Site Assessment Work Plan

Forest Creek Road Dump Site
DEQ Task Order 067-23-05
ECSI No. 6328

Prepared for:

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The material and data in this report were prepared under the supervision and direction of the undersigned.

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Contents

Limitations

Figures

Following the Report

Tables

Following the Report

Appendices

Abbreviations

ACM	asbestos-containing material
bgs	below ground surface
CDL	Clandestine Drug Lab
COPC	chemical of potential concern
CSM	conceptual site model
DEQ	Oregon Department of Environmental Quality
DU	decision unit
ECSI	Environmental Cleanup Site Information
EPA	U.S. Environmental Protection Agency
GPS	global positioning system
HASP	health and safety plan
IDW	investigation-derived waste
IRAM	interim removal action measure
ISM	incremental sampling methodology
ITRC	Interstate Technology & Regulatory Council
MFA	Maul Foster & Alongi, Inc.
MRL	method reporting limit
OAR	Oregon Administrative Rule
OHA	Oregon Health Authority
ORS	Oregon Revised Statute
OWRD	Oregon Water Resources Department
PID	photoionization detector
PPE	personal protective equipment
QA/QC	quality assurance/quality control
QAPP	quality assurance project plan
RBC	risk-based concentration
RSD	relative standard deviation
RSE	Removal Site Evaluation
SOP	standard operating procedure
SVOC	semi-volatile organic compound
SWOSA	Solid Waste Orphan Site Account
TCRA	Time Critical Removal Action
the Site	the Forest Creek Road Dump Site, 113 Forest Creek Road, Selma, Oregon
VOC	volatile organic compound

1 Introduction and Overview

Maul Foster & Alongi, Inc. (MFA) prepared this Work Plan to present the scope of work for a site assessment at the Forest Creek Road Dump site located at 113 Forest Creek Road in Selma, Oregon (the Site) (Figure 1-1). Cleanup and assessment of the Site are ongoing as directed by the Oregon Department of Environmental Quality (DEQ). This Work Plan was prepared for the DEQ under Task 5 of Task Order 067-23-05 and will be implemented under Task 6.

1.1 Purpose

The purpose of this scope of work is to evaluate areas of potential surface soil contamination from historical Site activities and determine if further investigation or remedial action is required at the Site. Specifically, the assessment activities will include composite soil sampling at areas with potential impacts (e.g., former drum storage area, burn areas observed during waste removal) and incremental sampling methodology (ISM) surface soil sampling for the remaining areas of the Site.

Chemical data from the investigation activities described in this Work Plan will be screened against DEQ risk-based concentrations (RBCs) (DEQ 2024) to assess whether the Site poses an unacceptable risk to human health and ecological receptors for current and likely future receptors and exposure pathways. Specific objectives of this project include the following:

- Assess the magnitude and extent of potential chemical contaminants in surface soil
- Obtain sufficient chemical data to assess for potential risks posed by the site, to human health and the environment
- Develop a Conceptual Site Model (CSM)
- Perform land and beneficial water use determinations at and adjacent to the Site
- Perform a risk screening of data for identified potentially complete exposure pathways to evaluate whether unacceptable risks are present

1.2 Scope of Work

To accomplish the above objectives, the scope of work described in this Work Plan consists of the following general tasks:

- Collect composite surface soil samples from the former drum storage area and two burn areas identified during the solid waste removal activities completed at the Site in 2023
- Conduct ISM sampling to assess surface soil conditions across the remainder of the Site
- Develop a CSM for the Site, including a beneficial land and water use survey
- Perform a Level 1 Ecological Scoping Visit and documentation

- Perform a risk screening of data for potentially complete exposure pathways to evaluate whether unacceptable risks are present
- Manage investigation-derived waste (IDW)
- Prepare a Site Assessment report discussing the above activities, the analytical results, and the potential risks posed by chemical contamination at the Site, if present.

These activities are discussed in further detail in this Work Plan. A health and safety plan (HASP) is included in Appendix A.

2 Background

2.1 Property Location, History, and Description

The Site is located in the southwest corner of the southeast corner of section 34, township 38 south, range 7 west of the Willamette Meridian in Selma, Oregon (Figure 1-1). The Site is comprised of one Josephine County tax parcel designated as Map & Tax lot No. 380734B000010900 TL109.

The property is zoned RR-5 (rural residential, minimum 5-acres) and is approximately 5.05 acres. Forest Creek Road borders the Site on the east, a residence lies to the north, and there is undeveloped property to the west and south of the Site. Thompson Creek, designated as essential salmonid habitat by the Oregon Department of State Lands, and Haven Creek (also known as East Fork Thompson Creek) both pass through the Site prior to their confluence north of the Site. Prior to federal removal actions performed in 2022, there were several structures located on-site, which were demolished with most materials remaining on-site. There were numerous campers, trailers, and boats, some of which occupants of the Site reportedly used as unpermitted dwellings and Clandestine Drug Labs (CDL). A 1,152 square foot residence constructed in 1972 was among the structures demolished during the removal actions.

The Site is rural and is not connected to municipal water or sewer services. At present, there are no known septic systems or water supply wells located on-site. A potential well casing was discovered during removal activities. It was an 8-inch steel casing placed vertically to a depth of approximately 7 feet. The casing did not appear to have been used as an actual well as the casing bottom was dry, and contained sticks, leaves, and rocks. There was no indication that the casing had been used for dumping. Oregon Health Authority (OHA) was made aware of the discovery of the potential well, and approved backfilling the casing with grout to prevent any future potential use. The location of the backfilled casing is shown on Figure 2-1.

2.2 Geology and Hydrology

The Site is located in the western portion of the Klamath Mountains. The oldest rocks in the vicinity of the Site are Triassic/Jurassic-aged metamorphic rocks of the Applegate Group, marine-sedimentary rocks of the Sexton Mountain Terrane, and Jurassic-aged marine sedimentary rocks of the Galice Formation of the Western Klamath Terrane. These complexes of exotic terranes were accreted to the western boundary of the ancestral North American Plate and are associated with

varying degrees of uplift, deformation, and metamorphoses. Most of the vicinity is dominated by these marine sedimentary, igneous, and metamorphic rocks of Jurassic and Triassic age. Over time, uplift and erosion have carved out deep valleys that have accumulated more recent Quaternary-aged deposits of unconsolidated sediments including alluvial, fluvial, and lacustrine deposits—left by the current and ancestral rivers and streams—and more broadly by the Missoula and Bonneville floods (Murray).

According to nearby water supply well logs listed in the Oregon Water Resources Department (OWRD) well log database, depths to groundwater in the vicinity of Forest Creek Road recorded at the time of drilling ranged between 18 and 80 feet below ground surface (bgs). Static depths to water measured in completed water supply wells ranged from 8 to 50 feet bgs. Site-specific groundwater data are not available or were otherwise not identified during the preparation of this Work Plan.

Topography at the Site and the vicinity is generally flat but gradually slopes down to the north-northwest toward the confluence of Thompson Creek and Haven Creek approximately 500 feet northwest of the Site; Site elevation ranges between approximately 1,630 and 1,650 feet above mean sea level. Both Haven Creek and Thompson Creek bisect the Site property as they flow from the south to the north forming small erosional channels through the middle of the Site. The creeks join just north of the Site and after some distance join the Illinois River (a tributary of the Rogue River) approximately nine miles west-northwest of the Site. Based on the topography of the Site and the flow direction of the creeks that bisect the property, groundwater is expected to flow to the north-northwest.

2.3 Previous Environmental Activities

According to Josephine County Sheriff's Department and Josephine County Code Enforcement accounts, the Site had received solid wastes for decades. The Site has contained various wastes, including automobiles, vehicle parts, waste tires, car batteries, numerous containers with waste oils and automotive fluids, appliances, demolition materials, asbestos-containing materials (ACM), tools, toys, furniture, and household garbage throughout the property.

There have been numerous complaints regarding the property, and because of inaction and the potential risk posed to human health and the environment, Josephine County filed a "Complaint for Injunctive Relief and Penalties" to take possession of the property on February 20, 2019. On July 25, 2019, the General Judgement and Money Award placed the property and all contents into receivership with Josephine County staff. DEQ and Josephine County have entered into an Access Agreement providing for DEQ's legal access to the Property and removal of the property's contents.

The Site is assigned No. 6328 in DEQ's Environmental Cleanup Site Information (ECSI) database. On April 9, 2019, DEQ declared the Site a Solid Waste Orphan Site under Oregon Revised Statute (ORS) 465.381 and Oregon Administrative Rule (OAR) 340-122-0530. This designation enabled DEQ to use the Solid Waste Orphan Site Account (SWOSA) to fund Site investigation, stabilization, and clean-up activities.

Because the entire Site was considered a CDL by OHA, all waste evaluation and removal activities at the Site were required to be overseen by an OHA-licensed drug lab decontamination contractor, including the preparation of the Removal Action Work Plan and final reporting.

DEQ issued Task Order 73-18-12 to MFA in January 2020 and held a preliminary Site visit with MFA on February 4, 2020. MFA issued a request for bid documents for drug lab clean up and waste

removal services in early June 2020 and held a pre-bid Site walk with prospective bidders (licensed drug lab decontamination firms) on June 23, 2020. Three prospective bidders attended the Site walk, but only one submitted a bid.

To reduce project costs, in 2021 DEQ evaluated whether to reduce the scope of the project, focusing only on the portion of the property between the road and Haven Creek (the "front portion"), saving the portion of the property between Haven Creek and Thompson Creek (the "middle portion") and the portion of the property west of Thompson Creek (the "back portion") for the future to avoid stream crossings. DEQ also determined that if the CDL & waste removal subcontractor oversaw all work, it could subcontract some of the Site solid waste removal work (i.e., work that does not involve contact with any waste on the Site) to non-CDL firm(s).

The project was on hold between September 2020 and April 2021 while DEQ, OHA, and Josephine County were in negotiations regarding how to move forward with the project. In July 2021, DEQ determined that the anticipated scope of work would be to remove all drug-lab contaminated materials from only the "front portion" of the property to eliminate stream crossings from the scope of work.

In January 2022, DEQ began coordination with the U.S. Environmental Protection Agency (EPA) Superfund and Emergency Management Division to evaluate the need for a Time Critical Removal Action (TCRA) for hazardous materials at the Site. A Removal Site Evaluation (RSE) was performed by EPA contractors in February and March 2022, with results identifying ACM, hazardous substances, and contaminated soil. EPA conducted the TCRA in November 2022, which included removal and disposal of ACM, chemicals, petroleum, and other potential hazardous materials. These actions resulted in the removal of 20 cubic yards of ACM and 16 tons of petroleum-contaminated soil from six different locations at the Site. EPA and its contractors also segregated solid waste to the extent practicable and staged materials near the main access off Forest Creek Road for future removal actions by DEQ. The TCRA by EPA changed the scope of work for this Site, with the remaining wastes including only solid wastes such as vehicles, wood waste, construction debris, waste tires, and general household trash, necessitating revision of MFA's subcontractor solicitation approach.

MFA initiated a second subcontractor solicitation in May 2023, and in November and December 2023, MFA coordinated the removal of all remaining solid waste at the property by Anderson Environmental Contracting, LLC of Kelso, Washington, including all building remnants and vehicles. After OHA approved the Removal Action Report and the application for Certificate and Affidavit of Completion and Compliance, it issued a Certificate of Fitness for the Site in a letter dated April 29, 2024. DEQ, however, has subsequently determined that further site assessments are necessary to evaluate the necessity of interim removal action measures (IRAMs). These subsequent environmental investigations (i.e., the surface soil evaluation described in this work plan) and removal of contaminated material from the Site do not need to be overseen by an OHA-licensed drug lab decontamination contractor.

The historical mismanagement of waste and the illicit manufacture of drugs at the property potentially released hazardous substances at the Site, including fuels, lubricants, solvents containing ammonia, benzene, chloroform, ethyl ether, hexane, hydrochloric acid, hydrogen peroxide, hydroiodic acid, lead acetate, lithium aluminium hydride, mercuric chloride, palladium, red phosphorus, sodium cyanide, and sulfuric acid, cadmium, lead, zinc, as well as phthalates into soils. DEQ does not know if tire fires occurred at the property, but if so, they can release harmful emissions into the air that can disperse over a wide area. Such emissions can contain carcinogens, dioxin, heavy metals, sulfur

oxides, and volatile organic compounds. Combustion of tires can also result in the generation of pyrolytic oil, which can contain hazardous heavy metals such as arsenic, cadmium, chromium, lead, and carcinogenic compounds such as polycyclic aromatic hydrocarbons.

3 Site Assessment

The proposed scope of work was determined based on data gaps identified during previous Site activities. The planned activities include the collection of surface soil samples from areas of suspected contamination to identify potential contaminant impacts and to screen remaining areas of the Site to inform future cleanup actions (if warranted), development, and reuse. This section presents the scope of work that will be performed to accomplish these activities.

3.1 Preparatory Activities

Site Health and Safety Plan. A Site-specific HASP has been prepared for the proposed activities (Appendix A). The HASP was prepared in general accordance with the Occupational Safety and Health Act and OARs. A copy of the HASP will be available for use by MFA staff during the field activities.

Underground Utility Location. A public utility notification request will be submitted through the Oregon Utility Notification Center, which will in turn notify the various utilities in the area to mark any subsurface structures. In addition, MFA will subcontract with a private utility locator to locate potential underground utilities at each of the proposed boring locations prior to the drilling activities. Underground utility locates will be conducted in accordance with MFA Standard Operating Procedure (SOP) 18 (see Appendix B).

Property Access and Work Notification. Site access is controlled by Josephine County (property owner). The DEQ and Josephine County have entered into an Access Agreement that provides for DEQ's legal access to the Site property to facilitate the environmental investigation of—and removal or remedial actions at—the property. MFA will notify the DEQ and the County of the proposed work schedule, and access to the Site will be handled through the Access Agreement.

Site Security and Safety Precautions. Due to the Site's history of illegal dumping, clandestine drug manufacturing, and illicit habitation, the potential to encounter bad actors at the Site exists. A "tank" trench was dug along the eastern property boundary of the Site and the access to the property from Forest Creek Road was blocked to deter people from accessing the property by vehicle.

For the safety of Site workers, all Site work will be conducted by MFA in pairs, where no one person shall be on-site alone. Field personnel will check in with an in-office member of the project team at the end of each field day. Additionally, work schedules will be communicated in advance to the Josephine County Sheriff's Office via DEQ. If necessary, MFA may request the Josephine County Sheriff's Office complete periodic Site visits or for uniformed officers be on-site during Site work.

3.2 Assessment Activities

Surface soil will be analyzed for chemicals of potential concern (COPCs) likely to be present based on previous Site work and historical Site use.

Representatives of MFA will oversee the utility locates and collect soil samples for chemical analysis. The proposed sampling locations are shown on Figure 3-1. The exact location of the samples may be adjusted based on field conditions at the time of sampling. The sampling locations will be navigated to and documented using a high-accuracy hand-held global positioning system (GPS) device.

3.2.1 Surface Soil Assessment – Composite Sampling

Composite surface soil sampling will be conducted in general accordance with MFA SOPs 4 and 5 (see Appendix B). Composite surface soil sample locations are shown on Figure 3-1. The composite surface soil samples are intended to assess three areas of concern identified during the waste removal activities completed in December 2023. The three areas selected for additional assessment include:

- The former drum storage area near the entrance to the Site along Forest Creek Road
- An area of stained soil (possible burn area) underneath the former tire pile at the Site
- A former burn area observed on the back portion of the property for the characterization of visibly blackened soils from the burning of unknown materials.

Five-point composite soil samples will be collected from the areas discussed above as detailed in Section 4. Composite soil samples will facilitate the assessment of a larger area than discrete soil sampling alone. The results of soil sampling will inform future cleanup actions (i.e., remedial excavation), if any, recommended for the Site. A summary of the soil sampling results including conclusions and recommendations will be included in a Site Assessment Report as detailed in Section 5.

3.2.2 Surface Soil Assessment – ISM Sampling

Surface soil ISM samples will be collected in accordance with MFA SOPs 4 and 5 (Appendix B). An ISM approach (DEQ 2020a) will be used to collect representative surface soil samples from the Site. ISM is a structured composite sampling and processing protocol that reduces data variability and increases the probability of identifying areas of elevated concentrations, thereby increasing data representativeness. ISM obtains data that are more representative of average concentrations than data from discrete or conventional composite samples and is particularly appropriate when the receptors of concern are expected to be exposed to larger areas (i.e., multiple areas within a property) rather than discrete locations. ISM provides a single sample for analysis with a concentration representative of the mean concentration in a predefined area termed a decision unit (DU).

The Site has been segregated into four areas selected for further evaluation based on historical Site use and observation made during past Site work. The four areas (DUs) selected for ISM sampling are shown on Figure 3-1 and include:

- DU-1: The "*front portion*" west end of the parcel on the north side of the property, between Haven Creek and Forest Creek Road. This excludes the former drum storage and tire pile storage areas.
- DU-2: The "*front portion*" west end of the parcel on the south side of the property, between Haven Creek and Forest Creek Road.
- DU-3: The "*middle portion*" of the parcel between Thompson Creek and Haven Creek.
- DU-4: The "*back portion*" of the parcel, east of Thompson Creek to the western parcel boundary, excluding the burn area.

Samples (called increments) will be manually collected from 0 to 6-inches bgs, following removal of the surface vegetation, at multiple locations placed in a systematic random sampling scheme in each DU. The increments will be combined into one ISM sample for the DU, processed by the laboratory, and analyzed to obtain representative average contaminant concentrations for COPCs within that DU. For this Site, 50 increments will be collected for each DU.

Increment locations for each DU were selected based on a systematically random sampling scheme and are shown on Figure 3-1. The exact location of increments may be adjusted, depending on field conditions (e.g., when an obstruction such as a hard surface is encountered). If locations need to be adjusted based on field conditions, the increment will be moved to the nearest location clear of obstruction (maximum of five feet in any direction). If the increment requires relocation beyond five feet, the increment will be relocated in consultation with the DEQ Technical Lead. An ISM triplicate sample will be collected from DU-1 for quality assurance as shown on Figure 3-1 and discussed in Section 4.1.2. To avoid duplicating sampling efforts, the composite soil sampling areas (discussed in Section 3.2.1) will not be included in the ISM DUs.

Based on the observed conditions during previous Site work, during the waste removal action, and based on historical Site knowledge, the ISM samples will be analyzed for the list of COPCs included in Section 4.2.1.

ISM surface soil samples will be collected from each of the DUs using the techniques described in Section 4.1. The results of soil sampling will inform future cleanup actions, if any, recommended for the Site. The results of this sampling event will be documented within the Site Assessment Report, discussed in Section 5.0.

3.3 Waste Handling and Disposal

Wastes generated during this project will consist of small quantities of excess soil and decontamination water generated during decontamination of non-disposable field equipment (see Section 4.1.4). Excess soil following composite and ISM sampling will be replaced at the sampling location and covered with removed vegetation, if any. Decontamination water will be land-applied at the Site. Disposable sampling equipment and personal protective equipment (PPE) will be disposed of as solid waste.

3.4 Ecological Scoping

Ecological features will be assessed by evaluating the habitat within the ecological risk assessment study area. Checklists used for this evaluation will be obtained from DEQ's Conducting Ecological

Risk Assessments (DEQ 2020b). If potential ecological impacts to terrestrial ecological receptors is identified during the ecological scoping, site assessment data will also be screened against relevant ecological RBCs.

3.5 Preliminary Land and Water Use Survey

To evaluate the potential risks posed by the Site to human health, the current and reasonably likely future land and water uses within the locality of the facility need to be identified (the "locality of the facility" is defined below). As such, land and water use surveys will be performed.

Locality of the Facility. The locality of the facility is any point where a human or an ecological receptor contacts or is reasonably likely to come into contact with chemical constituents from the facility (i.e., the Site). The locality of the facility considers the likelihood of the chemical constituents migrating over time. As such, it will probably include the Site and properties downgradient of the Site. Chemical data from the Site explorations will be used to approximate the locality of the facility.

Land Use. A land use survey will be performed for the locality of the facility in general accordance with the DEQ guidance for consideration of land use (DEQ 1998a). For land use within the locality of the facility, MFA will identify the current land uses and current zoning information.

Water Use. A water use survey will be performed for the locality of the facility in general accordance with the DEQ guidance for beneficial water use (DEQ 1998b). Both Haven Creek and Thompson Creek run through the Site property. It is expected that a significant portion of stormwater infiltrates on the Site but there is likely some discharge to the creeks. Additional observations will be made during fieldwork. The water use survey will include searching for water well records or water rights on the OWRD database; identifying groundwater regulated areas by contacting Oregon Health Division, U.S. Geological Survey, or local water master/water utility. A door-to-door survey is not included in this scope.

4 Sampling and Analysis Plan

This section presents the field and sampling procedures and the analytical testing program MFA will use to complete the field and analytical work for this project. These activities will be performed in general accordance with the DEQ's Brownfield Program Quality Assurance Project Plan (QAPP) (DEQ 2016) and Decision Unit Characterization document (DEQ 2020a). Quality assurance and quality control (QA/QC) procedures are discussed in Section 4.3.

4.1 Sampling Methods and Sample Handling

Composite and ISM Soil samples will be collected during the field activities in accordance with the following procedures and SOPs (Appendix B). Trip blanks and field duplicates will also be collected for analysis (see Section 4.3.2).

4.1.1 Field Screening

During the sampling event, a portion of each soil sample will be field screened for volatile organic compounds (VOCs) in accordance with SOP 3, using a photoionization detector (PID) and for heavier hydrocarbons (such as oil) using a sheen test (a visual inspection for assessing if an oily sheen is present). The sheen test will be conducted by placing a small portion of the soil sample in a Ziploc® bag or wide-mouth, glass jar partially filled with water. The presence of petroleum hydrocarbons is indicated if a sheen is produced on the water surface. Observations will be recorded in the field notes.

4.1.2 Composite Soil Sampling

Composite surface soil samples will be collected in general accordance with MFA SOPs 4 and 5 (Appendix B). Each composite soil sample will be comprised of five points or increments (i.e., subsamples) that will be collected from similarly spaced locations within the composite sample area, collected from the same depth interval (0 to 6-inches bgs), comprised of a homogenous soil texture, and with the same approximate volume or mass. The soil samples will be collected using a stainless-steel soil core sampler, or other stainless-steel sampling equipment (e.g., spoons or trowels), as needed.

4.1.3 ISM Sampling

Surface soils will be collected using ISM procedures. The following protocol was prepared based on the Interstate Technology & Regulatory Council (ITRC) and DEQ guidance documents (ITRC 2020, DEQ 2020a). Four DUs, shown on Figure 3-1, range in size from approximately 0.58-acre (DU-4) to 1.12-acres (DU-3). Although some of the DUs exceed the recommended acreage of 0.75-acre in the guidance, the proposed DU sizes are still applicable based on similar Site history. The four DUs and an ISM triplicate will be collected using the following protocols:

- One ISM sample will be collected in triplicate, consisting of 50 soil increments each. The proposed increment locations were selected based on a systematic random approach using a rectangular grid as presented on Figure 3-1. Using a systematic random grid, as opposed to a simple random sampling approach, reduces the probability of missing areas with elevated concentrations (DEQ 2020a). Field personnel will note any increments collected from areas that have visual indications of chemical impacts (e.g., soil staining representative of potential petroleum hydrocarbons).
- The target mass of each increment will be approximately 20 grams (± approximately 20 percent) to achieve the overall target sample mass of 1 kilogram. Sample increments will be retrieved using a stainless-steel soil core sampler, rotary-hammer drill (with decontaminated [clean] auger bit and sample collection bucket), or other stainless-steel sampling equipment, as needed.
- The soil core sampler or auger bit will be advanced to a depth of approximately 6-inches. If increment recovery is poor at certain locations, the increment will be discarded and resampled near the original location to the extent practicable. If the intended recovery amount cannot be obtained, it will be noted in the field observations.
- Organic debris (including surface vegetation and wood chips) and inorganic debris will be removed during sample collection using stainless-steel sampling equipment (e.g., trowels, spoons, etc.) or a clean gloved hand as needed. This effort will ensure that excessive organic

matter is not included in soil collected and will maintain substrate consistency between sample increments.

- Soil from each increment will be placed in a dedicated laboratory-provided, 1-liter glass jar, with the other increments from the DU, using a clean gloved-hand or decontaminated stainless-steel tool (e.g., spoon, trowel, knife, etc.). If necessary, a second 1-liter glass jar (provided by the laboratory) may be used to collect the necessary sample mass.
- Sieving will be conducted by the laboratory as part of the sample-drying process (Section 4.1.6), but care will be taken in the field to avoid particles larger than 2-millimeters where practicable. The type and nature of excluded particles will be recorded to ensure particles greater than 2-millimeters do not contain COPCs that may contribute to contamination of the soil fraction of interest. Purposefully excluding larger substrates will improve the probability that a consistent, uniform sample from each increment location will be incorporated, resulting in a representative average concentration.
- One ISM sample will be collected in triplicate. The replicate samples will consist of 50 soil increments each. Replicate increment locations were selected using a systematic random grid. Triplicate sampling will provide a conservative measure of ISM variability through the calculation of the relative standard deviation (RSD) between replicate concentrations. These samples will be evaluated for uncertainty as it pertains to the ISM concentrations detected in the DUs and quality control, as described in Section 4.3.2.

4.1.4 Collection of Soil Samples for Volatile Organic Compounds

The composite and ISM surface soil samples will be collected for the analysis of VOCs. To limit the loss of volatile compounds during sample collection, sample volume collected for volatile analyses will be collected using the EPA Method 5035 methodology in accordance with MFA SOP 5 (Appendix B). Undisturbed discrete soil cores will be collected with a Terra Core Sampler™ or similar sampler capable of collecting a 5-gram soil sample from surface soil in the immediate vicinity of each increment (within one-foot). The individual soil plugs will be added to larger sample containers capable of holding five 5-gram soil plugs each. Each jar will immediately be preserved with 25-mL of methanol—supplied by the laboratory—added in the field. The preserved sample jars will be composited in the laboratory before analysis. In addition, a 2-ounce unpreserved laboratory-supplied soil jar will be collected from the DU for dry weight.

4.1.5 Sample Handling and Storage

Clean sample containers will be provided by the analytical laboratory ready for sample collection, including preservative, if required. A label will be affixed to each sample container and marked with identifying information. Sample containers will be stored in a cooled ice chest until being transported to refrigerated storage or to the analytical laboratory. Chain-of-custody will be maintained and documented at all times.

Composite and ISM soil samples will be collected by placing increments or aliquots of the sample into laboratory supplied containers until the entire sample area is represented in the sample container(s). These samples will not be mixed or homogenized in the field. All mixing, homogenization, and sub-sampling will be conducted by the analytical laboratory under controlled conditions.

4.1.6 Laboratory Sampling Handling and Storage

After receipt of samples at the laboratory, ISM samples will be dried and processed. Processing will include air drying at room temperature, disaggregation, and sieving (using a No. 10 sieve with a 2-millimeter sieve size). The entire less than 2-millimeter size fraction will be spread out on a pan and 30 representative processing aliquots will be taken and homogenized. This combined aliquot will represent the entire ground sample and preparation and/or analytical aliquots will be taken from this processed sample. In addition to mass analytical requirements, sufficient mass of the processed sample will be archived for follow-up analysis, if necessary.

4.1.7 Decontamination

Decontamination of non-disposable field equipment (e.g., sampling hand tools, spoons, measuring cups, etc.) will be performed to prevent cross-contamination between sampling locations. Decontamination will be completed in accordance with SOP 1 (Appendix B).

4.2 Analyses for Chemicals of Concern

Soil samples will be submitted to Pace Analytical National (Pace), under DEQ's contract for chemical analysis. Analytical costs will be billed directly to DEQ per the price agreement. For ISM samples, after receipt of samples at the laboratory, samples will be dried and processed following the SOP provided by Pace (Appendix C) and in general accordance with Section 4.1.6.

Samples will be analyzed on a standard turnaround time (usually 10 business days) and will be archived for potential follow-up analyses. See Table 4-1 for a summary of the analytical methods and sample container requirements. See Table 4-2 for a summary of the analytical methods and reporting and detection limit goals.

4.2.1 Soil Samples

Composite and ISM surface soil samples will be analyzed for Site COPCs including gasoline-range total petroleum hydrocarbons (TPH) by Northwest Method NWTPH-Gx, diesel-range and oil-range TPH by Northwest Method NWTPH-Dx, VOCs by EPA Method 8260D, semi-volatile organic compounds (SVOCs) by EPA Method 8270-SIM, dioxins and furans by EPA Method 1613, priority pollutant metals (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc) by EPA Method 6010D/7471B, herbicides by EPA Method 8151, and pesticides by EPA Method 8081.

The target method reporting limits (MRLs) for the above analytes is provided in the attached table (Table 4.2). If there are high concentrations of nontarget analytes in the samples (e.g., methylene chloride, acetone), the laboratory may dilute the sample to avoid overloading and damaging its instruments. Likewise, if there are high concentrations of target analytes in the samples, this may inadvertently raise the MRLs of other target/nontarget analytes. The requested MRLs will be consistent with DEQ RBCs, where practicable.

4.3 Quality Assurance and Quality Control

Soil samples will be collected and analyzed in general accordance with DEQ's Brownfield Program QAPP (DEQ 2016). The QAPP presents quality objectives and procedures for sampling and analysis.

4.3.1 QA/QC Objectives

The general quality assurance/quality control (QA/QC) objectives for this project are to develop and implement procedures for obtaining and evaluating data of a specified quality that can be used to assess the nature and extent of contamination from current or past uses of hazardous substances and the risk posed to receptors by contamination at the Site. To collect such information, analytical data must have an appropriate degree of accuracy and reproducibility, samples collected must be representative of actual field conditions, and samples must be collected and analyzed using unbroken chain-of-custody procedures.

4.3.2 Field QA/QC

The field QC samples will be used to assess the accuracy and precision of the field sample collection and handling activities. Blanks may be collected and held for analysis until it is determined contamination may be a concern. During fieldwork, disposable or decontaminated sampling equipment will be used to minimize or eliminate cross-contamination. Samples will be labeled with sample-specific identifying information. Chain-of-custody will be maintained at all times. Table 4-3 summarizes the following quality assurance samples to be collected.

Field Duplicate Samples. One duplicate sample will be collected per 20 samples per sample matrix, a minimum of one duplicate will be collected for each soil sampling methodology (composite and ISM [see below]).

ISM Replicate Samples. Field replicates are collected to measure sampling and laboratory precision of ISM samples. A triplicate (three sets of 50 increment samples) will be collected in DU-1 (see Section 4.1.2), and the RSD between the primary, duplicate, and triplicate concentrations will be calculated.

Equipment Rinsate Blanks. Analyses of equipment rinsate blanks will be used to assess the efficacy of field equipment decontamination procedures in preventing cross-contamination of samples. Equipment rinsate blanks will be collected by pouring certified distilled or deionized water over or through decontaminated (clean) nondisposable sampling equipment used in the collection of investigative samples and will be subsequently collected in prepared sampling containers. Additives or preservatives will be included in the equipment rinsate blanks as required for analysis. The rinsate blank will be shipped with the associated field samples. A minimum of one rinsate blank will be collected for each day of sample collection.

Trip Blanks. Trip blanks are collected for VOC sample analysis to assess the contamination of sample containers or samples during transport to the project property, sample collection, and transport to the laboratory. Trip blanks are prepared in the laboratory, using analyte-free water. Trip blanks should be inspected for air bubbles by both the laboratory (before shipping) and the field team. Any vials containing visible air bubbles should be discarded. One trip blank will be included and analyzed for each sample cooler shipped to the laboratory that contains samples collected for analysis of VOCs.

4.3.3 Laboratory QA/QC

The laboratory will also perform QC analyses (e.g., matrix spikes and method blanks) per the requirements of the analytical method. Detection limits will be consistent with industry standards and, when practicable, below or comparable to promulgated regulatory standards unless raised due to high analyte concentrations in the sample or matrix effects.

4.3.4 Data Validation

Validation will be performed for 100 percent of the data report packages for each analysis type generated by each analytical laboratory contractor. The independent data validation review will include review of the following items from the laboratory data reports: consistency with the chain-of-custody, holding times, method blank performance, laboratory control sample and laboratory control sample duplicate recoveries and agreement, surrogate recoveries, matrix spike and matrix spike duplicate recoveries and agreement, ISM replicate and triplicate agreement, laboratory duplicate precision, and method blank analyses and reagent blanks.

5 Reporting

After receipt of analytical results, a Site Assessment Report will be prepared, presenting general information about the Site and nearby vicinity, the Site activities, the chemical results, a preliminary CSM, and a preliminary risk screening of the chemical results to assess whether the Site poses an unacceptable risk to human health and ecological receptors. The risk screening will be performed by comparing detected concentrations of chemical constituents to RBCs for exposure pathways identified by the CSM.

The report will be prepared in general accordance with the following outline:

1. Introduction
    a. Purpose
    b. Scope of Work
2. Background
    a. Site Location and Description
    b. Geology and Hydrogeology
    c. Previous Environmental Activities
3. Current and Reasonably Likely Future Uses of Land and Beneficial Uses of Water
4. Site Investigation Activities
    a. Utility Locates
    b. Composite Soil Sampling
    c. ISM Soil Sampling
    d. Ecological Scoping
5. Conceptual Site Model
    a. Sources

   b. Exposure Pathways
   c. Receptors
   d. Contaminants of Concern and Risk-Based Concentrations

6. Chemical Analyses and Results

   a. Analyses Performed
   b. Chemical Results

7. Conclusions and Recommendations

8. Appendices

   a. Photographs
   b. Field Methods and Sampling Procedures
   c. Analytical Laboratory Testing Program and Documentation, including a QA review

The report will initially be prepared as a draft for review by the DEQ. Upon receipt of DEQ's comments, the report will be revised (if needed), and a final version will be submitted to the DEQ.

References

DEQ. 1998a. *Consideration of Land Use in Environmental Remedial Actions*. Oregon Department of Environmental Quality. July 1. Updated October 2017.

DEQ. 1998b. *Guidance for Conducting Beneficial Water Use Determinations at Environmental Cleanup Sites*. Oregon Department of Environmental Quality. July 1. Updated November 2017.

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DEQ. 2020a. *Decision Unit Characterization.* Oregon Department of Environmental Quality. September 14.

DEQ. 2020b. *Conducting Ecological Risk Assessments.* Oregon Department of Environmental Quality. September 14.

ITRC. 2020. *Technical/Regulatory Guidance, Incremental Sampling Methodology (ISM) Update*. The Interstate Technology & Regulatory Council (ITRC). October.

Murray, R.B., unpublished. *Compilation and Synthesis of Geologic Mapping for the Upper Illinois River Basin, Josephine and Curry Counties, Oregon*. Oregon Department of Geology and Mineral Industries.

Limitations

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

Opinions and recommendations contained in this plan apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this plan.

Figures

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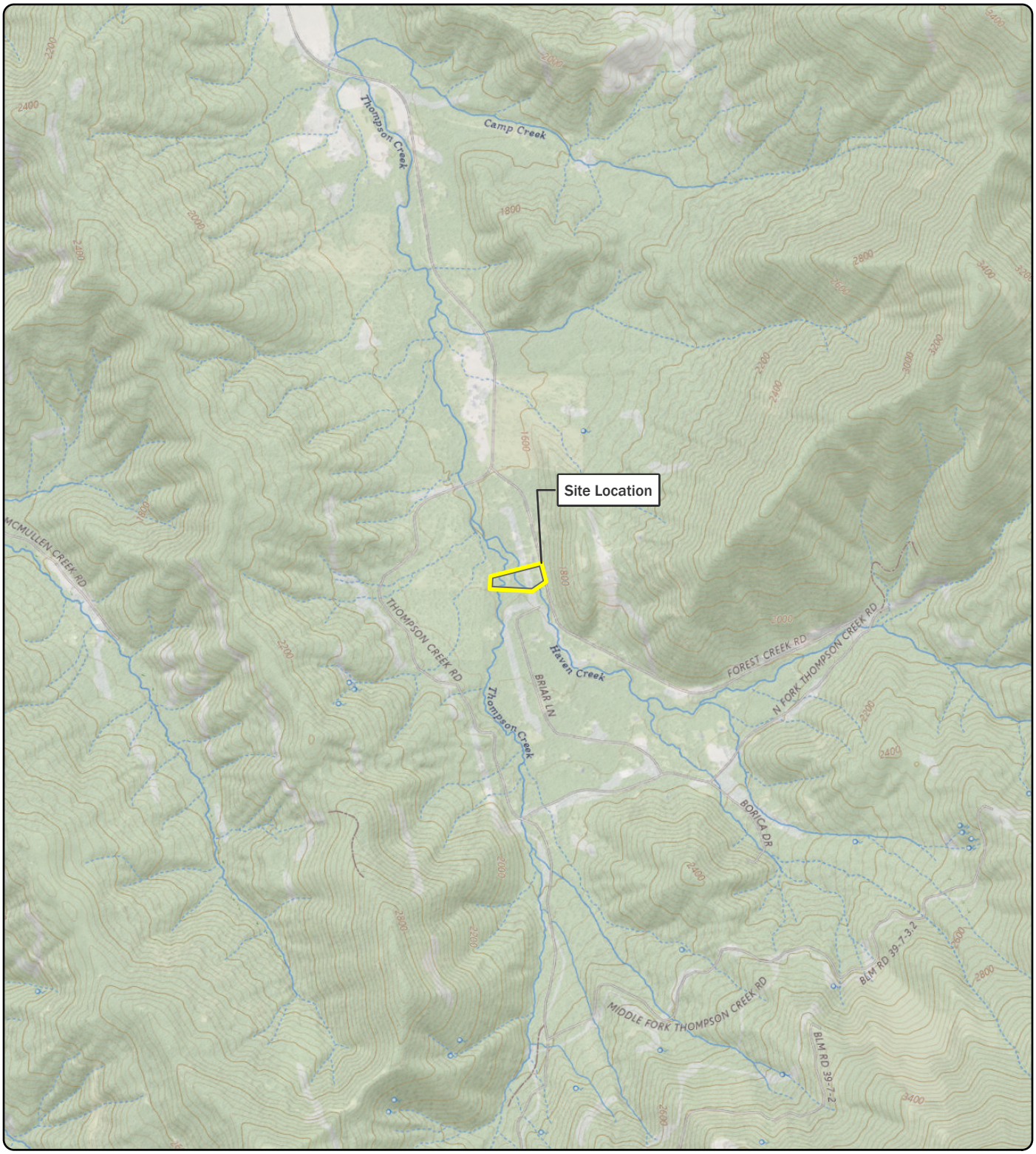

Notes
U.S. Geological Survey 7.5-minute topographic quadrangle (2020): Holland.
Township 38 south, range 7 west, section 34.

Data Source
Property boundary obtained from Josephine County.

Legend

Site Boundary

Figure 1-1
Site Location

Forest Creek Road Dump Site
Site Investigation
Oregon Department of Environmental Quality
113 Forest Creek Road
Selma, OR

0 2,000
Feet

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Path: X:\0785.12\001\Pro\M0785_12_001_005.aprx\Fig 1-1 Site Location
Print Date: 10/31/2024
Reviewed By: mwhitson
Produced By: jroberts
Project: M0785.12.001

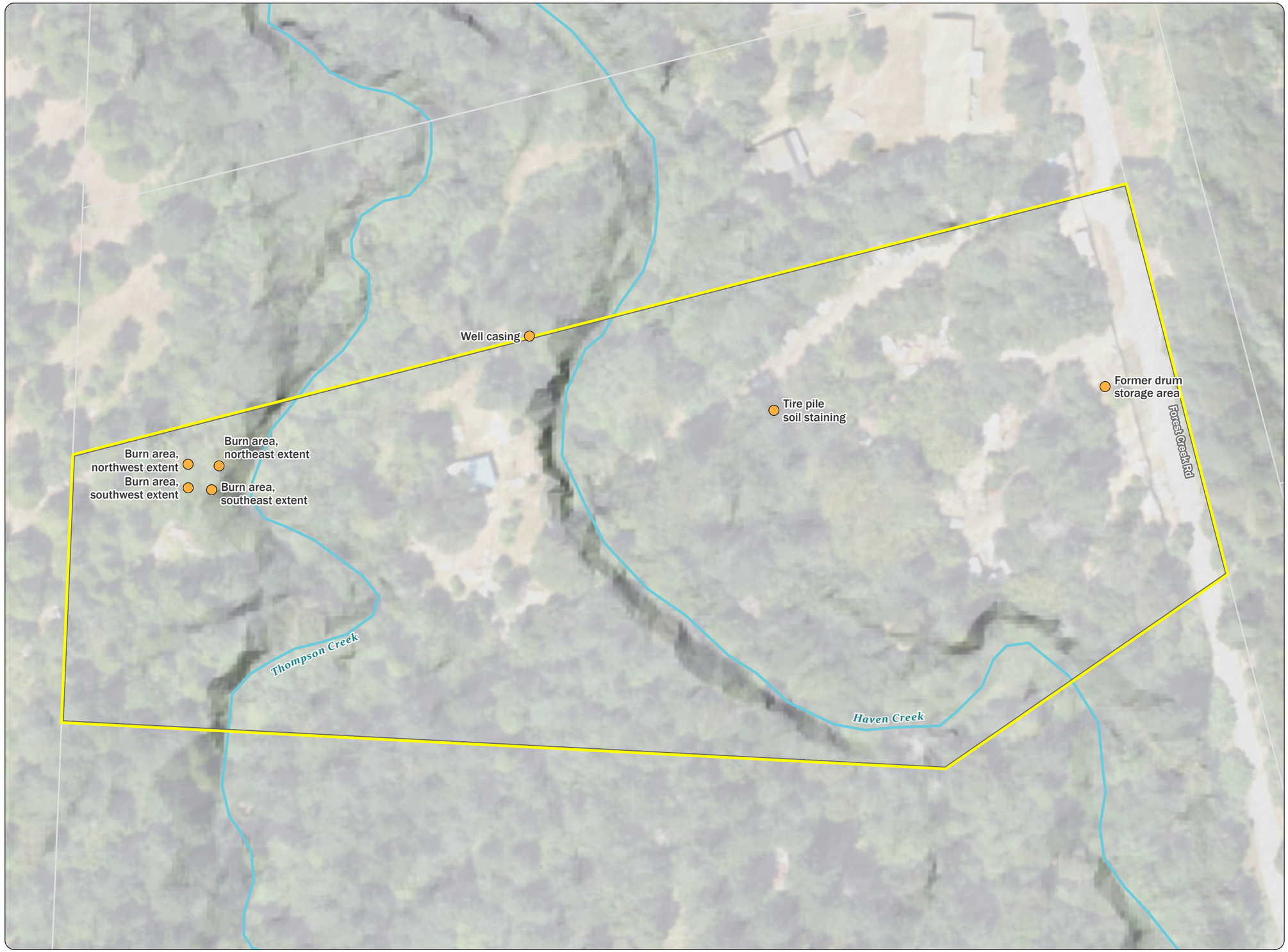

Figure 2-1
Site Features

Forest Creek Road Dump Site
Site Investigation
Oregon Department of
Environmental Quality
113 Forest Creek Road
Selma, OR

Legend

- Field Observations
- Stream
- Property Boundary
- Tax Lot

Note
Field observations logged by MFA staff on December 12, 2023 using real-time kinematic global navigation satellite service receiver.

0 60
Feet

Data Sources
Aerial photograph (2022) obtained from the Oregon Geospatial Enterprise Office; lidar topography (2011) obtained from the Oregon Department of Geology and Mineral Industries; tax lot data obtained from Josephine County.

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Path: X:\0785.12\001\Pro\M0785_12_001_005.aprx\Fig 3-1 Site Features Proposed Soil Sample Locs

Project: M0785.12.001 Produced By: sturner Reviewed By: mwhitson Print Date: 11/1/2024

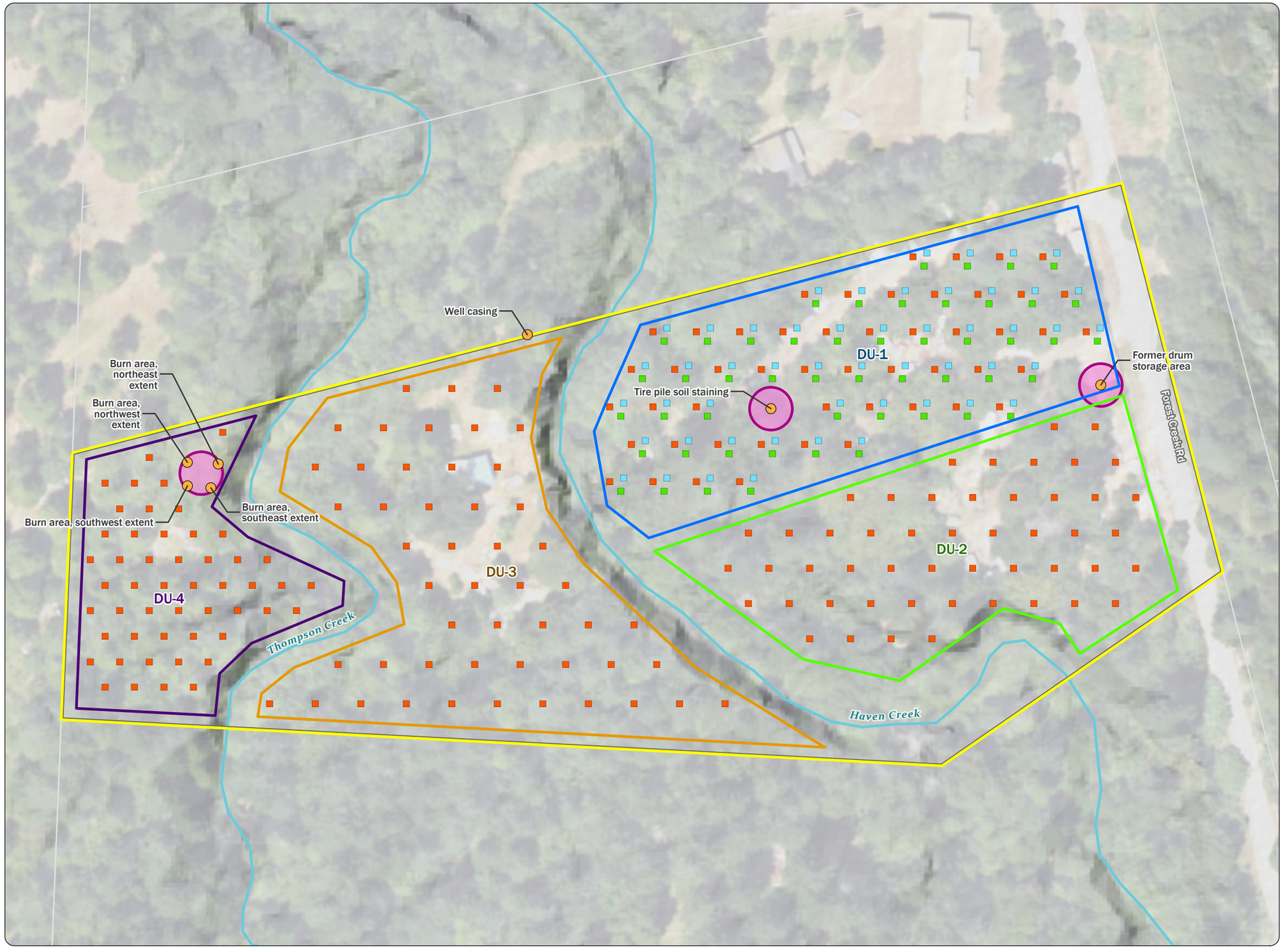

Figure 3-1
Site Features and Soil Sample Locations

Forest Creek Road Dump Site
Site Investigation
Oregon Department of Environmental Quality
113 Forest Creek Road
Selma, OR

Legend

- Field Observations
- ISM Sample
- ISM Sample Replicate
- ISM Sample Triplicate
- Five-Point Composite Sample
- Decision Unit 1
- Decision Unit 2
- Decision Unit 3
- Decision Unit 4
- Property Boundary
- Tax Lot
- Stream

Note
Field observations logged by MFA staff on December 12, 2023 using real-time kinematic global navigation satellite service receiver.

0 60
Feet

Data Sources
Aerial photograph (2022) obtained from the Oregon Geospatial Enterprise Office; lidar topography (2011) obtained from the Oregon Department of Geology and Mineral Industries; tax lot data obtained from Josephine County.

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Tables

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Table 4-1
Analytical Methods and Sample Container Requirements
DEQ—Forest Creek Road Dump Site
Selma, Oregon

Sample Matrix	Method	Parameter or Parameter Group	Container	Preservation	Storage Temperature	Hold Time
Composite Surface Soil	NWTPH-Gx	Gasoline-Range TPH	EPA 5035 Kit (ISM)[a]	Methanol	4°C	14 days
	NWTPH-Dx	Diesel- and Oil-Range TPH	2 x 8 ounce glass	None		14 days
	EPA 8260D	VOCs	EPA 5035 Kit (ISM)[a]	Methanol		14 days
	EPA 8270E-SIM	SVOCs	2 x 8 ounce glass	None		14 days
	EPA 1613B	Dioxins/Furans	2 x 8 ounce glass	None		365 days
	EPA 6010D/7471B	Priority Pollutant Metals[b]	2 x 8 ounce glass	None		180 days
	EPA 8151A	Herbicides	2 x 8 ounce glass	None		14 days
	EPA 8081B	Pesticides	2 x 8 ounce glass	None		30 days
ISM Surface Soil	NWTPH-Gx	Gasoline-Range TPH	EPA 5035 Kit (ISM)[a]	Methanol	4°C	14 days
	NWTPH-Dx	Diesel- and Oil-Range TPH	2 x 1 liter glass	None		14 days
	EPA 8260D	VOCs	EPA 5035 Kit (ISM)[a]	Methanol		14 days
	EPA 8270E-SIM	SVOCs	2 x 1 liter glass	None		14 days
	EPA 1613B	Dioxins/Furans	2 x 1 liter glass	None		365 days
	EPA 6010D/7471B	Priority Pollutant Metals[b]	2 x 1 liter glass	None		180 days
	EPA 8151A	Herbicides	2 x 1 liter glass	None		14 days
	EPA 8081B	Pesticides	2 x 1 liter glass	None		30 days

Notes

°C = degrees Celsius.

EPA = U.S. Environmental Protection Agency.

ISM = incremental sampling methodology.

NWTPH = Northwest Total Petroleum Hydrocarbons.

TPH = total petroleum hydrocarbons.

VOCs = volatile organic compounds.

SIM = selected ion monitoring.

SVOCs = semi-volatile organic compounds.

[a]5035 sample kit includes laboratory-supplied sample jar with 25 mL of methanol for every 5 increments and one 2-ounce jar for moisture content determination.

[b]antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc.

Various sample analyses can be combined in same container. Field samplers will consult with laboratory prior to combining sample volumes.

Table 4-2
Analytical Method and Detection Limit Goals
DEQ—Forest Creek Road Dump Site
Selma, Oregon

		Soil (mg/kg)	
Method	**Parameter**	**MDL**	**MRL**
Fuels			
NWTPH-Dx	Diesel-range organics	1.33	4.0
NWTPH-Dx	Residual-range organics	3.33	10
NWTPH-Gx	TPH-G C6 - C12	0.848	2.5
Metals			
6010D	Antimony	0.544	2.0
6010D	Arsenic	0.518	2.0
6010D	Beryllium	0.0315	0.20
6010D	Cadmium	0.0471	0.50
6010D	Chromium	0.133	1.0
6010D	Copper	0.400	2.0
6010D	Lead	0.208	0.50
7471B	Mercury	0.0206	0.040
6010D	Nickel	0.132	2.0
6010D	Selenium	0.764	2.0
6010D	Silver	0.127	1.0
6010D	Thallium	0.394	2.0
6010D	Zinc	0.832	5.0
Pesticides			
8081B	4,4-DDD	0.00370	0.020
8081B	4,4-DDE	0.00366	0.020
8081B	4,4-DDT	0.00627	0.020
8081B	Aldrin	0.00376	0.020
8081B	alpha BHC	0.00368	0.020
8081B	beta BHC	0.00379	0.020
8081B	Chlordane	0.103	0.30
8081B	delta BHC	0.00346	0.020
8081B	Dieldrin	0.00344	0.020
8081B	Endosulfan I	0.00363	0.020
8081B	Endosulfan II	0.00335	0.020
8081B	Endosulfan sulfate	0.00364	0.020
8081B	Endrin	0.00350	0.020
8081B	Endrin aldehyde	0.00339	0.020
8081B	Endrin ketone	0.00711	0.020
8081B	gamma BHC	0.00344	0.020
8081B	Heptachlor	0.00428	0.020
8081B	Heptachlor epoxide	0.00339	0.020
8081B	Hexachlorobenzene	0.00346	0.020
8081B	Methoxychlor	0.00484	0.020
8081B	Toxaphene	0.124	0.40

Table 4-2
Analytical Method and Detection Limit Goals
DEQ—Forest Creek Road Dump Site
Selma, Oregon

		Soil (mg/kg)	
Method	**Parameter**	**MDL**	**MRL**
Semi-Volatile Organic Compounds			
8270E-SIM	1-Methylnaphthalene	0.00449	0.020
8270E-SIM	2-Chloronaphthalene	0.00466	0.020
8270E-SIM	2-Methylnaphthalene	0.00427	0.020
8270E-SIM	Acenaphthene	0.00209	0.0060
8270E-SIM	Acenaphthylene	0.00216	0.0060
8270E-SIM	Anthracene	0.00230	0.0060
8270E-SIM	Benzo(a)anthracene	0.00173	0.0060
8270E-SIM	Benzo(a)pyrene	0.00179	0.0060
8270E-SIM	Benzo(b)fluoranthene	0.00153	0.0060
8270E-SIM	Benzo(g,h,i)perylene	0.00177	0.0060
8270E-SIM	Benzo(k)fluoranthene	0.00215	0.0060
8270E-SIM	Chrysene	0.00232	0.0060
8270E-SIM	Debenz(a,h)anthracene	0.00172	0.0060
8270E-SIM	Fluoranthene	0.00227	0.0060
8270E-SIM	Fluorene	0.00205	0.0060
8270E-SIM	Indeno(1,2,3-cd)pyrene	0.00181	0.0060
8270E-SIM	Naphthalene	0.00408	0.020
8270E-SIM	Phenanthrene	0.00231	0.0060
8270E-SIM	Pyrene	0.00200	0.0060
Herbicides			
8151A	2,4,5-T	0.00852	0.070
8151A	2,4,5-TP (Silvex)	0.0107	0.070
8151A	2,4-D	0.00702	0.070
8151A	2,4-DB	0.0297	0.070
8151A	Dalapon	0.0113	0.070
8151A	Dicamba	0.0157	0.070
8151A	Dichloroprop	0.0245	0.070
8151A	Dinoseb	0.00697	0.070
8151A	MCPA	0.443	6.5
8151A	MCPP	0.367	6.5
Volatile Organic Compounds			
8260D	1,1,1,2-Tetrachloroethane	0.000948	0.0025
8260D	1,1,1-Trichloroethane	0.000923	0.0025
8260D	1,1,2,2-Tetrachloroethane	0.000695	0.0025
8260D	1,1,2-Trichloroethane	0.000597	0.0025
8260D	1,1,2-Trichlorotrifluoroethane	0.000754	0.0025
8260D	1,1-Dichloroethane	0.000491	0.0025

Table 4-2
Analytical Method and Detection Limit Goals
DEQ—Forest Creek Road Dump Site
Selma, Oregon

		Soil (mg/kg)	
Method	**Parameter**	**MDL**	**MRL**
Volatile Organic Compounds (Continued)			
8260D	1,1-Dichloroethene	0.000606	0.0025
8260D	1,1-Dichloropropene	0.000809	0.0025
8260D	1,2,3-Trichlorobenzene	0.00733	0.0125
8260D	1,2,3-Trichloropropane	0.00162	0.0125
8260D	1,2,3-Trimethylbenzene	0.00158	0.0050
8260D	1,2,4-Trichlorobenzene	0.00440	0.0125
8260D	1,2,4-Trimethylbenzene	0.00158	0.0050
8260D	1,2-Dibromo-3-chloropropane	0.00390	0.025
8260D	1,2-Dibromoethane	0.000648	0.0025
8260D	1,2-Dichlorobenzene	0.000425	0.0050
8260D	1,2-Dichloroethane	0.000649	0.0025
8260D	1,2-Dichloropropane	0.00142	0.0050
8260D	1,3,5-Trimethylbenzene	0.00200	0.0050
8260D	1,3-Dichlorobenzene	0.000600	0.0050
8260D	1,3-Dichloropropane	0.000501	0.0050
8260D	1,4-Dichlorobenzene	0.000700	0.0050
8260D	2,2-Dichloropropane	0.00138	0.0025
8260D	2-Butanone (MEK)	0.0635	0.10
8260D	2-Chlorotoluene	0.000865	0.0025
8260D	4-Chlorotoluene	0.000450	0.0050
8260D	4-Methyl-2-pentanone (MIBK)	0.00228	0.025
8260D	Acetone	0.0365	0.050
8260D	Acrylonitrile	0.00361	0.0125
8260D	Benzene	0.000467	0.0010
8260D	Bromobenzene	0.000900	0.0125
8260D	Bromodichloromethane	0.000725	0.0025
8260D	Bromoform	0.00117	0.025
8260D	Bromomethane	0.00197	0.0125
8260D	Carbon tetrachloride	0.000898	0.0050
8260D	Chlorobenzene	0.000210	0.0025
8260D	Chlorodibromomethane	0.000612	0.0025
8260D	Chloroethane	0.00170	0.0050
8260D	Chloroform	0.00103	0.0025
8260D	Chloromethane	0.00435	0.0125
8260D	cis-1,2-dichloroethene	0.000734	0.0025
8260D	cis-1,3-dichloropropene	0.000757	0.0025
8260D	Di-isopropyl ether	0.000410	0.0010

Table 4-2
Analytical Method and Detection Limit Goals
DEQ—Forest Creek Road Dump Site
Selma, Oregon

		Soil (mg/kg)	
Method	**Parameter**	**MDL**	**MRL**
Volatile Organic Compounds (Continued)			
8260D	Dibromomethane	0.000750	0.0050
8260D	Dichlorodifluoromethane	0.00161	0.0050
8260D	Ethylbenzene	0.000737	0.0025
8260D	Hexachloro-1,3-butadiene	0.00600	0.025
8260D	Isopropylbenzene	0.000425	0.0025
8260D	Methyl tert-butyl ether (MTBE)	0.000350	0.0010
8260D	Methylene chloride	0.00664	0.025
8260D	N-butylbenzene	0.00525	0.0125
8260D	N-propylbenzene	0.000950	0.0050
8260D	Naphthalene	0.00488	0.0125
8260D	P-isopropyltoluene	0.00255	0.0050
8260D	sec-butylbenzene	0.00288	0.0125
8260D	Styrene	0.000229	0.0125
8260D	Tert-butylbenzene	0.00195	0.0050
8260D	Tetrachloroethene	0.000896	0.0025
8260D	Toluene	0.00130	0.0050
8260D	trans-1,2-dichloroethene	0.00104	0.0050
8260D	trans-1,3-dichloropropene	0.00114	0.0050
8260D	Trichloroethene	0.000584	0.0010
8260D	Trichlorofluoromethane	0.000827	0.0025
8260D	Vinyl chloride (VC)	0.00116	0.0025
8260D	Xylenes, total	0.000880	0.0065
Dioxin/Furans			
1613B	1,2,3,4,7,8-HxCDD	4.26E-07	5.0E-06
1613B	1,2,3,6,7,8-HxCDD	4.71E-07	5.0E-06
1613B	1,2,3,7,8,9-HxCDD	4.05E-07	5.0E-06
1613B	1,2,3,4,6,7,8-HpCDD	5.20E-07	5.0E-06
1613B	1,2,3,4,6,7,8-HpCDF	6.53E-07	5.0E-06
1613B	1,2,3,4,7,8,9-HpCDF	4.48E-07	5.0E-06
1613B	1,2,3,4,7,8-HxCDF	4.21E-07	5.0E-06
1613B	1,2,3,6,7,8-HxCDF	3.91E-07	5.0E-06
1613B	1,2,3,7,8,9-HxCDF	4.87E-07	5.0E-06
1613B	2,3,4,6,7,8-HxCDF	4.20E-07	5.0E-06
1613B	1,2,3,7,8-PeCDD	2.09E-07	5.0E-06
1613B	1,2,3,7,8-PeCDF	2.18E-07	5.0E-06
1613B	2,3,4,7,8-PeCDF	2.26E-07	5.0E-06
1613B	1,2,3,4,5,6,7,8-OCDD	2.00E-06	1.0E-05

Table 4-2
Analytical Method and Detection Limit Goals
DEQ—Forest Creek Road Dump Site
Selma, Oregon

		Soil (mg/kg)	
Method	**Parameter**	**MDL**	**MRL**
Dioxin/Furans (Continued)			
1613B	1,2,3,4,5,6,7,8-OCDF	1.46E-06	1.0E-05
1613B	2,3,7,8-TCDF	2.15E-07	1.0E-06
1613B	2,3,7,8-TCDD	1.95E-07	1.0E-06
1613B	Dioxin TEQ	NA	NA

Notes

-- = not applicable.

ASTM = ASTM International.

EPA = U.S. Environmental Protection Agency.

MDL = method detection limit.

MRL = method reporting limit.

mg/kg = milligrams per kilogram.

NWTPH = Northwest Total Petroleum Hydrocarbons.

SIM = selected ion monitoring.

Method detection limits and method reporting limits are provided by Pace National, Mt. Juliet, TN.

Table 4-3
Quality Assurance Samples
DEQ—Forest Creek Road Dump Site
Selma, Oregon

Sample Matrix	Field QA Sample Type	Frequency of Collection	Analysis Requested
Composite Surface Soil	Duplicate Sample	1 per investigation	All from Table 4-1
ISM Surface Soil	Field Replicate Samples (Duplicate and Triplicate)	1 per investigation	All from Table 4-1
Composite Surface Soil / ISM Surface Soil	Equipment Rinsate Blank	1 per investigation	All from Table 4-1
Composite Surface Soil / ISM Surface Soil	Trip Blank	1 per cooler	BTEX by EPA 8260D

Notes

BTEX = benzene, toluene, ethylbenzene, and total xylenes.

ISM = incremental sampling methodology.

QA = quality assurance.

VOC = volatile organic compound.

Appendix A

Health and Safety Plan

MAUL FOSTER ALONGI

Health and Safety Plan

Forest Creek Road Dump Site

113 Forest Creek Road

Selma, Oregon

Final

Prepared for:

Oregon Department of Environmental Quality

November 26, 2024
Project No. M0785.12.002

Prepared by:

Maul Foster & Alongi, Inc.
3140 NE Broadway, Portland, OR 97232

MAUL FOSTER ALONGI

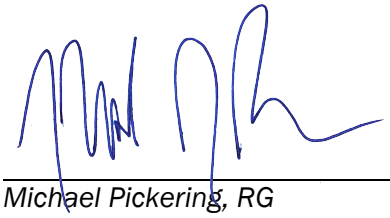
Health and Safety Plan

Forest Creek Road Dump Site
113 Forest Creek Road
Selma, Oregon

The material and data in this plan were prepared under the supervision and direction of the undersigned.

Maul Foster & Alongi, Inc.

Michael Whitson, RG
Project Geologist



Michael Pickering, RG
Principal Geologist

Contents

Appendixes

Abbreviations

AED	automated external defibrillator
CFR	Code of Federal Regulations
CDL	Clandestine Drug Lab
COPC	chemical of potential concern
HASP	health and safety plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSC	health and safety coordinator
JHA	job hazard analysis
MFA	Maul Foster & Alongi, Inc.
OHA	Oregon Health Authority
PIC	principal in charge
PPE	personal protective equipment
the Site	113 Forest Creek Road, Selma, Oregon
SSO	site safety officer

1 Nearest Hospital/Emergency Medical Center

1.1 Nearest Hospital

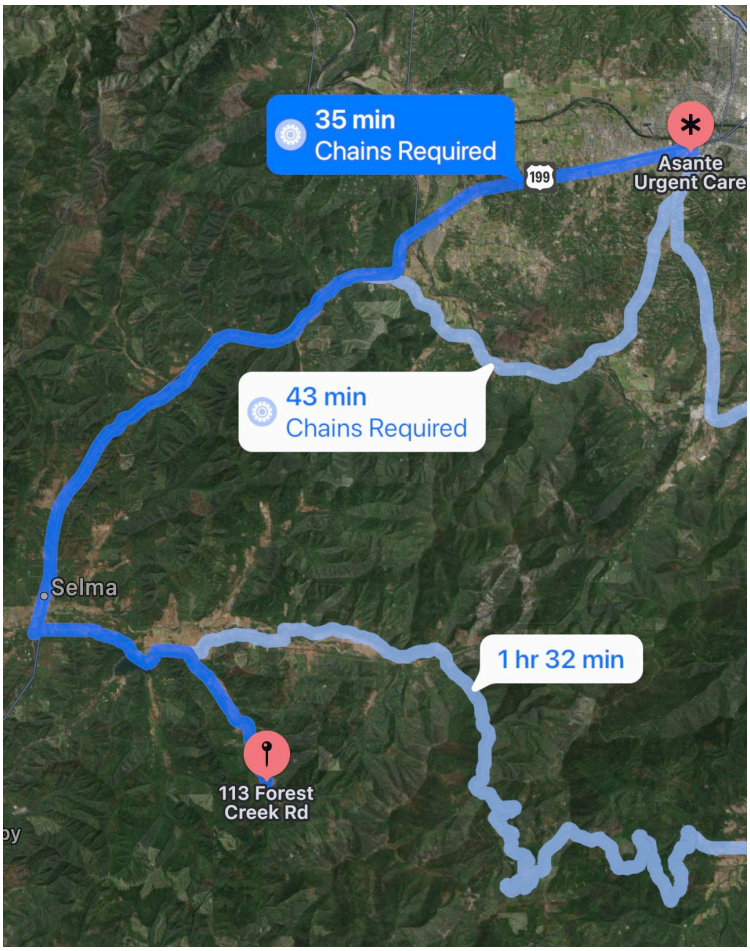
Asante Urgent Care – Grants Pass

Phone: 541-507-2170

Distance: 27 miles

Travel Time: 35 minutes

1.2 Route to Hospital from Site



1.2.1 Driving Directions to Hospital from Site

[Compare driving directions to map]

1. 0.3 mi – turn right onto Thompson Creek Rd.
2. 3.1 mi – turn left onto Lake Shore Dr.
3. 3.8 mi – turn right onto Redwood Hwy.
4. 12 mi – keep left onto Redwood Hwy.
5. 7.9 mi – turn right onto SW Fairgrounds Rd.
6. 200 ft – turn left onto Union Ave.
7. 500 ft – turn right into the parking lot.
8. 400 ft – arrive at the destination.

1.3 Emergency Phone Numbers

Ambulance, Police, Fire	Dial 911
Jessica Glenn Project Manager	Phone: 971-254-8085 Cell: 207-751-4335
Ted Wall Principal in Charge (PIC)	Phone: 503-501-5210 Cell: 503-939-4849
Nicole Bruneel Health and Safety Coordinator (HSC)	Phone: 208-784-1090 Cell: 208-949-3981

2 Plan Summary

This health and safety plan (HASP) was developed to describe the procedures and practices necessary for protecting the health and safety of Maul Foster & Alongi, Inc. (MFA), employees conducting activities at 113 Forest Creek Road (the Site). Other employers, including contractors and subcontractors, are expected to develop and implement their own HASPs to manage the health and safety of their personnel.

MFA personnel conducting activities at the Site are responsible for understanding and adhering to this HASP. Before fieldwork begins, the on-Site personnel will designate a site safety officer (SSO) who is familiar with health and safety procedures and with the Site. Safety deficiencies should be immediately communicated to the SSO and, if necessary, to the project manager, PIC/program manager, or MFA's HSC.

All contractors and subcontractors have the primary responsibility for the safety of their own personnel on the Site. All personnel on the Site have stop work authority if they observe conditions that they believe create an imminent danger.

If MFA employees work on the Site for more than a year, this HASP will be reviewed at least annually. Additionally, this HASP will be updated as new or changed conditions are encountered to ensure that it reflects the current known hazards and requirements associated with the Site.

MFA personnel who will be working on the Site are required to read and understand this HASP. MFA personnel entering the work area must sign the personnel acknowledgment sheet (Section 16), certifying that they have read and that they understand this HASP and agree to abide by it.

3 Key Project Personnel

Name	Responsibility
Ted Wall	PIC or Program Manager
Jessica Glenn	Project Manager
Connor Anderson	Field Personnel
Gina Baragona	Field Personnel
Ysabel Perez	Field Personnel
Nicole Bruneel	HSC

4 Emergency Supplies and Equipment List

Equipment	Location and Notes
First Aid Kit	Inside work vehicle.
Mobile Phones	On MFA staff.
Water and Other Fluid Replenishment	Inside work vehicle.
Health and Safety Plan	On MFA staff, in work vehicle, on MFA iPad.

5 Site Description and Background

5.1 Type of Site

The Site is approximately 5.05 acres and is zoned rural residential. The Site is accessible via Forest Creek Road (an unimproved gravel road) to the east. The Site property is only accessible on foot or with tracked equipment as there is a large “tank” trench dug along the eastern property boundary parallel to Forest Creek Road.

5.2 Buildings/Structures

There are no buildings or structures present on the Site

5.3 Topography

The Site slopes up from east to west and the topography is variable. Some small hills and ridges are present, as well as what appears to be man-made pits, trenches, pit toilets, and other disturbed areas.

5.4 General Geologic/Hydrologic Setting

The Site is approximately 1,600-feet above sea level. Thompson Creek (designated as essential salmonid habitat by Oregon Department of State Lands) and Haven Creek (also known as East Fork Thompson Creek) cross the Site from south to north dividing the property into 3 sections of land.

5.5 Site Status

The Site is currently uninhabited.

5.6 General Site History

The Site has received solid waste for multiple decades with reports and evidence of fires and explosions having occurred on the Site. The Site was previously considered a Clandestine Drug Lab (CDL) by the Oregon Health Authority (OHA) and a variety of wastes including vehicles, tires, drums, propane tanks, car parts, and hazardous materials had accumulated over time throughout the history of use at the Site. Waste removal actions were implemented between 2022 and 2023, and wastes were removed from the Site for offsite recycling and disposal. Following the removal actions, the OHA issued a Certificate of Fitness for the Site in April 2024.

6 Hazard Evaluation

6.1 Site Tasks and Operations

MFA has completed job hazard analyses (JHAs) for specific tasks that may be conducted on the Site, depending on the scope of work. JHAs are provided in Appendix A. The following list summarizes planned tasks and operations:

- General work with hand tools
- Working in remote locations

The control measures that field personnel must implement to eliminate or minimize these hazards, such as air monitoring, personal protective equipment (PPE), engineering controls, and decontamination procedures, are detailed in the JHAs and in subsequent sections of this HASP.

6.2 Chemical Hazard Evaluation

Chemicals of potential concern (COPCs), including concentrations detected on the Site, are summarized in Appendix B. Air monitoring action levels and associated controls are specified in Appendix C.

6.3 Physical Hazards

The specific physical hazards and associated controls for work on the Site are described in the JHAs provided in Appendix A.

7 Site-Control Measures

Control of access to the Site will be established before the work begins. Control measures may include fencing, gates, and signs limiting access to everyone except authorized personnel. The work/exclusion zones and contaminant reduction zones (and other relevant features, if any) will be designated by the SSO The exclusion zone is defined as the area of known or suspected contamination (e.g., the area where a well is being installed), and the contaminant reduction zone is where support activities take place (e.g., packing sample coolers, decontamination activities).

8 Health and Safety Training

MFA personnel who could be exposed to COPCs while conducting work on the Site will have completed training consistent with the Hazardous Waste Operations and Emergency Response (HAZWOPER) requirements in 29 Code of Federal Regulations (CFR) 1910.120(e) before beginning work on the Site. The training will include the following:

- Identification of an SSO, and other safety and health personnel, if applicable
- Identification of safety and health hazards specific to work being conducted
- Proper use of required PPE
- Safe work practices required (e.g., fall protection, confined-space entry procedures, hot-work permits, general safety rules)
- Safe use of engineering controls and equipment
- Medical surveillance requirements, including the recognition of signs and symptoms that might indicate overexposure to hazards
- The project-specific emergency response plan/spill containment plan

The HSC will oversee training for MFA personnel conducting fieldwork. Training records, including an outline, signoffs, and competency records, will be maintained by the HSC.

While the HSC is responsible for maintaining training records, the project manager is responsible for verifying that the training status of field personnel is current before these personnel deploy to the field.

9 Safety Equipment

9.1 Personal Protective Equipment

Individuals on the Site must wear PPE to protect against physical hazards. PPE required on the Site is typically modified Level D, which consists of the following:

- Hard hat
- High-visibility vest
- Work boots
- Safety glasses with side shields
- Nitrile gloves or equivalent if handling media potentially impacted or known to be impacted
- Work gloves (if handling materials that might have sharp edges, protrusions, or splinters)

Additional PPE may be necessary for specific tasks with additional hazards. The SSO will be responsible for designating additional PPE for specific tasks. Depending on the activity, additional PPE may include the following:

- Hearing protection (to be worn during high-noise tasks)
- Chemical-resistant clothing, (e.g., Tyvek coveralls)
- Chemical-resistant boots
- Chemical-resistant goggles
- Chemical-resistant gloves
- Faceshield
- Respiratory protection

Additional PPE may be required if workers discover unexpected contamination. Characteristics of unexpected contamination could include unusual odors, discolored media, or a visible sheen. MFA employees should contact the SSO and, if necessary, the project manager and/or the HSC as soon as possible after the discovery of unexpected contamination. The SSO and, if applicable, the project manager and/or HSC will determine any need for additional controls and/or training.

PPE used at the Site must meet the requirements of recognized consensus standards (e.g., American National Standards Institute, National Institute for Occupational Safety and Health), and respiratory protection will comply with the requirements set forth in 29 CFR 1910.134.

Project personnel are not permitted to reduce the specified level of required PPE without approval from the SSO or the project manager and/or HSC.

9.2 Safety Equipment

The SSO will be responsible for ensuring that the following safety equipment is available during fieldwork and is properly inspected and maintained:

- First aid kit
- Fire extinguisher
- Fluids for hydration, (e.g., drinking water or sports drink)

9.3 Air Monitoring Equipment

The following air monitoring equipment will be available to identify conditions that may require additional controls. See Appendix C for specified action levels and follow-up response actions.

- Photoionization detector

9.4 Communications Equipment

MFA personnel should have a mobile phone or a radio available in case of emergency.

10 Decontamination Procedures

10.1 Partial Decontamination Procedures

MFA employees will implement the following partial decontamination procedures when exiting the work/exclusion zone but remaining on the Site.

- Wash and rinse boots and outer gloves (if wearing two pairs) in containers in the contamination-reduction zone.
- Inspect Tyvek suit for stains, rips, or tears. If the suit is contaminated but is to be reused, full decontamination will be performed as described in Section 9.2. If the suit is damaged, it should not be reused; discard it in a container labeled for disposable items.
- Remove and inspect outer gloves. If they are ripped or otherwise damaged, discard them in a container labeled for disposable items.
- Remove respirator, if worn, and clean with premoistened alcohol wipes. Discard used cartridges at the frequency established by the SSO, project manager, or HSC.
- Wash hands and face with soap and water.

10.2 Full Decontamination Procedures

When exiting the exclusion zone and leaving the Site (e.g., at the end of the work shift), MFA employees will follow the full decontamination procedures listed below.

- Wash and rinse boots and outer gloves in containers in the contamination-reduction zone.
- Remove outer gloves and Tyvek suit and deposit in a container labeled for disposable items.
- Remove respirator and discard used cartridges at the frequency dictated by the SSO, project manager, or HSC.
- Wash and rinse respirator in decontamination container labeled “respirators only.”
- Remove work boots and put on street shoes. Place work boots in a plastic bag or container.
- Remove inner gloves and deposit in a container labeled for disposable items.
- Wash hands and face with soap and water.
- Shower as soon after the work shift as practicable.

11 Medical Surveillance

MFA will ensure that its employees who meet the following criteria are enrolled in a medical surveillance program consistent with 29 CFR 1910.120(f):

- The employees are, or may be, exposed to hazardous substances or health hazards at or above established permissible exposure limits for 30 or more days per year.
- The employees are required to wear a respirator for 30 or more days per year.

MFA employees who exhibit signs or symptoms consistent with overexposure to COPCs will be offered medical surveillance consistent with HAZWOPER requirements.

MFA will ensure that its employees who are authorized to wear respirators are medically evaluated and approved for respirator use, consistent with the respiratory protection standard (29 CFR 1910.134). The HSC or administrative designee (e.g., human resources manager) will maintain medical evaluation records, including respirator clearance documentation.

Personnel medically cleared for respirator use will undergo an annual qualitative fit test. The MFA HSC or administrative designee will conduct the annual qualitative fit tests and will manage the documentation.

If employees are required to wear a respirator on the Site, the project manager will verify that the employee has a current annual respirator fit test.

12 Air Monitoring

Based on Site conditions, it is not anticipated that air monitoring will be necessary; however, air monitoring equipment will be available in case workers encounter conditions, such as unusual odors, discolored media, or a visible sheen, that indicate the presence of unexpected contamination. If such conditions are discovered, workers will exit the area and contact the SSO and, as needed, the project manager or the HSC. If necessary, MFA will use the air monitoring equipment to evaluate the conditions and determine whether additional controls and/or training are required. Action levels and follow-up actions are provided in Appendix C.

If air monitoring is necessary, it must be performed by individuals familiar with the calibration, use, and care of the required instruments. Measurements will be documented, and the records must include the following information:

- The name of the person conducting the measurements
- The identity of workers, if any, who have exposure indicated by the measurement results
- Information about the instrument (e.g., type, make, model, serial number)
- The location where the measurement was taken
- The measurement date and start/stop time
- Conditions represented by the measurement, including applicable activities, work practices, weather conditions, Site conditions, and controls in place
- Measurement results
- Other relevant observations or notes

A dust monitoring record is included as Appendix D.

12.1 Air Monitoring Action Levels

If air monitoring is conducted, the results will be compared to the action levels provided in Appendix C. These levels have been established to comply with Occupational Safety and Health Administration permissible exposure limits, American Conference of Governmental Industrial Hygienists threshold limit values, and National Institute for Occupational Safety and Health recommendations for the chemicals that may be encountered on the Site. The action levels have been adjusted for the relative response of common photoionization detection instruments to motor-fuel vapors.

12.2 Explosion Hazard Action Levels

MFA employees will take measurements when working near known or suspected sources of explosive gases or vapors. The instrument alarm should be set to sound at 10 percent of the lower explosive limit. When measurements exceed this level, MFA employees will:

1. Extinguish ignition sources and shut down powered equipment in the work area.
2. Move personnel at least 100 feet away from the work area.
3. Contact the SSO, the project manager, and/or the HSC as applicable.
4. At the instruction of the project manager and/or the HSC and after waiting 15 minutes for explosive gases to dissipate, the SSO may use the combustible-gas meter to safely approach the work site to measure combustible gases in the work area. The SSO will not enter (or allow any personnel to enter) any area where the combustible-gas meter readings exceed the explosivity action level, nor will the SSO approach if there is a potential for fire or explosion.
5. The SSO may authorize personnel to reenter the work area after the source of the combustible gases has been identified and controlled.

12.3 Instrument Calibrations

Instruments will be calibrated consistent with manufacturers' recommendations. Calibrations will be coordinated by the SSO and the project manager. Calibration and monitoring records will be maintained by the SSO and/or the project manager.

13 Emergency Response, Spill Containment, and Confined Space

MFA employees will follow the emergency response, spill response, and confined-space procedures described in the MFA Policies and Procedures Manual. Incidents will be documented on the incident report form included as Appendix E.

14 Pre-entry Briefing

MFA employees will conduct pre-entry briefings prior to beginning work on the Site (e.g., tailgate meetings; see the checklist provided as Appendix F). Additional briefings shall be conducted as the scope of work or conditions change throughout the project to ensure that employees are familiar with and are adhering to the appropriate safety and health protocol. Attendance and discussion topics will be documented on sign-in sheets that will be maintained by the SSO.

15 Periodic Evaluation

The project manager or designee will evaluate the effectiveness of this HASP by conducting periodic HASP audits. A HASP audit form is included as Appendix H. In addition, HASP effectiveness will be evaluated by tracking ongoing health and safety feedback from field personnel working on the project. This feedback will be reviewed and incorporated into either immediate or annual updates of this HASP, as appropriate. This HASP will be reviewed and updated at least annually. Updating this HASP as necessary ensures that it reflects the known hazards, conditions, and requirements associated with the project. MFA will maintain HASP audit or other periodic evaluation records and track all revisions to this HASP.

16 Safe Work Practices

The following safe work practices are provided to supplement the other information in this HASP.

1. Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of materials is prohibited in areas with potentially contaminated materials.
2. Whenever practicable, field personnel will remain upwind of drilling rigs, open excavations, and other ground-disturbing activities.
3. Subsurface work will not be performed at any location until the area has been confirmed by a utility-locator firm to be free of underground utilities or other obstructions.

17 Acknowledgment

MFA cannot guarantee the health or safety of any person entering the Site. Because of the potentially hazardous nature of active sites, it is not possible to discover, evaluate, and provide protection against all possible hazards that may be encountered at the Site. Strict adherence to the health and safety guidelines set forth herein will reduce, but not eliminate, the potential for injury and illness. The health and safety guidelines in this HASP were prepared specifically for the Site and should not be used on any other site without prior evaluation by trained health and safety personnel.

MFA personnel who will work at the Site are to read, understand, and agree to comply with the specific practices and guidelines described in this HASP regarding field safety and health hazards.

This HASP has been developed for the exclusive use of MFA personnel. MFA may make this HASP available for review by contracted or subcontracted personnel for information only. This HASP does not cover the activities performed by employees of any other employer on the project. All contracted or subcontracted personnel are responsible for implementing their own health and safety program, including generating and using their own HASP.

I have read and I understand this HASP and all attachments, and agree to comply with the requirements described herein:

Name	Title	Date

Appendix A

Job Hazard Analyses

MAUL FOSTER ALONGI

Job Hazard Analysis

Task/Operation: Task-Specific Hazards	
Project Number: M0785.12.003	**Location/Site Where Task/Operation Performed:** 113 Forest Creek Road Selma, Oregon
Date Prepared: 10/31/2024 **Date Reviewed:** 10/31/2024	**Employee Preparing this Job Hazard Analysis (JHA):** Michael Whitson **Employee Reviewing and Certifying this JHA:** Michael Pickering

Job/Task Description
This JHA is specific to certain elements of fieldwork that have unique hazards and require specific safe-work practices to mitigate those hazards. See the separate General Fieldwork Hazards JHA for hazards and safe-work practices that are common to most types of fieldwork.

Sampling Contaminated Solid and Liquid Media		
Hazard/Risk	**Source of Hazard/Risk**	**Hazard/Risk Mitigation**
Exposure to chemicals or hazardous substances (e.g., asbestos) via direct contact and inhalation	Chemicals or hazardous materials in soil, sediment, surface water, groundwater, NAPL, stormwater, injection fluids, and building materials.	See the chemical hazards summary table for applicable chemical hazards.
		Consult the HASP to identify the required PPE for preventing direct contact with contaminated media. Chemical-resistant Tyvek (yellow/coated) is strongly recommended for projects that include potential exposure to NAPL.
		Consult the HASP to identify required air monitoring equipment, respiratory protection, and action for preventing inhalation of contaminated dust and vapors.
		When around monitoring wells, avoid working with your breathing zone directly above the opening of the well casing. When possible, work upwind of the well casing. Keep your face away from the monument when removing the well cap.
		Ensure field staff have up-to-date AHERA certifications for asbestos sampling.

Task/Operation: Task-Specific Hazards		
		Use plastic garbage bags or plastic sheeting to cover the work area. It is preferable to roll/berm the edges to catch any drips/spills. If it is raining, work under a rain canopy.
Sampling and/or Monitoring Vapors		
Exposure to chemicals via inhalation	Chemicals in indoor air, outdoor air, soil vapors, monitoring wells, borings, excavations, and manholes.	See the chemical hazards summary table for applicable chemical hazards.
		Consult the HASP to identify required PPE for preventing inhalation of contaminated or hazardous vapors.
		The HASP identifies required air monitoring equipment, monitoring locations, respiratory protection, and action levels for preventing inhalation of vapors.
		If action levels are exceeded, cease activities, notify other site workers and subcontractors, move away from or upwind of the point of exceedance, and continue to monitor your breathing zone. Contact the health and safety coordinator and the project manager as soon as possible.
Explosion	Potential presence of flammable/explosive vapors at concentrations above 10 percent of the lower explosive limit.	Use a calibrated four-gas meter and specify action levels as indicated in the HASP.
		Determine monitoring locations (e.g., work area, inside monitoring well casing or drill stem, container, excavation, manhole).
		If lower explosive limit readings are at or above 10 percent, cease activities; eliminate or turn off sources of ignition, including electronic devices; notify other site workers and subcontractors; evacuate the area; and continue to monitor your breathing zone. Contact the health and safety coordinator and the project manager as soon as possible.

Task/Operation: Task-Specific Hazards		
Inhalation, explosion, asphyxiation	Inadvertent release of calibration gas (four-gas mixture of carbon dioxide, hydrogen sulfide, methane, and oxygen) into work area. Exposure to helium gas when vapor sampling.	Calibrate combustible-gas meter in a well-ventilated area (e.g., not in a vehicle with doors closed).
		After calibration of equipment, remove regulator from compressed-gas cylinders.
		Properly secure compressed-gas cylinders during transport and use.
Working in, near, or over Water from Boats, Docks, Shorelines		
Drowning	Entering body of water where work is being conducted; slipping/falling in swift-moving streams.	Wear a U.S. Coast Guard approved personal flotation device when working in 10 feet of water or deeper. When on a boat, maintain three points of contact when motoring. Use the buddy system.
Sickness/nausea	Boat motion.	Use medication to prevent motion sickness. Return to shore if sickness develops. Avoid looking down; keep your head up so that you can see the horizon.
Slips, trips, and falls	Tight quarters, slippery surfaces, obscured ground surface.	Use caution when walking on uneven ground or when you cannot see ground conditions due to turbid or turbulent water or light reflection. Wear footwear with tread. Keep ropes and lines coiled and stowed to eliminate trip hazards. Beware of unstable banks. Shuffle feet when walking in a water body. Walk around rather than on large rocks to avoid elevating your body above the ground surface and increasing the potential for injury if you fall. When working in or crossing water features, use a backpack so that at least one or preferably both hands are free. Use a walking stick. Never carry electronic equipment in your hand when crossing streams. Secure sharp tools so that you are not injured if you fall.
Accidents with equipment/tools	Sample-collection equipment/tools.	Tie down or stow all equipment, supplies, and tools prior to motoring to ensure they will not move during transport.
Bodily harm	Pinch points from winches or other equipment.	Wear proper gloves and avoid contact with pinch points.

Task/Operation: Task-Specific Hazards		
Working around or in Excavations		
Bodily harm or death	Confined-space entry.	Excavations may be considered confined spaces. Contact the health and safety coordinator and the project manager if work in excavations will be necessary.
	Falling into open excavation from heights; engulfment/burial from working in excavations.	Ensure the HASP or Safe Work Plan identifies project-specific procedures and engineering controls to mitigate risk of fall, engulfment, and burial.
		Never enter an excavation deeper than 4 feet without first coordinating with the health and safety coordinator and the project manager. Ensure the excavation slope is appropriate for entry (i.e., 34 degrees), shoring/sheet pile is installed, and appropriate ingress and egress points are established.
		When working in an excavation, minimize time spent working near the excavation sidewall.
		Stay a safe distance from the excavation area—generally defined as a horizontal distance no less than the depth of the excavation.
		If close observation of an excavation is required (e.g., for describing soil stratigraphy, taking photos), slope or bench one side of the excavation sidewall to minimize potential for collapse.
		Use signs, cones, barrier tape, or equivalent methods to mark open excavations.
		Backfill excavations as soon as work is complete; never leave excavations unattended or open overnight.
	Exposure to chemicals in soil, groundwater, air.	See the "Sampling Contaminated Solid and Liquid Media" and "Sampling and/or Monitoring Vapors" task-specific hazards above.

Task/Operation: Task-Specific Hazards		
Working around Manholes		
Bodily harm or death	Confined-space entry.	Manholes are considered confined spaces. Contact the health and safety coordinator and the project manager if work in manholes will be necessary.
	Falling into a manhole.	Ensure the HASP or Safe Work Plan identifies project-specific procedures and engineering controls to mitigate risk of falling.
		Place a manhole guard around the manhole before opening it. Close the manhole lid as much as possible during sampling (i.e., leave only a gap for sample tubing and equipment). Close the lid immediately after sampling and before beginning other activities that require work around but not in the manhole (taking notes, labeling containers, loading equipment into field vehicle, etc.).
	Exposure to chemicals in stormwater or air.	See the "Sampling Contaminated Solid and Liquid Media" and "Sampling and/or Monitoring Vapors" task-specific hazards above.
Hand and foot injury	Being crushed by manhole lid.	Use a manhole hook to open manholes. Drag the lid horizontally out of the manhole and onto the adjacent ground. Never prop up the lid on the manhole rim. Wear protective composite or steel-toed boots.
Back injury	Strains from lifting manhole lid.	Keep your back and arms straight; use your legs to lift.
Working Remotely		
Delayed medical support	Any hazards or risks are increased during remote work due to delay in receiving medical support.	Consider potential hazards and bring necessary medical supplies. If cell service will be limited, bring an alternative form of communication in case of an emergency, or use the buddy system. When leaving the on-site headquarters, let a colleague know your destination, route, expected return time, and deviations.

Task/Operation: Task-Specific Hazards		
Forest fires	Forest fires can be unpredictable and fast moving.	The safety plan should include a contact for the local fire dispatch. Personnel should identify evacuation routes. If applicable, know and follow current local guidance regarding fire restrictions. This may include reduced working hours and having additional water on site.
Recreational users	Work during hunting season or around off-road vehicles.	Be familiar with the recreational uses of the area and hunting season schedules. Wear high-visibility clothing.
Getting lost	Lack of food, shelter, first aid.	Bring plenty of water and food. Drink plenty of fluids, especially when perspiring.
		Maintain first-aid kit and items necessary for specific hazards.
		Keep important medications accessible.
		Avoid performing site activities alone after dusk, and avoid working in remote areas alone without letting someone know where you are and when you plan to return.
		Have a detailed field map that includes the topography of the surrounding area, or keep sketches and note landmarks, distances covered, and backtrail (terrain looks different coming than it does going). Take an analog compass with you (i.e., something in addition to a smart phone).
		If traveling into areas with no radio/cell service, note the location where service was last available.
		Maintain radios, phones, and other devices, and have backup batteries. Keep in regular contact with other team members on site.
		Review the weather forecast, be prepared for changing weather conditions, bring and wear clothing adequate to thrive in a variety of climate conditions.
		Bring a fire-starting kit if working during cold weather.

Task/Operation: Task-Specific Hazards		
	Panic and loss of mental clarity.	Keep a positive mental attitude and stay put unless doing so endangers you. Travel slowly, conserve energy, take breaks, stay in open areas, and wait out bad weather.
Vehicle breakdown	Delayed return to cell coverage, medical assistance, food, and shelter.	Maintain adequate fuel and perform vehicle inspections before traveling to remote sites. In the event of vehicle breakdown, stay near the vehicle, dress in layers, drink water if it is available, and ration water if in limited supply. Do not overeat, drink alcohol, or smoke. Tie a red or colored cloth to the antenna or other readily visible object.
Working from Heights		
Bodily harm or death	Falling off a ladder, scaffolding, or other elevated surface.	Employees must be protected from falls when conducting work more than 4 feet above a lower level or any height above dangerous areas such as unguarded mechanical equipment. The safety plan should include an SOP for fall protection.
Additional Control Measures and Guidance		
Engineering Controls: No engineering controls specified. The need for engineering controls should be discussed with the project manager, health and safety coordinator, and subcontractors, and identified in the HASP or Safe Work Plan.		
General Safe-Work Practices and Guidance: • See the General Fieldwork Hazards JHA for safe-work practices and guidance common to most types of fieldwork. • If additional safe-work practices are needed to address unique, task-specific hazards, these should be specified in the HASP or Safe Work Plan.		

Job Hazard Analysis

Task/Operation: Conducting Fieldwork	
Project Number: M0785.12.003	**Location/Site or Property Where Task/Operation Performed:** 113 Forest Creek Road Selma, Oregon
Date Prepared: 10/31/2024 **Date Reviewed:** 10/31/2024	**Employee Preparing this Job Hazard Analysis (JHA):** Michael Whitson **Employee Reviewing and Certifying this JHA:** Michael Pickering

Job/Task Description

This JHA describes hazards and required safe-work practices that are common to most types of fieldwork. See the separate task-specific JHA for hazards and safe-work practices that are unique to certain tasks (e.g., sampling contaminated media, working in remote areas).

Physical Hazards

Hazard/Risk	Source of Hazard/Risk	Hazard/Risk Mitigation
Heat/cold/sunburn	Weather.	Be aware of seasonal dangers, including frostbite, hypothermia, snow blindness, trench foot, and heat stress. Drink plenty of fluids, especially when perspiring. Wear sunscreen on exposed skin. Stop work if an employee feels symptoms of dehydration, overheating, or heat stroke. Move to a shaded area and drink water. During cold or wet conditions, wear adequate clothing to reduce the potential for hypothermia. If there is lightning in the area, seek indoor shelter immediately, if possible. If outdoors, get into a hard-topped vehicle and away from trees. Turn off all radios and electronic equipment.
Eye injury	Debris (e.g., soil, water, injection fluids) coming into contact with eyes; working in areas with low, dense vegetation.	Wear eye protection with side shields. If there is a splash hazard, wear tight-fitting chemical goggles. If chemicals come into contact with eyes, immediately wash chemicals out with water. Identify the location of the eyewash station before beginning the work.

Task/Operation: Conducting Fieldwork		
Head injury	Heavy equipment, tools, overhead hazards impacting the head.	Wear a hard hat. Do not work near moving or heavy equipment or under overhead hazards.
Foot injury	Sharp objects that could be stepped on; large objects falling on feet.	Wear protective boots (composite or steel-toe).
Hand injury	Pinch points, sharp objects, stress from pulling rope, dermal contact with chemicals and contaminated media.	Wear protective gloves. Appropriate gloves should be identified in the HASP or Safe Work Plan. Avoid placing hands near operating equipment.
Hearing loss	Noise generated by heavy equipment/machinery.	Wear hearing protection such as earplugs or earmuffs.
Bodily harm, including to bystanders and the public and pedestrians in the locality of work	Heavy equipment, drilling rigs, support vehicles, traffic and public rights-of-way; potential to be struck, crushed, or impacted by moving objects.	Wear a safety vest for enhanced visibility. Use cones and caution tape to cordon off the immediate work area. Watch for and escort pedestrians away from the work area. Pause work if necessary. Ensure traffic control measures (e.g., traffic cones, signage) are in place. Do not work near moving or heavy equipment or under overhead hazards. Maintain eye contact with equipment operators. When working around vehicles or heavy equipment, know the locations of emergency equipment (e.g., fire extinguishers, emergency shutoff features).
	Potential to be struck by pressurized equipment and hoses	Install cable guards to prevent a suddenly disconnected hose from striking an individual or confirm with subcontractor that such safeguards are in place. Ensure pressurized tanks have safety relief valves. Do not work around pressurized equipment or within the radius of pressurized hoses.
Physical stress	Lifting heavy equipment and objects; conducting strenuous activities; kneeling on hard or gravel surfaces.	Use proper lifting techniques, i.e., bending and lifting with the legs and not the back. Do not twist at the waist when turning. Use the buddy system for heavy objects. Use knee pads or a kneeling pad. Take breaks and rest as needed.

Task/Operation: Conducting Fieldwork		
Accidents with equipment/tools	Sample-collection equipment/tools.	Verify that you have the appropriate equipment/tools for your tasks. Use equipment/tools as intended by the manufacturer. Only use open blades or sharp-edged tools for their intended purposes. Stow tools in the vehicle properly; use appropriate cases and bags. Secure equipment (including compressed-gas cylinders) in the vehicle with netting and straps; do not leave loose—it can cause property damage or serious injuries to others or yourself.
Slips, trips, and falls	Uneven or unstable ground.	Maintain good housekeeping in work areas to minimize or eliminate slip/trip/fall hazards from equipment and supplies. Walk around rather than over hazards on the ground. Use caution when walking on uneven ground or in snowy and/or icy conditions. Dense vegetation may obscure dangerous features, including biological hazards, riverbanks, cliffs, unstable/steep slopes, excavations, and mine adits. Flagging or marking dangerous areas can help reduce the likelihood of injury.

Task/Operation: Conducting Fieldwork		
Biological/Chemical Hazards		
Biological/Chemical Risk	**Source of Hazard/Risk**	**Hazard/Risk Mitigation**
Biological—animals	Livestock, deer; biting or stinging insects, spiders, and snakes; animal feces.	Do not turn your back on animals even if they seem docile. Make sure you have an escape plan in case an animal becomes aggressive. Use bug repellent. Insect nests should never be disturbed. Use snake chaps or shin guards when grass is above the ankle. Employees who are allergic to stings should not work in areas where there is a high risk of encountering stinging insects. Use a bar to clear spiders and/or snakes from objects and/or vegetation. Check well vaults and security lids for insects; use caution when opening. Avoid contact with animal feces. When working indoors, remove animal feces from the work area—if possible, without creating dust.
Biological—plants	Poisonous plants and other irritant vegetation (e.g., blackberry canes).	Do not touch or approach poisonous or irritant vegetation. Wear long pants and a long-sleeved shirt while on the site if poisonous plants and other irritant vegetation is present.
Exposure to chemicals in environmental media	Chemicals or hazardous materials in soil, sediment, surface water, groundwater, NAPL, stormwater, building materials, indoor air, outdoor air, soil vapors, monitoring wells, borings, excavations, and manholes.	See the task-specific JHA.
Additional Control Measures and Guidance		
Engineering Controls: No engineering controls specified. The need for engineering controls should be discussed with the project manager, health and safety coordinator, and subcontractors, and identified in the HASP or Safe Work Plan.		
General Safe-Work Practices and Guidance: • Employees should not eat or drink in the immediate area where sampling is being conducted. Employees should wash their hands and faces before eating or drinking. If used, nitrile gloves should be disposed of in a container labeled for disposable items. • Cones, barrier tape, or equivalent methods will be used to establish the work area, if feasible. • Tasks that must be conducted in the work area must be coordinated with equipment operators before work begins. Methods of communication, such as direct eye contact, hand signals, and/or verbal communication, will be established before work begins. • Employees should carry a cellular phone and/or a security radio.		

Task/Operation: Conducting Fieldwork
PPE: Hard hat (when working around heavy equipment, including drill rigs, or overhead hazards), work boots (protective composite or steel-toe boots when working around heavy equipment), high-visibility vest or outer garment, safety glasses with side shields, nitrile gloves (or other hand protection appropriate for the type of physical or chemical hazards present), hearing protection (earplugs or earmuffs) as needed. Use chemical goggles if there is a chemical splash hazard.

Appendix B

Chemicals of Potential Concern

MAUL FOSTER ALONGI

Table
Chemical Hazards

Analyte	Soil Range (mg/kg)		Groundwater Range (ppb)		OSHA PEL (TWA)	ACGIH TLV (TWA)	NIOSH IDLH[1]	LEL (%)	IP (eV)	Other Hazard
	Low	High	Low	High						
TPH										
Gasoline-range organics					NA	300 ppm	NA	1.4	NA	C, E, F, P
Diesel-range organics					NA	100 mg/m^3	NA	NA	NA	E, F, P
Residual-range organics					NA	NA	NA	NA	NA	E, F, P
VOCs										
1,1-Dichloroethane					100 ppm	100 ppm	3,000 ppm	5.4	11.06	
1,2-Dichloroethane					50 ppm	NE	50 ppm	6.2	11.05	
cis-1,2-Dichloroethene					200 ppm	NE	1,000 ppm	5.6	9.32	P
Tetrachloroethene					100 ppm	25 ppm	150 ppm	NA	9.32	C
Trichloroethylene					100 ppm	300 ppm	1,000 ppm	NA	9.45	C, P
Vinyl chloride					1 ppm	5 ppm	NA	3.6	9.99	C, F
PAHs										
Anthracene					0.2 mg/m^3	0.2 mg/m^3	80 mg/m^3	0.6	NA	F, P
Acenaphthene					NE	NE	NE	0.6	NA	F, P
Acenaphthylene					NE	NE	NE	NA	NA	F, P
Benzo(a)anthracene					NE	NE	NE	NA	NA	C, P
Benzo(a)pyrene					0.2 mg/m^3	0.2 mg/m^3	80 mg/m^3	NA	NA	C, P
Benzo(b)fluoranthene					NE	NE	NE	NA	NA	C, P
Benzo(g,h,i)perylene					NE	NE	NE	NA	NA	P
Benzo(k)fluoranthene					NE	NE	NE	NA	NA	C, P
Chrysene					0.2 mg/m^3	0.2 mg/m^3	80 mg/m^3	NA	7.59	C, P
Dibenz(a,h)anthracene					NE	NE	NE	NA	NA	C, P
Fluoranthene					NE	NE	NE	NA	NA	SC, P
Fluorene					NE	NE	NE	NA	NA	
Indeno(1,2,3-cd)pyrene					NE	NE	NE	NA	NA	SC
Naphthalene					10 ppm	10 ppm	250 ppm	0.9	8.12	SC, E, F, P

Table
Chemical Hazards

Analyte	Soil Range (mg/kg)		Groundwater Range (ppb)		OSHA PEL (TWA)	ACGIH TLV (TWA)	NIOSH IDLH[1]	LEL (%)	IP (eV)	Other Hazard
	Low	High	Low	High						
Phenanthrene					0.2 mg/m^3	0.2 mg/m^3	80 mg/m^3	NA	NA	
Pyrene					0.2 mg/m^3	0.2 mg/m^3	80 mg/m^3	NA	NA	P
1-Methylnaphthalene					NE	0.5 ppm	NE	NA	NA	SC, E, F, P
2-Methylnaphthalene					NE	0.5 ppm	NE	NA	NA	SC, E, F, P
Remaining PAH constituents					NA	NA	NA	NA	NA	NA
Metals										
Arsenic					0.01 mg/m^3	0.01 mg/m^3	5 mg/m^3	NA	NA	C, P
Barium					0.5 mg/m^3	0.5 mg/m^3	NE	NA	NA	R, P
Beryllium					0.002 mg/m^3	0.025 mg/m^3	4 mg/m^3	NA	NA	C
Cadmium					0.0050 mg/m^3	0.002 mg/m^3	9 mg/m^3	NA	NA	C
Chromium					1 mg/m^3	0.5 mg/m^3	250 mg/m^3	NA	NA	R, P
Chromium (VI)					0.001 mg/m^3	0.05 mg/m^3	15 mg/m^3	NA	NA	R, C
Copper					1 mg/m^3	0.2 mg/m^3	100 mg/m^3	NA	NA	
Lead					0.05 mg/m^3	0.05 mg/m^3	100 mg/m^3	NA	NA	C, P
Manganese					5 mg/m^3	0.02 mg/m^3	500 mg/m^3	NA	NA	NA
Mercury					0.1 mg/m^3 (CE)	0.01 mg/m^3	2 mg/m^3	NA	NA	R, P
Nickel					0.1 mg/m^3	0.1 mg/m^3	10 mg/m^3	NA	NA	C
Selenium					0.2 mg/m^3	0.2 mg/m^3	1 mg/m^3	NA	NA	R, P
Silver					0.01 mg/m^3	0.1 mg/m^3	10 mg/m^3	NA	NA	R, P
Zinc					10 mg/m^3	2 mg/m^3	500 mg/m^3	NA	NA	
Additional										
Ammonia					50 ppm	25 ppm	300 ppm	15	10.18	E, F, P, R
Antimony					0.5 mg/m^3	NE	50 mg/m^3	NA	NA	
Asbestos					0.1 fiber / cc	0.1 fiber / cc	NE	NA	NA	C
Benzene					1 ppm	5 ppm	500 ppm	1.2	9.24	F, C, P, R
Bis(2-ethylhexyl)phthalate					5 mg/m^3	5 mg/m^3	5,000 mg/m^3	2	NA	SC, P, F

Table
Chemical Hazards

Analyte	Soil Range (mg/kg)		Groundwater Range (ppb)		OSHA PEL (TWA)	ACGIH TLV (TWA)	NIOSH IDLH[1]	LEL (%)	IP (eV)	Other Hazard
	Low	High	Low	High						
Carbon black					3.5 mg/m^3	3 mg/m^3	1,750 mg/m^3	NA	NA	
Carbon monoxide					50 ppm	NE	1,200 ppm	NA	NA	
Chlorobenzene					75 ppm	10 ppm	1,000 ppm	NA	NA	
Chloroform					50 ppm (CE)	10 ppm	500 ppm	NA	11.42	SC, P
Chromic acid					0.1 mg/m^3	NE	15 mg/m^3	NA	NA	R
Cyanide					5 mg/m^3	NE	25 mg/m^3	NA	NA	
1,2-Dichlorobenzene					50 ppm	25 ppm	200 ppm	NA	NA	
1,4-Dichlorobenzene					75 ppm	10 ppm	150 ppm	2.5	8.98	P
1,4-Dioxane					100 ppm	NE	500 ppm	2	9.13	F, C, P, R
Ether					NE	500 ppm	1,900 ppm	1.9	9.53	E, F
Ethylbenzene					100 ppm	125 ppm	800 ppm	0.8	8.76	F, P
Heptachlor epoxide					0.5 mg/m^3	0.5 mg/m^3	35 mg/m^3	NA	NA	SC, P
Hexane					500 ppm	NE	1,100 ppm	10	10.18	F
Hydrogen sulfide					20 ppm (CE)	50 ppm	100 ppm	0.9	10.46	E, F, P
Methane					NE	NE	NE	5	None	F, P
Methylene chloride					25 ppm	125 ppm	2,300 ppm	13	11.32	SC
Pentachlorophenol					0.5 mg/m^3	1.5 mg/m^3	2.5 mg/m^3	NA	NA	C, P
Polychlorinated biphenyls					0.5 mg/m^3	1 mg/m^3	5 mg/m^3	NA	NA	C
Toluene					100 ppm	150 ppm	500 ppm	1.1	8.82	E, F, P, R
1,2,4-Trichlorobenzene					NE	NE	NE	2.5	NA	P
1,2,4-Trimethylbenzene					NE	NE	NE	0.9	8.27	
1,3,5-Trimethylbenzene					NE	NE	NE	NA	8.39	
Xylenes					100 ppm	150 ppm	900 ppm	0.9	8.44–8.56	F, P

Table
Chemical Hazards

Notes

ACGIH = American Conference of Governmental Industrial Hygienists.
C = carcinogen.
cc = cubic centimeter.
CE = ceiling concentration.
E = explosive.
F = flammable.
IDLH = immediately dangerous to life and health.
IP (eV) = ionization potential.
LEL = lower explosive limit.
mg/kg = milligrams per kilogram.
mg/m^3 = milligrams per cubic meter.
NA = not available.
NE = not established.
NIOSH = National Institute for Occupational Safety and Health.
OSHA = Occupational Safety and Health Administration.
P = poison.
PAH = polycyclic aromatic hydrocarbon.
PEL = permissible exposure level.
ppb = parts per billion.
ppm = parts per million.
R = reactive.
SC = suspected carcinogen.
TLV = threshold limit value.
TPH = total petroleum hydrocarbons.
TWA = time-weighted average.
VOC = volatile organic compound.

Reference

[1]CDC. 2019. "Immediately Dangerous to Life or Health (IDLH) Values." Centers for Disease Control and Prevention, The National Institute for Occupational Safety and Health (NIOSH). October 8. Accessed September 13, 2022. http://www.cdc.gov/niosh/idlh/intridl4.html.

Appendix C

Air Monitoring Action Levels

MAUL FOSTER ALONGI

Air Monitoring Procedures and Toxicity Action Levels

Instrument	Action Level	Initial Action	Follow-Up Action
PID[a]	Detection of 10 ppm (above ambient) in breathing zone and determined not to be benzene.	Upgrade to Level C and continue to monitor breathing zone with Dräger tube. If 50 ppm, leave exclusion zone. Return only if levels decrease to below 50 ppm.	Ventilate area; always work upwind.

Notes
Bold text indicates an action level.
CGI = combustible-gas indicator.
CO = carbon monoxide.
H2S = hydrogen sulfide.
HCN = hydrogen cyanide.
HSC = health and safety coordinator.
LEL = lower explosive limit.
PID = photoionization detector.
ppm = parts per million.
[a]Some PIDs do not work in high (e.g., greater than 90%) humidity or rainy weather. Under these atmospheric conditions, only PIDs certified for use in high humidity should be used.
[b]See Section 12.2 for complete explosion hazard action levels.

Appendix D

Dust Monitoring Record

MAUL FOSTER ALONGI

Dust Monitoring Record

Property Address: _____

Contractor: _____

Time	Date	Location (upwind/downwind; reference grid for station location)	Type (note visual monitoring or instrument used)	Duration of Sample	Concentration (if instrument used) (mg/m^3)	Recorded By	Dust Control Measures in Use	Work activities, weather conditions, or other applicable notes

Note
Supplemental recordkeeping forms may be required with certain permits and/or types of activities.

Appendix E

Incident Report Form

MAUL FOSTER ALONGI

Health and Safety Incident Report

This report must be completed in full and submitted within 24 hours to the MFA health and safety coordinator.

Project Name: _____

Project Number: _____

Date and Time of Incident: _____

Location: _____

Type of Incident (check all applicable items):

☐ Illness	☐ Health and safety infraction	☐ Vehicular accident
☐ Injury	☐ Fire, explosion, flash	☐ Electric shock
☐ Property damage or theft	☐ Chemical exposure	☐ Near miss
☐ Spill	☐ Other (describe):	

Description of Incident

Describe what happened and the possible cause of the incident. If reporting a spill, include the quantity or estimated quantity. Identify individual(s) involved, witnesses, and their affiliations. Describe emergency or corrective action taken. Attach additional sheets, drawings, or photographs as needed.

Incident Reporter:

Name	Signature	Date

Health and Safety Coordinator:

Name	Signature	Date

Appendix F

Tailgate Safety Meeting Checklist

MAUL FOSTER ALONGI

Tailgate Safety Meeting Checklist

Client Name:	
Project No.:	
Communicated By:	
Date:	

Yes	NA	Information Reviewed
☐	☐	Emergency Response Procedures and Site Evacuation Routes
☐	☐	Route to Hospital
☐	☐	HASP Review and Location
☐	☐	Key Project Personnel
☐	☐	Emergency Phone Numbers
☐	☐	Stop Work Authority
☐	☐	General Site Description/History and Chemical Hazards
☐	☐	For Active Sites—Site Activities and Vehicular/Equipment Traffic
☐	☐	Site-Specific Physical Hazards
☐	☐	Required Personal Protective Equipment
☐	☐	Available Safety Equipment and Location
☐	☐	Daily Scope of Work (reference JHAs as applicable)
☐	☐	Decontamination Procedures
☐	☐	Identify Work Zones, Exclusion Zones, and Decontamination Zones
☐	☐	Hazardous Atmospheres
☐	☐	Air Monitoring Equipment and Procedures
☐	☐	Identify Potential Site-Specific Slip, Trip, and Fall Hazards
☐	☐	Dust and Vapor Control
☐	☐	Confined Space(s)
☐	☐	Open Pits and Excavation
☐	☐	Extreme Temperatures
☐	☐	Incident Reporting
☐	☐	Other: _____

Additional Health and Safety Practices and Considerations

Attendees		
Name	Signature	Company
1)		
2)		
3)		
4)		
5)		
6)		
7)		
8)		

Appendix G

HASP Audit Checklist

MAUL FOSTER ALONGI

HASP Audit Checklist

Project Name:	
Project No.:	
Project Location:	
Audit Date / Time:	
Person / Persons Performing Audit:	
MFA Personnel Interviewed or Conducting Fieldwork:	

Audit Checklist Item	Status: Yes	Status: No	Status: N/A	Comment	Recommendation	Assigned to:	Scheduled Completion Date:	Actions Completed:	Person Who Completed Actions:	Date Completed:	Current Status / Notes:
1. Is there a written HASP for this project? If so, what is the revision date?											
2. Is the HASP available to project personnel?											
3. Does the HASP appear accurate and complete? For example, are the directions to the hospital and the emergency contact numbers accurate? Are the site contaminants listed?											
4. Do the JHAs appear accurate and complete? For example, do there appear to be risks addressed for all of the applicable activities?											
5. Do you observe violations of the HASP requirements?											
6. If applicable, are employees adhering to the respirator program (see SOP 03, Respiratory Protection)?											
Interview Questions											
7. Where do you keep the HASP for this project?											
8. Have you reviewed the HASP for this project? If so, what was your review process?											
9. Can you tell me how you conduct your site activities? Note to auditor—pick a JHA activity and identify major discrepancies between the answer and the JHA, if any.											
10. Do you have any health and safety questions or concerns? For example, have you observed things on this project that you thought were unsafe? Note to auditor—make sure we come up with a plan to promptly address any listed concerns.											

Signature of Person / Persons Conducting Audit			
Name	Signature	Date	

Signature of Project Manager and Principal in Charge Acknowledging Review of Completed HASP Audit Checklist			
Name	Signature	Date	

Appendix B

Standard Operating Procedures

MAUL FOSTER ALONGI

Standard Operating Procedure

Decontamination of Field Equipment

SOP Number: 1
Date: 03/09/2021
Revision Number: 0.1

Scope and Application

This standard operating procedure (SOP) describes the decontamination procedure for field equipment that may come in contact with contaminated media and that Maul Foster & Alongi, Inc. (MFA) staff may reuse at multiple sample locations or sites. Decontamination is performed to reduce the potential for cross-contamination of samples that will be collected with multiuse equipment and that will undergo physical or chemical analyses. Other equipment that is multiuse—not used specifically for sample collection (e.g., water level meter, pump used for well development)—also requires decontamination. Finally, decontamination is necessary to minimize the potential for MFA staff's exposure to chemicals.

Typically, decontamination is not necessary for field equipment that is disposable and intended to be used only once (e.g., disposable bailer). Additionally, this SOP does not apply to equipment used by subcontractors, such as drilling equipment. However, MFA staff should confirm that subcontractors are implementing appropriate decontamination procedures to minimize the potential for cross-contamination of samples or MFA staff's exposure to chemicals.

Equipment and Materials Required

The following materials are necessary for this procedure:

- Nonphosphate detergent solution (e.g., Alconox, Liquinox)
- Distilled and potable water
- Personal protective equipment (as specified in the site-specific health and safety plan)
- Buckets to contain rinsate, brushes, paper towels

Depending on the site conditions and the types of contaminants that may be present, the use of other decontamination materials, such as deionized water, methanol, hexane, or isopropyl alcohol, may be necessary. The need for other materials should be determined prior to fieldwork. The decontamination procedures using other materials should be described in a site-specific sampling and analysis plan (SAP).

Methodology

When the site-specific SAP specifies additional or different requirements for decontamination, it takes precedence over this SOP. In the absence of a SAP, the following procedures shall be used.

General Sampling Procedure:

1. Rinse the equipment with potable water to remove visible soil, petroleum sheen, or contamination.

2. Scrub the equipment with a brush and solution of distilled water and nonphosphate detergent.

3. Rinse the equipment with distilled water.

4. Allow equipment to air dry, or dry it with paper towels.

5. At all times, ensure that the decontaminated equipment is stored so as to prevent it from becoming contaminated while not in use. Depending on the size of the equipment, it can be wrapped with new aluminum foil or placed in a new plastic bag.

Rinsate Storage:

All fluids resulting from equipment decontamination shall initially be contained in a bucket and then transferred to a Department of Transportation-approved container (e.g., 55-gallon drum) stored on site at a location that does not interfere with on-site activities (e.g., vehicle traffic, pedestrian areas). Place a label on each container and include the following information:

- The date on which fluids were placed in the container
- Contents (e.g., “water from equipment decontamination”)
- Contact information, including MFA staff or client phone number

Note that labels on containers exposed to sunlight or precipitation are prone to fading. Use a waterproof, indelible ink pen (e.g., Sharpie®) whenever possible. In the field notebook, keep a detailed inventory of all containers, including the number of containers, the approximate quantity of liquids generated, and a description of the source of the fluids. Provide this information to the MFA project manager. For future reference, take photographs of (1) each drum label, (2) the drum(s), and (3) the drum storage vicinity on site.

Note that some clients and site owners have specific requirements for labeling and storage of containers. The requirements should be determined in advance of the fieldwork.

Standard Operating Procedure

Field Screening for VOCs in Soil

SOP Number: 3
Date: 03/09/2021
Revision Number: 0.1

Scope and Application

This standard operating procedure (SOP) describes the use of a photoionization detector (PID) to field screen soil for evidence of organic vapors. The PID measures the organic vapor concentration in parts per million, is not compound-specific.

Never rely on a stand-alone PID reading to identify organic chemical contamination in soil. Always collect multiple PID readings (e.g., at multiple depths along the length of a soil core), since it is the relative difference in concentration between multiple readings (e.g., a sudden increase in concentration at a certain depth interval) that is the typical indictor of contamination. Additionally, PID readings should always be accompanied by observation of the soil samples for other indictors of contamination, such as soil staining or chemical odors, so that these multiple lines of evidence can be used together to identify potential organic chemical contamination in the field.

Equipment and Materials Required

The following materials are necessary for this procedure:

- Personal protective equipment (as specified in the health and safety plan)
- PID with calibration gas
- Ziploc®-type bags
- Field forms or notebook for documenting PID readings

Methodology

When the project-specific sampling and analysis plan (SAP) specifies additional or different requirements for organic vapor field screening, it takes precedence over this SOP. In the absence of a SAP, the procedures in this SOP shall be used.

The electron volt (eV) rating for the PID lamp (e.g., 9.8, 10.6, 11.7) must be greater than the ionization potential (in eV) of a compound in order for the PID to detect the compound. A lamp of at least 9.8 eV should be used for petroleum hydrocarbons. A lamp of at least 10.6 eV should be used for typical chlorinated alkenes. If the project health and safety plan does not specify the lamp size, verify the compatibility of the lamp size with the anticipated compounds expected to be present in soil prior to the field activities, and confirm with the project manager.

General Sampling Procedure (Heading 3 No Number Style):

Calibration:

- The PID should be calibrated daily (or more frequently, as needed).
- Calibrate the PID according to the manufacturer's instructions.

- Document the calibration activities and results in the field notebook.

Measuring organic vapor content:

- Place a representative volume (generally, a "handful") of freshly exposed soil into a Ziploc-type bag.
- Seal the bag and gently knead the bag to loosen the soil.
- Let the bag set for several minutes to allow organic vapors, if present, to volatilize from the soil into the headspace of the bag.
- Partially open the bag so that the tip of the PID intake tube can be inserted into the bag but is not in contact with the soil, then close the bag seal around the intake tube.
- Record the PID measurement and document results in the field notes or boring log.

Static Sheen Test Procedure and Observations:

Sheen Test Procedure:

- Following the PID screen discussed above, add enough water to cover the soil in the container.
- Observe the water for signs of discoloration/sheen and characterize per the table below.

When static sheen testing is required or when making observations of a water surface the following table presents descriptions to be used (consistent with Department of Ecology Guidance)[1].

No Sheen (NS)	No visible sheen on the water surface
Slight Sheen (SS)	Light, colorless, dull sheen; spread is irregular, not rapid. Natural organic oils or iron bacteria in the soil may produce a slight sheen.
Moderate Sheen (MS)	Pronounced sheen over limited area; probably has some color/iridescence; spread is irregular, may be rapid; sheen does not spread over entire water surface.
Heavy Sheen (HS)	Heavy sheen with pronounced color/iridescence; spread is rapid; the entire water surface is covered with sheen.
Biogenic Film (BF)	False positive results may be generated by the presence of decaying organic matter and iron bacteria, which can produce a rainbow-like sheen similar to an oil sheen. These sheens, unlike oil sheens, can typically be broken up creating platy or blocky fragments when agitated or disturbed. Biogenic films can also be foamy.

[1] Department of Ecology. 2016. Guidance for remediation of petroleum contaminated sites. June.

Standard Operating Procedure

Surface and Subsurface Soil Sampling Using Hand Tools

SOP Number: 4
Date: 09/13/2023
Revision Number: 0.2

Scope and Application

This standard operating procedure (SOP) describes the use of hand tools for obtaining surface and subsurface soil samples for physical and/or chemical analysis.

Equipment and Materials Required

The following materials are necessary for this procedure:

- Personal protective equipment (as specified in the Health and Safety Plan)
- Tools appropriate for the conditions that may be encountered (e.g., spoon, trowel, shovel, hand auger); tools constructed of stainless steel are preferred.
- Stainless steel bowls
- Tape measure with increments in feet and tenths of a foot.
- Laboratory-supplied sample containers
- Laboratory chain-of-custody form and cooler with ice.
- Equipment decontamination supplies if sampling equipment will be reused between sample locations (see SOP 1 for equipment decontamination procedures).
- Field forms or notebook for documenting the sampling procedures.

Methodology

When the project-specific sampling and analysis plan (SAP) specifies additional or other requirements for soil sampling, it takes precedence over this SOP. In the absence of a SAP, the procedures in this SOP shall be used.

General Sampling Procedure:

- Don gloves as specified in the Health and Safety Plan; replace gloves with new gloves after each sample is collected.
- Clear the ground surface of brush, root mat, grass, leaves, and other debris.
- Use the selected hand tool to remove soil to the targeted sample depth. Use a measuring tape to verify that the sample depth is correct and record the depth in the field notebook or boring log.
- Describe and document the soil lithology in accordance with SOP 2.
- Use the selected hand tool to collect soil and homogenize in a decontaminated stainless-steel bowl or a dedicated Ziploc® bag and then transfer the sample to the sample container using hand tools.

- Before sample collection, and to the extent possible, use the selected hand tool to remove organic debris, anthropogenic material (e.g., brick, metal, glass), and gravels larger than 4 millimeters, unless a project-specific SAP directs otherwise.
- When sampling for gasoline-range total petroleum hydrocarbons (gasoline) or volatile organic compounds (VOCs), a subsample will be obtained from a discrete portion of the collected sample. To minimize the potential loss of volatiles during sampling, the subsample shall not be composited or homogenized. The sample container for gasoline and/or VOC analysis will be filled first if additional containers are necessary for other analysis. Specific procedures for collecting samples for gasoline and/or VOC analysis using the U.S. Environmental Protection Agency Method 5035 are specified in SOP 5.
- The sampling device and field equipment will be decontaminated between sample locations in accordance with SOP 1. Alternatively, new, disposable equipment can be used to collect each sample to preclude the need for equipment decontamination.

Backfilling Sample Locations:

Backfill in accordance with federal and state regulations (e.g., Oregon bentonite requirements per OAR 690-240-0035). Otherwise, manual excavations can be backfilled with excess soil remaining after sample collection, unless the project-specific SAP requires a different backfill procedure.

Standard Operating Procedure

EPA Method 5035 Soil Sampling

SOP Number: 5
Date: 9/25/2024
Revision Number: 0.2

Scope and Application

This standard operating procedure (SOP) describes the methods for obtaining soil samples for chemical analysis for gasoline-range petroleum hydrocarbons (gasoline) and volatile organic compounds (VOCs) by U.S. Environmental Protection Agency Method 5035A. Please see note in general sampling procedure regarding container labeling.

Equipment and Materials Required

The following materials are necessary for this procedure:

- Sampling equipment (e.g., Terra Core Sampler™ or similar sampler capable of collecting a 5-gram soil sample).
- Laboratory-supplied sample containers:
  - Preweighed and labeled 40-milliliter volatile organic analysis (VOA) vials, including preservative (typically methanol)
  - Two-ounce jar for percent total solids/moisture (if required, confirm with the laboratory)
- Laboratory chain-of-custody form and cooler with ice.
- Equipment decontamination supplies if sampling equipment will be reused between sample locations (see SOP 1 for equipment decontamination procedures).
- Field forms or notebook for documenting the sampling procedures.

Methodology

When the site-specific sampling and analysis plan (SAP) specifies additional or different requirements for soil sampling, it takes precedence over this SOP. In the absence of a SAP, the procedures in this SOP shall be used.

Laboratory Analytical Considerations:

- VOCs must be analyzed within 14 days of sample collection.
- Samples must be maintained at less than 4°±2°C.
- Discrete VOC samples may be composited at the laboratory.

General Procedure:

- When using the Terra Core Sampler, seat the plunger in the handle.
- Collect the sample by pushing the sampler into the soil until the soil has filled the sampler.
- Remove the sampler and confirm that the soil in it is flush with the mouth of the sampler.

- Wipe all debris from the outside of the sampler. Remove any excess collected soil that extends beyond the mouth of the sampler.
- Rotate the plunger handle 90 degrees until it is aligned with the slots in the body of the sampler. Place the mouth of the sampler into the sample container and extrude the sample into the sample container by pushing the plunger down. Hold the sample at an angle when extruding to minimize splashing of the preservative.
- Immediately remove any soil or debris from the threads of the vial and place the lid on the vial.
- Gently swirl the vial (do not shake) to allow the preservative to uniformly penetrate and wet the soil.
- Repeat process for each additional sample container.
- If required by the laboratory, fill a 2-ounce container to capacity for percent total solids determination.
- **Please note that the tare weight is recorded on the vial or is digitally recorded for that specific container using a bar code. Do not obscure the laboratory-provided tare weight or bar code. Do not place any labels, stickers, tape, etc., on the pre-weighed sample vials.**

Standard Operating Procedure

Underground Utility Locates

SOP Number: 18
Date: 03/09/2021
Revision Number: 0.1

Scope and Application

This standard operating procedure (SOP) describes the practices for locating underground utilities. Refer to the MFA health and safety plan (HASP) for additional information regarding communication procedures to be followed when an inadvertent utility strike occurs, as well as regarding methods for mitigating hazards during a utility strike.

Equipment and Materials Required

The following materials are necessary for this procedure:

- Personal protective equipment (as specified in the HASP)
- Marking materials (e.g., marking paint, stakes, flags)
- Field documentation materials

Methodology

When the project-specific sampling and analysis plan (SAP) specifies additional or different requirements for underground utility locates, it takes precedence over this SOP. In the absence of a SAP, the procedures in this SOP shall be used.

Before Conducting Utility Locates:

- Ensure that the locate will be conducted reasonably soon before the excavation work begins, e.g., within 48 hours. There may be project-specific conditions, e.g., weather and/or ground features that could cause markings to fade, which would require scheduling of the excavation work sooner than 48 hours after the locate.
- Clearly define the boundary of the work and the locations of all proposed excavations. Prepare a map of the project area showing the excavation locations.
- Interview site managers/property owners and obtain plans or drawings, if available, showing on-site utilities.
- For project work that will not take place in the public right-of-way, ensure that the public rights-of-way nearest to the project are identified and communicated during the one-call notification.
- Identify the township and range of the project area. This information can be easily attained by a quick email to MFA's GIS Exchange.
- If feasible, conduct a site visit to identify site conditions that could cause fading or disruption of marking paint. Such conditions could include gravel or ground sensitive to erosion and high traffic.
- Check the weather forecast to assess the potential for snow or rain to make marking utilities difficult or cause the markings to fade.

One-Call Utility Notification:

- If possible, initiate the one-call utility notification at least one week before the proposed work begins.
- Include a map or GPS coordinates when submitting the notification.
- Before conducting any excavation activities, confirm with each public utility that the utility locate has been completed.
- On remote or complicated sites, consider meeting public locators on site.
- Document the one-call ticket number and results in the project files.
- Provide the one-call ticket number to subcontractors who will be doing the excavations.

Private Utility Locate:

- Conduct the private utility locate only after confirmation that the public utility locate has been completed and all public utilities have been marked and the results reviewed by MFA staff who will be overseeing the excavations.
- Meet the private locator on site and participate in the entire private utility locate. Be engaged in the process, ask questions, and take time to walk the site thoroughly with the locator.
- Bring a copy of the one-call utility ticket and results of the one-call utility locater to check against the utility markings on the ground.
- If possible, have a site/property representative knowledgeable of on-site utilities participate in the private utility locate.
- If paint alone may not suffice to ensure clear marking of utilities, add vertical markers such as stakes or flags.
- Visually assess the area of the proposed excavation(s) to identify features potentially indicative of buried utilities. Have the private utility locator examine each feature identified below to assess the presence of buried utilities.
  - Examine adjacent public rights-of-way where public utilities have been marked for evidence of utilities that may extend onto the project site.
  - Identify nearby light poles, telephone poles, electrical utility poles, or other overhead utility poles with wires or conductors that run from the overhead utility, down the pole, and into the ground.
  - Identify the location of gas meters, water meters, or other aboveground junction boxes for evidence of utilities extending from these features into the ground.
  - Examine asphalt and concrete ground surfaces for discontinuities in the surface indicative of utility installations. Discontinuities may include recent patches of asphalt or concrete inlaid within older concrete or asphalt surfaces.
  - Identify manholes and catch basins indicative of buried storm or sanitary sewer pipes. Open manholes to examine the orientation of associated pipes to assess whether the utilities may be present near proposed excavations.
  - Identify tank ports and vent pipes.

- Identify irrigation systems and associated features such as valve boxes and controllers.
- Identify any other signs indicating the presence of buried utilities.
- Be wary of utility marks that suddenly begin or dead end.

Preparing to Perform Subsurface Activities after a Locate:

- Ensure that the markings are still visible when the work begins.
- Adjust locations, as needed, to avoid identified utilities, or use alternative methods such as nonmechanical excavation means (i.e., manual excavation or air-knifing) to a minimum depth of 5 feet.

Table
APWA UNIFORM COLOR CODE

	WHITE—Proposed Excavation
	PINK—Temporary Survey Markings
	RED—Electric Power Lines, Cables, Conduit and Lighting Cables
	YELLOW—Gas, Oil, Steam, Petroleum or Gaseous Materials
	ORANGE—Communication, Alarm or Signal Lines, Cables or Conduit
	BLUE—Potable Water
	PURPLE—Reclaimed Water, Irrigation and Slurry Lines
	GREEN—Sewers and Drain Lines

Source: Uniform Color Codes, ANSI Standard Z535.1. American Public Works Association. Revised 1999.

Appendix C

ISM Laboratory Site-Specific Sampling and Analysis Plan

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ENVIRONMENTAL SCIENCES

Document Information

Document Number: ENV-SOP-MTJL-0112 **Revision:** 05

Document Title: Multi-Increment Sampling

Department(s): SVOA

Date Information

Effective Date: 17 Feb 2022

Notes

Document Notes:

All Dates and Times are listed in: Central Time Zone

Signature Manifest

Document Number: ENV-SOP-MTJL-0112 **Revision:** 05

Title: Multi-Increment Sampling

All dates and times are in Central Time Zone.

ENV-SOP-MTJL-0112

QM Approval

Name/Signature	Title	Date	Meaning/Reason
Rebecca King (010125)	Manager - Quality	17 Feb 2022, 11:42:57 AM	Approved

Management Approval

Name/Signature	Title	Date	Meaning/Reason
Kyle Moore (006492)	Supervisor	14 Dec 2021, 03:29:55 PM	Approved
Michael Jones (006596)	Quality Analyst 3	17 Dec 2021, 12:44:45 PM	Approved

Pace Analytical™

TEST METHOD STANDARD OPERATING PROCEDURE
TITLE: Multi-Increment Sampling
TEST METHOD: NA

ISSUER: Pace Analytical National Center for Testing & Innovation

1.0 Scope and Application

1.1 Appendix A of EPA Method 8330B (SW-846) specifically addresses field sampling. The appendix provides guidance for explosive residue sample collection, handling, and laboratory processing techniques. Method 8330B recommends the use of multi-increment (MI) sampling, which involves the extraction of a representative portion of material from within a single decision unit which will adequately address potential compositional and distributional heterogeneity. In MI sampling, several increments from the same decision unit are combined to form one sample that is submitted for laboratory analysis. The procedures for MI sampling are specifically designed to minimize sampling error and provide a more scientifically-representative mean concentration of the contaminant(s) present in the decision unit.

1.2 Initial demonstration for achieving samples size below 75µm per DOD/DOE QSM is on file in the QA department.

2.0 Summary of Method

2.1 Samples are dried, ground, and homogenized before subsamples are taken for sample preparation.

3.0 Interferences

3.1 Care must be taken to not cross-contaminate samples during the drying, sieving, and grinding procedures. Grinding blanks are required to verify procedure is free from cross contamination.

3.2 The drying process may result in quantitative losses of some analytes. Project Managers may consider eliminating the drying process prior to analysis or removing poor performers from the target analyte list if drying is required.

4.0 Definitions

4.1 Sieve: A device made of wire mesh held in a frame through which finer particles of a mixture of various sizes may be passed to separate them from coarser ones or through which soft materials may be forced for reduction to fine particles.

4.2 Shatterbox: A device for mechanically pulverizing a sample or material.

4.3 Ball Mill: A device using ceramic pellets and rotation in a closed container to pulverize the contents.

4.4 Refer to the Laboratory Quality Manual for a glossary of common lab terms and definitions.

5.0 Health and Safety

5.1 The toxicity or carcinogenicity of each chemical material used in the laboratory has not been fully established. Each chemical should be regarded as a potential health hazard and exposure to these compounds should be as low as reasonably achievable.

5.2 The laboratory maintains documentation of hazard assessments and OSHA regulations regarding the safe handling of the chemicals specified in each method. Safety data sheets for all hazardous chemicals are available to all personnel. Employees must abide by the health, safety and environmental (HSE) policies and procedures specified in this SOP and in the Pace National Chemical Hygiene / Safety Manual.

5.3 Personal protective equipment (PPE) such as safety glasses, gloves, and a laboratory coat must be worn in designated areas and while handling samples and chemical materials to protect against physical contact with samples that contain potentially hazardous chemicals and exposure to chemical materials used in the procedure.

5.4 Concentrated corrosives present additional hazards and are damaging to skin and mucus membranes. Use these acids in a fume hood whenever possible with additional PPE designed for handing these materials. If eye or skin contact occurs, flush with large volumes of water. When working with acids, always add acid to water to prevent violent reactions. Any processes that emit large volumes of solvents (evaporation/concentration processes) must be in a hood or apparatus that prevents employee exposure.

5.5 Contact your supervisor or local HSE coordinator with questions or concerns regarding safety protocol or safe handling procedures for this procedure.

6.0 Sample Collection, Preservation, Holding Time, and Storage

6.1 Samples should be collected in accordance with a sampling plan and procedures appropriate to achieve the regulatory, scientific, and data quality objectives for the project.

6.2 Pace National will typically receive samples in 4-8oz containers for processing.

7.0 Equipment and Supplies

7.1 Sieve: 10mesh

7.2 Grinder: Shatterbox or equivalent capable of reducing particle size to <75µm

7.3 Drying rack

7.4 12-inch brass pans

7.5 Aluminum baking sheets

8.0 Reagents and Standards

8.1 All reagents and standards must be recorded in the appropriate preparation log and assigned a unique number. See ENV-SOP-MTJL-0041, *Standard Logger – Tree Operation*. Additional information regarding reagent preparation can be found in the Standards Logger (Tree) digital archive system. All spiking solutions and surrogate standard solutions should be replaced at least every six months or sooner if a problem is detected unless otherwise noted.

9.0 Procedure

9.1 All sample contents within the container are emptied into a pan/weigh boat and dried to a constant weight.

9.1.1 A Blank matrix must be dried with samples.

9.1.2 Obtain a clean pan/weigh boat and record the tare weight.

9.1.3 Empty the entire contents of the sample container into the pan/weigh boat.

9.1.4 Using gloved hands break the soil into small pieces as necessary to facilitate the drying process. Use fresh gloves for each sample to prevent cross contamination.

9.1.5 Record the initial weight of the entire sample.

9.1.6 After the initial weight is obtained, dry the sample at room temperature in a hood for approximately 24 hours. Then obtain a 2nd sample weight.

9.1.7 Continue the drying process for approximately 12 hours and obtain a 3rd sample weight.

9.1.8 Two consecutive weights of less than 10% difference, taken approximately 12 hours apart, is considered to be dried to a constant weight.

9.1.9 Dates/Times are recorded as well as the ambient temperature with each weighing of samples.

9.2 For all methods or when client-specific data quality objectives (DQOs) require grinding, dried sample is introduced into the shatterbox or equivalent. The entire sample must be ground. If multiple portions are ground separately, the aliquots must be combined prior to subsampling for extraction. Samples are ground up to three-minute intervals. Intervals and duration are dependent on the sample matrix and analytes of interest for the specific project. The Blank and weekly check sample must also proceed through this step.

9.3 Dried sample material is passed through a 10mesh (2mm) sieve (may be assisted using gloved hands). Do not intentionally include vegetation unless project specifications include this requirement. Depending on sample matrix, sieving may be performed initially to facilitate the drying process.

9.4 The Blank matrix is ground at the end of each batch. A blank will also be ground after any sample of known concentration above detectable limits, including quality control samples.

9.5 Each sample/QC is spread into a pan in order to perform sufficient subsampling of the final sample aliquot. At least 30 sample increments must be taken for the subsampling procedure. The sample volume extracted for analysis should represent the entire ground sample.

NOTE: If sample volume does not allow 30 aliquots, a note will be made on the extraction log.

9.6 See the specific method extraction SOP for further processing information.

10.0 Data Analysis and Calculations

10.1 See the Laboratory Quality Assurance Manual for equations for common calculations.

11.0 Quality Control and Method Performance

11.1 Analyst Qualifications and Training

11.1.1 Employees that perform any step of this procedure must have a completed Read and Acknowledgment Statement for this version of the SOP in their training record. In addition, prior to unsupervised (independent) work on any client sample, analysts that prepare or analyze samples must have successful initial demonstration of capability (IDOC) and must successfully demonstrate on-going proficiency on an annual basis. Successful means the initial and on-going DOC met criteria, documentation of the DOC is complete, and the DOC record is in the employee's training file. Refer to ENV-SOP-MTJL-0015, *Technical Training and Personnel Qualifications for Chemistry* for more information.

12.0 Data Review And Corrective Action

12.1 Data Review

12.1.1 Pace National's data review process includes a series of checks performed at different stages of the analytical process by different people to ensure that SOPs were followed, the analytical record is complete and properly documented, proper corrective actions were taken for QC failure and other nonconformance(s), and that test results are reported with proper qualification.

12.1.2 The review steps and checks that occur as employees complete tasks and review their own work is called primary review.

12.1.3 All data and results are also reviewed by an experienced peer or supervisor. Secondary review is performed to verify SOPs were followed, that calibration, instrument performance, and QC criteria were met and/or proper corrective actions were taken, qualitative ID and quantitative measurement is accurate, all manual integrations are justified and documented in accordance with the Pace National's SOP for manual integration, calculations are correct, the analytical record is complete and traceable, and that results are properly qualified.

12.1.4 A third-level review, called a completeness check, is performed by reporting or project management staff to verify the data report is not missing information and project specifications were met.

12.1.5 Refer to ENV-SOP-MTJL-0014, *Data Handling and Reporting* and ENV-SOP-MTJL-0038, *Data Review* for specific instructions and requirements for each step of the data review process.

12.2 Corrective Action

12.2.1 Corrective action is expected any time QC or sample results are not within acceptance criteria. If corrective action is not taken or was not successful, the decision/outcome must be documented in the analytical record. The primary analyst has primary responsibility for taking corrective action when QA/QC criteria are not met. Secondary data reviewers must verify that appropriate action was taken and/or that results reported with QC failure are properly qualified.

13.0 Pollution Prevention and Waste Management

13.1 Pace National proactively seeks ways to minimize waste generated during our work processes. Some examples of pollution prevention include but are not limited to: reduced

solvent extraction, solvent capture, use of reusable cycletainers for solvent management, and real-time purchasing.

13.2 The EPA requires that laboratory waste management practices be conducted consistent with all applicable federal and state laws and regulations. Excess reagents, samples and method process wastes must be characterized and disposed of in an acceptable manner in accordance with Pace National's Chemical Hygiene Plan / Safety Manual.

14.0 Modifications

14.1 Pace National is set up currently to process from 4oz/8oz/16oz/32oz jars that have been prepared in the field from bulk containers. Pace National cannot currently process bulk samples for this method.

14.2 Due to limited sample volume received as listed in 14.1:

14.2.1 Duplicate subsampling is performed rather than triplicate

15.0 Responsibilities

15.1 Pace National employees that perform any part this procedure in their work activities must have a signed Read and Acknowledgement Statement in their training file for this version of the SOP. The employee is responsible for following the procedures in this SOP and handling temporary departures from this SOP in accordance with Pace National's policy for temporary departure.

15.2 Pace National supervisors/managers are responsible for training employees on the procedures in this SOP and monitoring the implementation of this SOP in their work area.

16.0 Attachments

16.1 Not applicable to this SOP

17.0 References

17.1 Nitroaromatics, Nitramines, and Nitrate Esters by High Performance Liquid Chromatography (HPLC), SW-846 Method 8330B, Revision 2, October 2006, Appendix A.

17.2 Quality Systems Manual (QSM) for Environmental Laboratories, Department of Defense (DoD), Version 5.1, 2017.

TEST METHOD STANDARD OPERATING PROCEDURE
TITLE: Multi-Increment Sampling
TEST METHOD: NA
ISSUER: Pace Analytical National Center for Testing & Innovation

18.0 Revision History

This Version:

Section	Description of Change
7.3, 7.4, 7.5, 9.2. Removed 8.2, 9.6, & 14.3.	Process update and removal of 8330 prep steps.

This document supersedes the following document(s):

Document Number	Title	Version
ESC Lab Sciences SOP #330377	ESC Lab Sciences SOP #330377	1
ESC Lab Sciences SOP #330377	ESC Lab Sciences SOP #330377	2
ESC Lab Sciences SOP #330377	ESC Lab Sciences SOP #330377	3
ENV-SOP-MTJL-0112	Multi-Increment Sampling	01
ENV-SOP-MTJL-0112	Multi-Increment Sampling	02
ENV-SOP-MTJL-0112	Multi-Increment Sampling	03
ENV-SOP-MTJL-0112	Multi-Increment Sampling	04