and 7 feet bgs (Table 1). Water level elevations indicated a northwest groundwater flow direction at a gradient of approximately 0.0008 foot per foot toward the north and northwest as indicated on Figure 2.

As described in Section 2, Site Background, lead has not been detected at a concentration above the 15 µg/l MTCA Method A groundwater cleanup level in groundwater samples collected from the four Site monitoring wells during monitoring conducted since 1997. According to GeoSystems (2002c), total and dissolved lead were not detected above laboratory reporting limits or above the 15 µg/l MTCA Method A groundwater cleanup level in post-cleanup compliance groundwater monitoring samples collected in June 2002.

Total lead was detected at concentrations exceeding the MTCA Method A groundwater cleanup level in turbid unfiltered reconnaissance groundwater samples collected at the inlet and outlet ends of the abandoned floor drain during the EnCo (2011) investigation beneath the Site building. Reconnaissance groundwater samples that were field-filtered prior to analysis identified lead that exceeded the MTCA Method A groundwater cleanup level of 15 µg/l in only the sample collected near the outlet end of the abandoned floor drain. The groundwater data presented in the EnCo (2011) for the two reconnaissance groundwater samples at the inlet and outlet to the abandoned floor drain are summarized in Section 2, Site Background.

Farallon work included laboratory analysis of groundwater samples to obtain current concentrations of metals in the four Site monitoring wells. Farallon re-developed the four Site monitoring wells to ensure good hydraulic connection with the surrounding aquifer material and that groundwater samples collected were representative of groundwater conditions at the Site at the time of sampling. As shown in Table 2, total lead was detected in one unfiltered sample collected at down-gradient monitoring well MW-1 at a concentration slightly above the 1 µg/l reporting limit and considerably below the MTCA Method A groundwater cleanup level. Dissolved lead was not detected in the groundwater sample obtained from monitoring well MW-1. Neither total nor dissolved lead was detected in any other sample collected from the four Site monitoring wells during the Farallon subsurface investigation.

The Farallon subsurface investigation also included analyzing groundwater samples collected from the four Site monitoring wells for dissolved concentrations of arsenic, cadmium, chromium, copper, mercury, and zinc. The only one of these metals detected was dissolved arsenic, which was detected in up-gradient monitoring well MW-2 at a concentration below the MTCA Method A cleanup level.

3.2.2 Soil

Soil samples logged by Farallon during drilling activities on August 2, 2012 indicated that the soil at the sampled locations is generally sand with up to approximately 25 percent silt at one location, and up to approximately 30 percent gravel at another location. The water-bearing strata was described as silty sand with 80 percent brown fine to medium sand and 20 percent silt at the seven boring locations where groundwater was encountered.

As described in Section 2, Site Background, the EnCo (2011) report documents the presence of total lead in shallow soil beneath the Site building. Figure 2 summarizes the results from the EnCo (2011) subsurface investigation beneath concrete and asphalt surfaces at the Site, and flags 12 locations where lead was detected in soil samples at concentrations exceeding the 1,000 mg/kg MTCA Method A soil cleanup level for industrial land use. Seven soil samples from the EnCo (2011) investigation were collected at depths greater than 2 feet bgs, to a total depth of 8.5 feet bgs. Concentrations of total lead detected in one of the deeper soil samples, proximate to the inlet of the abandoned drain line, exceeded the MTCA Method A soil cleanup level for industrial land use. Fragments of battery casings were present at six of the EnCo (2011) sampling locations in the First Addition and in the Second Addition, indicating a history of on-Site disposal of battery parts in areas generally coincident with lead detected in shallow soil at concentrations exceeding the 1,000 mg/kg MTCA Method A soil cleanup level for industrial land use.

The Farallon subsurface investigation was conducted to confirm and clarify the estimated extent, both vertically and laterally, of total lead concentrations in shallow unsaturated soil beneath the Site building and areas surrounding the Site building. Soil samples were tested also for arsenic, cadmium, chromium, copper, mercury, and zinc. Five samples were analyzed for TCLP lead to assess the potential that the material would be designated as a dangerous waste under WAC 173-303.

Results from the Farallon subsurface investigation confirm that shallow soil exhibits total lead in excess of the MTCA Method A soil cleanup level for industrial land use at boring B-1 in the southwest part of the Second Addition, and at boring B-3 proximate to the inlet to the abandoned drain line at the southeast corner of the First Addition. The shallow soil samples collected from these two locations also exceeded the toxicity characteristic criterion for lead of 5 mg/l, which indicates that soil would classify as dangerous waste under WAC 173-303. This finding will be a consideration when disposal options are evaluated in the FFS. Total lead was detected at a concentration below the MTCA Method A soil cleanup criterion for industrial land use in the soil sample collected at boring B-3 at a depth of 6.5 feet bgs, suggesting that soil proximate to the inlet to the abandoned drain line has been affected to the approximate depth of groundwater. Results of the Farallon investigation also bounded the areas of impacted soil northeast of the Site building where the EnCo (2011) investigation indicated soil with total lead exceeding MTCA Method A soil cleanup levels was present. Analytical results for soil samples collected during the Farallon subsurface investigation did not identify arsenic, cadmium, chromium, copper, mercury, or zinc at concentrations exceeding MTCA soil cleanup criteria.

4.0 TECHNICAL ELEMENTS

Technical elements pertaining to subsurface conditions beneath the Site building and associated paved surfaces characterized by EnCo (2011), and by the Farallon subsurface investigation, include the medium and constituent of concern, the extent of affected medium, the remedial action objectives (RAOs), cleanup standards, and ARARs. Technical elements are basic considerations for evaluating the cleanup alternatives, presented in Section 5, Focused Feasibility Study.

4.1 MEDIUM AND CONSTITUENT OF CONCERN

Soil between the bottom of the pavement and the groundwater table has been confirmed as the affected medium of concern for the RI/FFS. Lead has been identified as the constituent of concern for cleanup of those areas beneath the Site building and associated paved surfaces. The source of lead contamination in soil presumably is releases from the former lead-acid battery manufacturing facility, which began operations in 1946.

Groundwater was not selected as a medium of concern for the RI/FFS. Concentrations of total lead and dissolved lead were detected in turbid reconnaissance groundwater samples collected from borings during the EnCo (2011) investigation; however, dissolved lead was not detected in groundwater samples collected from monitoring wells MW-1 through MW-4 during the Farallon subsurface investigation. Results from prior investigations indicate that lead was not detected in groundwater samples collected from monitoring wells MW-1 through MW-4 or, if lead was detected, concentrations were less than the MTCA Method A groundwater cleanup level. As indicated in Table 2, during the Farallon investigation, the concentration of total lead detected at one location, monitoring well MW-1, was slightly above the laboratory reporting limit and below the MTCA Method A groundwater cleanup level. Dissolved arsenic, cadmium, chromium, copper, lead, mercury, and zinc were not detected, with one exception. Dissolved arsenic was detected in monitoring well MW-2 below the MTCA Method A groundwater cleanup level.

4.1.1 Extent of Affected Soil

Based on total lead analytical results from both the EnCo (2011) and the Farallon subsurface investigation of conditions beneath paved surfaces associated with the Site building, concentrations of total lead exceed the MTCA Method A soil cleanup level for industrial land use in shallow soil (i.e., 2 feet bgs and shallower) at some sample locations beneath Second Addition asphalt. Total lead was detected in excess of the MTCA Method A soil cleanup level for industrial land use in shallow soil at two other sampling locations: near the center of the First Addition; and outside the northeast wall of the Site building (EnCo 2011). Soil as deep as the depth to groundwater (approximately 6.5 to 8.5 feet bgs) has concentrations of total lead in excess of the MTCA Method A soil cleanup level for industrial land use proximate to the inlet to the abandoned drain line. Total lead was detected at a concentration below the MTCA Method A soil cleanup level for industrial land use at the outlet to the abandoned drain line.

Figure 4 identifies three areas where concentrations of total lead in shallow soil (less than 2 feet bgs) exceed the MTCA Method A cleanup level for industrial land use: designated as

Remediation Area "A" in the area of the Second Addition based on results from EnCo (2011) and Farallon sampling; "B" in the central area of the First Addition based on results of EnCo (2011) sampling; and "C" outside the northeast wall of the Site building based on results of EnCo (2011) and Farallon sampling. Two subareas designated "A1" and "A2" are shown on Figure 4 to indicate areas where concentrations of total lead in soil between depths of 2 feet bgs and the depth to groundwater, approximately 6 to 9 feet bgs, were reported although total lead exceeded the MTCA Method A cleanup level for industrial land use only in subarea A1 at the inlet of the abandoned drain line.

4.1.2 Remedial Action Objectives

RAOs are the minimum goals that a cleanup alternative should achieve to be retained for further evaluation in the FFS. The overarching RAO for the cleanup action at the Site is to remediate contaminated soil that poses a potential threat to human health in an efficient and cost-effective manner that minimizes the impacts to Site use to the maximum extent practicable. The specific RAO for the Site is to achieve cleanup standards for soil.

4.2 CLEANUP STANDARDS

As defined in WAC 173-340-700, cleanup standards for the Site include establishing cleanup levels, and points of compliance for each media of concern at which the cleanup levels will be attained. The cleanup standards for the Site have been established in accordance with WAC 173-340-700 through 173-340-760 to be protective of human health and the environment, and comply with the ARARs defined for the Site.

The cleanup level is the concentration of a hazardous substance that protects human health and the environment under specific exposure scenarios. The Ecology (2012) Cleanup Levels and Risk Calculations (CLARC) online database tool was queried in August 2012 for available cleanup levels for indoor air, soil, and groundwater matrices. The most-stringent cleanup level provided in CLARC for lead in soil is the 250 mg/kg MTCA Method A soil cleanup level for unrestricted land use, which is based on preventing unacceptable blood lead levels in humans. However, the 1,000 mg/kg MTCA Method A soil cleanup level for industrial land use, protective of a general industrial land use human direct contact exposure pathway, is selected as the cleanup level for lead in soil at the Site. Current and foreseeable future Site land use and conditions meet the applicability criteria of industrial soil cleanup standards under MTCA presented in WAC 173-340-745. The Site meets the definition of an industrial property under WAC 173-340-200 in that the Site and general vicinity are zoned as industrial (PMI) by the City of Tacoma. Section 400 of Chapter 13.06 of the Tacoma Municipal Code establishes and defines three industrial district classifications that include PMI, Light Industrial, and Heavy Industrial. According to the Tacoma Municipal Code, the PMI district is proximate to deep-water berthing; is served by 24-hour port, road, and rail services; and encompasses the Port of Tacoma facilities, facilities that support Port of Tacoma's operations, facilities that process raw materials, manufacturing facilities, and other public and private maritime and industrial activities.

The points of compliance define the point or points at a site where cleanup levels must be attained. Once the cleanup levels have been attained at the defined points of compliance, the site

is no longer considered to be a threat to human health or the environment. For soil, the point of compliance at the Site will be the standard point of compliance for protection of groundwater per WAC 173-340-740(6)(b), which is soils throughout the Site. Existing data for soil beneath the Site building and associated paved surfaces indicate that the maximum depth where lead exceeds the MTCA Method A soil cleanup level for industrial land use is the approximate depth to groundwater, between 6 and 9 feet bgs, in the vicinity of the abandoned drain line.

4.3 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

The evaluation of cleanup alternatives will consider potentially applicable chemical-, action-, and location-specific requirements. WAC 173-340-710 requires that cleanup actions comply with applicable local, state, and federal laws. MTCA defines applicable local, state, and federal laws to include legally applicable requirements and relevant and appropriate requirements.

The following ARARs are anticipated to be the applicable requirements because they encompass the cleanup action framework, including applicable and relevant regulatory guidelines, cleanup standards, waste disposal criteria, and documentation standards.

- Washington State Model Toxics Control Act, Chapter 70.105D of the Revised Code of Washington (RCW 70.105D);
- MTCA (WAC 173-340);
- Water Quality Standards for Groundwaters of the State of Washington (WAC 173-200);
- Hazardous Waste Management Act (RCW 70.105);
- Washington State Solid Waste Management Laws and Regulations (RCW 70.95, WAC 173-351, and WAC 173-304);
- Dangerous Waste Regulations (WAC 173-303);
- Accreditation of Environmental Laboratories (WAC 173-50);
- Occupational Safety and Health Act (Part 1910 of Title 29 of the Code of Federal Regulations [29 CFR 1910] and WAC 296-62);
- State Environmental Policy Act Checklist (RCW 43.21);
- Maximum Containment Levels, National Primary Drinking Water Regulations (WAC 246-290-310 and 46 CFR 141);
- Safety Standards for Construction Work (WAC 296-155);
- Minimum Standards for Construction and Maintenance of Wells (WAC 173-160);
- National Primary and Secondary Air Quality Standards (40 CFR Part 50);
- Washington State General Requirements for Air Pollution Sources (WAC 173-400); and
- Local permits required by the Puget Sound Clean Air Agency, the City of Tacoma, and King County Industrial Waste.

5.0 FOCUSED FEASIBILITY STUDY

In 2002, a soil cleanup action was completed at the Site to satisfy the compliance requirements under enforcement order DE97TC-S137 and Agreed Order DE 01TCPSR-3130, as summarized in Section 2, Site Background. Approximately 500 cubic yards of shallow soil containing lead was excavated outside the Site building and on adjoining properties to the northeast, southeast, and southwest (Figure 2) The soil was stabilized, and in 2002, approximately 880 tons of the stabilized soil was transported to a Subtitle D solid waste landfill for disposal (GeoSystems 2002b). The analytical results for compliance soil samples collected from the excavations indicated that the soil cleanup levels were met at all excavation locations (GeoSystems 2002b). However, based on the analytical results for soil samples collected beneath the concrete and asphalt surfaces inside and outside the Site building in 2011 (EnCo 2011) and in 2012 during the Farallon subsurface investigation, approximately 220 cubic yards of soil, or about 350 tons, with concentrations of lead exceeding the MTCA Method A soil cleanup level for industrial land use remains at Areas A, A1, A2, B, and C shown on Figure 4.

Section 4, Technical Elements, pertains to subsurface conditions beneath the Site building and associated paved surfaces characterized by EnCo (2011) and by Farallon, and presents a basis for conducting an FFS addressing potential risk posed by the residual concentrations of lead in soil. Section 4 also summarizes the extent of affected soil, and identifies the RAOs, cleanup standards, and associated ARARs. The FFS identifies, develops, and evaluates technically feasible cleanup alternatives to enable selection of a preferred cleanup action in accordance with WAC 173-340-360. A summary of the selection and evaluation of cleanup alternatives is provided below.

5.1 CLEANUP ALTERNATIVES

This section summarizes the identified remedial technologies that were screened to determine which would be effective, implementable, and cost-effective under Site conditions. The results from the screening were used to select remedial technologies that were grouped into three technically feasible cleanup alternatives, which were evaluated according to MTCA threshold and other requirements defined in WAC 173-340-360.

Table 4 summarizes the general response actions, technology types, and technology process options considered to be effective and potentially implementable under Site conditions. Technology process options were evaluated with respect to protectiveness, permanence, cost, long-term effectiveness, short-term risk management, implementability, and public concerns. Implementation costs were based on published sources and professional judgment, and were used to further distinguish technologies having similar overall rankings. If technologies are equally ranked, the lower-cost technology typically is preferred.

Table 4 summarizes the scores assigned to the technology process options, and ranks each technology by comparing total individual scores to identify technology process options for inclusion in the cleanup alternative evaluation. The rankings in Table 4 indicate that the technologies to be included in the cleanup alternatives evaluation are:

- Excavation and ex-situ off-Site stabilization, followed by off-Site disposal; and
- Excavation and ex-situ on-Site stabilization, followed by off-Site disposal.

Also included as a baseline remedial technology was the use of institutional controls as an administrative option by recording an environmental covenant on the property deed to control risk at the Site. A "no action" alternative without institutional controls is not considered a viable cleanup approach, as this alternative would not meet the threshold requirement to be protective of human health and the environmental.

5.2 BUILDING DEMOLITION

The cleanup alternatives include demolition of the Site building. Hazardous building materials, including asbestos-containing materials (ACM) and lead-based paint on some surfaces as described by EnCo (2011), would be appropriately disposed of concurrently with implementation of Site cleanup. For cleanup alternatives that include excavation, concrete and asphalt floor paving will be removed in the excavation areas and disposed of off-Site. Upon completion of excavation work, the excavations will be backfilled and compacted but it is assumed that the paving will not be replaced.

5.3 DETAILED DESCRIPTION OF CLEANUP ALTERNATIVES

Technology process options for Site cleanup include: (1) excavation, off-Site stabilization, and off-Site disposal; (2) excavation, on-Site stabilization, and off-Site disposal; and (3) institutional and engineering controls, which were retained from the technology screening and incorporated into the technically feasible cleanup alternatives summarized below.

5.3.1 Cleanup Alternative 1—Excavation, Off-Site Stabilization, and Off-Site Disposal

Cleanup Alternative 1 involves excavating soil with concentrations of lead exceeding the MTCA Method A soil cleanup level for industrial land use to a depth of approximately 2 feet bgs and transporting it to a facility where lead will be stabilized by binding and/or encapsulating it or converting it to a much-less mobile form. The stabilized soil will be disposed of as a nonhazardous waste at a Subtitle D landfill. Cleanup Alternative 1 includes demolition of the Site building and appropriate disposal of hazardous building materials.

Soil excavation in Areas A1 and A2 will extend deeper than 2 feet bgs, to approximately 2 feet below the anticipated water table to ensure removal of concentrations of lead exceeding the MTCA Method A soil cleanup level for industrial land use. A volume of groundwater will be pumped from each of the two deeper excavations to remove water immediately surrounding the excavation area, and water made turbid by excavation activities. This water will be treated off the Site prior to disposal.

The objective of Cleanup Alternative 1 is to achieve the cleanup level at the points of compliance within a short time period. Removal of soil with concentrations of lead exceeding the MTCA Method A soil cleanup level for industrial land use would protect human health and the environment by permanently removing the known volume of lead-contaminated soil at the Site.

Cleanup Alternative 1 is not considered technically complex to implement. The short-term risks to human health and the environment include potential exposure of workers to ACM and lead-based paint during building demolition, and exposure to lead during excavation and material-handling activities.

The assumptions used to evaluate Cleanup Alternative 1—Excavation, Off-Site Stabilization, and Off-Site Disposal include the following:

- The extent of soil with concentrations of lead exceeding the MTCA Method A soil cleanup level for industrial land use corresponds approximately to the areas and depths shown on Figure 4 as Areas A, A1, A2, B, and C, and totals approximately 220 cubic yards or 350 tons.
- There is sufficient area on the Site and adjacent properties for materials management, including soil stockpiling and truck loading and off-loading activities. Permission(s) will not be necessary from adjacent property owners for trucks and equipment access to the approximately 2,400 square feet of open area southeast of the Site building (back yard).
- Successful stabilization will be measured by a reduction of the mobility of lead such that samples of treated soil meet the TCLP standard of 5 mg/l for lead.
- The Site building will be demolished. ACM and lead-based paint in the Site building will be mitigated and appropriately disposed of off-Site.
- Backfill will consist of:
    - Self-compacting aggregate material (e.g., pea gravel) in the deep excavations at Areas A1 and A2; and
    - A well-graded granular soil material suitable for standard construction use above the water table in Areas A, B, and C, compacted in lifts to meet acceptable compaction standards.
- Stabilization will be conducted by Waste Management, Inc. at the Chemical Waste Management of the Northwest facility in Arlington, Oregon. Following stabilization, the soil will be transported to the Waste Management, Inc. Columbia Ridge Landfill and Recycling Center Subtitle D landfill facility in Arlington, Oregon for disposal.
- The cost estimate for Cleanup Alternative 1 includes a contingency plan for installing two additional monitoring wells at or adjacent to the Site, and conducting four quarterly groundwater monitoring events if concentrations of dissolved lead exceed MTCA Method A groundwater cleanup levels in groundwater samples collected from one or both of the deeper excavations in areas A1 and A2 during cleanup construction (Figure 4).

The estimated cost to implement Alternative 1–Excavation, Off-Site Stabilization, and Off-Site Disposal in 2013 dollars is:

Site Building Demolition	$96,830
Cleanup Implementation	$324,813
Monitoring and Closure	$51,909
Total	$473,552

The summary of estimated costs for Cleanup Alternative 1 is provided in Appendix C.

The estimated restoration time frame is 6 to 12 months for design, permitting, and implementation. Four quarterly groundwater monitoring events using Site monitoring wells would be conducted during the first year after completion of excavation.

5.3.2 Cleanup Alternative 2—Excavation, On-Site Stabilization, and Off-Site Disposal

Cleanup Alternative 2 involves excavating soil with concentrations of lead exceeding the MTCA Method A soil cleanup level for industrial land use to a depth of approximately 2 feet bgs, and stockpiling the material on the Site. A specialty contractor will perform lead stabilization at the Site by binding and/or encapsulating it or converting it to a much-less mobile form. The stabilized soil will be transported off the Site and disposed of as nonhazardous waste at a Subtitle D landfill. Cleanup Alternative 2 includes demolition of the Site building and appropriate disposal of hazardous building materials.

As with Cleanup Alternative 1, soil excavation in Areas A1 and A2 will extend deeper than 2 feet bgs, to approximately 2 feet below the anticipated water table to ensure removal of concentrations of lead exceeding the MTCA Method A soil cleanup level for industrial land use. A volume of groundwater will be pumped from both of the two deeper excavations to remove water immediately surrounding the excavation area, and water made turbid by excavation activities. This water will be treated off the Site prior to disposal.

As for Cleanup Alternative 1, the objective of Cleanup Alternative 2 is to achieve the cleanup level at the points of compliance within a short time period. Removal of soil with concentrations of lead exceeding MTCA Method A soil cleanup level for industrial land use would protect human health and the environment by permanently removing the known volume of lead-contaminated soil at the Site.

Cleanup Alternative 2 is not considered technically complex to implement. The short-term risks to human health and the environment include potential exposure of workers to ACM and lead-based paint during interior excavation activities, and exposure to lead during excavation and material-handling activities.

The assumptions used to evaluate Cleanup Alternative 2—Excavation, On-Site Stabilization, and Off-Site Disposal include the following:

- The extent of soil with concentrations of lead exceeding MTCA Method A soil cleanup level for industrial land use corresponds approximately to the areas and depths shown on Figure 4 as Areas A, A1, A2, B, and C, and totals approximately 220 cubic yards or 350 tons.
- There is sufficient area on the Site and adjacent properties for materials management, including soil stockpiling and truck loading and off-loading activities. Permission(s) will not be necessary from adjacent property owners for trucks and equipment access to the approximately 2,400 square foot back yard area of the Site building.
- Successful stabilization will be measured by a reduction of the mobility of lead such that samples of the treated soil meet the TCLP standard of 5 mg/l for lead.
- The Site building will be demolished. ACM and lead-based paint in the Site building will be mitigated and appropriately disposed of off-Site.
- Backfill will consist of:
    - Self-compacting aggregate material (e.g., pea gravel) in the deep excavations at Areas A1 and A2; and
    - A well-graded granular soil material suitable for standard construction use above the water table in Areas A, B, and C, compacted in lifts to meet acceptable compaction standards.
- Stabilization on the Site will be conducted by a Waste Management, Inc. specialty contractor. Following stabilization, the soil will be transported to the Waste Management, Inc. Greater Wenatchee Landfill and Recycling Center Subtitle D landfill facility in Wenatchee, Washington for disposal.
- As for Cleanup Alternative 1, the cost estimate for Cleanup Alternative 2 includes a contingency plan for installing two additional monitoring wells at or adjacent to the Site, and conducting four quarterly groundwater monitoring events if concentrations of dissolved lead exceed MTCA Method A groundwater cleanup levels in groundwater samples collected from one or both of the deeper excavations in Areas A-1 and A-2 during cleanup construction (Figure 4).

The estimated cost to implement Cleanup Alternative 2–Excavation, On-Site Stabilization, and Off-Site Disposal in 2013 dollars is:

Site Building Demolition	$96,830
Cleanup Implementation	$269,468
Monitoring and Closure	$51,909
Total	$418,207

The summary of estimated costs for Cleanup Alternative 2 is provided in Appendix C.

The estimated restoration time frame is 6 to 12 months for design, permitting, and implementation. Four quarterly groundwater monitoring events using Site monitoring wells would be conducted during the first year after completion of excavation.

5.3.3 Cleanup Alternative 3—Institutional Controls and On-Site Containment

Cleanup Alternative 3 would reduce risk to human health and the environment resulting from exposure to concentrations of lead in soil by recording an environmental covenant on the property deed and through maintenance of the cover provided by paved surfaces following demolition of the Site building, and appropriate disposal of hazardous building materials, and ultimately following Site redevelopment. The environmental covenant would include health advisories and requirements for handling soil with residual concentrations of lead during future subsurface maintenance or redevelopment work. Periodic inspections and maintenance of the cover would be required. Annual compliance groundwater monitoring over a 5-year period using existing Site monitoring wells would be implemented to confirm that lead is not impacting groundwater quality at the Site.

The objective of Cleanup Alternative 3 is to protect future human exposure to residual concentrations of lead in Site soil. Once the Site has been re-developed, monitoring and maintaining impervious ground cover will limit exposure and infiltration of surface water that could increase the mobility of lead in soil.

Cleanup Alternative 3 is easily implementable and technically feasible, and would protect human health and the environment at the Site. However, soil cleanup levels would not be met at the standard point of compliance for soil, which is throughout the Site. Concentrations of lead exceeding the Site cleanup level are presumed to remain in soil until affected soil is removed during future redevelopment activities. Empirical data from the Site confirm that the concentrations of lead in soil have not caused elevated concentrations of lead in groundwater samples collected from existing Site monitoring wells. Therefore, this alternative provides a permanent remedy within the limits of practicability, and meets the threshold requirements of MTCA.

The assumptions used to evaluate Cleanup Alternative 3 include the following:

- The Site building will be demolished. ACM and lead-based paint in the Site building will be mitigated as part of a future building demolition project.
- A protective environmental covenant will be recorded on the deed for the Site.
- Redevelopment will include covering the ground surface with impervious surfaces such as buildings and/or pavement over areas on the Site where residual concentrations of lead in soil exceed the MTCA Method A soil cleanup level for industrial land use.
- The redevelopment impervious surfaces will be inspected and repaired, as necessary, every 2 years for 20 years.
- Groundwater will be monitored using the four existing Site monitoring wells on an annual schedule for 5 years.

The estimated cost to implement Cleanup Alternative 3—Institutional Controls in 2013 dollars is:

Site Building Demolition	$96,830
Cleanup Implementation	$63,481
Monitoring, Maintenance, Repair	$128,035
Total	$288,346

The summary of estimated costs for Cleanup Alternative 3 is provided in Appendix C.

The overall restoration time frame would be long, depending on future Site redevelopment activities.

5.4 CLEANUP ALTERNATIVES EVALUATION

The evaluation of each cleanup alternative is presented in the following sections. Table 5 provides the results of each evaluation according to the criteria listed below. Summary cost estimates developed for the three cleanup alternatives are provided in Appendix C.

5.4.1 Evaluation Criteria

The FFS considered the requirements under WAC 173-340-350 and the criteria defined in WAC 173-340-360 in screening potentially feasible cleanup alternatives for the Site. A cleanup alternative must satisfy the following threshold requirements, as specified in WAC 173-340-360(2)(a):

- Protection of human health and the environment;
- Compliance with cleanup standards;
- Compliance with applicable state and federal laws; and

- Provision for compliance monitoring.

Other requirements defined by MTCA include:

- Use of permanent solutions to the maximum extent practicable, which involves the following elements:
    - Protectiveness: Overall protectiveness of human health and the environment, including the degree to which existing risks are reduced, the time required to reduce risk at the facility and attain cleanup standards, risks at the Site resulting from implementing the alternative, and improvement of overall environmental quality.
    - Permanence: The degree to which the alternative permanently reduces the toxicity, mobility, or volume of hazardous substances, including the adequacy of the alternative in destroying the hazardous substances, the reduction or elimination of hazardous substance releases and sources of releases, the degree of irreversibility of waste treatment process, and the characteristics and quantity of treatment residuals generated.
    - Effectiveness over the long term: Long-term effectiveness includes the degree of certainty that the alternative will be successful, the reliability of the alternative during the period of time that hazardous substances are expected to remain on the Site at concentrations that exceed cleanup levels, and the magnitude of residual risk with the alternative in place. The following types of cleanup action components, presented in descending order, may be used as a guide when assessing the relative degree of long-term effectiveness: reuse or recycling; destruction or detoxification; immobilization or solidification; disposal on or off the Site in an engineered, lined, and monitored facility; isolation or containment with attendant engineering controls on the Site; and institutional controls and monitoring.
    - Management of short-term risks: The risk to human health and the environment associated with the alternative during construction and implementation, and the effectiveness of measures that will be taken to manage such risks. This criterion includes risks to workers at the Site resulting from implementation of the cleanup alternative.
    - Technical and administrative implementability: Ability to be implemented, including consideration of whether the alternative is technically feasible; administrative and regulatory requirements; permitting; scheduling; size; complexity; monitoring requirements; access for construction operations and monitoring; and integration with business operations at the Site.
    - Consideration of public concerns: Whether the community has concerns regarding the alternative and, if so, the extent to which the alternative addresses those concerns. This process includes concerns from individuals, community groups, local governments, federal and state agencies, or any other organization that may have an interest in or knowledge of the Site.

- Cost: The cost to implement the alternative, including the cost of construction and anticipated long-term costs. Long-term costs include groundwater monitoring and reporting costs.

- Provision for a reasonable restoration time frame, which includes the following elements:
  - Potential risks posed by the Site to human health and the environment;
  - Practicability of achieving a shorter restoration time frame;
  - Current use of the Site, surrounding areas, and associated resources that are or may be affected by releases from the Site;
  - Availability of alternative water supplies;
  - Likely effectiveness and reliability of institutional controls;
  - Ability to control and monitor migration of hazardous substances from the Site;
  - Toxicity of the hazardous substances at the Site; and
  - Natural processes that reduce concentrations of hazardous substances and have been documented to occur at the Site or under similar Site conditions.

5.4.2 Evaluation Process

A summary of the evaluation of the threshold and other requirements for Cleanup Alternative 1—Excavation, Off-Site Stabilization, and Off-Site Disposal; Cleanup Alternative 2—Excavation, On-Site Stabilization, and Off-Site Disposal; and Alternative 3—Institutional Controls and On-Site Containment is provided in Table 5. The evaluation was conducted in accordance with MTCA minimum requirements for cleanup actions per WAC 173-340-360(2) as summarized below.

5.4.2.1 Threshold Requirements

The alternatives evaluation summarized in Table 5 indicates that both Cleanup Alternative1—Excavation, Off-Site Stabilization, and Off-Site Disposal; and Cleanup Alternative 2—Excavation Excavation, On-Site Stabilization, and Off-Site Disposal meet the minimum threshold requirements for a cleanup action under WAC 173-340-360(2)(a). Cleanup levels would not be achieved at the standard point of compliance in the short term under Cleanup Alternative 3—Institutional Controls and On-Site Containment. The restoration time frame for Cleanup Alternative 3 using institutional controls and relying on containment aspects of Site redevelopment may not be considered reasonable.

5.4.2.2 Other Requirements

As defined in WAC 173-340-360, a cleanup action must: 1) use permanent solutions to the maximum extent practicable; and 2) be completed within a reasonable time frame.

Permanent Solutions to the Maximum Extent Practicable

Per WAC 173-340-360(3), the following criteria were considered for each of the cleanup alternatives under the requirement for a permanent solution to the maximum extent practicable. Table 5 summarizes the ranking for each alternative.

Protectiveness

- Cleanup Alternative 1—Excavation, Off-Site Stabilization, and Off-Site Disposal would achieve a high level of protectiveness as a result of removing soil containing concentrations of lead exceeding the Site cleanup level.
- Cleanup Alternative 2—Excavation, On-Site Stabilization, and Off-Site Disposal would achieve a high level of protectiveness as a result of removing soil containing concentrations of lead exceeding the Site cleanup level.
- Cleanup Alternative 3—Institutional Controls and On-Site Containment would provide an effective level of protectiveness that relies on administrative controls (an environmental covenant) and containment associated with a redevelopment project to prevent exposure to concentrations of lead in soil at the Site.

Permanence

- Cleanup Alternative 1—Excavation, Off-Site Stabilization, and Off-Site Disposal would achieve a high level of permanence by removing soil containing concentrations of lead exceeding the Site cleanup level.
- Cleanup Alternative 2—Excavation, On-Site Stabilization, and Off-Site Disposal would achieve a high level of permanence by removing soil containing concentrations of lead exceeding the Site cleanup level.
- Cleanup Alternative 3—Institutional Controls and On-Site Containment would prevent exposure to impacted soil using administrative controls (an environmental covenant) and containment associated with a redevelopment project to prevent exposure to residual concentrations of lead exceeding the Site cleanup level.

Effectiveness Over the Long Term

- Cleanup Alternatives 1 and 2 would provide effectiveness over the long term by permanently removing the mass of soil containing concentrations of lead exceeding the Site cleanup level. Cleanup Alternative 3 would provide a lesser degree of long-term effectiveness because residual concentrations of lead in soil would be left in-place beneath impervious surfaces placed during a redevelopment project, and long-term inspection and maintenance would be necessary to maintain effective containment.

Management of Short-Term Risks

- All three cleanup alternatives present short-term risks related to demolition of the Site building and mitigation and disposal of hazardous building materials. Cleanup Alternatives 1 and 2 present a higher degree of short-term risk associated with

exposure to contaminated soil during excavation and treatment, and with physical hazards related to the excavation work. A lesser degree of short-term risk is associated with Cleanup Alternative 3 related to inspection and maintenance of impervious surfaces and to groundwater monitoring at the Site.

Technical and Administrative Implementability

- Implementation of Cleanup Alternatives 1 and 2 would not involve technically complex field activities or administrative complications. Implementation of Cleanup Alternative 3 would be relatively uncomplicated, and would include activities such as negotiating the institutional controls, establishing an environmental covenant, and implementing long-term inspection, maintenance, and monitoring tasks.

Consideration of Public Concerns

- Concentrations of lead exceeding the Site cleanup level are limited to discrete areas on the Site, which is an industrial property with perimeter security fencing and controlled access. There currently is no complete pathway for exposure via direct contact for the public, and implementation of construction activities would include measures to prevent public exposure to hazardous materials. All three cleanup alternatives would address potential public concerns.

Cost

- The estimated cost for implementing Alternative 1—Excavation, Off-Site Stabilization, and Off-Site Disposal ($473,552), or Alternative 2—Excavation, On-Site Stabilization, and Off-Site Disposal ($418,206) is substantially higher than the estimated cost for Alternative 3—Institutional Controls and On-Site Containment ($288,346). The cost estimate summary for each alternative is provided in Appendix C.
- The estimated cost for Cleanup Alternative 1—Excavation, Off-Site Stabilization, and Off-Site Disposal includes excavation of residual concentrations of lead exceeding Site cleanup levels and would require substantial costs for permitting, building demolition, hazardous building material mitigation and disposal, excavation, off-Site stabilization, transport, disposal, and Site restoration.
- The estimated cost for Cleanup Alternative 2—Excavation, On-Site Stabilization, and Off-Site Disposal includes excavation of residual concentrations of lead exceeding Site cleanup levels and will incur substantial costs for permitting, building demolition, hazardous building material mitigation and disposal, excavation, on-Site stabilization, transport, disposal, and Site restoration.
- The estimated cost for Cleanup Alternative 3—Institutional Controls and On-Site Containment includes costs for building demolition, hazardous building material mitigation and disposal, implementing institutional controls (an environmental covenant) and containment, inspections and maintenance of the containment cover, and long-term compliance groundwater monitoring.

Completion within a Reasonable Time Frame

MTCA requires that cleanup levels identified for the Site are to be met at the points of compliance in the shortest reasonable time frame. Per WAC 173-340-360(4), the following criteria were considered for each of the cleanup alternatives under the requirement for completion within a reasonable restoration time frame.

Potential Risk

Potential risks to human health and the environment posed by residual concentrations of lead in soil at the Site are considered low under current and future conditions. The previous cleanup action removed a large portion of the contaminant mass. Most of the Site is paved or covered by the Site building, preventing possible leaching to groundwater by infiltrating surface water. Removal of residual concentrations of lead in soil (Cleanup Alternatives 1 and 2) would mitigate future risk to human health and the environment by eliminating the potential exposure pathways at the Site. Cleanup Alternative 3 would mitigate potential future Site risk by implementing physical and administrative protective measures to reduce the potential for complete exposure pathways at the Site.

Practicality of Achieving Shorter Time Frame

Restoration time frames for Cleanup Alternatives 1 and 2 are short such that Site cleanup realistically could not be achieved in a shorter time frame. The restoration time frame for Cleanup Alternative 3 relies on long-term attenuation processes and potential future cleanup that could occur during a redevelopment project, and currently cannot be defined.

Current Use of the Site

The Site and surrounding area are zoned for industrial land use and have a long history of commercial and industrial operations. No current plans for major changes in land use are known.

Potential Future Use of the Site

The Site and surrounding area are zoned for industrial land use. No major changes in future land use are anticipated.

Availability of Alternate Water Supplies

Potable water is supplied to the Site and surrounding area by the City of Tacoma municipal system.

Likely Effectiveness and Reliability of Institutional Controls

Institutional controls (Cleanup Alternative 3) can be an effective and reliable means of preventing exposure to lead in soil at the Site. Areas of residual soil contamination are well defined, and would be located beneath structures and impervious surfaces such as pavement following future redevelopment. Institutional controls can effectively mitigate exposure risks at the Site by implementing controls to protect workers from future exposure during excavation activities, to ensure proper management of residual soil

contamination if encountered during future maintenance or redevelopment, and to protect the integrity of impervious surfaces at the Site.

Ability to Control and Monitor Contaminant Migration

Concentrations of lead exceeding the Site cleanup level are well defined, and if left in place (Cleanup Alternative 3) would be isolated beneath buildings and impervious surfaces following future redevelopment. In addition, analytical results for groundwater samples collected from the existing monitoring wells at the Site indicate that residual concentrations of lead in soil are not a source to groundwater.

Toxicity of the Hazardous Substances

Excavation, stabilization, and off-Site disposal of soil containing concentrations of lead exceeding the Site cleanup level, as proposed under Cleanup Alternatives 1 and 2, would permanently eliminate the potential toxicity effects of lead. Cleanup Alternative 3 would not reduce the toxicity of lead, but would implement measures to protect human health and the environment by reducing the potential for complete exposure pathways at the Site.

Potential for Contaminant Degradation Over Time

Concentrations of lead in soil at the Site are not expected to significantly degrade over time, and would remain in the soil until attenuated naturally over the long-term or removed during implementation of cleanup or during future Site redevelopment.

6.0 RECOMMENDED CLEANUP ALTERNATIVE

Based on the results of the FFS, Cleanup Alternative 2—Excavation, On-Site Stabilization, and Off-Site Disposal is the preferred cleanup alternative for the Site to achieve an NFA determination under the VCP. Similar to Cleanup Alternative 1—Excavation, Off-Site Stabilization, and Off-Site Disposal, Cleanup Alternative 2 provides a high degree of environmental benefit and is the most cost-effective of the two permanent technically feasible cleanup alternatives. Cleanup Alternative 2 satisfies the requirements of MTCA and significantly reduces risk from Site contamination to the maximum extent practicable by removing the soil containing concentrations of lead exceeding MTCA Method A soil cleanup level for industrial land use. The estimated cost for implementing Cleanup Alternative 2 is about $420,000.

The rationale for selecting Cleanup Alternative 2 as the preferred alternative is based on the results of the evaluation presented in Section 5.4, Cleanup Alternatives Evaluation, which was conducted per the requirements set forth in MTCA (WAC 173-340-350 through 173-340-370) and applying Farallon's best professional judgment for implementing remedial technologies at the Site. With the exception of not complying with cleanup standards, Cleanup Alternative 3 satisfies MTCA threshold criteria as specified in WAC 173-340-360(2)(a) and meets additional requirements specified in WAC 173-340-360(2)(b).

Cleanup Alternatives 1 and 2 had similar evaluation results, and tied under a quantitative scoring approach. A MTCA Composite Benefit Score reflective of the overall environmental benefit of a cleanup alternative under MTCA was calculated for each alternative. The MTCA Composite Benefit Scores were derived using the methodology outlined by Ecology (2009) and were calculated using a 0 (least beneficial) to 10 (most beneficial) score for each of the six sub-criteria for the Permanence to the Maximum Extent Practicable MTCA criterion with an applied weighting factor. See Table 5 for the details regarding the MTCA Composite Benefit Score for each cleanup alternative.

Cleanup Alternative 2 meets the requirements set forth in WAC 173-340-370–Expectations for Cleanup Action Alternatives. Cleanup Alternative 2 emphasizes removal and remedial technologies to minimize reliance on long-term management and control of residual contamination. Cleanup Alternative 2 will achieve the cleanup level at the standard points of compliance (throughout the Site) and will be protective of direct contact exposure to lead in soil.

The sequence of work for implementing Cleanup Alternative 2 includes:

- Obtaining necessary permits and approvals;
- Mitigating and disposing of hazardous building materials contained in the Site building;
- Demolishing the Site building;
- Removing the concrete floor slab and asphaltic pavement in excavation areas;
- Excavating lead-contaminated soil from Areas A, A1, A2, B, and C, and stockpiling the soil on the Site;

- Removing groundwater from deeper excavations at Areas A1 and A2 and transporting the water off the Site for treatment and disposal;
- Treating the stockpiled soil on the Site by stabilizing with Portland cement to bind and encapsulate the lead, thereby greatly reducing its mobility (leachability);
- Analyzing samples of the stabilized soil using the TCLP method to confirm that the soil does not exceed the toxicity characteristic limit for lead; and
- Transporting the treated soil as a nonhazardous waste to a Subtitle D landfill for disposal.

Compliance monitoring at the Site will include:

- Confirmation soil sampling during the soil excavation to demonstrate that the cleanup level for lead is achieved at each excavation area;
- Confirmation sampling of stabilized soil to confirm that the treated soil is not a toxicity characteristic waste; and
- Long-term post-remediation compliance groundwater monitoring to include four to six monitoring wells sampled annually for 5 years.

Specific details concerning implementation of Cleanup Alternative 2 and the monitoring requirements that will be used to document MTCA compliance and effectiveness will be provided in a Cleanup Action Plan to be prepared for the Site.

7.0 LIMITATIONS

The conclusions and recommendations contained in this report/assessment are based on professional opinions with regard to the subject matter. These opinions have been arrived at in accordance with currently accepted hydrogeologic and engineering standards and practices applicable to this location, and are subject to the following inherent limitations:

- **Accuracy of Information.** Certain information used by Farallon in this report/assessment has been obtained, reviewed, and evaluated from various sources believed to be reliable. Although Farallon's conclusions, opinions, and recommendations are based in part on such information, Farallon's services did not include verification of its accuracy or authenticity. Should such information prove to be inaccurate or unreliable, Farallon reserves the right to amend or revise its conclusions, opinions, and/or recommendations.
- **Reconnaissance**. Farallon performed a reconnaissance of the site that is included in this report/assessment to document current conditions. Farallon focused on areas deemed more likely to exhibit hazardous materials conditions, while other areas received limited attention or were inaccessible at the time of the reconnaissance.

8.0 BIBLIOGRAPHY

Ecology and Environment, Inc. 1992. *Site Assessment Final Report for Sound Battery Company, Tacoma WA.* Prepared for the U.S. Environmental Protection Agency, Region X. Report No. TDD T10-9107-010. January.

EnCo Environmental Corporation (EnCo). 2011. *Near Surface Soil & Groundwater Quality Investigation with Hazardous Materials Survey (Final Version), Sound Battery, 2310 East 11th Street, Tacoma, Washington 98421*. Prepared for Marvin Dykman. September 7.

———. 2012. Letter Proposal Regarding Interim Remedial Action & Feasibility Study Sound Battery (aka Allied Battery Company Inc.) 2310 East 11th Street, Tax Parcel 2275200770, Tacoma, Pierce County WA 98421. From Jonathan M. Kemp, Principal. To. Marvin Dykman c/o Davis Law Office, PLLC. May 4.

Farallon Consulting, L.L.C. (Farallon). 2012. Draft *Subsurface Investigation and Focused Feasibility Study, Sound Battery, 2310 East 11th Street, Tacoma, Washington.* November 2.

GeoSystems Analysis, Inc. (GeoSystems). 1998. *Sound Battery Company Remedial Investigation Progress Report (No. 4).* Prepared for the Washington State Department of Ecology. October 23.

———. 2000a. *Final RI Report for Sound Battery Company, Tacoma WA*. Prepared for the Washington State Department of Ecology. January 6.

———. 2000b. Five Maps Showing Soil Sampling Locations and Total Soil Lead Concentrations in Shallow Samples Collected from Four Depth Intervals: 0 to 0.5 foot, 0.5 to 1 foot, 1 to 1.5 feet, and 1.5 to 2 feet. February 11.

———. 2000c. *Summary of Final Phase of Site Assessment Work for Off-Site Properties Adjacent to Sound Battery Co., Tacoma, WA*. Prepared for the Washington State Department of Ecology. February 17.

———. 2000d. *Feasibility Study to Evaluate Cleanup Alternatives for Soil Lead Contamination at Sound Battery Co. Tacoma, Washington*. Prepared for the Washington State Department of Ecology. July 6.

———. 2002a. *Draft Work Plan for Cleanup Action* [Partial document]. Prepared for the Washington State Department of Ecology. January 11.

———. 2002b. Letter Report Regarding Compliance Monitoring Results from Cleanup Action at Sound Battery Company, Tacoma, Washington. From Dale Hammermeister, Hydrologist, Project Manager. To the Washington State Department of Ecology. April 12.

———. 2002c. *Final Cleanup Action Report*. Prepared for Sound Battery. July 22.

Hart Crowser. 2011. *Phase I Environmental Site Assessment, Sound Battery Parcel, Port of Tacoma Project 092907, Tacoma, Washington*. January 11.

Science Applications International Corporation. 1991. *Draft Remedial Investigation Report for Sound Battery Company, Tacoma Washington*. Prepared for Washington State Department of Ecology. May.

U.S. Environmental Protection Agency (EPA). 1991. Selection of Control Technologies for Remediation of Lead Battery Recycling Sites. Prepared by Foster Wheeler Enviresponse, Inc., Edison, New Jersey, EPA/540/2-91/014, Office of Research and Development. July.

Washington State Department of Ecology (Ecology). 2009. Disproportionate Cost Analysis (DCA) Outline. June.

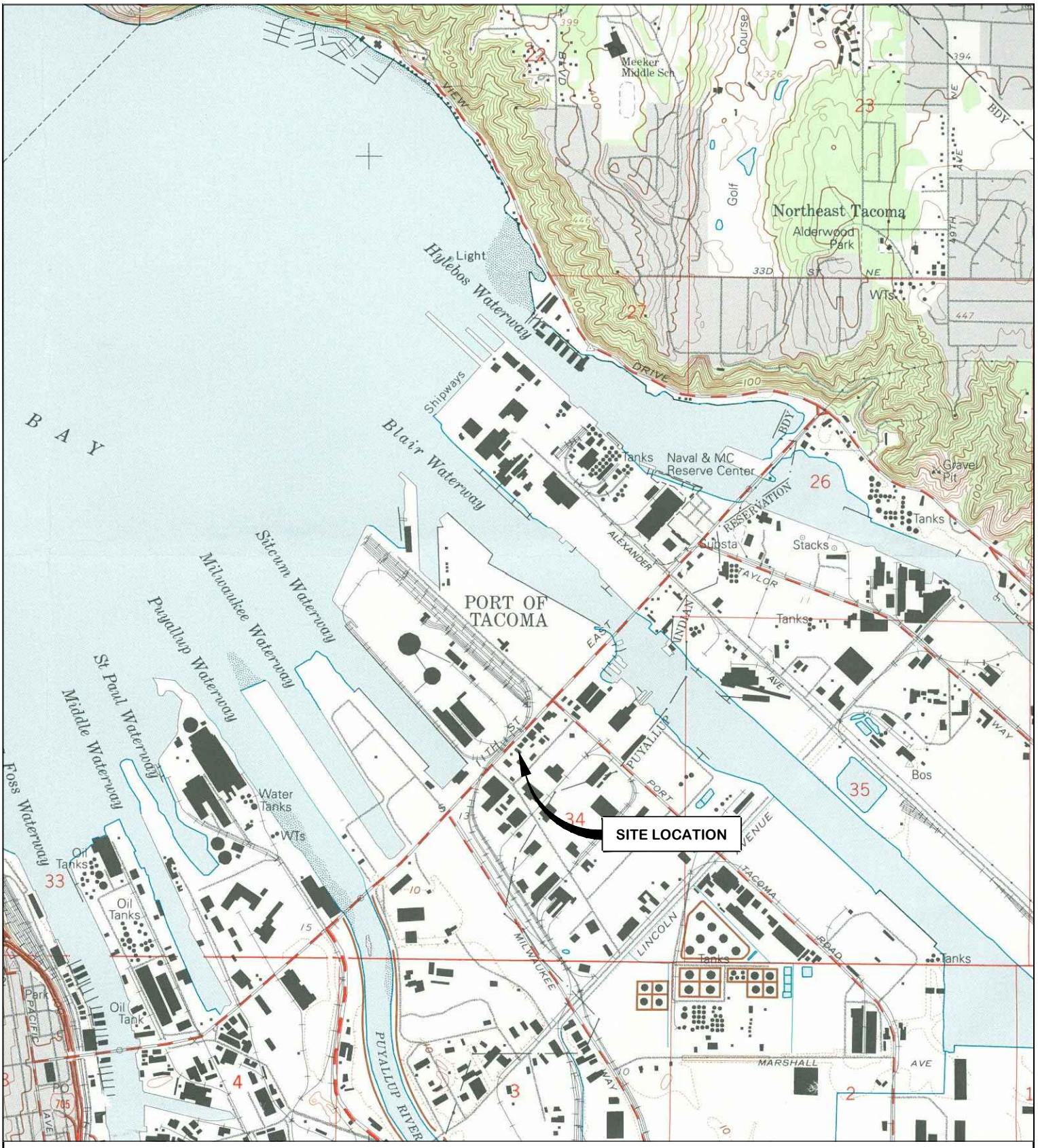
———. 2012. *Washington State Model Toxics Control Act Cleanup Regulation Cleanup Levels and Risk Calculations (CLARC) Database*. https://fortress.wa.gov/ecy/clarc/Reporting/ChemicalQuery.aspx. (August 24, 2012.)

———. 2013. *Washington State Department of Ecology Toxics Cleanup Program, Allied Battery Co Inc Tacoma Site, Integrated Site Information System Site Summary Reporting for Cleanup Site Details.* https://fortress.wa.gov/ecy/tcpwebreporting/TCPSubReportViewer.aspx?report=/TCPReports/ISIS_Web_Reporting_2010/PublicReports/CleanupSiteDetails_p&subRptsiteID=3646>. (June 27, 2013.)

FIGURES

REMEDIAL INVESTIGATION AND
FOCUSED FEASIBILITY STUDY REPORT
Sound Battery
2310 East 11th Street
Tacoma, Washington

Farallon PN: 1117-001



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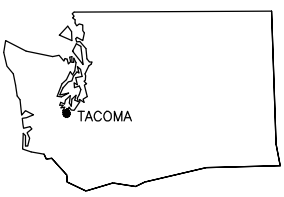

WASHINGTON

N

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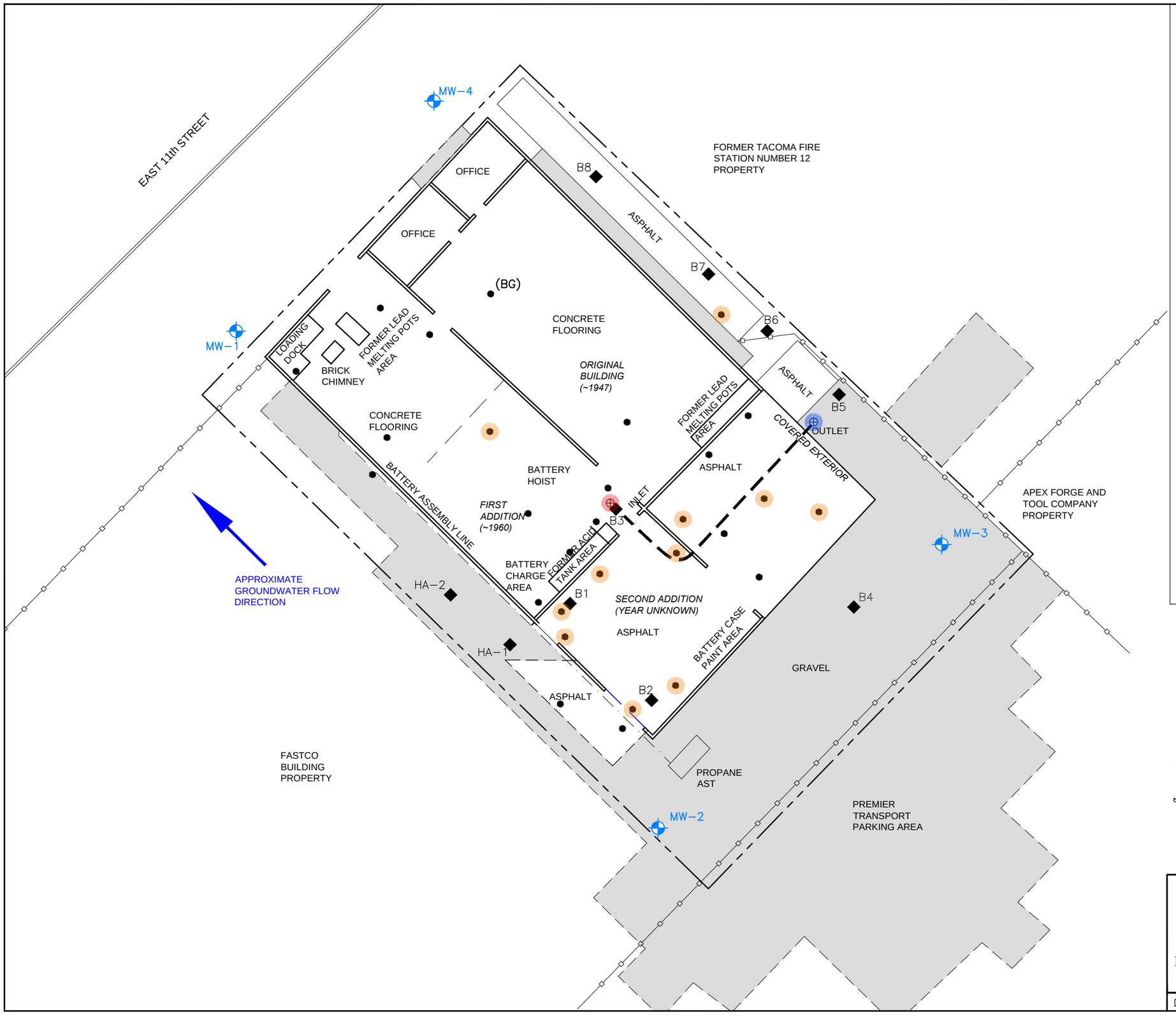
FIGURE 1

SITE VICINITY MAP
SOUND BATTERY PROPERTY
2310 EAST 11th STREET
TACOMA, WASHINGTON

FARALLON PN:1117-001

Drawn By: DEW	Checked By: TC	Date: 10/22/12	Disk Reference: 1117001



LEGEND

- JULY 2011 SOIL SAMPLING LOCATION (ENCO CORPORATION, SEPTEMBER 2011) BG = BACKGROUND SAMPLING LOCATION
- JULY 2011 RECONNAISSANCE GROUNDWATER SAMPLING LOCATION (ENCO CORPORATION, SEPTEMBER 2011)
- MW–4: SHALLOW MONITORING WELL (GEOSYSTEMS ANALYTICS, INC. OCTOBER, 1998) REDEVELOPED AND RESAMPLED FOR CURRENT INVESTIGATION BY FARALLON
- B7: SHALLOW SOIL SAMPLING LOCATIONS (FARALLON 2012)
- FENCE
- CONCRETE-FILLED FLOOR DRAIN
- APPROXIMATE EXTENT OF 2002 SHALLOW SOIL EXCAVATION (GEOSYSTEMS ANALYTICS, INC. APRIL, 2002)
- AREA SAMPLED IN JULY 2011 WHERE LEAD DETECTED GREATER THAN MTCA METHOD A SOIL CLEANUP LEVEL FOR INDUSTRIAL LAND USE (1,000 mg/kg) IN SOIL SHALLOWER THAN TWO FEET BGS (ENCO CORPORATION SEPTEMBER 2011)
- AREA SAMPLED IN JULY 2011 WHERE LEAD DETECTED GREATER THAN MTCA METHOD A SOIL CLEANUP LEVEL FOR INDUSTRIAL LAND USE (1,000 mg/kg) IN SOIL GREATER TWO FEET BGS OR DEEPER (ENCO CORPORATION SEPTEMBER 2011)
- AREA SAMPLED IN JULY 2011WHERE DISSOLVED LEAD DETECTED IN RECONNAISSANCE GROUNDWATER SAMPLE GREATER THAN MTCA METHOD A CRITERION (15 ug/L) (ENCO CORPORATION SEPTEMBER 2011)

MILLIGRAMS PER KILOGRAM (mg/kg)
MICROGRAMS PER LITER (ug/L)
BELOW GROUND SURFACE (BGS)

ALL LOCATIONS ARE APPROXIMATE

N

0 20
Scale in feet

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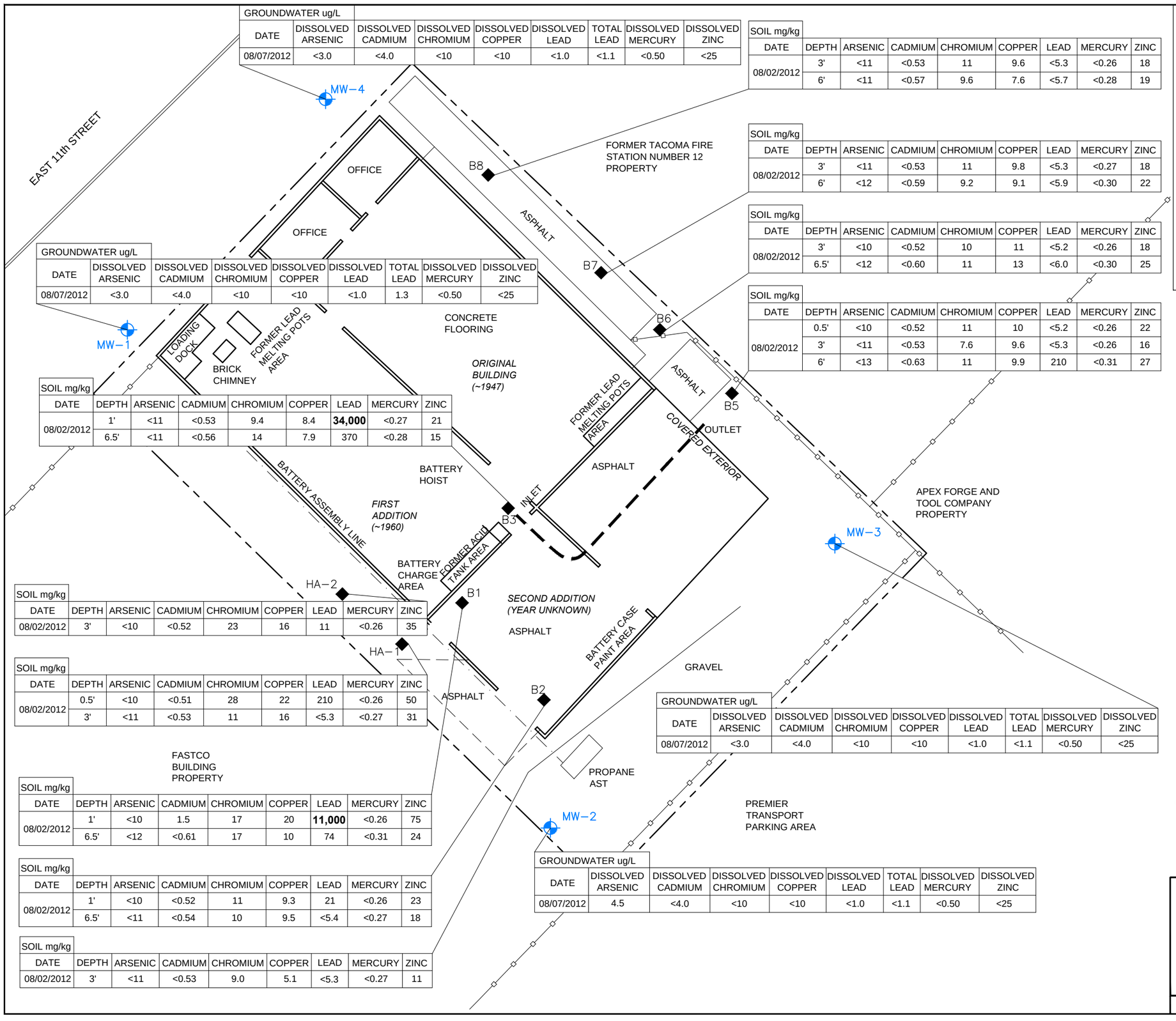
Issaquah, WA 98027

FIGURE 2

SITE PLAN
SOUND BATTERY PROPERTY
2310 EAST 11th STREET
TACOMA, WASHINGTON

FARALLON PN:1117–001

Drawn By:DEW	Checked By:TC	Date8/7/13	Disk Reference:1117001



GROUNDWATER ug/L

DATE	DISSOLVED ARSENIC	DISSOLVED CADMIUM	DISSOLVED CHROMIUM	DISSOLVED COPPER	DISSOLVED LEAD	TOTAL LEAD	DISSOLVED MERCURY	DISSOLVED ZINC
08/07/2012	<3.0	<4.0	<10	<10	<1.0	<1.1	<0.50	<25

GROUNDWATER ug/L

DATE	DISSOLVED ARSENIC	DISSOLVED CADMIUM	DISSOLVED CHROMIUM	DISSOLVED COPPER	DISSOLVED LEAD	TOTAL LEAD	DISSOLVED MERCURY	DISSOLVED ZINC
08/07/2012	<3.0	<4.0	<10	<10	<1.0	1.3	<0.50	<25

SOIL mg/kg

DATE	DEPTH	ARSENIC	CADMIUM	CHROMIUM	COPPER	LEAD	MERCURY	ZINC
08/02/2012	1'	<11	<0.53	9.4	8.4	**34,000**	<0.27	21
	6.5'	<11	<0.56	14	7.9	370	<0.28	15

SOIL mg/kg

DATE	DEPTH	ARSENIC	CADMIUM	CHROMIUM	COPPER	LEAD	MERCURY	ZINC
08/02/2012	3'	<10	<0.52	23	16	11	<0.26	35

SOIL mg/kg

DATE	DEPTH	ARSENIC	CADMIUM	CHROMIUM	COPPER	LEAD	MERCURY	ZINC
08/02/2012	0.5'	<10	<0.51	28	22	210	<0.26	50
	3'	<11	<0.53	11	16	<5.3	<0.27	31

SOIL mg/kg

DATE	DEPTH	ARSENIC	CADMIUM	CHROMIUM	COPPER	LEAD	MERCURY	ZINC
08/02/2012	1'	<10	1.5	17	20	**11,000**	<0.26	75
	6.5'	<12	<0.61	17	10	74	<0.31	24

SOIL mg/kg

DATE	DEPTH	ARSENIC	CADMIUM	CHROMIUM	COPPER	LEAD	MERCURY	ZINC
08/02/2012	1'	<10	<0.52	11	9.3	21	<0.26	23
	6.5'	<11	<0.54	10	9.5	<5.4	<0.27	18

SOIL mg/kg

DATE	DEPTH	ARSENIC	CADMIUM	CHROMIUM	COPPER	LEAD	MERCURY	ZINC
08/02/2012	3'	<11	<0.53	9.0	5.1	<5.3	<0.27	11

SOIL mg/kg

DATE	DEPTH	ARSENIC	CADMIUM	CHROMIUM	COPPER	LEAD	MERCURY	ZINC
08/02/2012	3'	<11	<0.53	11	9.6	<5.3	<0.26	18
	6'	<11	<0.57	9.6	7.6	<5.7	<0.28	19

SOIL mg/kg

DATE	DEPTH	ARSENIC	CADMIUM	CHROMIUM	COPPER	LEAD	MERCURY	ZINC
08/02/2012	3'	<11	<0.53	11	9.8	<5.3	<0.27	18
	6'	<12	<0.59	9.2	9.1	<5.9	<0.30	22

SOIL mg/kg

DATE	DEPTH	ARSENIC	CADMIUM	CHROMIUM	COPPER	LEAD	MERCURY	ZINC
08/02/2012	3'	<10	<0.52	10	11	<5.2	<0.26	18
	6.5'	<12	<0.60	11	13	<6.0	<0.30	25

SOIL mg/kg

DATE	DEPTH	ARSENIC	CADMIUM	CHROMIUM	COPPER	LEAD	MERCURY	ZINC
08/02/2012	0.5'	<10	<0.52	11	10	<5.2	<0.26	22
	3'	<11	<0.53	7.6	9.6	<5.3	<0.26	16
	6'	<13	<0.63	11	9.9	210	<0.31	27

GROUNDWATER ug/L

DATE	DISSOLVED ARSENIC	DISSOLVED CADMIUM	DISSOLVED CHROMIUM	DISSOLVED COPPER	DISSOLVED LEAD	TOTAL LEAD	DISSOLVED MERCURY	DISSOLVED ZINC
08/07/2012	<3.0	<4.0	<10	<10	<1.0	<1.1	<0.50	<25

GROUNDWATER ug/L

DATE	DISSOLVED ARSENIC	DISSOLVED CADMIUM	DISSOLVED CHROMIUM	DISSOLVED COPPER	DISSOLVED LEAD	TOTAL LEAD	DISSOLVED MERCURY	DISSOLVED ZINC
08/07/2012	4.5	<4.0	<10	<10	<1.0	<1.1	<0.50	<25

LEGEND

MW-4 — SHALLOW MONITORING WELL (GEOSYSTEMS ANALYTICS, INC. OCTOBER, 1998) REDEVELOPED AND RESAMPLED FOR CURRENT INVESTIGATION BY FARALLON

B7 — SHALLOW SOIL SAMPLING LOCATIONS (FARALLON 2012)

FENCE

CONCRETE-FILLED FLOOR DRAIN

SOIL ANALYTICAL RESULTS IN MILLIGRAMS PER KILOGRAM (mg/kg)

GROUNDWATER ANALYTICAL RESULTS IN MICROGRAMS PER LITER (ug/L)

BOLD = INDICATES CONCENTRATION EXCEEDS WASHINGTON STATE MODEL TOXICS CONTROL ACT CLEANUP REGULATION METHOD A CLEANUP LEVEL

< = INDICATES CONCENTRATION NOT DETECTED AT OR ABOVE THE STATED LABORATORY PRACTICAL QUANTITATION LIMIT

ALL LOCATIONS ARE APPROXIMATE

0 20
Scale in feet

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Issaquah, WA 98027

FIGURE 3

SITE INVESTIGATION RESULTS
SOUND BATTERY PROPERTY
2310 EAST 11th STREET
TACOMA, WASHINGTON

FARALLON PN:1117-001

Drawn By:DEW | Checked By:TC | Date:7/24/13 | Disk Reference:1117001

EAST 11th STREET

MW-4

OFFICE

OFFICE

B8

ASPHALT

FORMER TACOMA FIRE STATION NUMBER 12 PROPERTY

B7

C

B6

MW-1

LOADING DOCK

BRICK CHIMNEY

FORMER LEAD MELTING POTS AREA

CONCRETE FLOORING

ORIGINAL BUILDING (~1947)

ASPHALT

B5

FORMER LEAD MELTING POTS AREA

COVERED EXTERIOR

OUTLET

A2

CONCRETE FLOORING

B

BATTERY HOIST

BATTERY ASSEMBLY LINE

A1

ASPHALT

FIRST ADDITION (~1960)

B5

N

E

APEX FORGE AND TOOL COMPANY PROPERTY

MW-3

FORMER ACID TANK AREA

BATTERY CHARGE AREA

HA-2

B1

A

SECOND ADDITION (YEAR UNKNOWN)

ASPHALT

BATTERY CASE PAINT AREA

HA-1

GRAVEL

ASPHALT

B2

FASTCO BUILDING PROPERTY

PROPANE AST

MW-2

PREMIER TRANSPORT PARKING AREA

LEGEND

MW-4 — SHALLOW MONITORING WELL (GEOSYSTEMS ANALYTICS, INC. OCTOBER, 1998) REDEVELOPED AND RESAMPLED FOR CURRENT INVESTIGATION BY FARALLON

B7 — SHALLOW SOIL SAMPLING LOCATIONS (FARALLON 2012)

FENCE

CONCRETE-FILLED FLOOR DRAIN

APPROXIMATE EXTENT OF SOIL EXCEEDING THE MTCA METHOD A SOIL CLEANUP LEVEL FOR LEAD WITH INDUSTRIAL LAND USE (1,000 MG/KG) SHALLOWER THAN 2 FEET BELOW GROUND SURFACE

A — REMEDIATION AREA

APPROXIMATE EXTENT OF SOIL EXCEEDING THE MTCA METHOD A SOIL CLEANUP LEVEL FOR LEAD WITH INDUSTRIAL LAND USE (1,000 MG/KG) BETWEEN 2 FEET BELOW GROUND SURFACE AND DEPTH TO GROUNDWATER

A1 — REMEDIATION SUB-AREA

ALL LOCATIONS ARE APPROXIMATE

N

0 20

Scale in feet

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Issaquah, WA 98027

FIGURE 4

REMEDIATION AREAS
SOUND BATTERY PROPERTY
2310 EAST 11th STREET
TACOMA, WASHINGTON

FARALLON PN:1117-001

Drawn By:DEW	Checked By:TC	Date:6/26/13	Disk Reference:1117001

TABLES

REMEDIAL INVESTIGATION AND
FOCUSED FEASIBILITY STUDY REPORT
Sound Battery
2310 East 11th Street
Tacoma, Washington

Farallon PN: 1117-001

Table 1
Groundwater Elevations
Sound Battery Property
2310 East 11th Street
Tacoma, Washington
Farallon PN: 1117-001

Monitoring Well	Date Measured	Well Head Elevation (feet)[1]	Depth to Water (feet)[2]	Groundwater Elevation (feet)[1, 3]
MW-1	8/7/2012	10.48	6.34	4.14
MW-2	8/7/2012	15.25	10.66	4.59
MW-3	8/7/2012	13.83	9.50	4.33
MW-4	8/7/2012	10.34	6.21	4.13

NOTES:

[1] Elevations based on an arbitrary 100-foot datum established at the Site.

[2] In feet below measuring point on top of well casing.

[3] Available groundwater elevation data indicate a general groundwater flow gradient direction toward the northwest and East 11th Street. However, based on available data, the water level elevation at monitoring well MW-2 is typically about 0.2 foot higher than at monitoring well MW-3 to the northeast suggesting that groundwater flow may have a more northerly groundwater flow direction at the back, i.e., southeast part, of the Site and veers toward the northwest at East 11th Street near the center of the Site.

Table 2
Summary of Groundwater Analytical Results
Sound Battery Property
2310 East 11th Street
Tacoma, Washington
Farallon PN: 1117-001

Location	Sample Identification	Sample Date	Analytical Results (micrograms per liter)[4]							
			Dissolved Arsenic	Dissolved Cadmium	Dissolved Chromium	Dissolved Copper	Dissolved Lead	Total Lead	Dissolved Mercury	Dissolved Zinc
MW-1	MW-1-080712	08/07/2012	< 3.0	< 4.0	< 10	< 10	< 1.0	1.3	< 0.50	< 25
MW-2	MW-2-080712	08/07/2012	4.5	< 4.0	< 10	< 10	< 1.0	< 1.1	< 0.50	< 25
MW-3	MW-3-080712	08/07/2012	< 3.0	< 4.0	< 10	< 10	< 1.0	< 1.1	< 0.50	< 25
MW-4	MW-4-080712	08/07/2012	< 3.0	< 4.0	< 10	< 10	< 1.0	< 1.1	< 0.50	< 25
MTCA Method A Cleanup Levels for Groundwater[1]			**5**	**5**	**50**	**640[2]**	**15**	**15**	**2**	**4,800[3]**

NOTES:

Results in **bold** denote that sample results exceed applicable screening level

< denotes analyte not detected at or above the reporting limit listed.

[1] Washington State Model Toxics Control Act Cleanup Regulation (MTCA) Method A Groundwater Cleanup Levels, Table 720-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, as revised November 2007.

[2] No MTCA Method A groundwater cleanup level available-- most stringent cleanup level available in CLARC is 640 micrograms per liter using MTCA Method B cleanup level for groundwater.

[3] No MTCA Method A groundwater cleanup level available-- most stringent cleanup level available in CLARC is 4,800 micrograms per liter using MTCA Method B cleanup level for groundwater.

[4] Analyzed by U.S. Environmental Protection Agency Method 200.8/7470A

CLARC = Washington State Department of Ecology's online Cleanup Levels and Risk Calculations Database (https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx) queried 8/24/2012.

Dissolved = Field filtered with 0.45-micron filter

NA = Not available in CLARC

Table 3
Summary of Soil Analytical Results
Sound Battery Property
2310 East 11th Street
Tacoma, Washington
Farallon PN: 1117-001

Location	Sample Identification	Sample Date	Sample Depth (feet below ground surface)	Analytical Results (milligrams per kilogram, except as noted)[6]							
				Arsenic	Cadmium	Chromium	Copper	Lead	TCLP Lead (milligrams per liter)	Mercury	Zinc
B-1	B1-1.0	08/02/2012	1	< 10	1.5	17	20	**11,000**	**470**	< 0.26	75
	B1-6.5	08/02/2012	6.5	< 12	< 0.61	17	10	74	2.9	< 0.31	24
B-2	B2-1.0	08/02/2012	1	< 10	< 0.52	11	9.3	21	-	< 0.26	23
	B2-6.5	08/02/2012	6.5	< 11	< 0.54	10	9.5	< 5.4	< 0.20	< 0.27	18
B-3	B3-1.0	08/02/2012	1	< 11	< 0.53	9.4	8.4	**34,000**	**230**	< 0.27	21
	B3-6.5	08/02/2012	6.5	< 11	< 0.56	14	7.9	370	< 0.20	< 0.28	15
B-4	B4-3.0	08/02/2012	3	< 11	< 0.53	9.0	5.1	< 5.3	-	< 0.27	11
B-5	B5-0.5	08/02/2012	0.5	< 10	< 0.52	11	10	< 5.2	-	< 0.26	22
	B5-3.0	08/02/2012	3	< 11	< 0.53	7.6	9.6	< 5.3	-	< 0.26	16
	B5-6.0	08/02/2012	6	< 13	< 0.63	11	9.9	210	-	< 0.31	27
B-6	B6-3.0	08/02/2012	3	< 10	< 0.52	10	11	< 5.2	-	< 0.26	18
	B6-6.5	08/02/2012	6.5	< 12	< 0.60	11	13	< 6.0	-	< 0.30	25
B-7	B7-3.0	08/02/2012	3	< 11	< 0.53	11	9.8	< 5.3	-	< 0.27	18
	B7-6.0	08/02/2012	6	< 12	< 0.59	9.2	9.1	< 5.9	-	< 0.30	22
B-8	B8-3.0	08/02/2012	3	< 11	< 0.53	11	9.6	< 5.3	-	< 0.26	18
	B8-6.0	08/02/2012	6	< 11	< 0.57	9.6	7.6	< 5.7	-	< 0.28	19
HA-1	HA-1-0.5	08/02/2012	0.5	< 10	< 0.51	28	22	210	-	< 0.26	50
	HA-1-3.0	08/02/2012	3	< 11	< 0.53	11	16	< 5.3	-	< 0.27	31
HA-2	HA-2-3.0	08/02/2012	3	< 10	< 0.52	23	16	11	-	< 0.26	35
MTCA Method A Cleanup Levels for Soil[1]				**20**	**2**	**2000[2]**	**3,200[3]**	**1,000**	**5[4]**	**2**	**24,000[5]**

NOTES:

Results in **bold** denote that sample results exceed applicable screening level

< denotes analyte not detected at or above the reporting limit listed.

[1] Washington State Model Toxics Control Act Cleanup Regulation (MTCA) Method A Soil Cleanup Levels for Industrial Land Uses, Table 745-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, as revised November 2007.

[2] Value provided is for Chromium III. The MTCA Method A soil cleanup level for Chromium VI is 19 milligrams per kilogram.

[3] No MTCA Method A soil cleanup level available-- most stringent cleanup level available in CLARC is 3,200 micrograms per kilogram using MTCA Method B cleanup level for soil (standard formula value for direct contact--ingestion).

[4] MTCA Method A soil cleanup level not applicable--Value indicated is the maximum concentration of contaminants for the toxicity characteristic triggering dangerous waste classification number D008 for lead per Washington State Dangerous Waste Regulation Section 090(8) of Chapter 173-303 of the Washington Administrative Code, as revised January 2005.

[5] No MTCA Method A soil cleanup level available--most stringent cleanup level available in CLARC is 24,000 micrograms per kilogram using MTCA Method B cleanup level for soil (standard formula value for direct contact--ingestion).

[6] Analyzed by U.S. Environmental Protection Agency Method 6010B/7471A except for TCLP lead, which was analyzed using U.S. Environmental

CLARC = Washington State Department of Ecology's online Cleanup Levels and Risk Calculations Database (https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx) queried 8/24/2012.

TCLP = Toxicity Characteristic Leaching Procedure, Test Method 1311 in U.S. Environmental Protection Agency Publications SW-846.

Table 4
Summary of Remedial Technology Screening
Sound Battery Property
Tacoma, Washington
Farallon PN: 1117-001

General Response Action	Technology Type	Technology Process Option	Score of Evaluation Criteria: Protectiveness	Permanence	Cost	Long-Term Effectiveness	Short-Term Risk Management	Implementation	Consideration of Public Concerns	Total	Rank	Retain?
Institutional Controls	**Legal**	**Deed restrictions (Environmental Covenant) with Site use restrictions and health advisories**	**3**	**1**	**5**	**2**	**4**	**5**	**3**	**23**	**4**	**Y**
Containment	Physical isolation-- in-situ	On-Site in-situ containment beneath a cap/constructed cover	4	3	4	3	4	5	3	26	2	N
Treat in-situ	Chemical immobilization	In-situ solidification	4	3	2	4	3	4	4	24	3	N
Excavate and dispose with, or without, pre-treatment on-Site or off-Site	Physical isolation-- ex-situ	On-Site ex-situ containment beneath a cap/constructed cover	4	3	3	3	3	4	3	23	4	N
	Physical removal and off-Site disposal	Subtitle C or D landfill disposal without pre-treatment	3	3	2	4	3	1	4	20	5	N[1]
	Physical removal, on-Site chemical immobilization, and off-Site disposal	**Excavation, on-Site stabilization, and Subtitle D landfill disposal**	**5**	**5**	**3**	**5**	**3**	**4**	**5**	**30**	**1**	**Y**
	Physical removal, off-Site chemical immobilization, and off-Site disposal	**Excavation, off-Site stabilization, and Subtitle D landfill disposal**	**5**	**5**	**3**	**5**	**3**	**4**	**5**	**30**	**1**	**Y**

NOTES:

Rank = Position relative to other technologies based on total score.

Total Score = Sum of individual scores for implementability, effectiveness, and cost.

Y = Retained for consideration in FFS.

N = Not retained for consideration in FFS.

Bold denotes general response actions, technology types, and technology process options are retained for incorporation into cleanup alternatives

[1] Disposal of untreated soil at a permitted landfill may be implementable for some of the soil that would be excavated at the Site if the lead meets leachability characteristics required by the landfill. However, it is known that some soil would not meet required lead leachability characteristics and it would be costly to use field screening tools to segregate soil such a small excavation volume. It may not be possible to dispose of some material from the Site without prior treatment. For the purposes of the FFS, off-Site disposal without prior treatment was considered to have a very low implementability and was not a technology retained for further consideration in the FFS.

Ranking Criteria

5 = Very Favorable

4 = Favorable

3 = Somewhat Favorable to Uncertain

2 = Unfavorable

1 = Very Unfavorable

Table 5
Evaluation of Cleanup Alternatives
Sound Battery Property
Tacoma, Washington
Farallon PN: 1117-001

	Cleanup Alternative 1 **Excavation, Off-Site Stabilization, and Off-Site Disposal**	**Cleanup Alternative 2** **Excavation, On-Site Stabilization, and Off-Site Disposal**	**Cleanup Alternative 3** **Institutional Controls and On-Site Containment**
Description	Soil excavation, on-Site stabilization, and off-Site disposal at a Subtitle D landfill; building demolished	Soil excavation, off-Site stabilization, and off-Site disposal at a Subtitle D landfill; building demolished	Institutional controls in the form of an Environmental Covenant to include site use restrictions and health advisories; building demolished
Amount of Soil Removal (tons)	**350**	**350**	**0**
MTCA Composite Benefit Score[1]	**9.4**	**9.4**	**7.1**
Overall Alternative Ranking	**1**	**1**	**2**
THRESHOLD REQUIREMENTS			
Protection of Human Health and the Environment	**Yes** - Alternative will protect human health and the environment.	**Yes** - Alternative will protect human health and the environment.	**Yes** - Alternative will protect human health and the environment.
Compliance with Cleanup Standards	**Yes** - Active remedial measure (removal) is used for soil not complying with cleanup standards.	**Yes** - Active remedial measure (removal) is used for soil not complying with cleanup standards.	**No** - Cleanup levels will not be met throughout the Site except over the long-term with natural attenuation processes.
Compliance with Applicable State and Federal Laws	**Yes** - Alternative complies with applicable laws.	**Yes** - Alternative complies with applicable laws.	**Yes** - Alternative complies with applicable laws.
Provision for Compliance Monitoring	**Yes** - Alternative includes provisions for compliance monitoring (i.e., compliance soil sampling during removal and groundwater confirmational monitoring).	**Yes** - Alternative includes provisions for compliance monitoring (i.e., compliance soil sampling during removal and groundwater confirmational monitoring).	**Yes** - Compliance monitoring has been conducted at the Site (i.e., compliance soil sampling during removal in 2020 and periodic groundwater sampling between 1998 and 2012). Alternative provides for groundwater confirmational monitoring.
OTHER REQUIREMENTS			
Permanent to the Maximum Extent Practicable (see detail below)	**Yes** - Alternative is permanent to the maximum extent practicable	**Yes** - Alternative is permanent to the maximum extent practicable	**Yes** - Remediation of residual impacted soil is deferred until future property development.
Restoration Time Frame	Restoration time frame is approximately one year for design, excavation, restoration, and soil monitoring.	Restoration time frame is approximately one year for design, excavation, restoration, and soil monitoring.	Restoration time frame is undefined and dependent upon future property redevelopment activities.
Evaluation Criteria for Permanence to the Maximum Extent Practicable			
Protectiveness (30% weighting Factor)	Alternative will be most protective for the Site = **10**.	Alternative will be most protective for the Site = **10**.	Alternative will achieve overall protection = **7**.
Permanence (20% weighting Factor)	Alternative makes greatest use of removal and off-site disposal = **10**.	Alternative makes greatest use of removal and off-site disposal = **10**.	Part, or all, of the residual impacted soil will be removed when the property is redeveloped = **6**.
Long-Term Effectiveness (20% weighting Factor)	Alternative makes greatest use of removal and off-Site disposal = **10.**	Alternative makes greatest use of removal and off-Site disposal = **10.**	Alternative places controls on the residual impacted soil, including possible future removal of impacted soil if and when disturbed = **6.**
Short-Term Risk Management (10% weighting Factor)	Alternative disturbs impacted soils proximate to neighboring properties, presenting short-term risk management = **6.**	Alternative disturbs impacted soils proximate to neighboring properties, presenting short-term risk management = **6.**	Alternative does not disturb impacted soils in the short term; no short-term risk management needed = **8**.
Implementability (10% weighting Factor)	No difficulties with implementing the alternative are anticipated = **10**.	No difficulties with implementing the alternative are anticipated = **10**.	Subsurface excavation restrictions and health advisories will be implemented permanently = **10**.
Public Concerns (10% weighting Factor)	Alternative maximizes removal and disposal of impacted soils. Site is in area zoned for industrial use and public access is restricted. Limited public concern during excavation = **8.**	Alternative maximizes removal and disposal of impacted soils. Site is in area zoned for industrial use and public access is restricted. Limited public concern during excavation = **8.**	Alternative leaves impacted soil in place. Site is in area zoned for industrial use and public access is restricted. Limited public concern is anticipated = **8**.
Cost	**$473,552**	**$418,206**	**$288,346**

Notes:

[1] Basis for overall Washington State Model Toxics Control Act Cleanup Regulation (MTCA) Composite Benefit Score provided quantitatively with a "score" from 0 (least favorable) to 10 (most favorable) for each of the six evaluation criteria for permanence to the Maximum Extend Practicable above. MTCA Composite Benefit Scores are calculated by summing the mathematical product of the score times the indicated weighting factor for each of the six criteria. The basis for the weighting factors for the six criteria to evaluate permanence to the maximum extent practicable are obtained from Washington State Department of Ecology guidance cited in the text.

APPENDIX A
BORING LOGS

REMEDIAL INVESTIGATION AND
FOCUSED FEASIBILITY STUDY REPORT
Sound Battery
2310 East 11th Street
Tacoma, Washington

Farallon PN: 1117-001

FARALLON consulting
975 5th Avenue Northwest
Issaquah, Washington 98027

Log of Boring: B-1

Client: Davis Law Office, PLLC
Project: Sound Battery
Location: Tacoma, Washington

Farallon PN: 1117-001

Logged By: Ken Scott

Date/Time Started:	8/2/12 1010	**Sampler Type:**	2" Macrocore
Date/Time Completed:	8/2/12 1135	**Drive Hammer (lbs.):**	NA
Equipment:	Rotohammer	**Depth of Water ATD (ft bgs):**	7.0
Drilling Company:	ESN Northwest	**Total Boring Depth (ft bgs):**	9.0
Drilling Foreman:	Chris Ross	**Total Well Depth (ft bgs):**	NA
Drilling Method:	Hand-operated Geoprobe		

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 8/8/8	PID (ppm)	Sample ID	Sample Analyzed	Boring/Well Construction Details
0		0-0.4' Concrete.	CO							
		0.4'-4.5' Poorly graded SAND (95% sand/ 5% silt), fine to medium sand, light brownish gray, moist, no odor, no sheen, fill.	SP		100	NA		B1-1.0	x	
		2.2' Gravel content increases to 5%, becomes brown.								
		3.6' No silt content.								
5		4.5'-9.0' Silty SAND (80% sand/ 20% silt), fine sand, borwn, moist to wet, no odor, no sheen.	SM		100	NA		B1-6.5	x	▼

Well Construction Information

Monument Type: NA
Casing Diameter (inches): NA
Screen Slot Size (inches): NA
Screened Interval (ft bgs): NA

Filter Pack: NA
Surface Seal: NA
Annular Seal: NA

Ground Surface Elevation (ft): NA
Top of Casing Elevation (ft): NA
Boring Abandonment: NA
Surveyed Location: **X:** NA **Y:** NA

FARALLON consulting
975 5th Avenue Northwest
Issaquah, Washington 98027

Log of Boring: B-2

Client: Davis Law Office, PLLC
Project: Sound Battery
Location: Tacoma, Washington

Farallon PN: 1117-001

Logged By: Ken Scott

Date/Time Started:	8/2/12 1155	**Sampler Type:**	4' macrocore
Date/Time Completed:	8/2/12 1215	**Drive Hammer (lbs.):**	NA
Equipment:	SP30 Stratoprobe	**Depth of Water ATD (ft bgs):**	7.0
Drilling Company:	ESN Northwest	**Total Boring Depth (ft bgs):**	8.0
Drilling Foreman:	John Medford	**Total Well Depth (ft bgs):**	NA
Drilling Method:	Truck-mounted Geoprobe		

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 8/8/8	PID (ppm)	Sample ID	Sample Analyzed	Boring/Well Construction Details
0		0-0.4' Concrete.	CO							
		0.4'-3.8' Poorly graded SAND (95% sand/ 5% silt), fine to medium sand, light brown, moist, no odor, no sheen.	SP		100	NA		B2-1.0	x	
		2.6' Gravel content increases to 5%.								
		3.8'-8.0' Sitly SAND (80% sand/ 20% silt), fine sand, brown, moist to wet, no odor, no sheen.	SM							
5					100	NA		B2-6.5	x	

Well Construction Information

Monument Type: NA
Casing Diameter (inches): NA
Screen Slot Size (inches): NA
Screened Interval (ft bgs): NA

Filter Pack: NA
Surface Seal: NA
Annular Seal: NA

Ground Surface Elevation (ft): NA
Top of Casing Elevation (ft): NA
Boring Abandonment: NA
Surveyed Location: **X:** NA **Y:** NA

FARALLON consulting
975 5th Avenue Northwest
Issaquah, Washington 98027

Log of Boring: B-3

Client: Davis Law Office, PLLC
Project: Sound Battery
Location: Tacoma, Washington

Farallon PN: 1117-001

Logged By: Ken Scott

Date/Time Started:	8/2/12 1330	**Sampler Type:**	2' macrocore
Date/Time Completed:	8/2/12 1400	**Drive Hammer (lbs.):**	NA
Equipment:	Rotohammer	**Depth of Water ATD (ft bgs):**	7.0
Drilling Company:	ESN Northwest	**Total Boring Depth (ft bgs):**	7.0
Drilling Foreman:	Chris Ross	**Total Well Depth (ft bgs):**	NA
Drilling Method:	Hand-operated Geoprobe		

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 8/8/8	PID (ppm)	Sample ID	Sample Analyzed	Boring/Well Construction Details
0		0'-0.7' Concrete.	SP-SM							
		0.7'-7.0' Poorly graded SAND with silt and gravel (80% sand/ 10% silt/ 10% gravel), fine to medium sand, fine gravel, brown, moist, no odor, no sheen.	SM		100	NA		B3-1.0	x	
		2.6' No gravel content.								
5					100	NA		B3-6.5	x	

Well Construction Information

Monument Type: NA
Casing Diameter (inches): NA
Screen Slot Size (inches): NA
Screened Interval (ft bgs): NA

Filter Pack: NA
Surface Seal: NA
Annular Seal: NA

Ground Surface Elevation (ft): NA
Top of Casing Elevation (ft): NA
Boring Abandonment: NA
Surveyed Location: **X:** NA **Y:** NA

FARALLON consulting
975 5th Avenue Northwest
Issaquah, Washington 98027

Log of Boring: B-4

Client: Davis Law Office, PLLC
Project: Sound Battery
Location: Tacoma, Washington
Farallon PN: 1117-001
Logged By: Ken Scott

Date/Time Started:	8/2/12 1315	**Sampler Type:**	4' macrocore
Date/Time Completed:	8/2/12 1330	**Drive Hammer (lbs.):**	NA
Equipment:	SP30 Stratoprobe	**Depth of Water ATD (ft bgs):**	NE
Drilling Company:	ESN Northwest	**Total Boring Depth (ft bgs):**	4.0
Drilling Foreman:	Chris Ross	**Total Well Depth (ft bgs):**	NA
Drilling Method:	Truck-mounted Geoprobe		

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 8/8/8	PID (ppm)	Sample ID	Sample Analyzed	Boring/Well Construction Details
0		0'-0.4' Asphalt.	AC							
		0.4'-1.5' Poorly graded SAND with silt and gravel (60% sand/ 30% gravel/ 10% silt), fine to medium sand, fine to coarse gravel, light brown, moist, no odor, no sheen.	SP-SM							
		1.5'-2.3' Sandy SILT (60% silt/ 30% sand/ 10% gravel), fine to medium sand, fine to coarse gravel, yellowish brown, moist, no odor, no sheen.	ML							
		2.3'-4.0' Silty SAND (65% sand/ 25% silt, 10% gravel), fine sand, brown, moist, no odor, no sheen.	SM		100	NA		B4-3.0	x	
5										

Well Construction Information

Monument Type: NA
Casing Diameter (inches): NA
Screen Slot Size (inches): NA
Screened Interval (ft bgs): NA
Filter Pack: NA
Surface Seal: NA
Annular Seal: NA
Ground Surface Elevation (ft): NA
Top of Casing Elevation (ft): NA
Boring Abandonment: NA
Surveyed Location: **X:** NA **Y:** NA

FARALLON consulting
975 5th Avenue Northwest
Issaquah, Washington 98027

Log of Boring: B-5

Client: Davis Law Office, PLLC
Project: Sound Battery
Location: Tacoma, Washington

Farallon PN: 1117-001

Logged By: Ken Scott

Date/Time Started:	8/2/12 1455	**Sampler Type:**	4' macrocore
Date/Time Completed:	8/2/12 1505	**Drive Hammer (lbs.):**	NA
Equipment:	SP30 Stratoprobe	**Depth of Water ATD (ft bgs):**	6.5
Drilling Company:	ESN Northwest	**Total Boring Depth (ft bgs):**	8.0
Drilling Foreman:	Chris Ross	**Total Well Depth (ft bgs):**	NA
Drilling Method:	Truck-mounted Geoprobe		

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 8/8/8	PID (ppm)	Sample ID	Sample Analyzed	Boring/Well Construction Details
0		0'-0.4' Asphalt.	AC							
		0.4'-4.6' Poorly graded SAND (95% sand/ 5% silt), fine to medium sand, brown, moist, no odor, no sheen.	SP		100	NA		B5-0.5	x	
					100	NA		B5-3.0	x	
5		4.6'-8.0' Silty SAND (80% sand/ 20% silt), fine to medium sand, dark brown, moist to wet, no odor, no sheen.	SM		100	NA		B5-6.0	x	

Well Construction Information

Monument Type: NA
Casing Diameter (inches): NA
Screen Slot Size (inches): NA
Screened Interval (ft bgs): NA

Filter Pack: NA
Surface Seal: NA
Annular Seal: NA

Ground Surface Elevation (ft): NA
Top of Casing Elevation (ft): NA
Boring Abandonment: NA
Surveyed Location: **X:** NA **Y:** NA

FARALLON consulting
975 5th Avenue Northwest
Issaquah, Washington 98027

Log of Boring: B-6

Client: Davis Law Office, PLLC
Project: Sound Battery
Location: Tacoma, Washington
Farallon PN: 1117-001
Logged By: Ken Scott

Date/Time Started:	8/2/12 1515	**Sampler Type:**	4' macrocore
Date/Time Completed:	8/2/12 1530	**Drive Hammer (lbs.):**	NA
Equipment:	SP30 Stratoprobe	**Depth of Water ATD (ft bgs):**	7.0
Drilling Company:	ESN Northwest	**Total Boring Depth (ft bgs):**	8.0
Drilling Foreman:	Chris Ross	**Total Well Depth (ft bgs):**	NA
Drilling Method:	Truck-mounted Geoprobe		

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 8/8/8	PID (ppm)	Sample ID	Sample Analyzed	Boring/Well Construction Details
0		0'-0.4' Asphalt.	AC							
		0.4'-1.5' Poorly graded SAND (95% sand/ 5% silt), fine sand, light gray, moist, no odor, no sheen.	SP							
		1.5'-1.6' FILL, red brick.	FILL							
		1.6'-5.4' Poorly graded SAND (95% sand/ 5% silt), fine sand, light brown, moist, no odor, no sheen.	SP		100	NA		B6-3.0	x	
5		5.4'-8.0' Silty SAND (80% sand/ 20% silt), fine to medium sand, brown, moist to wet, no odor, no sheen.	SM		100	NA		B6-6.5	x	

Well Construction Information

Monument Type: NA
Casing Diameter (inches): NA
Screen Slot Size (inches): NA
Screened Interval (ft bgs): NA
Filter Pack: NA
Surface Seal: NA
Annular Seal: NA
Ground Surface Elevation (ft): NA
Top of Casing Elevation (ft): NA
Boring Abandonment: NA
Surveyed Location: X: NA Y: NA

FARALLON consulting
975 5th Avenue Northwest
Issaquah, Washington 98027

Log of Boring: B-7

Client: Davis Law Office, PLLC
Project: Sound Battery
Location: Tacoma, Washington
Farallon PN: 1117-001
Logged By: Ken Scott

Date/Time Started:	8/2/12 1530	**Sampler Type:**	4' macrocore
Date/Time Completed:	8/2/12 1550	**Drive Hammer (lbs.):**	NA
Equipment:	SP30 Stratoprobe	**Depth of Water ATD (ft bgs):**	6.5
Drilling Company:	ESN Northwest	**Total Boring Depth (ft bgs):**	8.0
Drilling Foreman:	Chris Ross	**Total Well Depth (ft bgs):**	NA
Drilling Method:	Truck-mounted Geoprobe		

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 8/8/8	PID (ppm)	Sample ID	Sample Analyzed	Boring/Well Construction Details
0		0'-0.4' Asphalt.	AC							
		0.4'-4.7' Poorly graded SAND (95% sand/ 5% silt), fine to medium sand, brown, moist, no odor, no sheen.	SP		100	NA		B7-3.0	x	
5		4.7'-8.0' Silty SAND (80% sand/ 20% silt), fine to medium sand, brown, moist to wet, no odor, no sheen.	SM		100	NA		B7-6.5	x	▼

Well Construction Information

Monument Type: NA
Casing Diameter (inches): NA
Screen Slot Size (inches): NA
Screened Interval (ft bgs): NA
Filter Pack: NA
Surface Seal: NA
Annular Seal: NA
Ground Surface Elevation (ft): NA
Top of Casing Elevation (ft): NA
Boring Abandonment: NA
Surveyed Location: **X:** NA **Y:** NA

FARALLON consulting
975 5th Avenue Northwest
Issaquah, Washington 98027

Log of Boring: B-8

Client: Davis Law Office, PLLC
Project: Sound Battery
Location: Tacoma, Washington
Farallon PN: 1117-001
Logged By: Ken Scott

Date/Time Started:	8/2/12 1555	**Sampler Type:**	4' macrocore
Date/Time Completed:	8/2/12 1625	**Drive Hammer (lbs.):**	NA
Equipment:	SP30 Stratoprobe	**Depth of Water ATD (ft bgs):**	6.5
Drilling Company:	ESN Northwest	**Total Boring Depth (ft bgs):**	8.0
Drilling Foreman:	John	**Total Well Depth (ft bgs):**	NA
Drilling Method:	Truck-mounted Geoprobe		

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 8/8/8	PID (ppm)	Sample ID	Sample Analyzed	Boring/Well Construction Details
0		0'-0.4' Asphalt.	AC							
		0.4'-4.4' Poorly graded SAND (95% sand/ 5% silt), fine to medium sand, brown, moist, no odor, no sheen.	SP		100	NA		B8-3.0	x	
5		4.4'-8.0' Silty SAND (80% sand/ 20% silt), fine to medium sand, brown, moist to wet, no odor, no sheen.	SM		100	NA		B8-6.0	x	▼

Well Construction Information

Monument Type:	NA	**Filter Pack:**	NA	**Ground Surface Elevation (ft):**	NA
Casing Diameter (inches):	NA	**Surface Seal:**	NA	**Top of Casing Elevation (ft):**	NA
Screen Slot Size (inches):	NA	**Annular Seal:**	NA	**Boring Abandonment:**	NA
Screened Interval (ft bgs):	NA			**Surveyed Location:** **X:** NA	**Y:** NA

FARALLON consulting
975 5th Avenue Northwest
Issaquah, Washington 98027

Log of Boring: HA-1

Client: Davis Law Office, PLLC
Project: Sound Battery
Location: Tacoma, Washington
Farallon PN: 1117-001
Logged By: Ken Scott

Date/Time Started:	8/2/12 1215	**Sampler Type:**	4" Hand Auger
Date/Time Completed:	8/2/12 1245	**Drive Hammer (lbs.):**	NA
Equipment:	Hand Auger	**Depth of Water ATD (ft bgs):**	NE
Drilling Company:	NA	**Total Boring Depth (ft bgs):**	3.5
Drilling Foreman:	NA	**Total Well Depth (ft bgs):**	NA
Drilling Method:	Hand Auger		

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 8/8/8	PID (ppm)	Sample ID	Sample Analyzed	Boring/Well Construction Details
0		0-2.5' Poorly graded SAND with silt and gravel (60% sand/ 30% gravel/ 10% silt), fine to medium sand, fine to coarse gravel, light brown, estimated dense, moist, no odor, no sheen, 3-4" rounded cobbles.	SP-SM		100	NA		HA-1-0.5	x	
		2.5'-3.5': Poorly graded SAND (90% sand/ 5% gravel/ 5% silt), fine to medium sand, brown, moist, no odor, no sheen.	SP		100	NA		HA-1-3.0	x	
5										

Well Construction Information

Monument Type:	NA	**Filter Pack:**	NA	**Ground Surface Elevation (ft):**	NA
Casing Diameter (inches):	NA	**Surface Seal:**	NA	**Top of Casing Elevation (ft):**	NA
Screen Slot Size (inches):	NA	**Annular Seal:**	NA	**Boring Abandonment:**	NA
Screened Interval (ft bgs):	NA			**Surveyed Location:** **X:** NA	**Y:** NA

FARALLON consulting
975 5th Avenue Northwest
Issaquah, Washington 98027

Log of Boring: HA-2

Client: Davis Law Office, PLLC
Project: Sound Battery
Location: Tacoma, Washington

Farallon PN: 1117-001

Logged By: Ken Scott

Date/Time Started:	8/2/12 1250	**Sampler Type:**	4" Hand Auger
Date/Time Completed:	8/2/12 1305	**Drive Hammer (lbs.):**	NA
Equipment:	Hand Auger	**Depth of Water ATD (ft bgs):**	NE
Drilling Company:	NA	**Total Boring Depth (ft bgs):**	3.5
Drilling Foreman:	NA	**Total Well Depth (ft bgs):**	NA
Drilling Method:	Hand Auger		

Depth (feet bgs.)	Sample Interval	Lithologic Description	USCS	USGS Graphic	% Recovery	Blow Counts 8/8/8	PID (ppm)	Sample ID	Sample Analyzed	Boring/Well Construction Details
0		0-2.6' Poorly graded SAND with silt and gravel (60% sand/ 30% gravel/ 10% silt), fine to medium sand, fine to coarse gravel, light brown, moist, no odor, no sheen.	SP-SM							
		2.6'-3.5': Poorly graded SAND (90% sand/ 5% gravel/ 5% silt), fine to medium sand, brown, moist, no odor, no sheen.	SP		100	NA		HA-2-3.0	x	
5										

Well Construction Information

Monument Type:	NA	**Filter Pack:**	NA	**Ground Surface Elevation (ft):**	NA
Casing Diameter (inches):	NA	**Surface Seal:**	NA	**Top of Casing Elevation (ft):**	NA
Screen Slot Size (inches):	NA	**Annular Seal:**	NA	**Boring Abandonment:**	NA
Screened Interval (ft bgs):	NA			**Surveyed Location:** **X:** NA	**Y:** NA

APPENDIX B
LABORATORY ANALYTICAL REPORTS

REMEDIAL INVESTIGATION AND
FOCUSED FEASIBILITY STUDY REPORT
Sound Battery
2310 East 11th Street
Tacoma, Washington

Farallon PN: 1117-001

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

August 14, 2012

Tad Cline
Farallon Consulting, LLC
Queen Anne Square East Bldg.
200 West Mercer Street, Suite 302
Seattle, WA 98119

Re: Analytical Data for Project 1117-001
Laboratory Reference No. 1208-024

Dear Tad:

Enclosed are the analytical results and associated quality control data for samples submitted on August 3, 2012.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: August 14, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024
Project: 1117-001

Case Narrative

Samples were collected on August 2, 2012 and received by the laboratory on August 3, 2012. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Total Metals EPA 6010B/7471A Analysis

Due to the high concentration of Lead in the QC sample, the amount spiked was insufficient for meaningful MS/MSD recovery data. The Spike Blank recovery was 108%.

The duplicate RPD for Lead is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: August 14, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024
Project: 1117-001

TOTAL METALS
EPA 6010B/7471A

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-024-01					
Client ID:	**B1-1.0**					
Arsenic	**ND**	10	6010B	8-8-12	8-9-12	
Cadmium	**1.5**	0.51	6010B	8-8-12	8-9-12	
Chromium	**17**	0.51	6010B	8-8-12	8-9-12	
Copper	**20**	1.0	6010B	8-8-12	8-9-12	
Lead	**11000**	51	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.26	7471A	8-7-12	8-7-12	
Zinc	**75**	2.6	6010B	8-8-12	8-9-12	
Lab ID:	08-024-02					
Client ID:	**B1-6.5**					
Arsenic	**ND**	12	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.61	6010B	8-8-12	8-10-12	
Chromium	**17**	0.61	6010B	8-8-12	8-10-12	
Copper	**10**	1.2	6010B	8-8-12	8-10-12	
Lead	**74**	6.1	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.31	7471A	8-7-12	8-7-12	
Zinc	**24**	3.1	6010B	8-8-12	8-10-12	
Lab ID:	08-024-03					
Client ID:	**B2-1.0**					
Arsenic	**ND**	10	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.52	6010B	8-8-12	8-10-12	
Chromium	**11**	0.52	6010B	8-8-12	8-10-12	
Copper	**9.3**	1.0	6010B	8-8-12	8-10-12	
Lead	**21**	5.2	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.26	7471A	8-7-12	8-7-12	
Zinc	**23**	2.6	6010B	8-8-12	8-10-12	

Date of Report: August 14, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024
Project: 1117-001

TOTAL METALS
EPA 6010B/7471A

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-024-04					
Client ID:	**B2-6.5**					
Arsenic	**ND**	11	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.54	6010B	8-8-12	8-10-12	
Chromium	**10**	0.54	6010B	8-8-12	8-10-12	
Copper	**9.5**	1.1	6010B	8-8-12	8-10-12	
Lead	**ND**	5.4	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.27	7471A	8-7-12	8-7-12	
Zinc	**18**	2.7	6010B	8-8-12	8-10-12	
Lab ID:	08-024-05					
Client ID:	**HA-1-0.5**					
Arsenic	**ND**	10	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.51	6010B	8-8-12	8-10-12	
Chromium	**28**	0.51	6010B	8-8-12	8-10-12	
Copper	**22**	1.0	6010B	8-8-12	8-10-12	
Lead	**210**	5.1	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.26	7471A	8-7-12	8-7-12	
Zinc	**50**	2.6	6010B	8-8-12	8-10-12	
Lab ID:	08-024-06					
Client ID:	**HA-1-3.0**					
Arsenic	**ND**	11	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.53	6010B	8-8-12	8-10-12	
Chromium	**11**	0.53	6010B	8-8-12	8-10-12	
Copper	**16**	1.1	6010B	8-8-12	8-10-12	
Lead	**ND**	5.3	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.27	7471A	8-7-12	8-7-12	
Zinc	**31**	2.7	6010B	8-8-12	8-10-12	

Date of Report: August 14, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024
Project: 1117-001

TOTAL METALS
EPA 6010B/7471A

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-024-07					
Client ID:	**HA-2-3.0**					
Arsenic	**ND**	10	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.52	6010B	8-8-12	8-10-12	
Chromium	**23**	0.52	6010B	8-8-12	8-10-12	
Copper	**16**	1.0	6010B	8-8-12	8-10-12	
Lead	**17**	5.2	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.26	7471A	8-7-12	8-7-12	
Zinc	**35**	2.6	6010B	8-8-12	8-10-12	
Lab ID:	08-024-08					
Client ID:	**B4-3.0**					
Arsenic	**ND**	11	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.53	6010B	8-8-12	8-10-12	
Chromium	**9.0**	0.53	6010B	8-8-12	8-10-12	
Copper	**5.1**	1.1	6010B	8-8-12	8-10-12	
Lead	**ND**	5.3	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.27	7471A	8-7-12	8-7-12	
Zinc	**11**	2.7	6010B	8-8-12	8-10-12	
Lab ID:	08-024-09					
Client ID:	**B3-1.0**					
Arsenic	**ND**	11	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.53	6010B	8-8-12	8-10-12	
Chromium	**9.4**	0.53	6010B	8-8-12	8-10-12	
Copper	**8.4**	1.1	6010B	8-8-12	8-10-12	
Lead	**23000**	53	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.27	7471A	8-7-12	8-7-12	
Zinc	**21**	2.7	6010B	8-8-12	8-10-12	

Date of Report: August 14, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024
Project: 1117-001

TOTAL METALS
EPA 6010B/7471A

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-024-10					
Client ID:	**B3-6.5**					
Arsenic	**ND**	11	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.56	6010B	8-8-12	8-10-12	
Chromium	**14**	0.56	6010B	8-8-12	8-10-12	
Copper	**7.9**	1.1	6010B	8-8-12	8-10-12	
Lead	**31**	5.6	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.28	7471A	8-7-12	8-7-12	
Zinc	**15**	2.8	6010B	8-8-12	8-10-12	
Lab ID:	08-024-11					
Client ID:	**B5-0.5**					
Arsenic	**ND**	10	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.52	6010B	8-8-12	8-10-12	
Chromium	**11**	0.52	6010B	8-8-12	8-10-12	
Copper	**10**	1.0	6010B	8-8-12	8-10-12	
Lead	**ND**	5.2	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.26	7471A	8-7-12	8-7-12	
Zinc	**22**	2.6	6010B	8-8-12	8-10-12	
Lab ID:	08-024-12					
Client ID:	**B5-3.0**					
Arsenic	**ND**	11	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.53	6010B	8-8-12	8-10-12	
Chromium	**7.6**	0.53	6010B	8-8-12	8-10-12	
Copper	**9.6**	1.1	6010B	8-8-12	8-10-12	
Lead	**ND**	5.3	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.26	7471A	8-7-12	8-7-12	
Zinc	**16**	2.6	6010B	8-8-12	8-10-12	

Date of Report: August 14, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024
Project: 1117-001

TOTAL METALS
EPA 6010B/7471A

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-024-13					
Client ID:	**B5-6.0**					
Arsenic	**ND**	13	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.63	6010B	8-8-12	8-10-12	
Chromium	**11**	0.63	6010B	8-8-12	8-10-12	
Copper	**9.9**	1.3	6010B	8-8-12	8-10-12	
Lead	**210**	6.3	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.31	7471A	8-7-12	8-7-12	
Zinc	**27**	3.1	6010B	8-8-12	8-10-12	
Lab ID:	08-024-14					
Client ID:	**B6-3.0**					
Arsenic	**ND**	10	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.52	6010B	8-8-12	8-10-12	
Chromium	**10**	0.52	6010B	8-8-12	8-10-12	
Copper	**11**	1.0	6010B	8-8-12	8-10-12	
Lead	**ND**	5.2	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.26	7471A	8-7-12	8-7-12	
Zinc	**18**	2.6	6010B	8-8-12	8-10-12	
Lab ID:	08-024-15					
Client ID:	**B6-6.5**					
Arsenic	**ND**	12	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.60	6010B	8-8-12	8-10-12	
Chromium	**11**	0.60	6010B	8-8-12	8-10-12	
Copper	**13**	1.2	6010B	8-8-12	8-10-12	
Lead	**ND**	6.0	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.30	7471A	8-7-12	8-7-12	
Zinc	**25**	3.0	6010B	8-8-12	8-10-12	

Date of Report: August 14, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024
Project: 1117-001

TOTAL METALS
EPA 6010B/7471A

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-024-16					
Client ID:	**B7-3.0**					
Arsenic	**ND**	11	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.53	6010B	8-8-12	8-10-12	
Chromium	**11**	0.53	6010B	8-8-12	8-10-12	
Copper	**9.8**	1.1	6010B	8-8-12	8-10-12	
Lead	**ND**	5.3	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.27	7471A	8-7-12	8-7-12	
Zinc	**18**	2.7	6010B	8-8-12	8-10-12	
Lab ID:	08-024-17					
Client ID:	**B7-6.0**					
Arsenic	**ND**	12	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.59	6010B	8-8-12	8-10-12	
Chromium	**9.2**	0.59	6010B	8-8-12	8-10-12	
Copper	**9.1**	1.2	6010B	8-8-12	8-10-12	
Lead	**ND**	5.9	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.30	7471A	8-7-12	8-7-12	
Zinc	**22**	3.0	6010B	8-8-12	8-10-12	
Lab ID:	08-024-18					
Client ID:	**B8-3.0**					
Arsenic	**ND**	11	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.53	6010B	8-8-12	8-10-12	
Chromium	**11**	0.53	6010B	8-8-12	8-10-12	
Copper	**9.6**	1.1	6010B	8-8-12	8-10-12	
Lead	**ND**	5.3	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.26	7471A	8-7-12	8-7-12	
Zinc	**18**	2.6	6010B	8-8-12	8-10-12	

Date of Report: August 14, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024
Project: 1117-001

TOTAL METALS
EPA 6010B/7471A

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-024-19					
Client ID:	**B8-6.0**					
Arsenic	**ND**	11	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.57	6010B	8-8-12	8-10-12	
Chromium	**9.6**	0.57	6010B	8-8-12	8-10-12	
Copper	**7.6**	1.1	6010B	8-8-12	8-10-12	
Lead	**ND**	5.7	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.28	7471A	8-7-12	8-7-12	
Zinc	**19**	2.8	6010B	8-8-12	8-10-12	

Date of Report: August 14, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024
Project: 1117-001

TOTAL METALS
EPA 6010B/7471A
METHOD BLANK QUALITY CONTROL

Date Extracted: 8-7,8&10-12
Date Analyzed: 8-7,9&10-12

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: MB0807S2,MB0808SM3&MB0810SM3

Analyte	Method	Result	PQL
Arsenic	6010B	**ND**	10
Cadmium	6010B	**ND**	0.50
Chromium	6010B	**ND**	0.50
Copper	6010B	**ND**	1.0
Lead	6010B	**ND**	5.0
Mercury	7471A	**ND**	0.25
Zinc	6010B	**ND**	2.5

Date of Report: August 14, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024
Project: 1117-001

TOTAL METALS
EPA 6010B/7471A
DUPLICATE QUALITY CONTROL

Date Extracted: 8-7,8&10-12
Date Analyzed: 8-7,9&13-12

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 08-024-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Arsenic	**ND**	**13.2**	NA	10	
Cadmium	**1.49**	**1.59**	6	0.50	
Chromium	**16.8**	**16.1**	5	0.50	
Copper	**19.7**	**21.0**	6	1.0	
Lead	**10700**	**13200**	22	50	K
Mercury	**ND**	**ND**	NA	0.25	
Zinc	**73.1**	**74.6**	2	2.5	

Date of Report: August 14, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024
Project: 1117-001

TOTAL METALS
EPA 6010B/7471A
MS/MSD QUALITY CONTROL

Date Extracted: 8-7,8&10-12
Date Analyzed: 8-7,9&13-12

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 08-024-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Arsenic	100	**110**	110	**108**	108	1	
Cadmium	50.0	**54.6**	106	**54.8**	107	0	
Chromium	100	**121**	104	**121**	104	0	
Copper	50	**76.0**	112	**76.7**	114	1	
Lead	250	**14700**	1619	**15000**	1738	2	A
Mercury	0.500	**0.496**	99	**0.517**	103	4	
Zinc	100	**184**	111	**188**	115	2	

Date of Report: August 14, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024
Project: 1117-001

TCLP LEAD
by EPA 1311/6010B

Matrix: TCLP Extract
Units: mg/L (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-024-02					
Client ID:	**B1-6.5**					
Lead	**2.9**	0.20	6010B	8-10-12	8-10-12	
Lab ID:	08-024-04					
Client ID:	**B2-6.5**					
Lead	**ND**	0.20	6010B	8-10-12	8-10-12	
Lab ID:	08-024-10					
Client ID:	**B3-6.5**					
Lead	**ND**	0.20	6010B	8-10-12	8-10-12	

Date of Report: August 14, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024
Project: 1117-001

TCLP LEAD
by EPA 1311/6010B
METHOD BLANK QUALITY CONTROL

Date Prepared:	8-9-12
Date Extracted:	8-10-12
Date Analyzed:	8-10-12
Matrix:	TCLP Extract
Units:	mg/L (ppm)
Lab ID:	MB0810T1

Analyte	Method	Result	PQL
Lead	6010B	**ND**	0.20

Date of Report: August 14, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024
Project: 1117-001

TCLP LEAD
by EPA 1311/6010B
DUPLICATE QUALITY CONTROL

Date Prepared:	8-9-12
Date Extracted:	8-10-12
Date Analyzed:	8-10-12
Matrix:	TCLP Extract
Units:	mg/L (ppm)
Lab ID:	07-117-11

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Lead	**ND**	**ND**	NA	0.20	

Date of Report: August 14, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024
Project: 1117-001

TCLP LEAD
by EPA 1311/6010B
MS/MSD QUALITY CONTROL

Date Prepared:	8-9-12
Date Extracted:	8-10-12
Date Analyzed:	8-10-12
Matrix:	TCLP Extract
Units:	mg/L (ppm)
Lab ID:	07-117-11

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Lead	10.0	**9.64**	96	**9.73**	97	1	

Date of Report: August 14, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024
Project: 1117-001

% MOISTURE

Date Analyzed: 8-7-12

Client ID	Lab ID	% Moisture
B1-1.0	08-024-01	2
B1-6.5	08-024-02	18
B2-1.0	08-024-03	3
B2-6.5	08-024-04	7
HA-1-0.5	08-024-05	3
HA-1-3.0	08-024-06	6
HA-2-3.0	08-024-07	4
B4-3.0	08-024-08	6
B3-1.0	08-024-09	6
B3-6.5	08-024-10	11
B5-0.5	08-024-11	4
B5-3.0	08-024-12	5
B5-6.0	08-024-13	20
B6-3.0	08-024-14	4
B6-6.5	08-024-15	17
B7-3.0	08-024-16	6
B7-6.0	08-024-17	16
B8-3.0	08-024-18	6
B8-6.0	08-024-19	12

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: FARALLON
Project Number: 1117-001
Project Name: SOUND BATTERY
Project Manager: TAD CLINE
Sampled by: Ken Scott

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Days
- ☐ 3 Days
- ☒ Standard (7 Days) (TPH analysis 5 Days)
- ☐ _____ (other)

Laboratory Number: 08-024

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	No. of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx	Volatiles 8260B	Halogenated Volatiles 8260B	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081A	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals As, Cr, Cd, Pb, + Hg	TCLP Metals Pb	HEM (oil and grease) 1664	total metals Cu	total metals Zn	total metals Pb		% Moisture
1	B1-1.0	8/2/12	1010	S	1														X			X	X	X		
2	B1-6.5		1135	S	1														X	X		X	X	X		
3	B2-1.0		1200	S	1														X			X	X	X		
4	B2-6.5		1210	S	1														X	X		X	X	X		
5	HA-1-0.5		1220	S	1														X			X	X	X		
6	HA-1-3.0		1245	S	1														X			X	X	X		
7	HA-2-3.0		1300	S	1														X			X	X	X		
8	B4-3.0		1325	S	1														X			X	X	X		
9	B3-1.0		1335	S	1														X			X	X	X		
10	B3-6.5		1355	S	1														X	X		X	X	X		

	Signature	Company	Date	Time
Relinquished	Ken Scott	FARALLON	8/3/12	700
Received		OSE	8/3/12	1100
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Chromatograms with final report ☐

Data Package: Level III ☐ Level IV ☐ Electronic Data Deliverables (EDDs) ☐ _____

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: FARALLON
Project Number: 1117-001
Project Name: SOUND BATTERY
Project Manager: TAD CLINE
Sampled by: Ken Scott

Turnaround Request (in working days)

(Check One)

☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days) (TPH analysis 5 Days)
☐ _____ (other)

Laboratory Number: 08-024

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	No. of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx	Volatiles 8260B	Halogenated Volatiles 8260B	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081A	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals As, Cr, Cd, Pb, + Hg	TCLP ~~Metals~~ Pb	HEM (oil and grease) 1664	Total Metals CJ	Total Metals ZN	Total Metals Pb		% Moisture
11	B5-0.5	8/2/12	1500	S	1														X			X	X			X
12	B5-3.0		1505	S	1														X			X	X			
13	B5-6.0		1510	S	1														X			X	X			
14	B6-3.0		1520	S	1														X			X	X			
15	B6-6.5		1525	S	1														X			X	X			
16	B7-3.0		1540	S	1														X			X	X			
17	B7-6.0		1545	S	1														X			X	X			
18	B8-3.0		1605	S	1														X			X	X			
19	B8-6.0	↓	1615	S	1														X			X	X			

	Signature	Company	Date	Time
Relinquished	Ken Scott	FARALLON	8/3/12	700
Received			8/3/12	1100
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Chromatograms with final report ☐

Data Package: Level III ☐ Level IV ☐ Electronic Data Deliverables (EDDs) ☐ _____

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

August 15, 2012

Tad Cline
Farallon Consulting, LLC
Queen Anne Square East Bldg.
200 West Mercer Street, Suite 302
Seattle, WA 98119

Re: Analytical Data for Project 1117-001
Laboratory Reference No. 1208-053

Dear Tad:

Enclosed are the analytical results and associated quality control data for samples submitted on August 7, 2012.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: August 15, 2012
Samples Submitted: August 7, 2012
Laboratory Reference: 1208-053
Project: 1117-001

Case Narrative

Samples were collected on August 7, 2012 and received by the laboratory on August 7, 2012. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: August 15, 2012
Samples Submitted: August 7, 2012
Laboratory Reference: 1208-053
Project: 1117-001

DISSOLVED METALS
EPA 200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-053-01					
Client ID:	**DUP-080712**					
Arsenic	**ND**	3.0	200.8	8-7-12	8-13-12	
Cadmium	**ND**	4.0	200.8	8-7-12	8-13-12	
Chromium	**ND**	10	200.8	8-7-12	8-13-12	
Copper	**ND**	10	200.8	8-7-12	8-13-12	
Lead	**ND**	1.0	200.8	8-7-12	8-13-12	
Mercury	**ND**	0.50	7470A	8-7-12	8-13-12	
Zinc	**ND**	25	200.8	8-7-12	8-13-12	
Lab ID:	08-053-02					
Client ID:	**MW-4-080712**					
Arsenic	**ND**	3.0	200.8	8-7-12	8-13-12	
Cadmium	**ND**	4.0	200.8	8-7-12	8-13-12	
Chromium	**ND**	10	200.8	8-7-12	8-13-12	
Copper	**ND**	10	200.8	8-7-12	8-13-12	
Lead	**ND**	1.0	200.8	8-7-12	8-13-12	
Mercury	**ND**	0.50	7470A	8-7-12	8-13-12	
Zinc	**ND**	25	200.8	8-7-12	8-13-12	
Lab ID:	08-053-03					
Client ID:	**MW-1-080712**					
Arsenic	**ND**	3.0	200.8	8-7-12	8-13-12	
Cadmium	**ND**	4.0	200.8	8-7-12	8-13-12	
Chromium	**ND**	10	200.8	8-7-12	8-13-12	
Copper	**ND**	10	200.8	8-7-12	8-13-12	
Lead	**ND**	1.0	200.8	8-7-12	8-13-12	
Mercury	**ND**	0.50	7470A	8-7-12	8-13-12	
Zinc	**ND**	25	200.8	8-7-12	8-13-12	

Date of Report: August 15, 2012
Samples Submitted: August 7, 2012
Laboratory Reference: 1208-053
Project: 1117-001

DISSOLVED METALS
EPA 200.8/7470A

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-053-04					
Client ID:	**MW-2-080712**					
Arsenic	**4.5**	3.0	200.8	8-7-12	8-13-12	
Cadmium	**ND**	4.0	200.8	8-7-12	8-13-12	
Chromium	**ND**	10	200.8	8-7-12	8-13-12	
Copper	**ND**	10	200.8	8-7-12	8-13-12	
Lead	**ND**	1.0	200.8	8-7-12	8-13-12	
Mercury	**ND**	0.50	7470A	8-7-12	8-13-12	
Zinc	**ND**	25	200.8	8-7-12	8-13-12	
Lab ID:	08-053-05					
Client ID:	**MW-3-080712**					
Arsenic	**ND**	3.0	200.8	8-7-12	8-13-12	
Cadmium	**ND**	4.0	200.8	8-7-12	8-13-12	
Chromium	**ND**	10	200.8	8-7-12	8-13-12	
Copper	**ND**	10	200.8	8-7-12	8-13-12	
Lead	**ND**	1.0	200.8	8-7-12	8-13-12	
Mercury	**ND**	0.50	7470A	8-7-12	8-13-12	
Zinc	**ND**	25	200.8	8-7-12	8-13-12	

Date of Report: August 15, 2012
Samples Submitted: August 7, 2012
Laboratory Reference: 1208-053
Project: 1117-001

DISSOLVED METALS
EPA 200.8/7470A
METHOD BLANK QUALITY CONTROL

Date Filtered:	8-7-12
Date Analyzed:	8-13-12
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0807F1

Analyte	Method	Result	PQL
Arsenic	200.8	**ND**	3.0
Cadmium	200.8	**ND**	4.0
Chromium	200.8	**ND**	10
Copper	200.8	**ND**	10
Lead	200.8	**ND**	1.0
Mercury	7470A	**ND**	0.50
Zinc	200.8	**ND**	25

Date of Report: August 15, 2012
Samples Submitted: August 7, 2012
Laboratory Reference: 1208-053
Project: 1117-001

DISSOLVED METALS
EPA 200.8/7470A
DUPLICATE QUALITY CONTROL

Date Filtered: 8-7-12
Date Analyzed: 8-13-12

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-053-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Arsenic	**ND**	**ND**	NA	3.0	
Cadmium	**ND**	**ND**	NA	4.0	
Chromium	**ND**	**ND**	NA	10	
Copper	**ND**	**ND**	NA	10	
Lead	**ND**	**ND**	NA	1.0	
Mercury	**ND**	**ND**	NA	0.50	
Zinc	**ND**	**ND**	NA	25	

Date of Report: August 15, 2012
Samples Submitted: August 7, 2012
Laboratory Reference: 1208-053
Project: 1117-001

DISSOLVED METALS
EPA 200.8/7470A
MS/MSD QUALITY CONTROL

Date Filtered: 8-7-12
Date Analyzed: 8-13-12

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-053-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Arsenic	200	**206**	103	**202**	101	2	
Cadmium	200	**202**	101	**198**	99	2	
Chromium	200	**187**	93	**184**	92	1	
Copper	200	**199**	100	**200**	100	0	
Lead	200	**201**	100	**196**	98	2	
Mercury	12.5	**11.2**	89	**11.4**	91	2	
Zinc	200	**205**	102	**202**	101	1	

Date of Report: August 15, 2012
Samples Submitted: August 7, 2012
Laboratory Reference: 1208-053
Project: 1117-001

TOTAL LEAD
EPA 200.8

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-053-02					
Client ID:	**MW-4-080712**					
Lead	**ND**	1.1	200.8	8-13-12	8-13-12	
Lab ID:	08-053-03					
Client ID:	**MW-1-080712**					
Lead	**1.3**	1.1	200.8	8-13-12	8-13-12	
Lab ID:	08-053-04					
Client ID:	**MW-2-080712**					
Lead	**ND**	1.1	200.8	8-13-12	8-13-12	
Lab ID:	08-053-05					
Client ID:	**MW-3-080712**					
Lead	**ND**	1.1	200.8	8-13-12	8-13-12	

Date of Report: August 15, 2012
Samples Submitted: August 7, 2012
Laboratory Reference: 1208-053
Project: 1117-001

TOTAL LEAD
EPA 200.8
METHOD BLANK QUALITY CONTROL

Date Extracted:	8-13-12
Date Analyzed:	8-13-12
Matrix:	Water
Units:	ug/L (ppb)
Lab ID:	MB0813WM1

Analyte	Method	Result	PQL
Lead	200.8	**ND**	1.1

Date of Report: August 15, 2012
Samples Submitted: August 7, 2012
Laboratory Reference: 1208-053
Project: 1117-001

TOTAL LEAD
EPA 200.8
DUPLICATE QUALITY CONTROL

Date Extracted: 8-13-12
Date Analyzed: 8-13-12

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-072-08

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Lead	**ND**	**ND**	NA	1.1	

Date of Report: August 15, 2012
Samples Submitted: August 7, 2012
Laboratory Reference: 1208-053
Project: 1117-001

TOTAL LEAD
EPA 200.8
MS/MSD QUALITY CONTROL

Date Extracted: 8-13-12
Date Analyzed: 8-13-12

Matrix: Water
Units: ug/L (ppb)

Lab ID: 08-072-08

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Lead	111	**112**	101	**111**	100	1	

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.
4
C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.4

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: FARALLON
Project Number: 1117-001
Project Name: SOUND BAttery
Project Manager: TAD CLINE
Sampled by: Ken Scott

Turnaround Request (in working days)

(Check One)

☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days) (TPH analysis 5 Days)
☐ _____ (other)

Laboratory Number: 08-053

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	No. of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx	Volatiles 8260B	Halogenated Volatiles 8260B	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081A	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664	Dissolved MTCA metals As, Cr, Cd, Pb + Hg 200.8/7470A	Dissolved metals Cu	Dissolved Metals Zn	Total Pb	% Moisture
1	DUP-080712	8/7/12	930	W	2																	X	X	X		
2	MW-4-080712		1025	W	2																	X	X	X		
3	MW-1-080712		1110	W	2																	X	X	X		
4	MW-2-080712		1220	W	2																	X	X	X		
5	MW-3-080712	↓	1255	W	2																	X	X	X		
							K5																			

	Signature	Company	Date	Time
Relinquished	Ken Scott	FARALLON	8/7/12	1520
Received		Onsite	8-7-12	1520
Relinquished				
Received				
Relinquished				
Received				

Comments/Special Instructions

Dissolved metal sample not field filtered. Please filter these samples immediately.

Reviewed/Date

Reviewed/Date

Chromatograms with final report ☐

Data Package: Level III ☐ Level IV ☐

Electronic Data Deliverables (EDDs) ☐ _____

OnSite Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

September 10, 2012

Tad Cline
Farallon Consulting, LLC
Queen Anne Square East Bldg.
200 West Mercer Street, Suite 302
Seattle, WA 98119

Re: Analytical Data for Project 1117-001
Laboratory Reference No. 1208-024

Dear Tad:

Enclosed are the analytical results and associated quality control data for samples submitted on August 3, 2012.

Please note that this is a *revised* report and replaces the original dated August 14, 2012 due to changes in the lead data for samples HA-2-3.0, B3-1.0 and B3-6.5.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: September 10, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024
Project: 1117-001

Case Narrative

Samples were collected on August 2, 2012 and received by the laboratory on August 3, 2012. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Total Metals EPA 6010B/7471A Analysis

Due to the high concentration of Lead in the QC sample, the amount spiked was insufficient for meaningful MS/MSD recovery data. The Spike Blank recovery was 108%.

The duplicate RPD for Lead is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

Any other QA/QC issues associated with this extraction and analysis will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

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Project: 1117-001

TOTAL METALS
EPA 6010B/7471A

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-024-01					
Client ID:	**B1-1.0**					
Arsenic	**ND**	10	6010B	8-8-12	8-9-12	
Cadmium	**1.5**	0.51	6010B	8-8-12	8-9-12	
Chromium	**17**	0.51	6010B	8-8-12	8-9-12	
Copper	**20**	1.0	6010B	8-8-12	8-9-12	
Lead	**11000**	51	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.26	7471A	8-7-12	8-7-12	
Zinc	**75**	2.6	6010B	8-8-12	8-9-12	
Lab ID:	08-024-02					
Client ID:	**B1-6.5**					
Arsenic	**ND**	12	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.61	6010B	8-8-12	8-10-12	
Chromium	**17**	0.61	6010B	8-8-12	8-10-12	
Copper	**10**	1.2	6010B	8-8-12	8-10-12	
Lead	**74**	6.1	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.31	7471A	8-7-12	8-7-12	
Zinc	**24**	3.1	6010B	8-8-12	8-10-12	
Lab ID:	08-024-03					
Client ID:	**B2-1.0**					
Arsenic	**ND**	10	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.52	6010B	8-8-12	8-10-12	
Chromium	**11**	0.52	6010B	8-8-12	8-10-12	
Copper	**9.3**	1.0	6010B	8-8-12	8-10-12	
Lead	**21**	5.2	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.26	7471A	8-7-12	8-7-12	
Zinc	**23**	2.6	6010B	8-8-12	8-10-12	

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TOTAL METALS
EPA 6010B/7471A

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-024-04					
Client ID:	**B2-6.5**					
Arsenic	**ND**	11	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.54	6010B	8-8-12	8-10-12	
Chromium	**10**	0.54	6010B	8-8-12	8-10-12	
Copper	**9.5**	1.1	6010B	8-8-12	8-10-12	
Lead	**ND**	5.4	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.27	7471A	8-7-12	8-7-12	
Zinc	**18**	2.7	6010B	8-8-12	8-10-12	
Lab ID:	08-024-05					
Client ID:	**HA-1-0.5**					
Arsenic	**ND**	10	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.51	6010B	8-8-12	8-10-12	
Chromium	**28**	0.51	6010B	8-8-12	8-10-12	
Copper	**22**	1.0	6010B	8-8-12	8-10-12	
Lead	**210**	5.1	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.26	7471A	8-7-12	8-7-12	
Zinc	**50**	2.6	6010B	8-8-12	8-10-12	
Lab ID:	08-024-06					
Client ID:	**HA-1-3.0**					
Arsenic	**ND**	11	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.53	6010B	8-8-12	8-10-12	
Chromium	**11**	0.53	6010B	8-8-12	8-10-12	
Copper	**16**	1.1	6010B	8-8-12	8-10-12	
Lead	**ND**	5.3	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.27	7471A	8-7-12	8-7-12	
Zinc	**31**	2.7	6010B	8-8-12	8-10-12	

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TOTAL METALS
EPA 6010B/7471A

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-024-07					
Client ID:	**HA-2-3.0**					
Arsenic	**ND**	10	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.52	6010B	8-8-12	8-10-12	
Chromium	**23**	0.52	6010B	8-8-12	8-10-12	
Copper	**16**	1.0	6010B	8-8-12	8-10-12	
Lead	**11**	5.2	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.26	7471A	8-7-12	8-7-12	
Zinc	**35**	2.6	6010B	8-8-12	8-10-12	
Lab ID:	08-024-08					
Client ID:	**B4-3.0**					
Arsenic	**ND**	11	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.53	6010B	8-8-12	8-10-12	
Chromium	**9.0**	0.53	6010B	8-8-12	8-10-12	
Copper	**5.1**	1.1	6010B	8-8-12	8-10-12	
Lead	**ND**	5.3	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.27	7471A	8-7-12	8-7-12	
Zinc	**11**	2.7	6010B	8-8-12	8-10-12	
Lab ID:	08-024-09					
Client ID:	**B3-1.0**					
Arsenic	**ND**	11	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.53	6010B	8-8-12	8-10-12	
Chromium	**9.4**	0.53	6010B	8-8-12	8-10-12	
Copper	**8.4**	1.1	6010B	8-8-12	8-10-12	
Lead	**34000**	53	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.27	7471A	8-7-12	8-7-12	
Zinc	**21**	2.7	6010B	8-8-12	8-10-12	

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TOTAL METALS
EPA 6010B/7471A

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-024-10					
Client ID:	**B3-6.5**					
Arsenic	**ND**	11	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.56	6010B	8-8-12	8-10-12	
Chromium	**14**	0.56	6010B	8-8-12	8-10-12	
Copper	**7.9**	1.1	6010B	8-8-12	8-10-12	
Lead	**370**	5.6	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.28	7471A	8-7-12	8-7-12	
Zinc	**15**	2.8	6010B	8-8-12	8-10-12	
Lab ID:	08-024-11					
Client ID:	**B5-0.5**					
Arsenic	**ND**	10	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.52	6010B	8-8-12	8-10-12	
Chromium	**11**	0.52	6010B	8-8-12	8-10-12	
Copper	**10**	1.0	6010B	8-8-12	8-10-12	
Lead	**ND**	5.2	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.26	7471A	8-7-12	8-7-12	
Zinc	**22**	2.6	6010B	8-8-12	8-10-12	
Lab ID:	08-024-12					
Client ID:	**B5-3.0**					
Arsenic	**ND**	11	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.53	6010B	8-8-12	8-10-12	
Chromium	**7.6**	0.53	6010B	8-8-12	8-10-12	
Copper	**9.6**	1.1	6010B	8-8-12	8-10-12	
Lead	**ND**	5.3	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.26	7471A	8-7-12	8-7-12	
Zinc	**16**	2.6	6010B	8-8-12	8-10-12	

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TOTAL METALS
EPA 6010B/7471A

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-024-13					
Client ID:	**B5-6.0**					
Arsenic	**ND**	13	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.63	6010B	8-8-12	8-10-12	
Chromium	**11**	0.63	6010B	8-8-12	8-10-12	
Copper	**9.9**	1.3	6010B	8-8-12	8-10-12	
Lead	**210**	6.3	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.31	7471A	8-7-12	8-7-12	
Zinc	**27**	3.1	6010B	8-8-12	8-10-12	
Lab ID:	08-024-14					
Client ID:	**B6-3.0**					
Arsenic	**ND**	10	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.52	6010B	8-8-12	8-10-12	
Chromium	**10**	0.52	6010B	8-8-12	8-10-12	
Copper	**11**	1.0	6010B	8-8-12	8-10-12	
Lead	**ND**	5.2	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.26	7471A	8-7-12	8-7-12	
Zinc	**18**	2.6	6010B	8-8-12	8-10-12	
Lab ID:	08-024-15					
Client ID:	**B6-6.5**					
Arsenic	**ND**	12	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.60	6010B	8-8-12	8-10-12	
Chromium	**11**	0.60	6010B	8-8-12	8-10-12	
Copper	**13**	1.2	6010B	8-8-12	8-10-12	
Lead	**ND**	6.0	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.30	7471A	8-7-12	8-7-12	
Zinc	**25**	3.0	6010B	8-8-12	8-10-12	

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TOTAL METALS
EPA 6010B/7471A

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-024-16					
Client ID:	**B7-3.0**					
Arsenic	**ND**	11	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.53	6010B	8-8-12	8-10-12	
Chromium	**11**	0.53	6010B	8-8-12	8-10-12	
Copper	**9.8**	1.1	6010B	8-8-12	8-10-12	
Lead	**ND**	5.3	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.27	7471A	8-7-12	8-7-12	
Zinc	**18**	2.7	6010B	8-8-12	8-10-12	
Lab ID:	08-024-17					
Client ID:	**B7-6.0**					
Arsenic	**ND**	12	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.59	6010B	8-8-12	8-10-12	
Chromium	**9.2**	0.59	6010B	8-8-12	8-10-12	
Copper	**9.1**	1.2	6010B	8-8-12	8-10-12	
Lead	**ND**	5.9	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.30	7471A	8-7-12	8-7-12	
Zinc	**22**	3.0	6010B	8-8-12	8-10-12	
Lab ID:	08-024-18					
Client ID:	**B8-3.0**					
Arsenic	**ND**	11	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.53	6010B	8-8-12	8-10-12	
Chromium	**11**	0.53	6010B	8-8-12	8-10-12	
Copper	**9.6**	1.1	6010B	8-8-12	8-10-12	
Lead	**ND**	5.3	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.26	7471A	8-7-12	8-7-12	
Zinc	**18**	2.6	6010B	8-8-12	8-10-12	

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TOTAL METALS
EPA 6010B/7471A

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-024-19					
Client ID:	**B8-6.0**					
Arsenic	**ND**	11	6010B	8-8-12	8-10-12	
Cadmium	**ND**	0.57	6010B	8-8-12	8-10-12	
Chromium	**9.6**	0.57	6010B	8-8-12	8-10-12	
Copper	**7.6**	1.1	6010B	8-8-12	8-10-12	
Lead	**ND**	5.7	6010B	8-10-12	8-13-12	
Mercury	**ND**	0.28	7471A	8-7-12	8-7-12	
Zinc	**19**	2.8	6010B	8-8-12	8-10-12	

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TOTAL METALS
EPA 6010B/7471A
METHOD BLANK QUALITY CONTROL

Date Extracted:	8-7,8&10-12
Date Analyzed:	8-7,9&10-12
Matrix:	Soil
Units:	mg/kg (ppm)
Lab ID:	MB0807S2,MB0808SM3&MB0810SM3

Analyte	Method	Result	PQL
Arsenic	6010B	**ND**	10
Cadmium	6010B	**ND**	0.50
Chromium	6010B	**ND**	0.50
Copper	6010B	**ND**	1.0
Lead	6010B	**ND**	5.0
Mercury	7471A	**ND**	0.25
Zinc	6010B	**ND**	2.5

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TOTAL METALS
EPA 6010B/7471A
DUPLICATE QUALITY CONTROL

Date Extracted: 8-7,8&10-12
Date Analyzed: 8-7,9&13-12

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 08-024-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Arsenic	**ND**	**13.2**	NA	10	
Cadmium	**1.49**	**1.59**	6	0.50	
Chromium	**16.8**	**16.1**	5	0.50	
Copper	**19.7**	**21.0**	6	1.0	
Lead	**10700**	**13200**	22	50	K
Mercury	**ND**	**ND**	NA	0.25	
Zinc	**73.1**	**74.6**	2	2.5	

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TOTAL METALS
EPA 6010B/7471A
MS/MSD QUALITY CONTROL

Date Extracted: 8-7,8&10-12
Date Analyzed: 8-7,9&13-12

Matrix: Soil
Units: mg/kg (ppm)

Lab ID: 08-024-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Arsenic	100	**110**	110	**108**	108	1	
Cadmium	50.0	**54.6**	106	**54.8**	107	0	
Chromium	100	**121**	104	**121**	104	0	
Copper	50	**76.0**	112	**76.7**	114	1	
Lead	250	**14700**	1619	**15000**	1738	2	A
Mercury	0.500	**0.496**	99	**0.517**	103	4	
Zinc	100	**184**	111	**188**	115	2	

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TCLP LEAD
by EPA 1311/6010B

Matrix: TCLP Extract
Units: mg/L (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-024-02					
Client ID:	**B1-6.5**					
Lead	**2.9**	0.20	6010B	8-10-12	8-10-12	
Lab ID:	08-024-04					
Client ID:	**B2-6.5**					
Lead	**ND**	0.20	6010B	8-10-12	8-10-12	
Lab ID:	08-024-10					
Client ID:	**B3-6.5**					
Lead	**ND**	0.20	6010B	8-10-12	8-10-12	

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TCLP LEAD
by EPA 1311/6010B
METHOD BLANK QUALITY CONTROL

Date Prepared:	8-9-12
Date Extracted:	8-10-12
Date Analyzed:	8-10-12
Matrix:	TCLP Extract
Units:	mg/L (ppm)
Lab ID:	MB0810T1

Analyte	Method	Result	PQL
Lead	6010B	**ND**	0.20

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TCLP LEAD
by EPA 1311/6010B
DUPLICATE QUALITY CONTROL

Date Prepared:	8-9-12
Date Extracted:	8-10-12
Date Analyzed:	8-10-12
Matrix:	TCLP Extract
Units:	mg/L (ppm)
Lab ID:	07-117-11

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Lead	**ND**	**ND**	NA	0.20	

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TCLP LEAD
by EPA 1311/6010B
MS/MSD QUALITY CONTROL

Date Prepared: 8-9-12
Date Extracted: 8-10-12
Date Analyzed: 8-10-12

Matrix: TCLP Extract
Units: mg/L (ppm)

Lab ID: 07-117-11

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Lead	10.0	**9.64**	96	**9.73**	97	1	

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% MOISTURE

Date Analyzed: 8-7-12

Client ID	Lab ID	% Moisture
B1-1.0	08-024-01	2
B1-6.5	08-024-02	18
B2-1.0	08-024-03	3
B2-6.5	08-024-04	7
HA-1-0.5	08-024-05	3
HA-1-3.0	08-024-06	6
HA-2-3.0	08-024-07	4
B4-3.0	08-024-08	6
B3-1.0	08-024-09	6
B3-6.5	08-024-10	11
B5-0.5	08-024-11	4
B5-3.0	08-024-12	5
B5-6.0	08-024-13	20
B6-3.0	08-024-14	4
B6-6.5	08-024-15	17
B7-3.0	08-024-16	6
B7-6.0	08-024-17	16
B8-3.0	08-024-18	6
B8-6.0	08-024-19	12

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: FARALLON
Project Number: 1117-001
Project Name: SOUND BATTERY
Project Manager: TAD CLINE
Sampled by: Ken Scott

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Days
- ☐ 3 Days
- ☒ Standard (7 Days) (TPH analysis 5 Days)
- ☐ _____ (other)

Laboratory Number: 08-024

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	No. of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx	Volatiles 8260B	Halogenated Volatiles 8260B	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081A	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals As, Cr, Cd, Pb, + Hg	TCLP Metals Pb	HEM (oil and grease) 1664	total metals Cu	total metals Zn	total metals Pb		% Moisture
1	B1-1.0	8/2/12	1010	S	1														X			X	X	X		
2	B1-6.5		1135	S	1														X	X		X	X	X		
3	B2-1.0		1200	S	1														X			X	X	X		
4	B2-6.5		1210	S	1														X	X		X	X	X		
5	HA-1-0.5		1220	S	1														X			X	X	X		
6	HA-1-3.0		1245	S	1														X			X	X	X		
7	HA-2-3.0		1300	S	1														X			X	X	X		
8	B4-3.0		1325	S	1														X			X	X	X		
9	B3-1.0		1335	S	1														X			X	X	X		
10	B3-6.5		1355	S	1														X	X		X	X	X		

	Signature	Company	Date	Time
Relinquished	Ken Scott	FARALLON	8/3/12	700
Received		OSE	8/3/12	1100
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Chromatograms with final report ☐

Data Package: Level III ☐ Level IV ☐ Electronic Data Deliverables (EDDs) ☐ _____

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: FARALLON
Project Number: 1117-001
Project Name: SOUND BATTERY
Project Manager: TAD CLINE
Sampled by: Ken Scott

Turnaround Request (in working days)

(Check One)

☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days) (TPH analysis 5 Days)
☐ _____ (other)

Laboratory Number: 08-024

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	No. of Cont.	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx	Volatiles 8260B	Halogenated Volatiles 8260B	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081A	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals As, Cr, Cd, Pb, + Hg	TCLP ~~Metals~~ Pb	HEM (oil and grease) 1664	Total Metals CJ	Total Metals ZN	Total Metals Pb		% Moisture
11	B5-0.5	8/2/12	1500	S	1														X			X	X			X
12	B5-3.0		1505	S	1														X			X	X			
13	B5-6.0		1510	S	1														X			X	X			
14	B6-3.0		1520	S	1														X			X	X			
15	B6-6.5		1525	S	1														X			X	X			
16	B7-3.0		1540	S	1														X			X	X			
17	B7-6.0		1545	S	1														X			X	X			
18	B8-3.0		1605	S	1														X			X	X			
19	B8-6.0	↓	1615	S	1														X			X	X			

	Signature	Company	Date	Time
Relinquished	Ken Scott	FARALLON	8/3/12	700
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Comments/Special Instructions

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OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

September 13, 2012

Tad Cline
Farallon Consulting, LLC
Queen Anne Square East Bldg.
200 West Mercer Street, Suite 302
Seattle, WA 98119

Re: Analytical Data for Project 1117-001
Laboratory Reference No. 1208-024B

Dear Tad:

Enclosed are the analytical results and associated quality control data for samples submitted on August 3, 2012.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: September 13, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024B
Project: 1117-001

Case Narrative

Samples were collected on August 2, 2012 and received by the laboratory on August 3, 2012. They were maintained at the laboratory at a temperature of 2°C to 6°C.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: September 13, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024B
Project: 1117-001

TCLP LEAD
by EPA 1311/6010B

Matrix: TCLP Extract
Units: mg/L (ppm)

Analyte	Result	PQL	EPA Method	Date Prepared	Date Analyzed	Flags
Lab ID:	08-024-01					
Client ID:	**B1-1.0**					
Lead	**470**	2.0	6010B	9-12-12	9-12-12	
Lab ID:	08-024-09					
Client ID:	**B3-1.0**					
Lead	**230**	2.0	6010B	9-12-12	9-12-12	

Date of Report: September 13, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024B
Project: 1117-001

TCLP LEAD
by EPA 1311/6010B
METHOD BLANK QUALITY CONTROL

Date Prepared:	9-11-12
Date Extracted:	9-12-12
Date Analyzed:	9-12-12
Matrix:	TCLP Extract
Units:	mg/L (ppm)
Lab ID:	MB0912T2

Analyte	Method	Result	PQL
Lead	6010B	**ND**	0.20

Date of Report: September 13, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024B
Project: 1117-001

TCLP LEAD
by EPA 1311/6010B
DUPLICATE QUALITY CONTROL

Date Prepared: 9-11-12
Date Extracted: 9-12-12
Date Analyzed: 9-12-12

Matrix: TCLP Extract
Units: mg/L (ppm)

Lab ID: 09-062-01

Analyte	Sample Result	Duplicate Result	RPD	PQL	Flags
Lead	**10.5**	**10.5**	0	0.20	

Date of Report: September 13, 2012
Samples Submitted: August 3, 2012
Laboratory Reference: 1208-024B
Project: 1117-001

TCLP LEAD
by EPA 1311/6010B
MS/MSD QUALITY CONTROL

Date Prepared: 9-11-12
Date Extracted: 9-12-12
Date Analyzed: 9-12-12

Matrix: TCLP Extract
Units: mg/L (ppm)

Lab ID: 09-062-01

Analyte	Spike Level	MS	Percent Recovery	MSD	Percent Recovery	RPD	Flags
Lead	10.0	**20.3**	99	**20.5**	101	1	

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-napthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

Y - Sample extract treated with an acid/silica gel cleanup procedure.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

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Company: FARALLON
Project Number: 1117-001
Project Name: SOUND BATTERY
Project Manager: TAD CLINE
Sampled by: Ken Scott

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Days
- ☐ 3 Days
- ☒ Standard (7 Days) (TPH analysis 5 Days)
- ☐ _____ (other)

Laboratory Number: 08-024

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1	B1-1.0	8/2/12	1010	S	1														X	X		X	X	X		
2	B1-6.5		1135	S	1														X			X	X	X		
3	B2-1.0		1200	S	1														X			X	X	X		
4	B2-6.5		1210	S	1														X			X	X	X		
5	HA-1-0.5		1220	S	1														X			X	X	X		
6	HA-1-3.0		1245	S	1														X			X	X	X		
7	HA-2-3.0		1300	S	1														X			X	X	X		
8	B4-3.0		1325	S	1														X			X	X	X		
9	B3-1.0		1335	S	1														X	X		X	X	X		
10	B3-6.5	↓	1355	S	1														X			X	X	X		

	Signature	Company	Date	Time
Relinquished	Ken Scott	FARALLON	8/3/12	700
Received		QSE	8/3/12	1100
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

(X) Added 9/10/12. DB (STA)

Chromatograms with final report ☐

Data Package: Level III ☐ Level IV ☐ Electronic Data Deliverables (EDDs) ☐ _____

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Laboratory Number: 08-024

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11	B5-0.5	8/2/12	1500	S	1														X			X				10
12	B5-3.0		1505	S	1														X			X	X			
13	B5-6.0		1510	S	1														X			X	X			
14	B6-3.0		1520	S	1														X			X	X			
15	B6-6.5		1525	S	1														X			X	X			
16	B7-3.0		1540	S	1														X			X	X			
17	B7-6.0		1545	S	1														X			X	X			
18	B8-3.0		1605	S	1														X			X	X			
19	B8-6.0	↓	1615	S	1														X			X	X			15

	Signature	Company	Date	Time	Comments/Special Instructions
Relinquished	Ken Scott	FARALLON	8/3/12	700	
Received		OSE	8/3/12	1100	
Relinquished					
Received					
Relinquished					
Received					
Reviewed/Date		Reviewed/Date			Chromatograms with final report ☐

Data Package: Level III ☐ Level IV ☐ Electronic Data Deliverables (EDDs) ☐ _____

APPENDIX C
CLEANUP ALTERNATIVES COST ESTIMATE

REMEDIAL INVESTIGATION AND
FOCUSED FEASIBILITY STUDY REPORT
Sound Battery
2310 East 11th Street
Tacoma, Washington

Farallon PN: 1117-001

Table C-1
Cost Estimate Summary--Cleanup Alternative 1
Excavation, Off-Site Stabilization, and Off-Site Disposal
Sound Battery Property
Tacoma, Washington
Farallon PN: 1117-001

Project Management and Communications			**$30,080**
Design, Pricing, Contractor Procurement			**$29,270**
Cleanup Implementation			**$362,293**
Farallon Labor and Other Direct Costs		$28,880	
Washington State Department of Ecology Voluntary Cleanup Program Fee		$5,000	
Building Demolition, including Hazardous Materials Mitigation		$96,830	
Soil Excavation and Backfill		$33,548	
Groundwater Removal and Disposal		$4,226	
Soil Transportation, Off-Site Stabilization, and Disposal		$118,558	
Compliance Soil and Groundwater Analytical Fees		$2,210	
Construction Contingency (20%)		$57,408	
Sales Tax Estimate (10%)		$15,633	
	Total:	$362,293	
Compliance Groundwater Monitoring Plan			**$3,974**
Monitoring Well Installation and Two Years Compliance Groundwater Monitoring			**$31,991**
Closure Report			**$15,944**
	TOTAL PROJECT COST		**$473,552**

Table C-2
Cost Estimate Summary--Cleanup Alternative 2
Excavation, On-Site Stabilization, and Off-Site Disposal
Sound Battery Property
Tacoma, Washington
Farallon PN: 1117-001

Project Management and Communications			**$30,080**
Design, Pricing, Contractor Procurement			**$29,270**
Cleanup Implementation			**$306,948**
Farallon Labor and Other Direct Costs		$29,680	
Washington State Department of Ecology Voluntary Cleanup Program Fee		$5,000	
Building Demolition, including Hazardous Materials Mitigation		$96,830	
Soil Excavation and Backfill		$33,548	
Groundwater Removal and Disposal		$4,226	
On-Site Stabilization, Transportation, and Disposal		$77,828	
Compliance Soil and Groundwater Analytical Fees		$2,208	
Construction Contingency (20%)		$49,422	
Sales Tax Estimate (10%)		$8,205	
	Total:	$306,948	
Compliance Groundwater Monitoring Plan			**$3,974**
Monitoring Well Installation and Two Years Compliance Groundwater Monitoring			**$31,991**
Closure Report			**$15,944**
	TOTAL PROJECT COST		**$418,207**

Table C-3
Cost Estimate Summary--Cleanup Alternative 3
Institutional Controls and On-Site Containment
Sound Battery Property
Tacoma, Washington
Farallon PN: 1117-001

Project Management and Communications			**$12,600**
Environmental Covenant Preparation			**$12,632**
Design, Pricing, Contractor Procurement			**$9,200**
Cleanup Implementation			**$125,879**
Building Demolition, including Hazardous Materials Mitigation		$96,830	
Construction Contingency (20%)		$19,366	
Sales Tax Estimate (10%)		$9,683	
	Total:	$125,879	
Compliance Groundwater Monitoring Plan			**$5,444**
Five Years Compliance Groundwater Monitoring			**$12,471**
Containment Inspection and Repair			**$81,000**
Reporting			**$29,120**
	TOTAL PROJECT COST		**$288,346**