Work Plan
Remedial Investigation

US 101 Midway Metals
Clallam County, Washington

for
Washington State Department of Transportation

December 9, 2011

GeoEngineers
Earth Science + Technology

Work Plan
Remedial Investigation

US 101 Midway Metals
Clallam County, Washington

for
Washington State Department of Transportation

December 9, 2011

GeoEngineers

1101 South Fawcett Avenue
Suite 200
Tacoma, Washington 98402
253.383.4940

Work Plan
Remedial Investigation

US 101 Midway Metals
Clallam County, Washington

Project No. 0180-292-00

December 9, 2011

Prepared for:

Washington State Department of Transportation
Headquarters Environmental Services Office
P.O. Box 47417
Olympia, Washington 98504-7417

Attention: Jeff Sawyer

Prepared by:

GeoEngineers, Inc.
1101 South Fawcett Avenue, Suite 200
Tacoma, Washington 98402
253.383.4940

Michael E. Hutchinson, LG, LHG
Principal

Aaron M. Waggoner, LG, LHG
Geologist

AMW:MEH:cn

Table of Contents

LIST OF FIGURES

APPENDICES

ACRONYMS

ASTM	ASTM International
BTEX	benzene, toluene, ethylbenzene and xylenes
COC	contaminants of concern
CPR	cardiopulmonary resuscitation
DOT	Department of Transportation
Ecology	Washington State Department of Ecology
EIM	Environmental Information Management
EPA	Environmental Protection Agency
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response Standard
IDW	investigation derived waste
LCS	laboratory control spike
LCSD	laboratory control spike duplicate
MDL	method detection limit
mg/kg	milligrams per kilogram
MQO	measurement quality objectives
MS	matrix spike
MSD	matrix spike duplicate
MTCA	Model Toxics Control Act
NA	not available
ND	not detected
NT	not tested
OSHA	Occupational Safety and Health Administration
PARCC	precision, accuracy, representativeness, completeness and comparability
PCOC	potential contaminants of concern
PEL	permissible exposure limits
PID	photo-ionization detector
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PQL	practical quantitation limit
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation and Feasibility Study
RPD	Relative percent difference
SAP	Sampling and Analysis Plan
SHA	site hazard assessment
STEL	short-term exposure limit
SVOC	semivolatile organic compound
TLV	threshold limit value

TPH	total petroleum hydrocarbons
TRL	target reporting limit
TWA	time-weighted average
USDA	United States Department of Agriculture
VOC	volatile organic compound
WAC	Washington Administrative Code
WSDOT	Washington State Department of Transportation

1.0 INTRODUCTION

This document presents a Work Plan for a remedial investigation and feasibility study (RI/FS) at the Midway Metals Property (Site) located at 258010 Highway 101, Sequim, Washington. The location of the site is shown with respect to surrounding physical features on the Vicinity Map, Figure 1. Washington State Department of Transportation (WSDOT) is performing this work to evaluate the nature and extent of contamination related to an Initial Investigation performed by Washington State Department of Ecology (Ecology) and Clallam County Environmental Health (Clallam Health) (Initial Investigation Field Report, 2006) in conjunction with a Site Hazard Assessment performed by Clallam Health (Site Hazard Assessment, 2008).

The objectives of the remedial investigation (RI) activities presented in this Work Plan are to characterize the condition of soil, groundwater, surface water and sediment on the Site. WSDOT will utilize the findings of the RI to evaluate the preferred administrative pathway and/or necessary engineering controls. The administrative pathways that are being considered include the voluntary cleanup program (VCP) and the prospective purchaser agreement/consent decree (PPA/CD).

This Work Plan was prepared in general accordance with the requirements of WAC 173-340-350. Appendices to this document include a Sampling and Analysis Plan (SAP; Appendix A) a Quality Assurance Project Plan (QAPP; Appendix B), a Site Health and Safety Plan (HASP; Appendix C),

2.0 BACKGROUND INFORMATION

This section presents background information for the site, including soil and groundwater conditions; historical and current site uses; previous environmental investigations; contaminants of concern (COCs) and potential contaminants of concern (PCOCs).

WSDOT is considering the acquisition of the northern portion of the Site that is located within the proposed right-of-way (ROW) of the WSDOT US 101 - Shore Road to Kitchen-Dick Road - Widening Project. This widening project is proposed for completing the remaining section of US 101 from a rural two lane highway to a rural four lane divided highway between Sequim and Port Angeles in an effort to reduce traffic congestion and auto accidents. The proposed acquisition is shown on Figure 2.

Soil contamination has been confirmed on Site, but the limits of contamination have not been defined.

2.1. Property Description

Midway Metals consists of a 2.67 acre parcel (Clallam County Parcel No. 0430184301000000) that has been a scrap metal recycling facility from 1991 to present day. Details of the site are presented on the Site Plan, Figure 2. Neighboring parcels that may have been impacted by the Site operations include: a 7.89 acre parcel No. 0430184300000000 to the east, a 4.99 acre parcel No. 0430184300750000 to the south and a 4.91 acre parcel No. 0430183400100000 to the west.

The scrap metal handled on Site includes (but is not limited to) cars and trucks, tires, heavy machinery and general construction debris. Between 1972 and 1989, the Site operated as a commercial retail concrete septic tank business. Prior to 1972, the Site and surrounding area was either undeveloped forested land or developed for rural residential purposes.

The Site gradually slopes to the north toward US 101 and is divided into three tiers with a range in elevation from 350 feet at the southern property boundary to 320 feet at the northern property boundary. The three tiers are accessed by dirt and gravel roadways and scrap metal is stored along both sides of these roadways. There are trees and underbrush along the east, south and west property boundaries. A shed is used as an office building near the entrance to the Site. There are no permanent structures located on Site and no public water sewer connections. The Herrera Phase I Environmental Site Assessment (ESA) indicated that there are two groundwater wells located on the Site, both within the portion of the Site that WSDOT intends to acquire.

2.2. Geologic and Soil Conditions

The local geology beneath the Site and nearby areas consists of Tertiary-age bedrock overlain by Pleistocene-age glacial deposits. The depth to bedrock under the Site is approximately 50 feet according to nearby water well logs. Most of the glacial deposits resulted from continental glaciers that advanced from the north, with fewer glacial deposits that resulted from alpine glaciation in the Olympic Mountains to the south. The glacial deposits consist of Vashon till; a well graded, highly compacted, very dense to hard mixture of unstratified clay, silt, sand, gravel, and boulders (WA DNR, 2000). Surface soil on Site consists of gravelly, sandy loam (USDA, 1987).

2.3. Groundwater Conditions

Based on review of available water well reports, an aquifer is present in the vicinity of the Site (SE ¼ of Section 18, T 30 N, R 4 W) ranging in depth between 20 feet and 220 feet bgs. Groundwater was observed approximately 10 to 14 feet below ground surface (bgs) in soil borings completed by WSDOT in March 2011. Information regarding hydraulic conductivity for the aquifer is not available. Based on surface topography, the groundwater flow direction likely is towards the north and northeast. Groundwater elevations and flow directions may vary seasonally.

2.4. Previous Investigations

WSDOT has completed a Phase I ESA (Herrera, 2002) and a Hazardous Materials Discipline Report (WSDOT, 2009) for the Widening Project to identify potential sources of contaminants that could be encountered during project construction. The Hazardous Materials Discipline Report recommended completing a Phase II ESA for the northern portion of the Midway Metals Site. The Hazardous Materials Discipline Report also revealed that Ecology and Clallam Health completed an Initial Investigation Field Report on October 10, 2006 (Ecology and Clallam Health, 2006) and that Clallam Health completed a Site Hazard Assessment on May 14, 2008 (Clallam Health, 2008).

2.4.1. *Initial Investigation (Ecology and Clallam Health, 2006)*

Ecology and the Clallam County Environmental Health conducted an Initial Investigation on the property on October 10, 2006 in response to public complaints regarding the mishandling of waste. They collected and submitted three soil samples from three different areas on site. The sampling results indicated the presence of heavy metals and residual-range hydrocarbons exceeding the Model Toxics Control Act (MTCA) Method A cleanup levels for unrestricted land use in the surface soils of the Site (0 to 2 feet bgs). The results are presented below in Table 1 and the sample locations are shown on the Site Plan, Figure 2. As a result of the Initial Investigation, Clallam Health recommended listing the Site on ISIS for a Site Hazard Assessment (SHA) following the MTCA Washington Ranking Method (WARM) for hazardous waste sites.

2.4.2. *Site Hazard Assessment (Clallam Health, 2008)*

Clallam Health completed the Site Hazard Assessment (SHA) on May 14, 2008 and assigned an overall WARM rank of 1 to the Midway Metals Site. A WARM rank of 1 represents the highest level of potential risk to human health and the environment. This ranking is due in part to the Site having soil contamination with a high surface water migration potential and no run-on/run-off controls. The nearest surface water bodies to the Site are a wetland approximately 750 feet to the north, across Highway 101 and McDonald Creek approximately 1,000 feet to the east. The SHA also indicated that there is a drinking water well less than 600 feet from the Site and airborne dust is a concern with residences less than 1,000 feet from the Site.

2.4.3. *Limited Phase II Environmental Site Assessment (WSDOT, 2011)*

WSDOT conducted a Limited Phase II ESA in March 2011 on the portion of the Site that they intend to acquire for the above mentioned Widening Project. WSDOT submitted 18 soil samples and two groundwater samples for chemical analysis. Of the 18 soil samples, two were of surface soil obtained by hand (MM-SC2 and MM-SC3), two were obtained by backhoe (MM-TP1-2.5-3 and MM-TP3-0-3) and 14 were obtained by direct-push drill rig (MM-B1 through MM-B8 with 0- to 4- and 4- to 8-foot depth intervals at each boring). Groundwater samples were obtained from temporary well screens set at two of the direct-push soil boring locations (MM-B1-W and MM-B3-W). The soil and groundwater sample locations are shown on the Site Plan, Figure 2.

The results of the Limited Phase II ESA indicated that surface soil at two locations had petroleum-impacts (oil-range organics) greater than the MTCA Method A cleanup levels for unrestricted land use. Two of the soil samples exceeded the Method A cleanup levels for metals (mercury and lead). Select WSDOT soil samples with detections are presented below in Table 1. Please see WSDOT's *US 101 Midway Metals Limited Phase II Environmental Site Assessment* memorandum for the complete set of data tables.

TABLE 1. SOIL CHEMICAL ANALYTICAL DATA

Analyte (mg/kg)	MTCA Method A CUL - Soil (mg/kg)	Sample Locations										
		CCEH/Ecology Samples (mg/kg)			WSDOT Samples (mg/kg)							
		Sample 1 Lawn Mower	Sample 2 Tier 2 West	Sample 3 Batteries	MM-B2-0-4	MM-B3-0-4	MM-B3-4-8	MM-B4-0-4	MM-B7-0-4	MM-B8-0-4	MM-SC2	MM-SC3
Gasoline-Range Organics	30/100[1]	-	-	-	-	-	-	-	-	-	24	13
Diesel-Range Organics	2,000	120	280	1,800	-	-	-	-	-	-	-	-
Oil-Range Organics	2,000	530	1,300	**10,000**	93	120	-	180	110	1,900	**4,900**	**4,300**
Benzene	0.03	-	-	-	-	-	-	-	-	-	0.02	-
Toluene	7.0	-	-	-	-	-	-	-	-	-	0.26	0.06
Ethyl-benzene	6.0	-	-	-	-	-	-	-	-	-	0.12	0.08
Xylenes (total)	9.0	-	-	-	0.19	0.09	0.07	0.12	-	-	0.80	0.38
Arsenic	20	-	-	-	-	-	-	-	-	-	-	-
Cadmium	2.0	**4.1**	**3.5**	**7.1**	-	-	-	-	-	-	-	-
Chromium	2,000/19[2]	-	-	-	35	30	33	61	32	38	52	40
Lead	250	172	136	**3,000**	12	7.1	-	19	12	18	150	**300**
Mercury	2.0	-	-	-	-	-	-	-	**2**	-	-	-

Notes:

[1] Detection limit with benzene present/without benzene present
[2] Detection limit for chromium III/VI
"-" indicates the analyte was either not sampled or not detected
Numbers shown in **bold** indicate levels above applicable cleanup levels.

2.5. Nature and Extent of Contamination

Previous investigations of the Site soil and groundwater conducted by Ecology and Clallam County Environmental Health (Initial Investigation Field Report, 2006) and by WSDOT (Phase II ESA, 2011) had soil and groundwater samples analyzed for the following potential contaminants:

- Gasoline-, diesel-, and heavy oil-range TPH;
- Metals; and
- BTEX VOCs.

The Initial Investigation Field Report summarizes the analytical results for three soil samples collected from areas selected during the site visit. These source areas included a lawn mower storage area, an inner circle area where heavy machinery parts and scrap was stored and a battery storage shed area. These soil analytical results were compared to MTCA Method A cleanup levels for unrestricted land use.

The WSDOT Phase II ESA memorandum summarizes the analytical results for 18 soil samples and two groundwater samples collected within the northern portion of the Site. The soil analytical results were compared to MTCA Method A cleanup levels for unrestricted land use and the groundwater samples were compared to MTCA Method A cleanup levels for groundwater.

The chemical analytical data from the previous studies provide the basis for the description of the nature and extent of contamination presented in this section. The applicable analytical data are provided previously in Table 1 for reference.

The screening levels presented in this Work Plan will be used to evaluate the nature and extent of contamination present in soil, groundwater, surface water and sediment for the whole Site. This section identifies contaminants of concern (COC) and potential contaminants of concern (PCOC) for the Site based on existing data and potential site activities.

2.5.1. *Soil Contamination Identified On Site:*

Oil-Range Organics (residual-range petroleum hydrocarbons) were detected as concentration greater than MTCA Method A cleanup levels in samples; *Sample 3 Batteries, MM-SC2 and MM-SC3*. Cadmium was detected as concentration greater than MTCA Method A cleanup levels in samples; *Sample 1 Lawn Mower, Sample 2 Tier 2 West and Sample 3 Batteries*.

Lead was detected as concentration greater than MTCA Method A cleanup levels in samples Samples; *3 Batteries and MM-SC3*. Mercury was detected as concentration greater than MTCA Method A cleanup levels in sample; *MM-B7-0-4*.

All soil exceedances greater than MTCA Method A cleanup levels were located in the upper 4 feet of soil on the site.

2.5.2. *Groundwater Contamination Identified On Site*

Groundwater samples were collected at two locations during the WSDOT ESA (MM-B1-W AND MM-B3-W) and submitted for chemical analysis of gasoline-range organics, diesel-range organics, the volatile organic compounds benzene, toluene, ethylbenzene and total xylenes (BTEX) and metals arsenic, cadmium, chromium, lead and mercury.

Total arsenic was detected at concentrations greater than MTCA Method A cleanup levels for groundwater in both samples, but dissolved arsenic was either not detected or detected at concentrations below MTCA Method A cleanup levels in both samples. Total Chromium and total lead were detected at concentrations greater than MTCA Method A cleanup levels in sample MM-B1-W, but dissolved chromium and lead were either not detected or detected at concentrations below the MTCA Method A cleanup levels at this location.

Metals detections in groundwater that exceed the MTCA Method A cleanup levels for total metals, but do not exceed for dissolved metals is an indication that the unfiltered sample contained suspended sediment. Total metals results from groundwater samples with elevated turbidity are not considered representative of groundwater conditions and are biased high due to the sediment present in the sample.

2.6. Site Contaminants of Concern

The COCs listed below were determined based on the contaminants that exceeded MTCA screening levels for soil in previous site assessments.

- Oil-range total petroleum hydrocarbons (TPH) by Ecology approved method NWTPH-Dx,
- Resource Conservation and Recovery Act (RCRA) 8 metals by EPA Methods 6000/7000 and 200.8,

Groundwater, surface water and sediment were not evaluated during the Initial Investigation and surface water and sediment were not evaluated during the Phase II ESA. Also, there are other potential contaminants associated with metals recycling that were not evaluated during the previous assessments. The RI will evaluate the media and contaminants that were not previously evaluated on this Site in addition to the COCs for the media listed above.

2.7. Site Potential Contaminants of Concern

The PCOCs for soil, groundwater, surface water and sediment determined for the Site include additional contaminants associated with metals recycling. PCOCs for the site include:

- Gasoline-range TPH by Ecology approved method NWTPH-Gx,
- Diesel extended-range TPH by Ecology approved method NWTPH-Dx,
- Low level volatile organic compounds (VOCs) by EPA Methods 8260B/5035A,
- Semivolatile organic compounds (SVOCs) and low level polycyclic aromatic hydrocarbons (PAHs) by EPA Methods 8270D/SIM, and
- Polychlorinated biphenyl's (PCBs) by EPA Method 8082.

Sources of TPH, metals, VOCs and SVOCs are linked to auto wrecking where PCBs are typically related to post war era electrical equipment (transformers, breakers, fuses, etc.) along with some heavy machinery hydraulic fluids that predate 1984 (USFS, 2009). SVOCs and PAHs are typically linked to lube and fuel oil spills, open burning of waste and application of pesticides and herbicides.

2.8. Preliminary Cleanup Levels

The COCs and PCOCs sampled for in soil and sediment will be compared to the MTCA Method A cleanup levels for unrestricted land use. The COCs and PCOCs sampled for in groundwater will be compared to the MTCA Method A cleanup levels for groundwater. The COCs and PCOCs sampled for in surface water will be compared to the MTCA Method B Non-Carcinogen criteria for surface water. During the feasibility study other factors will be considered (e.g., TEE) and cleanup levels will be reevaluated for site specific conditions.

3.0 REMEDIAL INVESTIGATION

The purpose of the work proposed herein is to collect soil, groundwater, surface water and sediment samples to evaluate the current conditions at the site. Field activities are described below.

3.1. Direct-push Soil and Groundwater Assessment

GeoEngineers will evaluate soil and groundwater conditions at the site using direct-push drilling techniques. The information obtained during the direct-push soil and groundwater assessment will be used to characterize the Site. Specific tasks that will be conducted during the direct-push soil and groundwater assessment are listed below.

The QAPP, included as Appendix B, discusses field sampling procedures (sample collection/storage, field screening, sampling equipment decontamination and field QC samples) and analytical QA/QC. The HASP, included as Appendix C, discusses health and safety procedures for RI field work.

- Conduct subsurface explorations using direct-push drilling techniques. Proposed boring locations are presented on Figure 2. We assume that 15 to 20 borings will be completed. The borings will be continuously sampled in 5-foot intervals to depths of about 15 feet below the ground surface. The purpose of the direct-push explorations will be to assess condition of surface, vadose-zone and saturated-zone soils and delineate the limits of contamination on the Site. We anticipate that some flexibility will be required during the field work to adjust exploration locations and depths as subsurface conditions are observed and the extent of contamination is developed. Utility locates completed in advance of drilling activities will encompass the areas of anticipated explorations instead of exact boring locations in order to provide flexibility for boring locations.
- Soil samples will be collected continuously from each direct-push exploration. Samples of material recovered will be field-screened using water sheen and headspace vapor measurements to assess possible presence of petroleum-related contaminants. Temporary well screens will be installed in a select number of borehole locations to facilitate collecting groundwater samples before backfilling the borings. Boreholes will be backfilled in accordance with applicable state regulations. Proposed direct-push boring locations are included in Figure 2 – Site Plan.

- Two soil samples from each direct-push exploration will be submitted for chemical analysis. One soil sample will be submitted from the upper 2 feet of soil while the second soil sample that exhibits the greatest field evidence of contamination, based on field screening, will be submitted. If contamination is not evident based on field screening, the second sample to be submitted for chemical analysis will be obtained nearest to the groundwater table. The soil samples will be submitted to OnSite Environmental, LLC in Redmond, Washington for analysis of the PCOCs listed above.
- Develop and purge each temporary well to collect a groundwater. Development and purge water will be drummed, labeled and stored for future disposal.
- Submit groundwater samples to OnSite Environmental, LLC for the analysis of the PCOCs listed above.
- Have WSDOT survey the direct-push boring locations following completion of sampling activities.

3.2. Surface Water and Sediment Assessment

GeoEngineers will sample the surface water and sediment in the drainage features identified on the site plan provide by WSDOT during the direct-push assessment activities. Specific tasks that will be conducted during the surface water and sediment assessment are listed below.

- If surface water is present in the drainage features identified on the site plan at the time of sampling, surface water samples will be collected from each feature at four principle locations: upstream of the potential source areas (background samples), upstream of any confluence of two or more drainage features, downstream of any confluence of two or more drainage features and at the exit point of the site. We anticipate up to seven surface water samples to be collected from the site based on our preliminary assessment of aerial photos of the property. The number of samples will be adjusted once the WSDOT site plan is received and a site walk has been conducted. Up to three surface water samples will be collected from water (if present) in the south ditch of Highway 101. The samples will be collected from locations northwest, north and northeast of the Site.
- Submit the surface water samples to OnSite Environmental, LLC for analysis of the above listed PCOCs (Section 2.5).
- Sediment samples will be collected from the drainage features identified on the WSDOT site plan and confirmed by the site walk using the same approach as the surface water sampling plan.
- Submit the sediment samples to OnSite Environmental, LLC for analysis of the above listed PCOCs (Section 2.5).
- Have WSDOT survey the surface water and sediment sample locations following completion of sampling activities.
- Enter analytical data into Ecology's Environmental Information Management (EIM) database.

4.0 FEASIBILITY STUDY

The FS will utilize the results of the RI to revise the proposed cleanup levels for future cleanup actions at the Site. The FS will develop and evaluate cleanup action alternatives for contaminated media so that appropriate cleanup actions may be selected. Specifically, the FS will:

- Establish proposed cleanup levels and points of compliance, and, as necessary, establish remediation levels;
- Delineate affected media where evaluation of cleanup action is appropriate;
- Develop cleanup action objectives; and
- Screen and evaluate specific cleanup alternatives and recommend a preferred alternative.

4.1. Establishment of Cleanup Levels, Points of Compliance and Remediation Levels

Proposed cleanup standards, including proposed cleanup levels and points of compliance, will be developed for soil and groundwater in accordance with MTCA requirements. Exposure pathways and receptors will be identified as part of this process. As needed, remediation levels may also be established for specific cleanup alternatives.

It is expected that proposed cleanup levels for soil will be protective of human health, wildlife and groundwater based on current and likely future uses of the property. The point of compliance for soil will also be established.

It is expected that proposed cleanup levels for groundwater will be based on protection of potential future use of groundwater as drinking water. A groundwater point of compliance will be proposed. The proposed point of compliance may be conditional (for example, located at or near the groundwater/surface water interface).

4.2. Delineation of Media Requiring Cleanup Action

The RI process will determine whether soil or groundwater sample results exceed preliminary cleanup levels and, if so, identify the locations of the exceedances. Based on any exceedances and the proposed points of compliance, the FS will identify the extent or volume of soil and/or groundwater that requires cleanup action.

4.3. Development of Cleanup Action Objectives

Cleanup action objectives (CAOs) that define the goals of the cleanup that must be achieved to adequately protect human health and the environment will be developed for each medium and area identified as requiring cleanup action. These CAOs will be action-specific and/or media-specific. Action-specific CAOs are based on actions required for environmental protection that are not intended to achieve a specific numeric chemical criterion. Media-specific CAOs are based on developed cleanup levels. The CAOs will specify the COCs, the potential exposure pathways and receptors, and acceptable contaminant levels or range of levels for each exposure pathway, as appropriate.

4.4. Screening of Cleanup Action Alternatives

Cleanup alternatives will be developed for each medium of concern. Initially, general remediation technologies will be identified for the purpose of meeting CAOs for each medium. General remediation technologies consist of specific remediation technologies and process options, and will be considered and evaluated based on the media type and the properties of the COCs. These may include institutional controls, containment or other engineering controls, removal, in-situ treatment and natural attenuation.

Specific remediation technologies and representative process options will be selected for evaluation based on documented development or documented successful use for the particular medium and COCs. Cleanup alternatives will be developed from the general and specific remediation technologies and process options, consistent with Ecology expectations identified in WAC 173-340-370, using best professional judgment and guidance documents as appropriate.

During the development of cleanup alternatives, both the current and planned future land use will be considered. For example, where property is already developed (not applicable to this Site) containment alternatives may be given preferential consideration over soil cleanup alternatives that would be more disruptive to Site use/structures.

If the RI identifies localized hot spots of contaminants in soil, active cleanup alternatives such as excavation or in-situ treatment alternatives may be appropriate for those limited areas. If there are portions of the property with large volumes of materials with relatively low concentrations of hazardous substances, cleanup alternatives including engineering controls or monitored natural attenuation will be considered.

4.5. Evaluation of Cleanup Action Alternatives

MTCA requires that cleanup alternatives be compared to a number of criteria as set forth in WAC 173-340-360 to evaluate the adequacy of each alternative in achieving the intent of the regulations, and as a basis for comparing the relative merits of the developed cleanup alternatives. Consistent with MTCA, the alternatives will be evaluated with respect to compliance with threshold requirements, permanence and restoration timeframe, and the results of the evaluation will be documented in the RI/FS report.

5.0 SCHEDULE AND REPORTING

The field assessment activities including direct-push drilling and sampling will be conducted in December 2011. The samples will be submitted for chemical analysis on a standard turnaround basis. Direct-push drilling and groundwater, surface water and sediment sampling are scheduled for the week of December 12, 2011. Drilling activities are expected to last two days. Additional drilling, if necessary is expected to take one day. Following completion of field activities and receipt of analytical data, we will prepare a draft remedial investigation report for review. Field work will be completed by December 31, 2011 and the final Remedial Investigation report will be submitted by March 1, 2011.

TABLE 2. PROJECT MILESTONES AND SCHEDULE

PROJECT MILESTONES	SCHEDULE
Draft Work Plan	November 30, 2011
Final Work Plan	December 9, 2011
Draft SAP	Submitted with Draft Work Plan
Final SAP	Submitted with Final Work Plan
Draft QAPP	Submitted with Draft Work Plan
Final QAPP	Submitted with Final Work Plan
HASP	Submitted with Draft Work Plan
Direct-push Soil and Groundwater Assessment	Week of December 12, 2011
Surface Water and Sediment Assessment	Same week as Direct-push Assessment
Follow-up Field Work	Week of December 26, 2011
Draft Remedial Investigation Report	February 10, 2011
Final Remedial Investigation Report	March 1, 2011

6.0 LIMITATIONS

We have prepared this draft RI/FS Work Plan for use by WSDOT during the RI/FS at the Midway Metals Site. Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, expressed or implied, should be understood.

7.0 REFERENCES

Herrera, 2002. Initial Site Assessment – E.T. Enterprises & Recycling, 258010 Highway 101, Sequim, Washington. Prepared for Washington State Department of Transportation, February 4, 2002.

Ecology & Clallam Health, 2006. Initial Investigation Field Report – ERTS No. 556813, Prepared for Washington State Department of Ecology, October 10, 2006.

Clallam Health, 2008. Site Hazard Assessment Worksheet 1 – TCP ID No. 1671323. Prepared for Washington State Department of Ecology, May 14, 2008.

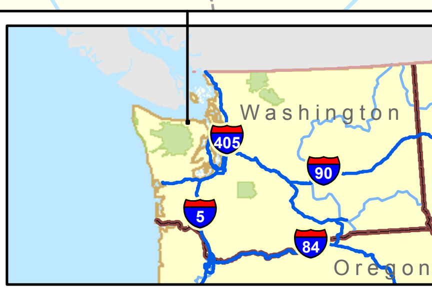
WSDOT, 2009. Hazardous Materials Discipline Report – US 101 Shore to Kitchen Dick Road – Widening Project. Prepared for Washington State Department of Transportation, November 2009.

WSDOT, 2011. US 101 Midway Metals Limited Phase II Environmental Site Assessment Memorandum – US 101 Shore to Kitchen Dick Road – Widening Project. Prepared for Washington State Department of Transportation, May 25, 2011.

USDA, 1987. Soil Survey of Clallam County Area, Washington, U.S. Department of Agriculture, February 1987.

WA DNR, 2000. Geologic Map of the Carlsborg 7.5-minute Quadrangle, Clallam County, Washington By Henry W. Schasse and Karl W. Wegmann. December 2000.

USFS 2009. Is there a problem with hydraulic fluid? United States Forest Service Engineering Toolbox article. http://www.fs.fed.us/eng/toolbox/haz/haz24.htm. Prepared for United States Forest Service Technology and Development. October 15, 2009.



N
W
E
S

2,000 0 2,000
Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources: ESRI Data & Maps, Street Maps 2005

Transverse Mercator, State Plane South, North American Datum 1983
North arrow oriented to grid north

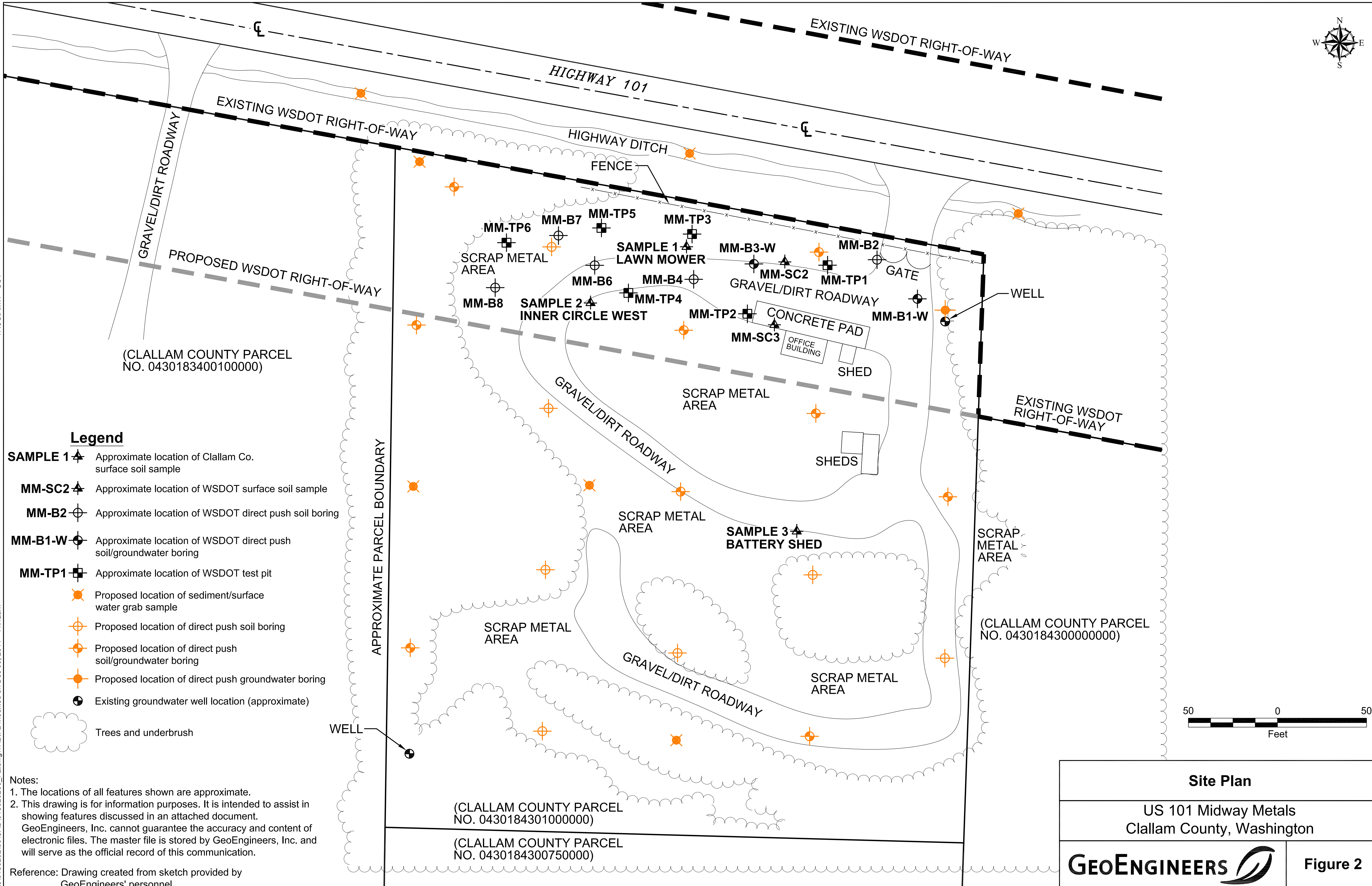
Vicinity Map

US 101 Midway Metals
Clallam County, Washington

GeoEngineers

Figure 1

Office: TACO Path: P:\0\0180292\GIS\018029200_F1.mxd Map Revised: 29 November 2011 syi



Legend

- SAMPLE 1 — Approximate location of Clallam Co. surface soil sample
- MM-SC2 — Approximate location of WSDOT surface soil sample
- MM-B2 — Approximate location of WSDOT direct push soil boring
- MM-B1-W — Approximate location of WSDOT direct push soil/groundwater boring
- MM-TP1 — Approximate location of WSDOT test pit
- Proposed location of sediment/surface water grab sample
- Proposed location of direct push soil boring
- Proposed location of direct push soil/groundwater boring
- Proposed location of direct push groundwater boring
- Existing groundwater well location (approximate)
- Trees and underbrush

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Drawing created from sketch provided by GeoEngineers' personnel.

Site Plan

US 101 Midway Metals
Clallam County, Washington

GEOENGINEERS

Figure 2

APPENDIX A
Sampling and Analysis Plan

Sampling and Analysis Plan (SAP)

US 101 Midway Metals
Remedial Investigation
Clallam County, Washington

for
Washington State Department of Transportation

December 9, 2011

GeoEngineers

1101 South Fawcett Avenue, Suite 200
Tacoma, Washington 98402
253.383.4940

Sampling and Analysis Plan (SAP)

US 101 Midway Metals
Clallam County, Washington

Project No. 0180-292-00

December 9, 2011

Prepared for:

Washington State Department of Transportation
Headquarters Environmental Services Office
P.O. Box 47417
Olympia, Washington 98504-7417

Attention: Jeff Sawyer

Prepared by:

GeoEngineers, Inc.
1101 South Fawcett Avenue, Suite 200
Tacoma, Washington 98402
253.383.4940

Michael E. Hutchinson, LG, LHG
Principal

Aaron M. Waggoner, LG, LHG
Geologist

AMW:MEH:cn

GEOENGINEERS

Table of Contents

LIST OF FIGURES

APPENDIX

1.0 INTRODUCTION

This Sampling and Analysis Plan (SAP) has been prepared for sampling and analysis activities planned to take place at the Midway Metals Property (Site) located at 258010 Hwy 101, Sequim, Washington (Figure 1). This SAP serves as the primary guide and standard operating procedures for advancement of soil borings. The SAP also describes procedures for sampling and analysis of soil, groundwater, surface water and sediment. The results of this sampling will be presented in a remedial investigation (RI) report and will be used to develop a feasibility study (FS) of treatment options.

The objectives of the investigation activities presented in this SAP are to characterize the condition of soil, groundwater, surface water and sediment on the Site and evaluate the preferred administrative pathway for Washington State Department of Transportation (WSDOT). The administrative pathways that are being considered include the voluntary cleanup program (VCP) and the prospective purchaser agreement/consent decree (PPA/CD).

Quality assurance and quality control (QA/QC) for field and laboratory activities are discussed in a separate Quality Assurance Project Plan (QAPP). A site-specific Health and Safety Plan (HASP) will be used for field activities.

2.0 BACKGROUND

2.1. Site Description and Background

Midway Metals consists of a 2.67 acre parcel (Clallam County No. 0430184301000000) that has been a scrap metal recycling facility from 1991 to present day. The scrap metal and waste handled on Site includes (but is not limited to) cars and trucks, tires, heavy machinery and general construction debris. Between 1972 and 1989, the Site operated as a commercial retail concrete septic tank business. Prior to 1972, the Site and surrounding area was either undeveloped forested land or developed for rural residential purposes. A site plan is provided as Figure 2.

WSDOT is considering the acquisition of the northern portion of the Site that is located within the proposed right-of-way (ROW) of the WSDOT US 101 - Shore Rd. to Kitchen-Dick Rd. - Widening Project. WSDOT has completed a Hazardous Materials Discipline Report (WSDOT, 2009) for the Widening Project along with Phase I Initial Site Assessment (Herrera, 2002) and Phase II Environmental Site Assessment (ESA) (WSDOT, 2011) for this northern portion of the Site. The Hazardous Materials Discipline Report revealed that the Washington Department of Ecology (Ecology) and Clallam County Environmental Health (Clallam Health) completed an Initial Investigation Field Report (Ecology & Clallam Health, 2006) in response to public complaints regarding environmental concerns on the property. Clallam Health conducted a Site Hazard Assessment (SHA) (Clallam Health, 2008) of Midway Metals and assigned a Site Hazard Ranking of 1, which represents the highest level of potential risk to human health and the environment.

As a result of the public complaints and WSDOT's interest in the property, the County, Ecology and WSDOT have all conducted soil sampling on the Site. WSDOT also conducted groundwater sampling during its Phase II ESA. The sampling results indicated the presence of heavy metals and residual-range hydrocarbons in the property's surface and shallow subsurface soils (0 to 4 feet below ground surface [bgs]). Soil contamination has been confirmed on Site, but the limits of contamination have not been defined.

2.2. Project Description and Schedule

The remedial investigation activities will consist of completing approximately 15 to 20 soil borings with groundwater samples collected from a select number of these borings. Groundwater will also be collected from the two onsite groundwater wells to assess the local drinking water aquifer. The soil borings will be completed using a limited access track-mounted direct push drill rig. The soil will be collected using a 5-foot continuous sampling probe with acetate liners driven with the rigs hydraulic hammer. The sampler will be advanced in 5-foot intervals to a depth of 15 feet. Continued sampling below 15 feet will be determined in the field on a boring by boring basis. The sampling equipment will be decontaminated following each sample collected to minimize the risk of cross-contamination. Decontamination procedures are described in the QAPP.

Groundwater is expected to be encountered on Site between 10 and 14 feet. Groundwater will be collected from the borings using temporary stainless steel sampling screens (hydropunch style) set at the soil/groundwater interface. The soil encountered during the direct push investigation will be described on boring logs by a representative of GeoEngineers under the supervision of a Washington State Licensed Geologist. An example of the boring log that will be used is included in Appendix A.

The previous investigations performed on the property identified the presence of contaminants of concern (COCs) in shallow soil (0 to 4 feet bgs). The COCs identified include:

- Lube oil-range total petroleum hydrocarbons (TPH) by Ecology approved method NWTPH-Dx,
- Resource Conservation and Recovery Act (RCRA) 8 metals by EPA Methods 6000/7000 and 200.8,
-

Due to the nature of the property's current and past use, there are other potential contaminants of concern (PCOCs) that will be taken into account during the remedial investigation. The PCOCs that will be evaluated during this RI will include:

- Gasoline-range TPH by Ecology approved method NWTPH-Gx,
- Diesel extended-range TPH and by Ecology-approved method NWTPH-Dx,
- Low level volatile organic compounds (VOCs) by EPA Methods 8260B/5035A,
- Semivolatile organic compounds (SVOCs) and low level polycyclic aromatic hydrocarbons (PAHs) by EPA Methods 8270D/SIM, and
- Polychlorinated biphenyl's (PCBs) by EPA Method 8082.

The basis for the above PCOC list was determined by an evaluation of potential sources of contamination at typical metals recycling facilities. Sources of TPH, metals, VOCs and SVOCs are linked to auto wrecking where PCBs are typically related to post war era electrical equipment (transformers, breakers, fuses, etc.) along with some heavy machinery hydraulic fluids that predate 1984 (USFS, 2009). SVOCs and PAHs are typically linked to lube and fuel oil spills, open burning of waste and application of pesticides and herbicides.

Soil borings and soil, groundwater, surface water and sediment sampling and analysis are planned to be performed to characterize the concentrations of these COCs and PCOCs on the property. The sampling locations shown on Figure 2 were chosen based on a triangular grid pattern with the objective to obtain an unbiased estimate of the extent of contamination on site (Gilbert, 1987). The grid spacing was established based on a 98th percentile confidence of locating a circular area of contamination with a radius of at least 50 feet. Additional locations may be added if there are potential source areas identified during the initial site walk. The initial proposed sampling locations are presented on the Site Plan, Figure 2.

3.0 SAMPLING PROCEDURES

Sampling activities will consist of the following:

- Obtaining surface water and sediment samples from surface drainage features located on the Site to be analyzed for the above listed COCs and PCOCs.
- Obtaining soil samples from the soil borings to be analyzed for above listed COCs and PCOCs.
- Obtaining groundwater samples from select soil boring locations to be determined in the field and from the two on site groundwater wells. Samples will be analyzed for the above listed COCs and PCOCs. The following field parameters will be measured at the time of sampling: electrical conductivity, dissolved oxygen, pH, temperature, oxidation-reduction potential and turbidity.

The following sections describe the field sampling procedures that will be used during the remedial investigation activities.

3.1. Surface Water and Sediment Sampling

A topographic survey of the property will be conducted by WSDOT (section 3.3.1) who will provide a site plan to GeoEngineers that will display the Site's surface water drainage features (either natural stream channels or manmade ditches). Surface water drainage features typically transport and concentrate contaminants on properties that have surface soil contamination. Contaminants may be transported off site either in suspension or dissolved into the surface water that is flowing through the drainage feature. Contaminants may also be concentrated and transported in the sediment deposited in the drainage feature.

If surface water is present in the drainage features identified on the site plan at the time of sampling, surface water samples will be collected from each feature at four principle locations: upstream of the potential source areas (background samples), upstream of any confluence of two or more drainage features, downstream of any confluence of two or more drainage features and at the exit point of the site. We anticipate up to 7 surface water samples to be collected from the site based on our preliminary assessment of aerial photos of the property. The number of samples will be adjusted once the WSDOT site plan is received and a site walk has been conducted. Up to 3 surface water samples will be collected from water (if present) in the south ditch of Highway 101. The samples will be collected from locations northwest, north and northeast of the Site.

Analytical laboratory supplied bottle ware will be filled directly from the surface water stream, being careful to minimize the collection of excessive suspended solids or highly turbid water. The metals sample will be unpreserved and unfiltered with a sample bottle label that reflects this. Sample labeling procedures are presented in the QAPP.

Regardless of the presence of surface water, sediment samples will be collected from the drainage features identified on the WSDOT site plan and confirmed by the site walk using the same approach as the surface water sampling plan. The sediment samples will be collected after all of the surface water samples have been collected to prevent the increased turbidity caused by the sediment sampling from impacting the surface water sample quality.

The Sediment samples will be collected beginning with the background sample locations followed by the downstream locations. The VOC samples will be collected directly from the sediment channel using the 5035A sampling method described in the QAPP. Following the VOC sample collection, sediment will be collected using decontaminated hand tools (e.g. hand auger, stainless steel trowel, stainless steel spoon, etc.), homogenized in a decontaminated stainless steel bowl and placed in the remaining laboratory supplied sample containers. Each sample container will be securely capped, labeled, and placed in a cooler with ice immediately upon collection as described in the QAPP. Each sample will be designated with a unique, sequential sample identification number.

3.2. Soil Sampling

Soil borings will be completed on the Site using a direct push drill rig. The drill rig will continuously sample each boring on 5-foot intervals using a direct push sample probe approximately 2 inches in diameter. The sample probe will be lined with a clear acetate sleeve to contain each soil sample interval. The sample sleeves will be cut open by the driller to allow access to the recovered soil for sampling and field logging purposes.

Visual field screening will be performed on material present in the sleeves to identify the soil that is to be collected for chemical analysis. The field representative will visually classify the soil in accordance with ASTM International (ASTM) Method D 2488 and record soil descriptions and other relevant field screening details (e.g., staining, debris, odors, etc.) in the field log. ASTM Method D 2488 is the visual-manual soil description method that corresponds to laboratory ASTM Method D 2487 (Unified Soil Classification System method). Field screening procedures are presented in Section 3.4.

The VOC samples will be collected first, directly from the sample sleeve using the 5035A sampling method. Following the VOC sample collection, soil will be placed in a decontaminated stainless steel bowl and homogenized. The homogenized soil will be placed the remaining sample containers provided by the analytical laboratory. Each sample container will be securely capped, labeled, and placed in a cooler with ice immediately upon collection. Each sample will be designated with a unique, sequential sample identification number.

Soil samples will be collected for chemical analysis from the upper 2 feet of every boring to characterize the Site's surface soil. At least one additional soil sample will be submitted for analysis from each boring at the location of highest visual contamination or at the soil/groundwater interface, whichever comes first. Additional soil samples will be collected based on field observations and held at the analytical laboratory pending the results of the initial samples. Additional samples will be selected and analyzed for specific COCs to close data gaps identified in the original data set.

3.3. Groundwater Sampling

The depth to groundwater will be measured and recorded at each sampling location prior to sampling using an electronic water level indicator.

Groundwater samples will be obtained using low-flow/low-turbidity sampling techniques to minimize the suspension of sediment in the samples. The hydropunch screens and the groundwater wells will be purged and groundwater samples will be obtained from them using a peristaltic pump with disposable polyethylene tubing. Groundwater will be purged from the wells at a rate not to exceed 0.5 liters per minute. A Horiba U-22 (or similar) water quality measuring system with a flow-through cell will be used to monitor the following water quality parameters during purging: electrical conductivity, dissolved oxygen, pH, salinity, total dissolved solids, oxidation-reduction potential, and temperature. Turbidity will be measured using a Hach turbidimeter (or similar). Samples will be collected from the wells and borings after these parameters vary by less than 10 percent on three consecutive measurements. The stabilized field measurements will be documented on the field log.

Following temporary well screen purging, the flow-through cell will be disconnected and groundwater samples will be collected in laboratory-prepared containers. Samples to be submitted for dissolved analyses will be filtered using a 0.45-micron filter. Samples will be submitted to an Ecology-certified laboratory for analyses of the list of PCOCs described in Section 2.2.

The samples will be placed into a cooler with ice and logged on the chain-of-custody form using procedures described in the QAPP.

3.4. Surveying

The WSDOT Projects Office will provide a survey crew to survey Site features and sampling locations relative to the WSDOT project plans. The Site features that will be surveyed will include parcel boundaries/corners, permanent structures, surface elevations, prominent vegetation (e.g., trees, brush, grassy areas, etc.), known utilities, surface drainage features, and generalized locations of the Site and adjacent roadways. The WSDOT survey crew will then survey the soil, groundwater, surface water and sediment sample locations to be included in the RI Site plans.

3.5. Field Screening

Soil samples will be field-screened for evidence of possible contamination. Field screening results will be recorded on the field logs and the results will be used as a general guideline to delineate areas of possible contamination. Field screening results will be used to aid in the selection of soil samples that will be submitted for chemical analysis, but will not serve as the only criteria; other factors to be considered include sample locations relative to other known or suspected contamination in the area. The following field screening methods will be used: 1) visual screening, 2) water sheen screening, and 3) headspace vapor screening.

3.5.1. Visual Screening

The soil will be observed for unusual color or staining that may be indicative of contamination.

3.5.2. Water Sheen Screening

This is a qualitative field screening method that can help identify the presence or absence of petroleum hydrocarbons. A portion of the soil sample will be placed in a pan containing distilled water. The water surface will be observed for signs of sheen. The following sheen classifications will be used:

Classification	Identifier	Description
No Sheen	(NS)	No visible sheen on the water surface
Slight Sheen	(SS)	Light, colorless, dull sheen; spread is irregular, not rapid; sheen dissipates rapidly
Moderate Sheen	(MS)	Light to heavy sheen; may have some color/iridescence; spread is irregular to flowing, may be rapid; few remaining areas of no sheen on the water surface
Heavy Sheen	(HS)	Heavy sheen with color/iridescence; spread is rapid; entire water surface may be covered with sheen

3.5.3. Headspace Vapor Screening

This is a semi-quantitative field screening method that can help identify the presence or absence of volatile chemicals. As soon as possible after collecting a soil sample, a portion of the sample is placed in a resealable plastic bag for headspace vapor screening. Ambient air is captured in the bag; the bag is sealed, left for approximately 5 minutes, and then shaken gently for approximately 10 seconds to expose the soil to the air trapped in the bag. Vapors present within the sample bag's headspace are measured by inserting the probe of a photoionization detector (PID) through a small opening in the bag. A PID measures the concentration of organic vapors ionizable by a 10.6 electron volt lamp (standard) in parts per million (ppm) and quantifies organic vapor concentrations in the range between 0.1 ppm and 2,000 ppm (isobutylene-equivalent) with an accuracy of 1 ppm between 0 ppm and 100 ppm. The maximum ppm value will be recorded on the field report for each sample. The PID will be calibrated to fresh air of similar relative humidity experienced at the Site and to 100 ppm isobutylene. The PID will be recalibrated if Site conditions change (ambient temperature, relative humidity, etc.).

3.6. Decontamination

Drilling and non-disposable sampling equipment will be decontaminated using the procedures described in the QAPP.

3.7. Sample Handling

Sample handling procedures, including labeling, container and preservation requirements and holding times are described in QAPP.

3.8. Disposal of Investigation-Derived Materials

3.8.1. Soil

Soil cuttings from monitoring wells will be placed in labeled and sealed 55-gallon drums. The drums will be temporarily stored on Site at a secure location pending receipt of analytical results of soil samples and off-site disposal at a permitted facility. If the results for a soil sample exceeds the "20 times" rule, the drum(s) containing the cuttings from the well from which the sample came will be analyzed using the Toxicity Characteristic Leaching Procedure (TCLP) to further evaluate disposal requirements. Each drum will be labeled with the following information:

- Material/media (i.e., soil, drill cuttings) contained in the drum;
- Source of the material in the drum (i.e., investigation locations and depths where appropriate);
- Date material was generated; and
- Name and telephone number of GeoEngineers contact person.

3.8.2. Groundwater and Decontamination Water

Development and purge water removed from the groundwater wells and hydropunch sample screens and decontamination water generated during all sampling activities will be placed in labeled and sealed 55-gallon drums. The drums will be temporarily stored on Site at a secure location pending receipt of analytical results and off-site disposal at a permitted facility. Each drum will be labeled with the following information:

- Material/media (i.e., water) contained in the drum;
- Source of the material in the drum (i.e., purge water, decontamination water);
- Date material was generated; and
- Name and telephone number of GeoEngineers contact person.

3.8.3. Incidental Waste

Incidental waste generated during sampling activities includes items such as gloves, plastic sheeting, sample tubing, paper towels and similar expended and discarded field supplies. These materials are considered *de minimis* and will be disposed of in a local trash receptacle or county disposal facility.

4.0 QUALITY ASSURANCE AND QUALITY CONTROL

Quality assurance/quality control (QA/QC) procedures and standards that will be implemented during investigation activities are presented in the QAPP. The purpose of the QAPP is to describe analysis and quality control procedures that will be implemented to produce chemical and field data that are representative, valid and accurate for use in characterizing soil and groundwater present at the Site.

5.0 REFERENCES

Clallam Health. 2008. Site Hazard Assessment Worksheet 1 – TCP ID No. 1671323. Prepared for Washington State Department of Ecology, May 14, 2008.

Ecology & Clallam Health. 2006. Initial Investigation Field Report – ERTS No. 556813, Prepared for Washington State Department of Ecology, October 10, 2006.

Gilbert. 1987. Statistical Methods for Environmental Pollution Monitoring. Richard O. Gilbert (Pacific Northwest Laboratory); Publisher Van Nostrand Reinhold, New York.

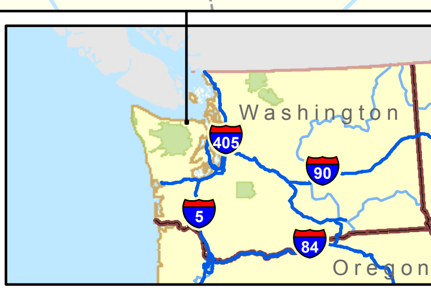
Herrera. 2002. Initial Site Assessment – E.T. Enterprises & Recycling, 258010 Highway 101, Sequim, Washington. Prepared for Washington State Department of Transportation, February 4, 2002.

USDA. 1987. Soil Survey of Clallam County Area, Washington, U.S. Department of Agriculture, February 1987.

USFS. 2009. Is there a problem with hydraulic fluid? United States Forest Service Engineering Toolbox article. http://www.fs.fed.us/eng/toolbox/haz/haz24.htm. Prepared for United States Forest Service Technology and Development. October 15, 2009.

WSDOT. 2009. Hazardous Materials Discipline Report – US 101 Shore to Kitchen Dick Road – Widening Project. Prepared for Washington State Department of Transportation, November 2009.

WSDOT. 2011. US 101 Midway Metals Limited Phase II Environmental Site Assessment Memorandum – US 101 Shore to Kitchen Dick Road – Widening Project. Prepared for Washington State Department of Transportation, May 25, 2011.



N
W
E
S

2,000 0 2,000

Feet

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources: ESRI Data & Maps, Street Maps 2005

Transverse Mercator, State Plane South, North American Datum 1983
North arrow oriented to grid north

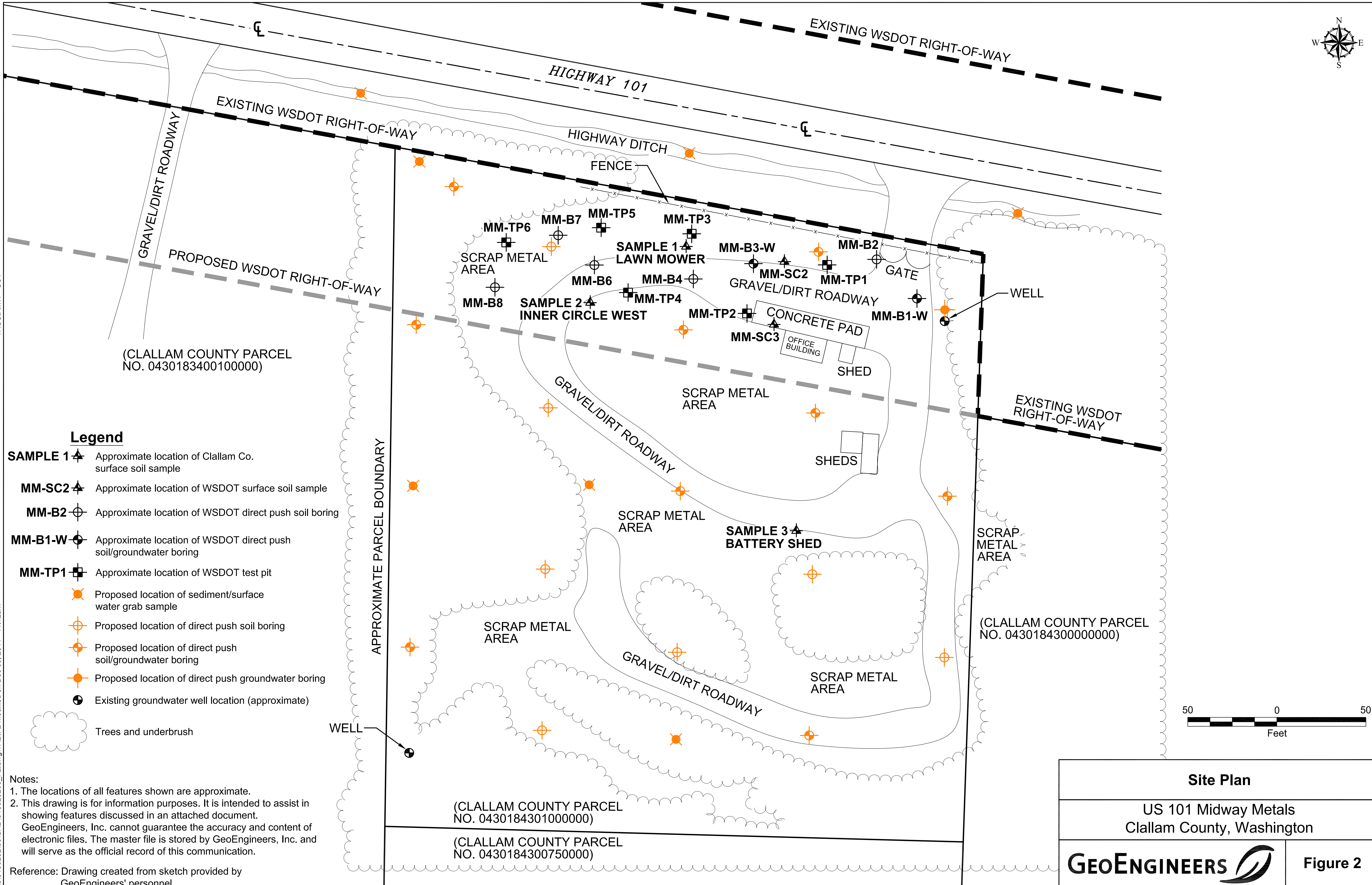
Vicinity Map

US 101 Midway Metals
Clallam County, Washington

GeoEngineers

Figure 1

Office: TACO Path: P:\0\0180292\GIS\018029200_F1.mxd Map Revised: 29 November 2011 syi



Legend

- SAMPLE 1 — Approximate location of Clallam Co. surface soil sample
- MM-SC2 — Approximate location of WSDOT surface soil sample
- MM-B2 — Approximate location of WSDOT direct push soil boring
- MM-B1-W — Approximate location of WSDOT direct push soil/groundwater boring
- MM-TP1 — Approximate location of WSDOT test pit
- Proposed location of sediment/surface water grab sample
- Proposed location of direct push soil boring
- Proposed location of direct push soil/groundwater boring
- Proposed location of direct push groundwater boring
- Existing groundwater well location (approximate)
- Trees and underbrush

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Reference: Drawing created from sketch provided by GeoEngineers' personnel.

Site Plan

US 101 Midway Metals
Clallam County, Washington

GEOENGINEERS

Figure 2

TACO:AMW : SCY

P:\0\0180292\00\CAD\018029200_F2.dwg\TAB:F2 modified on Dec 09, 2011 - 11:12am

APPENDIX A
Example Boring Log

Drilled	Start 11/14/2011	End 11/14/2011	Total Depth (ft) 46.5	Logged By CTB / Checked By NLT	Driller	Drilling Method Mud-Rotary

Surface Elevation (ft) / Vertical Datum: Undetermined	Hammer Data: Rope & Cathead, 140 (lbs) / 30 (in) Drop	Drilling Equipment: Mobile B59	
Easting (X) / Northing (Y)	System / Datum	Groundwater — Date Measured: 11/14/2011	Depth to Water (ft): 5.0 / Elevation (ft)
Notes:			

Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Group Classification	Material Description	Sheen	Headspace Vapor (ppm)	Remarks
0							AC	4 inches asphalt			
							SM	Gray silty fine sand with trace gravel (loose, wet) (fill)			
~3		1	4		1				NS		
5		2	3		2	▽			NS		
							PT	Dark brown peat with wood (medium stiff, wet)			
10		4	8		3				NS		
							SM	Gray silty fine to medium sand with silt and trace gravel and wood(medium dense, wet)			
								Gravelly at 13 feet			Slightly rough drilling at 13 feet
15		6	23		4				NS		
							SM	Brown silty fine to medium sand with trace gravel (very dense, wet)			
20		1	70		5				NS		
							SP-SM	Brownish-gray fine to coarse sand with silt and gravel (very dense, wet)			
25		14	99		6				NS		
							SP	Dark gray with oxidic staining fine to medium sand with trace silt and gravel (very dense, wet)			
							SP-SM	Red-brown fine to medium sand with silt (very dense, wet)			
30		14	86		7				NS		
							SP	Gray fine to medium sand with trace gravel (very dense, wet)			
35		14	63		8				NS		
40		14	92		9				NS		
45		15	97		10				NS		

Note: See Figure A-1 for explanation of symbols.

Log of Boring GEI-1

GEOENGINEERS

Project:
Project Location:
Project Number:

Figure A-2
Sheet 1 of 1

APPENDIX B
Quality Assurance Project Plan

Quality Assurance Project Plan (QAPP)

US 101 Midway Metals
Remedial Investigation
Clallam County, Washington

for
Washington State Department of Transportation

December 9, 2011

GeoEngineers

1101 South Fawcett Avenue,
Suite 200
Tacoma, Washington 98402
253.383.4940

Quality Assurance Project Plan (QAPP)

US 101 Midway Metals
Clallam County, Washington

Project No. 0180-292-00

December 9, 2011

Approved By:

Signature: Date: December 9, 2011

Michael E. Hutchinson, Principal, GeoEngineers, Inc.

Signature: Date: December 9, 2011

Aaron M. Waggoner, Field Coordinator, GeoEngineers, Inc.

Signature: Date: December 9, 2011

Mark J. Lybeer, Quality Assurance Leader, GeoEngineers, Inc.

AMW:MEH:MJL:cn

GeoEngineers

DISTRIBUTION LIST

Washington State Department of Ecology
Southwest Regional Office
Toxics Cleanup Program
300 Desmond Drive SE
Lacey, Washington 98503
Reps email address@ecy.wa.gov

Table of Contents

LIST OF TABLES

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been prepared for field and laboratory activities planned for the Midway Metals Property (Site) located 258010 Hwy 101, Sequim, Washington. This QAPP serves as the primary guide for the integration of quality assurance (QA) and quality control (QC) functions into the investigation activities. The QAPP presents the objectives, procedures, organization, and specific QA and QC activities designed to achieve data quality goals established for the project. Environmental measurements will be conducted to produce data that are scientifically valid, of known and acceptable quality and that meet established objectives. QA/QC procedures will be implemented so that the precision, accuracy, representativeness, completeness and comparability (PARCC) of the data generated meet the specified data quality objectives.

The objective of the investigation and sampling procedures are presented in a separate Sampling and Analysis Plan (SAP). A site-specific Health and Safety Plan (HASP) will be used for field activities.

2.0 BACKGROUND

2.1. Site Description and Background

Midway Metals consists of a 2.67 acre parcel (Clallam County No. 0430184301000000) that has been a scrap metal recycling facility from 1991 to present day. The scrap metal and waste handled on Site includes (but is not limited to) cars and trucks, tires, heavy machinery and general construction debris. Between 1972 and 1989, the Site operated as a commercial retail concrete septic tank business. Prior to 1972, the Site and surrounding area was either undeveloped forested land or developed for rural residential purposes.

Washington State Department of Transportation (WSDOT) is considering the acquisition of the northern portion of the Site that is located within the proposed right-of-way (ROW) of the WSDOT US 101 - Shore Road to Kitchen-Dick Road - Widening Project. WSDOT has completed a Hazardous Materials Discipline Report in 2009 for the Widening Project along with Phase I Initial Site Assessment in 2002 and Phase II Environmental Site Assessment (ESA) in 2011 for this northern portion of the Site. The Hazardous Materials Discipline Report revealed that the Washington State Department of Ecology (Ecology) and Clallam County Environmental Health (Clallam Health) completed an Initial Investigation Field Report in 2006 in response to public complaints regarding environmental concerns on the property. In 2008, Clallam Health conducted a Site Hazard Assessment (SHA) of Midway Metals and assigned a Site Hazard Ranking of 1, which represents the highest level of potential risk to human health and the environment.

As a result of the public complaints and WSDOT's interest in the property, the County, Ecology and WSDOT have all conducted soil sampling on the Site. WSDOT also conducted groundwater sampling during its Phase II ESA. The sampling results indicated the presence of heavy metals and residual-range hydrocarbons in the property's surface and shallow subsurface soils (0 to 4 feet below ground surface [bgs]). Soil contamination has been confirmed on Site, but the limits of contamination have not been defined.

2.2. Project Description and Schedule

The remedial investigation activities will consist of completing approximately 15 to 20 soil borings with groundwater samples collected from a select number of these borings. Groundwater will also be collected from the two on-site groundwater wells to assess the local drinking water aquifer. Groundwater is expected to be encountered on Site between 10 and 14 feet. The sampling equipment will be decontaminated following each sample collected to minimize the risk of cross-contamination. Decontamination procedures are described below in Section 6.2.1.

The previous investigations performed on the property identified the presence of contaminants of concern (COCs) in shallow soil (0 to 4 feet bgs). The COCs identified include:

- Lube oil-range total petroleum hydrocarbons (TPH) by Ecology-approved method NWTPH-Dx,
- Resource Conservation and Recovery Act (RCRA) 8 metals by EPA Methods 6000/7000 and 200.8.

Due to the nature of the property's current and past use, there are other potential contaminants of concern (PCOCs) that will be taken into account during the remedial investigation. The PCOCs that will be evaluated during this Remedial Investigation (RI) will include:

- Gasoline-range TPH by Ecology-approved method NWTPH-Gx,
- Diesel extended-range TPH by Ecology-approved method NWTPH-Dx,
- Low level volatile organic compounds (VOCs) by EPA methods 8260B/5035A,
- Semivolatile organic compounds (SVOCs) and low level polycyclic aromatic hydrocarbons (PAHs) by EPA Methods 8270D/SIM, and
- Polychlorinated biphenyls (PCBs) by EPA method 8082.

The basis for the above PCOC list was determined by an evaluation of potential sources of contamination at typical metals recycling facilities. Sources of TPH, metals, VOCs and SVOCs are linked to auto wrecking where PCBs are typically related to post-war era electrical equipment (transformers, breakers, fuses, etc.) along with some heavy machinery hydraulic fluids that predate 1984 (USFS http://www.fs.fed.us/eng/toolbox/haz/haz24.htm, 2009). SVOCs and PAHs are typically linked to lube and fuel oil spills, open burning of waste and application of pesticides and herbicides.

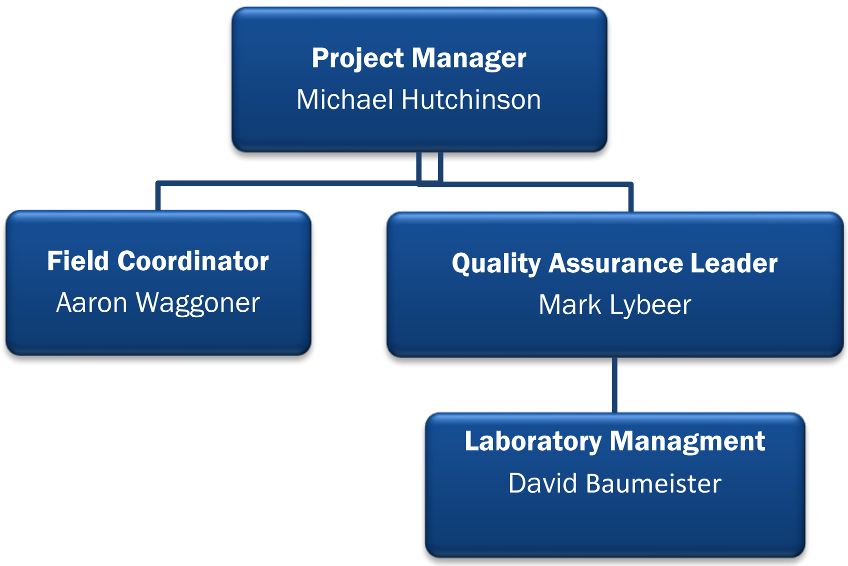
Soil borings and soil, groundwater, surface water and sediment sampling and analysis are planned to be performed to characterize the concentrations of these COCs and PCOCs on the property. The sampling details are described further in the RI Work Plan and the SAP.

3.0 PROJECT MANAGEMENT

3.1. Project Organization and Responsibilities

Descriptions of the responsibilities, lines of authority and communication for the key positions providing QA/QC are shown in the Project Organization Chart provided below. The project organization facilitates the efficient production of project work, allows for an independent quality review, and permits resolution of any QA issues.

Project Organization Chart



3.1.1. Project Manager

Michael Hutchinson is the Project Manager and can be reached at 253.431.2925. The Project Manager has overall responsibility for executing the project in accordance with contractual requirements. The Project Manager is also responsible for selecting project team members, assigning and coordinating project tasks, determining subcontractor participation, establishing and adhering to budgets and schedules, providing technical oversight, and coordinating production and review of project deliverables.

3.1.2. Field Coordinator

Aaron Waggoner is the Field Coordinator and can be reached at 253.579.2176. The Field Coordinator is responsible for the daily management of activities in the field. Specific responsibilities include the following:

- Provides technical direction to the field staff.
- Develops schedules and allocates resources for field tasks.
- Coordinates data collection activities to be consistent with information requirements.
- Supervises the compilation of field data and laboratory analytical results.

- Assures that data are correctly and completely reported.
- Implements and oversees field sampling in accordance with project plans.
- Supervises field personnel.
- Coordinates work with on-site subcontractors.
- Schedules sample shipment with the analytical laboratory.
- Monitors that appropriate sampling, testing and measurement procedures are followed.
- Coordinates the transfer of field data to the Project Manager for data reduction and validation.
- Participates in QA corrective actions as required.

3.1.3. Quality Assurance Leader

Mark Lybeer is the QA Leader and can be reached at 206.239.3227. The QA Leader is responsible for coordinating QA/QC activities as they relate to the acquisition of field data. Specific responsibilities include the following:

- Serves as the official contact for laboratory data QA concerns.
- Reviews and approves the laboratory QA Plan.
- Responds to laboratory data QA needs, answers laboratory requests for guidance and assistance, and resolves issues.
- Monitors laboratory compliance with data quality requirements.
- Ensures that appropriate sampling, testing, and analysis procedures are followed and that proper QC checks are implemented.
- Reviews the implementation of the QAPP and the overall quality of the analytical data generated.
- Maintains the authority to implement corrective actions as necessary.

3.1.4. Laboratory Management

David Baumeister at OnSite Environmental, Inc. (OnSite) will provide laboratory analytical services for the project. David Baumeister is the Laboratory's QA Coordinator for the project and can be reached at 425-883-3881.

The subcontracted laboratory conducting sample analyses for this project are required to obtain approval from the QA Leader before the initiation of sample analysis to assure that the laboratory QA plan complies with the project QA objectives. The Laboratory's QA Coordinator administers the Laboratory QA Plan and is responsible for QC. Specific responsibilities of this position include:

- Ensure implementation of the QA Plan.
- Serve as the laboratory point of contact.
- Activate corrective action for out-of-control events.
- Issue the final QA/QC report.

- Administer QA sample analysis.
- Comply with the specifications established in the project plans as related to laboratory services.
- Participate in QA audits and compliance inspections.

3.2. Health and Safety

A Site-specific HASP will be used for field activities. The Field Coordinator will be responsible for implementing the HASP during sampling activities. The Project Manager will discuss health and safety issues with the Field Coordinator on a routine basis during the completion of field activities.

The Field Coordinator will terminate any work activities that do not comply with the HASP. Companies providing services for this project on a subcontracted basis will be responsible for developing and implementing their own HASP.

4.0 DATA QUALITY OBJECTIVES

The quality assurance objective for technical data is to collect environmental monitoring data of known, acceptable and documentable quality. The QA objectives established for the project are:

- Implement the procedures outlined herein for field sampling, sample custody, equipment operation and calibration, laboratory analysis, and data reporting that will facilitate consistency and thoroughness of data generated.
- Achieve the acceptable level of confidence and quality required so that data generated are scientifically valid and of known and documented quality. This will be performed by establishing criteria for precision, accuracy, representativeness, completeness and comparability, and by testing data against these criteria.

The sampling design, field procedures, laboratory procedures, and QC procedures are set up to provide high-quality data for use in this project. Specific data quality factors that may affect data usability include quantitative factors (bias, detection limits, precision, accuracy and completeness) and qualitative factors (representativeness and comparability). The measurement quality objectives (MQO) associated with the data quality factors are summarized in Tables 1 and 2 and are discussed below.

4.1. Detection Limits

Analytical methods have quantitative limitations at a given statistical level of confidence that are often expressed as the method detection limit (MDL). Although results reported near the MDL provide insight to site conditions, quality assurance dictates that analytical methods achieve a consistently reliable level of detection known as the practical quantitation limit (PQL), which is typically demonstrated with the lowest point of a linear calibration. The contract laboratory will provide numerical results for all analytes and report them as detected above the PQL or undetected at the PQL.

The reporting limits for the target analytes are presented in Table 2 for soil and Table 3 for groundwater. These reporting limits were obtained from an Ecology-certified laboratory (OnSite).

The reporting limits presented in Tables 2 and 3 are the laboratory PQLs that are considered target reporting limits (TRLs) because several factors may influence final reporting limits. First, moisture and other physical conditions of soil affect detection limits. Second, analytical procedures may require sample dilutions or other practices to accurately quantify a particular analyte at concentrations above the range of the instrument. The effect is that other analytes could be reported as undetected but at a value higher than a specified TRL. Data users must be aware that high non-detect values, although correctly reported, can bias statistical summaries and careful interpretation is required to correctly characterize Site conditions.

4.2. Precision

Precision is the measure of mutual agreement among replicate or duplicate measurements of an analyte from the same sample and applies to field duplicate or split samples, replicate analyses, and duplicate spiked environmental samples (matrix spike duplicates). The closer the measured values are to each other, the more precise the measurement process. Precision error may affect data usefulness. Good precision is indicative of relative consistency and comparability between different samples. Precision will be expressed as the relative percent difference (RPD) for spike sample comparisons of various matrices and field duplicate comparisons.

This value is calculated by:

$$RPD\,(\%) = \frac{|D_1 - D_2|}{(D_1 + D_2)/2} \,X\,100,$$

Where

D_1 = Concentration of analyte in sample.

D_2 = Concentration of analyte in duplicate sample.

The calculation applies to split samples, replicate analyses, duplicate spiked environmental samples (matrix spike duplicates), and laboratory control duplicates. The RPD will be calculated for samples and compared to the applicable criteria. Precision can also be expressed as the percent difference (%D) between replicate analyses. Persons performing the evaluation must review the pertinent document (USEPA, 2004) that address criteria exceedances and courses of action. Project RPD goals for all analyses are 35 percent for water samples and 50 percent for soil samples, unless the primary and duplicate sample results are less than 5 times the MRL, in which case RPD goals will not apply for data quality assessment purposes.

4.3. Accuracy

Accuracy is a measure of bias in the analytic process. The closer the measurement value is to the true value, the greater the accuracy. This measure is defined as the difference between the reported values versus the actual value and is often measured with the addition of a known compound to a sample. The amount of known compound reported in the sample, or percent recovery, assists in determining the performance of the analytical system in correctly quantifying the compounds of interest. Since most environmental data collected represent one point spatially and temporally rather than an average of values, accuracy plays a greater role than precision in assessing the results. In general, if the percent recovery is low, non-detect results may indicate that compounds of interest are not present when in fact these compounds are present. Detected compounds may be biased low or reported at a value less than actual environmental conditions. The reverse is true when recoveries are high. Non-detect values are considered accurate while detected results may be higher than the true value.

For this project, accuracy will be expressed as the percent recovery of a known surrogate spike, matrix spike, or laboratory control sample (blank spike), concentration:

$$Recovery\ (\%) = \frac{Spiked\ Result - Unspiked\ Result}{Known\ Spike\ Concentration}\ X\ 100$$

Persons performing the evaluation must review the pertinent document (USEPA, 2004) that address criteria exceedances and courses of action. Accuracy criteria for surrogate spikes, matrix spikes, and laboratory control spikes are found in Table 1 of this QAPP.

4.4. Representativeness

Representativeness expresses the degree to which data accurately and precisely represent the actual Site conditions. The determination of the representativeness of the data will be performed by completing the following:

- Comparing actual sampling procedures to those delineated within the SAP and this QAPP.
- Comparing analytical results of field duplicates to determine the variations in the analytical results.
- Invalidating non-representative data or identifying data to be classified as questionable or qualitative.

Only representative data will be used in subsequent data reduction, validation, and reporting activities.

4.5. Completeness

Completeness establishes whether a sufficient amount of valid measurements were obtained to meet project objectives. The number of samples and results expected establishes the comparative basis for completeness. Completeness goals are 90 percent useable data for samples/analyses planned. If the completeness goal is not achieved an evaluation will be made to determine if the data are adequate to meet study objectives.

$$Completeness = \frac{number\ of\ valid\ measurements}{total\ number\ of\ data\ points\ planned}\ x\ 100$$

4.6. Comparability

Comparability expresses the confidence with which one set of data can be compared to another. Although numeric goals do not exist for comparability, a statement on comparability will be prepared to determine overall usefulness of data sets, following the determination of both precision and accuracy.

4.7. Holding Times

Holding times are defined as the time between sample collection and extraction, sample collection and analysis, or sample extraction and analysis. Some analytical methods specify a holding time for analysis only. For many methods, holding times may be extended by sample preservation techniques in the field. If a sample exceeds a holding time, then the results may be biased low. Holding times are presented in Table 4.

4.8. Special Training Requirements/Certification

The Superfund Amendments and Reauthorization Act of 1986 required the Secretary of Labor to issue regulations providing health and safety standards and guidelines for workers engaged in hazardous waste operations. Occupational Safety and Health Administration (OSHA) regulations (29 CFR 1910.120) require training to provide employees with the knowledge and skills necessary to enable them to perform their jobs safely and with minimum risk to their personal health. All sampling personnel will have completed the 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training course and 8-hour refresher courses, as necessary, to meet OSHA regulations.

5.0 DOCUMENTATION AND RECORDS

5.1. Field observations

Field documentation provides important information about potential problems or special circumstances surrounding sample collection. Field personnel will record information for each boring on field logs and will record a daily field report. Entries in the field logs will be made in pencil or water-resistant ink on water-resistant paper, and corrections will consist of line-out deletions. Individual logs and reports will become part of the project files at the conclusion of the field work.

At a minimum, the following information will be recorded during the collection of each sample.

- Sample location and description
- Sampler's name(s)
- Date and time of sample collection
- Sample matrix (soil or water)
- Type of sampling equipment used
- Field instrument (e.g., electronic water level indicator) readings
- Field observations and details that are pertinent to the integrity/condition of the samples (e.g., weather conditions, performance of the sampling equipment, sample depth control, sample disturbance, etc.)
- Preliminary sample descriptions (e.g., lithology, field screening results)

- Sample preservation
- Sample transport/shipping arrangements
- Name of recipient laboratory

In addition to the sampling information, the following specific information will also be recorded in the field log for each boring or in a daily field report.

- Sampling team members
- Time of arrival/entry on Site and time of Site departure
- Other personnel present at the Site
- Summary of pertinent meetings or discussions with contractor personnel
- Deviations from sampling plans, QAPP procedures, and HASP
- Changes in field personnel and responsibilities with reasons for the changes
- Levels of safety protection

The handling, use, and maintenance of field logs and reports are the Field Coordinator's responsibility.

5.2. Analytical Chemistry Records

Laboratories will be responsible for internal checks on data reporting and will correct errors identified during the QA review. All laboratories must be accredited by Ecology for the required analytical methods. Close contact will be maintained with the laboratories to resolve any quality control problems in a timely manner. The laboratories will be required to provide the following:

- **Project narrative –** This summary, in the form of a cover letter, will present any problems encountered during any aspect of analysis. The summary will include, but not be limited to, a discussion of QC, sample shipment, sample storage, and analytical difficulties. Any problems encountered by the laboratory, and their resolutions, will be documented in the project narrative.
- **Records –** Legible copies of the chain-of-custody (COC) forms will be provided as part of the data package. This documentation will include the time of receipt and the condition of each sample received by the laboratory. Additional internal tracking of sample custody by the laboratory will also be documented.
- **Sample results –** The data package will summarize the results for each sample analyzed. The summary will include the following information, as applicable:
    - Field sample identification code and the corresponding laboratory identification code
    - Sample matrix
    - Date of sample extraction/digestion
    - Date and time of analysis
    - Weight and/or volume used for analysis

  - Final dilution volumes or concentration factor for the sample
  - Total solids in the samples
  - Identification of the instruments used for analysis
  - MDLs and RLs
  - All data qualifiers and their definitions

- **QA/QC summaries –** These summaries will contain the results of all QA/QC procedures. Each QA/QC sample analysis will be documented with the same information as that required for the sample results (see above). The laboratory will make no recovery or blank corrections. The required summaries are listed below.
  - The calibration data summary will contain the concentrations of the initial calibration and daily calibration standards and the date and time of analysis. The response factor, percent standard deviation (%RSD), RPDs, and retention time for each analyte will be listed, as appropriate. Results for standards analyzed at the RL to determine instrument sensitivity will be reported.
  - The internal standard area summary will report the internal standard areas, as appropriate.
  - The method blank analysis summary will report the method blank analysis associated with each sample and the concentrations of all compounds of interest identified in these blanks.
  - The surrogate spike recovery summary will report all surrogate spike recovery data for organic analyses. The names and concentrations of all compounds added, percent recoveries, and QC limits will be listed.
  - The matrix spike (MS) recovery summary will report the MS or MS duplicate (MSD) recovery data for analyses, as appropriate. The names and concentrations of all compounds added, percent recoveries, and QC limits will be included in the data package. The RPD for all MS/MSD analyses will be reported.
  - The laboratory replicate summary will report the RPD for all laboratory replicate analyses. The QC limits for each compound or analyte will be listed.
  - The laboratory control sample (LCS) analysis summary will report the results of the analyses of the LCS. The QC limits for each compound or analyte will be included in the data package.
  - The relative retention time summary will report the relative retention times for the primary and confirmational columns of each analyte detected in the samples, as appropriate.

EQuIS four-file format electronic data deliverables will be obtained from the laboratory and data will be submitted into Ecology's Environmental Information Management (EIM) system after data quality assessments are completed.

5.3. Data Reduction

Data reduction is the process by which original data are converted or reduced to a specified format or unit to facilitate the analysis of the data. For example, a final analytical concentration may need to be calculated from a diluted sample result. Data reduction requires that all aspects of sample preparation that could affect the test result, such as sample volume analyzed or dilutions required, be taken into account in the final result. The laboratory personnel will reduce the analytical data for review by the Quality Assurance Leader and Project Manager.

During chemical analysis, samples are occasionally diluted after the initial analysis if the estimated concentration curve for one or more of the target analytes is above the calibration curve. In these instances, concentrations from the initial analysis will be identified as the "best result" for all target analytes other than the chemical(s) that was originally above the calibration range. The "best result" for this qualified analyte(s) will be taken from the diluted sample.

6.0 DATA GENERATION AND ACQUISITION

6.1. Sample Process Design

Soil, groundwater, surface water and sediment sampling will be conducted by GeoEngineers' field personnel. The samples samples are to be analyzed for:

- Gasoline-range TPH by Ecology approved method NWTPH-Gx,
- Diesel extended-range and lube oil-range TPH by Ecology approved method NWTPH-Dx,
- RCRA 8 metals by EPA methods 6000/7000 and 200.8,
- Low level VOCs by EPA Methods 8260B/5035A,
- SVOCs and low level PAHs by EPA methods 8270D/SIM, and
- PCBs by EPA method 8082.

6.1.1. Soil Sampling

Soil samples will be collected by a representative under the supervision of a licensed geologist from each boring. Sample procedures and sample frequencies are described in the SAP.

6.1.2. Groundwater Monitoring

Groundwater samples will be obtained from a select number of soil boirngs. Sample procedures and sample frequencies are described in the SAP.

6.2. Sample Methods

6.2.1. Sampling Equipment and Decontamination Procedures

Soil samples will be collected using direct push drilling equipment. Groundwater samples will be collected from temporary probe screens using a peristaltic pump with disposable tubing and low-flow sampling procedures.

Reusable sampling equipment that comes in contact with soil or groundwater will be decontaminated before each use. Decontamination procedures for this equipment will consist of the following:

1. Washing with a brush and non-phosphate detergent solution (e.g., Liqui-Nox and distilled water),
2. Rinsing with distilled water, and
3. Wrapping or covering the decontaminated equipment with aluminum foil. Field personnel will limit cross-contamination by changing gloves between sampling locations.

Soil samplers which come into contact with soil will be decontaminated before each use. Drilling tools and equipment will be decontaminated between locations. Decontamination procedures for this equipment will consist of the following:

1. Washing with pressurized hot-water,
2. Wash with brush and non-phosphate detergent solution, and
3. Rinse with potable water.

Wash water used to decontaminate the reusable sampling equipment will be collected and stored on site in 55-gallon drums.

6.2.2. Field Screening Procedures

The potential presence of contamination in soil samples will be evaluated using field screening techniques. Field screening results will be recorded on the field logs and the results will be used as a general guideline to delineate areas of possible contamination. Visual screening procedures are detailed in the SAP.

6.2.3. Sample Containers and Labeling

The Field Coordinator will establish field protocol to manage field sample collection, handling and documentation. Soil and groundwater samples will be placed in appropriate laboratory-prepared containers. Sample containers and preservatives are listed in Table 4.

Sample containers will be labeled with the following information at the time of sample collection:

- Project number
- Sample name, which will include a reference to the location, sampling depth (if applicable) and type (S for soil and W for groundwater)
- Date and time of collection
- Samplers initials
- Preservative type and field filtering (if applicable)

The sample collection activities will be noted on the field logs. The Field Coordinator will monitor consistency between sample containers/labels, field logs, and COC forms.

6.3. Sample Handling and Custody

6.3.1. Sample Storage

Samples will be placed in a cooler with ice after they are collected. The objective of the cold storage will be to attain a sample temperature of 2 to 6 degrees Celsius. Holding times (Table 4) will be observed during sample storage.

6.3.2. Sample Shipment

Samples will be transported and delivered to the analytical laboratory in the sample coolers. The samples will either be transported by field personnel, laboratory personnel, or by courier service. The Field Coordinator will ensure that the cooler has been properly secured using clear plastic tape and custody seals.

6.3.3. Chain-of-Custody Records

Field personnel are responsible for the security of samples from the time the samples are collected until the samples have been received by the courier service or laboratory personnel. A COC form will be completed for each group of samples being shipped to the laboratory. Information to be included on the COC form includes:

- Project name and number;
- Sample identification numbers;
- Date and time of sampling;
- Sample matrix (soil or groundwater), preservative, and number of containers for each sample;
- Analyses to be performed;
- Names of sampling personnel;
- Project manager name and contact information including phone number; and
- Shipping information including shipping container number, if applicable.

The original COC form will be signed by a member of the field team. Field personnel will retain copies and provide the original and remaining copies to the laboratory or courier.

6.3.4. Laboratory Custody Procedures

The laboratory will follow their standard operating procedures (SOPs) to document sample handling from time of receipt (sample log-in) to reporting. Documentation will include, at a minimum, the analyst's name or initials, time, and date.

6.4. Analytical Methods

The methods of chemical analysis are identified in Tables 2 and 3. All methods selected represent standard methods used for the analysis of these analytes in soil and groundwater. The laboratory project manager will determine the remedy to be used if the project RLs cannot be attained, in consultation with GeoEngineers Quality Assurance Leader.

6.5. Quality Control

Table 5 summarizes the types and frequency of QC samples to be analyzed, including both field QC and laboratory QC samples.

6.5.1. Field Duplicates

Field duplicates serve as a measure for precision. Under ideal field conditions, field duplicates (sometimes referred to as splits), are created by thoroughly mixing a volume of the sample matrix, placing aliquots of the mixed sample in separate containers, and identifying one of the aliquots as the primary sample and the other as the duplicate sample. Field duplicates measure the precision and consistency of laboratory analytical procedures and methods, as well as the consistency of the sampling techniques used by field personnel.

One field duplicate will be collected for every twenty soil samples. No more than twenty groundwater samples will be collected during this samling effort, therefore, only one groundwater field duplicate will be required.

Duplicate samples will not be collected from the surface water and sediment samples due to the limited number of samples proposed to be collected.

6.5.2. Trip Blanks

Trip blanks accompany samples for VOC analysis during field sampling and delivery to the laboratory. Trip blanks will be analyzed during this investigation only if VOCs are detected in the original data set to rule out sample containers and coolers as potential sources of the detections.

6.5.3. Equipment Rinsate Blanks

Rinsate blanks will not be analyzed during this investigation.

6.6. Laboratory Quality Control

Laboratory QC procedures will be evaluated through a formal data quality assessment process. The analytical laboratory will follow standard analytical method procedures that include specified QC monitoring requirements. These requirements will vary by method, but generally include:

- Method blanks
- Internal standards
- Instrument calibrations
- Matrix spike/matrix spike duplicates (MS/MSD)
- Laboratory control samples/laboratory control sample duplicates (LCS/LCSD)
- Laboratory replicates or duplicates
- Surrogate/Labeled compounds

6.6.1. Laboratory Blanks

Laboratory procedures utilize several types of blanks, but the most commonly used blanks for QC monitoring are method blanks. Method blanks are laboratory QC samples that consist of either a soil-like material having undergone a contaminant destruction process, or reagent (contaminant-free) water. Method blanks are extracted and analyzed with each batch of environmental samples undergoing analysis. If a substance is detected in a method blank, then one (or more) of the following occurred:

- Sample containers, measurement equipment, and/or analytical instruments were not properly cleaned and contained contaminants.
- Reagents used in the process were contaminated with a substance(s) of interest.

It is difficult to determine which of the above scenarios took place if blank contamination occurs. However, it is assumed that the conditions that affected the blanks also likely affected the project samples. If target analytes are detected in method blanks, data validation guidelines assist in determining which substances in project samples are considered “real,” and which ones are attributable to the analytical process. Furthermore, the guidelines state, “there may be instances where little or no contamination was present in the associated blank, but qualification of the sample is deemed necessary. Contamination introduced through dilution water is one example.”

6.6.2. Calibrations

Several types of instrument calibrations are used, depending on the analytical method, to assess the linearity of the calibration curve and assure that the sample results reflect accurate and precise measurements. The main calibrations used are initial calibrations, daily calibrations, and continuing calibration verification.

6.6.3. Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS/MSD samples are used to assess influences or interferences caused by the physical or chemical properties of the sample itself. For example, extreme pH can affect the results for semivolatile organic compounds. Or, the presence of a particular compound may interfere with accurate quantitation of another analyte. MS/MSD data is reviewed in combination with other QC monitoring data to determine matrix effects. In some cases, matrix effects cannot be determined due to dilution and/or high levels of related substances in the sample. A matrix spike is evaluated by spiking a project sample with a known amount of one or more of the target analytes, ideally at a concentration that is 5 to 10 times higher than the sample result. A percent recovery is then calculated by subtracting the un-spiked sample result from the spiked sample result, dividing by the known concentration of the spike, and multiplying by 100.

MS/MSD samples will be analyzed at a frequency of one MS/MSD per analytical batch. The samples for the MS/MSD analyses should be collected from a sampling location that is believed to have only low-level contamination. A sample from an area of low-level contamination is needed because the objective of MS/MSD analyses is to determine the presence of matrix interferences, which can best be achieved with low levels of contaminants. Additional sample volume will be collected for the MS/MSD analyses as required by the laboratory.

6.6.4. Laboratory Control Sample/Laboratory Control Sample Duplicates (LCS/LCSD)

Also known as blanks spikes, laboratory control samples (LCS) are similar to MS samples in that a known amount of one or more of the target analytes are spiked into a prepared sample medium, and a percent recovery of the spiked substances is calculated. The primary difference between LCS and MS samples is that the LCS uses a contaminant-free sample medium. For example, reagent water is typically used for LCS water analyses. The purpose of an LCS is to help assess the overall accuracy and precision of the analytical process including sample preparation, instrument performance, and analyst performance.

6.6.5. Laboratory Replicates/Duplicates

Laboratories utilize MS/MSDs, LCS/LCSDs, and/or replicates to assess precision. Replicates are a second analysis of a field-collected environmental sample. Replicates can be split at varying stages of the sample preparation and analysis process and most commonly consist of a second analysis on the extracted media.

6.6.6. Surrogates/Labeled Compounds

Surrogate spikes are used to verify proper extraction procedures and the accuracy of the analytical instrument. Surrogates are substances with characteristics similar to the target analytes. A known concentration of surrogate is added to the project sample and passed through the instrument and the percent recovery is calculated. Each surrogate used has acceptance limits (i.e., an acceptable range) for percent recovery. If a surrogate recovery is low, sample results may be biased low and depending on the recovery value, a possibility of false negatives may exist. Conversely, when recoveries are above the specified acceptance limits, a possibility of false positives exist, although non-detect results are considered accurate.

6.7. Instrument Testing, Inspection and Maintenance

The field coordinator will be responsible for overseeing the testing, inspection, and maintenance of all field equipment. The laboratory project manager will be responsible for laboratory equipment testing, inspection, and maintenance requirements. The calibration methods used in calibrating the analytical instrumentation are described in the following section.

6.7.1. Instrument Calibration and Frequency

6.7.1.1. FIELD INSTRUMENTATION

The calibration and calibration checks facilitate accurate and reliable field measurements. The calibration of field instruments used on the project will be checked and adjusted as necessary in general accordance with the manufacturer's recommendations. Methods and intervals of calibration checks and instrument maintenance will be based on the type of instrument, stability characteristics, required accuracy, intended use, and environmental conditions. The basic calibration check frequencies are described below.

6.7.1.2. LABORATORY INSTRUMENTATION

For chemical analytical testing, calibration procedures will be performed in general accordance with the analytical methods used and the laboratory’s SOPs. Calibration documentation will be retained at the laboratory.

All instrument calibrations and their appropriate chemical standards are to comply with the specific methods within EPA SW-846, Test Methods for Evaluating Solid Waste, Physical and Chemical Methods, 3rd Edition, December 1996 and the Laboratory SOPs. Calibration documentation, initial (ICALs) and continuing (CCALs), will be retained at the Laboratory.

6.8. Inspection of Supplies and Consumables

Supplies and consumables for the field sampling effort will be inspected upon delivery and accepted if the condition of the supplies is satisfactory. For example, jars will be inspected to ensure that they are the correct size and quantity and were not damaged in shipment.

6.9. Data Management

Laboratories will report data in formatted hardcopy and digital formats. Analytical laboratory measurements will be recorded in standard formats that display, at a minimum, the field sample identification, the laboratory identification, reporting units, data qualifiers, analytical method, analyte tested, analytical result, extraction and analysis dates, and quantitation limits. Each sample delivery group will be accompanied by sample receipt forms and a case narrative identifying data quality issues. Laboratory electronic data deliverable (EDD) requirements will be established by GeoEngineers, Inc. with the contract laboratory. The laboratory will send final analytical testing results to the Project Manager.

Following completion of the soil sampling and analysis and groundwater monitoring, the relevant data generated as part of the project will be reported to Ecology.

7.0 ASSESSMENT AND RESPONSE ACTIONS

7.1. Review of Field Documentation and Laboratory Receipt Information

Documentation of field sampling data will be reviewed periodically for conformance with project QC requirements described in this QAPP. At a minimum, field documentation will be checked for proper documentation of the following:

- Sample collection information (date, time, location, matrices, etc.);
- Field instruments used and calibration data;
- Sample collection protocol;
- Sample containers, preservation, and volume;
- Field QC samples collected at the frequency specified;
- COC protocols; and
- Sample shipment information.

Sample receipt forms provided by the laboratory will be reviewed for QC exceptions. The final laboratory data package will describe (in the case narrative) the effects that any identified QC exceptions have on data quality. The laboratory will review transcribed sample collection and receipt information for correctness prior to delivering the final data package.

7.2. Response Actions for Field Sampling

The Field Coordinator, or a designee, will be responsible for correcting equipment malfunctions throughout the field sampling effort and resolving situations in the field that may result in nonconformance or noncompliance with the QAPP. Corrective measures will be documented in the field report.

7.3. Corrective Action for Laboratory Analyses

Laboratories are required to comply with their current written SOPs. The laboratory project manager will be responsible for ensuring that appropriate corrective actions are initiated as required for conformance with this QAPP. All laboratory personnel will be responsible for reporting problems that may compromise the quality of the data to the laboratory project manager. A narrative describing the anomaly, the steps taken to identify and correct it, and the treatment of the relevant sample batch (i.e., recalculation, reanalysis, and re-extraction) will be submitted with the data package.

8.0 DATA VALIDATION AND USABILITY

8.1. Data Review, Verification and Validation

The data validation and usability elements of the QAPP as detailed below address the QA/QC activities that occur after data collection and/or data generation is complete. Implementation of these elements ensures that the data conform to the specified criteria and will achieve the project objectives.

The data are not considered final until validated. All data, including laboratory and field QC sample results, will be summarized in a data validation report. The data validation report will focus on data that did not meet the MQOs specified in Table 1. The data validation reports will be included as an appendix to the final report. The data report will also describe any deviations from this QAPP and actions taken to address those deviations.

Level III laboratory data packages will be obtained for all soil and groundwater samples. These data will be reviewed for the following QC parameters:

- Holding times and sample preservation
- Method blanks
- MS/MSD analyses
- LCS/LCSD analyses
- Surrogate spikes
- Duplicates/replicates
- Field/Lab duplicates
- Calibrations (Initial and Continuing)
- Internal Standards

- Instrument Tunes

In addition to these QC parameters, other documentation such as sample receipt forms and case narratives will be reviewed to evaluate laboratory QA/QC.

8.2. Verification and Validation Methods

Hard-copy laboratory reports will be generated providing the analysis-specific information including final sample analytical results, reportable field and laboratory QA/QC analytical results, MDLs and MRLs. The laboratory data will also be reported via electronic media using the tabular outputting capabilities of standard software formats.

The term "reporting limit" will be used interchangeably with "quantitation limit" to mean the lowest concentration at which an analyte can be quantified subject to the quality control criteria of the analytical method. These terms are different from "MDL," which refers to the lowest concentration that the analytical method can ideally detect.

Data validation qualifiers including "U," "J," and "R" will be used following the reported laboratory results to explain data quality issues affecting the laboratory data to the data user. These qualifiers are explained as follows:

- "U" indicates that a compound was analyzed for but not detected. The associated numerical value is the estimated sample quantitation limit, which is corrected for dilution and percent moisture.
- "J" indicates that a compound was detected below the reporting limit and the value is estimated or the value was estimated by the validator because the of instrument bias reasons.
- If any target analytes are found in a laboratory method blank, it will be regarded as blank contamination. In these cases, the result of a given analyte in the method blank will be compared to any positive result of the same analyte in the associated field samples. If a field sample result is less than five times (ten times for common laboratory contaminants like acetone, phthalates, etc.) the result that is reported in the method blank, the result will be considered blank contamination. Accordingly, the result will be qualified as not-detected "U" at the elevated reporting limit. Otherwise the positive result in the field sample will be considered real.
- "R" indicates results should not be used. If there are two analyses reported by the laboratory for one sample (as in the case of dilutions), the validator will use the method described in Section 5.3 of this QAPP to make the final assessment. As there should be only one reported result per analyte for a given sample, any extraneous results will be qualified as not-reportable "R" and will not be used.

8.3. Reconciliation with User Requirements

A data quality assessment will be conducted by the project Quality Assessment Leader to identify cases where the projects MQOs were not met.

9.0 REFERENCES

U.S. Environmental Protection Agency (USEPA), "Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, OSWER 9240.1-45, EPA 540-R-04-004." October 2004.

TABLE 1
MEASUREMENT QUALITY OBJECTIVES
US 101 MIDWAY METALS
CLALLAM COUNTY, WASHINGTON

Laboratory Analysis	Reference Method[1]	QC Check Standards (Laboratory Control Samples & Matrix Spike Samples) Limits			Surrogate Standards (SS) %R Limits	Field Duplicate Samples RPD Limits[3]	
		Soil %R[2]	Water %R[2]	RPD *Both Soil/Water*	Soil/Water	Soil	Water
Total Petroleum Hydrocarbons by NWTPH-Gx and NWTPH-Dx							
Gasoline-Range Petroleum Hydrocarbons	NWTPH-Gx	50-150	50-150	0-30	50-150	≤50%	≤35%
Diesel-Range Petroleum Hydrocarbons	NWTPH-Dx	50-150	50-150	0-30	50-150	≤50%	≤35%
Heavy Oil-Range Petroleum Hydrocarbons	NWTPH-Dx	50-150	50-150	0-30	50-150	≤50%	≤35%
Metals by EPA Methods 6000/7000 series							
Arsenic	EPA 6000/7000	75-125	75-125	0-20	-	≤50%	≤35%
Barium	EPA 6000/7000	75-125	75-125	0-20	-	≤50%	≤35%
Cadmium	EPA 6000/7000	75-125	75-125	0-20	-	≤50%	≤35%
Chromium (Total)	EPA 6000/7000	75-125	75-125	0-20	-	≤50%	≤35%
Chromium (VI)	EPA 6000/7000	75-125	75-125	0-20	-	≤50%	≤35%
Lead	EPA 6000/7000	75-125	75-125	0-20	-	≤50%	≤35%
Mercury	EPA 6000/7000	75-125	75-125	0-20	-	≤50%	≤35%
Selenium (Soil - Graphite Furnace EPA 7740)	EPA 6000/7000	75-125	75-125	0-20	-	≤50%	≤35%
Silver	EPA 6000/7000	75-125	75-125	0-20	-	≤50%	≤35%
Volatile Organic Compounds by EPA Method 8260							
1,1-Dichloroethene	EPA 8260B/5035A	67 - 135	64 - 127	0-30	-	≤50%	≤35%
1,1-Dichloroethane	EPA 8260B/5035A	75 - 124	-	-	-	≤50%	≤35%
1,1,1-Trichloroethane	EPA 8260B/5035A	70 - 128	69 - 123	0-30	-	≤50%	≤35%
1,1,2-Trichloroethane	EPA 8260B/5035A	75 - 122	74 - 120	0-30	-	≤50%	≤35%
1,1,2,2-Tetrachloroethane	EPA 8260B/5035A	66 - 128	64 - 127	0-30	-	≤50%	≤35%
1,2-Dichloroethane	EPA 8260B/5035A	69 - 123	68 - 124	0-30	-	≤50%	≤35%
1,2-Dichloroethene	EPA 8260B/5035A	30-160	-	-	-	≤50%	≤35%
1,2-Dichloropropane	EPA 8260B/5035A	30-160	75 - 120	0-30	-	≤50%	≤35%
Trans-1,2-Dichloroethene	EPA 8260B/5035A	74 - 126	70 - 120	0-30	-	≤50%	≤35%
Cis-1,3-Dichloropropene	EPA 8260B/5035A	67 - 125	72 - 121	0-30	-	≤50%	≤35%
Trans-1,3-Dichloropropene	EPA 8260B/5035A	57 - 125	68 - 124	0-30	-	≤50%	≤35%
2-Butanone (MEK)	EPA 8260B/5035A	62 - 127	10 - 194	0-30	-	≤50%	≤35%
4-Methyl-2-Pentanone	EPA 8260B/5035A	59 - 125	60 - 146	0-30	-	≤50%	≤35%
Acetone	EPA 8260B/5035A	48 - 143	-	-	-	≤50%	≤35%
Acrolein	EPA 8260B/5035A	-	10 - 194	0-30	-	≤50%	≤35%
Acrylonitrile	EPA 8260B/5035A	-	60 - 146	0-30	-	≤50%	≤35%
Benzene	EPA 8260B/5035A	80 - 126	73 - 120	0-30	-	≤50%	≤35%
Bromodichloromethane	EPA 8260B/5035A	70 - 128	73 - 120	0-30	-	≤50%	≤35%
Bromoform	EPA 8260B/5035A	50 - 128	63 - 128	0-30	-	≤50%	≤35%
Bromomethane	EPA 8260B/5035A	44 - 149	40 - 164	0-30	-	≤50%	≤35%
Carbon Disulfide	EPA 8260B/5035A	61 - 139	-	-	-	≤50%	≤35%
Carbon Tetrachloride	EPA 8260B/5035A	70 - 130	61 - 135	0-30	-	≤50%	≤35%
Chlorobenzene	EPA 8260B/5035A	82 - 120	73 - 120	0-30	-	≤50%	≤35%
Chloroethane	EPA 8260B/5035A	53 - 142	-	-	-	≤50%	≤35%
Chloroform	EPA 8260B/5035A	74 - 123	72 - 121	0-30	-	≤50%	≤35%
Chloromethane	EPA 8260B/5035A	54 - 135	57 - 133	0-30	-	≤50%	≤35%
Cis-1,2-Dichloroethene	EPA 8260B/5035A	76 - 123	-	-	-	≤50%	≤35%
Dibromochloromethane	EPA 8260B/5035A	55 - 128	71 - 125	0-30	-	≤50%	≤35%
Ethylbenzene	EPA 8260B/5035A	80 - 134	71 - 128	0-30	-	≤50%	≤35%
Methyl tert-butyl ether (MTBE)	EPA 8260B/5035A	62 - 128			-	≤50%	≤35%
Methylene Chloride (Dichloromethane)	EPA 8260B/5035A	61 - 132	61 - 133	0-30	-	≤50%	≤35%
Styrene	EPA 8260B/5035A	78 - 130	-	-	-	≤50%	≤35%
Toluene	EPA 8260B/5035A	79 - 120	74 - 120	0-30	-	≤50%	≤35%
m,p-Xylene	EPA 8260B/5035A	80 - 131	54 - 140	0-30	-	≤50%	≤35%
o-Xylene	EPA 8260B/5035A	71 - 126	69 - 127	0-30	-	≤50%	≤35%
Xylenes (Total)	EPA 8260B/5035A	NA	NA	NA	-	≤50%	≤35%
Tetrachloroethene	EPA 8260B/5035A	79 - 127	65 - 125	0-30	-	≤50%	≤35%
Trichloroethene	EPA 8260B/5035A	77 - 123	72 - 122	0-30	-	≤50%	≤35%
Vinyl Acetate	EPA 8260B/5035A	47 - 149	-	-	-	≤50%	≤35%
Vinyl Chloride	EPA 8260B/5035A	51 - 149	59 - 130	0-30	-	≤50%	≤35%
Dibromofluoromethane	EPA 8260B	-	-	-	63-127	≤50%	≤35%
Toluene-d8	EPA 8260B	-	-	-	65-129	≤50%	≤35%
4-Bromofluorobenzene	EPA 8260B	-	-	-	55-121	≤50%	≤35%
Polycyclic Aromatic Hydrocarbons by EPA 8270-SIM							
Acenaphthene	EPA 8270D/SIM	31 - 100	33 - 114	0-30	-	≤50%	≤35%
Acenaphthylene	EPA 8270D/SIM	26 - 102	25 - 104	0-30	-	≤50%	≤35%
Anthracene	EPA 8270D/SIM	30 - 117	18 - 113	0-30	-	≤50%	≤35%
Benzo(a)anthracene	EPA 8270D/SIM	36 - 125	31 - 125	0-30	-	≤50%	≤35%
Benzo(a)pyrene	EPA 8270D/SIM	33 - 122	10 - 109	0-30	-	≤50%	≤35%
Benzo(b)fluoranthene	EPA 8270D/SIM	42 - 124	31 - 134	0-30	-	≤50%	≤35%
Benzo(g,h,I)perylene	EPA 8270D/SIM	27 - 107	17 - 133	0-30	-	≤50%	≤35%
Benzo(k)fluoranthene	EPA 8270D/SIM	37 - 129	39 - 128	0-30	-	≤50%	≤35%
Chrysene	EPA 8270D/SIM	42 - 115	50 - 121	0-30	-	≤50%	≤35%
Dibenzo(a,h)anthracene	EPA 8270D/SIM	30 - 128	30 - 126	0-30	-	≤50%	≤35%
Fluoranthene	EPA 8270D/SIM	43 - 119	37 - 135	0-30	-	≤50%	≤35%
Fluorene	EPA 8270D/SIM	33 - 106	42 - 112	0-30	-	≤50%	≤35%
Indeno(1,2,3-cd)pyrene	EPA 8270D/SIM	29 - 126	32 - 124	0-30	-	≤50%	≤35%
Naphthalene	EPA 8270D/SIM	27 - 107	31 - 111	0-30	-	≤50%	≤35%
Phenanthrene	EPA 8270D/SIM	38 - 108	46 - 118	0-30	-	≤50%	≤35%
Pyrene	EPA 8270D/SIM	36 - 122	36 - 132	0-30	-	≤50%	≤35%
Total cPAHs TEC	EPA 8270D/SIM	NA	NA	NA	-	≤50%	≤35%

TABLE 1
MEASUREMENT QUALITY OBJECTIVES
US 101 MIDWAY METALS
CLALLAM COUNTY, WASHINGTON

Laboratory Analysis	Reference Method[1]	QC Check Standards (Laboratory Control Samples & Matrix Spike Samples) Limits			Surrogate Standards (SS) %R Limits	Field Duplicate Samples RPD Limits[3]	
		Soil %R[2]	Water %R[2]	RPD *Both Soil/Water*	Soil/Water	Soil	Water
Semivolatile Organic Compounds by EPA 8270-Low level							
1,2,4-Trichlorobenzene	EPA 8270D/SIM	35 - 100	25 - 107	0-30	-	≤50%	≤35%
1,2-Dichlorobenzene	EPA 8270D/SIM	36 - 100	24 - 104	0-30	-	≤50%	≤35%
1,3-Dichlorobenzene	EPA 8270D/SIM	33 - 100	22 - 103	0-30	-	≤50%	≤35%
1,4-Dichlorobenzene	EPA 8270D/SIM	34 - 100	22 - 103	0-30	-	≤50%	≤35%
2,6-Dinitrotoluene	EPA 8270D/SIM	46 - 108	-	-	-	≤50%	≤35%
2-Chloronaphthalene	EPA 8270D/SIM	42 - 100	26 - 131	0-30	-	≤50%	≤35%
2-Chlorophenol	EPA 8270D/SIM	37 - 100	32 - 122	0-30	-	≤50%	≤35%
2-Methylphenol	EPA 8270D/SIM	37 - 100	-	-	-	≤50%	≤35%
2,4-Dichlorophenol	EPA 8270D/SIM	41 - 100	30 - 134	0-30	-	≤50%	≤35%
2,4-Dimethylphenol	EPA 8270D/SIM	34 - 100	15 - 118	0-30	-	≤50%	≤35%
2,4-Dinitrophenol	EPA 8270D/SIM	10 - 170	10 - 202	0-30	-	≤50%	≤35%
2,4-Dinitrotoluene	EPA 8270D/SIM	49 - 114	-	-	-	≤50%	≤35%
2,4,5-Trichlorophenol	EPA 8270D/SIM	43 - 103	36 - 134	0-30	-	≤50%	≤35%
3,3'-Dichlorobenzidine	EPA 8270D/SIM	10 - 129	37 - 141	0-30	-	≤50%	≤35%
4-Chloroaniline	EPA 8270D/SIM	10 - 113	-	-	-	≤50%	≤35%
4-Methylphenol	EPA 8270D/SIM	37 - 100	-	-	-	≤50%	≤35%
Benzyl Alcohol	EPA 8270D/SIM	10 - 100	-	-	-	≤50%	≤35%
Bis(2-chloroethyl)ether	EPA 8270D/SIM	22 - 104	29 - 124	0-30	-	≤50%	≤35%
Bis(2-chloro-1-methylethyl)ether	EPA 8270D/SIM	10 - 107	14 - 133	0-30	-	≤50%	≤35%
Bis(2-chloroisopropyl)ether	EPA 8270D/SIM	-	14 - 133	0-30	-	≤50%	≤35%
Bis(2-ethylhexyl)phthalate	EPA 8270D/SIM	48 - 124	44 - 146	0-30	-	≤50%	≤35%
Butyl benzyl phthalate	EPA 8270D/SIM	35 - 122	14 - 172	0-30	-	≤50%	≤35%
Carbozole	EPA 8270D/SIM	34 - 122	-	-	-	≤50%	≤35%
Diethyl phthalate	EPA 8270D/SIM	44 - 108	36 - 134	0-30	-	≤50%	≤35%
Dimethylphthalate	EPA 8270D/SIM	46 - 103	38 - 132	0-30	-	≤50%	≤35%
Di-n-butyl phthalate	EPA 8270D/SIM	47 - 115	46 - 132	0-30	-	≤50%	≤35%
Di-n-octyl phthalate	EPA 8270D/SIM	49 - 107	-	-	-	≤50%	≤35%
Hexachlorobutadiene	EPA 8270D/SIM	33 - 100	12 - 108	0-30	-	≤50%	≤35%
Hexachlorocyclopentadiene	EPA 8270D/SIM	10 - 130	10 - 122	0-30	-	≤50%	≤35%
Hexachloroethane	EPA 8270D/SIM	28 - 100	13 - 100	0-30	-	≤50%	≤35%
Isophorone	EPA 8270D/SIM	39 - 105	44 - 130	0-30	-	≤50%	≤35%
Nitrobenzene	EPA 8270D/SIM	15 - 115	35 - 116	0-30	-	≤50%	≤35%
N-Nitroso-di-n-propylamine	EPA 8270D/SIM	27 - 101	25 - 128	0-30	-	≤50%	≤35%
N-Nitrosodiphenylamine	EPA 8270D/SIM	27 - 162	44 - 155	0-30	-	≤50%	≤35%
Phenol	EPA 8270D/SIM	41 - 100	6 - 100	0-30	-	≤50%	≤35%
2-Fluorophenol	EPA 8270D	-	-	-	18-97	≤50%	≤35%
Phenol-d6	EPA 8270D	-	-	-	10-104	≤50%	≤35%
Nitrobenzene-d5	EPA 8270D	-	-	-	37-112	≤50%	≤35%
2-Fluorobiphenyl	EPA 8270D	-	-	-	42-108	≤50%	≤35%
2,4,6-Tribromophenol	EPA 8270D	-	-	-	39-110	≤50%	≤35%
Terphenyl-d14	EPA 8270D	-	-	-	49-122	≤50%	≤35%
Nitrobenzene-d5	EPA 8270D/SIM	-	-	-	34-119	≤50%	≤35%
2-Fluorobiphenyl	EPA 8270D/SIM	-	-	-	38-109	≤50%	≤35%
Pyrene-d10	EPA 8270D/SIM	-	-	-	32-119	≤50%	≤35%
Terphenyl-d14	EPA 8270D/SIM	-	-	-	37-128	≤50%	≤35%
PCBs by EPA 8082-Low level (mg/kg) (25 g Initial mass)							
Aroclor 1016	EPA 8082	30-160	30-160	0-30	42-123	≤50%	≤35%
Aroclor 1221	EPA 8082	NA	NA	NA	42-123	≤50%	≤35%
Aroclor 1232	EPA 8082	NA	NA	NA	42-123	≤50%	≤35%
Aroclor 1242	EPA 8082	NA	NA	NA	42-123	≤50%	≤35%
Aroclor 1248	EPA 8082	NA	NA	NA	42-123	≤50%	≤35%
Aroclor 1254	EPA 8082	NA	NA	NA	42-123	≤50%	≤35%
Aroclor 1260	EPA 8082	30-160	30-160	0-30	42-123	≤50%	≤35%
Total PCBs (sum of Aroclors)	EPA 8082	NA	NA	NA	42-123	≤50%	≤35%

Notes:

1 Method numbers refer to EPA SW-846 Analytical Methods.

2 Percent recovery limits are compound-specific and based on laboratory studies. The surrogate %R and laboratory control/matrix spike sample %R control limits presented are the ranges for all of the individual analytes in the identified analysis. The individual control limits will be provided with the laboratory report for each analysis.

3 Project RPD goals are 35 percent for water samples and 50 percent for soil samples, unless the primary and duplicate sample results are less than 5 times the Minimum Reporting Limit (MRL), in which case RPD goals will not apply for data quality assessment purposes.

%R = Percent recovery

RPD = Relative Percent Difference

NA = Not applicable

TABLE 2

METHODS OF ANALYSIS AND TARGET REPORTING LIMITS FOR SOIL SAMPLES

US 101 MIDWAY METALS

CLALLAM COUNTY, WASHINGTON

Analyte	MTCA Method A Cleanup Level for Soil Unrestricted Land Use (mg/kg)	Screening Level[1] (mg/kg)	Target Reporting Limit (mg/kg)[2]
Total Petroleum Hydrocarbons by NWTPH-Gx and NWTPH-Dx			
Gasoline-Range Petroleum Hydrocarbons	30/100	0.371	5.0
Diesel-Range Petroleum Hydrocarbons	2,000	5.03	25
Heavy Oil-Range Petroleum Hydrocarbons	2,000	9.37	50
Metals by EPA Methods 6000/7000 series			
Arsenic	20	0.7780	10
Barium	NE	0.0916	2.5
Cadmium	2	0.0379	0.5
Chromium (Total)	NE	0.1460	0.5
Chromium (VI) by EPA Method 7196A	19	0.1070	1.0
Lead	250	1.11	5.0
Mercury by EPA Method 7470A	2	0.000245	0.25
Selenium (Soil - Graphite Furnace EPA 7740)	NE	2.45	10
Silver	NE	0.1280	0.5
Volatile Organic Compounds by EPA Method 8260			
(cis) 1,2-Dichloroethene	NE	0.000416	0.0010
(cis) 1,3-Dichloropropene	NE	0.000424	0.0010
(trans) 1,2-Dichloroethene	NE	0.000495	0.0010
(trans) 1,3-Dichloropropene	NE	0.000242	0.0010
1,1,1,2-Tetrachloroethane	NE	0.000358	0.0010
1,1,1-Trichloroethane	2	0.000449	0.0010
1,1,2,2-Tetrachloroethane	NE	0.000258	0.0010
1,1,2-Trichloroethane	NE	0.000368	0.0010
1,1-Dichloroethane	NE	0.000326	0.0010
1,1-Dichloroethene	NE	0.000513	0.0010
1,1-Dichloropropene	NE	0.000372	0.0010
1,2,3-Trichlorobenzene	NE	0.000325	0.0010
1,2,3-Trichloropropane	NE	0.000394	0.0010
1,2,4-Trichlorobenzene	NE	0.000447	0.0010
1,2,4-Trimethylbenzene	NE	0.000489	0.0010
1,2-Dibromo-3-chloropropane	NE	0.001540	0.0050
1,2-Dibromoethane	NE	0.000223	0.0010
1,2-Dichlorobenzene	NE	0.000375	0.0010
1,2-Dichloroethane	NE	0.000343	0.0010
1,2-Dichloropropane	NE	0.000523	0.0010
1,3,5-Trimethylbenzene	NE	0.000505	0.0010
1,3-Dichlorobenzene	NE	0.000407	0.0010
1,3-Dichloropropane	NE	0.000380	0.0010
1,4-Dichlorobenzene	NE	0.000391	0.0010
2,2-Dichloropropane	NE	0.000354	0.0010
2-Butanone	NE	0.003010	0.0050
2-Chloroethyl Vinyl Ether	NE	0.001260	0.0050
2-Chlorotoluene	NE	0.000510	0.0010
2-Hexanone	NE	0.001630	0.0050
4-Chlorotoluene	NE	0.000396	0.0010
Acetone	NE	0.002180	0.0050
Benzene	NE	0.000497	0.0010
Bromobenzene	NE	0.000445	0.0010
Bromochloromethane	NE	0.000415	0.0010
Bromodichloromethane	NE	0.000359	0.0010
Bromoform	NE	0.000313	0.0010
Bromomethane	NE	0.000499	0.0010
Carbon Disulfide	NE	0.000559	0.0010
Carbon Tetrachloride	NE	0.000435	0.0010
Chlorobenzene	NE	0.000421	0.0010
Chloroethane	NE	0.000680	0.0050
Chloroform	NE	0.000387	0.0010
Chloromethane	NE	0.000339	0.0050
Dibromochloromethane	NE	0.000277	0.0010
Dibromomethane	NE	0.000437	0.0010
Dichlorodifluoromethane	NE	0.000565	0.0010
Ethylbenzene	6	0.000446	0.0010
Hexachlorobutadiene	NE	0.000554	0.0050
Iodomethane	NE	0.001010	0.0050
Isopropylbenzene	NE	0.000463	0.0010
m,p-Xylene	NE	0.000986	0.0020
Methyl Isobutyl Ketone	NE	0.001510	0.0050
Methyl t-Butyl Ether	0.1	0.000349	0.0010
Methylene Chloride	0.02	0.000663	0.0050
Naphthalene	5	0.000418	0.0010
n-Butylbenzene	NE	0.000542	0.0010
n-Propylbenzene	NE	0.000462	0.0010
p-Isopropyltoluene	NE	0.000492	0.0010
sec-Butylbenzene	NE	0.000500	0.0010
Styrene	NE	0.000476	0.0010
tert-Butylbenzene	NE	0.000470	0.0010
Tetrachloroethene	0.05	0.000479	0.0010
Toluene	7	0.000511	0.0050

TABLE 2

METHODS OF ANALYSIS AND TARGET REPORTING LIMITS FOR SOIL SAMPLES

US 101 MIDWAY METALS

CLALLAM COUNTY, WASHINGTON

Analyte	MTCA Method A Cleanup Level for Soil Unrestricted Land Use (mg/kg)	Screening Level[1] (mg/kg)	Target Reporting Limit (mg/kg)[2]
Total Xylene	9	0.000472	0.0010
Trichloroethene	0.03	0.000515	0.0010
Trichlorofluoromethane	NE	0.000559	0.0010
Vinyl Acetate	NE	0.000287	0.0050
Vinyl Chloride	NE	0.000567	0.0010
Polycyclic Aromatic Hydrocarbons by EPA 8270-SIM			
Acenaphthene	NE	0.0002520	0.0067
Acenaphthylene	NE	0.0001240	0.0067
Anthracene	NE	0.0001090	0.0067
Benzo[a]anthracene	NE	0.0001840	0.0067
Benzo[a]pyrene	0.1	0.0001310	0.0067
Benzo[b]fluoranthene	NE	0.0002210	0.0067
Benzo[g,h,i]perylene	NE	0.0002070	0.0067
Benzo[j,k]fluoranthene	NE	0.0001720	0.0067
Chrysene	NE	0.0001790	0.0067
Dibenz[a,h]anthracene	NE	0.0001800	0.0067
Fluoranthene	NE	0.0002440	0.0067
Fluorene	NE	0.0000835	0.0067
Indeno[1,2,3-c,d]pyrene	NE	0.0001720	0.0067
1-Methylnaphthalene	NE	0.0002320	0.0067
2-Methylnaphthalene	NE	0.0004620	0.0067
Naphthalene	5	0.0004070	0.0067
Phenanthrene	NE	0.0001720	0.0067
Pyrene	NE	0.0001630	0.0067
Semivolatile Organic Compounds by EPA 8270-Low level			
(3+4)-Methylphenol (m,p-Cresol)	NE	0.004340	0.033
1,2,4-Trichlorobenzene	NE	0.007290	0.033
1,2-Dichlorobenzene	NE	0.004700	0.033
1,2-Dinitrobenzene	NE	0.005210	0.033
1,2-Diphenylhydrazine	NE	0.010900	0.033
1,3-Dichlorobenzene	NE	0.003770	0.033
1,3-Dinitrobenzene	NE	0.002840	0.170
1,4-Dichlorobenzene	NE	0.004240	0.033
1,4-Dinitrobenzene	NE	0.006650	0.033
1-Methylnaphthalene	NE	0.005370	0.033
2,3,4,6-Tetrachlorophenol	NE	0.003910	0.033
2,3,5,6-Tetrachlorophenol	NE	0.004910	0.033
2,3-Dichloroaniline	NE	0.005770	0.033
2,4,5-Trichlorophenol	NE	0.004620	0.033
2,4,6-Trichlorophenol	NE	0.004010	0.033
2,4-Dichlorophenol	NE	0.005280	0.033
2,4-Dimethylphenol	NE	0.018000	0.830
2,4-Dinitrophenol	NE	0.051500	0.170
2,4-Dinitrotoluene	NE	0.006970	0.033
2,6-Dinitrotoluene	NE	0.006260	0.033
2-Chloronaphthalene	NE	0.004120	0.033
2-Chlorophenol	NE	0.007400	0.033
2-Methylnaphthalene	NE	0.006140	0.033
2-Methylphenol (o-Cresol)	NE	0.004630	0.033
2-Nitroaniline	NE	0.005360	0.033
2-Nitrophenol	NE	0.009070	0.033
3,3'-Dichlorobenzidine	NE	0.067300	0.330
3-Nitroaniline	NE	0.003330	0.033
4,6-Dinitro-2-methylphenol	NE	0.004210	0.170
4-Bromophenyl-phenylether	NE	0.002960	0.033
4-Chloro-3-methylphenol	NE	0.008550	0.033
4-Chloroaniline	NE	0.003670	0.033
4-Chlorophenyl-phenylether	NE	0.004690	0.033
4-Nitroaniline	NE	0.003820	0.033
4-Nitrophenol	NE	0.015100	0.033
Acenaphthene	NE	0.007430	0.033
Acenaphthylene	NE	0.003450	0.033
Aniline	NE	0.004910	0.170
Anthracene	NE	0.003540	0.033
Benzidine	NE	0.000602	0.330
Benzo[a]anthracene	NE	0.002360	0.033
Benzo[a]pyrene	0.1	0.002010	0.033
Benzo[b]fluoranthene	NE	0.004140	0.033
Benzo[g,h,i]perylene	NE	0.002590	0.033
Benzo[j,k]fluoranthene	NE	0.003580	0.033
Benzoic acid	NE	0.052100	0.170
Benzyl alcohol	NE	0.006590	0.033
bis(2-Chloroethoxy)methane	NE	0.005700	0.033
bis(2-chloroethyl)ether	NE	0.007110	0.033
bis(2-Chloroisopropyl)ether	NE	0.006770	0.033
bis(2-Ethylhexyl)phthalate	NE	0.005210	0.033
bis-2-Ethylhexyladipate	NE	0.002910	0.033
Butylbenzylphthalate	NE	0.009360	0.033

TABLE 2

METHODS OF ANALYSIS AND TARGET REPORTING LIMITS FOR SOIL SAMPLES

US 101 MIDWAY METALS

CLALLAM COUNTY, WASHINGTON

Analyte	MTCA Method A Cleanup Level for Soil Unrestricted Land Use (mg/kg)	Screening Level[1] (mg/kg)	Target Reporting Limit (mg/kg)[2]
Carbazole	NE	0.003330	0.033
Chrysene	NE	0.003000	0.033
Dibenz[a,h]anthracene	NE	0.003650	0.033
Dibenzofuran	NE	0.003780	0.033
Diethylphthalate	NE	0.004220	0.170
Dimethylphthalate	NE	0.002690	0.033
Di-n-butylphthalate	NE	0.006400	0.033
Di-n-octylphthalate	NE	0.004550	0.033
Fluoranthene	NE	0.003560	0.033
Fluorene	NE	0.003580	0.033
Hexachlorobenzene	NE	0.003270	0.033
Hexachlorobutadiene	NE	0.006210	0.033
Hexachlorocyclopentadiene	NE	0.006370	0.033
Hexachloroethane	NE	0.005360	0.033
Indeno[1,2,3-c,d]pyrene	NE	0.003120	0.033
Isophorone	NE	0.005920	0.033
Naphthalene	5	0.005550	0.033
n-Decane	NE	0.008830	0.330
Nitrobenzene	NE	0.008110	0.033
n-Nitrosodimethylamine	NE	0.006700	0.033
n-Nitroso-di-n-propylamine	NE	0.008760	0.033
n-Nitrosodiphenylamine	NE	0.002880	0.033
n-Octadecane	NE	0.006840	0.033
Pentachlorophenol	NE	0.012100	0.170
Phenanthrene	NE	0.004180	0.033
Phenol	NE	0.004600	0.033
Pyrene	NE	0.004250	0.033
Pyridine	NE	0.010500	0.330
PCBs by EPA 8082-Low level (mg/kg) (25 g Initial mass)			
Aroclor 1016	NE	0.0159	0.05
Aroclor 1221	NE	0.0159	0.05
Aroclor 1232	NE	0.0159	0.05
Aroclor 1242	NE	0.0159	0.05
Aroclor 1248	NE	0.0159	0.05
Aroclor 1254	NE	0.0159	0.05
Aroclor 1260	NE	0.0159	0.05
Total PCBs (sum of Aroclors)	1	0.0159	0.05

Notes:

[1] Screening level provided for the purposes of identifying laboratory target reporting limits. Screening levels based on MTCA Method A or B cleanup levels and natural background for Washington State ("Natural Background Soil Metals Concentrations in Washington State," Ecology Publication #94-115, October 1994).

[2] Laboratory reporting limits were obtained from OnSite Environmental , Inc., an Ecology-approved laboratory.

NWTPH = Northwest Total Petroleum Hydrocarbons

Gx = Gasoline extended range

Dx = Diesel extended range

mg/kg = Milligram per kilogram

NE - Method A Screening Level Not Established

TABLE 3

METHODS OF ANALYSIS AND TARGET REPORTING LIMITS FOR WATER SAMPLES

US 101 MIDWAY METALS

CLALLAM COUNTY, WASHINGTON

Analyte	MTCA Method A Cleanup Level for Groundwater (ug/l)	MTCA Method B, Non-Carcinogen Cleanup Level for Surface Water (ug/l)	Screening Level[1] (ug/l)	Target Reporting Limit (ug/l)[2]
Total Petroleum Hydrocarbons by NWTPH-Gx and NWTPH-Dx				
Gasoline-Range Petroleum Hydrocarbons	800/1000	NE	7.19	100
Diesel-Range Petroleum Hydrocarbons	500	NE	71.2	250
Heavy Oil-Range Petroleum Hydrocarbons	500	NE	144	400
Metals by EPA Methods 6000/7000 series				
Arsenic	5	18	0.334	3.3
Barium	NE	NE	0.132	28
Cadmium	5	41	0.0884	4.4
Chromium Total	50	NE	0.114	11
Chromium (VI) by EPA Method 7196A	NE	490	2.56	10
Lead	150	NE	0.228	1.1
Mercury by EPA Method 7470A	2	NE	0.00303	0.5
Selenium	NE	2,700	0.632	5.6
Silver	NE	26,000	0.137	11
Volatile Organic Compounds by EPA Method 8260				
(cis) 1,2-Dichloroethene	NE	NE	0.0382	0.2
(cis) 1,3-Dichloropropene	NE	NE	0.0338	0.2
(trans) 1,2-Dichloroethene	NE	33,000	0.0312	0.2
(trans) 1,3-Dichloropropene	NE	NE	0.0378	0.2
1,1,1,2-Tetrachloroethane	NE	NE	0.0394	0.2
1,1,1-Trichloroethane	200	930,000	0.0460	0.2
1,1,2,2-Tetrachloroethane	NE	NE	0.0903	0.2
1,1,2-Trichloroethane	NE	2,300	0.0755	0.2
1,1-Dichloroethane	NE	NE	0.0345	0.2
1,1-Dichloroethene	NE	23,000	0.0338	0.2
1,1-Dichloropropene	NE	NE	0.0481	0.2
1,2,3-Trichlorobenzene	NE	NE	0.1030	0.2
1,2,3-Trichloropropane	NE	NE	0.0776	0.2
1,2,4-Trichlorobenzene	NE	230	0.0525	0.2
1,2,4-Trimethylbenzene	NE	NE	0.0309	0.2
1,2-Dibromo-3-chloropropane	NE	NE	0.4320	1.0
1,2-Dibromoethane	NE	NE	0.0446	0.2
1,2-Dichlorobenzene	NE	4,200	0.0215	0.2
1,2-Dichloroethane	5	43,000	0.0547	0.2
1,2-Dichloropropane	NE	NE	0.0278	0.2
1,3,5-Trimethylbenzene	NE	NE	0.0217	0.2
1,3-Dichlorobenzene	NE	NE	0.0417	0.2
1,3-Dichloropropane	NE	NE	0.1220	0.2
1,4-Dichlorobenzene	NE	NE	0.0382	0.2
2,2-Dichloropropane	NE	NE	0.0488	0.2
2-Butanone	NE	NE	0.3510	5.0
2-Chloroethyl Vinyl Ether	NE	NE	0.2070	1.0
2-Chlorotoluene	NE	NE	0.0374	0.2
2-Hexanone	NE	NE	0.1000	2.0
4-Chlorotoluene	NE	NE	0.0623	0.2
Acetone	NE	NE	0.9470	5.0
Benzene	5	2,000	0.0303	0.2
Bromobenzene	NE	NE	0.0537	0.2
Bromochloromethane	NE	NE	0.0502	0.2
Bromodichloromethane	NE	14,000	0.0322	0.2
Bromoform	NE	14,000	0.1460	1.0
Bromomethane	NE	970	0.0725	0.2
Carbon Disulfide	NE	NE	0.0475	0.2
Carbon Tetrachloride	NE	550	0.0417	0.2
Chlorobenzene	NE	5,000	0.0335	0.2
Chloroethane	NE	NE	0.0963	1.0
Chloroform	NE	6,900	0.0336	0.2
Chloromethane	NE	NE	0.0329	1.0
Dibromochloromethane	NE	14,000	0.0340	0.2
Dibromomethane	NE	NE	0.0569	0.2
Dichlorodifluoromethane	NE	NE	0.0441	0.2
Ethylbenzene	700	6,900	0.0254	0.2
Hexachlorobutadiene	NE	930	0.0960	0.2
Iodomethane	NE	NE	0.0451	1.0
Isopropylbenzene	NE	NE	0.0186	0.2
m,p-Xylene	NE	NE	0.0398	0.4
Methyl Isobutyl Ketone	NE	NE	0.1370	2.0
Methyl t-Butyl Ether	20	NE	0.0394	0.2
Methylene Chloride	5	170,000	0.0675	1.0
Naphthalene	160	4,900	0.1360	1.0
n-Butylbenzene	NE	NE	0.0344	0.2
n-Propylbenzene	NE	NE	0.1080	0.2
p-Isopropyltoluene	NE	NE	0.0322	0.2
sec-Butylbenzene	NE	NE	0.0199	0.2
Styrene	NE	NE	0.0410	0.2
tert-Butylbenzene	NE	NE	0.0331	0.2
Tetrachloroethene	5	840	0.0346	0.2

TABLE 3

METHODS OF ANALYSIS AND TARGET REPORTING LIMITS FOR WATER SAMPLES

US 101 MIDWAY METALS

CLALLAM COUNTY, WASHINGTON

Analyte	MTCA Method A Cleanup Level for Groundwater (ug/l)	MTCA Method B, Non-Carcinogen Cleanup Level for Surface Water (ug/l)	Screening Level[1] (ug/l)	Target Reporting Limit (ug/l)[2]
Toluene	1,000	19,000	0.0206	1.0
Total Xylene	1,000		0.0250	0.2
Trichloroethene	5	6.7	0.0707	0.2
Trichlorofluoromethane	NE	NE	0.0351	0.2
Vinyl Acetate	NE	NE	0.1360	2.0
Vinyl Chloride	0.2	6,600	0.0417	0.2
Polycyclic Aromatic Hydrocarbons by EPA 8270-SIM				
Acenaphthene	NE	640	0.0030	0.10
Acenaphthylene	NE	NE	0.0032	0.10
Anthracene	NE	26,000	0.0034	0.10
Benzo[a]anthracene	NE	NE	0.0061	0.01
Benzo[a]pyrene	0.1	NE	0.0062	0.01
Benzo[b]fluoranthene	NE	NE	0.0073	0.01
Benzo[g,h,i]perylene	NE	NE	0.0072	0.01
Benzo[j,k]fluoranthene	NE	NE	0.0072	0.01
Chrysene	NE	NE	0.0056	0.01
Dibenz[a,h]anthracene	NE	NE	0.0064	0.01
Fluoranthene	NE	90	0.0055	0.10
Fluorene	NE	3,500	0.0029	0.10
Indeno[1,2,3-c,d]pyrene	NE	NE	0.0072	0.01
1-Methylnaphthalene	NE	NE	0.0031	0.10
2-Methylnaphthalene	NE	NE	0.0031	0.10
Naphthalene	160	4,900	0.0035	0.10
Phenanthrene	NE	NE	0.0034	0.10
Pyrene	NE	2,600	0.0058	0.10
Semivolatile Organic Compounds by EPA 8270-Low level				
(3+4)-Methylphenol (m,p-Cresol)	NE	NE	0.1730	1.0
1,2,4-Trichlorobenzene	NE	230	0.1920	1.0
1,2-Dichlorobenzene	NE	4,200	0.1550	1.0
1,2-Dinitrobenzene	NE	NE	0.1730	1.0
1,2-Diphenylhydrazine	NE	NE	0.1430	1.0
1,3-Dichlorobenzene	NE	NE	0.1890	1.0
1,3-Dinitrobenzene	NE	NE	0.1190	1.0
1,4-Dichlorobenzene	NE	NE	0.1650	1.0
1,4-Dinitrobenzene	NE	NE	0.1690	1.0
1-Methylnaphthalene	NE	NE	0.1890	1.0
2,3,4,6-Tetrachlorophenol	NE	NE	0.2320	1.0
2,3,5,6-Tetrachlorophenol	NE	NE	0.2120	1.0
2,3-Dichloroaniline	NE	NE	0.1450	1.0
2,4,5-Trichlorophenol	NE	NE	0.1350	1.0
2,4,6-Trichlorophenol	NE	17	0.1100	1.0
2,4-Dichlorophenol	NE	190	0.2030	1.0
2,4-Dimethylphenol	NE	550	0.1690	1.0
2,4-Dinitrophenol	NE	3,500	2.9600	10
2,4-Dinitrotoluene	NE	1,400	0.2370	1.0
2,6-Dinitrotoluene	NE	NE	0.1620	1.0
2-Chloronaphthalene	NE	NE	0.1690	1.0
2-Chlorophenol	NE	97	0.1130	1.0
2-Methylnaphthalene	NE	NE	0.1410	1.0
2-Methylphenol (o-Cresol)	NE	NE	0.1150	1.0
2-Nitroaniline	NE	NE	0.1470	1.0
2-Nitrophenol	NE	NE	0.1620	1.0
3,3'-Dichlorobenzidine	NE	NE	0.1980	1.0
3-Nitroaniline	NE	NE	0.2120	1.0
4,6-Dinitro-2-methylphenol	NE	NE	0.1780	5.0
4-Bromophenyl-phenylether	NE	NE	0.1630	1.0
4-Chloro-3-methylphenol	NE	NE	0.1820	1.0
4-Chloroaniline	NE	NE	0.1300	1.0
4-Chlorophenyl-phenylether	NE	NE	0.1450	1.0
4-Nitroaniline	NE	NE	0.2070	1.0
4-Nitrophenol	NE	NE	0.2990	1.0
Acenaphthene	NE	640	0.3940	1.0
Acenaphthylene	NE	NE	0.1880	1.0
Aniline	NE	NE	0.1270	1.0
Anthracene	NE	26,000	0.1400	1.0
Benzidine	NE	89	3.2200	10
Benzo[a]anthracene	NE	NE	0.1840	1.0
Benzo[a]pyrene	0.1	NE	0.1270	1.0
Benzo[b]fluoranthene	NE	NE	0.2120	1.0
Benzo[g,h,i]perylene	NE	NE	0.1250	1.0
Benzo[j,k]fluoranthene	NE	NE	0.1000	1.0
Benzoic acid	NE	NE	4.3200	5.0
Benzyl alcohol	NE	NE	0.2100	1.0
bis(2-Chloroethoxy)methane	NE	NE	0.0961	1.0
bis(2-chloroethyl)ether	NE	NE	0.1580	1.0
bis(2-Chloroisopropyl)ether	NE	NE	0.1180	1.0
bis(2-Ethylhexyl)phthalate	NE	400	0.2800	1.0
bis-2-Ethylhexyladipate	NE	NE	0.1960	1.0

TABLE 3

METHODS OF ANALYSIS AND TARGET REPORTING LIMITS FOR WATER SAMPLES

US 101 MIDWAY METALS

CLALLAM COUNTY, WASHINGTON

Analyte	MTCA Method A Cleanup Level for Groundwater (ug/l)	MTCA Method B, Non-Carcinogen Cleanup Level for Surface Water (ug/l)	Screening Level[1] (ug/l)	Target Reporting Limit (ug/l)[2]
Butylbenzylphthalate	NE	1,300	0.6500	1.0
Carbazole	NE	NE	0.1550	1.0
Chrysene	NE	NE	0.1000	1.0
Dibenz[a,h]anthracene	NE	NE	0.1710	1.0
Dibenzofuran	NE	NE	0.1310	1.0
Diethylphthalate	NE	28,000	0.4600	1.0
Dimethylphthalate	NE	NE	0.1780	1.0
Di-n-butylphthalate	NE	NE	0.1740	1.0
Di-n-octylphthalate	NE	NE	0.1570	1.0
Fluoranthene	NE	90	0.3280	1.0
Fluorene	NE	3,500	0.1240	1.0
Hexachlorobenzene	NE	0.24	0.2260	1.0
Hexachlorobutadiene	NE	930	0.1910	1.0
Hexachlorocyclopentadiene	NE	3,600	0.1810	1.0
Hexachloroethane	NE	30	0.1890	1.0
Indeno[1,2,3-c,d]pyrene	NE	NE	0.1770	1.0
Isophorone	NE	120,000	0.1200	1.0
Naphthalene	160	4,900	0.1520	1.0
n-Decane	NE	NE	0.3210	20
Nitrobenzene	NE	1,800	0.1430	1.0
n-Nitrosodimethylamine	NE	NE	0.2540	1.0
n-Nitroso-di-n-propylamine	NE	NE	0.2270	1.0
n-Nitrosodiphenylamine	NE	NE	0.1580	1.0
n-Octadecane	NE	NE	0.3380	1.0
Pentachlorophenol	NE	1,200	0.3240	5.0
Phenanthrene	NE	NE	0.2120	1.0
Phenol	NE	560,000	0.1360	1.0
Pyrene	NE	2,600	0.1740	1.0
Pyridine	NE	NE	0.2470	1.0
PCBs by EPA 8082-Low level				
Aroclor 1016	NE	0.0058	0.00884	0.05
Aroclor 1221	NE	NE	0.00884	0.05
Aroclor 1232	NE	NE	0.00884	0.05
Aroclor 1242	NE	NE	0.00884	0.05
Aroclor 1248	NE	NE	0.00884	0.05
Aroclor 1254	NE	0.0017	0.00884	0.05
Aroclor 1260	NE	NE	0.00884	0.05
Total PCBs (sum of Aroclors)	0.10	NE	0.00884	0.05

Notes:

[1] Screening level provided for the purposes of identifying laboratory target reporting limits. Screening levels based on MTCA Method A or B cleanup levels and natural background for Washington State.

[2] Laboratory reporting limits were obtained from OnSite Environmental , Inc., an Ecology-approved laboratory.

NWTPH = Northwest Total Petroleum Hydrocarbons

Gx = Gasoline extended range

Dx = Diesel extended range

µg/l = Microgram per liter

TABLE 4

TEST METHODS, SAMPLE CONTAINERS, PRESERVATION AND HOLD TIMES

US 101 MIDWAY METALS

CLALLAM COUNTY, WASHINGTON

Analysis	Method	Soil				Groundwater			
		Minimum Sample Size	Sample Containers	Sample Preservation	Holding Times	Minimum Sample Size	Sample Containers	Sample Preservation	Holding Times
Gasoline-Range Petroleum Hydrocarbons	NWTPH-Gx	4 oz, 40ml VOA	4 oz glass wm with Teflon-lined lid, 40ml VOA (pre-weighted)	Cool 4°C	14 days	3 Vials	40ml VOA vial	HCl pH<2, 4oC	14 days
Diesel-Range Petroleum Hydrocarbons	NWTPH-Dx	4 oz	4 oz glass wm with Teflon-lined lid	Cool 4°C	14 days	2 500ml	500ml amber	HCl pH<2, 4oC	14 days
Heavy Oil-Range Petroleum Hydrocarbons	NWTPH-Dx	4 oz	4 oz glass wm with Teflon-lined lid	Cool 4°C	14 days	2 500ml	500ml amber	HCl pH<2, 4oC	14 days
RCRA 8 Metals	EPA 6000/7000	4 oz	4 oz glass wm with Teflon-lined lid	Cool 4°C	180 days/ 28 days for Mercury	500 mL	500 mL poly bottle	HNO3 - pH<2	180 days/28 days for Mercury
Volatile Organic Compounds (VOCs)	EPA 8260B/5035A	4 oz, 3 40ml VOAs, 2 with stir bar	4 oz glass wm with Teflon-lined lid, 40ml VOA (pre-weighted)	Cool 4°C	14 days	3 Vials	40ml VOA vial	HCl pH<2, 4oC	14 days
Polycyclic Aromatic Hydrocarbons (PAHs)	EPA 8270D/SIM	4 oz	4 oz glass wm with Teflon-lined lid	Cool 4°C	14 days	2 1 Liter	1 Liter amber	none	7 days
Semivolatile Organic Compounds (SVOCs)	EPA 8270D/SIM	4 oz	4 oz glass wm with Teflon-lined lid	Cool 4°C	14 days	2 1 Liter	1 Liter amber	none	7 days
Polychlorinated Biphenyls (PCBs)	EPA 8082	4 oz	4 oz glass wm with Teflon-lined lid	Cool 4°C	none	2 1 Liter	1 Liter amber	none	none

Notes:

Extraction Holding Time is based on elapsed time from date of sample collection.

oz = ounce

mL = milliliter

TABLE 5
QUALITY CONTROL SAMPLES - TYPE AND FREQUENCY
US 101 MIDWAY METALS
CLALLAM COUNTY, WASHINGTON

Samples Collected for Chemical Analytical Testing	Field QC		Laboratory QC			
	Field Duplicates	Trip Blanks	Method Blanks	LCS	MS/MSD	Lab Duplicates
Soil	1 per every 20 samples	NA	1/batch	1/batch	1/batch	1/batch
Groundwater	1 per every sampling event	NA	1/batch	1/batch	1/batch[1]	1/batch

Notes:

[1] Two times the sample volume will be collected to provide adequate sample volume to perform MS/MSD analyses.

An analytical batch is defined as a group of samples taken through a preparation procedure and sharing a method blank, LCS, and MS/MSD (or MS and lab duplicate).

No more than 20 field samples can be contained in one batch.

LCS = Laboratory control sample

MS = Matrix spike sample

MSD = Matrix spike duplicate sample

NA = Not Applicable

APPENDIX C
Health and Safety Plan

Site Health and Safety Plan

US 101 Midway Metals
Remedial Investigation
Clallam County, Washington

for
Washington State Department of Transportation

December 9, 2011

GeoEngineers

1101 South Fawcett Avenue,
Suite 200
Tacoma, Washington 98402
253.383.4940

Table of Contents

GEOENGINEERS, INC.
SITE HEALTH AND SAFETY PLAN
US 101 MIDWAY METALS
FILE NO. 0180-292-00

This Site Health and Safety Plan (HASP) is to be used in conjunction with the GeoEngineers Safety Program Manual. Together, the written safety programs and this HASP constitute the site safety plan for the US 101 Midway Metals Remedial Investigation (Midway Metals). This HASP is to be used by GeoEngineers personnel at Midway Metals and must be available on-site. If the work entails potential exposures to other substances or unusual situations, additional safety and health information will be included, and the plan will need to be approved by the GeoEngineers Health and Safety Manager. All plans are to be used in conjunction with current standards and policies outlined in the GeoEngineers Health and Safety Program Manual.

Liability Clause: If requested by subcontractors, this HASP may be provided for informational purposes only. In this case, Form C-3 shall be signed by the subcontractor. Please be advised that HASP is intended for use by GeoEngineers Employees only. Nothing herein shall be construed as granting rights to GeoEngineers' subcontractors or any other contractors working on this Site to use or legally rely on this HASP. GeoEngineers specifically disclaims any responsibility for the health and safety of any person not employed by them.

1.0 GENERAL PROJECT INFORMATION

Project Name:	US 101 Midway Metals Remedial Investigation
Project Number:	0180-292-00
Type of Project:	Environmental Services
Start/Completion:	November 2011 – December 2011
Subcontractors:	Cascade Drilling, Inc.

2.0 WORK PLAN

The following are the field activities to be performed for the present investigation:

1. Complete the necessary number of soil borings on or in the vicinity of the Midway Metals property using a track-mounted direct push drill rig. Soil samples will be collected from each of the boring locations and submitted for chemical analysis. Soil boring locations, chemical analysis and sampling frequency are detailed in the project sampling and analysis plan (SAP).
2. Collect groundwater grab samples from select boring locations using a temporary hydropunch style sampling screen. Groundwater samples will be submitted for chemical analysis. Requested chemical analyses are detailed in the SAP.

3. Collect one groundwater sample from each of the two existing site groundwater wells to be submitted for chemical analysis. Requested chemical analyses are detailed in the SAP.

Collect surface water and sediment samples using hand tools to be submitted for chemical analysis. Sampling locations and requested chemical analyses are detailed in the SAP.

2.1. Site Description and History

The 2.7 acre site slopes down towards US 101 and is located on the south side of the highway between Sequim and Port Angeles, Washington. Prior to 1972, the site and surrounding area was either undeveloped forested land or developed for rural residential purposes. A commercial retail concrete septic tank business operated on the property between 1972 and 1989. After a brief period of vacancy, the property was leased and used as a scrap metal recycling yard from 1991 to present day.

WSDOT is considering a partial acquisition of the Midway Metals site as part of the US 101 Shore Road to Kitchen-Dick Road Widening Project. Herrera Environmental Consultants was contracted to complete Phase I Environmental Site Assessment (Phase I ESA) for WSDOT in 2002. At the time, the site was known as E.T. Enterprises. The assessment found, "the only evidence of a potential for impact due to hazardous materials release is associated with storage of liquids in the metal shed." The report recommended a limited Phase II to collect shallow soil samples around the metal shed and possibly of soils located beneath scrap metal/tire/battery piles once the junk had been removed. It was thought that contamination was incidental in nature, would be limited to shallow soils, could be managed during construction, and would have minimal impact on property acquisition liability.

WSDOT Environmental Services Office (ESO) conducted a Phase II ESA in March 2011.

In August 2006, a complaint was reported to the Washington State Department of Ecology (Ecology) of junk cars being accepted at the site with no place to drain fluids, auto batteries stored on the ground, illegal burning occurring at the site, and oil observed on the ground. As a follow-up to this complaint, the Clallam County Environmental Health Department performed an initial investigation at the site in October 2006. The County collected three surface soil samples and found that all three exceeded the Model Toxics Control Act (MTCA) Method A cleanup levels for cadmium and one sample exceeded the cleanup level for lead and residual range organics. Based on this investigation, the site was reported to Ecology and assigned a Site Hazard Ranking of #1, which is reserved for sites that represent the highest level of potential risk.

On March 20, 2007, Ecology sent Mr. Thomas Lunderville, the site owner, a letter notifying him that the site would be listed as Facility Site Identification # 1671323. In 2010, two additional complaints were filed with Ecology. One complaint was that an excavator was tipped on its side and was leaking oil and antifreeze onto the ground. The report further stated that the site operators may not be disposing of their hazardous chemicals and petroleum properly. The second complaint reported that the site operators were not draining refrigerators prior to crushing them; that tires and other debris containing petroleum were being burned; and that used oil and transmission fluid were not being disposed of properly.

2.2. List of Field Activities

- Soil borings
- Soil sample collection
- Field screening of soil samples
- Groundwater sampling
- Surface water sampling
- Sediment sampling

3.0 LIST OF FIELD PERSONNEL AND TRAINING

Name of Employee on Site	Level of HAZWOPER Training (24-/40-hour)	Date of 8-Hour Refresher Training	Date of First Aid/CPR Training
Aaron Waggoner	8/11/00	12/9/10	12/21/10
John Deeds	6/30/97	1/26/11	4/7/09

Chain of Command	Title	Name	Telephone Numbers
1	Principle/Associate	Michael Hutchinson	253.431.2925
2	Project Manager	Aaron Waggoner	253.579.2176
3	HAZWOPER Supervisor		
4	Site Safety and Health Supervisor*	Aaron Waggoner	253. 579.2176
5	Field Engineer/Geologist	John Deeds	253.312.8626
6	Client-Assigned Site Supervisor		
7	Health and Safety Program Manager	Wayne Adams	253.383.4940
N/A	Subcontractor(s)	Cascade Drilling	425.485.8908

* **Site Safety and Health Supervisor** – The individual present at a hazardous waste site responsible to the employer and who has the authority and knowledge necessary to establish the site-specific HASP and verify compliance with applicable safety and health requirements.

4.0 EMERGENCY INFORMATION

Hospital Name and Address:
Providence Regional Medical Center
1321 Colby Avenue
Everett, WA 98201

Phone Number (Hospital ER):
(360) 417-7000

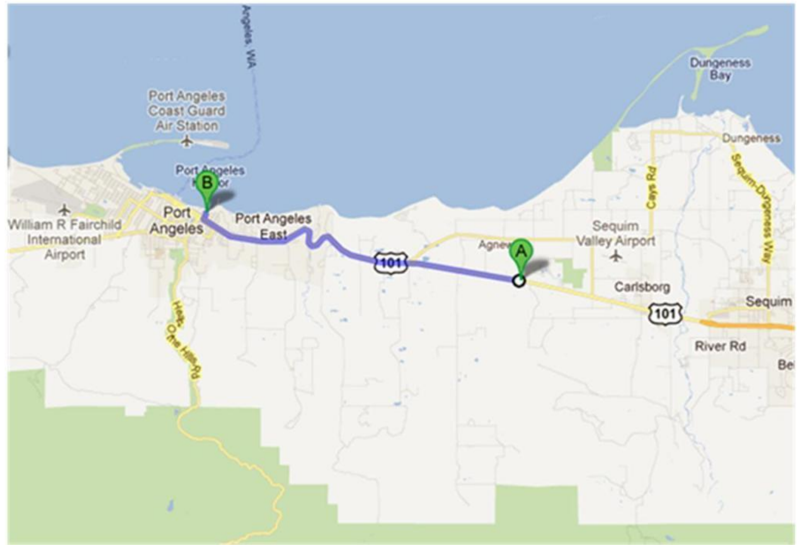
Route to Hospital (Distance: 9.2 miles):

1. Head west on US 101 toward Port Angeles (9.1 miles)

2. Turn right onto North Washington Street (0.1 miles)

3. Turn left onto Caroline Street (148 feet)

Destination will be on the right



4.1. Standard Emergency Procedures

Get help

- send another worker to phone 9-1-1 (if necessary)
- as soon as feasible, notify GeoEngineers' Project Manager

Reduce risk to injured person

- turn off equipment (if applicable)
- move person from injury location (if in life-threatening situation only)
- keep person warm
- perform CPR (if necessary)

Transport injured person to medical treatment facility (if necessary) -

- by ambulance (if necessary) or GeoEngineers vehicle
- stay with person at medical facility
- keep GeoEngineers manager apprised of situation and notify Human Resources Manager of situation

5.0 HAZARD ANALYSIS

- Note: A hazard assessment will be completed at the Site prior to beginning field activities. Updates will be included in the daily log. This list is a summary of hazards identified for the Site.

5.1. Physical Hazards

X	Drill rig
X	Backhoe/Trackhoe (possibly for clearing and grubbing)
	Crane
	Front End Loader
	Excavations/trenching (1:1 slopes for Type B soil)
	Shored/braced excavation if greater than 4 feet of depth
	Overhead hazards/power lines
X	Tripping/puncture hazards (scrap iron debris on-site)
	Unusual traffic hazard – Street traffic
X	Heat/Cold, Humidity
X	Utilities/utility locate

- Utility checklist will be completed as required for the locations to preventing drilling into utilities.
- Work areas will be marked with reflective cones, barricades and/or caution tape as necessary. High-visibility vests will be worn by on-site personnel to ensure they can be seen by vehicle and equipment operators.
- Field personnel will be aware at all times of the location and motion of heavy equipment in the area of work to ensure a safe distance between personnel and the equipment. Personnel will be visible to the operator at all times and will remain out of the swing and/or direction of the equipment apparatus. Personnel will approach operating heavy equipment only when they are certain the operator has indicated that it is safe to do so through hand signal or other acceptable means.
- Heavy equipment and/or vehicles used on this Site will not work within 20 feet of overhead utility lines without first ensuring that the lines are not energized. This distance may be reduced to 10 feet depending on the client and the use of a safety watch. Note: If it is later determined that overhead lines are a hazard on this job Site a copy the overhead lines safety section from the HASP Supplemental document will be attached.
- Personnel entry into unshored or unsloped excavations deeper than 4 feet is not allowed.
- Personnel will avoid tripping hazards, steep slopes, pits and other hazardous encumbrances.
- Heat and/or cold stress control measures will be implemented according to the GeoEngineers Health and Safety Program to prevent frost nip (superficial freezing of the skin), frost bite (deep tissue freezing), or hypothermia (lowering of the core body temperature).
- Heat stress control measures required for this Site will be implemented according to GeoEngineers Health and Safety Program with water provided on site.

5.2. Engineering Controls

_________ Trench shoring (1:1 slope for Type B Soils)

____X____ Locate work spaces upwind/conduct wind direction monitoring

_________ Other soil covers (as needed)

_________ Other (specify) ____

5.3. Chemical Hazards

CHEMICAL HAZARDS (POTENTIALLY PRESENT AT SITE)

SUBSTANCE	POTENTIAL PATHWAYS
Metals	Air/Water/Soil
Gasoline Range Organics	Air/Water/Soil
Diesel Range Organics	Air/Water/Soil
Lube Oil Range Organics	Air/Water/Soil
Volatile Organic Compounds	Air/Water/Soil
Polycyclic Aromatic Hydrocarbons	Air/Water/Soil
Polychlorinated Biphenyl's	Air/Water/Soil

SPECIFIC CHEMICAL HAZARDS AND EXPOSURES (POTENTIALLY PRESENT AT SITE)

Compound/ Description	OSHA PEL Exposure Limits/IDLH	NIOSH / ACGIH TLV Exposure Limits/IDLH	Exposure Routes	Toxic Characteristics
Diesel Fuel—liquid with a characteristic Odor	None established by OSHA,	TLV-TWA = 100 mg/m³ (as total hydrocarbons	Ingestion, inhalation, skin absorption, skin and eye contact	Irritated eyes, skin, and mucous membrane; fatigue; blurred vision; dizziness; slurred speech; confusion; convulsions; and headache, and dermatitis
Gasoline—clear liquid with a characteristic odor.	None established by OSHA	TLV-TWA = 300 ppm STEL = 500 ppm	Ingestion, inhalation, skin absorption, skin and eye contact	Irritated eyes, skin, and mucous membrane; fatigue; blurred vision; dizziness; slurred speech; confusion; convulsions; and headache, and dermatitis
Benzene	**OSHA** = TWA 1 ppm **STEL** = 5 ppm	NIOSH = TWA 0.1 ppm STEL= 1 ppm TLV-TWA = 0.5 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritated eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow depression; [potential occupational carcinogen]
Trichloroethene (TCE) Colorless liquid (unless dyed blue) with a chloroform-like odor.	**OSHA** = TWA 100 ppm, C 200 ppm	TLV TWA = 50 ppm, 269 mg/m3 TWA; STEL =100 ppm, 537 mg/m³	inhalation, skin absorption, ingestion, skin and/or eye contact	Irritation eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen

Compound/ Description	OSHA PEL Exposure Limits/IDLH	NIOSH / ACGIH TLV Exposure Limits/IDLH	Exposure Routes	Toxic Characteristics
Tetrachloroethene (PCE) Colorless liquid with a mild, chloroform-like odor	**OSHA** = TWA 0.5 mg/m³	**NIOSH** = 0. 001 ppm **IDLH** 5.0 ppm **TLV-TWA** = 0.5 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritated eyes, chloracne, liver damage, reproductive effects, potential carcinogen.
Polycyclic aromatic hydrocarbons (PAH)	**OSHA** = TWA 0.2 mg/m³	**NIOSH** = 0.1 mg/m³ **IDLH** 80 mg/m³ **TLV-TWA** = 0.2 mg/m³	Inhalation, ingestion, skin and/or eye contact	Dermatitis, bronchitis, potential carcinogen.
Arsenic	**OSHA** = TWA 0.01 mg/m³	**NIOSH** = C 0.002 mg/m³ **IDLH** = 5 mg/m³ **TLV-TWA** = 0.01 mg/m³	Inhalation, skin absorption, ingestion, skin and/or eye contact	Ulcerated nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin, potential carcinogen.
Lead (and inorganic compounds as lead)	**OSHA** = TWA 0.05 mg/m³	**NIOSH** = TWA 0.05 mg/m³ **IDLH** 100 mg/m³ **TLV –TWA** = 0.05 mg/m³	Inhalation, ingestion, skin and/or eye contact	Lassitude (weakness, exhaustion), insomnia, facial pallor, anorexia, weight loss, malnutrition, constipation, abdominal pain, colic, anemia, gingival lead line, tremor, wrist and ankle paralysis, encephalopathy, kidney disease, irritated eyes, hypotension.
Mercury (and inorganic compounds as mercury)	No available data	**IDLH** 10 mg/m³ **TLV-TWA** = 0.025 mg/m³ Ceiling 0.1 mg/m³	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritated eyes and skin, coughing, chest pain, difficulty breathing, bronchitis, pneumonitis, tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion), stomatitis, salivation, gastrointestinal disturbance, anorexia, weight loss, proteinuria.
Chromium	**OSHA** = TWA 1 mg/m³	**NIOSH** = TWA 0.5 mg/m³ **IDLH** 250 mg/m³ **TLV-TWA** = 0.5 mg/m³	Inhalation, ingestion, skin and/or eye contact	Chromium III is an essential nutrient, Chromium VI can cause irritation to nose, skin ulcers, linked to cancer.
Nickel	**OSHA** = TWA 1 mg/m³	**NIOSH** = TWA 0.015 mg/m³ **IDLH** 10 mg/m³ **TLV –TWA** = 0.1 mg/m³	Inhalation, ingestion, skin and/or eye contact	Sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]

Notes:

IDLH = immediately dangerous to life or health

OSHA = Occupational Safety and Health Administration

ACGIH = American Conference of Governmental Industrial Hygienists

mg/m³ = milligrams per cubic meter

TWA = time-weighted average (Over 8 hrs.)

PEL = permissible exposure limit

TLV = threshold limit value (over 10 hrs)

STEL = short-term exposure limit (15 min)

ppm = parts per million

5.4. Biological Hazards and Procedures

Y/N	Hazard	Procedures
	Poison Ivy or other vegetation	
X	Insects or snakes	Work boots, gloves and long sleeve shirt
X	Used hypodermic needs or other infectious hazards	Do not touch
	Others:	

5.5. Additional Hazards

Update in Daily Report. Include evaluation of:

- *Physical Hazards* (equipment, traffic, tripping, heat stress, cold stress and others)
- *Chemical Hazards* (odors, spills, free product, airborne particulates and others present)
- *Biological Hazards* (snakes, spiders, other animals, discarded needles, poison ivy, pollen, bees/wasps and others present)

6.0 AIR MONITORING PLAN

Work upwind if at all possible.

Check instrumentation to be used:

X Photoionization Detector (PID)

___ Other (i.e., detector tubes): ____

Check monitoring frequency/locations and type (specify: work space, borehole, breathing zone):

X 15 minutes – Initially during soil disturbance activities or handling samples

___ 15 minutes

___ 30 minutes

X Hourly (in breathing zone during drilling and sampling)

Additional personal air monitoring for specific chemical exposure:

- Heavy metals present the greatest risk to site personnel through inhalation and ingestion of soil particles. If site activities generate visible dust during drilling operations employees will be directed by the SSO to work up wind and/or mitigated exposure by wetting the contaminated soil. If site activities continue to generate significant visible dust the SSO will assess the need for air monitoring and lab analysis for inhalable and respirable particulates.
- A photoionization detector (PID) will also be used to monitor volatile organic compounds (VOCs) present during drilling activities. The PID must be properly maintained, calibrated and charged (refer

to the instrument manuals for details). Zero the PID in the same relative humidity as the area in which it will be used and allow at least a 10-minute warm-up prior to zeroing. Do not zero in a contaminated area. The PID can be tuned to detect one chemical with the response factor entered into the equipment, but the PID picks up all volatile organic compounds (VOCs) present. The ionization potential (IP) of the chemical has to be less than the PID lamp (10.6eV), and the PID does not detect methane. The ppm readout on the instrument is relative to the IP of isobutylene (calibration gas), so conversion must be made in order to estimate ppm of the chemical on-site.

- Vapor measurement surveys of the workspace should be conducted at least hourly or more often if persistent petroleum-related odors are detected. Additionally, if vapor concentrations exceed 5 ppm above background continuously for a 5-minute period as measured in the breathing zone, upgrade to Level C personal protective equipment (PPE) or move to a noncontaminated area.
- Standard industrial hygiene/safety procedure is to require that action be taken to reduce worker exposure to organic vapors when vapor concentrations exceed one-half the TLV. Because of the variety of chemicals, the PID will not indicate exposure to a specific PEL and is therefore not a preferred tool for determining worker exposure to chemicals. If odors are detected, then employees shall upgrade to respirators with Organic Vapor cartridges and will contact the Health and Safety Program Manager for other sampling options.

AIR MONITORING ACTION LEVELS

Contaminant	Activity	Monitoring Device	Frequency of Monitoring Breathing Zone	Action Level	Action
Organic Vapors	Drilling Activities	PID	Start of shift; every 60 minutes and in event of odors	Background to 5 ppm in breathing zone	Use Level D or Modified Level D PPE

7.0 SITE CONTROL PLAN

Work zones will be considered to be within 20 feet of the drill rig, backhoe/trackhoe, or other equipment. Employees should work upwind of the machinery if possible. To the extent practicable, use the buddy system. Do not approach heavy equipment unless you are sure the operator sees you and has indicated it is safe to approach. All personnel from GeoEngineers and subcontractor(s) should be made aware of safety features during each morning's safety tailgate meeting (drill rig shutoff switch, location of fire extinguishers, cell phone numbers, etc.). For medical assistance, see Section 3.0 above.

A contamination reduction zone should be established for personnel before leaving the Site or before breaking for lunches, etc. The zone should consist of garbage bags into which used PPE should be disposed. Personnel should wash hands at the Facility before eating or leaving the Facility.

7.1. Traffic or Vehicle Access Control Plans

The Site is private property and that is operated as a scrap metal recycling facility. Vehicle traffic is expected. Site personnel will be instructed to stop and look both ways before exiting the Site and entering US 101.

7.2. Site Work Zones

Hot zone/exclusion zone is w*ithin 20 feet of drill rig*

Method of delineation/excluding non-site personnel

______ Fence

______ Survey Tape

______ Traffic Cones

__X__ Other (evaluate the Site: if the public is not accessing Site, several traffic cones may suffice; if the public is accessing the Site, upgrade to survey tape as necessary)

Contamination reduction zone – between the hot zone and support vehicles

Decontamination Zone – will be set up for hand washing

7.3. Buddy System

Personnel on-site should use the buddy system (pairs), particularly whenever communication is restricted. If only one GeoEngineers employee is on-site, a buddy system can be arranged with subcontractor/contractor personnel.

7.4. Site Communication Plan

Positive communications (within sight and hearing distance or via radio) should be maintained between pairs on-site, with the pair remaining in proximity to assist each other in case of emergencies. The team should prearrange hand signals or other emergency signals for communication when voice communication becomes impaired (including cases of lack of radios or radio breakdown). In these instances, you should consider suspending work until communication can be restored; if not, the following are some examples for communication:

1. Hand gripping throat: Out of air, can't breathe.
2. Gripping partner's wrist or placing both hands around waist: leave area immediately, no debate.
3. Hands on top of head: Need assistance.
4. Thumbs up: Okay, I'm all right: or I understand.
5. Thumbs down: No, negative.

7.5. Decontamination Procedures

Decontamination consists of removing outer protective Tyvek clothing (if used) and washing soiled boots and gloves using bucket and brush provided on-site in the contamination reduction zone. Inner gloves will then be removed (if used), and respirator (if used). Hands and face will be washed in either a portable wash station or a bathroom facility near the Site. Employees will perform decontamination procedures and wash prior to eating or drinking.

7.6. Waste Disposal or Storage

PPE disposal (specify): Used PPE to be placed in trash containers, likely off site.

Drill cuttings disposal or storage:

__X__ On-site, pending analysis and further action

_____ Secured (list method) ________________________________

_____ Other:______________________________________

8.0 PERSONAL PROTECTIVE EQUIPMENT

After the initial and/or daily hazard assessment has been completed the appropriate personal protective equipment (PPE) will be selected to ensure worker safety. Task-specific levels of PPE shall be reviewed with field personnel during the pre-work briefing conducted prior to the start of Site operations.

Site activities include handling and sampling solid subsurface material (certain material will be saturated with groundwater). Well development, groundwater sampling and depth-to-groundwater measurements will be performed as well. Site hazards include potential exposure to hazardous materials and physical hazards such as trips/falls, heavy equipment, and exposure.

Air monitoring will be conducted to determine the level of respiratory protection.

- Half-face combination organic vapor/high efficiency particulate air (HEPA) or P100 cartridge respirators will be available on-site to be used as necessary. P100 cartridges are to be used only if PID measurements are below the Site action limit. P100 cartridges are used for protection against dust, metals and asbestos, while the combination organic vapor/HEPA cartridges are protective against both dust and vapor.
- Level D PPE unless a higher level of protection is required and will be worn at all times on the Site. Potentially exposed personnel will wash gloves, hands, face and other pertinent items to prevent hand-to-mouth contact. This will be done prior to hand-to-mouth activities including eating, smoking, etc.
- Adequate personnel and equipment decontamination will be used to decrease potential ingestion and inhalation.

Check applicable minimal personal protective equipment to be used (other equipment optional):

__X__ Hardhat (if overhead hazards, or client requests)

__X__ Steel-toed boots (if crushing hazards are a potential or if client requests)

__X__ Safety glasses (if dust, particles, or other hazards are present or client requests)

__X__ Hearing protection (if it is difficult to carry on a conversation 3 feet away)

__X__ Rubber boots (if wet conditions)

Gloves (X where required; other optional):

__X__ Nitrile, or;

_____ Latex

_____ Liners

_____ Leather

_____ Other (specify) ________________________

Protective clothing (X where required; other optional):

	Tyvek
	Saranex (personnel shall use Saranex if liquids are handled or splash may be an issue)
X	Cotton
X	Rain gear (as needed)
X	Layered warm clothing (as needed)

Inhalation hazard protection:

X	Level D
X	Level C (respirators with organic vapor/HEPA or P100 filters if air monitoring indicates this is necessary)

8.1. Personal Protective Equipment Inspections

PPE clothing ensembles designated for use during Site activities shall be selected to provide protection against known or anticipated hazards. However, no protective garment, glove or boot is entirely chemical-resistant, nor does any PPE provide protection against all types of hazards. To obtain optimum performance from PPE, Site personnel shall be trained in the proper use and inspection of PPE. This training shall include the following:

- Inspect PPE before and during use for imperfect seams, non-uniform coatings, tears, poorly functioning closures or other defects. If the integrity of the PPE is compromised in any manner, proceed to the contamination reduction zone and replace the PPE.
- Inspect PPE during use for visible signs of chemical permeation such as swelling, discoloration, stiffness, brittleness, cracks, tears or other signs of punctures. If the integrity of the PPE is compromised in any manner, proceed to the contamination reduction zone and replace the PPE.
- Disposable PPE should not be reused after breaks unless it has been properly decontaminated.

8.2. Respirator Selection, Use and Maintenance

If respirators are necessary (as indicated by air monitoring), Site personnel shall be trained before use on the proper use, maintenance and limitations of respirators. Additionally, they must be medically qualified to wear a respiratory protection in accordance with 29 CFR 1910.134. Site personnel who will use a tight-fitting respirator must have passed a qualitative or quantitative fit test conducted in accordance with an OSHA-accepted fit test protocol. Fit testing must be repeated annually or whenever a new type of respirator is used. Respirators will be stored in a protective container.

8.3. Respirator Cartridges

If Site personnel are required to wear air-purifying respirators, the appropriate cartridges shall be selected to protect personnel from known or anticipated Site contaminants. The respirator/cartridge combination shall be certified and approved by the National Institute for Occupational Safety and Health (NIOSH). A cartridge change-out schedule shall be developed based on known Site contaminants, anticipated contaminant concentrations and data supplied by the cartridge manufacturer related to the absorption capacity of the cartridge for specific contaminants. Site personnel shall be made aware of the cartridge change-out schedule prior to the initiation of Site activities. Site personnel shall also be instructed to change respirator cartridges if they detect increased resistance during inhalation or detect vapor breakthrough by smell, taste or feel, although breakthrough is not an acceptable method of determining the change-out schedule.

8.4. Respirator Inspection and Cleaning

The Site Safety and Health Supervisor shall inspect respirators at the project Site before use. Site personnel shall inspect respirators prior to each use in accordance with the manufacturer's instructions. In addition, Site personnel wearing a tight-fitting respirator shall perform a positive and negative pressure user seal check each time the respirator is donned, to ensure proper fit and function. User seal checks shall be performed in accordance with the GeoEngineers respiratory protection program or the respirator manufacturer's instructions.

9.0 ADDITIONAL ELEMENTS

9.1. Cold Stress Prevention

Working in cold environments presents many hazards to Site personnel and can result in frost nip (superficial freezing of the skin), frost bite (deep tissue freezing), or hypothermia (lowering of the core body temperature).

The combination of wind, wet/rainy conditions and cold temperatures increases the degree of cold stress experienced by Site personnel. Site personnel shall be trained on the signs and symptoms of cold-related illnesses, how the human body adapts to cold environments, and how to prevent the onset of cold-related illnesses. Heated break areas (vehicles) are available during periods of cold weather.

9.2. Heat Stress Prevention

State and federal OSHA regulations provide specific requirements for handling employee exposure to heat stress. GeoEngineers' program complies with these requirements and will be implemented in all areas where heat stress is identified as a potential health issue.

General requirements for preventing heat stress apply to outdoor work environments from May 1 through September 30, annually, only when employees are exposed to outdoor heat at or above an applicable temperature listed in the table below. To determine which temperature applies to each worksite, select the temperature associated with the general type of clothing or personal protective equipment (PPE) each employee is required to wear.

HEAT STRESS

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

Keeping workers hydrated in a hot outdoor environment requires that more water be provided than at other times of the year. GeoEngineers is prepared to supply at least one quart of drinking water per employee per hour. When employee exposure is at or above an applicable temperature listed in the table above, Project Managers shall ensure that:

- A sufficient quantity of drinking water is readily accessible to employees at all times; and
- All employees have the opportunity to drink at least one quart of drinking water per hour.

9.3. Emergency Response

- Personnel on-site should use the "buddy system" (pairs) to the extent practicable.
- Visual contact should be maintained between "pairs" on site, with the team remaining in proximity to assist each other in case of emergencies.
- If any member of the field crew experiences any adverse exposure symptoms while on-site, the entire field crew should immediately halt work and act according to the instructions provided by the Site Safety and Health Supervisor.
- Wind indicators visible to all on-site personnel should be provided by the Site Safety and Health Supervisor to indicate possible routes for upwind escape. Alternatively, the Site Safety and Health Supervisor may ask on-site personnel to observe the wind direction periodically during site activities.
- The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated should result in the evacuation of the field team, contact of the PM, and reevaluation of the hazard and the level of protection required.
- If an accident occurs, the Site Safety and Health Supervisor and the injured person are to complete, within 24 hours, an Accident Report for submittal to the PM, the Health and Safety Program Manager and Human Resources. The PM should ensure that follow-up action is taken to correct the situation that caused the accident or exposure.

10.0 MISCELLANEOUS

10.1. Personnel Medical Surveillance

GeoEngineers employees are not in a medical surveillance program because they do not fall into the category of “Employees Covered” in OSHA 1910.120(f)(2), which states a medical surveillance program is required for the following employees:

(1) All employees who are or may be exposed to hazardous substances or health hazards at or above the permissible exposure limits or, if there is no permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year;

(2) All employees who wear a respirator for 30 days or more a year or as required by state and federal regulations;

(3) All employees who are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation; and

(4) Members of HAZMAT teams.

10.2. Sampling, Managing, and Handling Drums and Containers

Drums and containers used during the investigation shall meet the appropriate Department of Transportation (DOT), OSHA and U.S. Environmental Protection Agency (EPA) regulations for the waste that they contain. Site operations shall be organized to minimize the amount of drum or container movement. When practicable, drums and containers shall be inspected and their integrity shall be ensured before they are moved. Drums and containers shall be labeled as soon as they are sealed. Before drums or containers are moved, all employees involved in the transfer operation shall be warned of the potential hazards associated with the contents. Drums will be stored in a secure location.

10.3. Entry Procedures for Tanks or Vaults (Confined Spaces)

Entry into tanks or vaults will not be performed, therefore this section does not apply.

10.4. Sanitation

Personnel will have soap and water available on site. Facilities are available in Sequim.

10.5. Lighting

All work is to be performed during daylight hours.

10.6. Excavation, Trenching and Shoring

All employees working on project sites where there is an excavation greater than 4 feet in depth shall be trained in excavation safety and shall utilize safe procedures. OSHA designates a 5-foot depth for instituting excavation safety procedures; however GeoEngineers will use the more conservative depth of 4 feet as specified by states such as Washington, Oregon and California. This program is for the protection of employees while working in excavations; however, employees should not enter excavations if there is an alternative.

GeoEngineers employees often do not have stop work authority on projects controlled by other contractors. However, any GeoEngineers employee, regardless of job title, working in the field will be responsible for contacting the Project Manager if they observe practices on the job site that are serious safety violations that are not under their control. They will document the unsafe practices and will contact the site safety coordinator as identified by the client. If no one is on-site, the Project Manager, once notified, will contact the client. This action establishes GeoEngineers' commitment to site health and safety on all job sites as our duty of care to the public, contractors, and clients.

GeoEngineers is responsible for its subcontractors and will also be providing inspections and corrections of any work that subcontractors perform around excavations.

11.0 DOCUMENTATION TO BE COMPLETED FOR HAZWOPER PROJECTS

The following forms are required for Hazardous Waste Operations and Emergency Response (HAZWOPER) projects:

- Field Log
- Health and Safety Plan acknowledgment by GeoEngineers employees (Form C-1)

- Contractors Health and Safety Plan Disclaimer (Form C-2)
- Conditional forms available at GeoEngineers office: Accident Report

NOTE: The Field Report is to contain the following information:

- Updates on hazard assessments, field decisions, conversations with subcontractors, client or other parties, etc.;
- Air monitoring/calibration results, including: personnel, locations monitored, activity at the time of monitoring, etc.;
- Actions taken;
- Action level for upgrading PPE and rationale; and
- Meteorological conditions (temperature, wind direction, wind speed, humidity, rain, snow, etc.).

12.0 APPROVALS

1. Plan Prepared	[signature] Signature	December 9, 2011 Date
2. Plan Approval	[signature] Project Manager Signature	December 9, 2011 Date
3. Health & Safety Officer	Wayne Adams Health & Safety Program Manager	December 9, 2011 Date

FORM C-1
HEALTH AND SAFETY PRE-ENTRY BRIEFING
US 101 MIDWAY METALS
FILE NO. 0180-292-00

Inform employees, contractors and subcontractors or their representatives about:

- The nature, level and degree of exposure to hazardous substances they're likely to encounter;
- All site-related emergency response procedures; and
- Any identified potential fire, explosion, health, safety or other hazards.

Conduct briefings for employees, contractors and subcontractors, or their representatives as follows:

- A pre-entry briefing before any site activity is started; and
- Additional briefings, as needed, to make sure that the Site-specific HASP is followed.

Make sure all employees working on the Site are informed of any risks identified and trained on how to protect themselves and other workers against the Site hazards and risks

Update all information to reflect current sight activities and hazards.

All personnel participating in this project must receive initial health and safety orientation. Thereafter, brief tailgate safety meetings will be held as deemed necessary by the Site Safety and Health Supervisor.

The orientation and the tailgate safety meetings shall include a discussion of emergency response, Site communications and site hazards.

Company Employee

Date	Topics	Attendee	Name	Initials

FORM C-2
SITE SAFETY PLAN – GEOENGINEERS' EMPLOYEE ACKNOWLEDGMENT
US 101 MIDWAY METALS
FILE NO. 0180-292-00

(All GeoEngineers' Site workers shall complete this form, which should remain attached to the Safety Plan and filed with other project documentation).

I hereby verify that a copy of the current Safety Plan has been provided by GeoEngineers, Inc., for my review and personal use. I have read the document completely and acknowledge an understanding of the safety procedures and protocol for my responsibilities on Site. I agree to comply with all required, specified safety regulations and procedures.

Print Name	Signature	Date

FORM C-3
SUBCONTRACTOR AND SITE VISITOR SITE SAFETY FORM
US 101 MIDWAY METALS
FILE NO. 0180-292-00

I verify that a copy of the current Site Safety Plan has been provided by GeoEngineers, Inc. to inform me of the hazardous substances on Site and to provide safety procedures and protocols that will be used by GeoEngineers' staff at the Site. By signing below, I agree that the safety of my employees is the responsibility of the undersigned company.

Print Name	Signature	Firm	Date