SoundEarth Strategies, Inc.
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GROUNDWATER PERFORMANCE MONITORING PLAN

Property:
Plastics Sales and Service Site
6870 Woodlawn Avenue Northeast
Seattle, Washington
Agreed Order No. DE 7084

Prepared for:
The Lutheran Retirement Home of Greater Seattle (d/b/a The Hearthstone)
6720 East Green Lake Way North
Seattle, Washington

Report Date:
March 4, 2020

Groundwater Performance Monitoring Plan

Prepared for:

The Lutheran Retirement Home of Greater Seattle (d/b/a The Hearthstone)
6720 East Green Lake Way North
Seattle, Washington 98103

Plastic Sales and Service Site
6870 Woodlawn Avenue Northeast
Seattle, Washington 98103

Project No.: 0651-002-02

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March 4, 2020

SoundEarth Strategies

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ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
Agreed Order	Agreed Order No. DE 7084
the alley	portions of the western alley
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
CAP	Cleanup Action Plan, prepared by Washington State Department of Ecology
cis-1,2-DCE	cis-1,2-dichloroethene
COC	contaminant of concern
CSM	conceptual site model
CVOC	chlorinated volatile organic compound
DQO	data quality objective
DRPH	diesel-range petroleum hydrocarbons
the Dry Cleaner Building Property	6870 Woodlawn Avenue Northeast in Seattle, Washington
Ecology	Washington State Department of Ecology
EPA	US Environmental Protection Agency
ERD	Enhanced Reductive Dichlorination
ERH	Electrical Resistance Heating
EVO	emulsified vegetable oil
Farallon	Farallon Consulting, Inc.
FC	field coordinator
GPMP	Groundwater Performance Monitoring Plan
GRPH	gasoline-range petroleum hydrocarbons
ID	identifier
mg/kg	milligrams per kilogram

ACRONYMS AND ABBREVIATIONS (CONTINUED)

mg/L	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
MTCA	Washington State Model Toxics Control Act
ORPH	oil-range petroleum hydrocarbons
PCE	tetrachloroethene
POC	points of compliance
PQL	practical quantitation limit
QC	quality control
QA/QC	quality assurance/quality control
RCRA	Resource Conservation Recovery Act
RIFS Addendum	Draft Final Revised Remedial Investigation/Feasibility Addendum, prepared by SoundEarth Strategies, Inc.
RIFS Report	Draft Final Remedial Investigation and Feasibility Study Report, prepared by Farallon Consulting, LLC
ROW	right-of-way
RPD	relative percent difference
the Site	the extent of contamination caused by the releases of hazardous substances at the property located at 6870 Woodlawn Avenue Northeast in Seattle, Washington
SoundEarth	SoundEarth Strategies, Inc.
TCE	trichloroethene
TCLP	Toxicity Characteristic Leaching Procedure
trans-1,2-DCE	trans-1,2-dichloroethene
UST	underground storage tank
WAC	Washington Administrative Code

1.0 INTRODUCTION

SoundEarth Strategies, Inc. (SoundEarth) has prepared this Groundwater Performance Monitoring Plan (GPMP) for the Plastic Sales and Service Site (the Site), defined below, on behalf of The Lutheran Retirement Home of Greater Seattle (d/b/a The Hearthstone), the owner of the property located at 6870 Woodlawn Avenue Northeast in Seattle, Washington (the Dry Cleaner Building Property; Figure 1).

The Dry Cleaner Building Property comprises a portion of the Site. The Site is defined in the Washington State Department of Ecology (Ecology) Agreed Order No. DE 7084 (Agreed Order), dated September 14, 2009, as the extent of contamination caused by the releases of hazardous substances at the property located at the Dry Cleaner Building Property. The Site includes the Dry Cleaner Building Property; the property adjoining it to the west, located at 6850 Woodlawn Avenue Northeast (the Hearthstone Property); the property adjoining it to the north, located at 6869 Woodlawn Avenue Northeast (north-adjoining property); and portions of the western alley (the alley), Woodlawn Avenue Northeast, and 4th Avenue Northeast rights-of-way (ROWs); and is collectively referred to as "the Site."

To meet the requirements of the Agreed Order, Plastic Sales and Services prepared the *Site Remedial Investigation and Feasibility Study Report* (the RIFS Report; Farallon 2013) and the Hearthstone prepared the *Draft Final Revised Remedial Investigation/Feasibility Addendum* (RIFS Addendum; SoundEarth 2016a). The RIFS Report and RIFS Addendum presented remedial investigation data and evaluations that defined the nature and extent of contamination at the Site.

The RIFS Report and RIFS Addendum then presented a feasibility study evaluation of remedial alternatives for cleanup actions and proposed preferred cleanup actions for the Site. A Cleanup Action Plan (CAP) was developed using information presented in the RIFS Report and RIFS Addendum for the Site (Ecology 2016). The Lutheran Retirement Home of Greater Seattle (d/b/a The Hearthstone) and Ecology entered into a Consent Decree on June 3, 2016, that describes the cleanup action selected by Ecology for the Site. Redevelopment construction was expected to begin at the Site in 2018 and is currently in progress. The selected remedy for the Site is presented in the CAP (Ecology 2016) and is expected to be conducted in conjunction with redevelopment of the Site.

This GPMP for the Site has been prepared as required by Washington State Model Toxics Control Act (MTCA) Regulation, Title 173, Chapter 340, Sections 410 and 820 of the Washington Administrative Code (WAC 173-340-410 through 820). The GPMP describes protection monitoring, performance monitoring, and confirmational monitoring methods to be implemented with the remedy to comply with the requirements of WAC 173-340-410. This GPMP also includes procedures for the acquisition of groundwater performance and confirmational samples, sample analyses, sample handling, documentation, and field and laboratory quality control at the Site. The GPMP includes description of contingency actions to be taken if monitoring indicates cleanup standards have not been attained following implementation of the remedy.

The following contaminants of concern (COCs) were detected at concentrations above applicable cleanup levels at the Site: chlorinated volatile organic compounds (CVOCs)—specifically, tetrachloroethene (PCE) and its degradation compounds trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride—in groundwater.

1.1 PURPOSE AND OBJECTIVES

The purpose of the GPMP is to describe the sample collection, handling, and analysis procedures to be implemented during the cleanup action in accordance with WAC 173-340-410 and 173-340-820 of MTCA. This GPMP identifies project schedule (Table 1), and project organization and responsibilities (Table 2), and specific sampling and analysis protocols (Table 3). It also provides detailed information regarding sampling and data quality objectives, sample location and frequency, equipment, and procedures to be used during the performance groundwater monitoring; sample handling and analysis; procedures for management of waste; quality assurance protocols for field activities and laboratory analysis; and reporting requirements (Tables 3 through 5).

1.2 GROUNDWATER PERFORMANCE MONITORING PLAN ORGANIZATION

The GPMP is organized into the following sections:

- **Section 1.0, Introduction.** This section describes the purpose of the GPMP and provides a description of the Dry Cleaner Building Property features and location and a brief summary of the current and historical uses of the Dry Cleaner Building Property.
- **Section 2.0, Site Remedial Actions.** This section presents a summary of the Site remedial actions, including removal of existing underground storage tanks (USTs), thermal treatment of soil, mass excavation, and the groundwater injection program.
- **Section 3.0, Current Conceptual Site Model.** This section describes the current conceptual Site model including current groundwater conditions at the Plastic Sales and Service cleanup Site.
- **Section 4.0, Cleanup Levels and Points of Compliance**. This section presents Site cleanup and remediation levels, and points of compliance (POCs) or locations where the cleanup levels shall be achieved for impacted media.
- **Section 5.0, Project Organization and Management.** This section presents the project team, including field personnel and management. Examples of field sampling forms are included as Appendix A.
- **Section 6.0, Performance Monitoring Plan.** This section presents the performance monitoring and confirmational monitoring programs for groundwater beneath the Site, including applicable cleanup levels and performance monitoring locations.
- **Section 7.0, Sampling and Analysis Plan.** This section presents the groundwater sampling frequency and locations, sample identification, sample procedures for groundwater sample collection, sample handling procedures, analytical testing, and management of investigation-derived waste.
- **Section 8.0, 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 9.0, Data Collection.** This section describes the type, transfer, inventory management, and validation procedures of the data that will be gathered during the cleanup action.
- **Section 10.0, Quality Control Procedures.** This section provides details regarding the quality control (QC) procedures for both field activities and laboratory analysis.
- **Section 11.0, Corrective Actions.** This section identifies the approaches that will be used to correct any protocols that may compromise the quality of the data.

- **Section 12.0, Documentation and Records.** This section outlines the documentation that will be prepared during the performance monitoring. It includes a discussion of document management, waste disposal tracking, and reports.
- **Section 13.0, Limitations.** This section describes the document limitations.
- **Section 14.0, References.** This section includes the documents that were cited for the within this GPMP.

2.0 SITE REMEDIAL ACTIONS

Remedial actions completed at the Site included the removal of underground storage tanks, Electrical Resistance Heating (ERH) of groundwater containing CVOCs, mass excavation and disposal of soil containing CVOCs in conjunction with the redevelopment of the former Dry Cleaner Building Property, and treatment of CVOCs in groundwater at the Site utilizing Enhanced Reductive Dechlorination (ERD). A summary of the remediation activities is presented below. Cleanup of the Site has occurred in conjunction with redevelopment of the former Dry Cleaner Property. The new development, called Cove East, includes a 22-unit independent living retirement building, and extension of The Hearthstone on Green Lake Way, including 29 underground parking spaces. Engineering controls for the future redevelopment include: a sub-slab drainage system, a vapor barrier, and a passive ventilation system.

2.1 UST REMOVALS

All known USTs encountered on the Dry Cleaner Building Property and adjacent Woodlawn Avenue Northeast ROW were decommissioned and UST site assessments were conducted under the oversight of a Washington State-certified UST site assessor in accordance with Ecology's *Guidance for Site Checks and Site Assessment for Underground Storage Tanks* (Ecology 1991), Ecology's *Guidance for Remediation of Petroleum Contaminated Sites* (Ecology 2010), and the Underground Storage Tank Regulations (WAC 173-360).

Two solvent USTs were formerly located in the ROW (Figure 2), where detectable concentrations of CVOCs above applicable MTCA Method A and B soil cleanup were present in the soil. The two USTs had a capacity of 1,500 and 2,000 gallons. The USTs were decommissioned and removed in September of 2016. Performance samples were collected from the limits of the UST excavation and analyzed for CVOCs and petroleum hydrocarbons. Analytical results showed that concentrations of PCE ranged from less than 0.025 milligrams per kilogram (mg/kg) to 120 mg/kg and gasoline-range petroleum hydrocarbons (GRPH) and benzene, toluene, ethylene, and total xylene (BTEX) concentrations ranged from less than 0.020 mg/kg benzene to 48 mg/kg GRPH; samples were collected at depths ranging from 8 to 14 feet below ground surface (bgs). After removing the USTs and collecting performance soil samples the excavation was backfilled in preparation for ERH soil treatment.

A single heating oil UST was formerly located in the western portion of the Dry Cleaner Building (Figure 2). The UST was decommissioned and removed in September of 2016. Performance soil samples were collected at the limits of the UST excavation and analyzed for petroleum hydrocarbons. Analytical results identified concentrations diesel- and oil-range petroleum hydrocarbons (DRPH and ORPH) ranging from less than 30 mg/kg benzene to 4,900 mg/kg DRPH. Performance samples were collected at depth 6 feet bgs. After removing the UST and collecting performance soil samples the excavation was backfilled in preparation for ERH.

2.2 THERMAL TREATMENT OF SOIL BY ERH

The thermal treatment system utilizing ERH technology was installed at the Site to treat saturated soil in the shallow water-bearing zone contaminated with CVOCs. The goal of the thermal treatment system was to reduce the concentration of PCE in saturated soil to less than 14 mg/kg and less than the toxic characteristics leach procedure (TCLP) threshold of 0.7 milligrams per liter (mg/L). The system operated from October 2016 through January 2017. The treatment system encompassed approximately 3,140 square feet and consisted of 19 electrodes and vapor extraction points and temperature probes installed in treatment Areas 1 through 3, as designated on Figure 3. Once installed, the treatment areas of the system encompassed approximately 3,140 square feet and treated to a depth of 16 feet bgs, or approximately 1,700 cubic yards of soil. ERH treatment targeted shallow water-bearing zone groundwater to remove contamination from the groundwater and the saturated soil. The detailed discussion of the design and installation of the thermal treatment system is presented the *Engineering Design Report* (EDR; SoundEarth 2016b).

The thermal treatment system operated from early October 2018 through early January 2019. During its tenure the treatment system removed approximately 7,200 pounds of solvent. The electrodes and temperature probes were decommissioned between early September and late October of 2018, during mass excavation of the former Dry Cleaner Property in accordance a variance issued by Ecology on August 7, 2018. The Ecology issued variance states a mass excavation at the Site will remove the entire structure of each well (i.e., electrodes and temperature probes).

2.3 MASS EXCAVATION

Prior to the start of mass excavation, post thermal treatment direct-push borings were advanced at the Dry Cleaner Building Property after the average temperature of the soil in the treatment zone was less the 30 degrees centigrade. A total of 27 direct-push borings were advanced between April 17 and 19, 2018, with soil samples collected at depths ranging from 2.5 to 16 feet bgs. Analytical results for soil samples showed that all but one soil sample contained concentrations of PCE less than 14 mg/kg and/or were reported below laboratory reporting limits. A detailed discussion of the analytical results in presented in the *Request for Contained-In-Determination Plastic Sales and Services Site* (SoundEarth 2018).

The mass excavation occurred at the former Dry Cleaner Building Property between September and late October of 2018. The limits of the mass excavation are shown on Figure 4. Based on the results from the post thermal treatment soil sampling, Ecology did not require disposal of approximately 7,200 tons of F002 DW contaminated soil at a Resource Conservation and Recovery Act (RCRA) permitted dangerous waste treatment, storage, and disposal facility, for soil containing less the 14 mg/kg PCE or less than the TCLP threshold of 0.7 mg/L PCE. Another 230 tons of F002 contaminated soil required disposal as dangerous waste at RCRA permitted dangerous waste treatment, storage, and disposal facility.

2.4 GROUNDWATER TREATMENT PROGRAM USING ERD

Following the completion of thermal treatment and the mass excavation of contaminated soil, residual concentrations of CVOCs in groundwater exceeding the applicable cleanup levels remained beneath the Site. The residual concentrations of CVOCs were treated using ERD technology to bring the concentrations of CVOCs to below applicable MTCA cleanup levels. The implementation of ERD involved the injection of emulsified vegetable oil (EVO) into a network of injection wells installed in the deep and shallow water-bearing zones at the Site. Thirty injection wells were installed on the former Dry Cleaner Building Property,

34 injection wells were installed in the Woodlawn Avenue Northeast and 4th Avenue Northeast ROWs, and 4 injection wells were installed in the alley (Figure 5). Of those wells, 45 injection wells were installed in the shallow water-bearing zone and 23 injection wells were installed in the deep water-bearing zone. Injection wells installed in the shallow water-bearing zone were installed to 15 feet bgs and screened between 5 and 15 feet bgs. Injection wells installed in the deep water-bearing zone were installed to 45 feet bgs and screened between 20 and 45 feet bgs. The injections wells installed on the former Dry Cleaner Building Property were installed after the excavation, prior to pouring the slab for the underground parking garage for the new development. EVO was injected into the ROWs injection well network in March of 2019. EVO was injected into the former Dry Cleaner Building Property injection well network in June 2019. Approximately 7,400 gallons of EVO was injected deep water-bearing zone injection wells and 4,750 gallons of EVO was injected to the shallow water-bearing zone injection wells. A detailed discussion of the ERD treatment program is presented in the *Engineering Design Report* (SoundEarth 2016b).

3.0 CURRENT CONCEPTUAL SITE MODEL

As a result of construction at the Dry Cleaner Building Property and the cleanup actions performed at the Site, the Conceptual Site Model (CSM) has been updated. This updated CSM reflects the baseline conditions in the groundwater prior to completing the remedial action at the Site. The CSM will be updated periodically using data from performance groundwater events.

3.1 GROUNDWATER FLOW

Groundwater elevations in the shallow and deep water-bearing zones were measured on May 7, 2019, for the entire monitoring well network. Groundwater elevation contours for the shallow water-bearing zone shows that to the south of Woodlawn Avenue ROW groundwater flowed east and west toward the former Dry Cleaner Building Property with groundwater flow gradients ranging from approximately 0.0122 to 0.0286 feet drop per feet flow. In the Woodlawn Avenue, ROW the shallow water-bearing zone groundwater flows northeast to northwest with an approximate gradient of 0.011 (Figure 6). The observed groundwater flow direction in the shallow water-bearing zone toward the Properties is interpreted as a function of the slab-drainage systems installed beneath the rat slab of the parking garages acting as a single large sump creating a localized cone of depression in the shallow water-bearing zone. SoundEarth presents a detailed discussion for the design of under-slab drainage system beneath the Property in the *Remedial Investigate/Feasibility Study Addendum* prepared by SoundEarth and dated March 9, 2016.

Groundwater elevation contours for the deep water-bearing zone show groundwater flows to the northeast across the Site with an approximate gradient of 0.0217 (Figure 7). The observed groundwater flow direction in the deep water-bearing zone is similar to the groundwater flow direction observed for the deep water-bearing zone from previous groundwater monitoring and sampling events.

3.2 EXTENT OF THE SHALLOW AND DEEP GROUNDWATER PLUMES

3.2.1 Shallow Water-Bearing Zone

Analytical results from groundwater samples collected from shallow water-bearing zone monitoring wells show the PCE plume extends downgradient from the Dry Cleaner Building Property to the north across the Woodlawn Avenue ROW (Table 6; Figure 6). Based on available data and professional judgement, the leading edge of the plume prior to cleanup actions, as

defined by concentrations of PCE less than 5 micrograms per liter (µg/L), was arbitrarily located on the north side of the Woodlawn Avenue ROW (Figure 7).

3.2.2 Deep Water-Bearing Zone

Analytical results from groundwater samples collected from deep water-bearing zone monitoring wells show the PCE plume extends downgradient from the Dry Cleaner Building Property across the Woodlawn Avenue ROW (Table 6; Figure 8). Based on available data and professional judgement, the leading edge of the plume prior to cleanup actions, as defined by concentrations of PCE less than 5 µg/L, was arbitrarily located beneath 4th Avenue Northeast ROW and the north-adjacent property (Figure 9).

3.3 CONCEPTUAL SITE MODEL SUMMARY

The current CSM for the Site indicates that contaminated groundwater plumes in both the shallow and deep water-bearing zones extend to the north side of Woodlawn Avenue ROW. Groundwater conditions prior to treating the shallow and deep water-bearing zones indicated that the groundwater chemistry at the time were not conducive to the degradation of CVOCs. Prior to ERD treatment, SoundEarth analyzed select groundwater samples collected from both the shallow and deep water-bearing zone monitoring well networks for natural attenuation parameters, the parameters from both laboratory analysis and field measurements at the time of sampling (Tables 7 through 10). The results for natural attenuation parameters were compared to the screening criteria of anaerobic biodegradation processes as presented in the *Technical Protocols for Evaluating Natural Attenuation of Chlorinated Solvents in Groundwater*, prepared by the US Environmental Protection Agency (EPA) and dated September 1998. Results from the screening analysis indicated that aerobic conditions are currently present in the shallow and deep water-bearing zones; these conditions are not conducive to intrinsic bioremediation of chlorinated solvents. Anaerobic conditions are present in groundwater under the following conditions:

- Dissolved oxygen concentrations greater than 1 mg/L
- Oxidation-reduction potentials greater than 50 millivolts
- Ferrous iron concentrations less than 1 mg/L
- Sulfate concentrations greater than 50 mg/L
- The absence of ethane, ethene, and methane
- Total organic carbon concentrations less than 20 mg/L
- The absence of volatile organic fatty acid

With the implementation of ERD treatment in both the shallow and deep water-bearing zones, natural attenuation parameters will begin the reflect anaerobic conditions in the groundwater, which will lead to the degradation of PCE and its degradation products. Additionally, reducing the mass of CVOCs in source area through thermal treatment and excavation of soil containing CVOCs will have reduced the mass of CVOCs leaching into the water-bearing zones and should aid in expediting a reduction in the concentrations and reduce the footprints of the CVOC plumes in both water-bearing zones.

4.0 CLEANUP LEVELS AND POINTS OF COMPLIANCE

4.1 CLEANUP LEVELS

Cleanup standards have been established for the Site, including both cleanup levels and POCs for groundwater, the media of concern. Since PCE, TCE, cis-1,2-DCE, trans-1,2-dichloroethene (trans-1,2-DCE), and vinyl chloride contamination defines the extent of cleanup at the Site, only cleanup standards for these COCs are presented in this section. Cleanup levels for groundwater are as follows.

4.1.1 Groundwater

- PCE—5 µg/L
- TCE—5 µg/L
- cis-1,2-DCE—80 µg/L
- trans-1,2-DCE—160 µg/L
- Vinyl chloride—0.2 µg/L

4.2 POINTS OF COMPLIANCE

POCs (i.e., locations where the cleanup levels shall be achieved) have been established for groundwater throughout the Site.

4.2.1 Groundwater Point of Compliance

The POC for the groundwater cleanup level is based on the ingestion exposure pathway. The MTCA standard POC for ingestion is throughout the Site from the uppermost level of the saturated zone extending vertically to the lowermost depth which could potentially be affected by the Site (WAC 173-340-720(8)(b). For the Site, Ecology has approved a conditional point of compliance for groundwater at the Site. The conditional point of compliance will be located on the north side of Woodlawn Avenue East and will be defined by the monitoring well network as discussed in Section 6.0, Compliance Monitoring Plan (Figure 5).

5.0 PROJECT ORGANIZATION AND MANAGEMENT

This section describes the overall project management strategy for implementing the cleanup action.

To ensure efficient decision-making for field sampling and laboratory analysis, key data collection decisions, decision criteria, process for decision making, quality assurance and quality control (QA/QC) procedures, and responsibilities are described below and detailed in Table 2.

These decisions and communication plans will be followed by field personnel under the direction of the field coordinator (FC) and task manager. Site quality control to ensure proper communication and adherence to this GPMP is discussed below in Section 10.0.

The groundwater performance monitoring activities are being conducted by SoundEarth on behalf of The Lutheran Retirement Home of Greater Seattle (d/b/a The Hearthstone). Ecology is providing regulatory guidance of Site activities. The following key personnel have been identified for the project. A summary of key personnel roles and responsibilities is provided in Table 2.

Regulatory Agency. Ecology is the lead regulatory agency for the Site. Ecology's Site Manager for the Project is:

Ms. Sunny Becker
Washington State Department of Ecology
3190 160th Avenue Southeast
Bellevue, Washington 98008
425-649-7187
hlin461@ecy.wa.gov

Project Contact. SoundEarth has been contracted by The Lutheran Retirement Home of Greater Seattle (d/b/a The Hearthstone) to plan and implement the groundwater monitoring program for the Site. The Lutheran Retirement Home of Greater Seattle (d/b/a The Hearthstone) will serve as the Remediation Manager for the Project. The Project Contact for The Lutheran Retirement Home of Greater Seattle (d/b/a The Hearthstone) is:

The Lutheran Retirement Home of Greater Seattle
c/o Mr. Elliott Westerman
Chief Financial Officer
6720 East Green Lake Way North
Seattle, Washington 98103
206-517-2212
ewesterman@hearthstone.org

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. Thomas Cammarata, LG, LHG
SoundEarth Strategies, Inc.
2811 Fairview Avenue East, Suite 2000
Seattle, Washington 98102
206-306-1900
Fax: 206-306-1907
tcammarata@soundearthinc.com

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

Mr. Logan Schumacher, LG
SoundEarth Strategies, Inc.
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206-306-1900
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lschumacher@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 GPMP. Friedman & Bruya, Inc. of Seattle, Washington, has been contracted to perform the chemical and physical analyses for performance samples collected during the cleanup action. 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 GPMP 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. Logan Schumacher, LG
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lschumacher@soundearthinc.com

Field Coordinator. The 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 field staff follows the GPMP and adheres to standardized methods for sample acceptability. The FC will ensure that field staff maintain records of field sampling events using the forms included as Appendix A of this GPMP. The FC will be responsible for proper completion and storage of field forms. The FC for SoundEarth is:

Mr. Logan Schumacher, LG
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Seattle, Washington 98102
206-306-1900
Fax: 206-306-1907
lschumacher@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 the laboratory, and report

any deviations from project plans as they relate to the cleanup action objectives as presented in the GPMP. Major deviations from the GPMP, 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.

6.0 PERFORMANCE MONITORING PLAN

This section describes the performance monitoring activities that will be performed at the Site. Performance monitoring activities identified in this section will fulfill the requirements of ongoing monitoring in accordance with MTCA (WAC 173-340-410). The schedule for performance monitoring is presented in Table 1.

6.1 PERFORMANCE MONITORING

Performance monitoring tasks are summarized below and are described in greater detail in the Sampling and Analysis Plan presented in Section 7.0. Performance monitoring examines the effectiveness of the soil removal and groundwater treatment programs (i.e., ERD) previously conducted at the Site. Performance groundwater samples will be collected from the Engineering Design Report (SoundEarth 2016b) monitoring well network that includes existing monitoring wells, select injections wells from Transect E and Transect D, and any additional wells installed downgradient of Transect E. Samples will be submitted for laboratory analyses of the COCs. Performance monitoring will be conducted until concentrations of COCs in groundwater beneath the Site have met the cleanup standards.

6.2 COMPLIANCE WITH GROUNDWATER CLEANUP STANDARDS

Compliance with cleanup standards for COCs in groundwater beneath the Site will be evaluated based on ongoing statistical trend analysis of the groundwater monitoring results for the Site. Once the statistical trend analyses indicate that concentrations of COCs in the groundwater beneath the Site are declining, based on groundwater analytical results from eight quarterly groundwater monitoring events, a restoration time frame for the COCs in the groundwater beneath the Site will be estimated. The restoration time frame refers to the period of time needed for the concentration of a COC to achieve the required cleanup level based on the estimated decay rate. Quarterly groundwater monitoring will begin two quarters after completion of the final implementation of the remedy as described in the CAP. The restoration time frame will be presented as number of years to achieve the restoration time since the second quarter after the final implementation of the remedy as described in the CAP. To account for any uncertainty in the calculated decay rate, and subsequently the estimated restoration time, a confidence level of 85 percent will be established for the decay rate. This means that 85 percent of the time the true rate of decay will be equal to or greater than the calculated decay rate and there is a high level of certainty in the estimated restoration time. The uncertainty analysis is based on Ecology's *Guidance on Remediation of Petroleum-Contaminated Ground Water by Natural Attenuation* (2005). After compliance with cleanup standards has been achieved for four consecutive quarterly groundwater monitoring events and once Ecology has provided written approval, decommissioning of the groundwater monitoring well network and injection wells will take place as discussed in Section 7.11 of this GPMP.

For groundwater at the Site, the estimated restoration time frame will be based on achieving the cleanup level for vinyl chloride (0.2 µg/L), the last degradation compound in the reductive dechlorination of PCE. If the analysis of groundwater performance monitoring results indicates the restoration time frame for

the Site is greater than 30 years, contingency measures will be implemented in consultation with Ecology to ensure the time frame is achieved.

6.3 EVALUATION OF ADDITIONAL PERFORMANCE MONITORING WELLS

Results of pre-treatment groundwater monitoring conducted in 2018 and 2019 identified concentrations of one or more CVOCs present in down gradient wells, including MW-9, MW-10, MW-21, IW33, and IW34.

The groundwater treatment system implemented at the Site (Section 2.4) is intended to inhibit the expansion and degrade the concentrations of CVOCs in the groundwater The injectate will initially sequester CVOCs, reducing dissolved phase concentrations in the groundwater and promoting degradation of PCE and TCE, and leading to an anticipated increase in the concentrations of cis-1,2-DCE and vinyl chloride.

At the time of this report post-treatment concentrations of CVOCs in downgradient monitoring wells is unknown. The results of the performance groundwater monitoring sampling and analysis plan will be used to further assess if concentrations of CVOCs extend beyond downgradient monitoring wells at the Site.

After the first two quarterly monitoring events have been conducted in first and second quarters 2020, the exact locations of one shallow downgradient monitoring well and one deep downgradient monitoring well will be assessed. Results of CVOC concentrations and observed groundwater flow directions in shallow and deep water-bearing zones from the first two quarterly monitoring events will be reviewed and recommendations for well installation locations will be presented to Ecology.

Groundwater data from the one shallow downgradient monitoring well and one deep downgradient monitoring well, to be install in June 2020, will be used to assess if the Site boundary has expanded. If CVOC groundwater concentrations in samples collected from the two wells exceed applicable MTCA cleanup levels, immediate actions should be taken.

7.0 SAMPLING AND ANALYSIS PLAN

To monitor the effectiveness of the soil removal and ERD groundwater treatment program previously conducted at the Site, groundwater samples will be collected from the monitoring well network located at the Site. The groundwater sampling frequency and locations, procedures for sample collection and handling, analytical testing methods, and QA/QC for groundwater performance monitoring are presented below.

Field personnel will adhere to health and safety procedures during sampling activities that will be detailed under a separate cover as the Site-Specific Health and Safety Plan (Appendix B).

7.1 SAMPLING FREQUENCY

Groundwater sampling will be conducted to evaluate the effect of ERD on CVOCs in groundwater beneath the Site. Performance monitoring will be conducted on a quarterly basis for 2 years, beginning in 2020. Performance monitoring will continue on a semiannual basis for 5 years, beginning in 2022, or until concentrations of COCs have met the cleanup standards. If at the end of 2026 concentrations of CVOCs are below applicable MTCA cleanup levels, a Compliance/Confirmational Monitoring Plan will be prepared and submitted to Ecology, and upon approval, four quarters of confirmation groundwater monitoring will

be conducted. If concentrations of CVOCs are still found to be above applicable MTCA cleanup levels but statistical trend analyses indicate compliance with cleanup levels will be achieved in 30 years, a new groundwater performance monitoring schedule will be prepared in consultation with Ecology. If trend analyses indicate the restoration time frame for the COCs present at the Site is greater than 30 years (as stated in the EDR and CAP), contingency measures will be implemented in consultation with Ecology to ensure the restoration time frame is achieved.

7.2 SAMPLING LOCATIONS

Performance groundwater samples will be collected from the existing monitoring well network, which is comprised of the following monitoring and injection wells:

- Woodlawn Avenue Northeast ROW: MW-6, MW-9, MW-10, MW-15, MW-21, MW-22, MW-24, MW-25, MW-26, MW-28, and MW-29
- 4th Avenue Northeast ROW: MW-2, MW-3, MW-8, and MW-27
- The alley ROW: MW-1 and MW-5
- On-Site Injection Wells: IW59 and IW60
- Off-Site Injection Wells: IW07, IW08, IW15, IW16, IW21, IW22, IW31, IW32, IW33, and IW34
- Downgradient Wells: Two additional downgradient monitoring wells as described in Section 6.3

The monitoring and injection well locations are shown on Figure 5. Select injection wells listed above have been included in the sampling network to allow for more comprehensive assessment of groundwater quality and natural attenuation parameters on the Property and along downgradient injection well transects D and E installed on the south and north sides of Woodlawn Avenue East, respectively. Injection wells selected for sampling are located in areas where groundwater monitoring wells are not present, or where previous sampling events have identified impacts to groundwater.

7.2.1 Sample Identification

The groundwater samples collected for groundwater performance monitoring will be assigned a unique sample identifier and number. The number will include a prefix of the well identification and the sampling date. For example, the groundwater sample collected from MW-17 on October 31, 2019, would be numbered MW17-20191031. The sample identification will be placed on the sample label, the Field Report Form, the Groundwater Purge and Sample Form, and the Sample Chain of Custody Form (Appendix A).

7.2.2 Sample Collection and Handling Procedures

Groundwater samples for performance monitoring will be collected and handled in accordance with the 1996 EPA guidance document*, Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures*, following the procedures described below:

- The locking well cap from the monitoring well will be removed, and the groundwater level in the well will be allowed to equilibrate to atmospheric pressure for a minimum of 20 minutes.
- The depth to groundwater in the monitoring well will be measured relative to the top of well casing to the nearest 0.01 foot using an electronic water level meter. The

depth to the monitoring well bottom will also be measured to evaluate the presence of sediment inside the monitoring well casing and to calculate the estimated purge water volume. Non-disposable equipment will be decontaminated between uses.

- Each monitoring well will be purged at a low-flow rate (100 to 300 milliliters-per-minute) using a peristaltic pump or a bladder pump and dedicated polyethylene tubing. The pump intake will be placed at the approximate center of the screened interval. Groundwater parameters, including temperature, pH, conductivity, dissolved oxygen, turbidity, and oxidation-reduction potential, will be monitored during purging using a water quality meter equipped with a flow-through cell while purging to determine when stabilization of these parameters occurs.
- Groundwater samples will be collected directly from the pump outlet following stabilization of groundwater parameters. If the monitoring well is completely dewatered during purging, samples will be collected when the groundwater in the well has recovered to at least 80 percent of the pre-purge casing volume.
- If low-flow sampling methods are not practical, the monitoring well will be allowed to recharge for no longer than 2 hours following cessation of purging and will then be sampled using a dedicated, disposable, polyethylene double-check valve bailer and sampling cord.
- Due to the presence of injectate in the groundwater in the vicinity of injection wells, groundwater samples will not be collected from injection wells using low-flow methods. Low flow sampling introduces injectate in the groundwater sample which can bias analytical results and raise laboratory detection limits. In order to collect representative groundwater samples from the injection wells, passive diffusion samplers will be deployed for a sampling period of 2 weeks in accordance with manufacturer specifications. Passive samplers will additionally be deployed in select monitoring wells following sampling by traditional low-flow sampling methods, and passive sampler field duplicates will be analyzed to assess the representativeness of passive diffusion sample collection.
- The sample containers will be filled directly if collected from a pump, or the water samples will be transferred immediately from the bailer into laboratory-supplied sample containers, taking care to minimize turbulence. Care will be taken not to handle the seal or lid of the container when decanting the sample into the containers. The containers will be filled completely to eliminate any headspace, and the seals/lid will be secured.
- The sample containers will be filled for samples collected from the passive sampler by pouring the water from the passive sampler into the laboratory-supplied sample containers, taking care to minimize turbulence. Care will be taken not to handle the seal or lid of the container when decanting the sample into the containers. The containers will be filled completely to eliminate any headspace, and the seals/lid will be secured.
- Each sample container will be labeled with the date and time sampled, well identification number, project number, and preservative(s), if any.

- All sample collection information will be documented on a Sample Chain of Custody form; the sample will be placed in a cooler chilled to near 4 degrees Celsius and transported to the laboratory.
- The chain of custody protocols will be maintained during sample transport and submittal to the laboratory.
- Purge water will be temporarily stored in an appropriately labeled container at the Site pending receipt of waste profiling results.
- Non-reusable sampling and health and safety supplies and equipment will be disposed of in an appropriate waste dumpster at the Site.
- The well cap and monument will be secured following sampling. Damaged or defective well caps or monuments will be noted and scheduled for replacement, if necessary.

Field personnel will be required to prepare Groundwater Purge and Sample Forms during groundwater monitoring and sampling activities. The forms will include depth to groundwater and total depth measurements, as well as groundwater parameter measurements, including pH, temperature, dissolved oxygen, specific conductance, oxidation-reduction potential, and turbidity. In addition, the sample identifier (ID), date of sample collection, and analyses will be recorded on the form. An example of the Groundwater Purge and Sample Form is included in Appendix A.

7.3 SAMPLE HANDLING AND QUALITY CONTROL PROCEDURES

Sections 7.4 through 7.8 summarize sample labeling, containers, handling, chain of custody, and field quality control procedures to be applied during the groundwater monitoring program.

7.4 SAMPLE IDENTIFICATION

Each groundwater sample collected during the groundwater monitoring program 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 will be filled out in indelible ink and will include the following information: media, date, time sampled, sample identification 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 Appendix A.

7.4.1 Groundwater

Groundwater sample IDs will include a prefix of the well identification and the sampling date. For example, the groundwater sample collected from monitoring well MW-22 on October 22, 2019, would be numbered MW22-20191022. The sample identification will be placed on the Sample ID label, the Field Report Form, the Groundwater Purge and Sample Form, and the Sample Chain of Custody Form.

7.5 DECONTAMINATION PROCEDURES

Decontamination of all non-disposable tools and equipment will be conducted prior to each sampling event and between each sampling location. 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. Field personnel will take precautions to prevent contact with water used in the decontamination process. The following steps will be followed to decontaminate reusable 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 7.10, Management of Investigation-Derived Waste.

7.6 SAMPLE CONTAINER AND HANDLING PROCEDURES

Groundwater samples will be collected in accordance with the EPA's 1996 guidance *Low Flow (Minimal Drawdown) Groundwater Sampling Procedures*. Required containers, preservation, and holding times for each anticipated analysis are listed in Table 3.

SoundEarth personnel will be responsible for following the container handling procedures below:

- Each sample container will be labeled and handled with the date and time sampled, well identification number, project number, and preservative(s), if any.
- Sample collection information will be documented on a Sample Chain of Custody form; the sample will be placed in a cooler chilled to near 4 degrees Celsius and transported to the laboratory.

The FC will check all container labels, chain of custody for entries, and field notes for completeness and accuracy at the end of each day.

7.7 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 Appendix 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 in the sample control room will be documented 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.

7.8 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 9.0. QA/QC samples will consist of field duplicates and trip blanks. 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 per sampling event, and one trip blank will accompany each batch of groundwater samples sent to the laboratory. The QA/QC samples will be assigned a unique sample ID and number. The number will include a prefix of MW99 for field duplicates. For example, a field duplicate collected on October 22, 2018, would be labeled MW99-20181022. SoundEarth will note the locations of the field duplicates in the field notes. The QA/QC groundwater sample will be collected from monitoring well MW-6.

7.9 ANALYTICAL TESTING

Groundwater performance and confirmational samples will be analyzed for the following:

- CVOCs by EPA Method 8260C

Select groundwater samples will also be analyzed for natural attenuation parameters which will include the following:

- Volatile organic fatty acids by EPA Method 300.0 Modified
- Modified total organic carbon by EPA Method 352.2
- Chloride, sulfate, and nitrate by EPA 300.0
- Total manganese and iron by EPA Method 200.8
- Ferrous iron by EPA Method 3500
- Methane, ethane, and ethene by Method RSK-175

Groundwater parameters will be measured and recorded at all groundwater monitoring wells, including pH, dissolved oxygen, oxidation-reduction potential, turbidity, and temperature, using a water quality meter with a flow-through cell.

Analytical results for CVOCs will be compared to applicable MTCA Methods A and B cleanup levels for groundwater to evaluate the groundwater conditions at the Site. Measurements of field parameters and natural attenuation parameter will be used to evaluate whether the chemistry of the groundwater is conducive to the degradation of CVOCs.

Performance samples will be submitted to Friedman & Bruya, Inc., an Ecology-accredited analytical laboratory, and analyzed on a standard turnaround time. The contract laboratory is expected to meet the following minimum requirements when completing chemical analyses for this project:

- Adhere to Ecology and EPA analytical procedures of the COCs.

- Deliver electronic data as specified.
- Meet reporting requirements for deliverables.
- Meet turnaround times for deliverables.
- Implement laboratory quality control requirements and performance evaluation testing requirements.
- Notify the Project QA/QC Manager 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.

Table 4 presents the analytes, analytical methods, and practical quantitation limits (PQLs) for performance samples, which will be compared to applicable regulatory limits. The PQL for each analyte is below the applicable regulatory limits.

Copies of the *Laboratory Quality Assurance Manual* from Friedman & Bruya, Inc. are on file at SoundEarth's offices for review and will be followed throughout the cleanup action. Access to laboratory personnel, equipment, and records pertaining to the collection, transportation, and analyses of the groundwater samples can be provided. Container requirements, holding times, and preservation methods for groundwater are summarized in Table 3.

Sample laboratory analytical results for each analyte will be compared to regulatory limits applicable to the cleanup action. A detailed description of the analytical methods, laboratory PQLs, and applicable regulatory limits for each analyte is provided in Table 4.

7.10 MANAGEMENT OF INVESTIGATION-DERIVED WASTE

Contaminated groundwater and disposable equipment generated during the cleanup action will be handled in accordance with a "contained-in" determination, if applicable, and in accordance with other applicable state and federal regulations. The procedures for managing investigation-derived waste for the expected waste streams are discussed in Sections 7.10.1 and 7.10.2 below.

7.10.1 Water

All purge water will be temporarily stored in appropriately labeled containers at the Site pending receipt of waste profiling results.

7.10.2 Disposables

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.

8.0 DATA QUALITY OBJECTIVES

Field and laboratory activities will be conducted to ensure valid results and 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 Solid Waste: Physical/Chemical Methods*

(also known as EPA Publication SW-846) and the National Contract Laboratory Review Program, National Functional Guidelines for Organic Data Review. The data quality objectives are designed as the following:

- 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 cleanup action.
- Verify that the data quality objectives (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 cleanup action. To verify that the DQOs are achieved, this GPMP describes aspects of sample collection and analyses, including analytical methods, QA/QC procedures, and data quality reviews. This GPMP 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 cleanup action will be used to develop and implement procedures to verify that data collected is of sufficient quality to adequately address the objectives of the Cleanup Action Plan (Ecology 2016). 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, a sufficient number of samples are collected, and 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 8.1 through 8.6. 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 5.

8.1 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.

8.2 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 10 groundwater samples or less. 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.

8.3 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 7.9, Analytical Testing, and Section 10.0, Quality Control Procedures.

8.4 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 10.0, 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 groundwater 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.

8.5 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.

8.6 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. The specific analytes and their corresponding PQLs that will be required for the cleanup action are presented in Table 4. The detection or reporting limits for actual samples may be higher depending on the sample matrix and laboratory dilution factors.

9.0 DATA COLLECTION

This section outlines the procedures to be followed for the inventory, control, storage, and retrieval of data collected during the performance groundwater monitoring. The procedures contained in this GPMP are designed to verify that the integrity of the collected data is maintained for subsequent use. Moreover, project-tracking data (e.g., schedule and progress reports) will be maintained to monitor, manage, and document the progress of the cleanup action.

9.1 DATA COLLECTION APPROACH

Procedures that will be used to collect, preserve, transport, and store samples are described in Section 7.3, 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 groundwater sampling field program will verify the project DQOs are met or exceeded.

9.2 DATA TYPES

A variety of data will be generated during the performance groundwater monitoring, 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 Groundwater Purge and Sampling Forms, and electronically reported laboratory data.

9.3 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, 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.

9.4 DATA INVENTORY

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

9.4.1 Document Filing and Storage

Electronic copies of files will be maintained in a project directory and backed up daily, weekly, and monthly.

9.4.2 Access to Project Files

Access to project files will be controlled and limited to the Lutheran Retirement Home of Greater Seattle (d/b/a The Hearthstone) and its authorized representatives, Ecology, and SoundEarth personnel.

9.5 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. The following types of QC information will be reviewed, as appropriate:

- Method deviations
- Sample extraction and holding times

- Method reporting limits
- Blank samples (equipment rinseate and laboratory method)
- Duplicate samples
- Matrix spike/matrix spike duplicate samples (accuracy)
- Surrogate recoveries
- Percent completeness and RPD (precision)
- A quality assurance review of the final analytical data packages for samples collected during the cleanup action

9.6 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 8.0, Data Quality Objectives. The 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, including 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.

10.0 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.

10.1 FIELD QUALITY CONTROL

Field QC samples (e.g., duplicate and trip blank 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 12.1, Field Documentation. Any deviations from the established protocols will be documented on the Field Report forms.

QA/QC groundwater samples will be collected during the performance groundwater monitoring to provide for data validation, as described in Section 8.0, 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 per sampling event. The QA/QC samples will be assigned a unique sample identifier and number. The number will include a prefix of MW99 or MW98 (if two field duplicates are collected) for field duplicates. For example, a field duplicate collected on October 22, 2019, would be labeled MW99-20191022. SoundEarth will note the locations of the field duplicates in the field notes.

10.2 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.

10.3 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 11.0, Corrective Actions.

10.4 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. Data validation parameters are outlined in Section 8.0, Data Quality Objectives.

10.5 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 11.0 below.

11.0 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 parameters.
- 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.

12.0 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. 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).

12.1 FIELD DOCUMENTATION

Documentation of field activities will be included on Field Report forms, Groundwater Purge and Sample Forms, Sample ID Labels, Non-Hazardous Waste Material Labels, Hazardous Waste Material Labels, Drum Inventory Sheet, and Sample Chain-of-Custody forms, examples of which are provided in Appendix 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 GPMP. 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. An example of the Field Report form is included in Appendix A.

12.2 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).

13.0 LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, expressed or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report are derived, in part, from data gathered by others, and from conditions evaluated when services were performed, and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We do not warrant and are not responsible for the accuracy or validity of work performed by others, nor from the impacts of changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the use of segregated portions of this report.

14.0 REFERENCES

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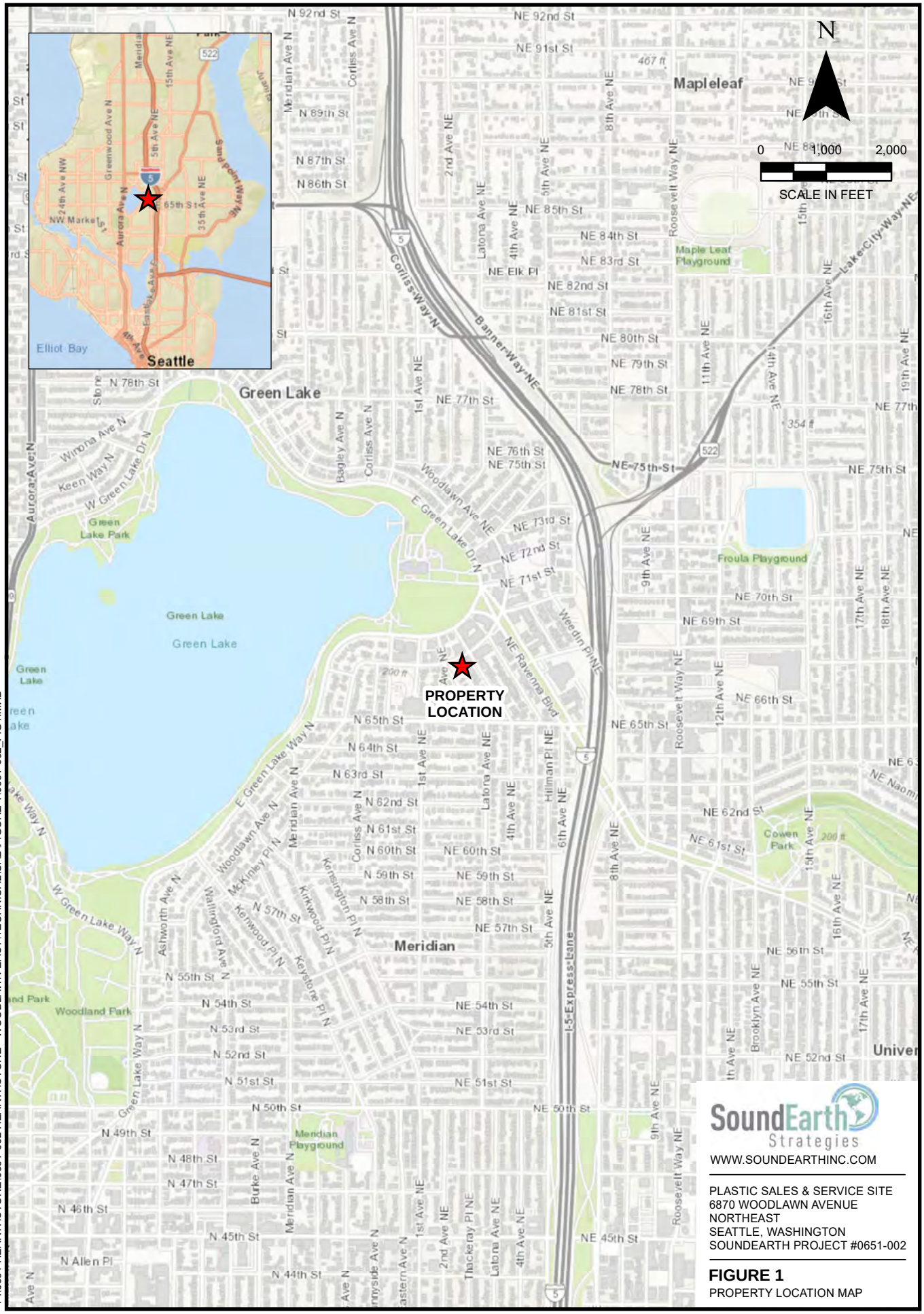
FIGURES



P:\0651 HEARTHSTONE\0651-002 HEARTHSTONE - WOODLAWN EAST\TECHNICAL\CAD\FIGURE 1\0651-002_FIG1.MXD

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NORTHEAST
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FIGURE 1
PROPERTY LOCATION MAP

12/11/2019

P:\0651 HEARTHSTONE\0651-002 HEARTHSTONE - WOODLAWN EAST\TECHNICAL\CAD\2019\2019 GCMP\0651-002_2019_SP.DWG

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APPROXIMATE SCALE IN FEET

LEGEND

- CATCH BASIN
- MANHOLE
- SHALLOW-ZONE MONITORING WELL
- DEEP-ZONE MONITORING WELL
- DECOMMISSIONED WELL
- DIRECT-PUSH BORING (GEOENGINEERS, 2002/2003)
- DIRECT-PUSH BORING (GEOENGINEERS, 2004)
- DIRECT-PUSH BORING (FARALLON, 2004)
- DIRECT-PUSH BORING (FARALLON, 2006/2007)
- DIRECT-PUSH BORING (FARALLON, 2010)
- DIRECT-PUSH BORING (SOUNDEARTH, 2008)
- HOLLOW-STEM AUGER (SOUNDEARTH, 2009)
- SW — STORMWATER LINE
- GAS — GAS LINE
- SS — SANITARY SEWER LINE
- W — WATER LINE
- OHP — OVERHEAD POWER LINE
- PROPERTY BOUNDARY LINE
- PARCEL BOUNDARY
- FORMER DRAIN PIPES
- FD — FLOOR DRAIN
- UST — UNDERGROUND STORAGE TANK

FIGURE DERIVED FROM BASEMAP BY FARALLON CONSULTING, 2010

6857 WOODLAWN AVENUE NORTHEAST

NORTH-ADJOINING PROPERTY
6869 WOODLAWN AVENUE NORTHEAST

6900 WOODLAWN AVENUE NORTHEAST

2ND AVENUE NORTHEAST

WOODLAWN AVENUE NORTHEAST

4TH AVENUE NORTHEAST

LATONA AVENUE NORTHEAST

DRY CLEANER BUILDING PROPERTY
6870 WOODLAWN AVENUE NORTHEAST

HEARTHSTONE PROPERTY
6850 WOODLAWN AVENUE NORTHEAST

SOUTH-ADJOINING PROPERTY
6565 4TH AVENUE NORTHEAST

FORMER LAUNDRY PROPERTY

FORMER YASUKO PROPERTY

APARTMENTS

SINGLE-FAMILY LOT

BOILER ROOM

WESTERN ALLEY

FORMER STODDARD SOLVENT USTs

FORMER DRY CLEANING EQUIPMENT

UST FILL PORT

FORMER HEATING OIL UST

HEATING OIL UST

UNKNOWN PIPE

COLUMN FOOTINGS

SUMPS

SLAB

DRAIN

RESTROOMS

POWER POLE

3'x3' VAULT AND SUMP

MW-1 MW-2 MW-3 MW-4 MW-5 MW-6 MW-7 MW-8 MW-9 MW-10 MW-11 MW-12 MW-13 MW-14 MW-15 MW-16 MW-17 MW-18 MW-19 MW-20 MW-21 MW-22 MW-23 MW-24 MW-25 MW-26 MW-27

SB-1 SB-2 SB-3 SB-4 SB-5 SB-6 SB-7 SB-8 SB-9 SB-10 SB-11 SB-12 (20' NORTH) SB-13 (47' NORTH) SB-15 SB-16 SB-17 SB-18 SB-19 SB-20 SB-21 SB-22 SB-23 SB-24 SB-25 SB-26 SB-27 SB-28 SB-29 SB-30 SB-31 SB-32 SB-33 SB-34 SB-35 SB-36 SB-37 SB-38 SB-39

GP-1 GP-2 GP-3 GP-4 GP-5 GP-6 GP-7 GP-9 GP-10 GP-12 GP-13

P01 P02 P03 P04 P05 P06 P07 P08 P09 P10 P11 P12 P13 P14 P15 P16 P17

TMW-1 TMW-2 TMW-3

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FIGURE 2
SITE PLAN

12/11/2019

P:\0651 HEARTHSTONE\0651-002 HEARTHSTONE - WOODLAWN EAST\TECHNICAL\CAD\2019\2019 GCMP\0651-002_2019_ERH.DWG

Symbol	Area	Area (Square Feet)	Average Thickness (Feet)	Volume (Cubic Yards)	Mass (Tons)	Former PCE Concentration (mg/kg)	TYPE
	1	1,160	13.5	580	986	>60	Thermal Treatment
	2	1,062	13.5	531	903	14-60	Thermal Treatment
	3	730	13.5	365	621	14-60	Thermal Treatment
	4	6,870	14.5	3,689	6,272	0.05-14	No Treatment
	5	4,567	14.5	2,453	4,170	<0.05-14	No Treatment

* Note that conversion factor of 1.7 was used from cubic yards to tons.

LEGEND

- CATCH BASIN
- MANHOLE
- SHALLOW-ZONE MONITORING WELL
- DEEP-ZONE MONITORING WELL
- DECOMMISSIONED WELL
- DIRECT-PUSH BORING (GEOENGINEERS, 2002/2003)
- DIRECT-PUSH BORING (GEOENGINEERS, 2004)
- DIRECT-PUSH BORING (FARALLON, 2004)
- DIRECT-PUSH BORING (FARALLON, 2006/2007)
- DIRECT-PUSH BORING (FARALLON, 2010)
- DIRECT-PUSH BORING (SOUNDEARTH, 2008)
- HOLLOW-STEM AUGER (SOUNDEARTH, 2009)
- F07 ELECTRODE LOCATION (19)
- F07 TMP (4)
- SW STORMWATER LINE
- GAS GAS LINE
- SS SANITARY SEWER LINE
- W WATER LINE
- OHP OVERHEAD POWER LINE
- PROPERTY BOUNDARY LINE
- PARCEL BOUNDARY
- 60 PCE ISOCONCENTRATION CONTOUR IN SOIL (mg/kg)
- FD FLOOR DRAIN

PCE	TETRACHLORETHENE
mg/kg	MILLIGRAM PER KILOGRAM
TMP	TEMPERATURE MONITORING POINT
UST	UNDERGROUND STORAGE TANK

FIGURE DERIVED FROM BASEMAP BY FARALLON CONSULTING, 2010

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APPROXIMATE SCALE IN FEET

NORTH-ADJOINING PROPERTY
6869 WOODLAWN AVENUE NORTHEAST

6900 WOODLAWN AVENUE NORTHEAST

2ND AVENUE NORTHEAST

WOODLAWN AVENUE NORTHEAST

4TH AVENUE NORTHEAST

LATONA AVENUE NORTHEAST

WESTERN ALLEY

FORMER STODDARD SOLVENT USTs

FORMER DRY CLEANING EQUIPMENT

DRY CLEANER BUILDING PROPERTY
6870 WOODLAWN AVENUE NORTHEAST

SOUTH-ADJOINING PROPERTY
6565 4TH AVENUE NORTHEAST

HEARTHSTONE PROPERTY
6850 WOODLAWN AVENUE NORTHEAST

FORMER LAUNDRY PROPERTY

FORMER YASUKO PROPERTY

SINGLE-FAMILY LOT

APARTMENTS

MW-1 MW-2 MW-3 MW-4 MW-5 MW-6 MW-7 MW-8 MW-9 MW-10 MW-11 MW-13 MW-14 MW-15 MW-16 MW-17 MW-18 MW-19 MW-20 MW-21 MW-22 MW-23 MW-24 MW-25 MW-26 MW-27

SB-1 SB-2 SB-3 SB-4 SB-5 SB-6 SB-7 SB-8 SB-10 SB-12 SB-13 (47' NORTH) SB-20 SB-21 SB-22 SB-23 SB-24 SB-25 SB-26 SB-27 SB-29 SB-30 SB-31 SB-32 SB-33 SB-34 SB-35 SB-36 SB-37 SB-38 SB-39

GP-1 GP-2 GP-3 GP-4 GP-5 GP-6 GP-7 GP-9 GP-10 GP-11 GP-13

P11

C03 C04 C05 C06 D03 D04 D05 D06 D07 E03 E04 E05 E06 E07 F04 F05 F06 F07 F08

2 14 60

SUMP

FD

UST FILL PORT

BOILER ROOM

COMPRESSOR

OIL/WATER SEPARATOR

CONDENSER

GCU 4000 OUTLET

IN-LET

COOLING TOWER C-12

BLOWER 15 HP

VGAC

LGAC

DISCHARGE STACK

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FIGURE 3
ELECTRICAL RESISTIVE HEATING
UPPER SHALLOW ZONE
ELECTRODES AND TMP LAYOUT

12/11/2019

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APPROXIMATE SCALE IN FEET

LEGEND

- CATCH BASIN
- MANHOLE
- SHALLOW-ZONE MONITORING WELL
- DEEP-ZONE MONITORING WELL
- DECOMMISSIONED WELL
- DIRECT-PUSH BORING (GEOENGINEERS, 2002/2003)
- DIRECT-PUSH BORING (GEOENGINEERS, 2004)
- DIRECT-PUSH BORING (FARALLON, 2004)
- DIRECT-PUSH BORING (FARALLON, 2006/2007)
- DIRECT-PUSH BORING (FARALLON, 2010)
- DIRECT-PUSH BORING (SOUNDEARTH, 2008)
- HOLLOW-STEM AUGER (SOUNDEARTH, 2009)
- POST-ERH BORING LOCATION
- STORMWATER LINE
- GAS LINE
- SANITARY SEWER LINE
- WATER LINE
- OVERHEAD POWER LINE
- PROPERTY BOUNDARY LINE
- PARCEL BOUNDARY
- AREA CONTAINED-IN DETERMINATION (0'-16')
- AREA PARTIALLY INCLUDED IN CONTAINED-IN DETERMINATION (0'-8')
- AREA PARTIALLY INCLUDED IN CONTAINED-IN DETERMINATION (8'-16')
- AREA EXCLUDED FROM CONTAINED-IN DETERMINATION
- FD FLOOR DRAIN

ERH	ELECTRICAL RESISTANCE HEATING
PCE	TETRACHLORETHENE
mg/kg	MILLIGRAM PER KILOGRAM
TMP	TEMPERATURE MONITORING POINT
UST	UNDERGROUND STORAGE TANK

FIGURE DERIVED FROM BASEMAP BY FARALLON CONSULTING, 2010

6857 WOODLAWN AVENUE NORTHEAST

NORTH-ADJOINING PROPERTY
6869 WOODLAWN AVENUE NORTHEAST

6900 WOODLAWN AVENUE NORTHEAST

2ND AVENUE NORTHEAST

WOODLAWN AVENUE NORTHEAST

4TH AVENUE NORTHEAST

LATONA AVENUE NORTHEAST

WESTERN ALLEY

FORMER STODDARD SOLVENT USTs

FORMER DRY CLEANING EQUIPMENT

DRY CLEANER BUILDING PROPERTY
6870 WOODLAWN AVENUE NORTHEAST

SOUTH-ADJOINING PROPERTY
6565 4TH AVENUE NORTHEAST

HEARTHSTONE PROPERTY
6850 WOODLAWN AVENUE NORTHEAST

FORMER LAUNDRY PROPERTY

FORMER YASUKO PROPERTY

APARTMENTS

MW-1 MW-2 MW-3 MW-4 MW-5 MW-6 MW-7 MW-8 MW-9 MW-10 MW-11 MW-12 MW-13 MW-14 MW-15 MW-16 MW-17 MW-18 MW-19 MW-20 MW-21 MW-22 MW-23 MW-24 MW-25 MW-26 MW-27

SB-1 SB-2 SB-3 SB-4 SB-5 SB-6 SB-7 SB-8 SB-9 SB-10 SB-11 SB-12 (20' NORTH) SB-13 (47' NORTH) SB-20 SB-21 SB-22 SB-23 SB-24 SB-25 SB-26 SB-27 SB-28 SB-29 SB-30 SB-31 SB-32 SB-33 SB-34 SB-35 SB-36 SB-37 SB-38 SB-39

GP-1 GP-2 GP-3 GP-4 GP-5 GP-6 GP-7 GP-9 GP-10 GP-11 GP-13

B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13 B14 B15 B16 B17 B18 B19 B20 B21 B22 B23 B24 B25 B26 B27

P11

	AREA (SQFT)	DEPTH (FEET)	VOLUME (CUBIC FEET)	VOLUME (CUBIC YARDS)	VOLUME (TONS)*
	2900	16	46400	1719	3007
	4890	8	39120	1449	2536
	340	8	2720	101	176
	1000	0			

*ASSUME 1.75 TONS/YARD

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FIGURE 4
MASS REMOVAL LAYOUT

12/11/2019

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APPROXIMATE SCALE IN FEET

LEGEND

- CATCH BASIN
- MANHOLE
- SHALLOW-ZONE MONITORING WELL
- DEEP-ZONE MONITORING WELL
- DEEP DEWATERING WELL
- SHALLOW INJECTION WELL
- DEEP INJECTION WELL
- DECOMMISSIONED WELL
- DIRECT-PUSH BORING (GEOENGINEERS 2002/2003)
- DIRECT-PUSH BORING (GEOENGINEERS 2004)
- DIRECT-PUSH BORING (FARALLON 2004)
- DIRECT-PUSH BORING (FARALLON 2006/2007)
- DIRECT-PUSH BORING (FARALLON 2010)
- DIRECT-PUSH BORING (SOUNDEARTH 2008)
- HOLLOW-STEM AUGER (SOUNDEARTH 2009)
- POST-ELECTRICAL RESISTANCE HEATING BORING LOCATION
- SW — STORMWATER LINE
- GAS — GAS LINE
- SS — SANITARY SEWER LINE
- W — WATER LINE
- OHP — OVERHEAD POWER LINE
- PROPERTY BOUNDARY LINE
- PARCEL BOUNDARY
- FD — FLOOR DRAIN
- UST — UNDERGROUND STORAGE TANK

FIGURE DERIVED FROM BASEMAP BY FARALLON CONSULTING, 2010

6857 WOODLAWN AVENUE NORTHEAST

NORTH-ADJOINING PROPERTY
6869 WOODLAWN AVENUE NORTHEAST

6900 WOODLAWN AVENUE NORTHEAST

SOUTH-ADJOINING PROPERTY
6565 4TH AVENUE NORTHEAST

HEARTHSTONE PROPERTY
6850 WOODLAWN AVENUE NORTHEAST

FORMER LAUNDRY PROPERTY

FORMER YASUKO PROPERTY

SINGLE-FAMILY LOT

APARTMENTS

2ND AVENUE NORTHEAST

4TH AVENUE NORTHEAST

WOODLAWN AVENUE NORTHEAST

LATONA AVENUE NORTHEAST

WESTERN ALLEY

FORMER STODDARD SOLVENT UST

FORMER UST FILL PORT

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FIGURE 5
COMPLIANCE MONITORING WELL NETWORK AND INJECTION WELL MAP

12/13/2019

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LEGEND

- CATCH BASIN
- MANHOLE
- SHALLOW-ZONE MONITORING WELL
- DEEP-ZONE MONITORING WELL
- DEEP DEWATERING WELL
- SHALLOW INJECTION WELL
- DEEP INJECTION WELL
- APPROXIMATE DIRECTION OF GROUNDWATER FLOW (SHALLOW ZONE)
- SHALLOW ZONE POTENTIOMETRIC SURFACE CONTOUR (MAY 7, 2019)
- (169.19') GROUNDWATER ELEVATION
- DECOMMISSIONED WELL
- DIRECT-PUSH BORING (GEOENGINEERS 2002/2003)
- DIRECT-PUSH BORING (GEOENGINEERS 2004)
- DIRECT-PUSH BORING (FARALLON 2004)
- DIRECT-PUSH BORING (FARALLON 2006/2007)
- DIRECT-PUSH BORING (FARALLON 2010)
- DIRECT-PUSH BORING (SOUNDEARTH 2008)
- HOLLOW-STEM AUGER (SOUNDEARTH 2009)
- POST-ELECTRICAL RESISTANCE HEATING BORING LOCATION
- SW STORMWATER LINE
- GAS GAS LINE
- SS SANITARY SEWER LINE
- W WATER LINE
- OHP OVERHEAD POWER LINE
- PROPERTY BOUNDARY LINE
- PARCEL BOUNDARY
- FD FLOOR DRAIN
- DECOM DECOMMISSIONED WELL
- bgs BELOW GROUND SURFACE
- DCE DICHLOROETHENE
- PCE TETRACHLOROETHENE
- TCE TRICHLOROETHENE
- UST UNDERGROUND STORAGE TANK
- MTCA WASHINGTON STATE MODEL TOXICS CONTROL ACT
- RED DENOTES CONCENTRATION EXCEEDS MTCA METHOD A OR B CLEANUP LEVEL
- * DENOTES SAMPLE WAS COLLECTED USING A PASSIVE MEMBRANE SAMPLER

FIGURE DERIVED FROM BASEMAP BY FARALLON CONSULTING, 2010

Well ID	Sample Date	PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	Vinyl Chloride
		Analytical Results (micrograms per liter)					
Shallow Zone Wells							
MW01	11/20/08	1.5	< 0.2	< 0.2	< 0.2	--	< 0.2
	05/04/10	1.8	< 0.2	< 0.2	< 0.2	--	< 0.2
	09/10/14	1.6	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	10/24/18	0.85	< 0.2	< 0.2	< 0.2	--	< 0.2
MW02	11/19/08	**6.80**	4.6	< 0.2	< 0.2	--	< 0.2
	05/04/10	**9.50**	3.5	< 0.2	< 0.2	--	< 0.2
	09/10/14	4.0	0.49	< 0.2	< 0.2	< 0.2	< 0.2
	10/25/18	1.7	0.61	< 0.2	< 0.2	--	< 0.2
MW03	11/19/08	**230**	1.6	2.0	< 1.0	--	< 1.0
	05/04/10	**150**	< 1.0	< 1.0	< 1.0	--	< 1.0
	09/10/14	**64**	0.58	0.79	< 0.2	< 0.2	< 0.2
	10/25/18	**54**	0.61	< 0.4	< 0.4	--	< 0.4
MW04	04/20/07	**3,100**	**720**	**940**	< 20	--	**160**
	11/20/08	**10,000**	**640**	**1,100**	< 50	--	**130**
	05/05/10	**10,000**	**1,000**	**1,600**	< 50	--	**370**
	09/10/14	**28,000**	**3,400**	**3,800**	< 200	< 200	**920**
MW05	11/20/08	**86**	**67**	**37**	1.4	--	**5.5**
	05/04/10	**82**	**34**	**27**	0.44	--	**0.88**
	09/11/14	**71**	**22**	5.6	0.27	< 0.2	< 0.2
	02/07/19	**36**	**7.6**	1.7	< 0.2	< 0.2	< 0.2
MW06	11/08/04	**29**	**18**	11	< 2.0	--	**6**
	05/04/10	**4,100**	**330**	**440**	< 20	--	**110**
	10/07/14	**10,000**	**450**	**320**	< 50	< 0.050	**72**
	02/07/19	**1,800**	**510**	**600**	< 50	< 0.050	**170**
MW15	11/20/08	0.26	< 0.2	< 0.2	< 0.2	--	< 0.2
	05/04/10	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	09/10/14	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	10/22/18	0.78	< 0.2	0.87	< 0.2	--	< 0.2
MW16	11/19/08	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	05/05/10	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	09/09/14	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	10/22/18	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
MW17	06/01/06	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	Monitoring Well Decommissioned						
MW19	03/11/09	< 1	< 1	< 1	< 1	--	< 0.2
	05/03/10	< 1	< 0.2	< 0.2	< 0.2	--	< 0.2
	09/09/14	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	10/24/18	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
MW21	11/20/08	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	05/04/10	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	09/09/14	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	**0.73**
	10/22/18	< 0.2	< 0.2	1.7	< 0.2	--	**0.37**
MW23	11/20/08	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	05/04/10	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	Monitoring Well Decommissioned						
MW24	03/04/09	**290**	< 10	< 10	< 10	--	< 2.0
	05/05/10	**40**	0.42	< 0.2	< 0.2	--	< 0.2
	09/10/14	**17**	0.27	< 0.2	< 0.2	< 0.2	< 0.2
	10/24/18	**20**	0.24	< 0.2	< 0.2	--	< 0.2
MW25	05/04/10	**14**	0.31	1.1	< 0.2	--	< 0.2
	10/07/14	**12**	0.36	0.37	< 0.2	--	< 0.2
	10/25/18	0.28	< 0.2	0.75	< 0.2	--	< 0.2
MW26	05/04/10	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	09/10/14	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	10/22/18	0.24	< 0.2	< 0.2	< 0.2	--	< 0.2
MW27	07/01/11	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	10/07/14	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	02/07/19	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
MW28	06/04/19	3.1	4.9	**50**	< 0.80	--	**16**
IW33	03/12/19	**6.3**	< 1	< 1	< 1	--	< 0.2
MTCA Cleanup Levels for Groundwater		**5**	**5**	**16**	**160**	**400**	**0.2**

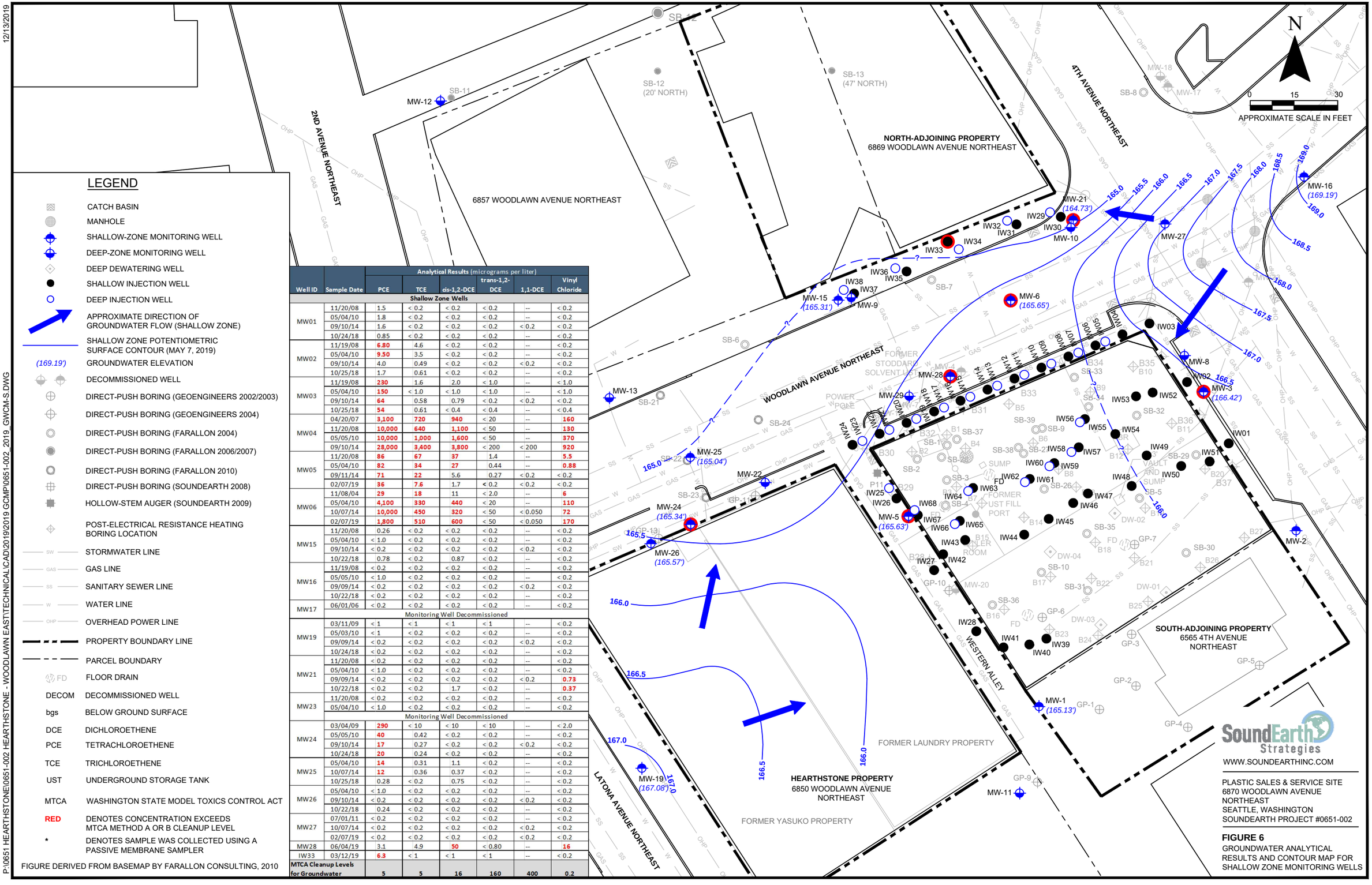

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FIGURE 6
GROUNDWATER ANALYTICAL RESULTS AND CONTOUR MAP FOR SHALLOW ZONE MONITORING WELLS

12/11/2019

P:\0651 HEARTHSTONE\0651-002 HEARTHSTONE - WOODLAWN EAST\TECHNICAL\CAD\2019\2019 GCMP\0651-002_2019_MW-ISO-S.DWG

LEGEND

- CATCH BASIN
- MANHOLE
- SHALLOW-ZONE MONITORING WELL
- DEEP-ZONE MONITORING WELL
- DEEP DEWATERING WELL
- SHALLOW INJECTION WELL
- DEEP INJECTION WELL
- PCE ISOCONTOUR
- DECOMMISSIONED WELL
- DIRECT-PUSH BORING (GEOENGINEERS 2002/2003)
- DIRECT-PUSH BORING (GEOENGINEERS 2004)
- DIRECT-PUSH BORING (FARALLON 2004)
- DIRECT-PUSH BORING (FARALLON 2006/2007)
- DIRECT-PUSH BORING (FARALLON 2010)
- DIRECT-PUSH BORING (SOUNDEARTH 2008)
- HOLLOW-STEM AUGER (SOUNDEARTH 2009)
- POST-ELECTRICAL RESISTANCE HEATING BORING LOCATION
- SW — STORMWATER LINE
- GAS — GAS LINE
- SS — SANITARY SEWER LINE
- W — WATER LINE
- OHP — OVERHEAD POWER LINE
- PROPERTY BOUNDARY LINE
- PARCEL BOUNDARY
- FD — FLOOR DRAIN
- UST — UNDERGROUND STORAGE TANK
- PCE — TETRACHLOROETHENE
- MTCA — WASHINGTON STATE MODEL TOXICS CONTROL ACT
- µg/L — MICROGRAMS PER LITER
- **RED** — DENOTES CONCENTRATION EXCEEDS MTCA METHOD A CLEANUP LEVEL

FIGURE DERIVED FROM BASEMAP BY FARALLON CONSULTING, 2010

N

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APPROXIMATE SCALE IN FEET

6857 WOODLAWN AVENUE NORTHEAST

NORTH-ADJOINING PROPERTY
6869 WOODLAWN AVENUE NORTHEAST

6900 WOODLAWN AVENUE NORTHEAST

2ND AVENUE NORTHEAST

WOODLAWN AVENUE NORTHEAST

4TH AVENUE NORTHEAST

LATONA AVENUE NORTHEAST

WESTERN ALLEY

FORMER LAUNDRY PROPERTY

FORMER YASUKO PROPERTY

HEARTHSTONE PROPERTY
6850 WOODLAWN AVENUE NORTHEAST

SOUTH-ADJOINING PROPERTY
6565 4TH AVENUE NORTHEAST

SINGLE-FAMILY LOT

APARTMENTS

FORMER STODDARD SOLVENT UST

FORMER UST FILL PORT

POWER POLE

SUMP

VAULT AND SUMP

BOILER ROOM

MW-12 (SB-11)
SB-12 (20' NORTH)
SB-13 (47' NORTH)
MW-18 (MW-17)
SB-8
MW-16 (<0.2 µg/L)
MW-27 (<0.2 µg/L)
MW-21 (<0.2 µg/L)
MW-10
MW-23
MW-15 (<0.78 µg/L)
MW-9
MW-6 (1,800 µg/L)
MW-8 (54 µg/L)
MW-3
MW-13 (SB-21)
MW-28 (<3.1 µg/L)
MW-29
MW-25 (0.28 µg/L)
MW-22
MW-24 (20 µg/L)
MW-26 (0.24 µg/L)
MW-5 (36 µg/L)
MW-19 (<0.2 µg/L)
MW-11
MW-1 (0.85 µg/L)
MW-2 (1.7 µg/L)
MW-20
GP-1 … GP-13
SB-2 … SB-7
SB-9 … SB-39
DW-01 … DW-04

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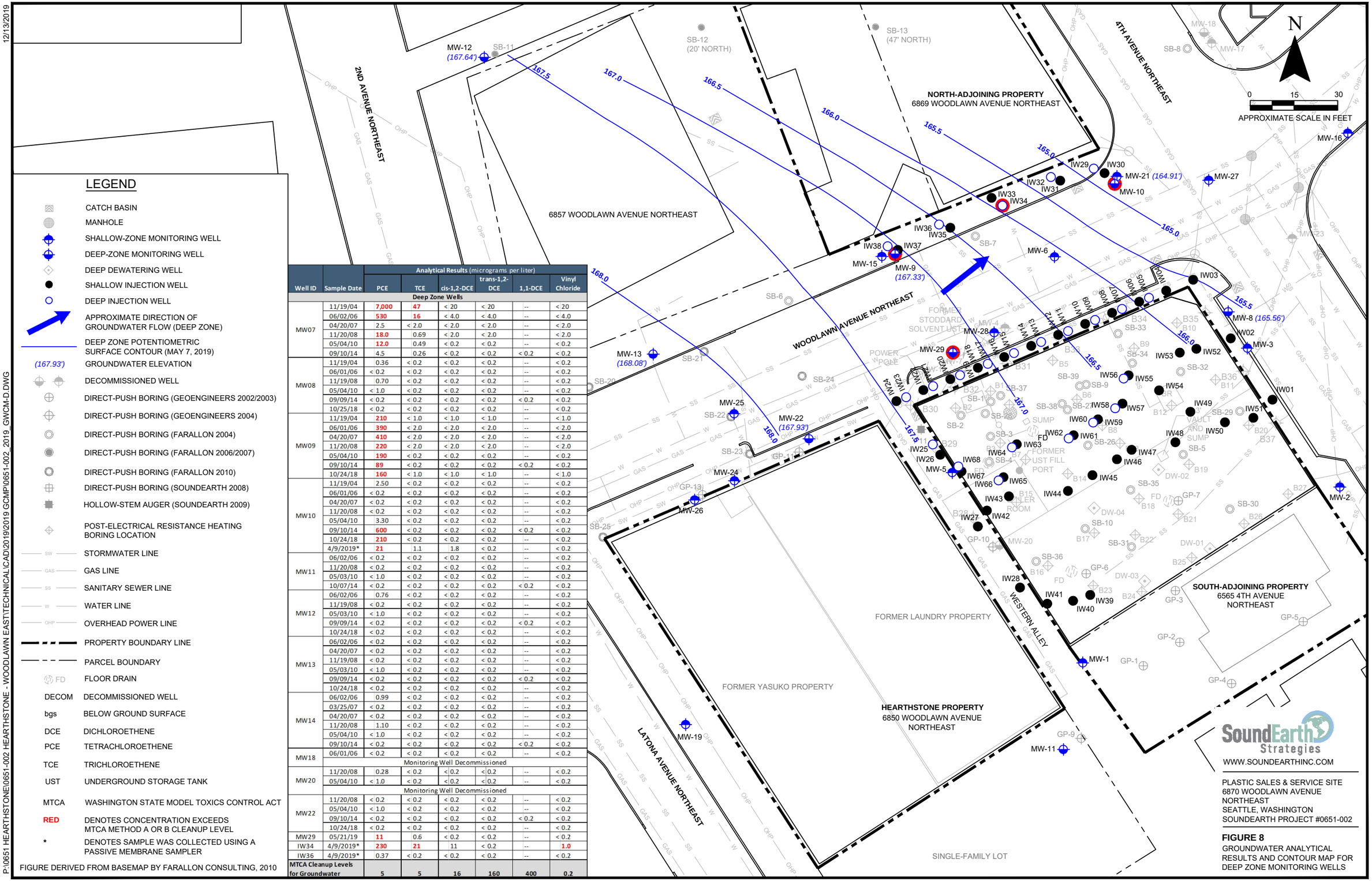
SOUNDEARTH PROJECT #0651-002

FIGURE 7
PCE ISOCONTOUR - SHALLOW ZONE MONITORING WELLS

12/13/2019

P:\0651 HEARTHSTONE\0651-002 HEARTHSTONE - WOODLAWN EAST\TECHNICAL\CAD\2019\2019 GCMP\0651-002_2019_GWCM-D.DWG



LEGEND

- CATCH BASIN
- MANHOLE
- SHALLOW-ZONE MONITORING WELL
- DEEP-ZONE MONITORING WELL
- DEEP DEWATERING WELL
- SHALLOW INJECTION WELL
- DEEP INJECTION WELL
- APPROXIMATE DIRECTION OF GROUNDWATER FLOW (DEEP ZONE)
- DEEP ZONE POTENTIOMETRIC SURFACE CONTOUR (MAY 7, 2019)
- (167.93') GROUNDWATER ELEVATION
- DECOMMISSIONED WELL
- DIRECT-PUSH BORING (GEOENGINEERS 2002/2003)
- DIRECT-PUSH BORING (GEOENGINEERS 2004)
- DIRECT-PUSH BORING (FARALLON 2004)
- DIRECT-PUSH BORING (FARALLON 2006/2007)
- DIRECT-PUSH BORING (FARALLON 2010)
- DIRECT-PUSH BORING (SOUNDEARTH 2008)
- HOLLOW-STEM AUGER (SOUNDEARTH 2009)
- POST-ELECTRICAL RESISTANCE HEATING BORING LOCATION
- SW STORMWATER LINE
- GAS GAS LINE
- SS SANITARY SEWER LINE
- W WATER LINE
- OHP OVERHEAD POWER LINE
- PROPERTY BOUNDARY LINE
- PARCEL BOUNDARY
- FD FLOOR DRAIN
- DECOM DECOMMISSIONED WELL
- bgs BELOW GROUND SURFACE
- DCE DICHLOROETHENE
- PCE TETRACHLOROETHENE
- TCE TRICHLOROETHENE
- UST UNDERGROUND STORAGE TANK
- MTCA WASHINGTON STATE MODEL TOXICS CONTROL ACT
- RED DENOTES CONCENTRATION EXCEEDS MTCA METHOD A OR B CLEANUP LEVEL
- * DENOTES SAMPLE WAS COLLECTED USING A PASSIVE MEMBRANE SAMPLER

FIGURE DERIVED FROM BASEMAP BY FARALLON CONSULTING, 2010

Well ID	Sample Date	Analytical Results (micrograms per liter) PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	Vinyl Chloride
Deep Zone Wells							
MW07	11/19/04	7,000	47	< 20	< 20	--	< 20
	06/02/06	530	16	< 4.0	< 4.0	--	< 4.0
	04/20/07	2.5	< 2.0	< 2.0	< 2.0	--	< 2.0
	11/20/08	18.0	0.69	< 2.0	< 2.0	--	< 2.0
	05/04/10	12.0	0.49	< 0.2	< 0.2	--	< 0.2
	09/10/14	4.5	0.26	< 0.2	< 0.2	< 0.2	< 0.2
MW08	11/19/04	0.36	< 0.2	< 0.2	< 0.2	--	< 0.2
	06/01/06	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	11/19/08	0.70	< 0.2	< 0.2	< 0.2	--	< 0.2
	05/04/10	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	09/09/14	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	10/25/18	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
MW09	11/19/04	210	< 1.0	< 1.0	< 1.0	--	< 1.0
	06/01/06	390	< 2.0	< 2.0	< 2.0	--	< 2.0
	04/20/07	410	< 2.0	< 2.0	< 2.0	--	< 2.0
	11/20/08	220	< 2.0	< 2.0	< 2.0	--	< 2.0
	05/04/10	190	< 0.2	< 0.2	< 0.2	--	< 0.2
	09/10/14	89	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	10/24/18	160	< 1.0	< 1.0	< 1.0	--	< 1.0
MW10	11/19/04	2.50	< 0.2	< 0.2	< 0.2	--	< 0.2
	06/01/06	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	04/20/07	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	11/20/08	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	05/04/10	3.30	< 0.2	< 0.2	< 0.2	--	< 0.2
	09/10/14	600	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	10/24/18	210	< 0.2	< 0.2	< 0.2	--	< 0.2
	4/9/2019*	21	1.1	1.8	< 0.2	--	< 0.2
MW11	06/02/06	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	11/20/08	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	05/03/10	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	10/07/14	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
MW12	06/02/06	0.76	< 0.2	< 0.2	< 0.2	--	< 0.2
	11/19/08	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	05/03/10	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	09/09/14	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	10/24/18	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
MW13	06/02/06	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	04/20/07	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	11/19/08	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	05/03/10	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	09/09/14	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	10/24/18	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
MW14	06/02/06	0.99	< 0.2	< 0.2	< 0.2	--	< 0.2
	03/25/07	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	04/20/07	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	11/20/08	1.10	< 0.2	< 0.2	< 0.2	--	< 0.2
	05/04/10	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	09/10/14	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
MW18	06/01/06	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	Monitoring Well Decommissioned						
MW20	11/20/08	0.28	< 0.2	< 0.2	< 0.2	--	< 0.2
	05/04/10	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	Monitoring Well Decommissioned						
MW22	11/20/08	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	05/04/10	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	09/10/14	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	10/24/18	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
MW29	05/21/19	11	0.6	< 0.2	< 0.2	--	< 0.2
IW34	4/9/2019*	230	21	11	< 0.2	--	1.0
IW36	4/9/2019*	0.37	< 0.2	< 0.2	< 0.2	--	< 0.2
MTCA Cleanup Levels for Groundwater		5	5	16	160	400	0.2

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FIGURE 8
GROUNDWATER ANALYTICAL RESULTS AND CONTOUR MAP FOR DEEP ZONE MONITORING WELLS

12/11/2019

P:\0651 HEARTHSTONE\0651-002 HEARTHSTONE - WOODLAWN EAST\TECHNICAL\CAD\2019\2019 GCMP\0651-002_2019_MW-ISO-D.DWG

LEGEND

- CATCH BASIN
- MANHOLE
- SHALLOW-ZONE MONITORING WELL
- DEEP-ZONE MONITORING WELL
- DEEP DEWATERING WELL
- SHALLOW INJECTION WELL
- DEEP INJECTION WELL
- PCE ISOCONTOUR
- DECOMMISSIONED WELL
- DIRECT-PUSH BORING (GEOENGINEERS 2002/2003)
- DIRECT-PUSH BORING (GEOENGINEERS 2004)
- DIRECT-PUSH BORING (FARALLON 2004)
- DIRECT-PUSH BORING (FARALLON 2006/2007)
- DIRECT-PUSH BORING (FARALLON 2010)
- DIRECT-PUSH BORING (SOUNDEARTH 2008)
- HOLLOW-STEM AUGER (SOUNDEARTH 2009)
- POST-ELECTRICAL RESISTANCE HEATING BORING LOCATION
- SW — STORMWATER LINE
- GAS — GAS LINE
- SS — SANITARY SEWER LINE
- W — WATER LINE
- OHP — OVERHEAD POWER LINE
- PROPERTY BOUNDARY LINE
- PARCEL BOUNDARY
- FD — FLOOR DRAIN
- UST — UNDERGROUND STORAGE TANK
- PCE — TETRACHLOROETHENE
- MTCA — WASHINGTON STATE MODEL TOXICS CONTROL ACT
- µg/L — MICROGRAMS PER LITER
- **RED** — DENOTES CONCENTRATION EXCEEDS MTCA METHOD A CLEANUP LEVEL

FIGURE DERIVED FROM BASEMAP BY FARALLON CONSULTING, 2010

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APPROXIMATE SCALE IN FEET

6857 WOODLAWN AVENUE NORTHEAST

NORTH-ADJOINING PROPERTY
6869 WOODLAWN AVENUE NORTHEAST

6900 WOODLAWN AVENUE NORTHEAST

SOUTH-ADJOINING PROPERTY
6565 4TH AVENUE NORTHEAST

HEARTHSTONE PROPERTY
6850 WOODLAWN AVENUE NORTHEAST

FORMER LAUNDRY PROPERTY

FORMER YASUKO PROPERTY

SINGLE-FAMILY LOT

APARTMENTS

2ND AVENUE NORTHEAST

4TH AVENUE NORTHEAST

WOODLAWN AVENUE NORTHEAST

WESTERN ALLEY

LATONA AVENUE NORTHEAST

MW-10 (210 µg/L) Q4/ (21 µg/L) Q2

MW-9 (160 µg/L)

IW34 (230 µg/L)

IW36 (0.37 µg/L)

MW-28 MW-29 (11 µg/L)

MW-12 (<0.2 µg/L)

MW-13 (<0.2 µg/L)

MW-22 (<0.2 µg/L)

MW-8 (<0.2 µg/L)

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SEATTLE, WASHINGTON
SOUNDEARTH PROJECT #0651-002

FIGURE 9
PCE ISOCONTOUR - DEEP ZONE MONITORING WELLS

TABLES

Table 1
Preliminary Project Schedule
Plastics Sales and Service Property
6870 Woodlawn Avenue Northeast
Seattle, Washington

Scope of Work[1]	Schedule [2]
Compliance groundwater monitoring and sampling	1st, 2nd, 3rd, and 4th Quarters of 2020
Compliance groundwater monitoring and sampling report	Results submitted 6 weeks after each monitoring event
Compliance groundwater monitoring and sampling	1st, 2nd, 3rd, and 4th Quarters of 2021
Compliance groundwater monitoring and sampling report	Results submitted 6 weeks after each monitoring event
Compliance groundwater monitoring and sampling	2nd and 4th Quarters of 2022
Compliance groundwater monitoring and sampling report	Results submitted 6 weeks after each monitoring event
Compliance groundwater monitoring and sampling	2nd and 4th Quarters of 2023
Compliance groundwater monitoring and sampling report	Results submitted 6 weeks after each monitoring event
Compliance groundwater monitoring and sampling	2nd and 4th Quarters of 2024
Compliance groundwater monitoring and sampling report	Results submitted 6 weeks after each monitoring event
Compliance groundwater monitoring and sampling	2nd and 4th Quarters of 2025
Compliance groundwater monitoring and sampling report	Results submitted 6 weeks after each monitoring event
Compliance groundwater monitoring and sampling	2nd and 4th Quarters of 2026
Compliance groundwater monitoring and sampling report	Results submitted 6 weeks after each monitoring event
Trend analysis and preparation of new Performance Monitoring Plan, Compliance Monitoring Plan, and/or implementation of contingency measures.	1st Quarter 2027

NOTES:

[1]Well decommissioning will be determined based on the results of compliance monitoring events.

[2]Quarterly groundwater sampling events for 2 years, from 2020 through 2021. Semiannual groundwater sampling events for 5 years, from 2022 through 2026. Compliance and trend analysis of previous data and preparation of a new Performance Monitoring Plan, a Compliance Monitoring Plan, and/or implementation of contingency measures in 2027. Results reported as quarterly progress reports and/or as annual groundwater monitoring reports.

Table 2
Key Personnel and Responsibilities
Plastics Sales and Service Property
6870 Woodlawn Avenue Northeast
Seattle, Washington

Project Title	Name	Project Role	Organization	Mailing Address	Email Address	Phone
Regulatory Agency	Sunny Becker	Regulatory project management. Reviews and approves all submittals to Ecology.	Washington State Department of Ecology	3190 160th Avenue Southeast Bellevue, Washington 98008	hlin461@ecy.wa.gov	425-649-7187
Project Contact	Elliott Westerman	Property contact.	The Lutheran Retirement Home of Greater Seattle	6720 East Green Lake Way North Seattle, Washington 98103	ewesterman@hearthstone.org	206-517-2212
Project Principal	Thomas Cammarata	Reviews and oversees all project activities. Reviews all data and deliverables prior to submittal to project contact or Ecology.	SoundEarth Strategies, Inc.	2811 Fairview Avenue South, Suite 2000, Seattle, Washington 98102	tcammarta@soundearthinc.com	206-306-1900
Project Manager	Logan Schumacher	Overall project management, including GCMP development, field oversight, document preparation and submittal, and project coordination.	SoundEarth Strategies, Inc.	2811 Fairview Avenue South, Suite 2000, Seattle, Washington 98102	lschumacher@soundearthinc.com	206-306-1900
Project QA/QC Officer	Logan Schumacher	Coordinates with laboratory to ensure that GCMP requirements are followed and that laboratory QA objectives are met.	SoundEarth Strategies, Inc.	2811 Fairview Avenue South, Suite 2000, Seattle, Washington 98102	lschumacher@soundearthinc.com	206-306-1900
Field Coordinator	Logan Schumacher	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 Strategies, Inc.	2811 Fairview Avenue South Suite 2000 Seattle, Washington 98102	lschumacher@soundearthinc.com	206-306-1900
Field Staff	Various licensed geologists and environmental professionals	Reports to field coordinator. Conducts sampling activities.	SoundEarth Strategies, Inc.	2811 Fairview Avenue South, Suite 2000, Seattle, Washington 98102	various emails	206-306-1900
Data Manager	Logan Schumacher	Ensures that analytical data is incorporated into site database with appropriate qualifiers following validation.	SoundEarth Strategies, Inc.	2811 Fairview Avenue South, Suite 2000, Seattle, Washington 98102	lschumacher@soundearthinc.com	206-306-1900
Data Validation	Logan Schumacher	Coordinates with laboratory to ensure that the GCMP requirements and laboratory QA/QC objectives are met.	SoundEarth Strategies, Inc.	2811 Fairview Avenue South, Suite 2000, Seattle, Washington 98102	lschumacher@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 GCMP.	Friedman & Bruya, Inc.	3012 16th Avenue West Seattle, Washington 98119	merdahl@friedmanandbruya.com	206-285-8282

NOTES:

Ecology = Washington State Department of Ecology

GCMP = Groundwater Compliance Monitoring Plan

QA/QC = quality control/quality assurance

Table 3
Analytical Methods, Container, Preservation, and Holding Time Requirements
Plastics Sales and Service Property
6870 Woodlawn Avenue Northeast
Seattle, Washington

Analyte and Analytical Method	Size and Type of Container	Number of Containers	Preservation Requirements	Holding Time
Groundwater Samples				
CVOCs by EPA Method 8260C	40-mL VOA vial	3	HCl/4°C	14 days
Methane, Ethane, and Ethene by Method RSK 175	40-mL VOA vial	2	HCl/4°C	14 days
Chloride by EPA Method 300.0	250 ml HDPE	1	4°C	28 days
Sulfate by EPA Method 300.0	250 ml HDPE	1	4°C	28 days
Nitrate by EPA Method 300.0	250 ml HDPE	1	4°C	48 hours
Fatty Acids by Ion Chromatography	40 ml VOA vial	2	4°C	28 days
Total Organic Carbon by SM 5310C	250 ml HDPE	1	HCl/4°C	28 days
Total Manganese by EPA Method 200.8	250 ml HDPE	1	nitric acid/4°C	6 months
Ferrous Iron by EPA Method 3500	250 ml amber	1	HCl/4°C	24 hours
Total Iron by EPA Method 200.8	250 ml HDPE	1	nitric acid/4°C	6 months

NOTES:

°C = degrees Celsius

CVOC = chlorinated volatile organic compound

EPA = US Environmental Protection Agency

HCl = hydrochloric acid

HDPE = high density polyethylene

L = liter

mL = milliliter

oz = ounce

SM - standard method

VOA = volatile organic analysis

Table 4
Analytes, Analytical Methods, Laboratory Practical Quantitation Limits, and Applicable Regulatory Limits
Plastics Sales and Service Property
6870 Woodlawn Avenue Northeast
Seattle, Washington

Analyte	Analytical Method	Unit	Laboratory PQL[1]	Applicable Regulatory Limit[2]
Groundwater				
PCE	EPA Method 8260C	µg/L	<1	5/360[3]
TCE	EPA Method 8260C	µg/L	<1	5/500[3]
Vinyl Chloride	EPA Method 8260C	µg/L	<0.2	0.2/3[3]
cis-1,2-DCE	EPA Method 8260C	µg/L	<1	1680/280[3]
trans-1,2-DCE	EPA Method 8260C	µg/L	<1	160/280[3]
Methane, Ethane, Ethene	Method RSK 175	µg/L	<0.5	NA/NA
Chloride	EPA Method 300.0	µg/L	<2000	NA/NA
Sulfate	EPA Method 300.0	µg/L	<5000	NA/NA
Nitrate	EPA Method 300.0	µg/L	<50	NA/NA
Fatty Acids	EPA Method 300. 0 Modified	µg/L	<500	NA/100,000[3]
Total Organic Carbon	EPA Method 352.2	µg/L	<1000	NA/NA
Total Manganese	EPA Method 200.8	µg/L	<10	NA/NA
Ferrous Iron	EPA Method 3500	µg/L	<40	NA/NA
Total Iron	EPA Method 200.8	µg/L	<50	NA/NA

NOTES:

[1]Standard laboratory PQLs for Friedman & Bruya, Inc.

[2]MTCA Method A or B Cleanup Levels, Table 720-1 of Section 900 of Chapter 173-340 of the Washington Administrative Code, revised November 2007.

[3]From the King County Wastewater Permit for the Dry Cleaner Building Property (part of the Site).

< = less than

µg/L = micrograms per liter

DCE = dichloroethene

EPA = US Environmental Protection Agency

MTCA = Washington State Model Toxics Control Act

NA = not applicable

PCE = tetrachloroethene

PQL = practical quantitation limit

SM = standard method

TCE = trichloroethene

Table 5
Quantitative Goals of Data Quality Objectives
Plastics Sales and Service Property
6870 Woodlawn Avenue Northeast
Seattle, Washington

Analyte	Analytical Method	Precision[1]	Accuracy[2]			Completeness[3]	Sensitivity[4]
		RPD (%)	Surrogate (% Recovery)	MS (% Recovery)	LCS (% Recovery)	(%)	PQL[5]
PCE	EPA Method 8260C	20	36–160	36–160	50–150	95	<1
TCE	EPA Method 8260C	20	36–160	36–160	50–150	95	<1
cis-1,2-DCE	EPA Method 8260C	20	36–160	36–160	50–150	95	<1
Vinyl Chloride	EPA Method 8260C	20	36–160	36–160	50–150	95	<0.2

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.

[4]Sensitivity is measured by the laboratory PQL for each analyte.

[5]Standard PQLs for Friedman & Bruya, Inc., standard PQLs.

% = percent
< = less than
DCE = dichloroethene
Ecology = Washington State Department of Ecology
EPA = US Environmental Protection Agency
LCS = laboratory control sample
MS = matrix spike
PCE = tetrachloroethene
PQL = practical quantitation limit
RPD = relative percent difference
TCE = trichloroethene

Table 6
Summary of Groundwater Elevation Data
Plastic Sales and Service Site
6870 Woodlawn Avenue Northeast
Seattle, Washington

Well ID	Screened Interval (feet bgs)	TOC Elevation (feet msl)[1]	Total Well Depth (feet below TOC)[2]	Date Measured	Depth to Groundwater (feet below TOC)[2]	Groundwater Elevation (feet msl)[1]
Shallow Water Bearing Zone Wells						
MW01	4 to 19	178.24	18.42	08/05/04	7.91	170.33
			18.42	11/18/04	7.00	171.24
			--	01/07/05	5.91	172.33
			--	05/31/06	6.36	171.88
			--	06/22/06	8.22	170.02
			18.15	01/08/07	3.93	174.31
			18.15	04/20/07	5.38	172.86
			18.48	11/19/08	6.78	171.46
			18.37	05/03/10	6.33	171.91
			--	05/07/10	6.52	171.72
			--	09/09/14	11.19	167.05
			17.95	05/09/18	10.05	168.19
			18.37	10/24/18	15.82	162.42
			18.18	05/07/19	13.11	165.13
MW02	5 to 20	176.22	19.48	08/05/04	6.39	169.83
			19.50	11/18/04	6.41	169.81
			--	01/07/05	5.88	170.34
			--	05/31/06	5.75	170.47
			--	06/22/06	7.01	169.21
			--	01/08/07	4.56	171.66
			--	04/20/07	4.90	171.32
			19.31	11/19/08	6.86	169.36
			19.45	05/03/10	6.50	169.72
			--	05/07/10	6.48	169.74
			--	09/09/14	9.01	167.21
			19.22	05/09/18	7.62	168.60
			19.45	10/25/18	14.42	161.80
	Well damaged and repaired 2019					
MW03	5 to 20	175.87	19.55	08/05/04	6.56	169.31
			19.56	11/18/04	6.64	169.23
			--	01/07/05	5.86	170.01
			--	05/31/06	2.79	173.08
			--	06/22/06	3.69	172.18
			19.54	01/08/07	2.18	173.69
			19.54	04/20/07	1.96	173.91
			19.6	11/19/08	2.65	173.22
			19.45	05/03/10	2.54	173.33
			--	05/07/10	2.59	173.28
			--	09/09/14	5.92	169.95
			19.22	05/09/18	3.44	172.43
			19.45	10/24/18	14.23	161.64
			19.37	05/07/19	9.45	166.42
MW04	4 to 18	176.15	18.08	08/05/04	7.66	168.49
			18.08	11/18/04	7.35	168.80
			--	01/07/05	6.82	169.33
			--	05/31/06	7.88	168.27
			--	06/22/06	8.19	167.96
			17.95	01/08/07	5.80	170.35
			17.95	04/20/07	6.49	169.66
			17.61	11/19/08	8.45	167.70
			17.54	05/03/10	8.02	168.13
			--	05/04/10	8.09	168.06
			--	05/07/10	7.98	168.17
			--	09/09/14	10.26	165.89
	Monitoring Well Decommissioned					

Table 6
Summary of Groundwater Elevation Data
Plastic Sales and Service Site
6870 Woodlawn Avenue Northeast
Seattle, Washington

Well ID	Screened Interval (feet bgs)	TOC Elevation (feet msl)[1]	Total Well Depth (feet below TOC)[2]	Date Measured	Depth to Groundwater (feet below TOC)[2]	Groundwater Elevation (feet msl)[1]
Shallow Water Bearing Zone Wells						
MW05	2.5 to 17.5	177.37	17.45	08/05/04	8.71	168.66
			17.45	11/18/04	7.86	169.51
			--	01/07/05	7.15	170.22
			--	05/31/06	7.50	169.87
			--	06/22/06	9.12	168.25
			17.44	01/08/07	2.90	174.47
			17.44	04/20/07	6.63	170.74
			17.47	11/19/08	8.30	169.07
			17.45	05/03/10	7.54	169.83
			--	05/04/10	7.87	169.50
			--	05/07/10	8.01	169.36
			--	09/09/14	10.97	166.40
			15.64	05/09/18	10.02	167.35
			16.05	05/07/19	11.74	165.63
MW06	15 to 20	176.26	--	11/18/04	--	--
			--	01/07/05	--	--
			--	05/31/06	--	--
			--	06/22/06	--	--
			--	01/08/07	8.84	167.42
			--	04/20/07	--	--
			19.93	05/03/10	10.4	165.86
			--	05/07/10	10.52	165.74
			--	09/09/14	11.53	164.73
			19.8	05/09/18	11.68	164.58
			20.00	05/07/19	10.61	165.65
MW15	5 to 20	176.62	18.12	05/31/06	6.76	169.86
			--	06/22/06	7.36	169.26
			18.15	01/08/07	5.63	170.99
			18.15	04/20/07	6.68	169.94
			18.2	11/19/08	9.21	167.41
			18.18	05/03/10	4.23	172.39
			--	05/07/10	4.22	172.40
			--	09/09/14	11.02	165.60
			17.95	05/09/18	10.21	166.41
			--	10/25/18	12.53	164.09
			18.24	05/07/19	11.31	165.31
MW16	5 to 20	175.60	19.45	05/31/06	4.56	171.04
			--	06/22/06	6.21	169.39
			--	01/08/07	3.91	171.69
			--	04/20/07	4.29	171.31
			19.6	11/19/08	5.03	170.57
			19.60	05/03/10	5.30	170.30
			--	05/07/10	5.44	170.16
			--	09/09/14	9.34	166.26
			19.43	05/09/18	5.35	170.25
			18.18	10/22/18	11.36	164.24
			19.67	05/07/19	6.41	169.19
MW17	5 to 20	175.79	19.19	05/31/06	4.29	171.50
			--	06/22/06	5.82	169.97
			--	01/08/07	3.67	172.12
			--	04/20/07	4.03	171.76
	Monitoring Well Decommissioned					
MW19	10 to 20	180.68	19.8	11/20/08	9.68	171.00
			19.72	05/03/10	9.17	171.51
			--	05/04/10	9.54	171.14
			--	05/07/10	9.40	171.28
			--	09/09/14	14.57	166.11
			19.62	05/09/18	13.10	167.58
			19.72	10/24/18	14.54	166.14
			19.81	05/07/19	13.60	167.08

Table 6
Summary of Groundwater Elevation Data
Plastic Sales and Service Site
6870 Woodlawn Avenue Northeast
Seattle, Washington

Well ID	Screened Interval (feet bgs)	TOC Elevation (feet msl)[1]	Total Well Depth (feet below TOC)[2]	Date Measured	Depth to Groundwater (feet below TOC)[2]	Groundwater Elevation (feet msl)[1]
Shallow Water Bearing Zone Wells						
MW21	14 to 24	175.93	23.74	11/19/08	10.21	165.72
			23.74	05/03/10	9.70	166.23
			--	05/07/10	9.73	166.20
			--	09/09/14	11.24	164.69
			23.55	05/09/18	10.28	165.65
			23.74	10/24/18	13.65	162.28
			23.90	05/07/19	11.20	164.73
MW23	10 to 20	176.03	20.15	11/19/08	10.81	165.22
			20.15	05/03/10	10.17	165.86
			--	05/07/10	10.32	165.71
	Monitoring Well Decommissioned					
MW24	8 to 18	177.62	17.25	11/19/08	9.34	168.28
			17.34	05/03/10	8.89	168.73
			--	05/04/10	8.96	168.66
			--	05/07/10	8.95	168.67
			17.34	09/09/14	12.19	165.43
			17.10	05/09/18	11.88	165.74
			17.34	10/24/18	12.88	164.74
			17.43	05/07/19	12.28	165.34
MW25	8 to 18	176.95	18.29	05/03/10	9.85	167.10
			--	05/04/10	10.02	166.93
			--	05/07/10	9.86	167.09
			--	09/09/14	11.85	165.10
			14.75	05/09/18	11.71	165.24
			17.34	10/24/18	12.55	164.40
			16.65	05/07/19	11.91	165.04
MW26	8 to 18	177.83	18.18	05/03/10	8.71	169.12
			--	05/04/10	8.81	169.02
			--	05/07/10	8.75	169.08
			18.18	09/09/14	12.63	165.20
			17.82	05/09/18	12.10	165.73
			18.18	10/24/18	13.00	164.83
			18.08	05/07/19	12.26	165.57
TMW01	8 to 18	176.98	18.75	04/05/10	5.12	171.86
			18.80	05/04/10	5.27	171.71
			--	05/07/10	5.31	171.67
TMW02	8 to 18	176.91	18.79	04/05/10	5.62	171.29
			18.83	05/04/10	6.31	170.60
			--	05/07/10	6.25	170.66
TMW03	8 to 18	177.14	18.22	04/05/10	6.96	170.18
			18.25	05/04/10	7.53	169.61
			--	05/07/10	7.52	169.62
MW27	8.5 to 13.5	--	13.5	06/28/11	--	--
			--	09/09/14	11.54	--
			12.90	05/09/18	10.80	--
			13.20	05/07/19	11.31	--
MW28	5 to 18	--	18.61	05/07/19	10.27	--
Deep Water Bearing Zone Wells						
MW07	21 to 31	176.56	31.00	12/06/04	7.45	169.11
			--	01/07/05	7.30	169.26
			--	05/31/06	8.09	168.47
			--	06/22/06	8.42	168.14
			31.01	01/08/07	6.52	170.04
		176.59	--	04/20/07	7.00	169.59
			30.67	11/19/08	8.38	168.21
			30.84	05/03/10	7.99	168.60
			--	05/07/10	8.04	168.55
			--	09/09/14	10.37	166.22
	Monitoring Well Decommissioned					

Table 6
Summary of Groundwater Elevation Data
Plastic Sales and Service Site
6870 Woodlawn Avenue Northeast
Seattle, Washington

Well ID	Screened Interval (feet bgs)	TOC Elevation (feet msl)[1]	Total Well Depth (feet below TOC)[2]	Date Measured	Depth to Groundwater (feet below TOC)[2]	Groundwater Elevation (feet msl)[1]
Deep Water Bearing Zone Wells						
MW08	30 to 40	175.90	40.09	12/06/04	6.55	169.35
			--	01/07/05	6.34	169.56
			--	05/31/06	6.35	169.55
			--	06/22/06	7.55	168.35
			40.09	01/08/07	5.54	170.36
			40.09	01/08/07	5.98	169.92
			40.15	11/19/08	9.00	166.90
			40.15	05/03/10	8.49	167.41
			--	05/07/10	8.51	167.39
			--	09/09/14	10.32	165.58
			39.96	05/09/18	9.35	166.55
			40.15	10/25/18	10.38	165.52
			40.82	05/07/19	15.38	160.52
MW09	30 to 40	176.43	39.81	12/06/04	6.81	169.62
			--	01/07/05	6.49	169.94
			--	05/31/06	6.34	170.09
			--	06/22/06	7.48	168.95
			39.75	01/08/07	5.85	170.58
			39.75	04/20/07	6.01	170.42
			39.81	11/19/08	7.30	169.13
			39.80	05/03/10	6.74	169.69
			--	05/07/10	6.73	169.70
			--	09/09/14	9.25	167.18
			39.60	05/09/18	5.50	170.93
			39.80	10/25/18	12.92	163.51
			39.56	05/07/19	9.10	167.33
MW10	30 to 40	176.01	39.98	12/06/04	7.12	168.89
			--	01/07/05	6.89	169.12
			--	05/31/06	6.99	169.02
			--	06/22/06	8.12	167.89
			--	01/08/07	6.05	169.96
			--	04/20/07	6.57	169.44
			40.01	11/19/08	10.21	165.80
			40.00	05/03/10	9.72	166.29
			--	05/07/10	9.75	166.26
			--	09/09/14	11.26	164.75
			39.82	05/09/18	10.32	165.69
			40.00	10/25/18	13.81	162.20
			40.24	05/07/19	11.10	164.91
MW11	57.5 to 67.5	178.99	64.30	05/31/06	7.71	171.28
			--	06/22/06	8.78	170.21
			64.28	01/08/07	7.30	171.69
			64.28	04/20/07	7.38	171.61
			65.30	11/19/08	8.34	170.65
			65.24	05/03/10	7.73	171.26
			--	05/07/10	7.69	171.30
			64.91	09/09/14	11.00	167.99
			--	05/09/18	Inaccessible	
MW12	57 to 67	176.95	62.51	05/31/06	7.31	169.64
			--	06/22/06	8.40	168.55
			66.55	01/08/07	7.04	169.91
			66.55	04/20/07	7.05	169.90
			66.10	11/19/08	7.92	169.03
			65.78	05/03/10	7.35	169.60
			--	05/07/10	7.32	169.63
			--	09/09/14	9.38	167.57
			65.60	05/09/18	8.67	168.28
			65.78	10/25/18	11.47	165.48
			66.80	05/07/19	9.31	167.64

Table 6
Summary of Groundwater Elevation Data
Plastic Sales and Service Site
6870 Woodlawn Avenue Northeast
Seattle, Washington

Well ID	Screened Interval (feet bgs)	TOC Elevation (feet msl)[1]	Total Well Depth (feet below TOC)[2]	Date Measured	Depth to Groundwater (feet below TOC)[2]	Groundwater Elevation (feet msl)[1]
Deep Water Bearing Zone Wells						
MW13	55.5 to 65.5	177.03	62.90	05/31/06	6.31	170.72
			--	06/22/06	7.40	169.63
			66.18	01/08/07	5.96	171.07
			66.18	04/20/07	6.01	171.02
			66.22	11/19/08	6.95	170.08
			66.21	05/03/10	6.35	170.68
			--	05/07/10	6.30	170.73
			--	09/09/14	9.02	168.01
			66.05	05/09/18	8.26	168.77
			66.21	10/25/18	12.69	164.34
			67.30	05/07/19	8.95	168.08
MW14	63 to 73	176.50	72.81	05/31/06	6.55	169.95
			--	06/22/06	6.65	169.85
			71.8	01/08/07	5.18	171.32
		176.72	--	04/20/07	5.47	171.25
			72.16	11/19/08	6.45	170.27
			72.05	05/03/10	5.86	170.86
			--	05/07/10	5.81	170.91
			--	09/09/14	8.74	167.98
	Monitoring Well Decommissioned					
MW18	68 to 78	175.91	77.42	05/31/06	6.89	169.02
			--	06/22/06	7.84	168.07
			78.05	01/08/07	6.04	169.87
			78.05	04/20/07	6.26	169.65
	Monitoring Well Decommissioned					
MW20	40 to 50	177.62	49.19	11/19/08	7.16	170.46
			48.49	05/03/10	6.56	171.06
			--	05/07/10	6.50	171.12
	Monitoring Well Decommissioned					
MW22	39.5 to 49.5	177.23	49.2	11/19/08	7.18	170.05
			49.20	05/03/10	6.59	170.64
			--	05/07/10	6.53	170.70
			--	09/09/14	9.44	167.79
			48.40	05/09/18	8.64	168.59
			49.20	10/24/18	12.88	164.35
			49.31	05/07/19	13.36	163.87
MW29	25 to 65	--	64.35	05/07/19	8.44	--

NOTES:

[1]Initial elevation data for wells obtained from the Draft Final Remedial Investigation/Feasibility Study Report prepared by Farallon and dated July 2013. Farallon survey based on North American Vertical Datum of 1988.

[2]As measured from a fixed spot on the well TOC.

-- = not measured
bgs = below ground surface
Farallon = Farallon Consulting LLC
msl = mean sea level
TOC = top of casing

Table 7
Groundwater Analytical Results for CVOCs
Plastic Sales and Service Site
6870 Woodlawn Avenue Northeast
Seattle, Washington

Well ID	Sample ID	Sampled By	Sample Date	Sample Point Depth (feet bgs)	Analytical Results[1] (micrograms per liter) PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	Vinyl Chloride
Shallow Zone Wells										
MW01	MW-1	GeoEngineers	10/30/03	--	< 2.0	< 2.0	< 2.0	< 2.0	--	< 2.0
	MW1-060206	Farallon	06/02/06	16.42	1.1	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW1-112008	Farallon	11/20/08	16.48	1.5	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW1-050410	Farallon	05/04/10	11.50	1.8	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW01-20140910	SoundEarth	09/10/14	13.50	1.6	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	MW01-20181024	SoundEarth	10/24/18	11.50	0.85	< 0.20	< 0.20	< 0.20	--	< 0.20
MW02	MW-2	GeoEngineers	10/30/03	--	< 2.0	< 2.0	< 2.0	< 2.0	--	< 2.0
	MW2-060106	Farallon	06/01/06	17.50	< 0.2	**5.5**	< 0.2	< 0.2	--	< 0.2
	MW2-111908	Farallon	11/19/08	17.31	**6.80**	4.6	< 0.2	< 0.2	--	< 0.2
	MW2-050410	Farallon	05/04/10	12.50	**9.50**	3.5	< 0.2	< 0.2	--	< 0.2
	MW02-20140910	SoundEarth	09/10/14	11.50	4.0	0.49	< 0.2	< 0.2	< 0.2	< 0.2
	MW02-20181025	SoundEarth	10/25/18	12.50	1.7	0.61	< 0.20	< 0.20	--	< 0.20
MW03	MW-3	GeoEngineers	10/30/03	--	**170**	< 2.0	< 2.0	< 2.0	--	< 2.0
	MW3-060106	Farallon	06/01/06	17.56	**150**	1.1	< 1.0	< 1.0	--	< 1.0
	MW3-111908	Farallon	11/19/08	17.60	**230**	1.6	2.0	< 1.0	--	< 1.0
	MW3-050410	Farallon	05/04/10	12.50	**150**	< 1.0	< 1.0	< 1.0	--	< 1.0
	MW03-20140910	SoundEarth	09/10/14	8.50	**64**	0.58	0.79	< 0.2	< 0.2	< 0.2
	MW03-20181025	SoundEarth	10/25/18	12.50	**54**	0.61	< 0.40	< 0.40	--	< 0.40
MW04	MW-4	GeoEngineers	10/30/03	--	**2,100**	**220**	**92**	< 2.0	--	**20**
	MW4-080504	Farallon	08/05/04	16.00	**860**	**1200**	**250**	< 10	--	**68**
	MW4-060206	Farallon	06/02/06	16.08	**1,100**	**730**	**590**	< 10	--	**170**
	MW4-042007	Farallon	04/20/07	14.95	**3,100**	**720**	**940**	< 20	--	**160**
	MW4-112008	Farallon	11/20/08	15.61	**10,000**	**640**	**1,100**	< 50	--	**130**
	MW4-050510	Farallon	05/05/10	11.00	**10,000**	**1,000**	**1,600**	< 50	--	**370**
	MW04-20140910	SoundEarth	09/10/14	12.50	**28,000**	**3,400**	**3,800**	< 200	< 200	**920**
MW05	MW-5	GeoEngineers	10/30/03	--	**270**	**46**	< 2.0	< 2.0	--	< 2.0
	MW5-060106	Farallon	06/01/06	15.45	**54**	**9.6**	3.3	< 0.4	--	< 0.4
	MW5-20080328	SoundEarth	03/28/08	--	**19**	**110**	**40**	< 1	--	**2.8**
	MW5-112008	Farallon	11/20/08	15.47	**86**	**67**	**37**	1.4	--	**5.5**
	MW5-050410	Farallon	05/04/10	10.00	**82**	**34**	**27**	0.44	--	**0.88**
	MW05-20140911	SoundEarth	09/11/14	13.50	**71**	**22**	5.6	0.27	< 0.2	< 0.2
	MW05-20190207	SoundEarth	02/07/19	14.00	**36**	**7.6**	1.7	< 0.20	< 0.20	< 0.20
MW06	MW-6	GeoEngineers	11/08/04	--	**29**	**18**	11	< 2.0	--	**6**
	MW6-050410	Farallon	05/04/10	14.50	**4,100**	**330**	**440**	< 20	--	**110**
	MW06-20141007	SoundEarth	10/07/14	17.50	**10,000**	**450**	**320**	< 50	< 0.050	**72**
	MW06-20190207	SoundEarth	02/07/19	17.50	**1,800**	**510**	**600**	< 10	< 10	**170**
MW15	MW15-060106	Farallon	06/01/06	16.12	0.22	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW15-112008	Farallon	11/20/08	13.20	0.26	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW15-050410	Farallon	05/04/10	12.50	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW15-20140910	SoundEarth	09/10/14	17.50	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	MW15-20181022	SoundEarth	10/22/18	12.50	0.78	< 0.20	0.87	< 0.20	--	< 0.20
MW16	MW16-060106	Farallon	06/01/06	17.45	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW16-111908	Farallon	11/19/08	17.60	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW16-050510	Farallon	05/05/10	12.50	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW16-20140909	SoundEarth	09/09/14	12.00	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	MW16-20181022	SoundEarth	10/22/18	12.50	< 0.20	< 0.20	< 0.20	< 0.20	--	< 0.20
MW17	MW17-060106	Farallon	06/01/06	17.19	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	Monitoring Well Decommissioned									
MW19	MW17-20080328	SoundEarth	03/28/08	--	< 1	< 1	< 1	< 1	--	< 0.2
	MW19-20090311	SoundEarth	03/11/09	--	< 1	< 1	< 1	< 1	--	< 0.2
	MW19-050310	Farallon	05/03/10	15.00	< 1	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW19-20140909	SoundEarth	09/09/14	17.00	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	MW19-20181024	SoundEarth	10/24/18	15.00	< 0.20	< 0.20	< 0.20	< 0.20	--	< 0.20
MW21	MW21-112008	Farallon	11/20/08	21.74	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW21-050410	Farallon	05/04/10	19.00	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW21-20140909	SoundEarth	09/09/14	19.00	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	**0.73**
	MW21-20181022	SoundEarth	10/22/18	19.00	< 0.20	< 0.20	1.7	< 0.20	--	**0.37**
MW23	MW23-112008	Farallon	11/20/08	18.15	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW23-050410	Farallon	05/04/10	15.00	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	Monitoring Well Decommissioned									
MTCA Cleanup Levels for Groundwater					**5[2]**	**5[2]**	**16[3]**	**160[3]**	**400[3]**	**0.2[2]**

SoundEarth Strategies

Table 7
Groundwater Analytical Results for CVOCs
Plastic Sales and Service Site
6870 Woodlawn Avenue Northeast
Seattle, Washington

Well ID	Sample ID	Sampled By	Sample Date	Sample Point Depth (feet bgs)	Analytical Results[1] (micrograms per liter)					
					PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	Vinyl Chloride
Shallow Zone Wells										
MW24	MW18-20080328	SoundEarth	03/28/08	--	650	< 10	< 10	< 10	--	< 2.0
	MW24-112008	Farallon	11/20/08	15.25	360	3.4	< 2.0	< 2.0	--	< 2.0
	MW24-20090304	Farallon	03/04/09	--	290	< 10	< 10	< 10	--	< 2.0
	MW24-050510	Farallon	05/05/10	13.00	40	0.42	< 0.2	< 0.2	--	< 0.2
	MW24-20140910	SoundEarth	09/10/14	15.00	17	0.27	< 0.2	< 0.2	< 0.2	< 0.2
	MW24-20181024	SoundEarth	10/24/18	13.00	20	0.24	< 0.20	< 0.20	--	< 0.20
MW25	MW25-050410	Farallon	05/04/10	13.00	14	0.31	1.1	< 0.2	--	< 0.2
	MW25-20141007	SoundEarth	10/07/14	14.00	12	0.36	0.37	< 0.2	--	< 0.2
	MW25-20181025	SoundEarth	10/25/18	13.00	0.28	< 0.20	0.75	< 0.20	--	< 0.20
MW26	MW26-050410	Farallon	05/04/10	13.00	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW26-20140910	SoundEarth	09/10/14	15.00	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	MW26-20181022	SoundEarth	10/22/18	13.00	0.24	< 0.20	< 0.20	< 0.20	--	< 0.20
MW27	MW27-070111	Farallon	07/01/11	11.00	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW27-20141007	SoundEarth	10/07/14	12.00	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	MW27-20190207	SoundEarth	02/07/19	13.00	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
MW28	MW28-20190604	SoundEarth	06/04/19	14.00	3.1	4.9	50	< 0.80	--	16
TMW01	TMW-1-040510	Farallon	04/05/10	13.75	15	0.29	< 0.2	< 0.2	--	< 0.2
	TMW-1-20100405	SoundEarth	04/05/10	--	16	< 1	< 1	< 1	--	< 0.2
TMW02	TMW-2-040510	Farallon	04/05/10	13.79	110	1.5	< 1.0	< 1.0	--	< 1.0
	TMW-2-20100405	SoundEarth	04/05/10	--	150	1.5	< 1	< 1	--	< 0.2
TMW03	TMW-3-040510	Farallon	04/05/10	13.22	310	3.6	< 2.0	< 2.0	--	< 2.0
	TMW-3-20100405	SoundEarth	04/05/10	--	350	3.7	< 1	< 1	--	< 0.2
IW33	IW33-20190312	SoundEarth	03/12/19	13.00	6.3	< 1	< 1	< 1	--	< 0.2
Deep Zone Wells										
MW07	MW7-111904-01	Farallon	11/19/04	26.00	7,000	47	< 20	< 20	--	< 20
	MW7-060206	Farallon	06/02/06	29.00	530	16	< 4.0	< 4.0	--	< 4.0
	MW7-042007	Farallon	04/20/07	28.00	2.5	< 2.0	< 2.0	< 2.0	--	< 2.0
	MW7-112008	Farallon	11/20/08	28.67	18.0	0.69	< 2.0	< 2.0	--	< 2.0
	MW7-050410	Farallon	05/04/10	26.00	12.0	0.49	< 0.2	< 0.2	--	< 0.2
	MW07-20140910	SoundEarth	09/10/14	26.00	4.5	0.26	< 0.2	< 0.2	< 0.2	< 0.2
MW08	MW8-111904-01	Farallon	11/19/04	35.00	0.36	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW8-060106	Farallon	06/01/06	38.09	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW8-111908	Farallon	11/19/08	38.15	0.70	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW8-050510	Farallon	05/04/10	35.00	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW08-20140909	SoundEarth	09/09/14	30.00	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	MW08-20181025	SoundEarth	10/25/18	37.50	< 0.20	< 0.20	< 0.20	< 0.20	--	< 0.20
MW09	MW9-111904-01	Farallon	11/19/04	35.00	210	< 1.0	< 1.0	< 1.0	--	< 1.0
	MW9-060106	Farallon	06/01/06	37.81	390	< 2.0	< 2.0	< 2.0	--	< 2.0
	MW9-042007	Farallon	04/20/07	36.75	410	< 2.0	< 2.0	< 2.0	--	< 2.0
	MW9-112008	Farallon	11/20/08	37.81	220	< 2.0	< 2.0	< 2.0	--	< 2.0
	MW9-050410	Farallon	05/04/10	35.00	190	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW09-20140910	SoundEarth	09/10/14	35.00	89	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	MW09-20181024	SoundEarth	10/24/18	35.00	160	< 1.0	< 1.0	< 1.0	--	< 1.0
MW10	MW10-111904-01	Farallon	11/19/04	34.98	2.50	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW10-060106	Farallon	06/01/06	37.98	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW10-042007	Farallon	04/20/07	37.00	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW10-112008	Farallon	11/20/08	38.01	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW10-050410	Farallon	05/04/10	35.00	3.30	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW10-20140910	SoundEarth	09/10/14	35.00	600	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	MW10-20181024	SoundEarth	10/24/18	35.00	210	< 0.20	< 0.20	< 0.20	--	< 0.20
	MW10-20190409	SoundEarth	04/09/19[4]	45.00	21	1.1	1.8	< 0.20	--	< 0.20
MW11	MW11-060206	Farallon	06/02/06	62.30	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW11-112008	Farallon	11/20/08	63.30	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW11-050310	Farallon	05/03/10	62.50	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW11-20141007	SoundEarth	10/07/14	62.50	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
MW12	MW12-060206	Farallon	06/02/06	60.51	0.76	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW12-111908	Farallon	11/19/08	64.10	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW12-050310	Farallon	05/03/10	62.00	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW12-20140909	SoundEarth	09/09/14	62.00	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	MW12-20181024	SoundEarth	10/24/18	62.00	< 0.20	< 0.20	< 0.20	< 0.20	--	< 0.20
MTCA Cleanup Levels for Groundwater					**5[2]**	**5[2]**	**16[3]**	**160[3]**	**400[3]**	**0.2[2]**

Table 7
Groundwater Analytical Results for CVOCs
Plastic Sales and Service Site
6870 Woodlawn Avenue Northeast
Seattle, Washington

Well ID	Sample ID	Sampled By	Sample Date	Sample Point Depth (feet bgs)	Analytical Results[1] (micrograms per liter) PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	Vinyl Chloride
Deep Zone Wells										
MW13	MW13-060206	Farallon	06/02/06	60.90	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW13-042007	Farallon	04/20/07	63.18	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW13-111908	Farallon	11/19/08	64.22	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW13-050310	Farallon	05/03/10	60.00	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW13-20140909	SoundEarth	09/09/14	60.00	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	MW13-20181024	SoundEarth	10/24/18	60.50	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
MW14	MW14-060206	Farallon	06/02/06	71.31	0.99	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW14-032507	Farallon	03/25/07	70.08	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW14-042007	Farallon	04/20/07	68.80	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW14-112008	Farallon	11/20/08	70.16	1.10	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW14-050410	Farallon	05/04/10	68.00	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW14-20140910	SoundEarth	09/10/14	68.00	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
MW18	MW18-060106	Farallon	06/01/06	75.92	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	Monitoring Well Decommissioned									
MW20	MW20-112008	Farallon	11/20/08	47.19	0.28	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW20-050410	Farallon	05/04/10	45.00	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	Monitoring Well Decommissioned									
MW22	MW22-112008	Farallon	11/20/08	47.19	< 0.2	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW22-050410	Farallon	05/04/10	44.00	< 1.0	< 0.2	< 0.2	< 0.2	--	< 0.2
	MW22-20140910	SoundEarth	09/10/14	44.50	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	MW22-20181024	SoundEarth	10/24/18	44.50	< 0.20	< 0.20	< 0.20	< 0.20	--	< 0.20
MW29	MW29-20190521	SoundEarth	05/21/19	45.00	**11**	0.62	< 0.20	< 0.20	--	< 0.20
IW34	IW34-20190409	SoundEarth	04/09/19[4]	45.00	**230**	**21**	11	4.0	--	**1.0**
IW36	IW36-20190409	SoundEarth	04/09/19[4]	45.00	0.37	< 0.20	< 0.20	< 0.20	--	< 0.20
MTCA Cleanup Levels for Groundwater					**5[2]**	**5[2]**	**16[3]**	**160[3]**	**400[3]**	**0.2[2]**

NOTES:

Red denotes concentration exceeds MTCA cleanup level for groundwater.

[1]Analyzed by U.S. Environmental Protection Agency Method 8260B or 8260C.

[2]MTCA Cleanup Regulation, Chapter 173-340-900 of WAC, Table 720-1 Method A Cleanup Levels for Groundwater, revised November 2007.

[3]MTCA Cleanup Regulation, Chapter 173-340 of WAC, CLARC, Groundwater, Method B, Non-Carcinogen, Standard Formula Value, CLARC Website <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.

[4]Sample was taken with a passive diffusion bag sampler.

-- = not analyzed

< = not detected at a concentration above the laboratory reporting limit

bgs = below ground surface

CLARC = cleanup levels and risk calculations

CVOC = chlorinated volatile organic compound

DCE = dichloroethene

Farallon = Farallon Consulting, L.L.C.

GeoEngineers = GeoEngineers, Inc.

MTCA = Washington State Model Toxics Control Act

PCE = tetrachloroethene

SoundEarth = SoundEarth Strategies, Inc.

TCE = trichloroethene

WAC = Washington Administrative Code

SoundEarth Strategies

Table 8
Natural Attenuation Parameters
Plastic Sales and Service Site
6870 Woodlawn Avenue Northeast
Seattle, Washington

Well ID	Sample ID	Sample Date	Analytical Results (milligrams per liter)										
			Dissolved Oxygen[1]	Nitrate[2]	Total Manganese[3]	Dissolved Manganese[3]	Total Iron[3]	Ferrous Iron[4]	Ferric Iron[5]	Sulfate[6]	Methane[7]	Ethane[7]	Ethene[7]
Shallow Zone Wells													
MW01	MW1-060206	06/02/06	4.16	16	--	0.02	1.30	0.00	1.30	16	<0.01	<0.01	<0.01
	MW1-20140910	09/10/14	1.24	4.1	--	<0.011	<0.06	0.041	0.00	26	<0.0005	<0.0005	<0.0005
	MW01-20181024	10/24/18	2.60	--	--	--	--	--	--	--	--	--	--
MW02	MW02-20181025	10/25/18	3.41	--	--	--	--	--	--	--	--	--	--
MW03	MW03-20181025	10/25/18	1.80	--	--	--	--	--	--	--	--	--	--
MW15	MW15-20181022	10/22/18	1.71	2.5	36	--	210	<0.040	--	65	2.1	<0.50	<0.50
MW16	MW16-20181022	10/22/18	2.53	--	--	--	--	--	--	--	--	--	--
MW19	MW19-20181024	10/24/18	3.60	--	--	--	--	--	--	--	--	--	--
MW21	MW21-20181022	10/22/18	1.10	<0.050	1,600	--	460	0.093	--	67	43	<3.0	<3.0
MW24	MW24-20181024	10/24/18	5.45	--	--	--	--	--	--	--	--	--	--
MW25	MW25-20181025	10/25/18	7.14	--	--	--	--	--	--	--	--	--	--
MW26	MW26-20181022	10/22/18	3.22	--	--	--	--	--	--	--	--	--	--
Deep Zone Wells													
MW07	MW7-060206	06/02/06	0.11	<0.15	--	0.10	4.30	0.00	4.30	65	0.33	<0.01	<0.01
	MW07-20140910	09/10/14	0.34	2.7	--	<0.011	<0.06	0.173	0.00	32	<0.0005	<0.0005	<0.0005
MW08	MW08-20140909	09/09/14	0.22	<0.050	--	0.17	<0.06	0.059	0.00	43	<0.0005	<0.0005	<0.0005
	MW08-20181025	10/25/18	1.78	<0.050	600	--	190	0.087	--	41	<1.0	<0.50	<0.50
MW09	MW09-20140910	09/10/14	2.90	4.7	--	<0.011	<0.06	<0.04	0.00	27	<0.0005	<0.0005	<0.0005
	MW09-20181024	10/24/18	4.52	5.1	47	--	130	0.09	--	25	<1.0	<0.50	<0.50
MW10	MW10-20140910	09/10/14	0.29	<0.050	--	0.1	<0.06	0.048	0.00	37	<0.0005	<0.0005	<0.0005
	MW10-20181024	10/24/18	1.05	<0.050	180	--	220	<0.040	--	45	2.8	<0.50	<0.50
MW11	MW11-060206	06/02/06	0.32	2.8	--	0.25	2.80	0.00	2.80	35	<0.01	<0.01	<0.01
	MW11-20141007	10/07/14	0.22	<0.050	--	0.019	<0.06	0.889	0.00	50	0.042	<0.003	<0.003
MW12	MW12-060206	06/02/06	0.11	<0.15	--	0.11	4.20	0.00	4.20	39	<0.01	<0.01	<0.01
	MW12-20181024	10/24/18	1.36	--	--	--	--	--	--	--	--	--	--
MW13	MW13-060206	06/02/06	0.11	<0.15	--	0.24	2.20	0.00	2.20	35	<0.01	<0.01	<0.01
	MW13-20181024	10/24/18	3.66	--	--	--	--	--	--	--	--	--	--

Table 8
Natural Attenuation Parameters
Plastic Sales and Service Site
6870 Woodlawn Avenue Northeast
Seattle, Washington

Well ID	Sample ID	Sample Date	Analytical Results (milligrams per liter)										
			Dissolved Oxygen[1]	Nitrate[2]	Total Manganese[3]	Dissolved Manganese[3]	Total Iron[3]	Ferrous Iron[4]	Ferric Iron[5]	Sulfate[6]	Methane[7]	Ethane[7]	Ethene[7]
MW14	MW14-060206	06/02/06	0.10	<0.15	--	0.32	1.90	0.00	1.90	34	<0.01	<0.01	<0.01
MW22	MW22-20140910	09/10/14	5.95	4.9	--	<0.011	<0.06	<0.04	0.00	24	<0.0005	<0.0005	<0.0005
	MW22-20181024	10/24/18	5.24	--	--	--	--	--	--	--	--	--	--

NOTES:

[1]Analyzed by field instrument.

[2]Analyzed by EPA Method 353.2.

[3]Analyzed by EPA Method 6010C or 6010D.

[4]Analyzed by EPA Method SM 3500-Fe B or Field Kit Instrument.

[5]Ferric Iron = Total Iron minus Ferrous Iron. If concentrations of Ferrous Iron are non-detect, Ferric Iron is assumed to be equal to Total Iron.

[6]Analyzed by ASTM D516-07.

[7]Analyzed by Method RSK 175.

-- = not analyzed/not measured

< = not detected at a concentration above the laboratory reporting limit

ASTM = American Society for Testing and Materials

EPA = US Environmental Protection Agency

Table 9
Geochemical and Water Quality Parameters
Plastic Sales and Service Site
6870 Woodlawn Avenue Northeast
Seattle, Washington

Well ID	Sample ID	Sample Date	ORP[1] (mV)	Specific Conductivity[1] (mS/cm)	Turbidity[1] (NTU)	Temperature[1] (°C)	pH[1]	Alkalinity[2] (mg/L $CaCO_3$)	Total Organic Carbon[3] (mg/L)
Shallow Zone Wells									
MW01	MW1-060206	06/02/06	198.6	--	--	14.37	6.71	--	--
	MW01-20140910	09/10/14	120	0.371	367.0	19.74	6.61	150	1.5
	MW01-20181024	10/24/18	106.0	0.437	--	15.04	6.59	--	--
MW02	MW02-20181025	10/25/18	106.9	0.517	21.0	15.73	6.99	--	--
MW03	MW03-20181025	10/25/18	143.7	0.552	54.6	16.71	7.28		
MW15	MW15-20181022	10/22/18	107.7	0.599	5.39	16.59	6.79	--	2.2
MW16	MW16-20181022	10/22/18	86.0	0.485	3.14	16.31	6.70	--	--
MW19	MW19-20181024	10/24/18	126.2	0.770	7.32	16.00	6.99	--	--
MW21	MW21-20181022	10/22/18	79.2	0.528	8.55	16.28	7.81	--	5.4
MW24	MW24-20181024	10/24/18	154.1	0.441	2.88	15.58	7.00	--	--
MW25	MW25-20181025	10/25/18	101.0	0.051	369	15.78	7.09	--	--
MW26	MW26-20181022	10/22/18	105.4	0.262	3.89	15.61	7.26	--	--
Deep Zone Wells									
MW07	MW7-060206	06/02/06	20.6	--	--	15.30	7.62	--	--
	MW07-20140910	09/10/14	20.7	0.305	21.9	16.70	7.42	140	<1.0
MW08	MW08-20140909	09/09/14	21	0.302	40.5	15.98	8.00	130	<1.0
	MW08-20181025	10/25/18	114.9	0.369	5.16	16.17	7.69	--	1.1
MW09	MW09-20140910	09/10/14	-87	0.241	0.98	17.90	7.46	96	<1.0
	MW09-20181024	10/24/18	161.1	0.276	11.9	16.92	7.23	--	<1.0
MW10	MW10-20140910	09/10/14	-49	0.331	36.3	16.65	7.89	120	<1.0
	MW10-20181024	10/24/18	102.9	0.356	7.37	16.63	7.96	--	1.00
MW11	MW11-060206	06/02/06	149.2	--	--	13.65	7.15	--	--
	MW11-20141007	10/07/14	-124.5	0.252	40.0	15.00	9.15	110	2.6
MW12	MW12-060206	06/02/06	-91.2	--	--	15.34	7.14	--	--
	MW12-20181024	10/24/18	109.3	0.281	4.2	15.81	7.61	--	--
MW13	MW13-060206	06/02/06	53.1	--	--	14.91	7.4	--	--
	MW13-20181024	10/24/18	175.8	0.246	3.56	15.83	7.37	--	--
MW14	MW14-060206	06/02/06	-103.5	--	--	15.12	7.5	--	--
MW22	MW22-20140910	09/10/14	179.3	0.28	3.52	16.84	6.78	100	<1.0
	MW22-20181024	10/24/18	177.6	0.249	11.00	14.99	6.74	--	--

NOTES:

Data prior to 2006 obtained by Farallon Consulting LLC of Issaquah, Washington.

[1]Analyzed by field instrument.

[2]Analyzed by Standard Method 2320B.

[3]Analyzed by Standard Method 5310B.

-- = not analyzed

< = not detected at a concentration above the laboratory reporting limit

°C = degrees Celsius

$CaCO_3$ = calcium carbonate

mg/L = milligrams per liter

mS/cm = millisiemens per centimeter

mV = millivolts

NTU = nephelometric turbidity units

ORP = oxidation-reduction potential

Table 10
Groundwater Analytical Results for Volatile Fatty Acids
Plastic Sales and Service Site
6870 Woodlawn Avenue Northeast
Seattle, Washington

Well ID	Sample ID	Sample Date	Lactate[(1)] (mg/L)	Acetate[(1)] (mg/L)	Propionate[(1)] (mg/L)	Formate[(1)] (mg/L)	Butyrate[(1)] (mg/L)	Pyruvate[(1)] (mg/L)
Shallow Zone Wells								
MW15	MW15-20181022	10/22/18	<0.39	<0.54	<0.31	<0.22	<0.41	<0.69
MW21	MW21-20181022	10/22/18	<0.39	<0.54	<0.31	<0.22	<0.41	<0.69
Deep Zone Wells								
MW08	MW08-20181025	10/25/18	<0.39	<0.54	<0.31	<0.22	<0.41	<0.69
MW09	MW09-20181024	10/24/18	<0.39	<0.54	<0.31	<0.22	<0.41	<0.69
MW10	MW10-20181024	10/24/18	<0.39	<0.54	<0.31	<0.22	<0.41	<0.69

NOTES:

Analyses performed by SiREM in Guelph, ON.

[(1)]Analyzed by Ion Chromatography.

< = not detected at a concentration above the laboratory reporting limit

mg/L = milligrams per liter

APPENDIX A
FIELD SAMPLING FORMS

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

GROUNDWATER PURGE AND SAMPLE FORM
LOW FLOW PUMP

Sample Date:_____

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

Sampling Comments: _____

Analytical

Sample Number/ID	Number of Containers and 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 turbidity or dissolved oxygen must stabilize within the limits (indicated in *italics*) for three successive readings prior to sampling.

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 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:	

NON-HAZARDOUS WASTE

GENERATOR INFORMATION (Optional)

SHIPPER _____

ADDRESS _____

CITY, STATE, ZIP _____

CONTENTS _____

_____

NON-HAZARDOUS WASTE

HAZARDOUS WASTE

ACCUMULATION
START DATE _____

CONTENTS _____

HANDLE WITH CARE!

CONTAINS HAZARDOUS OR TOXIC WASTES

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?)

SAMPLE CHAIN OF CUSTODY

Send Report to _____

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 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								
								NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270				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:				

APPENDIX B
SITE-SPECIFIC HEALTH AND SAFETY PLAN

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

SITE-SPECIFIC HEALTH AND SAFETY PLAN

Property:
Plastic Sales and Service Site
6870 Woodlawn Avenue Northeast
Seattle, Washington
Agreed Order No. DE 7084

Initiation Date: January 22, 2020
Expiration Date: January 21, 2021

Prepared for:
The Lutheran Retirement Home of Greater Seattle (d/b/a The Hearthstone)
6720 East Green Lake Way North
Seattle, Washington

Site-Specific Health and Safety Plan

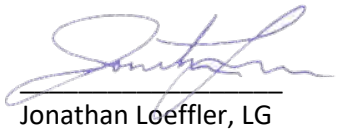
Prepared for:

The Lutheran Retirement Home of Greater Seattle
(d/b/a The Hearthstone)
6720 East Green Lake Way North
Seattle, Washington 98103

Plastic Sales and Service Site
6870 Woodlawn Avenue Northeast
Seattle, Washington 98103

Project No.: 0651-002

Prepared by:



Jonathan Loeffler, LG
Project Geologist

Reviewed by:

Tom Cammarata
Principal Environmental Geochemist

Initiation Date: January 22, 2020
Expiration Date: January 21, 2021

HAZARD SUMMARY

SoundEarth Strategies, Inc. (SoundEarth) has prepared this Site-Specific Health and Safety Plan (HASP) for the Groundwater Compliance Monitoring Plan for the Plastic Sales and Service Site, defined below, on behalf of The Lutheran Retirement Home of Greater Seattle (d/b/a The Hearthstone), the owner of the Dry Cleaner Building Property discussed below. The HASP was written in general accordance with the Washington State Model Toxics Control Act as promulgated in Chapter 173-340-350 of the Washington Administrative Code.

SITE DESCRIPTION

The Dry Cleaner Building Property comprises a portion of the Plastic Sales and Service cleanup site. The Site is defined in the Washington State Department of Ecology (Ecology) Agreed Order No. DE 7084 (Agreed Order), dated September 14, 2009, as the extent of contamination caused by the releases of hazardous substances at the property located at 6870 Woodlawn Avenue Northeast in Seattle, Washington (the Dry Cleaner Building Property). The Site includes the Dry Cleaner Building Property; the property adjoining it to the west, located at 6850 Woodlawn Avenue Northeast (the Hearthstone Property); the property adjoining it to the north, located at 6869 Woodlawn Avenue Northeast (north-adjoining property); and portions of the western alley (the alley), Woodlawn Avenue Northeast, and 4th Avenue Northeast rights-of-way (ROWs); and is collectively referred to as "the Site."

The following contaminants of concern (COCs) were detected at concentrations above applicable cleanup levels at the Site: chlorinated volatile organic compounds (CVOCs)—specifically, tetrachloroethene (PCE) and its degradation compounds trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride—in groundwater.

The Dry Cleaner Building Property is comprised of three tax parcels (King County Parcel Nos. 952810-4720, 952810-4725, and 952810-4735) that cover approximately 13,345 square feet (0.6 acre) of land. The Dry Cleaner Building Property is located at 6870 Woodlawn Avenue Northeast and 6565 4th Avenue East in Seattle, Washington.

The Dry Cleaner Building Property previously contained two buildings: a 1924-vintage, two-story single-family residence and a 1947-vintage, two-story, masonry-framed warehouse building. The former warehouse building was historically used as a drycleaner and a plastic sales and services company.

Currently, the Dry Cleaner Building Property consists of a construction site for the ongoing development of a mixed-use building.

FIELD ACTIVITIES

The following field activity are covered under this HASP:

- Groundwater sampling and monitoring

HAZARD SUMMARY (CONTINUED)

SITE HAZARDS

Hazards present at the site include the following:

Chemical

- PCE
- TCE
- cis-1,2-DCE
- Vinyl chloride

Physical

- Electrical hazards
- Ergonomic hazards
- Flammable liquids
- Overhead utilities and features
- Slips, trips, and falls
- Spills
- Struck by
- Struck against
- Temperature extremes
- Traffic and moving equipment
- Underground utilities and features
- Unsecure/uncontrolled site
- Visibility

HAZARD CONTROLS

The following hazard controls, based on the tasks identified in the Field Activities listed above, are required for employees of SoundEarth while performing work on the site:

- Level D personal protective equipment, which includes hard hats, steel-toed boots, safety glasses, a reflective safety vest, and hearing protection as necessary
- Traffic control devices in compliance with traffic control plans required or as necessary including delineators/traffic cones, caution tape, fencing and barricades, and lighting
- Metal plates
- Nitrile gloves
- Face splash shield during injections
- Caution tape and traffic control in all parking areas and on streets

HAZARD SUMMARY (CONTINUED)

This hazard summary is presented solely for introductory purposes, and the information contained in this section should be used only in conjunction with the full text of this report. A complete description of the project, site conditions, investigation methods, and investigation results is located in previous reports referenced in Section 5.1.1, Reports that Provide Chemical Data.

TABLE OF CONTENTS

FIGURES

ATTACHMENTS

1.0 INTRODUCTION

This Site-Specific Health and Safety Plan (HASP) was written for the use of SoundEarth Strategies, Inc. (SoundEarth) and its employees. The health and safety and emergency response protocols outlined in this plan are designed to ensure compliance with state and federal regulations governing worker safety on hazardous waste sites. The US 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 Chapter 296-843 of the Washington Administrative Code, Hazardous Waste Operations. These regulations apply to the activities to be performed at this Site as a site remediation, or cleanup, under the Federal Resource Conservation and Recovery Act of 1976 and/or the Washington State Model Toxics Control Act.

Subcontractors to SoundEarth and other contractors performing work within the exclusion zone of the Site are required to prepare and effectively implement their own HASP based on their unique scope of work and professional expertise. Each contractor's HASP must comply with all applicable federal, state, and local regulations. The contractor'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 or Site.

The responsibilities of SoundEarth for safety on this site 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.

This plan is active for this site until SoundEarth implements a scope of work change not covered by this HASP, after which time it must be reviewed and extended.

NOTE: Standard Safety Procedures (SSPs) incorporated into this HASP refer to the documents that compile detailed information and instructions for protecting SoundEarth employees from chemical and physical hazards applicable to this HASP. The Standard Safety Procedures identified in this HASP are provided in Attachment A. This HASP must be present at the site during field activities.

2.0 PROJECT INFORMATION

Property Name: Plastics Sales and Service Site
Property Address: 6870 Woodlawn Avenue Northeast, Seattle, Washington
Property Owner: The Lutheran Retirement Home of Greater Seattle (d/b/a The Hearthstone)
Property Tenant: None
Nature of Activities at this Property: Current: Redevelopment and remediation activities; compliance groundwater monitoring and sampling Past: Former plastic facility, and former commercial laundry facility
Figures 1 and 2 show the site location and features.

3.0 PROJECT RESPONSIBILITIES

Site personnel shall acknowledge that they have reviewed a copy of the HASP for this project, that they understand it, and that they agree to comply with all of its provisions by signing and dating the Acknowledgement and Agreement form found in Attachment B.

A daily health and safety tailgate meeting shall take place at the start of every day in the field. Persons attending this meeting are to print and sign their name on the attached Daily Health and Safety Briefing Log in Attachment C.

(Standard Safety Procedure [SSP] 02, General Site Safety Requirements, provides more information.)

Project Manager: Logan Schumacher, LG
Site Manager/Health and Safety Officer: Logan Schumacher, LG
Principal in Charge: Tom Cammarata, LG, LHG
Corporate Health and Safety Administrator: Chris Carter

4.0 EMERGENCY INFORMATION

For a critical emergency, 911 should be called.

Note: A SoundEarth employee MAY NOT transport a non-SoundEarth employee off the site for medical attention.

Local Emergency Numbers		
Institution/Department	**Name/Address**	**Phone Number**
Hospital	Swedish Medical Center – Ballard 5300 Tallman Avenue Northwest Seattle, Washington	206-782-2700

Local Emergency Numbers		
Institution/Department	**Name/Address**	**Phone Number**
Alternative Hospital	Harborview Medical Center 325 9th Avenue Seattle, Washington	206-744-3300
Ambulance	Not applicable	911
Police/Sheriff	Seattle Police Department 2300 Southwest Webster Street Seattle, Washington	206-733-9800 or 911
Fire	Seattle Fire Department 301 2nd Avenue South Seattle, Washington	206-386-1400 or 911

Project Emergency Numbers		
Title	**Name**	**Phone Number**
Project Manager	Logan Schumacher	O: 206-436-5925 C: 206-484-7189
Site Manager/Project QA/QC Officer	Brandon Gutierrez	O: 206-436-5951 C: 360-770-7006
Principal in Charge	Tom Cammarata	O: 206-436-5940 C: 206-261-8046
Corporate Health and Safety Administrator	Chris Carter	O: 206-436-5905 C: 206-618-0306

Attachment D, Hospital Route, provides the location and driving directions. The route must be posted at the site.

5.0 SITE HAZARD ANALYSIS

This section is used to determine the project's potential health and safety hazards specifically as they relate to the site where the work will occur. Task-related hazards are analyzed in Section 6.0, Task-Related Site Hazard Analysis.

5.1 SITE HAZARD ANALYSIS—CHEMICAL

This section describes and identifies potential and known chemical hazards that may be encountered at the site (summarized in Table 1). SSP 01, Chemical and Physical Hazards Analysis, provides more information.

5.1.1 Reports that Provide Chemical Data

The following report(s) and associated table(s) containing chemical analytical data have been prepared for the site:

- *Draft Final Remedial Investigation and Feasibility Study, Plastics Sales & Service, Inc Site, 6860 and 6870 Woodlawn Avenue Northeast, Seattle, Washington*, Farallon Consulting, LLC, July 2, 2013.
  - Table 2, Soil Analytical Results for Selected Halogenated Volatile Organic Compounds
  - Table 3, Groundwater Analytical Results for Selected Halogenated Volatile Organic Compounds
  - Table 4, Monitoring Well Analytical Results for Selected Halogenated Volatile Organic Compounds
- *Draft Remedial Investigation/Feasibility Study Addendum, Plastics Sales and Service Site, 6870 Woodlawn Avenue Northeast, Seattle, Washington*, SoundEarth Strategies, Inc., April 13, 2015.
  - Table 2, Groundwater Analytical Results for CVOCs

5.1.2 Summary of Potential Chemical Hazards

The following known or suspected chemical hazards have been identified at the site:

- PCE in groundwater
- TCE in groundwater
- cis-1,2-DCE groundwater
- Vinyl chloride groundwater

The chemicals identified above are included in Table 1: Chemical Hazards.

5.1.3 Past Opportunities for Chemical Contamination

The Dry Cleaning Building Property formerly operated as dry-cleaning facility, Sunshine Cleaners, from 1948 to 1977. The dry cleaning building was constructed in 1948 and utilized steam heat fueled by a heating oil underground storage tank (UST) of unknown capacity, located in the western portion of the building. Stoddard solvent was stored in two USTs with capacities of 1,500 and 2,000 gallons. The USTs were located in Woodlawn Avenue Northeast ROW adjacent to the north side of the on-property building and were reportedly abandoned in-place in 1958 when the Sunshine Cleaners began using PCE for dry cleaning operations. Sunshine Cleaners reportedly stored PCE in an aboveground storage tank (AST) with a capacity of 200 gallons. The former location of the AST is unknown. All USTs and the AST have been removed.

Plastic Sales and Service began operating as a plastic fabrication facility in the Dry Cleaner building in 1978. Plastic Sales and Service did not operate as a dry cleaner; however, small quantities of solvent were used during its tenure. No plastics are manufactured on the Dry Cleaner Building Property, but plastic stock materials were stored and finished into final products.

5.1.4 Opportunities for Unknown or Unidentified Chemical Contamination

No sources for unknown or unidentified chemical contamination at the site are likely.

5.1.5 Existing Controls in Place

- Caution tape and traffic control in all parking areas and on streets
- Chain-link fencing around property perimeter

TABLE 1: CHEMICAL HAZARDS

Chemical or Class (Synonyms or Isomers)	DOSH PEL/AL (OSHA PEL if different)	Other Pertinent Limits Special Characteristics	Routes of Exposure Warning Properties	Exposure Symptoms	Target Organs First Aid	Recommended PPE Respiratory Protection	Recommended Monitoring
1,2-DCE (1,2-Dichloroethene; includes cis- or trans-isomers)	DOSH PEL: 200 ppm TWA 250 ppm STEL	NIOSH REL: 200 ppm TWA IDLH: 1,000 ppm FP: 36–39˚F LEL: 5.6% None	Inhalation, ingestion, skin or eye contact Slightly acidic, chloroform-like odor	Eye and respiratory system irritation, central nervous system depression	Eyes, respiratory system, central nervous system Eye: Irrigate immediately Skin: Soap wash promptly Inhalation: Respiratory support Ingestion: Medical attention immediately	▪ Impermeable, chemical-resistant, disposable clothing ▪ Silver Shield/composite glove If PEL is exceeded: min SA continuous flow or PAPR OV cartridge	If potential for exposure exists: ▪ Initiate personal air monitoring; additional monitoring if necessary based on initial results ▪ Verify method with laboratory prior to ordering media and equipment Real Time Monitoring Equipment: ▪ Detector Tubes ▪ 10.2 or 10.6 eV PID
Stoddard's Solvent (Petroleum distillate, dry cleaning solvent)	DOSH PEL: 100 ppm TWA 150 ppm STEL OSHA PEL: 500 ppm TWA	NIOSH REL: 350 mg/m^3 TWA 1,800 mg/m^3 C (15 minutes) IDLH: 20,000 mg/m^3 FP: 102-110°F None	Inhalation, ingestion, skin or eye contact Kerosene-like odor	Irritation of eyes, nose, throat; dizziness; dermatitis; chemical pneumonitis (aspiration liquid); in animals: kidney damage	Eyes, skin, respiratory system, central nervous system, kidneys Eye: Irrigate immediately Skin: Soap wash promptly Inhalation: Respiratory Support Ingestion: Medical attention immediately	▪ Impermeable, disposable clothing ▪ Nitrile or Neoprene gloves If PEL is exceeded: min ½ Mask AP with OV cartridge	If potential for exposure exists: ▪ Initiate personal air monitoring; additional monitoring if necessary based on initial results ▪ Verify method with laboratory prior to ordering media and equipment Real Time Monitoring Equipment: ▪ 9.8 eV PID

Chemical or Class (Synonyms or Isomers)	DOSH PEL/AL (OSHA PEL if different)	Other Pertinent Limits Special Characteristics	Routes of Exposure Warning Properties	Exposure Symptoms	Target Organs First Aid	Recommended PPE Respiratory Protection	Recommended Monitoring
PCE (Tetrachloroethylene, tetrachloroethene, perchloroethylene)	DOSH PEL: 25 ppm TWA 38 ppm STEL Skin OSHA PEL: 100 ppm TWA 200 ppm C (5-minutes in 3-hour period) 300 ppm (5-min maximum peak)	ACGIH TLV: 25 ppm TWA 100 ppm STEL IDLH: 150 ppm Carcinogen	Inhalation, ingestion, skin absorption, skin or eye contact Mild, chloroform-like odor	Irritation of eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage; (potential occupational carcinogen)	Eyes, skin, respiratory system, liver, kidneys, central nervous system Eye: Irrigate immediately Skin: Soap wash promptly Inhalation: Respiratory Support Ingestion: Medical attention immediately	▪ Impermeable, chemical resistant disposable clothing ▪ Nitrile or neoprene gloves If PEL is exceeded: any full-face SA respirator in PP/PD mode	If potential for exposure exists: ▪ Initiate personal air monitoring; additional monitoring if necessary based on initial results ▪ Verify method with laboratory prior to ordering media and equipment Real Time Monitoring Equipment: 10.2 or 10.6 eV PID
TCE (Trichloroethylene, trichloroethene, ethylene trichloride)	DOSH PEL: 50 ppm TWA 200 ppm STEL OSHA PEL: 100 ppm TWA 200 ppm C 300 ppm peak (5 minutes)	IDLH: 1,000 ppm LEL: 8% None	Inhalation, skin absorption, ingestion, skin or eye contact Chloroform-like odor	Irritation of eyes and skin; headache; visual disturbance; weakness; exhaustion; dizziness; tremor; drowsiness; nausea; vomiting; tingling, pricking, and inflammation of skin; cardiac arrhythmias; liver injury (potential occupational carcinogen)	Eyes, skin, respiratory system, heart, liver, kidneys, central nervous system Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately	Impermeable, chemical resistant disposable clothing Nitrile gloves If PEL is exceeded: min full-face SA respirator in PP/PD mode	If potential for exposure exists: ▪ Initiate personal air monitoring; additional monitoring if necessary based on initial results ▪ Verify method with laboratory prior to ordering media and equipment Real Time Monitoring Equipment: ▪ 10.2 or 10.6 eV PID

Chemical or Class (Synonyms or Isomers)	DOSH PEL/AL (OSHA PEL if different)	Other Pertinent Limits / Special Characteristics	Routes of Exposure / Warning Properties	Exposure Symptoms	Target Organs / First Aid	Recommended PPE / Respiratory Protection	Recommended Monitoring
Vinyl Chloride (Chloroethylene)	DOSH PEL: 1 ppm TWA 5 ppm STEL OSHA PEL: 0.5 ppm AL	LEL: 3.6% Carcinogen Attacks iron and steel in the presence of moisture Polymerizes in air and sunlight Flammable gas at standard temperature and pressure	Inhalation, ingestion, skin or eye contact Pleasant odor at high concentrations	Lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; [potential occupational carcinogen]	Liver, central nervous system, blood, respiratory system, lymphatic system Eyes and skin: If frostbite has occurred, seek medical attention immediately; if tissue is not frozen, immediately flush with water for a minimum of 15 minutes. Breathing: Respiratory support	▪ Impermeable, chemical resistant disposable clothing Silver Shield/composite gloves If PEL is exceeded: any SA respirator in PP/PD mode	If potential for exposure exists: ▪ Initiate personal air monitoring; additional monitoring if necessary based on initial results ▪ Verify method with laboratory prior to ordering media and equipment Real Time Monitoring Equipment: ▪ 10.2 or 10.6 eV PID

NOTES:
The NIOSH Pocket Guide provides more information for the chemical in question or for a chemical not listed.
Attachment E includes Safety Data Sheets for chemicals used on site (i.e., injection compounds).

% = percent
ACGIH = American Conference of Governmental Industrial Hygienists
AL = action limit
AP = air purifying respirator
C = ceiling exposure limit
DOSH = Washington State Department of Labor and Industries, Division of Occupational Safety and Health
eV = electron volt
^{o}F = degrees Fahrenheit
FP = flash point
IDLH = immediately dangerous to life and health
LEL = lower explosive limit
mg/m^3 = milligrams per cubic meter
min = minimum
NIOSH = National Institute of Safety and Health
OSHA = Occupational Safety and Health Administration
OV = organic vapor cartridge
PAPR = powered air purifying respirator
PEL = permissible exposure limit
PID = photoionization detector
PP/PD = positive pressure/pressure demand mode
PPE = personal protective equipment
ppm = parts per million
REL = recommended exposure limit
SA = supplied air respirator
SDS = Site-Specific Chemical Safety Data Sheets
STEL = short-term exposure limit, 15 minutes, unless otherwise noted
TLV = threshold limit value
TWA = time-weighted average

5.2 SITE HAZARD ANALYSIS—PHYSICAL

This section addresses known and potential physical hazards specific to the site. SSP 01, Chemical and Physical Hazards Analysis, provides more information. Site documents provided by the client/owner/tenant can be helpful to identify site-specific hazards (such as non-SoundEarth HASPs, traffic control plans, and operation and maintenance plans).

5.2.1 Site-Specific Physical Hazards

Described below are physical hazards that may be encountered while on the site:

- Electrical hazards
- Ergonomic hazards
- Flammable liquids
- Overhead utilities and features
- Slips, trips, and falls
- Spills
- Struck by
- Struck against
- Temperature extremes
- Traffic and moving equipment
- Underground utilities and features
- Unsecure/uncontrolled site
- Visibility

5.2.2 Utility Hazards

Described below are utility hazards that may be present at the site. In order to locate utilities, the Utilities Underground Location Center should be called at 800-424-5555, a private locate should be scheduled (as appropriate), side sewer cards should be reviewed, owner/tenant documents should be reviewed, and the site should be visually inspected.

5.2.2.1 Underground Utilities (SSP 12, Underground Services Location and Protection)

The following utilities have been identified beneath the site:

- Natural gas line, water, and sanitary sewer

5.2.2.2 Overhead Utilities (SSP 10, Electrical Safety)

Overhead power lines have been identified to the north and west of the Dry Cleaner Building Property along Woodlawn Avenue Northeast and 4th Avenue Northeast, respectively, and at the south-adjoining property along 4th Avenue Northeast.

6.0 TASK-RELATED SITE HAZARD ANALYSIS

This section outlines the health and safety hazards that may be present on the site as a result of the tasks to be performed by SoundEarth or subcontractors as they relate to the chemical and physical hazards identified in Sections 5.1 and 5.2 above. The SSPs noted in Table 2 are provided in Attachment A. The SSPs contain detailed information and instructions for protecting SoundEarth employees from chemical and physical hazards applicable to this HASP. A summary of the controls specific to the site is presented in Section 7.0, Task-Related Site Hazard Controls.

TABLE 2 SITE-SPECIFIC TASK-RELATED HAZARDS

Tasks	Role	Hazard	Standard Safety Procedures
Sampling – Environmental	Task performed by SoundEarth	Chemicals	Table 1, Chemical Hazards 01, Chemical and Physical Hazards Analysis
		Confined spaces	15, Confined Space Awareness
		Dust	01, Chemical and Physical Hazards Analysis 02, General Site Safety Requirements
		Emergencies	02, Emergency Response Plan
		Ergonomics	09, Ergonomics
		General site hazards	02, General Site Safety Requirements
		Ladders or heights	11, Ladder Safety and Work at Heights
		Spills	01, Chemical and Physical Hazards Analysis 19, Safe Handling of Flammable Liquids
		Temperature extremes	08, Temperature Extremes
		Unstable ground	13, Unstable Ground
		Visibility	02, General Site Safety Requirements
		Working near water	18, Work Near Water

Tasks	Role	Hazard	Standard Safety Procedures
Monitoring Well Decommissioning	Subcontractor Observation	Chemicals	Table 1, Chemical Hazards 06, Chemical Hazard Controls 01, Chemical and Physical Hazards Analysis
		Emergencies	02, Emergency Response Plan
		Ergonomics	09, Ergonomics
		General site hazards	02, General Site Safety Requirements
		Noise	05, Noise and Hearing Protection
		Overhead electric utilities	10, Electrical Safety
		Powered tools and equipment	10, Electrical Safety
		Temperature extremes	08, Temperature Extremes
		Unsecure/uncontrolled site	03, Site Security and Overall Site Control
		Underground utilities and features	12, Underground Services Location and Protection 10, Electrical Safety
		Unstable ground	13, Unstable Ground
		Visibility	02, General Site Safety Requirements

7.0 TASK-RELATED SITE HAZARD CONTROLS

The following existing controls are present at the site:

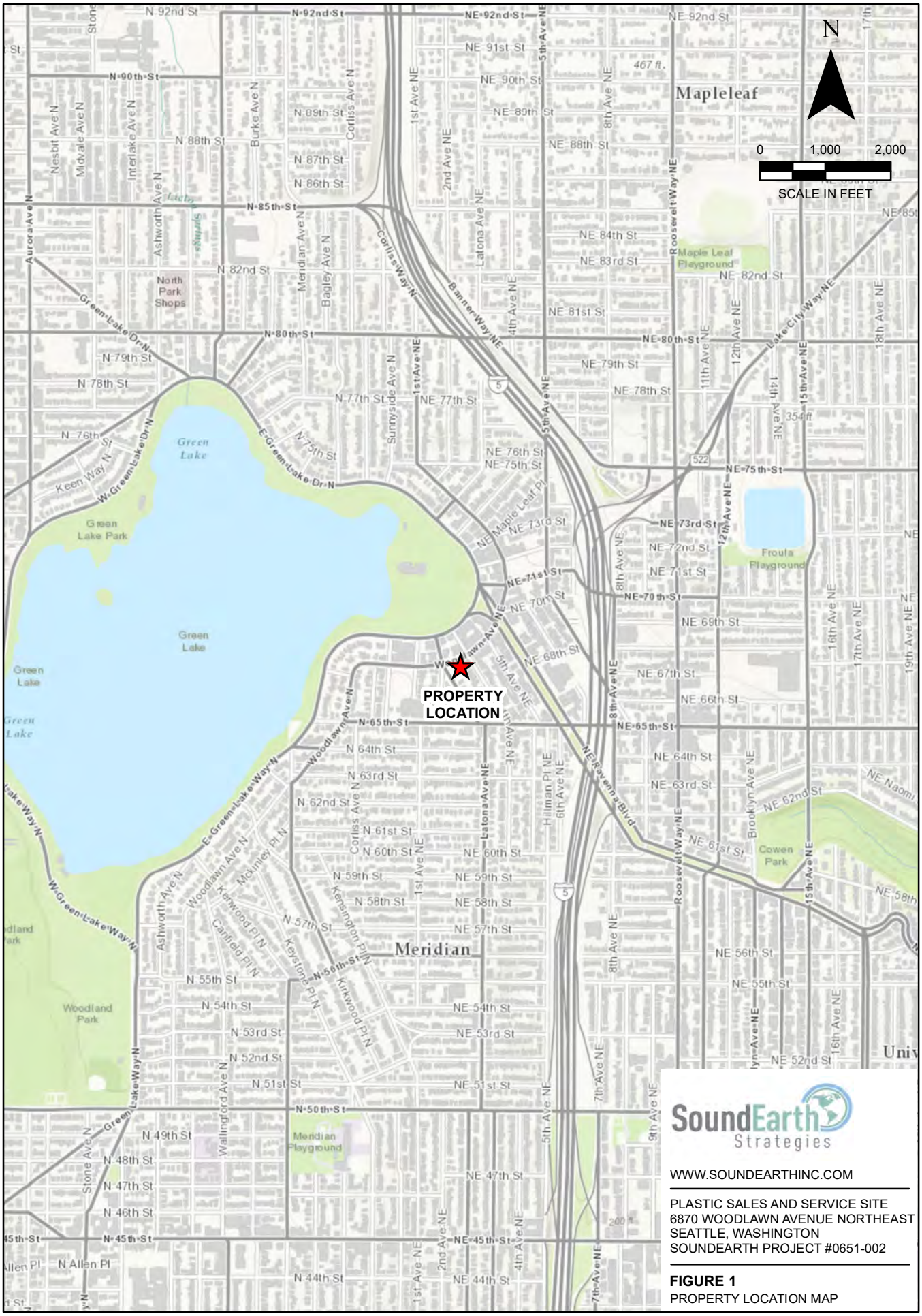
- Caution tape and traffic control in all parking areas and on streets.
- Chain-link fencing around property perimeter.

The following controls are required for SoundEarth employees while performing work on the site:

- Level D personal protective equipment, which includes hard hats, steel-toed boots, safety glasses, a reflective safety vest, and hearing protection, as necessary

- Traffic control devices in compliance with traffic control plans required or as necessary including delineators/traffic cones, caution tape, fencing and barricades, and lighting
- Metal plates
- Nitrile gloves
- Face splash shield during injections
- Caution tape and traffic control in all parking areas and on streets

FIGURES



SoundEarth Strategies

WWW.SOUNDEARTHINC.COM

PLASTIC SALES AND SERVICE SITE
6870 WOODLAWN AVENUE NORTHEAST
SEATTLE, WASHINGTON
SOUNDEARTH PROJECT #0651-002

FIGURE 1
PROPERTY LOCATION MAP

4/22/2019

P:\0651 HEARTHSTONE\0651-002 HEARTHSTONE - WOODLAWN EAST\TECHNICAL\CAD\2019\OLD\2019-05-07\2019-05-07_0651-002_2019_SBM.DWG

LEGEND

- CATCH BASIN
- MANHOLE
- SHALLOW-ZONE MONITORING WELL
- DEEP-ZONE MONITORING WELL
- DEEP DEWATERING WELL
- SHALLOW INJECTION WELL
- DEEP INJECTION WELL
- DECOMMISSIONED WELL
- DIRECT-PUSH BORING (GEOENGINEERS 2002/2003)
- DIRECT-PUSH BORING (GEOENGINEERS 2004)
- DIRECT-PUSH BORING (FARALLON 2004)
- DIRECT-PUSH BORING (FARALLON 2006/2007)
- DIRECT-PUSH BORING (FARALLON 2010)
- DIRECT-PUSH BORING (SOUNDEARTH 2008)
- HOLLOW-STEM AUGER (SOUNDEARTH 2009)
- POST-ELECTRICAL RESISTANCE HEATING BORING LOCATION
- SITE BOUNDARY
- SW — STORMWATER LINE
- GAS — GAS LINE
- SS — SANITARY SEWER LINE
- W — WATER LINE
- DHP — OVERHEAD POWER LINE
- PROPERTY BOUNDARY LINE
- PARCEL BOUNDARY
- FD — FLOOR DRAIN
- UST — UNDERGROUND STORAGE TANK

FIGURE DERIVED FROM BASEMAP BY FARALLON CONSULTING, 2010

N

0 15 30

APPROXIMATE SCALE IN FEET

6857 WOODLAWN AVENUE NORTHEAST

NORTH-ADJOINING PROPERTY
6869 WOODLAWN AVENUE NORTHEAST

6900 WOODLAWN AVENUE NORTHEAST

2ND AVENUE NORTHEAST

WOODLAWN AVENUE NORTHEAST

4TH AVENUE NORTHEAST

WESTERN ALLEY

LATONA AVENUE NORTHEAST

FORMER LAUNDRY PROPERTY

FORMER YASUKO PROPERTY

SINGLE-FAMILY LOT

APARTMENTS

SOUTH-ADJOINING PROPERTY
6565 4TH AVENUE NORTHEAST

HEARTHSTONE PROPERTY
6870 WOODLAWN AVENUE NORTHEAST

FORMER STODDARD SOLVENT UST

FORMER UST FILL PORT

POWER POLE

SUMP AND VAULT

SoundEarth Strategies

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PLASTIC SALES & SERVICE SITE
6870 WOODLAWN AVENUE NORTHEAST
SEATTLE, WASHINGTON
0651-002

FIGURE 2
SITE BOUNDARY MAP

ATTACHMENT A
STANDARD SAFETY PROCEDURES

STANDARD SAFETY PROCEDURE 01: CHEMICAL AND PHYSICAL HAZARDS ANALYSIS

INTRODUCTION AND SCOPE

One of the most critical aspects of developing a site-specific Health and Safety Plan (HASP) is to accurately determine the hazards that can be reasonably expected to be present on the site. Those hazards may be generally summarized as site-related and task-related. In both cases, the analysis of the hazard requires a consideration of both chemical contaminants and physical hazards.

This Standard Safety Procedure (SSP) addresses the process for evaluating the potential for encountering site-related chemical and physical hazards.

KEY HAZARDS

- Chemical exposure from known or unknown sources
- Physical hazards, including, but not limited to, noise, pressure, or heat

PRE-FIELD CONSIDERATIONS

Request all available information from the client and site owner/operator regarding chemical hazards and environmental data on the site, including the following topics:

- Past activities that resulted in soil or water contamination.
- Any processes that involve known contaminants and processes with contaminants that are not fully identified or well characterized.
- Any existing environmental mitigation activities or controls.
- Hazardous processes noted on a site map.
- Environmental Phase I and II assessment reports.
- Building surveys for asbestos, lead, or other hazardous materials.
- Details and locations of underground storage tanks and associated fueling system components or other chemical storage areas.
- Safety Data Sheets or other company hazard communication information relating to areas personnel will be working .

Request and gather the following information on physical hazards at the site:

- Overhead electrical lines or other utilities
- Internal and public roadways and movement of on-site machinery or equipment
- Any site emergency response provisions that might apply to SoundEarth personnel in the event of a site-related emergency, such as site emergency response capabilities, emergency reporting number and procedure, and the meaning of alarms

GENERAL REQUIREMENTS

A full analysis of potential chemical and physical hazards should be completed prior to work on-site and summarized in the site-specific HASP. Personnel should continually assess hazards while working, as hazard risk can change due to changing work conditions.

A public one-call locate and private utility locate will be conducted on all sites where subsurface work will be completed. The public one-call must be called in 72 hours before the start of work, with the area marked in white paint. Refer to SSP #12 Underground Services Location and Protection for additional details on utility locates.

Identify whether proximity to neighbors could present additional hazards to SoundEarth personnel. In addition, identify the potential for neighbors to be impacted by SoundEarth's activities on the site.

APPLICABLE PPE AND CONTROLS

Standard Level D personal protective equipment (PPE) is required at all SoundEarth work sites. See SSP #06 Chemical Hazard Controls for applicable PPE for chemical hazards.

OTHER CONSIDERATIONS

Conduct a public records search if property information is not readily available from the client, owner, or operator.

REGULATORY REFERENCES

None.

STANDARD SAFETY PROCEDURE 02: GENERAL SITE SAFETY REQUIREMENTS

INTRODUCTION AND SCOPE

Safety is a joint responsibility of all parties on a worksite. The following basic guidelines are written to help protect SoundEarth Strategies, Inc. (SoundEarth) employees and the public and are a mandatory responsibility for personnel working on a SoundEarth worksite.

PRE-FIELD CONSIDERATIONS

Before any work begins on a new site, a site-specific Health and Safety Plan (HASP) will be drafted. Prior to the commencement of work, the Site Manager will review the provisions of the HASP for that project with all personnel who will be on the site. An emphasis should be placed on the hazards identified for the site/project and any special precautions or requirements for the control or mitigation of those hazards.

In addition, a daily briefing on applicable health and safety topics will be conducted and recorded on the Daily Health and Safety Briefing Log, which is an attachment to the HASP.

Unsafe site conditions observed at any time should be reported to the project manager (PM) and contractor on-site for immediate correction.

A site telephone (which may be an employee cell phone), sanitary facilities (if not located within a reasonable distance from the project site), and potable water will be provided.

GENERAL REQUIREMENTS

All employees must follow the safe practices and rules contained in this Standard Safety Procedure (SSP) and such other rules and practices as pertain to the project or are communicated on the job. Employees must also follow all client safety rules and regulations when working on client-owned or client-operated sites. When working for a general contractor or directly under the supervision of an owner/operator, the higher-tiered employer's rules must be followed as they apply to work by SoundEarth personnel.

Employees should report all unsafe conditions or practices to the PM or their direct supervisor. If corrective action is not taken in a timely fashion, employees have a right and obligation to report significant hazards to higher level management or the Corporate Health and Safety Administrator (CHSA).

Personnel must practice the following safe work habits:

- Maintaining good housekeeping, cleaning up waste, and eliminating trip hazards with extension cords, tools, hoses, and similar equipment.
- Using sound ergonomic methods that maintain a neutral spine when handling drums or lifting heavy materials. If necessary, two people should perform heavy or awkward lifts. Mechanical means should be used for loads that are too heavy for two people to lift.
- Checking that electrical equipment is bonded and grounded and using ground fault circuit interrupters for plug-in electrical devices and extension cords (three-pin plugs only). In addition, using spark-proof and explosion resistant equipment as necessary on some projects.

- Avoiding working alone in an isolated area or an Exclusion Zone. Where necessary, use the buddy system.
- Trying to stay upwind of potential airborne hazards when collecting samples or providing oversight.
- Reporting all injuries or potential exposures to hazardous materials to the PM and CHSA. Follow the attached Incident Reporting Flow Chart for specific instructions.
- Reporting to the CHSA for investigation of all incidents that resulted in injury, potential for illness, damage to equipment (ours or other parties), interference with site operations, or public impacts. Follow the attached Incident Decision Tree for specific instructions.
- Reporting to the CHSA for communication of all safety observations that could have resulted in injury, potential for illness, damage to equipment (ours or other parties), interference with site operations, or public impacts. Fill out the attached Safety Observation Form and send to the CHSA.
- Being familiar with the site—its physical characteristics, hazardous processes in or near the work area, wind direction, access, overhead utilities, location of communication devices, and safety equipment.
- Checking that the locations of overhead power lines and underground utilities are established, prior to initiating intrusive activities.
- Striving to always be aware of the surroundings, the chemical/physical hazards that may be present, changes in conditions, and the limitations of personal protective equipment (PPE). This is particularly true when working in an Exclusion Zone or on a complex site, such as a construction or industrial site.
- Keeping working surfaces as clean and dry as possible to prevent accidental trips or slips.

The following practices are **expressly forbidden** on SoundEarth worksites:

- Working when ability or alertness is impaired by fatigue, illness, medication, or other causes that it could expose SoundEarth employees or others to injury.
- Smoking, eating, drinking, chewing gum or tobacco, or wearing contact lenses while in an Exclusion Zone or any potentially contaminated area.
- Using a cell phone while in an Exclusion Zone except in the case of an emergency; all work must stop prior to any cell phone use in an Exclusion Zone.
- Wearing rings, watches, bracelets, necklaces, or other jewelry that could trap chemical contamination or get caught in moving equipment.
- Having facial hair that could interfere with respirator fit on sites where respirators are in use.
- Having unnecessary contact with potentially contaminated substances, such as by walking through puddles or pools of liquid, kneeling on the ground or leaning, sitting, or placing equipment on the contaminated soil, or testing soil or collecting samples without gloves.

REQUIRED POSTINGS

The Washington State L&I, Division of Occupational Safety and Health requires that the following informational posters be posted at the employees' place of employment:

- Notice to Employees—If a Job Injury Occurs
- Job Safety and Health Protection
- Your Rights as a Non-Agricultural Worker

APPLICABLE PPE AND CONTROLS

The minimum PPE on any SoundEarth worksite includes safety vest, safety glasses, steel-toed work shoes or boots, hearing protection around noisy operations, and hard hat where there is an overhead hazard. Unless otherwise specified, nitrile or neoprene gloves should be worn when collecting samples.

All PPE must be properly fitted to each employee who will use it. It must be kept clean, sanitary, and properly maintained. Cleaning is particularly important for eye and face protection, because dirty or fogged lenses could impair vision. Personnel must inspect, clean, and maintain PPE according to the manufacturers' instructions before and after each use. Equipment must be inspected by the employee prior to each use to confirm the equipment is within the manufacturers expiration date. Expired equipment must be immediately discarded and replaced. The CHSA or Safety Supervisor can answer any questions about the appropriate PPE for the project or the correct care of it.

OTHER CONSIDERATIONS

This SSP addresses the general site safety requirements that apply to most sites. More targeted, hazard-specific information is provided in the applicable SSP addressing the hazard of concern.

Although SoundEarth personnel are not directly responsible for the safety of other employers' personnel, except as contractually determined or in regard to the hazards that the work might create, an awareness of safety should be maintained in every aspect of the job. If a safety concern is noticed, it should be reported to the applicable contractor's representative on-site. If a SoundEarth employee informs the affected employee of the concern, the affected employee's management should also be told of the conversation.

TRAINING REQUIREMENTS

- Hazardous Waste Operations
- 24-, 40-, or 80-hour training, depending on job tasks and exposure potential, and discussed in "Table 3, Training Requirements," in Title 296, Chapter 843, Section 20010 of the Washington Administrative Code (WAC 296-843-20010)
- Annual refresher training—8 hours every 12 months

REGULATORY REFERENCES AND ADDITIONAL INFORMATION

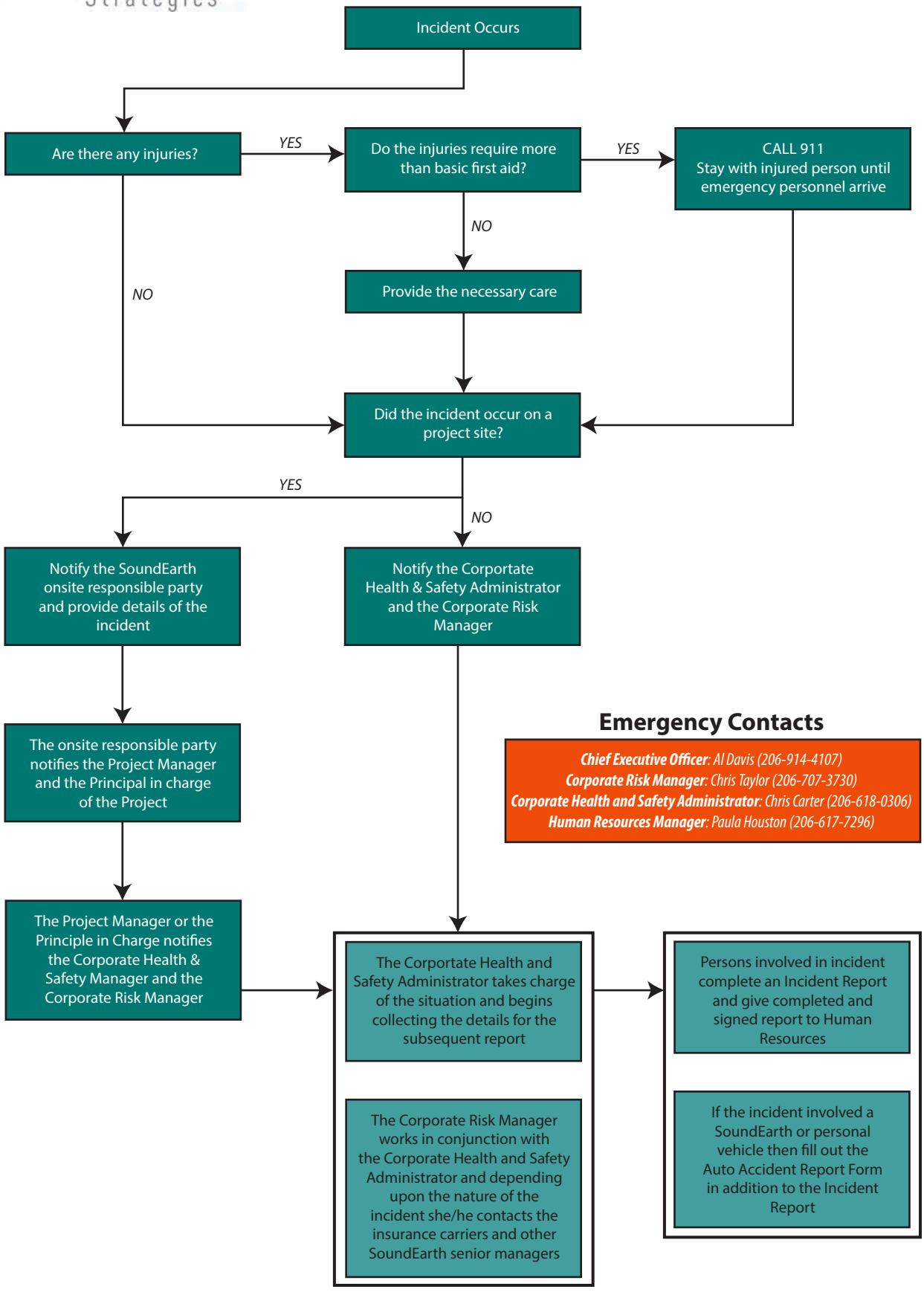
- **Title 29, Part 1926, Subpart C of the Code of Federal Regulations and WAC 296-800—General Safety and Health Provisions/Safety and Health Core Rules.** These chapters address the basic

core rules of health and safety in the workplace, including topics such as employer/employee responsibilities, housekeeping, sanitation, drinking water, illumination, first aid, accident reporting, and PPE.

Attachments:
Incident Decision Tree
Safety Observation Form

SoundEarth Strategies, Inc.
Incident Decision Tree

FEBRUARY 27, 2018



Emergency Contacts

***Chief Executive Officer**: Al Davis (206-914-4107)*
***Corporate Risk Manager**: Chris Taylor (206-707-3730)*
***Corporate Health and Safety Administrator**: Chris Carter (206-618-0306)*
***Human Resources Manager**: Paula Houston (206-617-7296)*

SAFETY OBSERVATION

Date of Observation: _____ **Time of Observation:** _____
Location of Observation: _____

If SoundEarth project, provide the following:
Project Name: _____ **Project Number:** _____

If not a SoundEarth project, did you notify the site safety personnel? _____

Description of Observation: _____

Suggestion for Corrective Action: _____

Names & Contact Information of Witnesses: _____

Name of Individual Completing Form	**Signature**	**Date**
Project Manager	**Signature**	**Date**
Corporate Health & Safety Manager	**Signature**	**Date**

Attach photos of observation report and any additional documentation as necessary.

Submit completed form to human resources.

STANDARD SAFETY PROCEDURE 03: SITE SECURITY AND OVERALL SITE CONTROL

INTRODUCTION AND SCOPE

Site security is necessary to prevent the exposure of unauthorized, unprotected people to site hazards and to protect the project from theft, vandalism, and interference with safe work practices.

KEY HAZARDS

- Unauthorized personnel on-site
- Pedestrian safety

GENERAL REQUIREMENTS

Work sites should be secured depending on the on-site activities, materials stored on-site, and practicality. No unauthorized personnel will be allowed on active sites.

The site-specific Health and Safety Plan should establish an entry and exit log for the site. For this purpose, personnel can use an Entry and Exit Log form, record entry and exit information in field notes for the field program, or use any other documented means to prevent unauthorized entry onto the site and make it possible to conduct an accurate headcount in the event of an emergency. All field personnel should note their time of entry and exit from the site.

The active work area on the site should be delineated using caution tape and delineator cones, at a minimum.

Normally, it is not necessary to post a guard or install a monitoring system for security during off-hours, but this type of security should be considered for a site that cannot be adequately controlled otherwise.

If unauthorized personnel enter the site, they should immediately be asked to leave. If the worker feels threatened or the unauthorized person will not leave, call the police immediately.

APPLICABLE PPE AND CONTROLS

If conditions on the site could present a hazard to unauthorized and unprotected people, or could be tempting to thieves or vandals, the site perimeter is to be fenced and locked during off-hours. Otherwise, barrier tape with appropriate signage may be used. The site should be well lit during off-hours, with a minimum 5-foot clear zone within the fencing.

Bulk chemicals are to be stored in a locked storage facility, appropriate to the type of chemical being stored.

OTHER CONSIDERATIONS

The client or contractor may include specific security provisions, which should be incorporated into these requirements when generating the site-specific Health and Safety Plan.

STANDARD SAFETY PROCEDURE 04: FIRST AID

INTRODUCTION AND SCOPE

Emergencies and first aid scenarios happen quickly and unexpectedly and require an immediate and appropriate response. It is vital that each SoundEarth Strategies, Inc. (SoundEarth) employee understands the requirements of this Standard Safety Procedure and any additional requirements that may pertain to a specific worksite. SoundEarth emergency response procedures are outlined in the Corporate Health and Safety Plan.

The first aid provider is someone who is trained in the delivery of initial medical emergency procedures, using a limited amount of equipment to perform a primary assessment and intervention while awaiting arrival of emergency medical services.

KEY HAZARD

- Medical Emergency

TRAINING REQUIREMENTS

First Aid Certification

CPR Training

- Blood-borne Pathogen refresher training is required annually for those who have not received it as part of their First Aid/CPR certification training

PRE-EMERGENCY PLANNING

The following supplies will be available and readily accessible at each work area:

- A fully stocked first aid kit, including equipment to support universal precautions to prevent the transmission of blood-borne illnesses.
- An adequate supply of fresh water and a portable emergency eye wash.
- One or more appropriately sized Type ABC portable fire extinguishers, for sites where fire hazards exist.

In addition, a vehicle will be available on-site during all work activities so that injured SoundEarth personnel who do not require medical treatment beyond first aid can be driven to the emergency medical facility identified in the Health and Safety Plan.

SoundEarth personnel may not transport subcontractors or other non-SoundEarth personnel to a medical facility for care. SoundEarth personnel will call 911 for emergency medical transport.

INCIDENT RESPONSE

When an accident occurs, the witness to the accident is to take the following actions:

- Call or instruct someone near to call 911 for help if medical assistance beyond first aid is required.

- Carefully approach the accident scene. Any assistance provided should never place the rescuer at unacceptable risk (e.g., confined space). If the victim cannot be helped without risking the rescuer's safety, obtain additional assistance or equipment immediately.
- Prevent unauthorized personnel from attempting a rescue.
- If safe to do so, begin initial first aid. If not trained in first aid, assess the victim's condition as thoroughly as possible, call 911 for instructions, and wait for the emergency medical personnel to arrive.
- Use appropriate precautions to avoid the spread of blood-borne pathogens.
- If the victim is in a dangerous area, it might be necessary to move them to safety. This decision is made by the Site Manager or other first aid-trained person. Someone with a neck or back injury should not be moved unless in a location that is immediately dangerous to life or health.
- The Site Manager is to supervise the administration of any required first aid, CPR or use of an automated external defibrillator, and to determine whether off-site support should be called or the victim should be driven to the hospital.
- For inhalation, ingestion, or absorption exposure cases, the victim should be promptly removed from the exposure but treatment should be performed only by a qualified physician. In the case of injurious contact with the skin or the eyes, immediate measures should be taken at the site to counteract the substance's effect. First aid treatment consists of flooding the affected area with copious amounts of water.

Regardless of the severity of an incident, the attached Incident Report is to be completed by the Site Manager, with input from all involved personnel, and forwarded to the project manager and Corporate Health and Safety Administrator within 24 hours of the incident. Use the attached Incident Decision Tree for instructions on incident response and reporting.

In addition, in the event of the death, probable death, or inpatient hospitalization of any employee due to an on-the-job injury, the appropriate agency must be contacted within 8 hours:

- OSHA states: Call 1-800-321-OSHA (1-800-321-6742). Note that this number can be called if working in a state not listed below.
- Washington: Call 1-800-423-7233.
- Oregon: Call 503-378-3272 or 800-922-2689.

Even if no injuries are involved, all motor vehicle accidents that occur on the site or involve a transport vehicle traveling to or from the site are to be reported using the attached Auto Accident Report Form in addition to the Incident Report.

APPLICABLE PPE AND CONTROLS

The minimum personal protective equipment on any SoundEarth worksite includes safety vest, safety glasses, steel-toed work shoes or boots, hearing protection around noisy operations, and hard hat where there is an overhead hazard. Unless otherwise specified, nitrile or neoprene gloves should be worn when administering first aid.

OTHER CONSIDERATIONS

At least one SoundEarth employee is required to be have current first aid certification and CPR training on each site.

REGULATORY REFERENCES AND ADDITIONAL INFORMATION

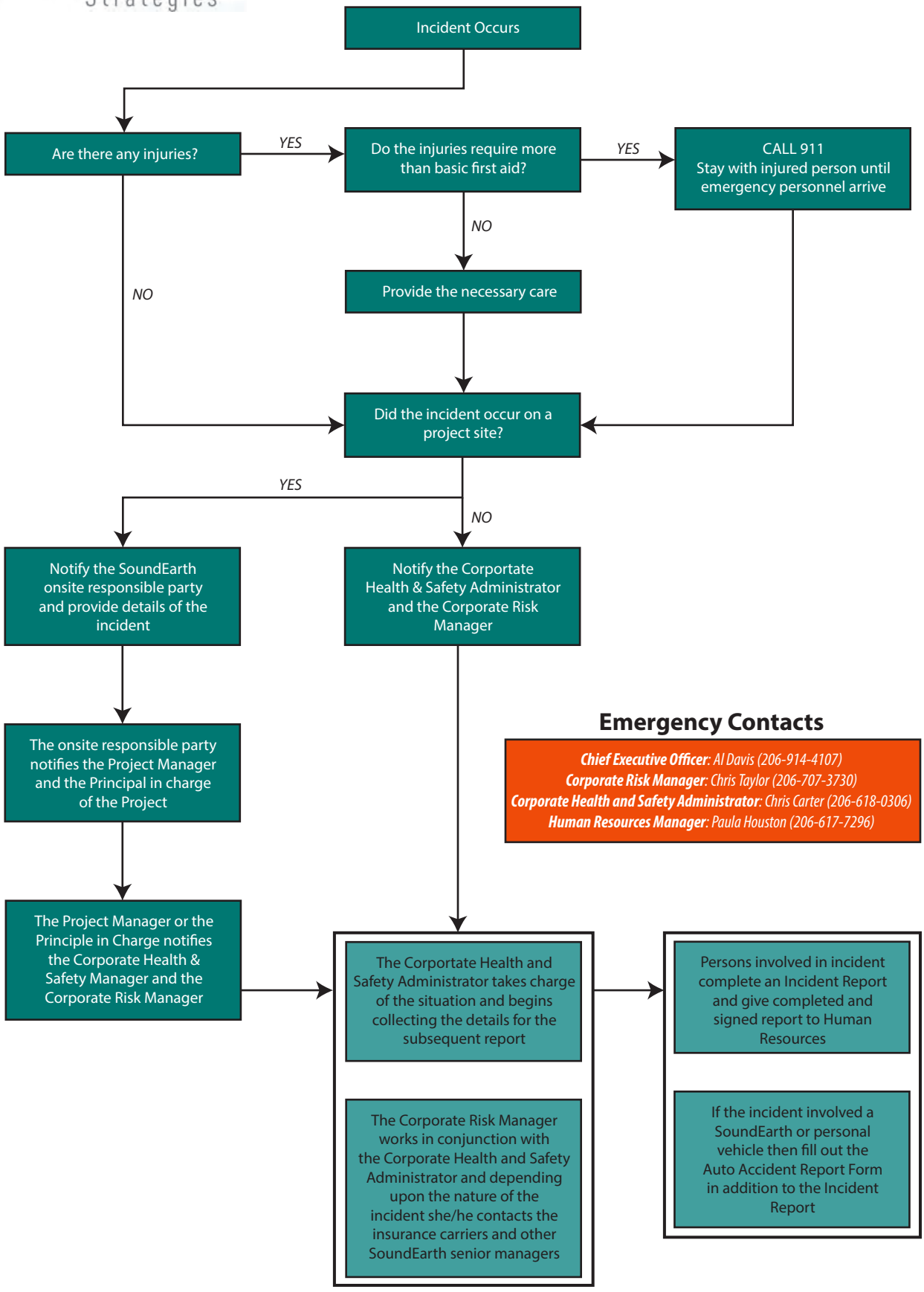
Title 29, Part 1910, Standard 1910.151 of the Code of Federal Regulations (29 CFR 1910.151)—Medical and First Aid.

Title 29, Part CFR 1910.1030 and Washington Administrative Code 296-823—Blood-borne Pathogens.

Attachments:
Incident Decision Tree
Auto Accident Report Form
Incident Report

SoundEarth Strategies, Inc.
Incident Decision Tree

FEBRUARY 27, 2018



Emergency Contacts

***Chief Executive Officer**: Al Davis (206-914-4107)*
***Corporate Risk Manager**: Chris Taylor (206-707-3730)*
***Corporate Health and Safety Administrator**: Chris Carter (206-618-0306)*
***Human Resources Manager**: Paula Houston (206-617-7296)*

Damage to Company Auto

Vehicle Involved_____

Vehicle No._____

Name of Driver_____

Date of Birth_____

Address_____

License No._____State_____

Describe Damage to Auto or Take Photos

_____

_____

_____

_____

_____

_____

Injured Individuals

Name_____

Address_____

Phone_____

Email_____

Name_____

Address_____

Phone_____

Email_____

SERVCO PACIFIC INSURANCE

Partnership makes the best policy.

Preliminary Auto Accident Report

Accident

Date_____Time_____

Location_____

City_____State_____

Damage to Other Parties' Car

Make_____

Model_____

License No._____

Insurance Carrier_____

Name of Owner_____

Address_____Phone_____

Name of Driver_____

Address_____Phone_____

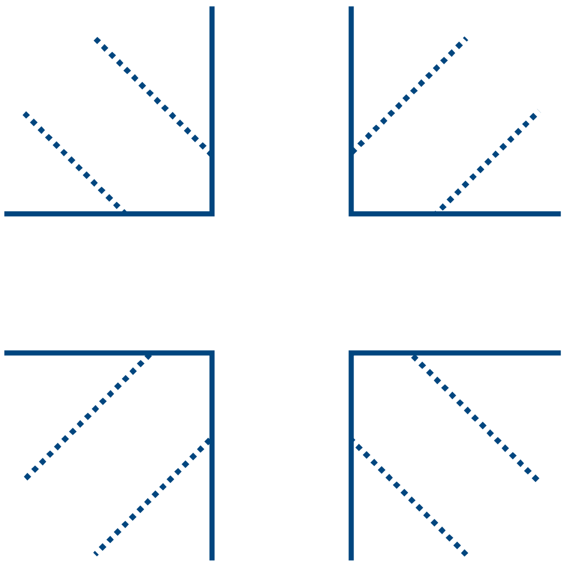
Provide Brief Description of Take Photos

_____

_____

DO NOT DISCUSS ACCIDENT *EXCEPT* with police and your insurance company representative.

Diagram of Accident Scene



WHAT TO DO IN CASE OF AN ACCIDENT

- STOP AT ONCE AND INVESTIGATE
- SET WARNING DEVICES
- HELP THE INJURED by obtaining competent first aid and calling doctor or hospital if necessary
- PROTECT YOUR VEHICLE AND CARGO from theft and further damage
- OBTAIN NAMES AND ADDRESSES OF ALL POSSIBLE WITNESSES – use witness cards inside
- COMPLETE PRELIMINARY REPORT – complete report at the scene of the accident
- CONTACT SUPERVISOR as soon as possible – either by phone or in person

Brief Description of Accident

Include information on where you were going, what speed you were going, estimated speed of other vehicles, and/or any other information that is pertinent to this accident. Take pictures, if possible.

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____
____

Police Incident Number (if any)

____
____

Servco Pacific Claims Contact Information

Jeannine Early – 206.272.3103

After Hours – 206.216.4830

Witness Information

If you witnessed the accident that just occurred, fill out the below information. Thank you.

Accident at________________________________

Date______________ Time__________ ☐ am ☐ pm

Did you see the accident happen? ☐ yes ☐ no
Did you see anyone hurt? ☐ yes ☐ no
Were you riding in a vehicle involved? ☐ yes ☐ no

Name____________________ Phone_____________
Address_________________________________
Email___________________________________

Witness Information

If you witnessed the accident that just occurred, fill out the below information. Thank you.

Accident at________________________________

Date______________ Time__________ ☐ am ☐ pm

Did you see the accident happen? ☐ yes ☐ no
Did you see anyone hurt? ☐ yes ☐ no
Were you riding in a vehicle involved? ☐ yes ☐ no

Name____________________ Phone_____________
Address_________________________________
Email___________________________________

Witness Information

If you witnessed the accident that just occurred, fill out the below information. Thank you.

Accident at________________________________

Date______________ Time__________ ☐ am ☐ pm

Did you see the accident happen? ☐ yes ☐ no
Did you see anyone hurt? ☐ yes ☐ no
Were you riding in a vehicle involved? ☐ yes ☐ no

Name____________________ Phone_____________
Address_________________________________
Email___________________________________

INCIDENT REPORT

Date of Incident: _____ **Time of Incident:** _____

Name(s) of Personnel Involved: _____

Location of Incident: _____

Project Name: _____ **Project Number:** _____

Type of Incident (Check all that apply):

_____ Injury
_____ Vehicle Accident
_____ Underground Property Damage
_____ Aboveground Property Damage
_____ Other (describe below)

_____

_____

Description of Incident: _____

_____

_____

_____

_____

Action Taken: _____

_____

_____

Names & Contact Information of Witnesses: _____

_____

_____

Name of Individual Completing Form	**Signature**	**Date**
Project Manager	**Signature**	**Date**
Corporate Health & Safety Manager	**Signature**	**Date**

Attach photos of incident and any additional documentation as necessary.

Submit completed form to human resources.

STANDARD SAFETY PROCEDURE 05: NOISE AND HEARING PROTECTION

INTRODUCTION AND SCOPE

This Standard Safety Procedure refers to the requirements for noise control, evaluation, and protection on a worksite.

KEY HAZARD

Hearing Loss

NOISE EVALUATION

Note: Anyone who will evaluate noise exposures must either be a formally trained industrial hygienist or have received training in noise monitoring and its interpretation.

It is important to collect representative noise monitoring data. If site conditions or tasks for which representative data have not yet been collected are identified, noise monitoring should be conducted. The types of site conditions or tasks that may require noise monitoring are described below:

- Work performed adjacent to noisy industrial operations or processes on-site.
- Work performed on a project site with noisy operations in close proximity.

Noise measurements should be taken using two kinds of equipment:

- Personal dosimetry—to assess employee exposure over an 8-hour day when working around noisy processes or equipment and to take into account all noise exposures during the day.
- Handheld sound level meter—to assess the contribution of specific sources.

A noise dose of 50 percent, equivalent to an **8-hour exposure at an average of 85 decibels** on the A scale (dBA), requires hearing protection and enrollment of the employee in a program of annual audiometric testing. When a work shift will exceed 8 hours, the allowable dose must be adjusted as required by Title 296, Chapter 817, Section 300 of the Washington Administrative Code (WAC 296-817-300) and/or the dosimeter manufacturer. Each 3 dBA increase results in half the amount of exposure time to receive the same noise dose.

HEARING PROTECTION

The use of hearing protection is required when employees will be working around a process, piece of equipment, or task where the noise exposure has been documented to have the potential to exceed 85 dBA as an 8-hour exposure.

If a noise exposure has not been assessed, SoundEarth personnel are to employ a conservative approach to the use of hearing protection around such processes, equipment, or tasks. If it seems noisy, then hearing protection should be worn.

Engineering Controls:

- Choose low-noise tools and machinery, when possible
- Maintain and lubricate machinery and equipment
- Place a barrier between the noise source and the workers
- Enclose or isolate the noise source

Hearing Protection:

- Ear plugs, ear caps, or ear muffs
  - Different levels of hearing protection must reduce worker exposure to a level below 85 dBA.
  - Check the Noise Reduction Rating (NRR) of the hearing protection. The NRR minus 7 dBA is the reduction in noise exposure. For example, exposure at 90 dBA with earplugs with a 17 NNR would reduce the employee exposure from 90 dBA to 80 dBA.

OTHER CONSIDERATIONS

If SoundEarth personnel encounter a noisy situation that has not been previously monitored, they should take a conservative approach and use appropriate hearing protection.

For reference:

- 130 dBA = jackhammer
- 120 dBA = jet plane take-off, car stereo, band practice
- 110 dBA = machinery
- 100 dBA = snowmobile, chain saw, pneumatic drill
- 90 dBA = lawnmower, shop tools, truck traffic
- 80 dBA = alarm clock, busy street
- 60 dBA = conversation, dishwasher
- 50 dBA = moderate rainfall
- 40 dBA = quiet room

REGULATORY REFERENCES AND ADDITIONAL INFORMATION

- **Title 29, Part 1910, Standard 95 of the Code of Federal Regulations and WAC 296-817—Hearing Loss Prevention.** This chapter defines the requirements for a hearing conservation program, including noise measurement and computation, audiometric testing, and hearing protective equipment.

STANDARD SAFETY PROCEDURE 06: CHEMICAL HAZARD CONTROLS

INTRODUCTION AND SCOPE

The control of chemical hazards is a necessary component of safety management on a worksite where the remediation of environmental hazards is involved. Chemical hazards pose a wide range of health hazards. Controlling exposures is a fundamental method of protecting workers.

KEY HAZARD

- Exposure to hazardous chemicals

PRECAUTIONARY MEASURES

The specific chemical hazard potentials should be identified for each site. Once identified, chemicals must be fully characterized before they can be property controlled.

Sources of chemical hazard information include product Safety Data Sheets; chemical hazard summaries, such as the National Institute for Occupational Safety and Health (NIOSH) Pocket Guide; U.S. Environmental Protection Agency hazard summaries; Occupational Safety and Health Administration Safety and Health Topics; NIOSH Health Hazard Evaluations; American Conference of Governmental Industrial Hygienists (ACGIH) documentation of Threshold Limit Values; and American Industrial Hygiene Association Workplace Environmental Exposure Levels.

Most of these documents provide regulatory or recommended exposure limits. They also provide information on the nature of the hazard—physical properties and flammability as well as health hazards, including signs and symptoms of exposure. Table 1, Chemical Hazards, located in the site-specific Health and Safety Plan (HASP) template, briefly summarizes this information for the contaminants that might commonly be encountered. Additional information listed in this table includes the level at which chemicals are Immediately Dangerous to Life or Health (IDLH), the Lower Explosive Limit (LEL), whether or not the chemical can be absorbed through the skin, and basic air monitoring methods for each chemical.

All employers with hazardous chemicals in their workplaces must have labels and Safety Data Sheets for their exposed workers, and train them to handle the chemicals appropriately. The training for employees must also include information on the hazards of the chemicals in their work area and the measures to be used to protect themselves.

Determine the process or activity that may result in exposure and the potential routes of exposure. As part of characterizing how the exposure could occur, ventilation or other mitigating factors should also be considered, as well as enclosed spaces or other factors that could increase the hazard.

Also assess nearby processes that may not be part of the processes which SoundEarth Strategies, Inc. (SoundEarth) personnel are directly involved.

ENGINEERING CONTROLS

Several means are available to control the potential for exposure to chemical hazards:

- From an exposure control perspective, site control involves establishing clearly marked and identified regulated areas and decontamination stations.
- Substitution—if a chemical product that is hazardous is being used and a less hazardous one can be substituted, this can reduce the potential for exposure.
- Natural ventilation is an advantage if work can be conducted upwind of any hazardous exposure potentials. When there is a potential flammable hazard, ventilation should be employed to maintain gas or vapor levels below 10 percent of the LEL, spark-proof and explosion resistant tools should be used, and air should be tested continuously with a combustible gas monitor.
- Isolate or enclose the hazardous process where possible.
- Consider changes to the process that may minimize the direct contact with hazardous chemicals.
- Dust should be controlled by applying water or other dust suppressant.
- Rotate job assignments or adjust work schedules to avoid overexposure to a hazardous chemical.

PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) may include safety glasses or goggles, face shield, hearing protection, hard hat, gloves, steel-toed shoes or boots, rubber boots with steel toes, reflective safety vest, and disposal coveralls. SoundEarth does not allow the use of employee-owned PPE. General site PPE requirements include safety glasses, safety vest, and steel-toed shoes or boots as a minimum, with hearing protection in any noisy areas and a hard hat where there may be an overhead hazard. Other PPE depends on the requirements of the site (owner, operator, or contractor requirements) and the potential hazards present. On hazardous waste or remediation sites, levels of protection are assigned primarily based on the seriousness of potential chemical hazards and the level of respiratory protection and other PPE required. PPE levels range from Level D (least protective) to Level A (most protective). In brief, the levels are summarized as follows:

- **Level D—**no respiratory protection, minimal skin protection.
- **Level C—**air-purifying respirator, skin protection that includes disposable chemical-resistant coveralls and chemical-resistant boots and gloves.
- **Level B—**pressure-demand, full-facepiece self-contained breathing apparatus (SCBA) or pressure-demand, full-facepiece supplied-air respirator with 5-minute escape bottle, with skin protection similar to that for Level C. This is the recommended minimum protection where hazardous unknowns may exist or during initial air monitoring in the case of extremely hazardous compounds.
- **Level A—**pressure-demand, full-facepiece SCBA or pressure-demand, full-facepiece supplied-air respirator with 5-minute escape bottle, with fully-encapsulating chemical-resistant suit.

Normally, SoundEarth personnel use Level D protection in a remediation situation. Leather gloves may be used for protection from cuts and abrasions but should be lined with a nitrile inner glove and cannot be reused once exposed to chemical contamination. Level C protection, with an air-purifying respirator, may also be necessary on certain sites.

SoundEarth personnel should not enter a Level A or B environment without permission of the Corporate Health and Safety Administrator. Work in Level C or above requires the use of the buddy system, in which two people are assigned to work together and keep track of one another, monitoring each other for signs and symptoms or exposure.

Respiratory protection should be chosen based on air monitoring results. Other considerations in respirator selection include the purpose of the respirator, the potential for oxygen deficiency, and whether or not eye protection is required. Note that SoundEarth personnel are not permitted to enter an oxygen-deficient or IDLH atmosphere.

SoundEarth personnel must be medically evaluated to determine their ability to wear a respirator before being assigned to use a respirator, and an annual fit test must be provided. Facial hair that would interfere with respirator fit is not allowed.

DECONTAMINATION PROCEDURES

For contaminant control, entry into and out of the site is controlled in order to limit the spread of contamination and to maintain adequate protection within the more hazardous areas of the site, allowing entry only for authorized persons and at designated entry and exit points. A more complex site or one involving regulated hazardous materials may include an Exclusion Zone, a Contaminant Reduction Zone with access points through a Contaminant Reduction Corridor for entry and exit, and a Support Zone (or Safe Zone).

The Exclusion Zone is the area of most significant contamination and work may be conducted only with the most stringent level of PPE specified for the site. The Contaminant Reduction Zone is an area of lesser contamination surrounding the Exclusion Zone where work can be conducted using a lesser level of PPE. Outside of the Contaminant Reduction Zone (or beyond the Exclusion Zone on a simpler project) is the Support Zone, where PPE is not required. Decontamination takes place in the Contamination Reduction Corridor or, in a simpler scenario, at the access points to the Exclusion Zone.

Personnel entering the site are required to log in at the access point and log out upon exiting the site.

The Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (refer to Additional Information below) provides more information on establishing control zones.

Decontamination facilities are set up to enable people to don protective clothing and equipment (see next section) when entering and to remove and/or decontaminate that clothing and equipment when exiting. In general, decontamination steps are as follows:

- Using equipment drop for the decontamination of sampling and other portable equipment taken into the site using essentially the same steps described for protective equipment.
- Physical cleaning of disposable outer garments by wiping off excess material onto a plastic sheet that can be picked up and disposed of.
- Disinfecting (biological agents) or inactivating chemicals, if necessary, on reusable boots and gloves; may require dilute acid or alkaline solution or detergent, such as Alconox, or an appropriate solvent rinse.

- Rinsing of reusable boots and gloves in potable water.
- Removing and bagging of outer boots and gloves.
- Removing and disposing of disposable outer garments, respirators, and glove liners.
- If not disposable, removing of respirator and disposing of used cartridges.
- Washing of hands and face; showering as soon as possible.
- Cleaning of respirator facepiece in mild detergent solution and rinsing in clean potable water; bagging for later final cleaning and air drying in respirator cleaning station.

All cleaning solutions and rinse water must be collected for appropriate disposal as hazardous material.

In addition, sampling and other portable technical equipment can be protected from contamination by wrapping in plastic to minimize the need for decontamination before leaving the site.

If necessary, a decontamination station should be set up for trucks and heavy equipment used on the site. This equipment should be thoroughly washed down with potable water. It may be necessary to collect this water for disposal as hazardous waste, depending on the site and the nature of the contamination.

In the event of an emergency, where immediate evacuation or medical treatment is necessary to prevent loss of life or severe injury, decontamination should be delayed until the evacuation is complete and/or the victim is stabilized. SoundEarth does not normally work on sites where site- or task-related hazards are so severe that decontamination could not be delayed.

TRAINING REQUIREMENTS

- Hazardous Waste Operations:
  - 24-, 40- or 80-hour training, depending on job tasks and exposure potential, discussed in "Table 3, Training Requirements" in Title 296, Chapter 843, Section 20010 of the Washington Administrative Code (WAC 296-843-20010).
  - Annual refresher training—8 hours every 12 months.
  - Respiratory Protection.

OTHER CONSIDERATIONS

SoundEarth subcontractors are responsible for developing and implementing their own HASPs to maintain the protection of their personnel and to protect other personnel, the site, and the public from damage, injury, or illness as a result of their activities.

However, SoundEarth personnel are generally responsible for implementing systems to contain chemical hazards within a controlled hazardous materials work area and for maintaining appropriate procedures and PPE for the protection of individuals working within the area of contamination. In this case, subcontractors, other contractors and site personnel, and visitors are expected to comply with the systems established by SoundEarth. SoundEarth will direct and monitor compliance with the systems that

have been implemented but will refer personnel who refuse to comply to their respective management for enforcement of required procedures. Visitors who do not comply will be denied entry into the site.

REGULATORY REFERENCES AND ADDITIONAL INFORMATION

- **Title 29, Part 1910, Standard 1910.120 of the Code of Federal Regulations (29 CFR 1910.120) and WAC 296-843—Hazardous Waste Operations (HAZWOPER).** This chapter addresses the requirements for working safely on a hazardous waste site or in the event of a chemical spill. It includes the requirements for a written HASP and addresses most of the specific topics discussed in this Standard Safety Procedure.

  It also addresses medical surveillance from a general perspective. Specific requirements for chemicals with substance-specific standards, such as benzene and asbestos, are also addressed. Another reference that provides recommendations for biological monitoring is the ACGIH current annual book of Threshold Limit Values and Biological Exposure Indices (BEIs), which lists BEIs.

- **29 CFR 1910.119 and WAC 296-67—Process Safety Management of Highly Hazardous Chemicals.** This chapter defines the requirements for a process safety program for the management of highly hazardous chemicals and complex chemical systems.

STANDARD SAFETY PROCEDURE 07: AIR MONITORING

INTRODUCTION AND SCOPE

Airborne contaminants can present a significant threat to workers. Identification and air monitoring should be conducted to assess the potential exposure on sites and is important to ensure the health and safety of workers. Air monitoring should be done when there is potential for airborne levels of contaminants, either present on the site or generated by the task.

KEY HAZARD

- Chemical Exposure

PRE-FIELD CONSIDERATIONS

- Identify the potential chemicals or airborne hazards present on the site.
- Identify the source or task that generates the hazard.
- Evaluate the effectiveness of existing or proposed control measures.
- It is recommended that an industrial hygienist be consulted in regard to the sampling or be engaged to perform the monitoring directly.

AIR MONITORING APPROACHES

Air monitoring may be performed either by using site monitoring equipment, direct-reading equipment, or by collecting air samples for chemical analysis, as appropriate.

Site Monitoring

Site monitoring priorities will be based on information from the initial site characterization. Four categories of site monitoring may be necessary:

- Monitoring for Immediate Danger to Life and Health (IDLH) conditions – Air monitoring for dangerous conditions such as flammable or explosive atmospheres, oxygen-deficient environments, or highly toxic levels of airborne contaminants. Extreme caution should be used when monitoring for IDLH conditions. SoundEarth Strategies, Inc. (SoundEarth) personnel are not permitted to enter any confined space.
- General on-site monitoring – Air sampling should be conducted to identify the major airborne contaminants and concentrations present on the site. Modified Level D protection should be used during the initial sampling. Sampling should start downwind, and work upwind until reaching the source area. Levels of personal protective equipment (PPE) should be based on the initial air monitoring results.
- Perimeter monitoring – Fixed location at the site perimeter, to measure contaminant migration from the site.
- Periodic monitoring – Air monitoring should be conducted periodically as site conditions or work changes. If work begins on a different portion of the site, different contaminants are present, or

a different task is being performed, additional monitoring should be conducted to assess the potential change in atmospheric conditions.

Direct-reading instruments include the following:

- Combustible gas meters, which measure the concentration of combustible gas or vapor. Combustible gas meters are not compound-specific; however, they are often included in a combination gas meter that reads combustible gases and several common compounds, such as carbon monoxide, oxygen, and hydrogen sulfide. Certain gas meters may be able to detect other compounds.
- Portable volatile organic compound (VOC) monitors, which use a photoionization detector (PID) to measure VOCs in the parts per million and/or parts per billion range. These can be calibrated to specific compounds but are often used more broadly. Often, they are set to hexane or methane as a reference, or they may be set to be benzene-specific, since benzene is commonly the VOC on remediation sites with the lowest permissible exposure limit (PEL).
- Single-gas personal monitors, which can be used where continuous monitoring is required, with an alarm capability.
- Colorimetric detection tubes, which are compound-specific. A hand-held pump may be used to spot check for a particular chemical, or a colorimetric detector tube may be worn with a continuously operating pump for a personal sample over a longer period of time.

Laboratory Samples

Air samples can be collected on various types of filters and treated or impregnated filters, on charcoal and other adsorbent tubes, and on organic vapor badges. Often monitoring with direct reading instruments is not sensitive enough to measure low concentrations of potential toxins or are limited because they only measure specific substances. To measure low-level contaminants, laboratory analysis of air samples may be necessary.

The appropriate sampling media will depend on the specific chemical and the physical state of the chemical. Specific air sampling methods are discussed in the SKC Guide to OSHA/NIOSH/ASTM Air Sampling Methods and can be accessed at <http://www.skcinc.com/OSHA-NIOSH/default.asp>. A guide from a comprehensive industrial hygiene laboratory, such as Galson Laboratories Inc. <http://www.galsonlabs.com/samplinganalysis/sampling-analysis-guide/>, is also useful.

AIR MONITORING RESULTS AND ANALYSIS

If it is determined that there is a potential airborne hazard, initial air samples must first be collected and compared with the Department of Occupational Safety and Health PEL or other applicable exposure limit. If representative exposure monitoring shows that exposures are likely to be less than one-half the PEL (or less than the action level [AL] in the case of a compound with a substance-specific standard that includes an AL), then monitoring may be discontinued.

If the initial sampling exceeds one-half the PEL, where there is no substance-specific standard, then additional monitoring should be done to obtain a statistical analysis that confirms with a 95 percent

upper confidence level that the PEL will not be exceeded. If the PEL may be exceeded, then the controls discussed in the next section of this Standard Safety Procedure must be provided.

If the chemical being monitored has a substance-specific standard, then a determination must be made of whether or not the AL is exceeded. Refer to the specific standard in question. Generally, exposures exceeding the AL require medical surveillance and additional monitoring. Where the exposure exceeds the PEL, the remaining required controls must be implemented, which typically include regulated areas, hygiene facilities, respiratory protection, and PPE.

In addition to compound-specific air monitoring, VOC or combustible gas monitoring may be conducted. In general, a VOC level above 5 parts per million (ppm) requires additional evaluation. A combustible gas reading exceeding 10 percent of the LEL requires that work be stopped, the source evaluated and controlled, and additional sampling be conducted. Work may not resume until readings are below 10 percent of the LEL.

Air monitoring data should be recorded on the attached Air Monitoring Log.

APPLICABLE PPE AND PERSONAL MONITORING

Standard PPE should be worn. Modified Level D should be worn (respirator with cartridge appropriate to the potential exposure) during initial site sampling if concentrations are unknown.

Personal monitoring samples can be collected to evaluate worker safety. The personal monitoring sample should be collected from the breathing zone, while working closest to the source. If workers closest to the source are not significantly exposed, then other workers do not need to be monitored. The type of medium for collection is compound-specific. Most media require a personal pump, worn by the employee for a time weighted average (TWA) sample. In some cases (asbestos area samples), a high-volume pump may be used. This pump requires an electrical outlet or generator to energize the pump. Air samples can be collected on various types of filters and treated or impregnated filters, on charcoal and other adsorbent tubes, and on organic vapor badges. Other kinds of sample collection media are available but less commonly used. An organic vapor badge is a small, self-contained collection device that works on the principle of diffusion and does not require a pump.

OTHER CONSIDERATIONS

Hazardous waste sites have several uncontrollable variables that can affect airborne concentrations. Changes in temperature, wind speed and direction, rainfall, moisture content, and work activities can all affect the vapor concentrations on a worksite. These factors should be considered when developing a site air monitoring program and during site work.

REGULATORY REFERENCES AND ADDITIONAL INFORMATION

- **Title 29, Part 1910, Standard Number 1910.1000 of the Code of Federal Regulations and Title 296, Chapter 841 of the Washington Administrative Code—Airborne Contaminants.** This chapter includes a list of the airborne chemical contaminants for which a PEL has been established. In some cases (benzene, for instance), a substance-specific standard has been promulgated. In such a situation, that standard is referenced. Continuing with benzene as an

example, the PEL for benzene as a 1 ppm TWA and a 5 ppm Short-Term Exposure Limit. In addition, the substance-specific standard for benzene is listed.

Attachment:
Air Monitoring Log

AIR MONITORING LOG

Client:	
Project Name:	
SoundEarth Project Number:	
SoundEarth Field Representative:	

Sample Information				Start Time	Flow L/Min	Stop Time	Flow L/Min	Total Min	Average Flow L/Min	Total Volume L	Instrument Reading (include units)	Laboratory Results		
Sample Number	Date	Worker/Area/ Pump/Instrument	Type									Fibers / Field	Fibers / cc	Limit of Detection

Sample Types:
A = Area
C = Clearance
N = Negative Exposure Assessment
P = Personal
PRE = Pre Abatement
FB = Field Blank
LB = Lot Blank
X = Excursion

Analyzed By: _____

STANDARD SAFETY PROCEDURE 08: TEMPERATURE EXTREMES

INTRODUCTION AND SCOPE

Heat-related illness and cold stress are well-recognized hazards in the outdoor work environment. Heat stress is a condition that can develop when the body is unable to adequately cool itself through responses such as sweating and blood circulation. Employees may experience heat stress due to a combination of environmental factors such as temperature; humidity; radiant heat (i.e., from the sun or another heat source); air velocity; and the concurrent use of personal protective equipment (PPE). Cold stress is a condition caused by prolonged exposure to cold that results in lowered body temperatures. Cold stress can lead to hypothermia or frostbite.

Heat stroke and cold stress should be treated as medical emergencies.

KEY HAZARDS

- Heat Exhaustion or Heat Stroke
- Hypothermia or Frostbite

PRECAUTIONARY MEASURES

For Hot Conditions	For Cold Conditions
(1) Stay Hydrated. Drink at least one quart of water per hour. Drink water every 15 minutes.	(1) Avoid caffeine, nicotine, and certain medications.
(2) Sufficient potable water will be provided on each worksite.	(2) Take frequent breaks in heated shelter.
(3) Wear breathable clothing where possible.	(3) Drink warm, sweet liquids and eat warm, high-calorie food.
(4) Avoid caffeine, alcohol, and nicotine.	(4) Do not begin work with wet clothes or resume work with wet clothes. Wear layers, gloves, and a hat. Bring hand and foot warmers.
(5) Keep an eye on workers, minimize overexertion. Take frequent breaks in the shade.	(5) Monitor workers for symptoms of cold stress.

Consider if planned work will contribute to possible temperature exposures and if work can be safely completed in the current conditions.

SYMPTOMS

Heat Exhaustion: Heat rash, fainting, heat cramps; shallow breathing; profuse sweating; pale, cool, or moist skin; dizziness; and physical or mental exhaustion.

Heat Stroke: Red, hot, dry skin; no perspiration; nausea; dizziness and confusion; strong rapid pulse; coma.

Heat cramps: Muscle spasms, pain, usually in abdomen, arms, or legs.

Hypothermia: Sever shivering, fatigue, abnormal behavior, pain in fingers or toes, drowsiness, slowing, loss of coordination, confusion and disorientation, weakness.

Severe Hypothermia: No shivering, blue skin, dilated pupils, inability to walk, slow pulse and breathing, unconsciousness.

Frostbite: Localized. Ranges from sudden blanching or whitening of skin; skin becomes waxy and is firm to touch; tissues are cold, pale, and solid.

FIRST AID RESPONSE

Heat stroke and hypothermia are medical emergencies. Obtain help immediately.

If a worker is experiencing symptoms of heat exhaustion, place worker in cool, shaded area. Wet workers skin and increase air movement around worker. Replace fluids as soon as possible. Call for emergency help if signs and symptoms worsen or do not improve. If a worker is experiencing heat stroke, call 911 immediately. While waiting, follow the same procedure as heat exhaustion. Stay with the worker until help arrives.

If a worker is experiencing symptoms of hypothermia or frostbite, move the worker into a warm room or shelter. Remove wet clothing. Warm the center of their body first – chest, neck, head, and groin – using electric or regular blankets. Do not cover their face. Place warm bottles or hot packs in armpits, sides, and groin, if possible. Give warm sweetened drinks, but do not give alcoholic beverages. Do not give beverages to an unconscious person. For localized frostbite, do no walk on frostbitten toes or feet. Immerse the area in warm (but not hot) water or warm the affected area using body heat. Do not rub or massage the frostbitten area.

APPLICABLE PPE AND CONTROLS

Standard PPE is required on all worksites. If Tyvek or additional layers of PPE are required during hot temperatures, the action temperature will be lower. The following table presents the temperatures at which the above precautions should be taken, based on the type of clothing and/or PPE being worn:

Type of Clothing/PPE	Action Temperature
Non-breathable clothes, including vapor-barrier clothing or PPE such as chemical-resistant suits	52 °F
Double-layer woven clothes, including coveralls, jackets, and sweatshirts	77 °F
All other clothing	89 °F

NOTE:
°F = degrees Fahrenheit

OTHER CONSIDERATIONS

During all times of the year and regardless of temperature, adequate potable water must be supplied to each worksite. Staff trained in first aid must also be present at each worksite.

TRAINING REQUIREMENTS

- Site Managers must be trained in preventing heat related illnesses and cold stress prior to employee supervision. All supervisors and employees will be trained in emergency response procedures.

REGULATORY REFERENCES AND ADDITIONAL INFORMATION

Occupational Safety and Health Administration (OSHA). Safety and Health Topics, Occupational Heat Exposure. Available online at <http://www.osha.gov/SLTC/heatstress/index.html>.

Safety and Health Topics, Emergency Preparedness and Response, Safety and Health Guides, Cold Stress. Available online at <http://www.osha.gov/SLTC/emergencypreparedness/guides/cold.html>.

Cold Stress Equation. Available online at <http://www.osha.gov/Publications/coldcard/coldcard.html>.

U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health. Prepared by National Institute for Occupational Safety and Health, Occupational Safety and Health Administration, U.S. Coast Guard, and U.S. Environmental Protection Agency. Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities. Chapter 8 of Publication No. 85-115. October 1985.

STANDARD SAFETY PROCEDURE 09: ERGONOMICS

INTRODUCTION AND SCOPE

Good ergonomics is essential to everything we do. Whenever we work, we move—we lift, push, and pull. We hold a position at our desk. We reach for something. To create an ergonomic workplace, all SoundEarth Strategies, Inc. employees must consider how the workplace is designed and how we move and use our bodies in our work.

KEY HAZARD

- Bodily Injury

PRECAUTIONARY MEASURES

While you may not be performing the tasks described or for the time periods described, it is useful to consider the nature of the postures you assume to do your job. Awkward postures include kneeling, squatting, reaching overhead, and working with your neck or back bent. One key to good ergonomics is to maintain a neutral spine and a neutral position in critical joints, such as the wrists, which are subjected to repeated motions.

Consider the work you are doing and look for opportunities to eliminate awkward postures, use them less, or use them with less weight or force. Be aware of your own limitations, including pre-existing injuries, which might make you more likely to sustain further injury. Find opportunities to improve your own ergonomics and help others to do so, too. If you need help with a task, ask.

Lifting loads over 50 pounds will increase the risk of injury.

LIFTING TECHNIQUES

- Lift with your legs, not with your back. Bend at the knees, not at the waist, to maintain the proper spine alignment.
- While carrying materials, hold within the “power zone”: close to your body, between mid-thigh and mid-chest.
- Use ramps, lift-gates, or other mechanical means where available.
- Use two or more people for heavy objects.
- Avoid twisting or reaching while lifting.

OFFICE ERGONOMICS

When working at your desk, the best postures for your neck and your wrists are neutral postures. Try to assume a posture that allows your joints and muscles to be reasonably relaxed.

Also, consider how you might vary your task and your position. For instance, placing your wastebasket on the other side of the room will force you to get up periodically and move about. Our bodies are made for movement and don’t like to assume a static position for too long, especially if that position is awkward or unnatural.

To rest your eyes, look for opportunities throughout the day to focus at a distance. Your eyes, like any other part of your body, become strained when forced to maintain a single position for too long.

These are examples of simple ways to improve your own office ergonomics. However, if your workstation configuration forces you to adopt an unnatural position for extended periods of time and especially if you experience discomfort, contact the Corporate Health and Safety Administrator (CHSA) for assistance in solving the problem.

APPLICABLE PPE AND CONTROLS

Use mechanical controls to assist with lifting, where applicable and available. Use suction devices to lift boxes or other smooth surfaces which places a temporary handle to make lifting easier.

OTHER CONSIDERATIONS

Good ergonomics involves asking questions. Is this the best way to lift this piece of equipment? If you are uncomfortable at your desk or workstation, ask the CHSA to evaluate your concern.

STANDARD SAFETY PROCEDURE 10: ELECTRICAL SAFETY

INTRODUCTION AND SCOPE

This standard safety procedure (SSP) addresses the requirements for electrical safety on project worksites, with an emphasis on basic electrical safety precautions, including grounding and work around overhead power lines. This SSP addresses procedures and guidelines to eliminate injuries resulting from possible malfunctions or improper grounding.

The SSP also addresses energy control. The purpose of energy control (i.e., lockout/tagout procedures) is to prevent sometimes severe injuries that result from the unexpected or unintended motion, energizing, or start-up of equipment or from the release of stored energy. Employees of SoundEarth Strategies, Inc. (SoundEarth) do not normally perform work requiring lockout/tagout. However, they should be able to identify such a situation. Only authorized persons who have received specific training in the control of hazardous energy are permitted to perform lockout/tagout.

KEY HAZARDS

- Electric shocks, arcs, and blasts
- Electrocution

EMERGENCY PROCEDURE

- If an electrocution occurs, do not touch the person who is in contact with a live power line. Dial 911 immediately for emergency assistance.

BASIC ELECTRICAL SAFETY

- All electrical equipment must be used only for its approved or listed purpose. This includes electrical outlets and extension cords.
- Assume all overhead wires are energized at lethal voltages.
- In wet or damp locations, use only equipment designed for that purpose.
- Do not use equipment if the original approvals/markings have worn off.
- Do not remove or modify equipment guards.
- Inspect all electrical equipment, including cords and connections, before use.
- Maintain all flexible cords and cables in good condition and use them only as approved.
- Damaged items shall be tagged “DO NOT USE” and removed from service until repaired and tested.
- Protect all flexible cords and cables from pinching, cutting, or crushing that could damage insulation and expose an electrical hazard.
- Do not run flexible cords through holes in walls, ceilings, and floors or through doorways and windows.
- Do not attach flexible cords to building surfaces.

- Do not use electrical cords to raise or lower equipment.
- Keep cords out of walkways or anywhere they might present a tripping hazard.
- Do not plug or unplug energized equipment or extension cords if your hands are wet.
- Employees of SoundEarth are not allowed to open high-power electrical cabinets on client facilities or to enter client structures that house high-power equipment.

OVERHEAD POWERLINES

The following precautions should be taken when working near overhead power lines:

- Know the location and height of all overhead power lines before starting work.
- Check that any non-SoundEarth personnel working under SoundEarth direction or oversight who will be operating mobile cranes, drilling rigs, excavators, or other equipment with an overhead reach are aware of overhead power lines and their height in relation to the equipment.
- Maintain a safe working distance (at least 10 feet) between equipment and overhead wires and power transmission lines. Very high voltage levels (over 50 kilovolts) require distances greater than 10 feet.
- Contact the overhead power utility or owner of the overhead lines if there might be difficulty maintaining the minimum safe distance to determine a safe approach to the work.
- Do not allow scaffolds, portable ladders, pipes, or tools to come within 10 feet of power lines. Use only nonconductive wooden or fiberglass ladders; do NOT use aluminum ladders.
- Use a trained and qualified spotter whenever it might be difficult for the equipment operator to judge and maintain the required distance.
- If there is any possibility that equipment could contact the power lines, keep personnel working below the lines well away at all times.
- Remember that electronic warning devices can also be installed on cranes or other equipment to alert the operator if the boom is coming too close to an energized line.

In the event that a power line is downed, take the following additional precautions:

- Never touch a downed power line; assume it is live.
- If your vehicle contacts an overhead power line, do NOT leave the vehicle or touch anything that might be metal.
- If you are forced to jump out of a vehicle because of fire, do not touch the vehicle, anything metal or any wires and keep your feet together.

LOCKOUT/TAGOUT PROCEDURE AWARENESS

Cord-and-plug equipment is the only type of equipment expected to require energy control by SoundEarth personnel. Therefore, SoundEarth personnel are not trained to perform more complex lockouts and are considered authorized only to lock out a cord-and-plug device.

Work on cord-and-plug-connected electrical equipment is exempt from the requirement to lock out the equipment when the following two conditions are met:

- Exposure to the hazards of unexpected energization or start-up of the equipment can be controlled by unplugging the equipment from the energy source —*and*—
- The plug is under the exclusive control of the employee performing the servicing or maintenance.

The following basic procedure applies to locking out cord-and-plug equipment when the plug is out of sight or otherwise not directly in your control:

- Check that the machine or equipment has a single cord-and-plug energy source that can be readily identified and isolated.
- Check that the machine or equipment has no potential for stored or residual energy or accumulation of stored energy after shut down, which could endanger employees.
- Isolate the energy source to completely de-energize and deactivate the machine or equipment.
- Apply your personal lock to the plug using an appropriate lockout device to accommodate the lock.
- Apply a notice to the lockout/tagout device that explains the reason for the lockout control and identifies the responsible party who has authority to remove the controls.
- Keep the key to your personal lock under your exclusive control during the servicing or maintenance.
- Be sure that the servicing or maintenance does not create hazards for other employees.
- Fill out the Lockout/Tagout Audit Record Form (attached).
- Remove the lock when the servicing or maintenance is completed.
- If the lock is removed by a supervisor, complete the Supervisor Removal of Lockout/Tagout Device Form (attached).
- Keep your lock and key in a secure place until the next time they are required.

Note that incidents involving the unexpected activation or re-energization of a machine or equipment during servicing or maintenance requires the use of a more extensive procedure.

CONTROLS – GROUNDING EQUIPMENT

The ground fault circuit interrupter (GFCI) is a fast-acting circuit breaker that senses small imbalances in a circuit caused by current leakage to the ground and, in a fraction of a second, shuts off the electricity. It is important to understand what protections a GFCI does and does not provide.

- A GFCI protects against the most common form of electrical shock hazard—the ground fault—and also protects against fires, overheating, and destruction of insulation on wiring.
- A GFCI does not protect against line-to-line contact hazards, such as holding two “hot” wires or a hot and a neutral wire in each hand.

At construction sites, GFCIs must be used on all 120-volt, single-phase, 15- and 2-ampere receptacle outlets that are not part of the permanent wiring of the building or structure.

TRAINING REQUIREMENTS

- Awareness training for all personnel.
- Basic training in the lockout of a cord-and-plug device.
- Certified training, as required by the standard, for personnel who must use lockout/tagout for other forms of hazardous energy control.

REGULATORY REFERENCES AND ADDITIONAL INFORMATION

- **Title 29, Part 1910, Standard 1910.301 through 1910.308 of the Code of Federal Regulations (29 CFR 1910.301-308) and Title 296, Chapter 800, Section 280 of the Washington Administrative Code (WAC 296-800-280)—Basic Electrical Rules.** This chapter defines the requirements for protecting employees from the hazards of working with electrical equipment, tools, and appliances. (Note that the comparable rules under the Occupational Safety and Health Administration are more spread out. The Washington Industrial Safety and Health Act of 1973 standards are more readily accessible and easily referenced.)
- **29 CFR 1910.147 and WAC 296-803—Lockout/Tagout (Control of Hazardous Energy).** This chapter presents the requirements for using lockout/tagout as an energy source control. This control reduces the risk of a person being injured by the unexpected energization or start-up of a machine or equipment.

Attachments:
Lockout/Tagout Audit Record Form
Supervisor Removal of Lockout/Tagout Device Form

SoundEarth Strategies

LOCKOUT/TAGOUT AUDIT RECORD FORM

INSPECTOR:_____ DATE: _____

EQUIPMENT INSPECTED: _____

LOCATION OF EQUIPMENT INSPECTED: _____

AUTHORIZED EMPLOYEE'S NAME: _____

Observations

Observations

1. Foremen and affected personnel notified of lockout/tagout activity? _____
2. The entry/exit inventory sheet has been checked and all personnel have exited the lockout area and are accounted for? _____
3. All energy sources deenergized and isolated? _____
4. All lockout/tagout devices applied properly? _____
5. If a lockout is used, has a tag also been applied? _____
6. All tags filled out correctly? _____
7. System tested (i.e., Tryout) for deenergization prior to workstarting? _____
8. Proper transfer procedures used, if applicable? _____
9. Foremen and affected personnel notified before reenergization procedures begun?

SoundEarth Strategies

SUPERVISOR REMOVAL OF LOCKOUT/TAGOUT DEVICE FORM

DATE:_____ TIME: _____

1. Name of lockout/tagout installer: _____

2. Efforts made to locate the person who installed the lock or tag:

   a. Called on radio: _____

   b. Contacted supervisor: _____

   c. Checked parking area: _____

   d. Called home: _____

   Was contact made? _____
   If yes, by whom?_____

3. Explain why this lockout/tagout removal is necessary:

   _____
   _____
   _____
   _____

4. Has the entire portion of the system under lockout/tagout been inspected and been found to be safe to reenergize? Has it been verified that the person is not in the area?_____
   If yes, by whom?_____

5. Have all personnel in the area of the system been notified of the pending reenergization? If yes, by whom?_____

6. **WARNING: The authorized employee whose lockout/tagout has been removed must be informed of the removal before he/she is allowed to resume work.**

7. The lockout/tagout device may be removed only by the person signing below.

   Supervisor: _____

STANDARD SAFETY PROCEDURE 11: LADDER SAFETY AND WORK AT HEIGHTS

INTRODUCTION AND SCOPE

The following procedure applies to all SoundEarth Strategies, Inc. (SoundEarth) employees who perform work at heights that may require the use of a ladder or fall protection.

Falls are the leading cause of on-the-job deaths in construction, and they happen in an instant. The average person's reaction time is half a second—the time it takes to fall 4 feet. This Reference presents steps and procedures for reducing the risk of falls from a height, including the safe use of ladders, precautions to take when working on scaffolds, and the use of personal fall protection.

KEY HAZARDS

- Fall from heights
- Falling onto hard surfaces
- Overhead equipment falling on personnel
- Correct use of fall protection

PRECAUTIONARY MEASURES

SoundEarth employees should only use properly manufactured ladders. The following general precautions and procedures should be followed:

- Identify all potential tripping and fall hazards before work starts.
- Practice good housekeeping to minimize tripping hazards.
- Ladders should be inspected by a competent person for visible defects before every use.
- Ladders that are identified with structural defects shall be removed from service until properly repaired.
- Identify the appropriate fall protection for the work being completed.

GENERAL LADDER REQUIREMENTS

- The self-supporting and non-self-supporting ladders shall both be able to support a least 4 times the maximum intended load to be used. Check with the manufacture for the maximum intended load. For 1A metal or plastic ladders that are extra heavy duty, the ladder shall support 3.3 times the maximum intended load.
- Ladder side rails shall extend a minimum of 3 feet (0.9 meter) above the top of a landing surface. If the ladder is not able to be extended then the ladder shall be secured at its top to a rigid support that will not deflect and a grasping device, such as a grab-rail shall be provided.
- Every cleat must be cable of supporting at a minimum 1 load of 250 pounds (114 kilograms) applied at the center of the cleat.
- The cleats of the ladder shall be parallel, level, and uniformly spaced when the ladder is in position for use and have some form of skid-resistance to prevent slipping.

- Extension ladders shall be placed at a minimum ratio of 4:1 feet (vertical over horizontal).
- Place the ladder only on stable and level surfaces.

LADDER USE SAFETY

- Employee(s) shall use the hand over hand method to grasp the ladder when progressing up and/or down the ladder. One hand must be on the cleat at all times. Maintain three points of contact while climbing.
- Always face towards the ladder while progressing up or down the ladder.
- Do not carry objects or a load that could cause the employee to lose balance or exceed the maximum load limit.
- Never stand on the top of a ladder.
- Ladders should only be used for the purpose for which they were designed.
- Keep the area below the ladder clear.
- Do not apply more weight on the ladder than it is designed to support per the manufacturer.
- Use only ladders that comply with OSHA design standards.
- Fall protection may be required depending on the type and height of ladder and type of work being performed. If there are any questions regarding the fall protection requirements employees shall contact the Project Manager or the Corporate Health and Safety Administrator.

SCAFFOLDING SAFETY

SoundEarth personnel do not normally erect scaffolds, but they might work on a scaffold erected by a contractor or subcontractor. A fall from a scaffold that has not been properly designed and erected can result in serious or even fatal injuries.

Take the following precautions before working on another party's scaffold:

- Do not use a scaffold unless you are authorized to do so.
- If possible, check whether the scaffold has been erected under the supervision of an appropriately trained and qualified competent person. Only materials designed for scaffold flooring can be used as walking/working surfaces.
- Do not mount a scaffold if it has not been erected on a firm and level footing, does not have guardrails on walkways, or does not have a permitted means of access, such as a ladder, stair tower, or ramp.
- Do not climb the crossbars of a scaffold.
- Do not work outside of the guardrails of a scaffold without using a personal fall protection system (see Step 4, below) that is secured to an anchorage capable of supporting a minimum fall impact load of at least 5,000 pounds. The fall protection system must never be attached to the scaffold!

- If a scaffold appears questionable, do not mount or use it. Check with the SoundEarth Corporate Safety and Health Administrator prior to using the scaffold.

FALL PROTECTION

If a SoundEarth employee will be working outside of established guardrails at a height of 4 feet or more, within the Washington State, a fall protection system must be utilized. Note that OSHA interprets this to include work above water.

Where fall protection is used for fall arrest, it must be capable throughout the system of supporting a minimum fall impact load of at least 5,000 pounds, applied at the lanyard point of connection. A full body harness must be used, with the attachment point of the body harness located in the center of the wearer's back near shoulder level or above the wearer's head. All system components must be designed for the purpose, compatible, and inspected before each use.

Prior to any SoundEarth employee's use of fall protection, a Site-Specific Fall Protection Work Plan (template attached) must be prepared for the site and the specific use, and the affected personnel must receive training in the procedures and equipment to be used. A method for the prompt, safe removal of injured workers must be addressed in both the Fall Protection Work Plan and the fall protection training.

APPLICABLE PPE

Standard PPE is required on all worksites.

TRAINING REQUIREMENTS

Washington

1. You must train employees to recognize ladder hazards and the procedures to minimize these hazards.
2. You must have a competent person train employees that use ladders in at least the following topics:
    a. The proper construction, use, placement, and care in handling ladders.
    b. The maximum intended load capacities of ladders that are used.
3. You must provide refresher training to employees as necessary to make sure they know and understand the content of the original training.

REGULATORY REFERENCES

29 CFR 1926.1053 "Ladders". 29 CFR 1926 Subpart L "Scaffolds".

Stairways and Ladders, A guide to OSHA Rules; OSHA publication 3124-12R 2003.

WAC 296-876 and -874 (Washington)

Title 8 CCR 3276 (California)

Occupational Health and Safety Administration (OSHA). “Stairways and Ladders: A Guide to OSHA Rules,” OSHA Publication No. 3124-12R, 2003.

Occupational Health and Safety Administration (OSHA). “A Guide to Scaffold Use in the Construction Industry,” OSHA Small Business Safety Management Series, OSHA Publication No. 3150, 2002 (revised).

Attachment:
Site-Specific Fall Protection Work Plan Template

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

SITE-SPECIFIC FALL PROTECTION WORK PLAN

PREPARED FOR USE BY SOUNDEARTH STRATEGIES, INC. EMPLOYEES

Property:
[Property Name]
[Street Address]
[City, State]

Prepared for:
[Client Name]
[Street Address]
[City, State]

Report Date:
[Month X, YEAR]

DRAFT – ISSUED FOR CLIENT REVIEW

Site-Specific Fall Protection Work Plan

Prepared for:

[Client Name]
[Street Address]
[City, State XXXXX]

[Property Name]
[Street Address]
[City, State XXXXX]

Project No.: [XXXX-XXX-XX]

Prepared by:

DRAFT

_____
[Name]
[Title]

Prepared by:

DRAFT

_____
[Name]
[Title]

DRAFT

_____
[Name]
[Title]

[Month X, YEAR]

FALL HAZARD IDENTIFICATION AND PROTECTION SELECTION WORKSHEET

In the table below, identify each fall hazard of 10 feet or more that exists or will exist during this construction project and then select the protection method from the options identified below the table.

√	Hazard Type	General Location(s)	Fall Protection Method	Overhead Protection
	Roof > 4/12 Pitch			
	Roof < 4/12 Pitch			
	Skylight Openings			
	Roof Openings			
	Floor Openings			
	Window Openings			
	Open-sided Floors			
	Decks			
	Balconies			
	Leading Edge Work			
	Mobile Lift Work			
	Excavation Edges			
	Grade Drop-Offs			
	Other _____			

Fall Protection Methods: Select a fall protection method from the list below for each hazard identified above. Assembly and implementation instructions for the method(s) used are located elsewhere in this document.

Standard Guardrails	Fall Arrest Harness	Fall Restraint Harness/Belt
Warning Line System	Safety Net	Cover or Hatch
Warning Line & Safety Monitor	Positioning Belt	Other: _____

Overhead Hazard Protection Methods: For each overhead hazard identified, specify the method(s) of protection for workers below. Refer to the "Overhead Protection" Section of this plan for any special installation instructions.

Hard Hats Required	Screens on Guardrails
Overhead Hazard Signs	Barricade to Control Access to Area
Debris Nets	Other: _____
Toeboards on Guardrails	Other: _____

FALL PROTECTION SYSTEM ASSEMBLY AND MAINTENANCE

Fall protection systems will be assembled and maintained according to manufacturer's instructions when using a manufactured system. A copy of these instructions will be attached to this Work Plan and available on-site for reference. Any fall protection system used will meet WISHA (Washington Industrial Safety and Health Act) regulations as contained in accordance with Title 296, Chapter 155 of the Washington Administrative Code (WAC 296-155) Part C-1. Assembly and maintenance instructions unique to this worksite such as components, placement of systems, anchor points, areas where systems are particularly subject to damage, etc., are specified below.

STANDARD GUARDRAILS:

- Must be 39 inches to 45 inches above the work surface at top rail with midrail and toeboard.
- Must be able to withstand 200 pounds of pressure on the top rail in any direction.
- Must not have significant deflection.
- Must be inspected regularly by the Site Manager for damaged or missing components.

Note: A guardrail does not protect a person standing on a ladder, box, or other surface above the work surface.

Post Material: _____ Rail Material: _____

Post Spacing (8 feet max): _____ Anchor Method: _____

Other Instructions: _____

FALL ARREST HARNESS:

- Must have anchor points capable of withstanding a 5,000-pound shock unless a deceleration device in use limits fall to 2 feet, in which case a 3,000-pound anchor point may be used.
- Free fall may not exceed 6 feet.
- A lower level may not be contacted during a fall.
- Lifelines must be placed or protected to prevent abrasion damage.
- Snap hooks may not be connected to each other, or to loops in webbing.
- Inspect components for deformation, wear, and mildew.

System Component List: _____

Anchor Point at this Worksite: _____

Configuration and Placement Sketch Attached? Yes _____ No _____

Other Instructions: _____

POSITIONING BELT:

- Employees must not be able to fall more than 2 feet.
- The anchorage must be able to sustain four times the intended load.
- Snap hooks must not be connected to each other, or to loops in webbing.

System Component List: _____

Anchor Point at this Worksite: _____

Other Instructions: _____

FALL RESTRAINT HARNESS/BELT:

Fall restraint protection must conform to the following provision:

- Personal fall restraint systems must be rigged to allow the movement of employees only as far as the unprotected sides and edges of the walking/working surface, and must consist of the following requirements:
  - A full body harness must be used.
  - The full body harness must be attached to securely rigged restraint lines.
  - All hardware assemblies for full body harness must be capable of withstanding a tension loading of 4,000 pounds without cracking, breaking, or taking a permanent deformation.
  - Compatibility of components must be ensured.
  - Anchorage points used for fall restraint must be capable of supporting four times the intended load.
  - Rope grab devices are prohibited for fall restraint applications unless they are part of a fall restraint system designed specifically for the purpose by the manufacturer, and used in strict accordance with the manufacturer's recommendations and instructions.

ANCHOR POINTS:

- Must withstand four times the intended load.
- Must ***always*** prevent a free fall from the work surface. (Several alternate anchor points may be necessary to achieve this requirement.)
- Inspect components for deformation, wear, and mildew.

System Component List: _____

Anchor Point at this Worksite: _____

Configuration and Placement Sketch Attached? Yes _____ No _____

Other Instructions: _____

SAFETY NETS:

- Must be installed within 30 feet vertically of the work surface. The potential fall area to the net must be unobstructed.
- Must extend out from the outermost projection of the work surface as specified in the table below:

Vertical distance from working levels to horizontal plane of net	Minimum required horizontal distance of outer edge of net from the edge of the working surface
Up to 5 feet	8 feet
More than 5 feet up to 10 feet	10 feet
More than 10 feet	13 feet

- Must be tested or certified to withstand a 400-pound object dropped from the highest work surface.
- Mesh at any point must not exceed 36 square inches with the largest opening being 6 inches side to side.
- Inspect weekly for mildew, wear, or damage and remove any objects in the net as soon as possible.

Note: A person falling into the net cannot contact any object below the net.

System Component List: _____

Anchor Point at this Worksite: _____

Maximum Fall Distance from Work Surface to Net: _____ Feet

Distance from Outer Edge of Net to Outermost Edge of Work Surface:

_____ Up to 5 Feet Fall = 8 Feet _____ 5 Feet to 10 Feet Fall = 10 Feet _____ > 10 Feet Fall = 13 Feet

Configuration and Placement Sketch Attached? Yes _____ No _____

Other Instructions: _____

COVERS OR HATCHES:

- Must be able to support twice the weight of employees and equipment that would be on it at the same time or twice the maximum axle load of the largest vehicle that would cross it.
- Must be secured to prevent accidental displacement.
- Must be marked with the word “Cover” or “Hole”.

Material to Use: _____

Other Instructions: _____

WARNING LINE SYSTEMS:

- Must blocked access to all fall hazards in the work area.
- Must be placed 6 feet back from the edge.
- Must be made of rope wire or chain between 39 inches and 45 inches above the surface height.
- Must be flagged at 6-foot intervals
- Must be attached to stanchions such that pulling on one section of chain will not take up slack in the other sections.
- Must have stanchions that are able to withstand a 16-pound force applied horizontally at 30 inches high.

System Component List: _____

Configuration and Placement Sketch Attached? Yes _____ No _____

Other Instructions: _____

CONTROLLED ACCESS ZONES:

- Must meet the "Warning Line System" requirements described above, 6 feet to 25 feet back from the edge plus the following when employees work between the fall hazard and the warning line (control zone).
- Must have a competent person designated as "Monitor" who:
  - Wears a high-visibility vest marked "Monitor".
  - Is in visual and voice range of employees in the control zone.
  - Is on the same working surface.
  - Has no other duties except watching, warning, and directing employees regarding fall hazards.
  - Has a maximum of eight employees working in the control zone (all of whom also wear high-visibility vests and are easily distinguishable from the Monitor).

This system is not to be used in adverse weather conditions such as snow, rain, or high wind, nor after dark.

Monitor(s): _____

Control Zone Employees:

_____ _____

_____ _____

_____ _____

_____ _____

OTHER FALL PROTECTION SYSTEM:

Provide a description of how the system is to be assembled, disassembled, operated, inspected, and maintained, including specifications for materials to be used in its construction:

_____

_____

_____

EMERGENCIES AND INJURIES:

First Aid Trained Employee(s) On-Site:

Name: _____ Title: _____

Name: _____ Title: _____

First Aid Kit Location(s): _____

Nearest Medical Facility: _____

Emergency Services Phone Numbers:

Medical: _____ Fire: _____ Police: _____

Location of Nearest Telephone: _____

If a crew member is injured at elevation, the Site Manager will evaluate the employee's condition and administer first aid. Emergency services will be called as needed. If an injured employee can't return to ground level, the employee will be brought down to a lower level by emergency services. The following equipment is available on-site to facilitate lowering the injured worker:

EMPLOYEE TRAINING:

All employees must be instructed on the provisions of this plan and have been trained in the proper use of the fall protection equipment involved. By signing this document, the employees acknowledge that they understand the plan and have been trained in the use of the equipment.

Name	Signature	Date

The competent person's signature verifies that the hazard analysis has been done, the employees informed of the plan's provisions and that employees have received training in the fall protection systems in use:

Name	Signature	Date

FALL PROTECTION TRAINING GUIDE FOR EMPLOYEES

SAFETY BELT, HARNESS, AND LANYARD INSPECTION AND MAINTENANCE

I. ANSI Classification:

Class I	Body belts—used to restrain a person from falling.
Class II	Chest harness—used for restraint purposes (NOT for vertical free fall hazards).
Class III	Full body harness—used for fall arrest purposes. Can also be used for fall restraint.
Class IV	Suspension/position belt—used to suspend or support the worker. If a fall arrest hazard exists, this must be supplemented by use of a safety harness.

II. Inspection Guidelines:

To maintain their service life and high performance, all belts and harnesses must be inspected prior to each use for mildew, wear, damage, and other deteriorations. Visual inspection before each use is just common sense. Periodic tests by a trained inspector for wear, damage, or corrosion should be part of the safety program. Inspect equipment daily and replace it if any of the defective conditions in this manual are found.

BELT INSPECTION:

1. Beginning at one end, holding the body side of the belt toward you, grasp the belt with your hands 6 to 8 inches apart. Bend the belt in an inverted "U". The resulting surface tension makes damaged fibers or cuts easier to see.
2. Follow this procedure for the entire length of the belt or harness. Watch for frayed edges, broken fibers, pulled stitches, cuts, or chemical damage.
3. Special attention should be given to the attachment of buckles and D rings to webbing. Note any unusual wear, frayed or cut fibers, or distortion of the buckles or D rings.
4. Inspect for frayed or broken strands. Broken webbing strands generally appear as tufts on the webbing surface. Any broken, cut, or burned stitches will be readily seen.
5. Rivets should be tight and immovable with fingers. Body side rivet base and outside rivet burr should be flat against the material. Bent rivets will fail under stress.
6. Especially note condition of D Ring rivets and D Ring metal wear pads (if any). Discolored, pitted, or cracked rivets indicate chemical corrosion.
7. The tongue, or billet, of the belt receives heavy wear from repeated buckling and unbuckling. Inspect for loose, distorted, or broken grommets. Belts using punched holes without grommets should be checked for torn or elongated holes, causing slippage of the buckle tongue.
    a. Tongue Buckle: Buckle tongues should be free of distortion in shape and motion. They should overlap the buckle frame and move freely back and forth in their socket. Roller should turn freely on frame. Check for distortion or sharp edges.
    b. Friction Buckle: Inspect the buckle for distortion. The outer bars and center bars must be straight. Pay special attention to corners and attachment to points of the center bar.

c. Slide Buckle: Inspect buckle frame and sliding bar for cracks, distortions, or sharp edges. Sliding bar should move freely. Knurled edge will slip if worn smooth. Pay special attention to corners and ends of sliding bar.

LANYARD INSPECTION:

When inspecting lanyards, begin at one end and work to the opposite end. Slowly rotate the lanyard so that the entire circumference is checked. Spliced ends require special attention. Hardware should be examined under procedures also detailed below, i.e., Snaps, D rings, and Thimbles.

1. Steel—While rotating the steel lanyard, watch for cuts, frayed areas, or unusual wearing patterns on the wire. Broken strands will separate from the body of the lanyards.
2. Webbing—While bending webbing over a pipe or mandrel, observe each side of the webbed lanyard. This will reveal any cuts or breaks. Swelling, discolorations, cracks, and charring are obvious signs of chemical or heat damage. Observe closely for any breaks in stitching.
3. Rope—Rotation of the rope lanyard while inspecting from end to end will bring to light any fuzzy, worn, broken, or cut fibers. Weakened areas from extreme loads will appear as a noticeable change in original diameter. The rope diameter should be uniform throughout, following a short break-in-period.

FALL PROTECTION SYSTEM CONSIDERATIONS

Below are guidelines for worker protection where fall arrest or fall restraint systems are used. Some of this material may be suitable for adding to the written fall protection work plan specified in WAC 296-155-24505. Also reference WAC 296-24-88050, Appendix C, Personal Fall Arrest System.

1. Selection and use considerations: The kind of personal fall arrest system selected should match the particular work situation, and any possible free fall distance should be kept to a minimum. Consideration should be given to the particular work environment. For example, the presence of acids, dirt, moisture, oil, grease, etc., and their effect on the system, should be evaluated. Hot or cold environments may also have an adverse effect on the system. Wire rope should not be used where an electrical hazard is anticipated. As required by the standard, the employer must plan to have means available to promptly rescue an employee should a fall occur, since the suspended employee may not be able to reach a work level independently. Where lanyards, connectors, and lifelines are subject to damage by work operations such as welding, chemical cleaning, and sandblasting, the component should be protected, or other securing systems should be used. The employer should fully evaluate the work conditions and environment (including seasonal weather changes) before selecting the appropriate personal fall protection system. Once in use, the system's effectiveness should be monitored. In some cases, a program for cleaning and maintenance of the system may be necessary.
2. Testing considerations: Before purchasing or putting into use a personal fall arrest system, an employer should obtain from the supplier information about the system based on its performance during testing so that the employer can know if the system meets this standard. Testing should be done using recognized test methods. WAC 296-24-88050, Appendix C, Part II, contains test methods recognized for evaluating the performance of fall arrest systems. Not all systems may need to be individually tested; the performance of some systems may be based on data and calculations derived from testing of similar systems, provided that enough information is available to demonstrate similarity of function and design.

3. Component compatibility considerations: Ideally, a personal fall arrest system is designed, tested, and supplied as a complete system. However, it is common practice for lanyards, connectors, lifelines, deceleration devices, and body harnesses to be interchanged since some components wear out before others. The employer and employee should realize that not all components are interchangeable. For instance, a lanyard should not be connected between a body harness and a deceleration device of the self-retracting type since this can result in additional free fall for which the system was not designed for. Any substitution or change to a personal fall arrest system should be fully evaluated or tested by a competent person to determine that it meets the standard, before the modified system is put in use.
4. Employee training considerations: Thorough employee training in the selection and use of personal fall arrest systems is imperative. As stated in the standard, before the equipment is used, employees must be trained in the safe use of the system. This should include the following: application limits; proper anchoring and tie-off techniques; estimation of free fall distance, including determination of deceleration distance, and total fall distance to prevent striking a lower level; methods of use; and inspection and storage of the system. Careless or improper use of the equipment can result in serious injury or death. Employers and employees should become familiar with this material, as well as manufacturer's recommendations, before a system is used. Of uppermost importance is the reduction in strength caused by certain tie-offs (such as using knots, tying around sharp edges, etc.) and maximum permitted free fall distance. Also, to be stressed are the importance of inspections prior to use, the limitations of the equipment, and unique conditions at the worksite which may be important in determining the type of system to use.
5. Instruction considerations: Employers should obtain comprehensive instructions from the supplier as to the system's proper use and application, including, where applicable:
    a. The force measured during the sample force test.
    b. The maximum elongation measured for lanyards during the force test.
    c. The deceleration distance measured for deceleration devices during the force test.
    d. Caution statements on critical use limitations.
    e. Application limits.
    f. Proper hook-up, anchoring and tie-off techniques, including the proper dee-ring or other attachment point to use on the body harness for fall arrest.
    g. Proper climbing techniques.
    h. Methods of inspection, use, cleaning, and storage.
    i. Specific lifelines that may be used. This information should be provided to employees during training.
6. Inspection considerations: Personal fall arrest systems must be regularly inspected. Any component with any significant defect, such as cuts, tears, abrasions, mold, or undue stretching; alterations or additions which might affect its efficiency; damage due to deterioration; contact with fire, acids, or other corrosives; distorted hooks or faulty hook springs; tongues unfitted to the shoulder of buckles; loose or damaged mountings; nonfunctioning parts; or wearing or internal deterioration in the ropes must be withdrawn from service immediately, and should be tagged or marked as unusable, or destroyed.

7. Rescue considerations: When personal fall arrest systems are used, the employer must assure that employees can be promptly rescued or can rescue themselves should a fall occur. The availability of rescue personnel, ladders, or other rescue equipment should be evaluated. In some situations, equipment that allows employees to rescue themselves after the fall has been arrested may be desirable, such as devices that have descent capability.

8. Tie-off considerations:

    a. One of the most important aspects of personal fall protection systems is fully planning the system before it is put into use. Probably the most overlooked component is planning for suitable anchorage points. Such planning should ideally be done before the structure or building is constructed so that anchorage points can be incorporated during construction for use later for window cleaning or other building maintenance. If properly planned, these anchorage points may be used during construction, as well as afterwards

    b. Employers and employees should at all times be aware that the strength of a personal fall arrest system is based on its being attached to an anchoring system that does not significantly reduce the strength of the system (such as a properly dimensioned eye-bolt/snap-hook anchorage). Therefore, if a means of attachment is used that will reduce the strength of the system, that component should be replaced by a stronger one but one that will also maintain the appropriate maximum arrest force characteristics.

    c. Tie-off using a knot in a rope lanyard or lifeline (at any location) can reduce the lifeline or lanyard strength by 50 percent or more. Therefore, a stronger lanyard or lifeline should be used to compensate for the weakening effect of the knot, the lanyard length should be reduced (or the tie-off location raised) to minimize free fall distance, or the lanyard or lifeline should be replaced by one which has an appropriately incorporated connector to eliminate the need for a knot.

    d. Tie-off of a rope lanyard or lifeline around an "H" or "I" beam or similar support can reduce its strength as much as 70 percent due to the cutting action of the beam edges. Therefore, a webbing lanyard or wire core lifeline should be used around the beam, the lanyard or lifeline should be protected from the edge, or free fall distance should be greatly minimized.

    e. Tie-off where the line passes over or around rough or sharp surfaces reduces strength drastically. Such a tie-off should be avoided or an alternative tie-off rigging should be used. Such alternatives may include use of a snap-hook/D-ring connection, wire rope tie-off, an effective padding of the surfaces, or an abrasion-resistance strap around or over the problem surface.

    f. Horizontal lifelines may, depending on their geometry and angle of sag, be subjected to greater loads than the impact load imposed by an attached component. When the angle of horizontal lifeline sag is less than 30 degrees, the impact force imparted to the lifeline by an attached lanyard is greatly amplified. For example, with a sag angle of 15 degrees, the force amplification is about 2:1, and at 5 degrees sag, it is about 6:1. Depending on the angle of sag, and the line's elasticity, the strength of the horizontal lifeline and the anchorages to which it is attached should be increased a number of times over that of the lanyard. Extreme care should be taken in considering a horizontal lifeline for multiple tie-offs. The reason for this is that in multiple tie-offs to a horizontal lifeline, if one employee falls, the movement of the falling employee and the horizontal lifeline during arrest of the fall may cause other employees to also fall. Horizontal lifeline and anchorage strength

should be increased for each additional employee to be tied-off. For these and other reasons, the design of systems using horizontal lifelines must only be done by qualified persons. Testing of installed lifelines and anchors prior to use is recommended.

g. The strength of an eye-bolt is rated along the axis of the bolt, and its strength is greatly reduced if the force is applied at an angle to this axis (in the direction of shear). Also, care should be exercised in selecting the proper diameter of the eye to avoid accidental disengagement of snap-hooks not designed to be compatible for the connection.

h. Due to the significant reduction in the strength of the lifeline/lanyard (in some cases, as much as a 70 percent reduction), the sliding hitch knot should not be used for lifeline/lanyard connections except in emergency situations where no other available system is practical. The "one-and-one" sliding hitch knot should never be used because it is unreliable in stopping a fall. The "two-and-two," or "three-and-three" knot (preferable), may be used in emergency situations; however, care should be taken to limit free fall distance to a minimum because of reduced lifeline/lanyard strength.

9. Vertical lifeline considerations: As required by the standard, each employee must have a separate lifeline when the lifeline is vertical. The reason for this is that in multiple tie-offs to a single lifeline, if one employee falls, the movement of the lifeline during the arrest of the fall may pull other employees' lanyards, causing them to fall as well.

10. Snap-hook considerations:

    a. Required by this standard for all connections, locking snap-hooks incorporate a positive locking mechanism in addition to the spring loaded keeper, which will not allow the keeper to open under moderate pressure without someone first releasing the mechanism. Such a feature, properly designed, effectively prevents roll-out from occurring.

    b. The following connections must be avoided (unless properly designed locking snap-hooks are used) because they are conditions which can result in roll-out when a nonlocking snap-hook is used:

        i. Direct connection of a snap-hook to a horizontal lifeline.

        ii. Two (or more) snap-hooks connected to one D ring.

        iii. Two snap-hooks connected to each other.

        iv. A snap-hook connected back on its integral lanyard.

        v. A snap-hook connected to a webbing loop or webbing lanyard.

        vi. Improper dimensions of the D ring, rebar, or other connection point in relation to the snap-hook dimensions which would allow the snap-hook keeper to be depressed by a turning motion of the snap-hook.

11. Free fall considerations: The employer and employee should at all times be aware that a system's maximum arresting force is evaluated under normal use conditions established by the manufacturer, and in no case using a free fall distance in excess of 6 feet (1.8 meter). A few extra feet of free fall can significantly increase the arresting force on the employee, possibly to the point of causing injury. Because of this, the free fall distance should be kept at a minimum, and, as required by the standard, in no case greater than 6 feet (1.8 meter). To help assure this, the tie-off attachment point to the lifeline or anchor should be located at or above the connection point

of the fall arrest equipment to harness. (Since otherwise additional free fall distance is added to the length of the connecting means (i.e. lanyard).) Attaching to the working surface will often result in a free fall greater than 6 feet (1.8 meter). For instance, if a 6-foot (1.8-meter) lanyard is used, the total free fall distance will be the distance from the working level to the body harness attachment point plus the 6 feet (1.8 meter) of lanyard length. Another important consideration is that the arresting force that the fall system must withstand also goes up with greater distances of free fall, possibly exceeding the strength of the system.

12. Elongation and deceleration distance considerations: Other factors involved in a proper tie-off are elongation and deceleration distance. During the arresting of a fall, a lanyard will experience a length of stretching or elongation, whereas activation of a deceleration device will result in a certain stopping distance. These distances should be available with the lanyard or device's instructions and must be added to the free fall distance to arrive at the total fall distance before an employee is fully stopped. The additional stopping distance may be very significant if the lanyard or deceleration device is attached near or at the end of a long lifeline, which may itself add considerable distance due to its own elongation. As required by the standard, sufficient distance to allow for all of these factors must also be maintained between the employee and obstructions below, to prevent an injury due to impact before the system fully arrests the fall. In addition, a minimum of 12 feet (3.7 meter) of lifeline should be allowed below the securing point of a rope grab type deceleration device, and the end terminated to prevent the device from sliding off the lifeline. Alternatively, the lifeline should extend to the ground or the next working level below. These measures are suggested to prevent the worker from inadvertently moving past the end of the lifeline and having the rope grab become disengaged from the lifeline.
13. Obstruction considerations: The location of the tie-off should also consider the hazard of obstructions in the potential fall path of the employee. Tie-offs that minimize the possibilities of exaggerated swinging should be considered.
14. Other considerations: Because of the design of some personal fall arrest systems, additional considerations may be required for proper tie-off. For example, heavy deceleration devices of the self-retracting type should be secured overhead in order to avoid the weight of the device having to be supported by the employee. Also, if self-retracting equipment is connected to a horizontal lifeline, the sag in the lifeline should be minimized to prevent the device from sliding down the lifeline to a position that creates a swing hazard during fall arrest. In all cases, manufacturer's instructions should be followed.

CONSTRUCTION SELF-INSPECTION GUIDE

- ☐ **Power lines**: Minimum 10 feet clearance/insulate—de-energize, under 50 kilowatts (kw); over 50 kw – refer to WAC 296-155-24505.
- ☐ **Trench/excavation**: Any trench 4 feet or greater in depth must be sloped, shored, or braced.
- ☐ **Guardrails**: Any opening 4 feet or more above ground level must be guarded.
- ☐ **Standard guardrail**: Top rail = 39 inches to 45 inches above working surface. Midrail = halfway between top rail and floor. Toeboard = 4 inches.
- ☐ **Scaffold**: Fully planked.
- ☐ **Scaffold**: Fall protection provided if fall hazards over 10 feet exist.
- ☐ **Stairs**: Four or more risers must have handrails.
- ☐ **Fall protection**: Any exposure to fall hazards of 10 feet or greater must be eliminated by the use of safety harness/belt, lanyard or lifeline, horizontal lines, or catenary lines. Positive fall restraint/protection must be utilized at all times. Two lanyards may be necessary at the beam/upright traverse points. No exposure at any time is allowed.
- ☐ **Fall protection work plan**: Job specific, in writing; available on-site for all fall hazards above 10 feet.
- ☐ **Open belts and pulleys, chains and sprockets, points of operation:** Must be guarded to prevent accidental contact. Air compressors and electric motor pulleys are the most common hazards.
- ☐ **Radial saws**: Cutting head must return easily to start position when released; blade must not extend past the edge of the worktable; off/on switch should be at front of operator's position.
- ☐ **Table saws**: Upper hood guard; anti-kickback, push stick, belt and pulley guarded.
- ☐ **Circular saws**: Blade guard instantly returns to covering position.
- ☐ **Never wedge or pin a guard.**
- ☐ **Chain saw**: Ballistic nylon leg protection; eye, ear, face protection; hard hat.
- ☐ **Angle grinders**: 180-degree guard required.
- ☐ **Ladders**: Extended 36 inches above landing and secured to prevent displacement.
- ☐ **Articulating boomlift**: Safety harness and lanyard at all times.
- ☐ **Floor holes/openings**: Covered and secured; be sure no tripping hazards in the area.
- ☐ **Extension cords/electric power tools**: Marked/covered by Assured Grounding Program.
- ☐ **Clothing**: Minimum of short sleeve shirts, long pants, and substantial footwear; no recreational shoes.
- ☐ **Hard hats**: Readily accessible at all times; worn when overhead hazard exists.
- ☐ **Oxygen/acetylene storage areas**: Cylinders chained and separated.
- ☐ **Personal protective equipment**: Head, eye, ear, respiratory, and leg protection—high visibility vests when required.
- ☐ **Housekeeping**: Workers are responsible for their own area of exposure.
- ☐ **First aid/fire extinguishers**: Available and readily accessible.
- ☐ **First aid trained personnel**: Minimum of one person on-site at all times with first aid CPR training.
- ☐ **Accident Prevention Program**: In written format.
- ☐ **Crew Leader Meetings**: At beginning of each job and at least weekly thereafter. Documented.
- ☐ **Chemical hazard communication program**

For specific information, refer to the safety and health standards, Chapters 800, 24, 62 and 155.

REFERENCE

This plan modified from template located at
<http://www.lni.wa.gov/Safety/TrainingPrevention/Programs/FPWP.asp>.

SITE PHOTOGRAPHS

CONFIGURATION DIAGRAMS

STANDARD SAFETY PROCEDURE 12: UNDERGROUND SERVICES LOCATION AND PROTECTION

INTRODUCTION AND SCOPE

"Underground utilities" generally refers to the buried pipelines and cables that transport petroleum, natural gas, electricity, communications, cable television signals, steam, water, and sewage. Underground utilities can be publically or privately owned. Underground structural components can be damaged by drilling, excavation, or other activities.

KEY HAZARDS

- Underground releases of natural gas and propane can result in explosions, significant injuries, wide-ranging damage, and even loss of life. Contact with electrical or steam utilities can injure or kill workers in the area. Some utilities, such as water or sewer, can present an engulfment hazard to personnel working in trenches, while hazardous chemicals can damage the environment and disrupt critical private and public services.

LOCATE LAW

- Public Law 109-468 (effective December 29, 2006)—This law pertains to energy products and other hazardous materials transported by pipeline. It requires:
  - Calling 811 or contacting the state or county One-Call Notification System prior to demolition, excavation, tunneling, or construction activity or using the online Utility Notification Center at <http://www.callbeforeyoudig.org/>.
  - Conducting demolition, excavation, tunneling, or construction activity with regard to the location information or markings established by a pipeline facility operator.
  - Promptly reporting to the owner of the facility any damage that could endanger life or cause serious bodily harm or damage to property.
  - Calling the 911 emergency telephone number to report damage that results in the escape of any flammable, toxic, or corrosive gas or liquid.

Note that this regulation provides for a civil penalty of up to $100,000 for each violation, with a maximum of $1,000,000 for a related series of violations.

LOCATE PROCEDURES

- Call 811 or the appropriate Utility Notification Center for the area in which you will be working. The telephone number for King County, Washington, is 1-800-424-5555. The website <www.callbeforeyoudig.org> can also be used for the public locate.
- SoundEarth Strategies, Inc. (SoundEarth) employees must complete a public locate if conducting any activity 12 inches or more in depth that has a potential to damage underground utilities or structural components.
- SoundEarth employees must complete a public and private utility locate if conducting any subsurface excavation using **mechanical means**, including investigatory excavations and borings, regardless of depth.

- Obtain applicable as-built drawings and/or maps from the facility owner. Ask the owner for any information it has on both public and privately held underground utilities.
- Allow at least 2 business days for the location request to be fulfilled.
- Locate area must be marked in white prior to calling in the locate request.
- The location request should be in the name of SoundEarth.
- After initial marking, you may maintain markings for up to 45 days.
- Jobs having a locate area of 700 linear feet or over will require a site meeting with all named utilities on your locate ticket.

PRIVATE LOCATE

A private locate should be conducted in conjunction with the public locate on private property. The private locator will be able to locate on-property utilities, such as the side sewer, light fixtures, or other private utilities.

UTILITY PROTECTION DURING WORK

An appropriate distance should be kept from utilities during subsurface work. Conduct the drilling or excavation with as much caution as possible, using manual methods, or employ air knife soil removal with a vactor truck when excavating within close proximity to underground utilities or structural components. Utility setback distances established by the utility companies, excavation contractor, or as required by local, state, or federal regulations, must be adhered to.

- Take pictures of the markings that identify the underground utilities in relation to the drilling or excavation area. This both provides documentation and serves as a verification of what was located by the public utility companies.
- Refer to the One-Call color chart if there are questions about a marking, or contact the owner or appropriate agency if clarification is needed.
- If the markings appear to be inaccurate at any point, stop the dig and reassess.

INCIDENT RESPONSE

- Report all damage, however slight, to the owner/operator of the utility. Photograph any damage and also any steps taken to protect the line from further damage. At a minimum, stop work and protect the affected area with barrier tape until the owner/operator can provide direction.
- If a natural gas, propane gas, or power line is damaged, call 911 and evacuate all people from the area immediately.
- If any flammable, toxic, or corrosive gas or liquid is released, call 911 and the owner/operator of the facility and/or utility or pipeline immediately.
- Do not attempt to turn off water or any other type of line without direction from and permission of the owner/operator.

Submit a completed SoundEarth Incident Report (attached) to the SoundEarth Corporate Risk Manager within 24 hours.

REGULATORY REFERENCES

- **29 CFR 1926.651 and WAC 296-155-655—General protection requirements.** This regulation addresses the general protection requirements for excavations, including requirements that underground utilities be located prior to opening an excavation. Further it requires that, as the estimated location of an underground installation is approached, the exact location be determined by safe and acceptable means, as well as that the underground installations be protected, supported, or removed as necessary to safeguard employees.
- **RCW 19.122—Underground utilities.** This regulation addresses in more detail the requirements of excavators in regard to underground utilities. The stated intent of this legislation is "to assign responsibilities for locating and keeping accurate records of utility locations, protecting and repairing damage to existing underground utilities, and protecting the public health and safety from interruption in utility services caused by damage to existing underground utilities."

Attachment:
Incident Report

SoundEarth Strategies

INCIDENT REPORT

Date of Incident: _____ **Time of Incident:** _____
Name(s) of Personnel Involved: _____
Location of Incident: _____
Project Name: _____ **Project Number:** _____

Type of Incident (Check all that apply):

_____ Injury
_____ Vehicle Accident
_____ Underground Property Damage
_____ Aboveground Property Damage
_____ Other (describe below)

_____

_____

Description of Incident: _____

_____

_____

_____

_____

Action Taken: _____

_____

_____

Names & Contact Information of Witnesses: _____

_____

_____

Name of Individual Completing Form	**Signature**	**Date**
Project Manager	**Signature**	**Date**
Corporate Health & Safety Manager	**Signature**	**Date**

Attach photos of incident and any additional documentation as necessary.

Submit completed form to human resources.

STANDARD SAFETY PROCEDURE 13: UNSTABLE GROUND

INTRODUCTION AND SCOPE

Unstable ground can present hazards of falling or flying rock or other loose material, and can present potentially life-threatening hazards of ground collapse and engulfment, entrapment, or burial. Unstable ground can result from activities such as drilling, excavating, and trenching. Ground can also be unstable above old and improperly supported tunnels, where underground utilities have collapsed, at old mine sites, and on landfill sites, where pockets of instability can be encountered. At landfill sites, unstable pockets can also present a hazard from toxic and/or flammable gases.

KEY HAZARDS

- Entrapment, engulfment, or burial
- Ground collapse can be sudden, catastrophic, and deadly, and rescue can be very challenging.

KEY POINTS

- Trenches 4 feet or more in depth must be provided with a fixed means of egress, no more than 25 feet from the people working in the trench.
- Trenches 4 feet deep or greater require protective system unless the excavation is made entirely of rock. Trenches 20 feet deep or greater require the protective system be designed by a registered professional engineer.
- Keep stockpiles and other heavy equipment at least 2 feet away from trench edges.

PRE-FIELD CONSIDERATIONS

Before work, it is necessary to evaluate the potential for ground instability. This can include inquiring about the history of the site and any hazards known to the site owner/operator, conducting a public records search, and requesting that public and private underground utilities be located.

Any excavation (such as of a trench or pit) of soil, rock, or other ground material or excavation of the sidewall of a mining operation presents the potential for the movement of ground materials and associated instability hazards.

A competent person must inspect trenches daily and as conditions changes. **A competent person** is: an individual who is capable of identifying existing and predictable hazards or working conditions that are hazardous, unsanitary, or dangerous to workers; soil types and protective systems requirements; and who is authorized to take corrective measures to eliminate these hazards and conditions.

SoundEarth Strategies, Inc. (SoundEarth) employees are not typically identified as the competent person in charge of excavation and slope stability. Excavation sites should be evaluated and monitored by a licensed geotechnical professional or engineer. However, SoundEarth employees should be aware of the conditions that may cause slope instability or failure on sites with open excavations.

EXCAVATION AWARENESS

- The excavation is to be inspected by the competent person as follows:
  - Daily and before the start of each shift.
  - Continually during the excavation process to observe for fracture lines, cracks, subsidence, and other visual indicators of failure.
  - After every rainstorm or other weather event that could increase the hazard.
  - When fissures, tension cracks, sloughing, undercutting, water seepage, bulging at the bottom, or similar conditions are noted.
  - When there is a change in the size, location, or placement of the spoil pile.
  - When there is any indication of change or movement in adjacent structures.
  - As otherwise dictated by the work being done in the trench.
- In addition, the following precautions are also to be taken:
  - The observer should position him or herself at a location that is at the end of the long axis of the excavation, within sight of the excavator operator, and avoid the long edge of the excavation where possible.
  - Temporary spoil is to be placed at least 2 feet from the edge of the excavation and positioned so that it channels rainwater and other runoff water away from the excavation.
  - Permanent spoil is to be placed at some distance from the excavation.
  - Surface crossing of trenches is to be discouraged. When it must be done, walkways or bridges for foot traffic must comply with Title 296, Chapter 155, Part N of the Washington Administrative Code (WAC 296-155 Part N), and vehicle crossings must be designed by and installed under the supervision of a registered professional engineer.
  - Trenches 4 feet or more in depth must be provided with a fixed means of egress, no more than 25 feet from the people working in the trench, and as otherwise described in WAC 296-155 Part N. Note: Steps should have already been taken to see that underground electrical hazards are not present, but extra care must be taken when using metal ladders in a pit or trench.
  - A trench or pit with a depth of 4 feet or more could meet the definition of a confined space. If there could be a hazardous atmosphere in an excavation, the excavation must be treated as a permit-required confined space, which includes meeting the requirements for an attendant and rescue equipment on the site.
  - Employees must be protected from vehicular traffic and cranes and heavy equipment.
  - Water accumulation and standing water must be controlled.

SOIL CLASSIFICATIONS

Excavation standards require a competent person to classify soil and rock as one of the four classifications:

- **Stable Rock –** Natural solid mineral matter. Can be excavated with vertical sides.
- **Type A soil –** Cohesive soils with unconfined compressive strength of 1.5 tons per square feet (tsf) or greater. Examples include: clay, silty clay, and clay loam.
- **Type B soil –** Includes cohesive soils with unconfined compressive strength greater than 0.5 tsf and granular cohesionless soils (such as angular gravel, crushed rock, silt, sandy loam).
- **Type C soil –** Cohesive soils with unconfined compressive strength less than 0.5 tsf or granular soils, submerged soil, submerged rock that is not stable, or materials in a sloped, layered system where the layers dip into the excavation with a slope greater than 4:1.

PROTECTIVE SYSTEMS AWARENESS

Several types of protective systems are available depending on the site and soil conditions.

- **Benching:** Excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels. Benching cannot be done in Type C soil.
- **Sloping:** Involves cutting the trench wall at an angle inclined away from the excavation. Sloping at 1.5 to 1 foot is considered safe for most types of soil.
- **Shoring:** Requires installation of aluminum hydraulic or other types of supports to prevent soil movement and cave-ins.
- **Shielding:** Uses trench boxes or other types of supports to prevent soil cave-ins. The appropriate protective system should consider soil classification, depth of cut, water content, changes in weather, surcharge loads, and other operations in the vicinity.

REGULATORY REFERENCES AND ADDITIONAL INFORMATION

- **Title 29, Part 1926, Subpart P of the Code of Federal Regulations and WAC 296-155-650, Part N—Excavation, Trenching, and Shoring.** This chapter defines the protection requirements when these activities are being conducted.

STANDARD SAFETY PROCEDURE 14: OVERHEAD HAZARDS

INTRODUCTION AND SCOPE

Employees of SoundEarth Strategies, Inc. (SoundEarth) could be subject to overhead hazards on industrial or construction sites. In addition, some projects for which SoundEarth provides direction or oversight (such as exterior lead abatement) could create an overhead hazard. Overhead hazards often exist during trenching or excavation. This Standard Safety Procedure (SSP) addresses several potential circumstances.

KEY HAZARD

- Head injury

PRECAUTIONARY MEASURE

- Wear an American National Standards Institute (ANSI)-approved hard hat when working on a site where overhead hazards may be present, such as construction, demolition, and industrial sites.

GENERAL SAFETY PROCEDURES

- Follow the requirements for the site and observe all caution signs, barriers, or other indicators of overhead hazards.
- Do not walk under obvious overhead hazards. Never walk under a suspended load.
- In addition, wear an ANSI-approved hard hat when working on a mine site or other sites where there is a hazard from flying or propelled rock or other materials.
- SoundEarth employees are not permitted underneath loads being handled by lifting or digging equipment. This includes employees working in a trench or pit, who are required to wear an ANSI-approved hard hat.
- In addition, SoundEarth employees are to be provided with adequate protection to protect them from loose rock or soil that could pose a hazard, and from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations.
- SoundEarth employees are required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators should remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped to provide adequate protection for the operator during loading and unloading operations.
- SoundEarth personnel directing or providing oversight of a project where there is potential for overhead hazards to other workers or the general public are to assess the hazard potential and determine the necessary steps to see that appropriate catch systems, barriers, and/or warnings are used.
- SoundEarth personnel performing this analysis and implementation are to coordinate with the contractor whose employees are performing the work. The contractor is responsible for enforcing the limitations and precautions established for the site/project with its employees.

APPLICABLE PPE AND CONTROLS

ANSI-approved hard hat in addition to other personal protective equipment.

OTHER CONSIDERATIONS

For information on overhead utilities, reference SSP 10, Electrical Safety and Lockout/Tagout.

REGULATORY REFERENCES AND ADDITIONAL INFORMATION

- **Title 29, Part 1926.100 of the Code of Federal Regulations and Title 296, Chapter 800, Section 160 of the Washington Administrative Code—Personal Protective Equipment (PPE), head protection specifically.** This chapter requires the provision of appropriate head protection when employees are working where there is a hazard of flying or propelled objects or falling objects or materials.

STANDARD SAFETY PROCEDURE 15: CONFINED SPACE AWARENESS

INTRODUCTION AND SCOPE

Employees of SoundEarth Strategies, Inc. (SoundEarth) are ***not* permitted to perform any work within confined spaces.** However, SoundEarth personnel should be able to identify confined spaces. Therefore, this Standard Safety Procedure (SSP) describes their characteristics.

If work must be done in a confined space, a specialized contractor with that expertise should be used. If SoundEarth personnel find a project requirement to work in a confined space, additional training and company authorization are required. Note also that work in a permit-required space calls for additional equipment and at least one additional person. This should be considered in developing a bid or site-specific Health and Safety Plan (HASP) where confined space entry is involved.

SoundEarth employees should contact emergency personnel immediately upon discovery of an emergent incident within a confined space. At no time is a SoundEarth employee to enter a confined space to attempt a rescue.

KEY HAZARDS

- Asphyxiation
- Entrapment

DEFINITION OF A CONFINED SPACE

A confined space is defined as:

- Large enough and arranged so an employee could fully enter the space and work.
- Has limited or restricted entry or exit. Examples of spaces with limited or restricted entry are tanks, vessels, silos, storage bins, hoppers, vaults, excavations, and pits.
- Not primarily designed for continuous human occupancy.

Some examples of confined spaces include: tanks, engine rooms, storage bins, manholes, pits, excavation trenches, silos, tunnels, and underground utility vaults. A space that must be entered using a ladder could be considered to have restricted access.

PERMIT-CONFINED SPACE

Once it is determined that the space meets the definition of a confined space, then it must be determined whether it is considered permit-required, which means there is a potential hazard in the space that requires an additional level of precaution.

Some of the potential hazards associated with entry into confined spaces are toxic, flammable, or oxygen-deficient atmospheres; mechanical, engulfment, or electrical hazards; tapered floors or inwardly converging walls; and heat or steam hazards. Exposure to these hazards in a confined space can result in the injury, illness, or death of the entrant or an impaired ability to self-rescue.

HOW TO EVALUATE A POTENTIAL CONFINED SPACE

- Does the person have to use their hands to enter or exit the space?
- Must the person assume an awkward position when entering or exiting the space?
- Was the space designed for continuous human occupancy?

SAFETY PROCEDURES

SoundEarth personnel are not permitted to enter confined spaces.

OSHA defines “entry" as the action of passing through the opening into a permit-required confined space. Entry is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space. Do not break the plane of the confined space with your hands, foot, or head.

Site owners/operators are responsible for identifying and posting the permit-required spaces on their property. If there is a question about this, appropriate information can be obtained from the owner/operator when SoundEarth is developing a hazard analysis for the HASP.

TRAINING REQUIREMENTS

- Confined space awareness training for SoundEarth Hazardous Waste Operations and Emergency Response-certified employees.
- Permit-Required Confined Space Entry Requirements for non-SoundEarth personnel who will act as entrants or other members of a confined space entry team.

REGULATORY REFERENCES AND ADDITIONAL INFORMATION

- **Title 29, Part 1910, Standard 1910.146 of the Code of Federal Regulations and Title 296, Chapter 809 of the Washington Administrative Code—Permit-Required Confined Space Entry.** This chapter defines a permit-required confined space and the requirements for entry.
- <http://apps.leg.wa.gov/WAC/default.aspx?cite=296-809-20002>.
- <https://www.osha.gov/dep/etools/eprcs/prcsappendices.pdf>.

STANDARD SAFETY PROCEDURE 16: HOT WORK AWARENESS

INTRODUCTION AND SCOPE

Hot work includes tasks such as welding, cutting, and burning. Examples of projects that might include hot work are the decommissioning of underground storage tanks, piping repair or reconfiguration, and building demolition, construction, or systems maintenance. Although employees of SoundEarth Strategies, Inc. (SoundEarth) do not perform hot work directly, they should be aware of the hazards associated with hot work and the necessary precautions to take when they are near hot work.

KEY HAZARDS

- Airborne exposure hazards
- Fire and explosion hazards

PRECAUTIONARY MEASURES

Hot work should be performed in an area free of flammable chemicals. If you or personnel under your direction or oversight will be working with flammables, take care that hot work will not be performed in your vicinity.

Do not approach too closely when hot work is being performed. To avoid flash burns to the eyes, do not look directly at the heat source.

Hot work should be performed in well-ventilated areas.

Ensure an appropriate fire extinguisher is close by before work begins.

Determine if a Hot Work Permit is required. If yes, the permit should be obtained before work begins.

GENERAL REQUIREMENTS FOR SUBCONTRACTORS

If a subcontractor under your direction or oversight will be performing hot work (such as cutting a tank or line), check that the subcontractor is prepared to follow the provisions of the applicable regulation(s). If applicable, determine if a Hot Work permit has been obtained before work begins. Tanks and lines should be purged of flammable liquids and filled with an inert gas to displace any residual flammable vapors before cutting.

Note that cutting on a line that has contained a chlorinated solvent can also be hazardous, as the combustion products (e.g., phosgene gas) may present a potentially deadly airborne exposure, especially in trenches, pits, or other confined areas.

Contractors should use only approved equipment in good condition and following the manufacturer's instructions.

AIR MONITORING

If hot work will be done indoors, in a confined area where metals fumes are likely to build up, or on tanks or lines that have contained a chlorinated solvent, air monitoring may be necessary to evaluate

exposure to personnel and provide information needed to implement appropriate engineering controls and identify appropriate personnel protective equipment.

For more information on air monitoring requirements, see SSP #07, Air Monitoring.

APPLICABLE PPE AND CONTROLS

Standard personal protective equipment (PPE) applies. Additional PPE may include:

- Eye protection that shields against sparks, molten metal, and welder's flash
- Heat-resistant clothing
- Gloves made of leather or other flameproof fabric
- Respiratory protection

An appropriate fire extinguisher should be available during any hot work.

REGULATORY REFERENCES AND ADDITIONAL INFORMATION

- **Title 29, Part 1926, Subpart J of the Code of Federal Regulations and Title 296, Section 24, Part I of the Washington Administrative Code—Welding, Cutting, and Brazing.** This chapter defines the requirements for safety during welding, cutting, and brazing operations. Although its provisions are applicable to personnel performing these operations and therefore not directly applicable to SoundEarth personnel, it is presented here to provide additional information.
- Harris, Michael K. *Welding Health and Safety: A Field Guide for OEHS Professionals*. American Industrial Hygiene Association. 2002.

STANDARD SAFETY PROCEDURE 17: LONE WORKER

INTRODUCTION AND SCOPE

A key component of worker safety is looking out for each other. A lone worker can be anyone who works alone at a facility or site. Lone workers face the risks present to all workers on a job site, but in addition cannot call out for help to a fellow worker in the event of an emergency. All standard safety guidelines still apply to lone workers.

PRE-FIELD CONSIDERATIONS

- Assess the risk of the planned work for a lone worker.
- Consider possible methods of communication with lone workers.
- If work cannot be completed safely alone, two workers should be present on-site.
- Train lone workers in emergency response.

SITUATIONS TO CONSIDER

- Are there chemicals or hazardous substances that pose a risk to the worker?
- Does the work involve lifting or moving objects too large for one worker?
- Is more than one person needed to operate essential controls or equipment?
- Is there a risk of violence or an unsafe environment?
- Are young, pregnant, disabled, or workers with medical conditions at risk if they work alone?

GENERAL RECOMMENDATIONS

- Set limits for what work is permissible during lone work.
- Supervisors should check on lone workers at regular intervals. This should include large sites where workers are not visible or within shouting distance.
- Establish a clear action plan in the event of an emergency.
- ***Verify that lone workers have returned to a fixed base or home after completing the work.***
- Provide additional communication devices, such as hand-held two-way radios, cell phones, or satellite phones. A computer, webcam, or radio-frequency identification may be considered.
- Use automatic warning devices that alert others if signals are not received periodically from a lone worker.

APPLICABLE PPE AND CONTROLS

Standard personal protective equipment is still applicable to lone workers. Additional control measures may include alarms systems or communication devices.

TRAINING REQUIREMENTS

Lone workers should be trained in emergency response and how to contact others in the event of an emergency.

Workers should be trained to understand the risks inherent in the job and the additional risks of working alone.

REGULATORY REFERENCES

Washington State Department of Labor & Industries, "Working Alone Safely: Controlling the Risks of Solitary Work." <http://wisha-training.lni.wa.gov/training/presentations/WorkingAlone.pps>.

Standard 29, Part 1915, Standard Number 1915.84 of the Code of Federal Regulations—Safety and Health Standards for Shipyard Employment, Working Alone.

STANDARD SAFETY PROCEDURE 18: WORK NEAR WATER

INTRODUCTION AND SCOPE

Drowning hazards are present around irrigation canals or ditches, ponds and cisterns, liquid storage or treatment pits or tanks, water-filled well tailing pits, wells, lakes, reservoirs, rivers, and streams. Marine or shipyard work can also present a drowning hazard. This safety procedure addresses the requirements for protection of SoundEarth Strategies, Inc. (SoundEarth) employees from accidental drowning.

KEY HAZARD

- Drowning

PRECAUTIONARY MEASURES

- Prior to work on a worksite, determine if work near water is a possibility. Consider streams, culverts, stormwater systems, canals, and areas with accumulated standing water.
- Avoid entering canals or ditches that may present a hazard because of deep or fast-moving water; steep or slippery walls; grates, culverts, spillways, or in-water energy dissipation devices.
- Never enter an underground, water-filled tunnel or pipeline. Only trained commercial divers who are properly equipped and follow established safety precautions can enter these areas.
- Never enter wells, manholes, and pits without taking appropriate precautions for a permit-required confined space; refer to Standard Safety Procedure 15 (Confined Space Awareness). SoundEarth personnel are not permitted to enter confined spaces.

GENERAL SAFETY PROCEDURES

Work around other bodies of deep or fast-moving water only in teams of two or more people and using appropriate life-saving equipment.

If a task is identified as presenting a hazard of falling into water and drowning, personnel must be protected through guardrails, personal fall protection, or personal flotation devices (PFDs).

When working on a vessel, SoundEarth will expect from the vessel owner a deck plan that can be used to determine the positioning of the vessel owner, personnel, and equipment, along with work and decontamination zones for SoundEarth personnel. Ventilation and sanitary facilities will meet or exceed the minimum Occupational Safety and Health Administration/U.S. Coast Guard requirements.

The vessel owner will be expected to complete a Float Plan prior to each day's work and the vessel will be inspected daily. Ring buoys with at least 90 feet of line shall be provided by the vessel owner and be readily available for emergency rescue operations. The distance between ring buoys shall not exceed 200 feet. In addition, at least one lifesaving skiff shall be immediately available.

APPLICABLE PPE AND CONTROLS

SoundEarth personnel will wear U.S. Coast Guard-approved PFDs, in addition to other personal protection equipment (PPE) required for protection against chemical contamination. Other PPE will not

be worn such that it interferes with the function of the PFD. The PFD must be worn and fastened properly, as directed by the manufacturer. Each person will adjust his/her PFD for size prior to first use. He/she shall inspect it for defects that could alter its strength or buoyancy, prior to and following each use. Defective units will not be used and will be replaced, and the new PFD will be adjusted for size, before departing.

OTHER CONSIDERATIONS

Be aware that dams and the backwash areas below them (known as the "drowning machine") can be particularly hazardous.

Consider the presence of grates, culverts, or in-water energy dissipation devices could cause a worker to become caught by or struck by an object/grate and to become submerged.

REGULATORY REFERENCES AND ADDITIONAL INFORMATION

Standard 29, Part 1926, Standard Number 1926.106 of the Code of Federal Regulations and Title 296, Chapter 800, Section 160—Working Around Water/PPE for Protection from Drowning. This chapter defines requirements for the use of lifesaving equipment to prevent drowning accidents.

STANDARD SAFETY PROCEDURE 19: SAFE HANDLING OF FLAMMABLE LIQUIDS

INTRODUCTION AND SCOPE

Flammable and combustible liquids present two primary hazards—explosion and fire. The proper storage and handling of flammable liquids can significantly reduce the possibility of accidental fires and injury to employees.

KEY HAZARDS

- Explosion
- Fire

DEFINITIONS

Aerosol: A material which is dispensed from its container as a mist, spray, or foam by a propellant under pressure.

- Combustible Liquid: Any liquid having a flashpoint at or above 100 degrees Fahrenheit (°F; 37.8 degrees Celsius [°C]). Combustible liquids are divided into two classes as follows:
  - Class II liquids include those with flashpoints at or above 100 °F (37.8 °C) and below 140 °F (60 °C).
  - Class III liquids include those with flashpoints at or above 140 °F (60 °C).
- Flammable Liquids: Any liquid having a flashpoint below 100 °F (37.8 °C). Flammable liquids are known as Class I liquids and are divided into three classes as follows:
  - Class IA liquids include liquids having flashpoints below 73 °F (22.8 °C) and having a boiling point below 100 °F (37.8 °C).
  - Class IB liquids include liquids having flashpoints below 73 °F (22.8 °C) and having a boiling point at or above 100 °F (37.8 °C).
  - Class IC liquids include liquids having flashpoints at or above 73 °F (22.8 °C) and below 100 °F (37.8 °C).
- Flashpoint: The minimum temperature at which a liquid gives off vapor within a test vessel in sufficient concentration to form an ignitable mixture with air near the surface of the liquid.
- Safety Can: An approved container, of not more than 5 gallons capacity, having a spring-closing lid and spout cover, so designed that it will safely relieve internal pressure when subjected to fire exposure.

PRECAUTIONARY MEASURES

- A copy of all safety data sheets (SDS) for flammable liquids are kept on each worksite (as applicable), in the Safety Program Administrator's office, and within each storage location. The SDS should be reviewed prior to receiving, handling, or storage of any hazardous materials.
- Only approved containers and portable tanks shall be used for storage and handling of flammable and combustible liquids. Approved metal safety cans, or department of

transportation-approved containers shall be used for the handling and use of flammable liquids in quantities of 5 gallons or less, except that this shall not apply to those flammable liquid materials which are highly viscid (extremely hard to pour), which may be used and handled in original shipping containers. For quantities of 1 gallon or less, only the original container may be used for storage, use, and handling of flammable liquids.

- Gasoline shall not be used as a solvent or a cleaning agent.

STORAGE REQUIREMENTS

- No more than 25 gallons of flammable or combustible liquids shall be stored in a room outside of an approved storage cabinet. Quantities of flammable and combustible liquid in excess of 25 gallons shall be stored in an acceptable or approved cabinet. Not more than 60 gallons of flammable or 120 gallons of combustible liquids shall be stored in any one storage cabinet.
- Storage inside storage rooms shall comply with the following table.

Fire Protection Provided	Fire Resistance	Maximum Size	Total Allowable Quantities gallons/square feet/floor area
Yes	2 hours	500 square feet	10
No	2 hours	500 square feet	4
Yes	1 hour	150 square feet	5
No	1 hour	150 square feet	2

NOTE:
Fire protection system shall be sprinkler, water spray, carbon dioxide, or other system approved by a nationally recognized testing laboratory for this purpose.

- Flammable or combustible liquids shall not be stored in areas used for exits, stairways, or normally used for the safe passage of people.
- Flammable and combustible liquid containers shall be legibly marked to indicate their contents.
- Outdoor storage of containers (not more than 60 gallons each) shall not exceed 1,100 gallons in any one pile or area. Piles or groups of containers shall be separated by a 5-foot clearance. Piles or groups of containers shall not be nearer than 20 feet to a building. Within 200 feet of each pile of containers, there shall be a 12-foot-wide access way to permit approach of fire control apparatus.

APPLICABLE PERSONAL PROTECTIVE EQUIPMENT AND CONTROLS

At least one portable fire extinguisher having a rating of not less than 20-B units shall be located not less than 25 feet, nor more than 75 feet, from any flammable liquid storage area located outside. At least one portable fire extinguisher having a rating of not less than 20-B units shall be provided on all vehicles used for transporting and/or dispensing flammable or combustible liquids.

DISPENSING LIQUIDS

- Transfer flammable liquids from one container to another shall be done only when containers are electrically interconnected (bonded). To bond containers, each container is wired together and one container is connected to a good ground point to allow any charge to drain away safely. Bonding will control a static electric charge from releasing a spark that could ignite the liquid.
- Flammable liquids shall be kept in closed containers when not actually in use. Only the minimum amount required shall be kept on hand. Flammable liquids shall be used only where there are no open flames or other sources of ignition within 50 feet of the operation, unless conditions warrant greater clearance.
- Leakage or spillage of flammable or combustible liquids shall be disposed of promptly and safely.
- If oil- and grease-soaked rags or other materials are left on the ground, spontaneous combustion may occur; keep all chemical-soaked rags in approved self-closing metal containers.

TRAINING REQUIREMENT

- Fire Extinguisher use

REGULATORY REFERENCES AND ADDITIONAL INFORMATION

This Standard Safety Procedure is written to be consistent with the requirements of the State of Washington Department of Labor and Industries Division of Occupational Safety and Health standard Title 296, Chapter 155, Section 270 of the Washington Administrative Code. Flammable and Combustible Liquids, and the Occupational Safety and Health Administration standard Title 29, Part 1910, Standard 1910.106 of the Code of Federal Regulations, Flammable and Combustible Liquids.

National Fire Protection Association (NFPA) 30, Flammable and Combustible Liquids Code, and NFPA 321, Standard on Basic Classification of Flammable and Combustible Liquids, in each case the most current edition.

STANDARD SAFETY PROCEDURE 20: DEMOLITION

INTRODUCTION AND SCOPE

Demolition of structures presents both safety hazards related to the demolition itself and the use of cranes, powered industrial trucks, or other mechanical equipment and also chemical hazards related to building materials and coatings/paints. This safety procedure presents requirements to protect workers and to ensure that hazardous materials are appropriately handled in regard to demolition of structures.

KEY HAZARDS

- Structural Instability
- Chemical Exposure

PRECAUTIONARY MEASURES

- Prior to permitting employees to start demolition operations, ensure that an engineering survey of the structure has been conducted by a competent person. The survey should determine the condition of the framing, floors, and walls, and possibility of unplanned collapse of any portion of the structure. Any adjacent structure where employees may be exposed should also be similarly checked. Include written evidence that such a survey has been performed in the project file.
- When employees are required to work within a structure to be demolished which has been damaged by fire, flood, explosion, or other cause, the walls or floor should be shored or braced.
- All electric, gas, water, steam, sewer, and other service lines should be shut off, capped, or otherwise controlled, outside the building line before demolition work is started. In each case, any utility company which is involved must be notified in advance. If it is necessary to maintain any power, water, or other utilities during demolition, such lines should be temporarily relocated, as necessary, and protected.
- Where a hazard exists from fragmentation of glass, remove such hazards.
- Where a hazard exists of employees falling through wall openings, protect the opening per the requirements in Standard Safety Procedure 11.

CHEMICAL IDENTIFICATION AND REMOVAL

- Determine if any type of hazardous chemicals, gases, explosives, flammable materials, or similarly dangerous substances have been used in any pipes, tanks, or other equipment on the property. When the presence of any such substances is apparent or suspected, testing and purging must be performed and the hazard eliminated before demolition is started.
- Identify and test any potential asbestos-containing or other hazardous materials related to building materials.
- Abate or remove asbestos-containing or other hazardous materials, as required based on the results of the initial testing. Refer to the Occupational Safety and Health Administration (OSHA) Interpretation Regarding the Application of the Asbestos Standard to Demolition of Buildings with ACM in Place (August 26, 2002) and/or Department of Labor and Industries WISHA

Regional Directive (WRD) 23.35 for more detail as to the requirements for abatement and/or removal.

SAFETY PROCEDURES DURING DEMOLITION

It is not expected that SoundEarth Strategies, Inc. (SoundEarth) personnel would conduct the demolition. If this work will be done by a subcontractor working for SoundEarth, the requirements for multi-employer worksites would apply and SoundEarth would incur the responsibilities of a higher-tiered (controlling) employer.

- Refer to the OSHA Interpretation Regarding the Application of the Asbestos Standard to Demolition of Buildings with ACM in Place (August 26, 2002) and/or WRD 23.35 for more detail as to the requirements for demolition of structures with asbestos-containing or other hazardous materials in place.
- Only those stairways, passageways, and ladders, designated as means of access to the structure of the building, shall be used. All other access will be entirely closed at all times.
- Any openings cut in a floor for the disposal of materials shall be no larger in size than 25 percent of the aggregate of the total floor area, unless the lateral supports of the removed flooring remain in place. Floors weakened or otherwise made unsafe by demolition operations shall be shored to carry safely the intended imposed load from demolition operations.
- Masonry walls, or other sections of masonry, shall not be permitted to fall upon the floors of the building in such masses as to exceed the safe carrying capacities of the floors. No wall section, which is more than one story in height, shall be permitted to stand alone without lateral bracing, unless such wall was originally designed and constructed to stand without such lateral support, and is in a condition safe enough to be self-supporting.
- Structural or load-supporting members on any floor shall not be cut or removed until all stories above such a floor have been demolished and removed.

APPLICABLE PPE AND CONTROLS

Standard personal protective equipment is required during demolition activities.

REGULATORY REFERENCES AND ADDITIONAL INFORMATION

- **Standard 29, Part 1926, Subpart T of the Code of Federal Regulations—Demolition.** This chapter defines requirements for the planning and preparation prior to demolition, as well as for the conduct of the demolition itself.

ATTACHMENT B

ACKNOWLEDGMENT AND AGREEMENT FORM

ACKNOWLEDGMENT AND AGREEMENT FORM

Project Name:_____

Project Number:_____

I acknowledge that I have reviewed a copy of the Health and Safety Plan for this project, that I understand it, and that I agree to comply with all of its provisions. I also understand that I could be prohibited by the Site Manager/Health and Safety Officer or other SoundEarth personnel from working on this project if I fail to comply with any aspect of this Health and Safety Plan:

Name	*Signature*	*Company*	*Date*
Name	*Signature*	*Company*	*Date*
Name	*Signature*	*Company*	*Date*
Name	*Signature*	*Company*	*Date*
Name	*Signature*	*Company*	*Date*
Name	*Signature*	*Company*	*Date*
Name	*Signature*	*Company*	*Date*
Name	*Signature*	*Company*	*Date*
Name	*Signature*	*Company*	*Date*
Name	*Signature*	*Company*	*Date*
Name	*Signature*	*Company*	*Date*

ATTACHMENT C

DAILY HEALTH AND SAFETY BRIEFING LOG

DAILY HEALTH AND SAFETY BRIEFING LOG

Date: _____ **Start Time:** _____

Sites Discussed: _____

_____

_____

_____

Subjects Discussed: _____

_____

_____

_____

_____

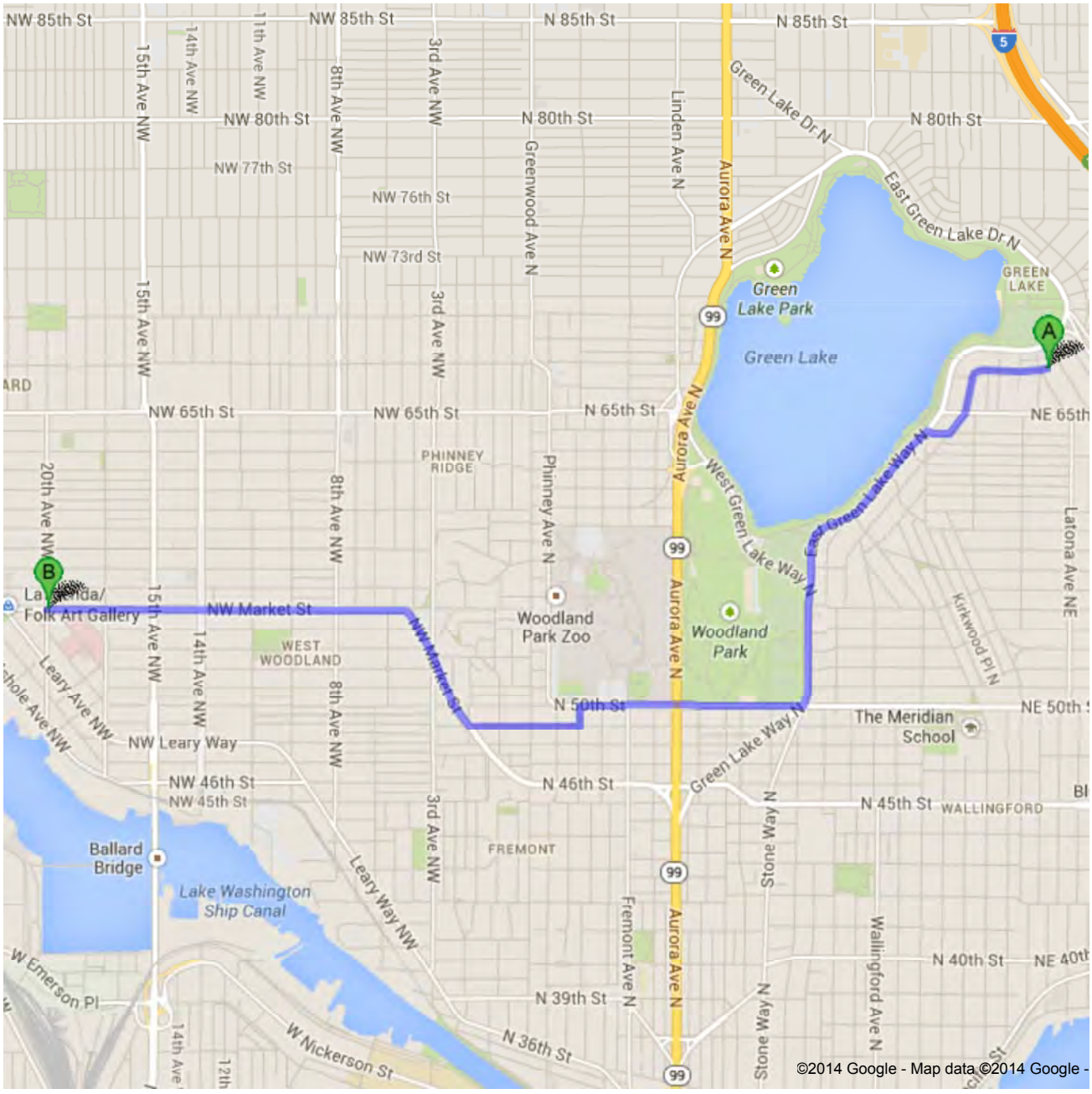
ATTENDEES

Print Name	**Signature**

Meeting Conducted by _____ **Date Signed**_____

ATTACHMENT D
HOSPITAL ROUTE

Directions to Swedish Medical Center-Ballard
5300 Tallman Ave NW, Seattle, WA 98107
3.4 mi – about **9 mins**



6860 Woodlawn Ave NE, Seattle, WA 98115

	1. Head **west** on **Woodlawn Ave NE** toward **2nd Ave NE** About 1 min	go 0.4 mi total 0.4 mi
	2. Turn right onto **N 64th St**	go 299 ft total 0.4 mi
	3. Turn left onto **East Green Lake Way N** About 1 min	go 0.6 mi total 1.0 mi
	4. Continue onto **Green Lake Way N**	go 0.3 mi total 1.3 mi
	5. Turn right onto **N 50th St**	go 0.3 mi total 1.5 mi
	6. Slight right to stay on **N 50th St**	go 0.3 mi total 1.8 mi
	7. Turn left onto **Dayton Ave N**	go 266 ft total 1.9 mi
	8. Take the 1st right onto **N 49th St** About 1 min	go 0.3 mi total 2.2 mi
	9. Turn right onto **NW Market St** About 3 mins	go 1.3 mi total 3.4 mi

Swedish Medical Center-Ballard
5300 Tallman Ave NW, Seattle, WA 98107

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Directions weren't right? Please find your route on maps.google.com and click "Report a problem" at the bottom left.

ATTACHMENT E
SITE-SPECIFIC CHEMICAL SAFETY DATA SHEETS

Safety Data Sheet

Emulsified Zero-Valent Iron - EZVI

SDS Revision Date: **06/02/2015**

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

1.1. Product identifier

Product Identity	Emulsified Zero-Valent Iron
Alternate Names	EZVI

1.2. Relevant identified uses of the substance or mixture and uses advised against

Intended use	See Technical Data Sheet.
Application Method	See Technical Data Sheet.

1.3. Details of the supplier of the safety data sheet

Company Name	Tersus Environmental, LLC 1116 Colonial Club Rd. Wake Forest, NC 27587
Emergency	
CHEMTREC (USA)	(800) 424-9300
24 hour Emergency Telephone No.	1-703-527-3887
Customer Service: Tersus Environmental, LLC	(919) 453-5577 info@tersusenv.com

SECTION 2: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW:

ROUTES OF ENTRY:

ABSORBTION (SKIN) (EYES): YES

INGESTION: YES

INJECTION: NO

INHALATION: NO

ACUTE HEALTH HAZARDS: None Known – Not believed to have harmful health effects

INGESTION/SWALLOWED: (Unknown)

- Accidental ingestion of the material may be damaging to the health of the individual.
- No harmful effects expected in amounts likely to be ingested by accident.
- Overexposure is unlikely in this form.
- Nonionic surfactants may produce localized irritation of the oral or gastrointestinal lining and induce vomiting and mild diarrhea.

EYE: (Unknown)

- Evidence exists, or practical experience predicts, that the material may cause eye irritation in a substantial number of individuals.
- Prolonged eye contact may cause inflammation characterized by a temporary redness of the conjunctiva (similar to windburn).
- Non-ionic surfactants can cause numbing of the cornea, which masks discomfort normally caused by other agents and leads to corneal injury. Irritation varies depending on the duration of contact, the nature and concentration of the surfactant.

SKIN: (Unknown)

- The material may cause moderate inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterized by redness, swelling and blistering.
- Prolonged contact may cause dryness of the skin.
- Skin contact is not thought to have harmful health effects, however the material may still produce health damage following entry through wounds, lesions or abrasions.
- Repeated exposure may cause skin cracking, flaking or drying following normal handling and use.
- Open cuts, abraded or irritated skin should not be exposed to this material.
- Entry into the blood-stream through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects.
- Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALATION: (Unknown)

- The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified using animal models). Nevertheless, adverse effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.
- In high concentrations, vapors may be irritating to the respiratory system.

CHRONIC HEALTH HAZARDS: None Known – Not believed to have harmful chronic health effects

- Long-term exposure to the product is not thought to produce chronic effects adverse to the health (as classified using animal models); nevertheless, exposure by all routes should be minimized as a matter of course. Prolonged or repeated skin contact may cause degreasing with drying, cracking and dermatitis following.

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

OSHA Regulatory Status: Some ingredients of this product are hazardous according to OSHA 29CFR 1910.1200.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE: None Known

CARCINOGENICITY

OSHA:	ACGIH:	NTP:	IARC:	OTHER:
NA	NA	NA	NA	NA

SECTION 2 NOTES:

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

PRODUCT NAME: Emulsified Zero-Valent Iron - EZVI
CASE NO.: None Known
SYNONYMS: None Known
PRODUCT CODES: None Known

INGREDIENT:	CAS NO.	% WT	% VOL	SARA 313 REPORTABLE
Water	7732-18-5	40 - 50	NA	NA
Soybean oil	8001-22-7	30 - 40	NA	NA
Iron	7439-89-6	8 - 20	NA	NA
Sorbitan trioleate	26266-58-0	1 - 5	NA	NA

EZVI	ppm	mg/m3
OSHA PEL-TWA:	NA	NA
OSHA PEL STEL :	NA	NA
OSHA PEL CEILING:	NA	NA
ACGIH TLV-TWA:	NA	NA
ACGIH TLV STEL:	NA	NA
ACGIH TLV CEILING:	NA	NA

IMPURITIES: NONE

STABILIZING ADDITIVES: NONE

SECTION 3 NOTES:

SECTION 4: FIRST AID MEASURES

EYES:

- In case of eye contact, rinse opened eye for 15 minutes then consult a doctor.

SKIN:

- Remove contaminated clothing. Wash contaminated clothing before reuse.
- In case of skin contact, immediately wash with water and soap, then rinse thoroughly.
- Seek medical assistance if redness, itching or a burning sensation develops.

INGESTION:

- In case of ingestion, after swallowing seek immediate medical advice.
- Make doctor aware that the following symptoms may occur: nausea, cramps, gastric or intestinal disorders.
- Drink 2 to 3 glasses of whole milk.

INHALATION:

- Move individual to fresh air. Not an expected route of exposure.
- If cough or other respiratory symptoms develop, consult medical personnel.

SECTION 4 NOTES:

SECTION 5: FIRE-FIGHTING MEASURES

FLAMMABLE LIMITS IN AIR, UPPER: NA
(% BY VOLUME) LOWER: NA

FLASH POINT:
F: >482°F
C: >250°C

METHOD USED: Closed Cup

AUTOIGNITION TEMPERATURE:
F: >760°F
C: >404°C

NFPA HAZARD CLASSIFICATION *SCALE: 4-extreme, 3-High, 2-Moderate, 1-Low, 0- Insignificant

HEALTH: 1 FLAMMABILITY: 2 REACTIVITY: 1
OTHER: None

HMIS HAZARD CLASSIFICATION

HEALTH: 1 FLAMMABILITY: 2 REACTIVITY: 1
PROTECTION:

EXTINGUISHING MEDIA: Extinguishing Powder – Class D Fire Extinguisher

SPECIAL FIRE FIGHTING PROCEDURES: Do NOT use water, carbon dioxide, or halogenated extinguishers.

UNUSUAL FIRE AND EXPLOSION HAZARDS: NA

HAZARDOUS DECOMPOSITION PRODUCTS: NA

SECTION 5 NOTES:

SECTION 6: ACCIDENTAL RELEASE MEASURES

ACCIDENTAL RELEASE MEASURES:
Person Related Safety Measures: Wear protective equipment, keep unprotected persons away, ensure adequate ventilation
Environmental Safety Measures: NA
Measures for cleaning/collecting: Dispose of contaminated material as waste according to section 7

SECTION 6 NOTES:

SECTION 7: HANDLING AND STORAGE

HANDLING AND STORAGE:

- Contain spilled material and recover into drums. Plastic drums are recommended.
- All drums should be placed out of direct sunlight.
- Ensure good ventilation at the workplace.
- Keep ignition sources away.
- Do not store together with oxidizing and acidic materials.
- Store away from halogens.

SECTION 7 NOTES:

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Block off area from unprotected persons

VENTILATION : Ensure adequate ventilation

RESPIRATORY PROTECTION: NA

EYE PROTECTION: Safety Goggles

PROTECTIVE GLOVES: Rubberized gloves (neoprene or pvc)

PROTECTIVE FOOTWEAR: Slip resistant footwear

SKIN PROTECTION: Outer clothing to minimize dermal contact.

WORK HYGIENIC PRACTICES: Surfaces covered with EZVI are very slick. Exercise care in handling or clean up to avoid injury due to falls.

SECTION 8 NOTES:

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Grey to black, viscous liquid

ODOR: Soybean Oil (cooking oil) odor

PHYSICAL STATE: Liquid

pH AS SUPPLIED:

pH (Other):

BOILING POINT:

F: >572 ^{o}F

C: >300 °C
MELTING POINT:
F: -4 °F
C: -20 °C
FREEZING POINT:
F: NA
C: NA
VAPOR PRESSURE (mmHg):
@
F: NA
C: NA
VAPOR DENSITY (AIR = 1):
@
F: NA
C: NA
SPECIFIC GRAVITY (H2O = 1):
@
1.05 – 1.10 g/cm^3
EVAPORATION RATE (Butyl Acetate = 1): NA

SOLUBILITY IN WATER: Insoluble

PERCENT SOLIDS BY WEIGHT: 10 – 17%

PERCENT VOLATILE:
BY WT/ BY VOL @
F: NA
C: NA
VOLATILE ORGANIC COMPOUNDS (VOC):

WITH WATER: NA LBS/GAL
WITHOUT WATER: NA LBS/GAL

MOLECULAR WEIGHT: NA

SECTION 9 NOTES:

SECTION 10: STABILITY AND REACTIVITY

	STABLE	UNSTABLE
STABILITY:	X	

CONDITIONS TO AVOID (STABILITY): Avoid improper handling and storage conditions.

INCOMPATIBILITY (MATERIAL TO AVOID): Acids, oxidizing agents, halogens

HAZARDOUS DECOMPOSITION OR BY-PRODUCTS: If combined with halogens will produce hydrogen gas.

HAZARDOUS POLYMERIZATION: NA

CONDITIONS TO AVOID (POLYMERIZATION): None

SECTION 10 NOTES:

SECTION 11: TOXICOLOGICAL INFORMATION

TOXICOLOGICAL INFORMATION: NA

IRON Toxicity to Animals: Acute oral toxicity (LD50): 30000 mg/kg [Rat].

Routes of Entry: Eye contact, inhalation, ingestion, and absorption.

LD50: Not available.
LC50: Not available.

Possible Toxic Effects on Humans: Hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Chronic Effects on Humans: Not available.
Special Remarks on other Toxic Effects on Humans: Not available.

SECTION 11 NOTES:

SECTION 12: ECOLOGICAL INFORMATION

ECOLOGICAL INFORMATION: NA

SECTION 12 NOTES:

SECTION 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Store waste materials int appropriately labeled drums out of direct sunlight. Moist conditions are preferred. Waste materials should be doused with water while in drums.

RCRA HAZARD CLASS: NA

SECTION 13 NOTES:

SECTION 14: TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION
- PROPER SHIPPING NAME: Emulsified Zero Valent Iron
- HAZARD CLASS: NA
- ID NUMBER: NA
- PACKING GROUP: None
- LABEL STATEMENT:

WATER TRANSPORTATION
- PROPER SHIPPING NAME: Emulsified Zero Valent Iron
- HAZARD CLASS: NA
- ID NUMBER: NA

PACKING GROUP: None
LABEL STATEMENTS:

AIR TRANSPORTATION
PROPER SHIPPING NAME: Emulsified Zero Valent Iron
HAZARD CLASS: NA
ID NUMBER: NA
PACKING GROUP: None
LABEL STATEMENTS:

OTHER AGENCIES:

SECTION 14 NOTES:

SECTION 15: REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS (No known regulations are in place for this product)
TSCA (TOXIC SUBSTANCE CONTROL ACT): NA

CERCLA (COMPREHENSIVE RESPONSE COMPENSATION, AND LIABILITY ACT): NA

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT): NA

311/312 HAZARD CATEGORIES: NA

313 REPORTABLE INGREDIENTS: NA

STATE REGULATIONS: NA

INTERNATIONAL REGULATIONS: NA

OSHA Regulatory Status: Some ingredients of this product are hazardous according to OSHA 29CFR 1910.1200. These specific ingredients are in lower amounts than the OSHA Permissible Exposure Limits and ACGIH Time Weighted Average.

IMPORTANT: The information contained herein relates only to the specific material identified. RemQuest believes that such information is accurate and reliable as of the date of this material safety data sheet, but no representation, guarantee or warranty, express or implied, is made as to the accuracy, reliability, or completeness of the information. RemQuest urges persons receiving this information to make their own determination as to the information's suitability and completeness for their particular application.

SECTION 16: OTHER INFORMATION

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to the information contained herein. We accept no responsibility and disclaim all liability for any harmful effects which may be caused by exposure to our products. Customers/users of this product must comply with all applicable health and safety laws, regulations, and orders.

SDS Revision Date: **06/02/2015**

The full text of the phrases appearing in section 3 is: Not applicable

This is the first version in the GHS SDS format. Listings of changes from previous versions in other formats are not applicable.

We suggest that containers be either professionally reconditioned for re-use by certified firms or properly disposed of by certified firms to help reduce the possibility of an accident. Disposal of containers should be in accordance with applicable federal, state and local laws and regulations. "Empty" drums should not be given to individuals.

The conditions of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Tersus Environmental be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Tersus Environmental has been advised of the possibility of such damages.

End of Document

Electron Donor Solution

Section 1: Chemical Product and Company Identification

Product Name: Electron Donor Solution Extended Release
Catalog Codes: EDS-ER
CAS#: 8001-22-7
TSCA: TSCA 8(b) inventory: Soybean oil
HMIS Code: H F R P: 10 0 A
Trade Name and Synonyms: EDS-ER
Chemical Family: Glyceride Oils

Contact Information:
Tersus Environmental, LLC
109 E. 17th Street, Suite #3880
Cheyenne, WY 82001
Ph: 307.638.2822 • info@tersusenv.com
www.tersusenv.com
For emergency assistance, call: 919.638.7892

Section 2: Composition and Information on Ingredients

COMPONANT	CAS #	OSHA TWA	OSHA STEL	ACGIH TWA	ACGIH STEL
Soybean Oil	8001-22-7	---	10 mg/m^3	---	---
Emulsifiers	Confidential	---	---	---	---

HAZARDOUS INGREDIENTS: NONE AS DEFINED UNDER THE U.S. OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200) OR THE CANADIAN HAZARDOUS PRODUCTS. ACT S.C. 1987, C.30 (PART 1).

THE PRECISE COMPOSITION OF THIS PRODUCT IS PROPRIETARY INFORMATION. A MORE COMPLETE DISCLOSURE WILL BE PROVIDED TO A PHYSICIAN IN THE EVENT OF A MEDICAL EMERGENCY.

SARA HAZARD: NONE NOTED (SECTION 311/312) TITLE III SECTION 313 - NOT LISTED
All components of this product are listed on the TSCA registry.

Section 3: Physical/Chemical Characteristics

BOILING RANGE: Not applicable VAPOR DENSITY: Exceeds 1.0

SPECIFIC GRAVITY (H20=1.0): 0.93 VAPOR PRESSURE: Not applicable

PERCENT VOLATILE BY VOLUME: 0% SOLUBILITY IN WATER: Miscible

EVAPORATION RATE: Not applicable
APPEARANCE AND ODOR: A pale yellow, oily liquid - only a faint odor.
WEIGHT PER GALLON: 7.7 lbs. at 60F.

Section 4: Fire and Explosion Data

FLAMMABILITY CLASSIFICATION: Combustible Liquid - Class IIIB.
FLASHPOINT: Greater than 550 F (288 C).
METHOD USED: Tag Closed Cup.
EXTINGUISHING MEDIA: CO2, dry chemical, foam, sand.
SPECIAL FIREFIGHTING PROCEDURES: Avoid use of water as it may spread fire by dispersing oil. Use water to keep fire-exposed containers cool. Water spray may be used to flush spills away from fire.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Rags soaked with any oil or solvent can present a fire hazard and should always be stored in UL Listed or Factory Mutual approved, covered containers. Improperly stored rags can create conditions that lead to oxidation. Oxidation, under certain conditions can lead to spontaneous combustion.

Section 5: Reactivity Data

STABILITY: Generally stable. Spontaneous combustion can occur. See Unusual Fire and Explosion Procedures, Section IV.

CONDITIONS TO AVOID: High surface area exposure to oxygen can result in polymerization and release of heat.

INCOMPATABILITY (MATERIALS TO AVOID): Avoid contact with strong oxidizing agents.

HAZARDOUS DECOMPOSITIONS OR BY-PRODUCTS: Decomposition may produce carbon dioxide and carbon monoxide.

HAZARDOUS POLYMERIZATION: Will not occur.

Section 6: Health Hazard Data

THRESHHOLD LIMIT VALUE: As a liquid - none. As oil mist - 10 mg/m3 total particulate.

INHALATION HEALTH RISKS AND SYMPTOMS OF EXPOSURE: Excessive inhalation of oil mist may affect the respiratory system. Oil mist is classified as a nuisance particulate by ACGIH.

SKIN ABSORPTION HEALTH RISKS AND SYMPTOMS OF EXPOSURE: Not classified as a primary skin irritant or corrosive material. Sensitive individuals may experience dermatitis after long exposure of oil on skin.

HEALTH HAZARDS (ACUTE AND CHRONIC): Acute: none observed by inhalation. Chronic: none reported.

EMERGENCY AND FIRST AID PROCEDURES FOR:

SKIN CONTACT: May be removed from skin by washing with soap and warm water.

EYE CONTACT: Immediately flush eyes with plenty of cool water for at least 15 minutes. Do NOT let victim rub eyes.

INHALATION: Immediately remove exposed individual to fresh air source. If victim has stopped breathing give artificial respiration, get medical attention immediately.

Section 7: Precautions for Safe Handling and Use

ENVIRONMENTAL PRECAUTIONS: Where large spills are possible, a comprehensive spill response plan should be developed and implemented.

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Wear appropriate respiratory protection and protective clothing as described in section VIII. Depending on quantity of spill: (a) Small spill - add solid adsorbent, shovel into disposable container and wash the area. Clean area with detergent. (b) Large spill - Squeegee or pump into holding container. Clean area with detergent. In the event of an uncontrolled release of this material, the user should determine if this release is reportable under applicable laws and regulations.

WASTE DISPOSAL METHOD: All recovered material should be packaged, labeled, transported, and disposed or reclaimed in accordance with local, state, and federal regulations and good engineering practices.

Section 8: Control Measures

RESPIRATORY PROTECTION: Not normally needed. A qualified health specialist should evaluate whether there is a need for respiratory protection under specific conditions.

VENTILATION: Handle in the presence of adequate ventilation. Intermittent clean air exchanges recommended, but not required.

PROTECTIVE GLOVES: Not normally needed. However, protective clothing is always recommended when handling chemicals.

EYE PROTECTION: Eye protection is always recommended when handling chemicals. Wear safety glasses meeting the specifications established in ANSI Standard Z87.1.

Section 9: Special Precautions

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Store away from flame, fire, and excessive heat.

Section 10: Disposal Considerations

General Information: Do not discharge into drains, watercourses or onto the ground. Discharge, treatment, or disposal may be subject to national, state, or local laws. Empty containers may contain product residues.

Disposal Methods: No specific disposal method required.

Container: Since emptied containers retain product residue, follow label warnings even after container is emptied.

Section 11: Transportation Information

DOT Not regulated.
TDG Not regulated.
IATA Not regulated.
IMDG Not regulated.

Section 12: Other Information

Hazard Ratings

	Health Hazard	Fire Hazard	Instability	Special Hazard
NFPA	1	1	0	NONE

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe
NFPA Label colored diamond code: Blue - Health; Red - Flammability; Yellow - Instability; White - Special Hazards

	Health Hazard	Flammability	Physical Hazard	Personal Protection
HMIS	1	1	0	--

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe
HMIS Label colored bar code: Blue - Health; Red - Flammability; Orange - Physical Hazards; White - Special

Section 13: Disclaimer and/or Comments

We suggest that containers be either professionally reconditioned for re-use by certified firms or properly disposed of by certified firms to help reduce the possibility of an accident. Disposal of containers should be in accordance with applicable federal, state and local laws and regulations. "Empty" drums should not be given to individuals.

The conditions of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product.

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