SoundEarth Strategies, Inc.
2811 Fairview Avenue East, Suite 2000
Seattle, Washington 98102

SUBSURFACE INVESTIGATION WORKPLAN

Property:
Whitehead Tyee Property
730 South Myrtle Street
Seattle, Washington

Report Date:
November 6, 2013

Prepared for:
The Whitehead Company and
Reliable Transfer & Storage Co.
P.O. Box 81144
Seattle, WA

DRAFT

Subsurface Investigation Workplan

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730 South Myrtle Street
Seattle, Washington

Prepared for:

The Whitehead Company and Reliable Transfer & Storage Co.
P.O. Box 81144
Seattle, WA

Project No.: 0973-001

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November 6, 2013

SoundEarth Strategies

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1.0 INTRODUCTION

On behalf of The Whitehead Company and Reliable Transfer & Storage Co. (the Ownership), SoundEarth Strategies, Inc. (SoundEarth) has prepared this Subsurface Investigation Workplan (Workplan) for the Whitehead Tyee Property located at 730 South Myrtle Street in Seattle, Washington (the Property; Figure 1).

1.1 PURPOSE AND OBJECTIVES

The purpose of the Workplan is to identify the suggested subsurface investigation scope of work to evaluate Recognized Environmental Conditions (RECs) identified for the Property during SoundEarth's Phase I Environmental Site Assessment (ESA) research. These RECs are summarized below:

- Confirmed soil and/or groundwater contamination beneath and near the Property and north-adjoining property related to the Fox Avenue Site.
- Former use of a lumber dip tank and associated UST used to store pentachlorophenol (PCP) adjacent to the south of the Property in the South Myrtle Street right-of-way.
- Historical operation of a sawmill/lumber manufacturing facility on the Property from 1918 to approximately 1989.
- Confirmed concentrations of stoddard solvent and ORPH in soil above their respective MTCA Method A cleanup levels at two separate locations on the Property (boring GP-2 at 12-13 feet bgs and boring GP-10 at 0-5 feet bgs, respectively).
- Former operation of auto and truck repair shops on the southeastern portion of the Property during the 1940s and 1960s.
- General industrial use of the Property from approximately 1991 to current, including truck and freight container storage.
- Historical operation of a gasoline service station/automotive repair shop on the east-adjoining property.

This Workplan includes a description of sample collection, handling, and analysis procedures to be implemented during the subsurface investigation. The Workplan also provides detailed information regarding the sampling and data quality objectives, sample location and frequency, equipment, and procedures to be used during the investigation; sample handling and analysis; procedures for management of waste; quality assurance protocols for field activities and laboratory analysis; and reporting requirements.

1.2 SAMPLING AND ANALYSIS PLAN ORGANIZATION

The SAP is organized into the following sections:

- **Section 1.0, Introduction.** This section describes the purpose of the Workplan and provides a summary of the RECs associated with the Property which are to be evaluated during the subsurface investigation.
- **Section 2.0, Project Organization and Management.** This section presents the project team, including field personnel and management.
- **Section 3.0, Field Activities.** This section presents the subsurface investigation objectives and field activity summary.
- **Section 4.0, Sample Handling and Quality Control Procedures.** This section describes the sample handling techniques and quality assurance procedures that will be followed during the subsurface investigation.
- **Section 5.0, Analytical Testing.** This section describes the type and number of sample analyses that will be conducted on soil and groundwater during the subsurface investigation.
- **Section 6.0, Management of Investigation-Derived Waste.** This section provides details on handling and disposal procedures that will be implemented during the subsurface investigation.
- **Section 7.0, Data Quality Objectives.** This section summarizes the data quality objectives that will need to be met to ensure the validity of the analytical results.
- **Section 8.0, Data Collection.** This section describes the type, transfer, inventory management, and validation procedures of the data that will be gathered during the subsurface investigation.
- **Section 9.0, Quality Control Procedures.** This section provides details regarding the quality control (QC) procedures for both field activities and laboratory analysis.
- **Section 10.0, Corrective Actions.** This section identifies the approaches that will be used to correct any protocols that may compromise the quality of the data.
- **Section 11.0, Documentation and Records.** This section outlines the documentation that will be prepared during the subsurface investigation. It includes a discussion of document management, waste disposal tracking, and compliance reports.
- **Section 12.0, Health and Safety Procedures.** This section summarizes the health and safety procedures outlined in the Project-Specific Health and Safety Plan.

1.3 BACKGROUND

This section provides a description of the Property features and location, a summary of historical Property use, and a summary of previous investigations conducted at the Property and adjoining parcels and ROWs.

1.3.1 Property Location and Description

The Property consists of an irregularly-shaped tax parcel (King County Parcel No. 2734100270) that covers approximately 140,465 square feet (3.22 acres) of land. The Property is located at 730 South Myrtle Street, approximately 4 miles south of downtown Seattle, Washington, as shown in Figure 1. Figure 2 depicts a plan view/layout of the Property. According to the King County iMap application, the Property is located at an approximate elevation of 15 feet above mean sea level.

The Property is currently occupied by a pre-1985-vintage, metal-framed storage shed and a truck and freight container storage yard, as shown on Figure 2. The storage shed is unheated. Photographs of the Property are included as attachments to this report.

Potable water and sewer service are provided to the Property by Seattle Public Utilities. According to Seattle Engineering Department side sewer card records, the sanitary sewer was initially connected to the Property in 1950. Seattle City Light provides electricity to the Property. Solid waste disposal and recycling services are provided by Waste Management. No evidence of potable or process water supply wells on the Property was found during the Phase I ESA research and site visit.

The current Property use is freight and truck storage, occupied by Seattle Iron and Metals.

1.3.2 Property History

Based on information reviewed in the course of this investigation and as discussed in appropriate sections of this report, it appears that the Property was initially developed by 1917 with three residences and several sheds on the eastern portion of the Property. The residences were removed by 1936 and an automotive and truck repair shop was constructed on the southeastern portion of the Property by 1949. This repair shop was removed from the Property by 1966 when this area was in use as a lumber sorting yard. Corson Avenue passed from northeast to southwest through the Property. The portion of the Property west of Corson Avenue was initially developed with a sawmill facility in 1918 that initially included a 17,010-square foot mill building, a 13,973-square foot lumber warehouse, and a lumber shed. The sawmill was expanded by 1929 to include a boiler house, a dry kiln, and a lunch room. The boiler was fueled by a sawdust/refuse burner (Figure 2). Another dry kiln was added in 1947. These kilns were heated by steam from the boiler house on the Property. The 1918-vintage sawmill buildings were also expanded in size over the years. A small building on the southern portion of the Property nearby to the east of the boiler house was in use for auto repairing activities in 1966. Williams Fir Finish Company operated the mill on the Property in 1929. Tyee Lumber began operating the sawmill on the Property after 1929 until approximately 1986. The Whitehead Company acquired the Property in 1986. Sawmill operations ceased at the Property in approximately 1989. The sawmill buildings were demolished in 1990-1991 and the Property was leased for general industrial use, including truck and freight container storage to the present time. The Property has been leased to Seattle Iron and Metals since July 1999.

At some point during Tyee Lumber Company's operations, lumber was treated with preservatives, including PCP, in a top-loading dip tank. The dip tank was approximately 10 to 15 feet long, 5 feet wide, and 5 to 6 feet deep. Additionally, a 300-gallon PCP underground storage tank located adjacent to the dip tank shed was reportedly decommissioned in 1986 with the rest of the lumber treatment operations when the Whitehead Company acquired the Property. Wood treatment/preservation operations occurred to the south of the Property, within the City of Seattle right-of-way (ROW), and not within the Property boundary.

Previous environmental investigations have confirmed the presence of pentachlorophenol, Stoddard solvents, and oil-range range petroleum hydrocarbons in soil and/or groundwater beneath the Property and south adjoining ROW.

1.4 SUBSURFACE INVESTIGATION TASK DESCRIPTIONS

The tasks proposed as part of the subsurface investigation include the following:

- Preparing a health and safety plan in accordance with the Washington State Model Toxics Control Act (MTCA) and Part 1910.120 of Title 29 of the Code of Federal Regulations prior to initiating field activities.
- Performing a utility locate at the proposed boring locations using a private utility location service and contacting the One-Call Center for utility location.
- Performing a ground-penetrating radar (GPR) survey on the Property.
- Advancing 11 soil borings (B01 through B11) on the Property near potential source areas identified during the Phase I ESA.
- Installing monitoring wells MW01 through MW04 in borings B01 through B04.
- Submitting select soil samples collected from the borings for laboratory analysis.
- Collecting low-flow and reconnaissance groundwater samples from monitoring wells MW01 through MW04, and boring B05 through B11.
- Collecting low-flow groundwater samples from existing wells MW-7, B-18, and B-38.
- Submitting the groundwater samples for laboratory analysis.

2.0 PROJECT ORGANIZATION AND MANAGEMENT

This section describes the overall project management strategy for the investigation.

To ensure efficient decision making for field sampling and laboratory analysis, key data collection decisions, decision criteria, process for decision making, quality assurance/quality control (QA/QC) procedures, and responsibilities are described below and detailed in Table 1.

Regulatory Agency. The Washington State Department of Ecology (Ecology) will be the lead regulatory agency for the project, as promulgated in MTCA. Although, Ecology's Site Manager for the Project has not yet been assigned.

Washington State Department of Ecology
3190 160th Avenue Southeast
Bellevue, Washington 98008

Project Contact. SoundEarth has been contracted by The Ownership to plan and implement the investigation at the Property. The Project Contact for the Ownership is:

Mr. Howard Giske
The Whitehead Company

P.O. Box 81144
Seattle, WA 98108
206-714-0953
howard@whiteheadco.com

Project Principal. The Project Principal provides oversight of all project activities and reviews all data and deliverables prior to their submittal to the Project Contact or Regulatory Agency. The Project Principal for SoundEarth is:

Mr. Chris Carter
SoundEarth Strategies, Inc.
2811 Fairview Avenue East, Suite 2000
Seattle, Washington 98102
206-306-1900
Fax: 206-306-1907
chrisc@soundearthinc.com

Project Manager. The Project Manager has overall responsibility for developing the Workplan, monitoring the quality of the technical and managerial aspects of the investigation, and implementing the Workplan and corresponding corrective measures, where necessary. The Project Manager for SoundEarth is:

Mr. Brian Dixon
SoundEarth Strategies, Inc.
2811 Fairview Avenue East, Suite 2000
Seattle, Washington 98102
206-306-1900
Fax: 206-306-1907
bdixon@soundearthinc.com

Laboratory Project Manager. The Laboratory Project Manager will provide analytical support and will be responsible for providing certified, pre-cleaned sample containers and sample preservatives (as appropriate) and for ensuring that all chemical analyses meet the project quality specifications detailed in this Workplan. Friedman and Bruya Inc., of Seattle, Washington, has been contracted by SoundEarth to perform the chemical and physical analysis for compliance samples collected during the investigation. The Laboratory Project Manager is:

Mr. Mike Erdahl
Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, Washington 98119
206-285-8282
merdahl@friedmanandbruya.com

Project QA/QC Officer. The Project QA/QC Officer has the responsibility to monitor and verify that the work is performed in accordance with the Workplan and other applicable procedures. The Project QA/QC Officer has the responsibility to assess the effectiveness of the QA/QC program and to

recommend modifications to the program when applicable. The Project QA/QC Officer is responsible for assuring that the personnel assigned to the project are trained relative to the requirements of the QA/QC program and for reviewing and verifying the disposition of nonconformance and corrective action reports. The Project QA/QC Officer for SoundEarth is:

Mr. Brian Dixon
SoundEarth Strategies, Inc.
2811 Fairview Avenue East, Suite 2000
Seattle, Washington 98102
206-306-1900
Fax: 206-306-1907
bdixon@soundearthinc.com

Field Coordinator. The Field Coordinator (FC) will supervise field collection of all samples. The FC will ensure proper recording of sample locations, depths, and identification; sampling and handling requirements, including field decontamination procedures; physical evaluation and logging of samples; and completing of chain-of-custody forms. The FC will ensure that all SoundEarth field staff follows the SAP, will ensure that the physical evaluation and logging of soil is based on the Unified Soil Classification System (USCS), and will adhere to standardized methods for sample acceptability and physical description of samples. The FC will ensure that field staff maintain records of field sampling events using the forms included as Attachment A of this SAP. The FC will be responsible for proper completion and storage of field forms. The FC for SoundEarth is:

Mr. Chuck Cacek
SoundEarth Strategies, Inc.
2811 Fairview Avenue East, Suite 2000
Seattle, Washington 98102
206-306-1900
Fax: 206-306-1907
ccacek@soundearthinc.com

Field Staff. Members of the field staff must understand and implement the QA/QC program, coordinate and participate in the field sampling activities, coordinate sample deliveries to laboratory, and report any deviations from project plans as they relate to the subsurface investigation objectives as presented in the SAP. Major deviations from the SAP, such as the inability to collect a sample from a specific sampling location, obtaining an insufficient sample volume for the required analyses, or a change in sampling method, must be reported to the Project Manager.

Subcontractors. All subcontractors will follow the protocols outlined in this SAP and will be overseen and directed by SoundEarth. The following subcontractors have been identified:

Private Utility Locator:

Mr. Kemp Garcia
Bravo Environmental
6437 South 144th Street
Tukwila, Washington 98168

425-424-9000
kgarcia@bravonw.com

Drilling Contractor:

Ms. Anisa Harnden
Environmental Services Network Northwest
1210 Eastside Street SE, Suite 200
Olympia, Washington 98501
360-459-4670
anisa@esnnw.com

3.0 FIELD ACTIVITIES

A GPR survey and private utility location survey will be conducted by Bravo Environmental, of Tukwila, Washington, prior to investigation activities. Drilling activities will be conducted under the supervision of a SoundEarth geologist. Drilling services will be provided by provided by Environmental Services Network Northwest, of Olympia, Washington.

The GPR survey will be conducted across the entire Property to locate subsurface anomalies, such as unknown USTs or piping.

3.1 SOIL AND GROUNDWATER SAMPLE COLLECTION

Nine soil borings (B01 through B11) will be advanced beneath the Property to depths ranging from 15 to 20 feet bgs (Figure 2). Boring locations have been selected to provide sufficient data to assess potential source areas that may have affected soil and groundwater quality at the Property. Boring B01 through B04 will be advanced in the vicinity of the former pentachlorophenol dip tank to assess the nature and extent of the release on the Property; borings B05 through B08 will be advanced in the vicinity of the former automotive repair facilities; B09 will be advanced directly west the eastern property boundary, adjacent to the former gasoline station, and B10 and B11 will be advanced in the northeast corner of the Property. Boring locations and former site features are shown on Figure 2.

Soil borings B01 through B04 will be completed as groundwater monitoring wells MW01 through MW04 (Figure 2). Well screens will be set from 5 to 20 feet bgs, based on information regarding depth to water observed during previous investigations. The monitoring wells will be developed by purging a minimum of five well casing volumes of water from each well.

The borings will be advanced using a combination of hollow stem auger and direct push drilling methods. Borings will be sampled at approximate 4 to 5-foot intervals from ground surface to the total depths explored. After the maximum depth is achieved in each sample interval, relatively undisturbed, discrete soil samples will be collected from the soil boring. The soil will be classified using the Unified Soil Classification System. Soil characteristics, including moisture content, relative density, texture, and color, will be recorded on the boring logs. The depths at which changes in soil lithology are observed and at what depth groundwater is first encountered will also be included on the boring logs. Selected portions of recovered soil core samples will be placed in a plastic bag so the presence or absence of volatile organic compounds can be quantified using a photoionization detector (PID). Soil samples will be selected for analysis based on field indications of potential contamination, including visual and olfactory

notations, PID readings, and the location of the sample proximate to the soil-groundwater interface. Soil samples will be placed into laboratory-prepared glassware in accordance with U.S. Environmental Protection Agency (EPA) Method 5035A guidelines for volatile organic compound (VOC) analysis, and into four- ounce laboratory-prepared containers for non-VOC analysis.

SoundEarth will collect groundwater samples from newly installed monitoring wells MW01 through MW04, and existing monitoring wells MW-7, B-18 and B-38 according to the EPA *Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures* (April 1996). Purging and sampling of each well will be performed using a peristaltic pump and dedicated polyethylene tubing. During purging, water quality parameters will be monitored and recorded included temperature, pH, specific conductivity, dissolved oxygen, turbidity, and oxidation-reduction potential. Each well will be purged until, at a minimum, pH, specific conductivity, and turbidity or dissolved oxygen stabilized. Samples will be placed directly in to clean, laboratory-prepared containers.

SoundEarth will also collect reconnaissance groundwater samples, during drilling activities, from temporary well screens inserted into borings B05 through B11 using a peristaltic pump and dedicated polyethylene tubing.

4.0 SAMPLE HANDLING AND QUALITY CONTROL PROCEDURES

Sections 4.1 through 4.4 summarize sample labeling, containers, handling, chain of custody, and field quality control procedures to be applied during the subsurface investigation.

4.1 SAMPLE IDENTIFICATION

Each sample collected during the investigation will be assigned a unique sample ID and number. Sample ID labels will be filled out and affixed to appropriate containers immediately prior to sample collection. The label is filled out in indelible ink and will include the following information: media, date, time sampled, sample ID and number, project name, project number, sampler's initials, and analyte preservative(s) if any. An example of the Sample ID Label is included in Attachment A of this Workplan.

4.1.1 Soil

Soil samples collected will be identified by the boring and depth at which they were collected. For example, a soil sample collected from boring B01 at a depth of 15 feet bgs would be identified as B01-15.

4.1.2 Groundwater

Reconnaissance groundwater sample IDs will include a prefix of the boring identification and the date. For example, the groundwater sample collected from boring B01 on October 22, 2014, would be numbered B01-20141022. The sample identification will be placed on the Sample ID label, the Field Report form, and the Sample Chain of Custody form.

4.2 DECONTAMINATION PROCEDURES

Decontamination of all nondisposable tools and equipment will be conducted prior to each sampling event and between each sampling location, including stainless steel bowls/containers, stainless steel spoons/spatulas, stainless steel core catcher, hack saw blades, and drill bits. A sufficient supply of pre-decontaminated small equipment will be mobilized to the sampling locations to minimize the need for performing field decontamination. Field personnel will change disposable latex or nitrile gloves before

collecting each sample and before decontamination procedures and will take precautions to prevent contaminating themselves with water used in the decontamination process. The following steps will be followed to decontaminate reusable soil and groundwater sampling equipment:

- The equipment will be washed with a solution of Alconox (or an equivalent detergent) and water.
- The equipment will be rinsed with tap water.
- A final rinse will be conducted with distilled or deionized water.

Residual sample media from the equipment, used decontamination solutions and associated materials, and disposable contaminated media will be disposed of according to the procedures described in Section 6.0, Management of Investigation-Derived Waste.

4.3 SAMPLE CHAIN-OF-CUSTODY PROCEDURES

The written procedures that will be followed whenever samples are collected, transferred, stored, analyzed, or destroyed are designed to create an accurate written record that can be used to trace the possession and handling of the sample from the moment of its collection through analysis and reporting of analytical values. This written record, the Sample Chain of Custody form, will be filled out by the field sampling team at the time the sample is obtained. An example of the Sample Chain of Custody form is included in Attachment A.

All samples submitted to the laboratory are accompanied by the Sample Chain of Custody form. This form is checked for accuracy and completeness and then signed and dated by the laboratory sample custodian accepting the sample. At the laboratory, each sample is assigned a unique, sequential laboratory identification number that is stamped or written on the Sample Chain of Custody form.

All samples are held under internal chain of custody in the sample control room using the appropriate storage technique (i.e., ambient, refrigeration, frozen). The Laboratory Project Manager assigned to a particular client will be responsible for tracking the status of the samples throughout the laboratory. Samples will be signed out of the sample control room in a sample control logbook by the analyst who will prepare the samples for analysis.

The Sample Chain of Custody form will include the following information: client, project name and number, date and time sampled, sample identification, sampler's initials, analysis, and analyte preservative(s), if any.

4.4 FIELD QUALITY ASSURANCE SAMPLING

Field and laboratory activities will be conducted in such a manner that the results be valid and meet the data quality objectives for this project. QA/QC groundwater samples will be collected during the course of the groundwater monitoring to provide for data validation as detailed in Section 7.0. QA/QC samples will consist of field duplicates. QA/QC samples will be collected and sent to the laboratory along with the primary field samples. Based on the sampling frequency and number of groundwater samples anticipated, it is estimated that one groundwater field duplicate sample will be submitted for analysis. The QA/QC sample will be assigned a unique sample identifier and number. The number will include a prefix of B99 for field duplicates. For example, a field duplicate collected on October 22, 2014, would be labeled B99-20141022. SoundEarth will note the locations of the field duplicate in the field notes.

5.0 ANALYTICAL TESTING

All samples will be submitted to Friedman & Bruya, Inc., an Ecology-accredited analytical laboratory, on a standard 10- to 14-day turnaround time. All chemical and physical testing will adhere to EPA's SW-846 QA/QC procedures and analysis protocols or follow the appropriate Ecology methods. In completing chemical analyses for this project, the laboratory will meet the following minimum requirements:

- Adhere to the methods outlined in this Workplan, including methods referenced for each analytical procedure.
- Provide a detailed discussion of any modifications made to previously approved analytical methods.
- Deliver PDF and electronic data as specified.
- Meet reporting requirements for deliverables.
- Meet turnaround times for deliverables.
- Implement QA/QC procedures discussed in Section 7.0, including data quality objectives (DQOs), laboratory quality control requirements, and performance evaluation testing requirements.
- Notify the Project QA/QC Officer of any QA/QC problems when they are identified to allow for quick resolution.
- Allow laboratory and data audits to be performed, if deemed necessary.

Copies of the *Laboratory Quality Assurance Manual* from Friedman & Bruya, Inc. are on file at SoundEarth's offices for review and reference and will be followed during the investigation. Access to laboratory personnel, equipment, and records pertaining to samples, collection, transportation, and analysis can be provided. Container requirements, holding times, and preservation methods for soil and water are summarized in Table 2. Sample laboratory analytical results for each analyte will be compared to regulatory limits applicable to the subsurface investigation.

5.1 SOIL

Soil samples will be submitted for laboratory analysis of pentachlorophenol by EPA Method 8270D SIM. Select samples may also be analyzed for: gasoline-range petroleum hydrocarbons (GRPH) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) by Northwest Method NWTPH-Gx; and diesel-range petroleum hydrocarbon and oil-range petroleum hydrocarbons (DRPH and ORPH respectively) by Northwest Method NWTPH-Dx. The soil sample with the highest detectable concentration of pentachlorophenol will also be sampled for Dioxins/Furans by EPA Method 8290. Investigation derived waste will be sampled for metals by EPA Methods 200.8 and 1631E.

5.2 GROUNDWATER

Groundwater samples will be submitted for laboratory analysis of pentachlorophenol by EPA Method 8270D SIM. Select samples may also be analyzed for: GRPH and BTEX by Northwest Method NWTPH-Gx; and DRPH and ORPH by Northwest Method NWTPH-Dx.

6.0 MANAGEMENT OF INVESTIGATION-DERIVED WASTE

Contaminated soil, groundwater, and disposable equipment generated during the investigation will be handled in accordance with state and federal regulations.

Wastes generated during the investigation require analytical testing before disposal. Generally, the treatment, storage, and disposal facility (TSDF) receiving the waste specifies the minimum number of samples and analyses before accepting wastes from a site; at the Property, data generated during the investigation activities will be sufficient to develop a waste profile. Wastes that will be generated from the investigation and destined for off-Site disposal include the following:

- Soil contaminated with Penta, GRPH, BTEX, DRPH, ORPH, and associated compounds.
- Groundwater contaminated with Penta, GRPH, BTEX, DRPH, ORPH, and associated compounds.
- Contaminated personal protective equipment.
- Decontamination solutions.
- Miscellaneous solid wastes.

Each waste stream will be profiled separately in accordance with the minimum waste analyses requirements of the respective permitted TSDF. If unforeseen soil conditions are encountered, additional waste profiling may be required to ensure proper classification and disposal.

Soil and groundwater waste generated during drilling will be stored in labeled 55-gallon drums. Composite soil samples will be collected from the drums for waste characterization purposes. The drums will be labeled with the source (soil boring ID and depths) and disposed of in accordance with the requirements based on the analytical results of sampling. A Hazardous or Non-Hazardous Waste Label will be affixed to each drum, and the number and type of drums will be documented on a Drum Inventory Sheet (Attachment A).

Disposable personal protective clothing (e.g., Tyvek suits, rubber gloves, and boot covers) and disposable sampling devices (e.g., plastic tubing, plastic scoops, and bailers) will be placed in plastic garbage bags and disposed of as nonhazardous waste.

7.0 DATA QUALITY OBJECTIVES

Field and laboratory activities will be conducted in such a manner that the results will be valid and will meet the data quality objectives for this project. Guidance for QA/QC will be derived from the protocols developed for the cited methods within EPA's documents *Test Methods for Evaluating of Solid Waste Physical/Chemical Methods, also known* SW-846, and the National Contract Laboratory Review Program, National Functional Guidelines for Organic Data Review. The data quality objectives are designed to:

- Assist the project manager and project team to focus on the factors affecting data quality during the planning stage of the project.
- Facilitate communication among field, laboratory, and project staff as the project progresses.
- Document the planning, implementation, and assessment procedures for QA/QC activities for the investigation.

- Verify that the DQOs are achieved.
- Provide a record of the project to facilitate final report preparation.

The DQOs for the project include both qualitative and quantitative objectives, which define the appropriate type of data and specify the tolerable levels of potential decision errors that will be used as a basis for establishing the quality and quantity of data needed to support the investigation. To verify that the DQOs are achieved, this Workplan details aspects of sample collection and analysis including analytical methods, QA/QC procedures, and data quality reviews. This Workplan describes both qualitative and quantitative measures of data quality to verify that the DQOs are achieved.

Detailed QA/QC procedures in the field and at the laboratory are provided in the following sections. The DQOs for the investigation will be used to develop and implement procedures to verify that data collected is of sufficient quality to adequately address the objectives of the Wokrplan. All observations and measurements will be made and recorded in such a manner as to yield results representative of the media and conditions observed and/or measured. Goals for representativeness will be met by verifying that sampling locations are selected properly, that a sufficient number of samples are collected, and that field screening and laboratory analyses are conducted properly.

The quality of the laboratory data will be assessed by precision, accuracy, representativeness, completeness, comparability, and sensitivity. Definitions of these parameters and the applicable QC procedures are described in Sections 7.1 through 7.6. Quantitative DQOs are provided following each definition. Laboratory DQOs have been established by the analytical laboratory. Applicable quantitative goals for these DQOs are listed in Table 3.

7.1 PRECISION

Precision measures the reproducibility of measurements under a given set of conditions. Specifically, it is a quantitative measure of the variability of two or more measurements compared to their average values. Precision is calculated from results of duplicate sample analyses. Precision is quantitatively expressed as the relative percent difference (RPD) and is calculated as follows:

$$RPD = \frac{(C_1 - C_2)}{(C_1 + C_2)/2} \, x \, 100$$

Where:
RPD = relative percent difference
C_1 = larger of the two duplicate results (i.e., the highest detected concentration)
C_2 = smaller of the two duplicate results (i.e., the lowest detected concentration)

There are no specific RPD criteria for organic chemical analyses. Quantitative RPD criteria for organic analyses will be based on laboratory-derived control limits.

7.2 ACCURACY

Accuracy is a measure of the closeness (bias) of the measured value to the true value. The accuracy of chemical analytical results is assessed by "spiking" samples in the laboratory with known standards (a surrogate or matrix spike of known concentration) and determining the percent recovery. The accuracy is measured as the percent recovery (%R) and is calculated as follows:

$$\%R = \frac{(M_{sa} - M_{ua})}{C_{sa}} x\ 100$$

Where:
%R = percent recovery
M_{sa} = measured concentration in spiked aliquot
M_{ua} = measured concentration in unspiked aliquot
C_{sa} = actual concentration of spike added

Laboratory matrix spikes and surrogates will be carried out at the analytical laboratory in accordance with EPA SW-846 and Ecology methods and procedures for inorganic and organic chemical analyses. The frequency of matrix spikes and matrix spike duplicates will each be one per batch of 20 samples or less for soil samples. Quantitative percent recovery criteria for organic analyses will be based on laboratory-derived control limits for surrogate recovery and matrix spike results.

The accuracy of sample results can also be affected by the introduction of contaminants to the sample during collection, handling, or analysis. Contamination of the sample can occur because of improperly cleaned sampling equipment, exposing samples to chemical concentrations in the field or during transport to the laboratory, or because of chemical concentrations in the laboratory. To demonstrate that the samples collected are not contaminated, laboratory method blank samples will be analyzed. The laboratory will run method blanks at a minimum frequency of 5 percent or one per batch to assess potential contamination of the sample within the laboratory.

7.3 REPRESENTATIVENESS

Representativeness is a qualitative assessment of how closely the measured results reflect the actual concentration or distribution of the constituent concentrations in the matrix sampled. The sampling plan design, sample collection techniques, sample handling protocols, sample analysis methods, and data review procedures have been developed to verify that the results obtained are representative of the site conditions. These issues are addressed in detail in Section 5.0, Analytical Testing and Section 9.0, Quality Control Procedures.

7.4 COMPLETENESS

Completeness is defined as the percentage of measurements judged to be valid. Results will be considered valid if they are not rejected during data validation (Section 9.0, Quality Control Procedures). Completeness is calculated as follows:

$$C = \frac{(Number\ of\ Valid\ Measurements)}{(Total\ Number\ of\ Measurements)} x\ 100$$

Objectives for completeness are based, in part, on the subsequent uses of the data (i.e., the more critical the use, the greater the completeness objective). The objectives for completeness of samples are expressed as percentages, which refer to the minimum acceptable percentages of samples received at the laboratory in good condition and acceptable for analysis. The objectives of completeness for other samples are 95 percent for soil and water samples. These objectives will be met through the use of proper sample containers, proper sample packaging procedures to prevent breakage during shipment,

proper sample preservation, and proper labeling and chain-of-custody procedures. A loss of 5 to 10 percent of intended samples is common, and the goals set are sufficient for intended data uses.

The objectives for completeness of chemical analyses are also expressed as percentages and refer to the percentages of analytical requests for which usable analytical data are produced. The initial objective for completeness of chemical analyses in the laboratory is 95 percent.

7.5 COMPARABILITY

Comparability is a qualitative parameter expressing the confidence with which one data set can be compared with another. The use of standard Ecology and EPA methods and procedures for both sample collection and laboratory analysis will make the data collected comparable to both internal and other data generated.

7.6 SENSITIVITY

Analytical sensitivities are measured by PQLs, which are defined as the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. PQLs are determined by the laboratory.

8.0 DATA COLLECTION

This section outlines the procedures to be followed for the inventory, control, storage, and retrieval of data collected during performance of the investigation. The procedures contained in this Workplan are designed to verify that the integrity of the collected data is maintained for subsequent use.

8.1 DATA COLLECTION APPROACH

Procedures that will be used to collect, preserve, transport, and store samples are described in Section 4.0, Sample Handling and Quality Control Procedures. All sampling protocols will be performed in accordance with generally accepted environmental practices and will meet or exceed current regulatory standards and guidelines. Sampling procedures may be modified, if necessary, to satisfy amendments to current regulations, methods, or guidelines. The data collection approach for key elements of the investigation field program will verify the project DQOs are met or exceeded. The total number of samples collected and specific analyses to be performed will be based on field screening results, and field observations.

8.2 DATA TYPES

A variety of data will be generated during the investigation, including sampling and analytical data. The laboratory analytical data will be transmitted to SoundEarth as an electronic file, in addition to a hardcopy laboratory data report. This method will facilitate the subsequent validation and analysis of these data while avoiding transcription errors that may occur with computer data entry. Examples of data types include manually recorded field data, such as boring logs, and electronically reported laboratory data.

8.3 DATA TRANSFER

Procedures controlling the receipt and distribution of incoming data packages to SoundEarth and outgoing data reports from SoundEarth include the following:

- Incoming documents will be date-stamped and filed. Correspondence and transmittal letters for all reports, maps, and data will be filed chronologically. Data packages, such as those from field personnel, laboratories (such as soil data) and surveyors (elevation data), will be filed by project task, subject heading, and date. If distribution is required, the appropriate number of copies will be made and distributed to the appropriate persons or agencies.
- A transmittal sheet will be attached to all project data and reports sent out. A copy of each transmittal sheet will be kept in the administrative file and the project file. The Project Manager and Project QA/QC Officer will review all outgoing reports and maps.

8.4 DATA INVENTORY

Procedures for filing, storage, and retrieval of project data and reports are discussed below.

8.4.1 Document Filing and Storage

Project files and raw data files will be maintained at SoundEarth's office. Files will be organized by project tasks or subject heading and maintained by the document control clerk. Hard copy project files will be archived for a minimum of 3 years after completion of the project. Electronic copies of files will be maintained in a project directory and backed up daily, weekly, and monthly.

8.4.2 Access to Project Files

Access to project files will be controlled by and limited to the Ownership and their authorized representatives, Ecology, and SoundEarth personnel. When a hard copy file is removed for use, a sign-out procedure will be used to track custody. If a document is to be used for a long period, a copy will be used, and the original will be returned to the project file. Electronic access to final reports, figures, and tables will be write-protected in the project directory.

8.5 DATA VALIDATION

Data quality review will be performed where applicable in accordance with the current EPA guidance as set forth in *Guidance on Environmental Data Verification and Data Validation* (EPA QA/G-8, EPA/240/R-02-004, November 2002). The following types of QC information will be reviewed, as appropriate:

- Method deviations
- Sample extraction and holding times
- Method reporting limits
- Blank samples (equipment rinsate and laboratory method)
- Duplicate samples
- Matrix spike/matrix spike duplicate samples (accuracy)
- Surrogate recoveries
- Percent completeness and RPD (precision)
- A quality assurance (QA) review of the final analytical data packages for samples collected during the subsurface investigation.

8.6 DATA REDUCTION AND ANALYSIS

The Project Manager and Project QA/QC Officer are responsible for data review and validation. Data validation parameters are outlined as quantitative DQOs in Section 7.0, Data Quality Objectives. The particular type of analyses and presentation method selected for any given data set will depend on the type, quantity, quality, and prospective use of the data in question. The analysis of the project data will require data reduction for the preparation of tables, charts, and maps. To verify that data are accurately transferred during the reduction process, two data reviews will be performed, one by the Project QA/QC Officer or Project Manager and another by the Project Principal, prior to issuing the documents. Any incorrect transfers of data will be highlighted and changed.

9.0 QUALITY CONTROL PROCEDURES

This section provides a description of the QC procedures for both field activities and laboratory analysis. The field QC procedures include standard operating procedures for sample collection and handling, equipment calibration, and field QC samples.

9.1 FIELD QUALITY CONTROL

Field QC samples (e.g., duplicate samples) will be collected during this project and will follow the standard operating procedures during field screening activities. The procedural basis for these field data collection activities will be documented on the field report forms, as described in Section 11.1, Field Documentation. Any deviations from the established protocols will be documented on the field report forms.

A QA/QC groundwater sample will be collected during the Investigation to provide for data validation, as described in Section 7.0 Data Quality Objectives. QA/QC samples will consist of field duplicates. QA/QC samples will be collected and shipped to the laboratory along with the primary field samples. Based on the sampling frequency and number of groundwater samples anticipated, it is estimated that one field duplicate sample will be submitted. The QA/QC sample will be assigned a unique sample identifier and number. The number will include a prefix of B99. For example, a field duplicate collected on October 22, 2014, would be labeled B99-20141022. SoundEarth will note the locations of the field duplicate in the field notes.

9.2 LABORATORY QUALITY CONTROL

Analytical laboratory QA/QC procedures are provided in the *Laboratory Quality Assurance Manual* that is on file at SoundEarth's office for Friedman & Bruya, Inc. and are summarized below:

- **Laboratory Quality Control Criteria.** Results of the QC samples from each sample group will be reviewed by the analyst immediately after a sample group has been analyzed. The QC sample results will then be evaluated to determine whether control limits were exceeded. If control limits are exceeded in the sample group, corrective action (e.g., method modifications followed by reprocessing the affected samples) will be initiated prior to processing a subsequent group of samples. All primary chemical standards and standard solutions used in this project will be traceable to documented and reliable commercial sources. Standards will be validated to determine their accuracy by comparison with an independent standard. Any impurities identified in the standard will be documented.

The following paragraphs summarize the procedures that will be used to assess data quality throughout sample analysis:

- **Laboratory Duplicates.** Analytical duplicates provide information on the precision of the analysis and are useful in assessing potential sample heterogeneity and matrix effects. Analytical duplicates are subsamples of the original sample that are prepared and analyzed as a separate sample. A minimum of 1 duplicate will be analyzed per sample group or for every 20 samples, whichever is more frequent.
- **Matrix Spikes and Matrix Spike Duplicates.** Analysis of matrix spike (MS) samples provides information on the extraction efficiency of the method on the sample matrix. By performing matrix spike duplicate (MSD) analyses, information on the precision of the method is also provided for organic analyses. A minimum of 1 MS/MSD will be analyzed for every sample group or for every 20 samples, whichever is more frequent.
- **Laboratory Control Samples.** A laboratory control sample is a method blank sample carried throughout the same process as the samples to be analyzed, with a known amount of standard added. The blank spike compound recovery assesses analytical accuracy in the absence of any sample heterogeneity or matrix effects.
- **Surrogate Spikes.** All project samples analyzed for organic compounds will be spiked with appropriate surrogate compounds as defined in the analytical methods. Surrogate recoveries will be reported by the laboratories; however, no sample result will be corrected for recovery using these values.
- **Method Blanks.** Method blanks are analyzed to assess possible laboratory contamination at all stages of sample preparation and analysis. A minimum of 1 method blank will be analyzed for every extraction batch or for every 20 samples, whichever is more frequent.

9.3 DATA QUALITY CONTROL

All data generated by Friedman & Bruya, Inc. will undergo two levels of QA/QC evaluation: one by the laboratory and one by SoundEarth. As specified in Friedman & Bruya, Inc.'s *Laboratory Quality Assurance Manual*, the laboratory will perform initial data reduction, evaluation, and reporting. The analytical data will then be validated at SoundEarth under the supervision of the Project QA/QC Officer. The following types of QC information will be reviewed, as appropriate:

- Method deviations
- Sample transport conditions (temperature and integrity)
- Sample extraction and holding times
- Method reporting limits
- Blank samples
- Duplicate samples
- Surrogate recoveries
- Percent completeness
- RPD (precision)

SoundEarth will review field records and results of field observations and measurements to verify procedures were properly performed and documented. The review of field procedures will include the following:

- Completeness and legibility of field logs
- Preparation and frequency of field QC samples
- Equipment calibration and maintenance
- Sample Chain-of-Custody forms

Corrective actions are described in Section 10.0, Corrective Actions.

9.4 DATA ASSESSMENT PROCEDURES

The Project Manager and Project QA/QC Officer are responsible for data review and validation. Upon receipt of each data package from the laboratory, calculations using the equations presented for precision, accuracy, and completeness will be performed. Results will be compared to quantitative DQOs, where established, or qualitative DQOs.

9.5 PERFORMANCE AUDITS

Performance audits will be completed for both sampling and analysis work. Field performance will be monitored through regular review of Sample Chain-of-Custody forms, field forms, and field measurements. The Project Manager and/or the Project QA/QC Officer may also perform periodic review of work in progress at the site.

Accreditations received from Ecology for each analysis by Friedman & Bruya, Inc. demonstrate the laboratory's ability to properly perform the requested methods. Therefore, a system audit of the analytical laboratory during the course of this project will not be conducted.

The Project Manager and/or Project QA/QC Officer will oversee communication with the analytical laboratory on a frequent basis while samples are being processed and analyzed at the laboratory. This will allow SoundEarth to assess progress toward meeting the DQOs and to take corrective measures if problems arise.

The analytical laboratory will be responsible for identifying and correcting, as appropriate, any deviations from performance standards as discussed in Friedman & Bruya, Inc.'s *Laboratory Quality Assurance Manual.* The laboratory will communicate to the Project Manager or the Project QA/QC Officer all deviations to the performance standards and the appropriate corrective measures made during sample analysis. Corrective actions are discussed in Section 10.0.

10.0 CORRECTIVE ACTIONS

Corrective actions will be the joint responsibility of the Project Manager and the Project QA/QC Officer. Corrective procedures can include the following:

- Identifying the source of the violation.
- Reanalyzing samples, if holding time criteria permit.

- Resampling and analyzing.
- Re-measuring parameter.
- Evaluating and amending sampling and analytical procedures.
- Qualifying data to indicate the level of uncertainty.

During field sampling operations, the Project Manager and field staff will be responsible for identifying and correcting protocols that may compromise the quality of the data. All corrective actions taken will be documented in the field notes.

11.0 DOCUMENTATION AND RECORDS

Project files and raw data files will be maintained at SoundEarth's office. Project records will be stored and maintained in a secure manner. Each project team member is responsible for filing all necessary project information or providing it to the person responsible for the filing system. Individual team members may maintain files for individual tasks, but must provide such files to the central project files upon completion of each task. A project-specific index of file contents will be kept with the project files. Hard copy documents will be kept on file at SoundEarth or at a document storage facility throughout the duration of the project, and all electronic data will be maintained in the database at SoundEarth. All sampling data will be submitted to Ecology in both printed and electronic formats pursuant to WAC 173-340-840(5) and Ecology's Toxics Cleanup Program Policy 840 (Data Submittal Requirements).

11.1 FIELD DOCUMENTATION

Documentation of field activities will be included on Field Report forms, Boring Log forms, Groundwater Purge and Sample Forms, Sample ID Labels, Waste Material Labels, Waste Inventory Forms, Drum Inventory forms, Sample Summary Forms, and/or Sample Chain-of-Custody forms, examples of which are provided in Attachment A. Field forms will be scanned and saved to an electronic project folder. Original and copied forms will be filed in a binder that will be maintained by the Project Manager.

Field personnel will be required to keep a daily field log on a Field Report form. Field notes will be as descriptive and as inclusive as possible, allowing independent parties to reconstruct the sampling situation from the recorded information. Language will be objective, factual, and free of inappropriate terminology. A summary of each day's events will be completed on a Field Report form. At a minimum, field documentation will include the date, job number, project identification and location, weather conditions, sample collection data, personnel present and responsibilities, field equipment used, and activities performed in a manner other than specified in the Workplan. In addition, if other forms are completed or used (e.g., Sample Chain-of-Custody form), they will be referred to in and attached to the Field Report form. Field personnel will sign the Field Report form.

11.2 ANALYTICAL RECORDS

Analytical data records will be retained by the laboratory and stored electronically in the SoundEarth project file and project database. For all analyses, the data reporting requirements will include those items necessary to complete data validation, including copies of all raw data. The analytical laboratory will be required to report the following, as applicable: project narrative, chain-of-custody records, sample results, QA/QC summaries, calibration data summary, method blank analysis, surrogate spike recovery, matrix spike recovery, matrix duplicate, and laboratory control sample(s).

12.0 HEALTH AND SAFETY PROCEDURES

Field personnel will adhere to health and safety procedures that will be detailed under a separate cover as the Project-Specific HASP. The health and safety and emergency response protocols outlined in the HASP are designed to ensure compliance with state and federal regulations governing worker safety on hazardous waste sites. The Department of Labor has published final rules (Part 1910.120 of Title 29 of the Code of Federal Regulations, March 6, 1990) that amend the existing Occupational Safety and Health Administration standards for hazardous waste operations and emergency response. Within Washington State, these requirements are addressed in WAC 296-843, Hazardous Waste Operations.

Subcontractors to SoundEarth are required to prepare and effectively implement their own HASP based on their unique scope of work and professional expertise. Each subcontractor's HASP must comply with all applicable federal, state, and local regulations. The subcontractor's HASP should employ appropriate best practices to protect all personnel working on the site, as well as the public, and to prevent negative impacts to the project.

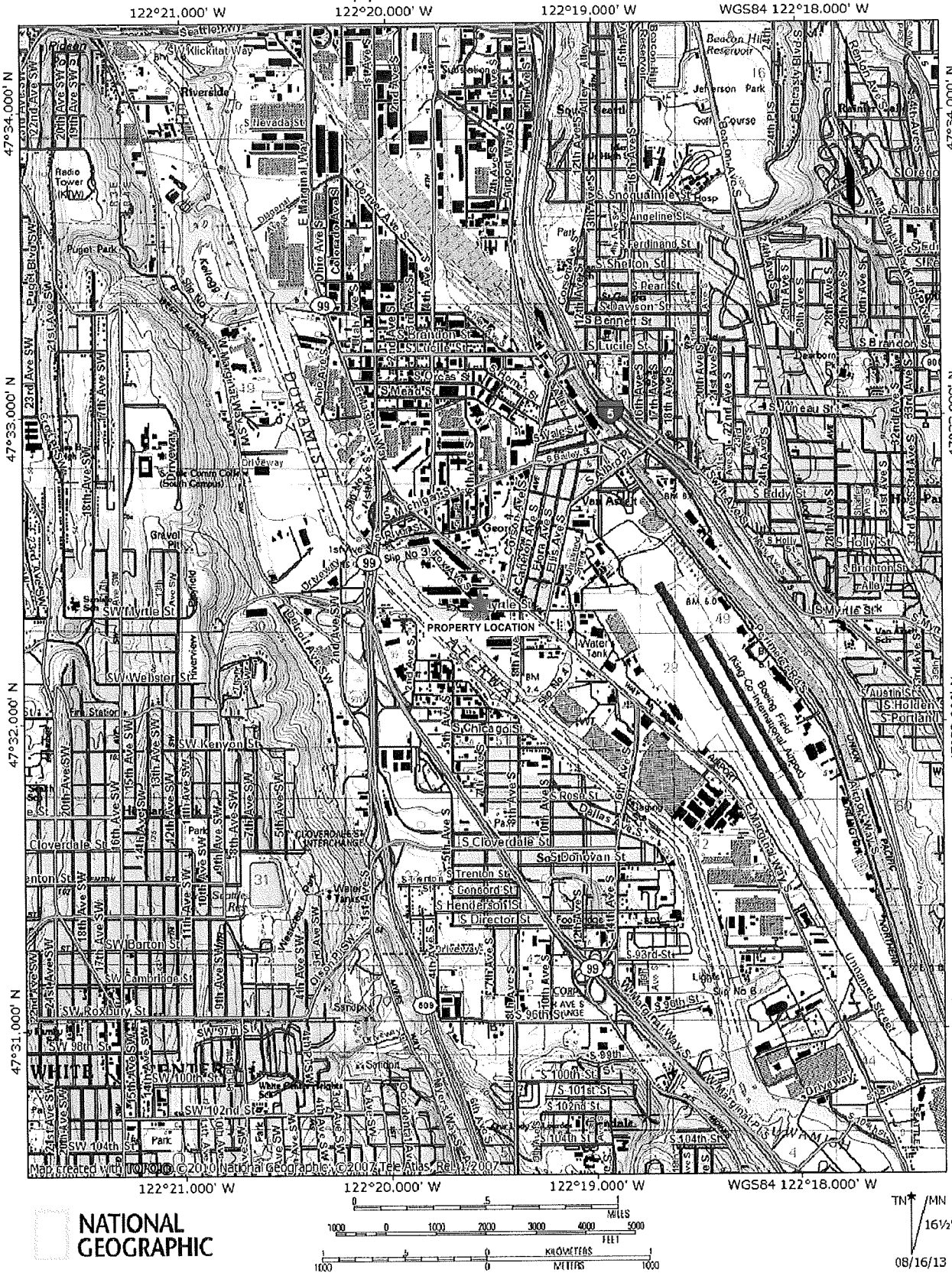
The responsibilities of SoundEarth for safety on this project are limited to the following:

- Implementation of the provisions of this HASP for the protection of its employees and visitors on the site to the extent that the site and its hazards are under the control of SoundEarth.
- Protection of the site, other personnel, and the public from damage, injury, or illness as a result of the activities of SoundEarth and its employees while on the site.
- Provision of additional safety-related advice and/or management as contractually determined between the parties.

It is anticipated that all field work will be performed during the investigation in Level D personal protective equipment. Potential hazards that may be encountered during the investigation activities include exposure to contaminants; traffic/mobile equipment; process hazards; unstable ground; noise exposure; overhead and underground utilities; slips, trips, and falls; powered tools and equipment; working around heavy equipment; rolling and/or pinching objects; and exposure to weather conditions.

FIGURES

P:\0973 WHITEHEAD\TECHNICAL\CAD\FIGURE 1\0973-001_FIG1_F.DWG



SoundEarth Strategies
WWW.SOUNDEARTHINC.COM

DATE:	09/26/13
DRAWN BY:	JQC
CHECKED BY:	CGC
CAD FILE:	0973-001_FIG1

PROJECT NAME:	WHITEHEAD PROPERTY
PROJECT NUMBER:	0973-001-03
STREET ADDRESS:	730 SOUTH MYRTLE STREET
CITY, STATE:	SEATTLE, WASHINGTON

FIGURE 1
PROPERTY
LOCATION MAP

WWW.SOUNDEARTHINC.COM

11/6/2013

CASCADE COLUMBIA DISTRIBUTION
FOX AVENUE SITE
(6900)

B-16
PCP: ND

ASTs

FORMER GREAT WESTERN
INTERNATIONAL CHEMICAL
COMPANY (GWICC)

B-15
PCP: 2.3 µg/L

ASTs
DRUM
STORAGE

B-30
PCP: 37 µg/L

PCP: 16 µg/L
B-47
PCP: 5.7 µg/L

B-12

B-31
PCP: 71µg/L

B-49
PCP:
116µg/L

APPROXIMATE
FORMER STEAM DRY
KILNS AREA

MW-9
PCP: 3.0 µg/L

B-60
PCP: ND

PIPE SHOP

B-20A
PCP: ND

FOX AVENUE SOUTH

GP-7
PCP: ND @ 0-5 ft

MW-7
PCP: 3.4 µg/L

B10

B11

PRE-1985 VINTAGE
STORAGE SHED

FORMER
CORSON AVENUE

FORMER TYEE LUMBER &
MANUFACTURING COMPANY

APPROXIMATE
LOCATION OF FORMER
AUTOMOTIVE
REPAIR FACILITY

B-62
PCP: ND

MW-3
PCP: 3.2 µg/L

SEATTLE BOILER WORKS

B04

GP-8
ND @ 0-5 ft

GP-9

GP-10
PCP: 0.19 mg/kg @ 0-5 ft
ORPH: 7,850 mg/kg @
0-5 ft

GP-11
PCP: ND @ 0-5 ft

APPROXIMATE
LOCATION OF FORMER
AUTOMOTIVE
REPAIR FACILITY

B09

EI RENTON
NIGHT CLUB
(FORMER
GASOLINE STATION)
(7047)

GP-5
PCP: ND @ 0-5 ft

GP-6

GP-2
PCP: 8.9 mg/kg @ 10-13 ft
SS: 5,290 mg/kg @ 12-13 ft

B-18
PCP: ND

GP-1

B05

B06

APPROXIMATE
LOCATION OF FORMER
REFUSE BURNER

B08

VACANT OFFICE
BUILDING

GP-3
PCP: 7.1 mg/kg
@ 10-13 ft

B01

GP-4
PCP: 9.8 mg/kg
@ 10-13 ft

B02

B03

B07

DEPTH TO STORM DRAIN
= 6.57 FEET

DEPTH TO SANITARY SEWER
= 12.21 FEET

DEPTH TO SANITARY SEWER
= 11.07 FEET

GP-12

APPROXIMATE
LOCATION OF FORMER
DIP TANK

B-36
PCP: ND

B-38 PCP: 11,500 µg/L
PCP: 91 mg/kg

APPROXIMATE
LOCATION OF FORMER PCP UST

SOUTH MYRTLE STREET

DEPTH TO STORM DRAIN
= 7.37 FEET

DEPTH TO STORM DRAIN
= 5.43 FEET

7TH AVENUE SOUTH

SEATTLE IRON AND METAL CORPORATION
SORTING FACILITY

COMMERCIAL WELDING
(711)

CAFFE D'ARTE
ROASTING PLANT
(719)

SEA NATIVE
USA WASHINGTON
SEAFOOD PROCESSING

UNITED RENTALS
TRENCH SAFETY; UST SITE
(7135)

CENTURYLINK
UTILITY BUILDING
(7000)

EAST MARGINAL WAY SOUTH

N

LEGEND

- CATCH BASIN
- GP-1 — GEOPROBE LOCATIONS (FLOYD SNIDER 2013)
- MW-7 — MONITORING WELL, 1ST WATER BEARING ZONE
- PROPOSED DIRECT PUSH BORING
- PROPOSED MONITORING WELL
- PROPERTY BOUNDARY
- RAILROAD
- SS — SEWER LINE
- SV — STORMWATER LINE
- 9.8 mg/kg @ 10-13 ft / 11,500 µg/L — CONCENTRATION IN SOIL / CONCENTRATION IN GROUNDWATER (2007)
- mg/kg — MILLIGRAMS PER KILOGRAM
- µg/L — MICROGRAMS PER LITER
- ft — FEET
- AST — ABOVEGROUND STORAGE TANK
- ND — NOT DETECTED ABOVE LABORATORY REPORTING LIMIT
- PCP — PENTACHLOROPHENOL
- SS — STODDARD SOLVENT
- ORPH — OIL-RANGE PETROLEUM HYDROCARBONS
- UST — UNDERGROUND STORAGE TANK
- (6900) — ADDRESS NUMBER
- GROUNDWATER FLOW DIRECTION (FSI 2011)

P:\0973 WHITEHEAD\TECHNICAL\CAD\2013 PEL\0973-001_PP_F.DWG

SoundEarth Strategies
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DATE:	10/01/13
DRAWN BY:	JQC
CHECKED BY:	CGC
CAD FILE:	0973-001_PP

PROJECT NAME:	WHITEHEAD PROPERTY
PROJECT NUMBER:	0973-001-03
STREET ADDRESS:	730 SOUTH MYRTLE STREET
CITY, STATE:	SEATTLE, WASHINGTON

REGION:

0 30 60 120
APPROXIMATE SCALE IN FEET

FIGURE 2
PROPOSED EXPLORATION
LOCATION PLAN

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TABLES

SoundEarth Strategies

Table 1
Key Personnel and Responsibilities
Whitehead Tyee Property
730 South Myrtle Street
Seattle, Washington

Project Title	Name	Project Role	Organization	Mailing Address	Email Address	Phone
Regulatory Agency	Not Assigned	Regulatory project management. Reviews and approves all submittals to Ecology.	Ecology	3190 160th Avenue Southeast Bellevue, Washington 98008	TBD	TBD
Project Contact	Dean Whitehead	Project contact.	The Whitehead Company	P.O. Box 81144 Seattle, Washington	redwoodllc@aol.com	(206) 714-0953
Project Principal	Chris Carter	Reviews and oversees all project activities. Reviews all data and deliverables prior to submittal to project contact or Ecology.	SoundEarth	2811 Fairview Avenue South, Suite 2000 Seattle, Washington	chrisc@soundearthinc.com	(206) 306-1900
Project Manager	Brian Dixon	Overall project management, including SAP development, field oversight, document preparation and submittal, and project coordination.	SoundEarth	2811 Fairview Avenue South, Suite 2000 Seattle, Washington	bdixon@soundearthinc.com	(206) 306-1900
Project QA/QC Officer	Brian Dixon	Coordinates with laboratory to ensure that SAP requirements are followed and that laboratory quality assurance objectives are met.	SoundEarth	2811 Fairview Avenue South, Suite 2000 Seattle, Washington	bdixon@soundearthinc.com	(206) 306-1900
Field Coordinator	Chuck Cacek	Reports to the project manager. Ensures all project health and safety requirements are followed; coordinates and participates in the field sampling activities; coordinates sample deliveries to laboratory; coordinates sampling activities with site owner subcontractors; reports any deviations from project plans.	SoundEarth	2811 Fairview Avenue South, Suite 2000 Seattle, Washington	ccacek@soundearthinc.com	(206) 306-1900
Field Staff	Various licensed geologists and environmental professionals	Reports to field coordinator. Conducts sampling activities.	SoundEarth	2811 Fairview Avenue South, Suite 2000 Seattle, Washington		(206) 306-1900
Data Manager	Jenny Cheng	Ensures that analytical data is incorporated into site database with appropriate qualifiers following validation.	SoundEarth	2811 Fairview Avenue South, Suite 2000 Seattle, Washington	jcheng@soundearthinc.com	(206) 306-1900
Data Validation	Audrey Hackett	Coordinates with laboratory to ensure that the workplan requirements and laboratory QA/QC objectives are met.	SoundEarth	2811 Fairview Avenue South, Suite 2000 Seattle, Washington	ahackett@soundearthinc.com	(206) 306-1900
Laboratory Project Manager	Michael Erdahl	Provides analytical support and will be responsible for providing certified, precleaned sample containers and sample preservatives (as appropriate) and for ensuring that all chemical analyses meet the project quality specifications detailed in the Workplan.	Friedman & Bruya, Inc.	3012 16th Avenue West Seattle, Washington	merdahl@friedmanandbruya.com	(206) 285-8282
Private Utility Locator (Subcontractor)	Bravo Environmental	Under the oversight of SoundEarth, clears all boring locations for utilities prior to drilling.	Bravo Environmental	6437 South 144th Street Tukwila, Washington	kgarcia@bravonw.com	(425) 424-9000
Driller (Subcontractor)	Anisa Harnden	Conducts drilling activities using a full-size hollow-stem auger drill rig.	Environmental Services Network Northwest	19404 Woodinville-Snohomish Road Woodinville, Washington	anisa@esnnw.com	(425) 485-8908

NOTES:

Ecology = Washington State Department of Ecology

QA/QC = quality control/quality assurance

SoundEarth = SoundEarth Strategies, Inc.

SoundEarth Strategies

Draft

Table 2
Analytical Methods, Container, Preservation, and Holding Time Requirements
Whitehead Tyee Property
730 South Myrtle Street
Seattle, Washington

Analyte and Analytical Method	Size and Type of Container	Number of Containers	Preservation Requirements	Holding Time
Soil Samples				
Pentachlorophenol by EPA Method 8270D SIM	4-oz glass jar	1	4°C/-7°C at the laboratory	14 days
GRPH by Method NWTPH-Gx BTEX by EPA Method 8021B or 8260B	40-mL VOA	3	4°C/-7°C at the laboratory	48 hours/2 weeks
DRPH and ORPH by Method NWTPH-Dx	4-oz glass jar	1	4°C/-7°C at the laboratory	14 days
Water Samples				
Pentachlorophenol by EPA Method 8270D SIM	4-oz glass jar	1	4°C	7 days
GRPH by Method NWTPH-Gx BTEX by EPA Method 8021B	40-mL VOA vial	3	HCl/4°C	14 days
DRPH and ORPH by Method NWTPH-Dx	500-mL amber	1	4°C	7 days

NOTES:
°C = degrees Celsius
BTEX = benzene, toluene, ethylbenzene, and total xylenes
DRPH = diesel-range petroleum hydrocarbons
EPA = U.S. Environmental Protection Agency
GRPH = gasoline-range petroleum hydrocarbons
HCl = hydrochloric acid
mL = milliliter
NWTPH = Northwest Total Petroleum Hydrocarbon
ORPH = oil-range petroleum hydrocarbons
oz = ounce
VOA = volatile organic analysis

SoundEarth Strategies

Table 3
Quantitative Goals of Data Quality Objectives
Whitehead Tyee Property
730 South Myrtle Street
Seattle, Washington

Analyte	Analytical Method	Precision[1]	Accuracy[2]			Completeness (%)[3]
		RPD (%)	Surrogate (% Recovery)	MS (% Recovery)	LCS (% Recovery)	
Soil						
Pentachlorophenol	8270D SIM	20	--	31-121	32-130	95
GRPH	NWTPH-Gx	20	50-150	50-150	50-150	95
Benzene	EPA Method 8021B	20	50-150	50-150	50-150	95
Toluene	EPA Method 8021B	20	50-150	50-150	50-150	95
Ethylbenzene	EPA Method 8021B	20	50-150	50-150	50-150	95
Total Xylenes	EPA Method 8021B	20	50-150	50-150	50-150	95
DRPH	NWTPH-Dx	20	50-150	50-150	50-150	95
ORPH	NWTPH-Dx	20	50-150	50-150	50-150	95
Water						
Pentachlorophenol	8270D SIM	20	--	31-121	32-130	95
GRPH	NWTPH-Gx	20	50-150	50-150	50-150	95
Benzene	EPA Method 8021B	20	50-150	50-150	50-150	95
Toluene	EPA Method 8021B	20	50-150	50-150	50-150	95
Ethylbenzene	EPA Method 8021B	20	50-150	50-150	50-150	95
Total Xylenes	EPA Method 8021B	20	50-150	50-150	50-150	95
DRPH	NWTPH-Dx	20	50-150	50-150	50-150	95
ORPH	NWTPH-Dx	20	50-150	50-150	50-150	95

NOTES:

[1]Precision measured in RPD between sample and lab duplicate, LCS and LCS duplicate, and/or MS and MS duplicate.

[2]Laboratory to follow in accordance with the EPA SW-846 and Ecology methods and procedures for inorganic and organic chemical analyses. Method Blanks will be analyzed for each analyte in addition to the quantitative data quality objectives listed in this table.

[3]Refers to the minimum acceptable percentages of samples received at the laboratory in good condition that are acceptable for analysis.

DRPH = diesel-range petroleum hydrocarbons
Ecology = Washington State Department of Ecology
EPA = U.S. Environmental Protection Agency
GRPH = gasoline-range petroleum hydrocarbons
LCS = laboratory control sample
MS = matrix spike
NWTPH = Northwest Total Petroleum Hydrocarbon Method
ORPH = oil-range petroleum hydrocarbons
RPD = relative percent difference

ATTACHMENT A
FIELD FORMS

SoundEarth Strategies
2811 Fairview Avenue East, Suite 2000
Seattle, Washington 98102
P: (206) 306-1900 F: (206) 306-1907

FIELD REPORT

Client & Site Name/Number:		SoundEarth Project Number:	Date:
Site Address:		Purpose of Visit/Task #:	Field Report Prepared by:
Temp/Weather:	Permit Required to Work:	Time of Arrival/Departure (2400): ____ onsite to ____ offsite	Personnel Onsite:

Attachments:

SoundEarth Strategies

Project:
Project Number:
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG

Site Address:

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0									
5									
10									
15									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

Project:
Project Number:
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG

Site Address:

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15									
20									
25									
30									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

Page:

SoundEarth Strategies

GROUNDWATER PURGE AND SAMPLE FORM
LOW FLOW PUMP

General Info

Client: _____ Project #: _____

Site Name/ #: _____ Field/Sampling Personnel: _____ **Well ID Number:** _____

Well Details

Total Depth (TD)	Depth to Water (DTW) (Immediately Prior to Purging)	Water Column (WC) =TD-DTW	Casing Diameter / Volume Conversion Factor (VC)					Casing Volume =WC x VC
			0.75"	1"	2"	4"	6"	
Feet BTOC	Feet BTOC	Feet BTOC	0.023	0.041	0.16	0.65	1.44	gallons

Screened Interval: _____ to _____ Feet bgs

Screen Submerged? ☐ NO ⟹ Place tubing intake 2 to 3 feet below depth to water
☐ YES ⟹ Place tubing intake at approximate center of screen

Equipment

Pump Method: ☐ Peristaltic ☐ Other: _____ Owner/ID #: _____ **Water Quality Meter** Brand/Model: _____ Owner/ID #: _____

Water Level Instrument: ☐ WL Meter ☐ Bubbler ☐ Interface ☐ Other: _____ Owner/ID #: _____

Sampling

Depth of Tubing Intake: _____ Feet BTOC Time Start Purge: _____

Time (3-5 min intervals)	Water Level (feet) drawdown <0.33 feet	**Purge Rate** (L/min) 0.1 – 0.5	**pH**[1] *± 0.1*	**Specific Conductivity**[1] UNITS: _____ *± 3%*	**Turbidity**[1] (NTU) *If ≥10, ±10% if <10, stabilized*	**Dissolved Oxygen**[1] (mg/L) *If ≥1.00, ± 10% if ≤1.00, ± 0.2*	Temperature (ºC)	ORP (mV)
Minimum # of Readings								

Sample Date: _____ **Sample Time:** _____ **Field Duplicate Sample Time:** _____ **Time Sampling Ended:** _____

Sampling Comments: _____

Analytical

Sample Number/ID	Container Type	Preservative	Field Filtered?			Analysis Request
			No	0.45	0.10	
			No	0.45	0.10	
			No	0.45	0.10	
			No	0.45	0.10	
			No	0.45	0.10	
			No	0.45	0.10	

Purge Water

Sheen? ☐ NO ☐ YES **Odor?** ☐ NO ☐ YES ⟹ Describe: _____ Color (describe): _____

Total Discharged (1Gal = 3.88 liter): _____ gallons Disposal Method: ☐ Drummed ☐ Remediation System ☐ Other: _____

Well Condition

Well/Security Devices in good condition (i.e.: Monument, Bolts, Seals, J-cap, Lock)? ☐ YES ☐ NO ⟹ Describe: _____

Water in Monument? ☐ NO ☐ YES ⟹ Describe: _____

Additional Well Condition Comments or Explanation of any Access Issues: _____

[1]At minimum, pH, specific conductivity, and dissolved oxygen and/or turbidity must stabilize within the limits (indicated in *italics*) for three successive readings prior to sampling.

SoundEarth Strategies

GROUNDWATER PURGE AND SAMPLE FORM
LOW FLOW PUMP – *Continued*

General Info

Client: ______________ Project #: ______________

Site Name/ #: ______________ Field/Sampling Personnel: ______________ **Well ID Number:** ______________

See Page 1 for well construction and purge water information

Sample Date: ______________ **Sample Time:** ______________ **Field Duplicate Sample Time:** ______________ **Time Sampling Ended:** ______________

Sampling *(Continued from Page 1)*

Time (3-5 min intervals)	Water Level (feet) drawdown <0.33 feet	**Purge Rate** (L/min) 0.1 – 0.5	pH[1] *± 0.1*	**Specific Conductivity[1]** UNITS: ______ *± 3%*	**Turbidity[1]** (NTU) *If ≥10, ±10%* *if <10, stabilized*	**Dissolved Oxygen[1]** (mg/L) *If ≥1.00, ± 10%* *if ≤1.00, ± 0.2*	Temperature (ºC)	ORP (mV)

Additional Sampling Comments: ____

[1]At minimum, pH, specific conductivity, and dissolved oxygen and/or turbidity must stabilize within the limits (indicated in *italics*) for three successive readings prior to sampling.

FRIEDMAN & BRUYA, INC.	
Client:	
Sample ID:	
Date Sampled:	Time:
Project:	
Analysis Request:	
Preservative:	

SAMPLE CHAIN OF CUSTODY

Send Report to _____

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, WA 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS *(signature)*	
PROJECT NAME/NO.	PO #
REMARKS	

Page # _____ of _____

TURNAROUND TIME
Standard (2 Weeks)
RUSH_____
Rush charges authorized by:
_____

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED								
								DRPH & ORPH by NWTPH-Dx	GRPH by NWTPH-Gx	VOCs by EPA 8260C	RCRA 8 Metals by EPA 200.8 & 1631E					Notes

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:				
Received by:				
Relinquished by:				
Received by:				

FORMS\COC\COC.DOC

SoundEarth Strategies

DRUM INVENTORY SHEET

Site Name: _____

Site Address: _____

Reason for Site Visit: _____

Date of Inventory: _____

Field Personnel: _____

_____

Drum #[1] (eg. 001)	Content Information	Date(s) Accumulated	Fullness (%)	Sample Analysis Performed?	Composite Soil Sample (RCRA 8 metals)[2] (Y/N)	Saturated Soil[3] (Y/N)	Drum Labeled (Y/N)	Drum Location Photo (Y/N)	Drum Access[4]
Eg. 001	Soil, B05, 5'-15'	2/3/10	100%	Gx, BTEX	Y	N	Y	Y	Combo lock #xxxx
Eg. 002	Purge Water	2/3/10	100%	Gx, BTEX	N/A	N/A	Y	Y	Combo lock #xxxx

NOTES:

[1]Drum #— Write the Drum # on the drum lid, as well as on the non-hazardous or hazardous waste labels.

[2]Composite Soil Sample—For all sites, collect one composite soil sample from each drum onsite. Place sample on hold at the laboratory, for future RCRA 8 metals analysis. Collect sample in one-4 ounce jar.

[3]Saturated soil—Add bentonite chips or kitty litter to the water that has accumulated or may accumulate inside the drum. Bentonite chips available in the garage.

[4]Drum access for pickup—(eg. fenced, owner notification, lock combination?)

HAZARDOUS WASTE

ACCUMULATION
START DATE _____

CONTENTS _____

HANDLE WITH CARE!

CONTAINS HAZARDOUS OR TOXIC WASTES

NON HAZARDOUS WASTE

GENERATOR INFORMATION (Optional)

SHIPPER _____

ADDRESS _____

CITY, STATE, ZIP _____

CONTENTS _____

_____