

March 20, 2024

Landfill Gas Monitoring Probe Work Plan

**Marshall Landfill Cleanup and Closure, CSID 1022
Spokane County, Washington**

Prepared for
Christer Loftenius
Washington State Department of Ecology
4601 North Monroe Street
Spokane, Washington 99205-1295

Prepared by
Herrera Environmental Consultants, Inc.
2200 Sixth Avenue, Suite 1100
Seattle, Washington 98121
Telephone: 206-441-9080

Note:

Some pages in this document have been purposely skipped or blank pages inserted so that this document will print correctly when duplexed.

Contents

Introduction.....	1
Site Description and Background	1
LFG Monitoring Activities.....	2
Theoretical LFG Generation Rates and Calculated Emission Loading	2
Lateral Extents of Waste	3
Landfill Closure Design	3
LFG Monitoring Probe Installation	3
Pre-Drilling Activities	3
Installation Procedures.....	5
Drilling and Sampling.....	5
LFG Monitoring Probe Construction.....	6
Incomplete LFG Monitoring Probe Abandonment.....	7
Decontamination and Disposal Procedures.....	7
Schedule	8
References.....	9

Appendices

Appendix A	Health and Safety Plan
Appendix B.....	LFG Monitoring Probe Figures

Tables

Table 1. Proposed LFG Monitoring Probe Locations and Completions.....	4
--	---

This page intentionally left blank

Introduction

Herrera Environmental Consultants, Inc. (Herrera) has prepared this Landfill Gas (LFG) Monitoring Probe Work Plan (Work Plan) for the Washington State Department of Ecology (Ecology) to describe investigatory LFG monitoring activities at the Marshall Landfill in Spokane County, Washington. LFG monitoring probes will be installed beyond the lateral edges of landfilled waste to the north, west, and east of the Marshall Landfill. Data will be collected from the LFG monitoring probes to assess the potential LFG migration from the Marshall Landfill towards adjacent receptors. Data will be used to further evaluate LFG management systems included in design for the Closure and Cleanup of the Marshall Landfill (Project, Ecology Cleanup Site Identification 1022).

Site Description and Background

The Marshall Landfill (Site) is located northwest of Cheney-Spokane Road about 1 mile southwest of the town of Marshall, Washington and 7 miles southwest of Spokane, Washington. The Site is bounded to the north by a gravel pit and privately-owned vacant land, to the east by South Cheney-Spokane Road, to the south by a landfill property owned by Spokane County, and to the west by privately-owned vacant land. The Site layout and the locations of groundwater monitoring wells are presented in Site Plan, (Appendix B). The Site consists of two primary historic land use areas: the approximate 25-acre Main Landfill and the Five-acre Landfill.

- **The Main Landfill:** This approximate 25-acre waste disposal area is located within the south-central portion of the Site. Sand and gravel removed from the Main Landfill were replaced with waste during the period from 1970 through 1990. The landfilled waste thickness was estimated at 100 feet in the Main Landfill (Fetrow 1991). The Main Landfill does not have a bottom liner. The cover consists of fine to coarse sand with silt and gravel, or fine to coarse gravel with silt and sand. The cover ranges from 0 to 5.5 feet in most locations.
- **The Five-acre Landfill:** This approximate 5-acre waste disposal area is located within the northwest portion of the Site. Waste was disposed within the Five-acre Landfill during the period from 1980 through 1984. The landfilled waste thickness was estimated at 45 feet in the Five-acre Landfill (Fetrow 1991). The Five-acre Landfill does not have a bottom liner. The cover consists of fine to coarse sand with varying amounts of silt, underlain by a fine-grained soil cover layer (stiff lean clay with varying amounts of sand). Soil cover thickness ranges from 0 to 9.5 feet throughout the Five-acre Landfill.

The Marshall Landfill is located adjacent to a mix of public- and private-owned properties:

- The former Spokane County Landfill (Parcel No. 24282.9002) is located adjacent to the southern boundary of the Main Landfill. The landfill was operated by Spokane County as a daily-burn landfill from the 1950s until 1970 and has no bottom liner.
- Spokane County Engineers own three parcels to the west of the Marshall Landfill. These parcels are primarily undeveloped and are heavily forested.

- An access road to an active gravel pit and associated offices, laydown area, and parking facilities borders the Five Acre Landfill to the north. The access road separates the Five Acre Landfill from an undeveloped private property.
- Parcels owned by Randall Gillingham and Castle Materials are located to the north of the Marshall Landfill. The parcels include a gravel pit, administrative offices, parking, and haul road. The Castle Materials property has historically been used by Action Materials for ongoing excavation operations at an active gravel pit (the Gillingham Gravel Pit). Action Materials began leasing the gravel pit, administrative offices, and parking area to McCallum Rock Drilling in early 2024.
- The east side of the Main Landfill is bordered by South Cheney Spokane Road.

LFG Monitoring Activities

GeoEngineers conducted a Remedial Investigation (RI) and Feasibility Study (FS) for Ecology at the Site (GeoEngineers 2018). As part of the RI effort, GeoEngineers installed 10 LFG monitoring wells and conducted sampling events in September 2015, August 2016, November 2016, and February 2017. A total of 12 volatile organic compounds (VOCs) were detected at concentrations greater than the Model Toxics Control Act (MTCA) Method B shallow soil gas screening levels (SLs) in at least one sample. Exceedances were observed in eight of the 10 LFG monitoring wells. Observed methane concentrations were greater than the lower explosive limit (LEL) of 5 percent in two of four LFG monitoring wells at the Five-acre Landfill and three of six LFG monitoring wells at the Main Landfill during at least one monitoring event. The lateral extent of LFG contamination was not defined.

Static pressure within landfill gas monitoring wells was measured during the December 2017 monitoring event. Results indicate that, during the December 2017 monitoring event, pressure in each landfill gas monitoring well was minimal. The maximum pressure was 0.21 inches of water, observed in landfill gas monitoring well LFB-4 (GeoEngineers 2018).

The boundaries of LFG contamination have not been delineated, except for the following:

- VOC exceedances appear to attenuate before the south boundary of the Main Landfill.
- Methane exceedances appear to attenuate before the south and southeast boundaries of the Main Landfill.

VOCs and methane in LFG carry the potential for vapor intrusion into overlying or nearby buildings. Buildings are not present on the Landfill and are not anticipated for the future. Action Materials' buildings to the north may be subject to vapor intrusion.

Theoretical LFG Generation Rates and Calculated Emission Loading

Herrera assessed the theoretical generation and concentrations of LFG constituents at the Site (Marshall Landfill Gas Technical Memorandum, Herrera, 2022). Theoretical findings indicated passive venting as an anticipated appropriate technology. The findings recommended LFG polishing biofiltration should be considered to decrease content of methane and VOCs. Gas probes were recommended to collect perimeter LFG data to further refine and validate LFG management design.

Lateral Extents of Waste

The RI/FS indicated approximate boundaries of the Marshall Landfill based on historical evidence and field work. During November 2022, GeoEngineers excavated test pits at the anticipated edges of waste to identify lateral extents of waste (Herrera 2023). During excavation activities, waste was observed extending west onto Spokane County Engineers parcels and north onto Randall Gillingham parcels. The approximate lateral extents of waste are shown in Appendix B.

Landfill Closure Design

Through coordination with ECY and neighboring properties, waste observed beyond the extents of the Marshall Landfill will be buried and covered in place. The existing Marshall Landfill cap does not provide protection from waste for human health and the environment. The proposed cap for the Project includes a soil cover designed in accordance with Washington Administrative Code (WAC) 173-304 and 40 Code of Federal Regulations (CFR) 258.60(a). A passive LFG collection system is proposed to provide venting through compost bioberms.

LFG Monitoring Probe Installation

The Consultant (Herrera in association with GeoEngineers Inc. [Geo]) will arrange for and oversee installation of up to eight LFG monitoring probes. Work required to install the LFG monitoring probes includes the following:

- Pre-Drilling Activities
- Drilling and Installation of LFG Monitoring Probes
- Decontamination and Disposal of Waste
- Baseline Data Collection

The ensuing sections describes the activities in detail.

Pre-Drilling Activities

The Well Contractor will provide the Consultant with the following information for review and approval prior to drilling activities:

- Proposed materials for the construction of the LFG monitoring probes and backfill
 - Note:** This information will include, but is not limited to, material safety data sheets and manufacturer's instructions.
- LFG monitoring probe drawings, including proposed locations and standard detail for flush and surface mounted probes
- Example well boring log and construction log
- A copy of the Drilling Contractor's Operator's license

The Drilling Contractor’s Health and Safety Plan (HASP) will be submitted to the Consultant for informational purposes.

Prior to drilling, the Consultant will perform a site walk with Ecology and Well Contractor to review conditions at proposed probe locations. Probe locations will be adjusted as necessary to accommodate installation activities. Once access is confirmed, the Well Contractor will mark proposed boring locations with a stake and lathe. The Well Contractor will submit a utility locate request through the Washington State Utility Notification Center (811) within 5 to 10 calendar days prior to probe installation to perform private utility locates at the staked locations. The Well Contractor will facilitate completion of the private utility locate prior to the start of drilling.

Eight probes are proposed for installation beyond the extents of landfilled waste to assess potential migration and monitor for compliance:

- Four probes west of the Marshall Landfill
- One probe at the north end of the Five-acre Landfill
- Two probes adjacent to Castle Materials—one to the west, one to the east
- One probe along the east edge of the Main Landfill

Proposed probe locations are shown in Appendix B and summarized in Table 1. Following the site walk, figures will be updated with adjustments identified by the team for construction access.

Table 1. Proposed LFG Monitoring Probe Locations and Completions.				
Location ID	Northing	Easting	Surface Elevation (AMSL)	Boring Depth (ft)
LFB-24-01	47.331632	117.302647	2280.51	100
LFB-24-02	47.332271	117.303398	2315.55	50
LFB-24-03	47.332582	117.303811	2351.12	50
LFB-24-04	47.332477	117.304543	2348.55	50
LFB-24-05	47.441803	117.304441	2333.33	50
LFB-24-06	47.331325	117.303893	2326.31	60
LFB-24-07	47.330605	117.303994	2296.80	50
LFB-24-08	47.331061	117.302340	2182.27	20

1. Horizontal coordinates are State Plane (North) NAD83
2. AMSL = Above Mean Sea Level. Elevations are approximate based on Survey performed by Coffman Engineers (DATE)

The Well Contractor will prepare a Notice of Intent (NOI) form for each probe location and submit the form to Ecology in compliance with WAC 173-160-151. The NOI forms must be submitted to Ecology at least 72 hours prior to drilling.



Installation Procedures

Drilling and Sampling

Vegetation removal may be required for access to LFG monitoring probes. The Well Contractor shall remove vegetation for appropriate offsite disposal. LFG monitoring probe locations may shift at the approval of the Engineer to provide improved access for the Well Contractor.

The LFG monitoring probes will be drilled and installed using a dual-casing rotosonic rig with 12-inch bit to allow for collection of continuous-core samples. The Well Contractor will discharge soil cores into plastic tubing for sampling in 5- to 10-foot intervals by the Consultant's Licensed Geologist. The Well Contractor will provide the plastic tubes and a table for borehole logging. The Licensed Geologist will log soil per ASTM Method D2488, measure water levels, measure overall depth of the borehole, and interpret stratigraphy to identify the appropriate screen level. Following confirmation that soils have been reviewed and logged, the Well Contractor will dispose soil cuttings in 55-gallon drums, further described in ensuing sections.

The Well Contractor will provide 4-gas meters capable of measuring ambient oxygen, carbon monoxide, hydrogen sulfide (H₂S), and combustible gases (methane, measured as lower explosive limit [LEL]). The Well Contractor will provide a portable LFG meter (Landtec GEM series or equivalent) and an H₂S meter to monitor concentrations of LFG and H₂S at the borehole and within the work zone. LFG and H₂S measurements will be taken from the top of the drill casing after each sample run by the Well Contractor. The Well Contractor will record periodic ambient air measurements as part of Health and Safety monitoring.

If LFG or H₂S is identified, drilling will cease and a brush fan, provided by the Well Contractor, will be used to clear the immediate area of dangerous gasses. Drilling will resume after mitigation plans approved by the Consultant's Health and Safety Field Lead are put into place to ensure safe drilling operations.

Field findings and observations (pertinent geologic and hydrogeologic subsurface conditions, water and total depths, H₂S, and LFG readings) will be recorded on field forms (Appendix B) and submitted upon completion of the work by the Well Contractor. Field calibration of equipment will be recorded in field notes and retained along with any vendor calibration record.

Boreholes will not be left open at the completion of each day's work. If sufficient depth cannot be reached in a borehole for LFG monitoring probe installation, at the direction of the Consultant, the Well Contractor will abandon the borehole, described further in ensuing sections.

LFG Monitoring Probe Construction

Following drilling, LFG monitoring probes and backfill will be installed as the 12-inch casing is removed. A minimum of 2 inches of pea gravel will be installed at the bottom of the borehole to protect the bottom of the LFG monitoring probe. LFG monitoring probes will be constructed, from bottom to top, the following components:

- 1-inch Schedule 40 polyvinyl (PVC) cap
- 1-inch Schedule 40 PVC casing
- 1-inch pre-fabricated Schedule 40 PVC screen with 0.010-inch continuous slots (CSS) to a minimum of 10 feet below ground surface
- 1-inch Schedule 40 PVC casing, extended to a minimum of 2 feet above ground surface
- 1-inch by ¼-inch Schedule 40 PVC reducing bushing, female by female, NPT
- ¼-inch labcock
- Protective monument:
 - For surface mounted LFG monitoring probes: minimum 3 feet above grade with locking lid. The lid will be installed such that a 90-degree angle from the steel monument is maintained when the lid is open to support future monitoring. The monument will be primed and painted with corrosion-resistant materials. The monument will be painted yellow.
 - For flush mounted LFG monitoring probes: Morris Industries locking lid or approved equal. Lids will be HS-20 rated.

Once the casing is set, the boring will be backfilled, from bottom to top, with the following:

- Pea gravel to a maximum of 3 feet from bottom of LFG monitoring probe to form the filter pack
- A minimum 7 feet of non-coated hydrated bentonite chips/pellets to secure LFG monitoring probe and provide seal from LFG migration
- The final 2 feet will be finished with concrete, topped with a concrete apron extending a minimum of 1 foot in all directions from the LFG monitoring probe:
 - For surface mounted probes, the concrete apron will be placed at a minimum 2-inch thickness and slope away from the probe. The annulus between protective monument and PVC pipe will be backfilled with sand.
 - For flush mounted probes, the concrete apron will be finished flush with surrounding grade.

Locks and unique identification tags for LFG monitoring probes will be provided by Ecology and installed upon completion at each location. For surface mounted probes, 3-inch steel yellow-painted concrete filled bollards will be placed at 120-degree offsets a minimum of 2 feet from the LFG monitoring probe steel monument. The bollards will be installed into a minimum of 3 feet of concrete. Bollards will be primed and painted with corrosion-resistant materials.

The Consultant's Licensed Geologist will document the construction of LFG monitoring probes. Information will include depths of backfill materials, total length of solid and slotted pipe, stickup above

ground surface and any other pertinent information. Well construction logs will be documented on field forms (Appendix B) and submitted upon completion of the work.

At the completion of each day's work, the Well Contractor will provide the Consultant with handwritten daily drilling report information, including the following:

- Date
- Name and license number of Driller
- Name of Driller helper (if applicable)
- LFG Monitoring Probe identification
- Size of boring
- Depth of boring
- Depth of installed LFG Monitoring Probe
- Description of materials encountered, including depths
- General observations

Typical LFG monitoring probe construction details and a daily drilling report template is included in the appendices.

Incomplete LFG Monitoring Probe Abandonment

If, in the opinion of the Engineer, the borehole has not reached a sufficient depth to function as an effective LFG monitoring probe, the Well Contractor will abandon the borehole by backfilling with cuttings removed during drilling. Soil will be backfilled to a minimum 10 feet from surface. Non-coated hydrated bentonite chips/pellets will be installed for the final 10 feet and compacted to ground surface.

If waste is encountered during probe installation, the probe will be abandoned and backfilled with non-coated hydrated bentonite chips/pellets through the entire borehole and compacted to ground surface.

Decontamination and Disposal Procedures

Following completion of each LFG monitoring probe, the Well Contractor will decontaminate equipment and containerize refuse prior to work on the subsequent LFG monitoring probe. Decontamination and disposal procedures are described in the ensuing sections.

Disposal Procedures

Refuse and contaminated soils are not anticipated to be encountered during installation of LFG monitoring probes. General sampling refuse (gloves, water bottles, PVC scraps, empty materials bags) will be collected by the Well Contractor for off-site disposal. Investigation derived waste (IDW) developed by the Well Contractor to support the work (soil cuttings, soil sampling sleeves, excess bentonite) will be containerized in 55-gallon drums and kept onsite in the location identified by the Consultant.

Should refuse or contaminated soils be exposed during the work, at the direction of the Consultant, the Well Contractor will containerize impacted soils and/or water in 55-gallon drums and kept onsite in the

location identified by the Consultant. IDW with impacted soils will be segregated in separate drums from general soil cuttings and identified at the direction of the Consultant.

55-gallon drums stored onsite will be kept within the landfill, out of site to the extent practical, and covered with tarp. Drums will be profiled and removed within 90 days.

Decontamination Procedures

All equipment used for completion of LFG monitoring probes will be decontaminated prior to use on site and between probe locations. Drilling equipment will be decontaminated by the Well Contractor using appropriate decontamination procedures, including but not limited to a mobile hot-water high-pressure washer, buckets, and brushes.

Any sampling equipment used in the monitoring probes, such as water-level indicators, will be decontaminated after use at each LFG monitoring probe location. The decontamination procedure consists of spraying Alconox or other nonphosphate detergent on the equipment, scrubbing the equipment with a brush, rinsing it thoroughly with potable water, and then another thorough rinse with distilled water.

Water and chemicals used for equipment washing will be containerized in 55-gallon drums and labeled by the Well Contractor. The drums will be stored onsite at the location indicated by the Consultant.

Schedule

The Consultant will perform a pre-drilling site walk with Ecology and the Well Contractor on February 5, 2024. Following the site walk, the Consultant will update figures with probe locations staked during the site walk. The Consultant will coordinate with the Well Contractor to schedule a private utilities locate 1–2 weeks prior to drilling and acquire materials for LFG monitoring probe installation.

LFG monitoring probe installation timing will be coordinated with Ecology. As of the development of this Work Plan, installation is anticipated in March 2024. Following installation, the Consultant will return to site within 1–2 weeks to sample probes for LFG constituents to establish baseline conditions. Quarterly LFG sampling will be conducted and incorporated into design for the Project.

References

Fetrow, Inc. 1991. Marshall Landfill Site Characterization Study Final Report (Volume 1 and 2). Prepared for Marshall Landfill, Inc.

GeoEngineers, Inc. 2018. Remedial Investigation Report, Marshall Landfill, Spokane County, Washington. Prepared by GeoEngineers, Inc. of Spokane Washington, for the Washington State Department of Ecology, Spokane, Washington, May 22.

Herrera Environmental Consultants Inc. 2022. Draft Landfill Gas Technical Memorandum. Prepared by Herrera Environmental Consultants Inc. of Seattle, Washington, for the Washington State Department of Ecology, Spokane, Washington, November 21.

Herrera Environmental Consultants, Inc. 2023. Draft Cover System and Buttress Alternatives Evaluation – Marshall Landfill. Prepared by Herrera Environmental Consultants Inc. of Seattle, Washington, for the Washington State Department of Ecology, Spokane, Washington, June 13.

This page intentionally left blank

Appendix A

Health and Safety Plan

This page intentionally left blank

Site-Specific Health and Safety Plan

**Marshall Landfill Closure
Marshall, WA**

**Prepared for
Washington State Department of Ecology**

**Prepared by
Herrera Environmental Consultants, Inc.**

Note:

Some pages in this document have been purposely skipped or blank pages inserted so that this document will print correctly when duplexed.

Site-Specific Health and Safety Plan

Marshall Landfill Closure

Marshall, WA

Prepared for
Washington State Department of Ecology
Spokane, WA 99205

Prepared by
Herrera Environmental Consultants, Inc.
2200 Sixth Avenue, Suite 1100
Seattle, WA 98121
Telephone: 206-441-9080

March 22, 2024

This page intentionally left blank

Health and Safety Plan Review and Approval

Client:	State of Washington, Department of Ecology	Site Name:	Marshall Landfill, CSID 1022
Project Name:	Marshall Landfill Cleanup and Closure	Project No.:	21-07716-000
Start Date:	March 24, 2022	End Date:	December 31, 2026
Plan Expiration Date:	March 20, 2025		

The following individuals have reviewed this Health and Safety Plan (HASP) and have approved its use for the dates specified.

Nigel Baummer		3/22/2024
Plan Completed by	Signature	Date
Michael Spillane		3/22/2024
Project Manager	Signature	Date
George Iftner		3/22/2024
Corporate Health and Safety Officer	Signature	Date
Nigel Baummer		3/22/2024
Site Health and Safety Officer	Signature	Date

This HASP is based on federal (29 Code of Federal Regulations [CFR] Part 1910.120) and state (Chapter 296-843-120 Washington Administration Code [WAC]) regulations, which address practices conducted at sites associated with hazardous substances. This HASP is applicable only to employees of Herrera Environmental Consultants, Inc. Consultants, subconsultants, and contractors other than Herrera working at this jobsite are responsible for the health and safety of their own employees and are required to develop their own HASP. Other contractor personnel, who provide site-specific information, may review this HASP; however, Herrera Environmental Consultants, Inc. assumes no responsibility or liability for the use of this document by other parties.

Due to the potentially hazardous nature of this site and the activity occurring thereon, it is not possible to discover, evaluate, and provide protection for all possible hazards that may be encountered. Strict adherence to the health and safety guidelines set forth herein will reduce, but not eliminate, the potential for injury at this site. The health and safety guidelines in this HASP were prepared specifically for this site based on site conditions, purposes, dates, and personnel specified, and must be amended if these conditions change. This HASP should not be used on any other site without prior research by trained health and safety specialists.

Contents

Health and Safety Plan Review and Approval	i
Contents	iii
Attachments	v
Abbreviations and Acronyms	vi
Introduction.....	1
Safety Policy	1
Site Description and Scope of Work.....	1
Detailed Description of Specific Tasks Planned.....	2
Potential Hazards Associated With Field Tasks	3
Potential Chemical Hazards	3
Potential Physical Hazards.....	3
Potential Biological Hazards	3
Initial Site Entry	3
Traffic Control.....	4
Interior Work and Confined Spaces.....	4
Sewers or Other Areas of Potentially Containing Explosive Gases or Vapors.....	4
Hazardous Materials	5
Site Status	6
Site Control and Security.....	6
Local Emergency and Project Telephone Numbers.....	7
Site Address and Phone Number.....	7
Local Emergency Phone Numbers.....	7
Project Personnel Phone Numbers	7
Emergency Routes	9
Hospital Location and Route Map.....	10
Emergency Response Plan.....	11
Injury or Exposure	11
Site Incident	11

General Site Requirements and Background Information.....	13
HASP Organization and Responsibilities.....	13
Key Personnel.....	13
Minimum Training, Immunization, and Medical Surveillance Requirements for Site Personnel.....	15
Training.....	15
Medical Surveillance.....	15
Immunizations.....	15
General Field Safety.....	17
General Field Safety Requirements.....	17
Work Limitations and Restrictions.....	17
Hazard Identification.....	18
Potential Chemical Hazards.....	18
Regulatory Action Levels.....	19
Exposure Pathways and Permissible Exposure Limits.....	20
Predominant Potential Site Chemical Hazards.....	21
General Procedures for Air Monitoring.....	25
Other Monitoring Procedures During Excavation, Drilling, or Other Work in MSW.....	25
Action Level Table for Chemical Monitoring.....	26
Potential Physical Hazards.....	27
Heat and Cold Stress.....	29
General Procedures Associated with Excavation and Trenching Activities.....	29
Noise.....	31
Potential Biological Hazards.....	31
Stinging Insect Allergies.....	31
Personal Protective Equipment Requirements.....	35
Level of Protection.....	35
Personal Protective Equipment.....	35
Safety Equipment.....	36
Decontamination.....	37
Personnel Decontamination.....	37

Sampling Equipment Decontamination	37
Waste Characteristics.....	39
Waste Generation	39
Training, Immunization, and Medical Clearance	40
Health and Safety Plan — Acknowledgement and Agreement Form.....	43

Attachments

- Attachment 1 Injury/Exposure Report and Site Incident Report
- Attachment 2 Personnel Training Certificates
- Attachment 3 Daily Tailgate Health and Safety Meeting Form
- Attachment 4 Pre-Activity Safety Plan
- Attachment 5 Groundwater Sampling Health and Safety Plan
- Attachment 6 Air Monitoring Equipment Calibration/Check Log and Air Monitoring Log

Abbreviations and Acronyms

ANSI	American National Standards Institute
CFR	Code of Federal Regulations
CH ₄	Methane
CPR	Cardiopulmonary Resuscitation
CSID	Cleanup Site Identification
Ecology	Washington State Department of Ecology
H ₂ S	Hydrogen Sulfide
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations and Emergency Response
Herrera	Herrera Environmental Consultants
Herrera Consultant Team	Herrera and Herrera's Subconsultants
JHA	Job Hazard Assessment
Landfill / Site	Marshall Landfill
LEL	Lower Explosive Limit
LFG	Landfill Gas
LOP	Level of protection
mg/kg	Milligram per kilogram
MSW	Municipal Solid Waste
MTCA	Model Toxics Control Act
NIOSH	National Institute of Occupational Safety and Health
NMOC	Non-Methane Organic Compounds
OSHA	Occupational Safety and Health Administration
PEL	Permissible Exposure Limit
PFAS	Per- and Polyfluoroalkyl substances
PPE	Personal Protective Equipment
PPM	Parts per million
SHSO	Site Health and Safety Officer
SL	Screening Level
Td	Tetanus/Diphtheria
TWA	Time Weighted Average
VOC	Volatile Organic Compound
WAC	Washington Administrative Code

Introduction

This site-specific health and safety plan (HASP) applies to field work associated with activities at the Marshall Landfill (Landfill), a site with potential releases of hazardous substance(s) to the environment. Herrera Environmental Consultants, Inc. (Herrera) requires that employees, for company-approved field work or personal use, follow safety procedures and regulations set forth in this safety plan. In addition, staff must adhere to Washington State Department of Ecology (Ecology) safety processes and policies when at the Landfill.

This HASP includes two levels of safety precaution:

- For general site visits and when no construction is ongoing at the site, a Pre-Activity Safety Plan included as Attachment 1, shall be filled out by Herrera staff. Herrera staff shall discuss the Pre-Activity Safety Plan with subconsultants prior to site activities, and request their signature prior to mobilization.
- For construction and landfill-related activities, and site visits that include potentially hazardous operations, each participating Herrera personnel shall review and sign the full HASP document. Although subconsultants are responsible for their own health and safety, Herrera shall provide this HASP to subconsultants prior to mobilization for support of work described herein. Herrera will request subconsultants sign the document acknowledging safety considerations prior to support for these activities.

Safety Policy

Herrera's Safety Policy is that health and safety of the staff is of paramount importance. Activities performed under potentially hazardous conditions shall be acknowledged and planned to mitigate personal injury. Herrera's Safety Policy shall apply during company-approved field work only.

Site Description and Scope of Work

The Marshall Landfill Site (Site) is located about one mile southwest of Marshall, WA and includes two disposal areas:

- The 25-acre Main Landfill received waste from approximately 1970 to 1990. The maximum thickness of waste in the Main Landfill is about 100 feet.
- The Five-Acre Landfill includes an approximate 5-acre waste disposal area that received waste from about 1980 to 1984. The maximum thickness of waste in the Five-Acre Landfill is about 45 feet.

Herrera is scoped to provide engineering services for a traditional design-bid-build public works project in conformance with Revised Code of Washington (RCW) 39.04 to provide remedial action at a former municipal solid waste (MSW) landfill per the requirements set forth in Washington Administrative Code (WAC) 173-340. Site work associated with the project includes, but is not limited to, the following:

- General site visits to assess existing conditions.
- Site survey.
- Subsurface exploratory excavation work to identify lateral extent of existing landfilled waste and to assess site conditions at a proposed infiltration pond.
- Installation and sampling of groundwater monitoring wells, including decommissioning of existing groundwater monitoring wells.
- Installation of landfill gas (LFG) monitoring probes, including follow-up sampling.
- Serpentine monitoring to assess potential for LFG migration through the existing cap.
- Construction oversight and support.

Detailed Description of Specific Tasks Planned

List each separate task in order of progression:

Task	Task Description
Task 1.	Site Visit – assessment of conditions and discussion of observations with Ecology.
Task 2.	Surveying – field measurements to be performed throughout the Landfill (by a Subconsultant). Subsurface exploratory soil excavations (test pits). Landfill Gas Probe installation – 3-4 probes to be installed prior to closure activities. Landfill gas surface emissions monitoring (SEM).
Task 3.	Soil characterization – test pit excavations and lab sampling throughout, and adjacent to, the Landfill.
Task 4.	Exploratory soil excavations (test pits) for stormwater infiltration pond.
Task 5.	Construction oversight during closure activities.
Task 11.	Groundwater Monitoring, including installation of new wells and decommissioning of old wells, and removal of investigation derived waste (IDW).
Task 12.	Vegetation Management and Debris Removal oversight for interim fire-mitigation activities.

Potential Hazards Associated With Field Tasks

Potential Chemical Hazards

- Soil and groundwater may contain contaminants associated with buried municipal solid waste (MSW).
- Groundwater may contain per- and poly-fluororalkyl substances (PFAS).
- Contaminants in drums stored on site.
- Chemicals used in materials stockpiled on site, including motor oil, diesel fuel, and treated wood.

Potential Physical Hazards

- Slips, trips, and falls.
- Heavy equipment (drill rig, excavator, operating equipment) and associated mass earthwork.
- Fire.
- Contact with buried debris during investigations, debris removal, or construction (rebar, sheet metal, wood shards).

Potential Biological Hazards

- Bacterial/viral agents associated with MSW.
- Biting or stinging insects such as spiders, bees, wasps, or snakes.

Initial Site Entry

- Has this been performed by Herrera?

Yes: No:

Herrera staff have performed initial site reconnaissance at the Landfill.

Traffic Control

- Does field work require traffic control around the work area, using barricades, traffic signs, and other traffic control devices?

Yes: No:

- Is a city/county/state road use permit required?

Yes: No:

- Is a traffic control plan required with the road use permit?

Yes: No:

Interior Work and Confined Spaces

- Will any field work be done inside an enclosure, building, or confined space?

Yes: No:

Sewers or Other Areas of Potentially Containing Explosive Gases or Vapors

- Will any field work be done in sewers or other areas containing explosive gas/vapors?

Yes: No:

LFG is anticipated to be encountered during site investigations and during construction of the cover system. Risk is increased during construction of the LFG collection and conveyance system.

Hazardous Materials

- Will any hazardous materials (chemicals) be used on site (including decontamination)?

Yes: No:

Pesticides are anticipated to be used during interim vegetation management at the site to mitigate fire potential prior to the full closure project.

- Will any field work be done on a site with known or suspected release of hazardous materials?

Yes: No:

During LFG monitoring events in 2015-2017, a total of 12 volatile organic compounds (VOCs) were detected at concentrations greater than the Model Toxics Control Act (MTCA) Method B shallow soil gas screening levels (SLs) in at least one LFG sample. Exceedances were observed in eight of the 10 LFG monitoring wells. Detected methane concentrations were greater than the lower explosive limit (LEL) of 5 percent in two of four LFG wells at the Five-Acre Landfill and three of six LFG wells at the Main Landfill during at least one monitoring event. The lateral extent of LFG contamination was not defined. Contaminants of concern include the following:

- Petroleum Compounds: 1,2,4-trimethylbenzene, 1,3-butadiene, benzene, naphthalene, xylene.
- Chlorinated Solvents: 1,2-dichloroethane (ethylene dichloride), trichloroethene (trichloroethylene, TCE), vinyl chloride.
- Other: 1,4-dichlorobenzene, 1,4-dioxane, benzyl chloride, chloroethene.
- Methane.

During groundwater monitoring in early 2024, PFAS was identified in groundwater samples. PFAS exceedances of concern are listed below:

- Perfluorooctanoic acid (PFOA) was detected in MW-5A during monitoring at 53 nanograms per liter (ng/L). Washington State Department of Health (DOH) Station Action Level (SAL) and Model Toxics Control Act (MTCA) Method B cleanup levels are 10 ng/L and 48 ng/L, respectively.
- Perfluorooctanesulfonic acid (PFOS) was detected in MW-5A at 29 ng/L, which exceeds the DOH SAL of 15 ng/L, but is below MTCA Method B cleanup level of 48 ng/L.

Site Status

- Site Status: Occupied?

Yes: No:

The property north of the Landfill is owned by Randall Gillingham and Castle Materials, and has been leased historically to Action Materials, and recently (early 2024) to McCallum Rock Drilling. The Site includes an active gravel pit, administrative offices, parking, and a haul road.

Site Control and Security

- Any site access requirements and special considerations?

Yes: No:

Coordination needed with adjacent sites for access and for work located outside of the Landfill. Staff will yield right of way to adjacent site operations at all times.

- Work will be done in daylight hours?

Yes: No:

- Barricades, fencing, or other equipment to be used to mark the perimeter of the site?

Yes: No:

High-visibility silt fence or similar anticipated to be used at the extents of work during the full closure project.

- Require work area security (on- and off-hours) to be used?

Yes: No:

Local Emergency and Project Telephone Numbers

Site Address and Phone Number

Site Address:	Andrus & Spotted RD, Marshall, WA 990044
Site Phone Number:	NA

Local Emergency Phone Numbers

Agency	Name	Telephone Number
Hospital	MultiCare Deaconess Hospital	509.473.5800
Police / Fire	Cheney Police / Fire Department	911

Project Personnel Phone Numbers

Role	Name	Telephone Number
Site Health and Safety Officer	Nigel Baummer	443.517.9787 mobile
Project Manager	Michael Spillane	206.707.8201 office / 206.909.4343 mobile
Principal-in-Charge	Michael Spillane	206.707.8201 office / 206.909.4343 mobile
Client Contact / Project Manager	Christer Loftenius	509.385.8380 mobile
Corporate Health and Safety Officer	George Iftner	206.787.8210 office / 206.697.0312 mobile

This page intentionally left blank

Emergency Routes

Prior to field work, conduct a drive-by from the work area to the hospital to check for any obstacles (i.e., road closure due to construction, etc.) and change the emergency route(s) to the hospital accordingly.

Hospital Name:	MultiCare Deaconess Hospital
Hospital Address:	800 West 5 th Avenue, Spokane, WA 99204
Hospital Phone Number:	509.473.5800

Refer to the following page for the route to the Hospital.

Hospital Location and Route Map

MutiCare Deaconess Hospital – 800 West 5th Avenue, Spokane, WA 99204

← from Cheney School District, Washington
to MultiCare Deaconess Hospital, 800 W 5th Ave, ...

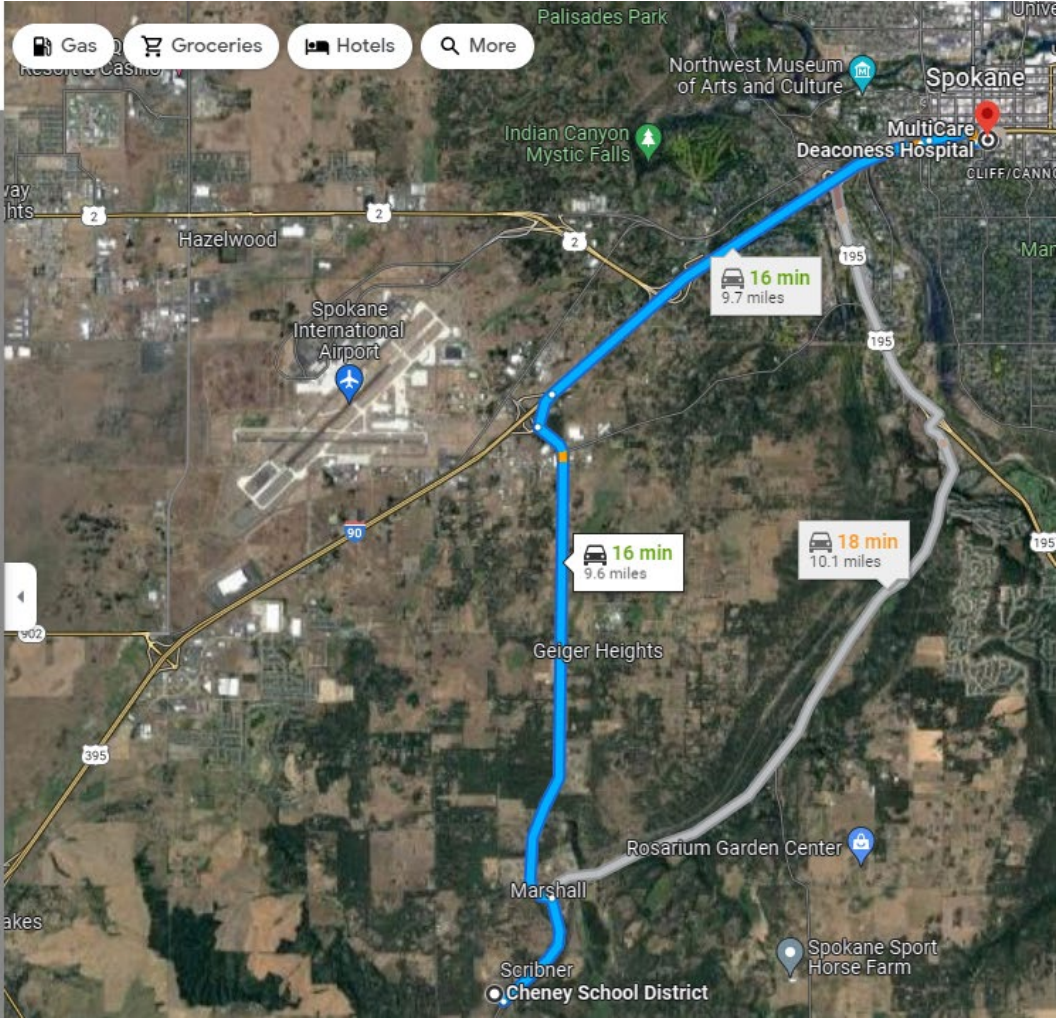
16 min (9.6 miles) via S Grove Rd and I-90 E
Best route now due to traffic conditions

Cheney School District
Washington

- > Take S Grove Rd and I-90 E to W 5th Ave in Spokane
14 min (9.4 mi)
- > Continue on W 5th Ave to your destination
2 min (0.2 mi)

MultiCare Deaconess Hospital
800 W 5th Ave, Spokane, WA 99204

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



Emergency Response Plan

Injury or Exposure

If an injury or exposure occurs, take the following actions:

- Get first aid for the person immediately.
- Notify the Site Health and Safety Officer (SHSO). The SHSO is responsible for immediately notifying the Project Manager and preparing and submitting an Injury/Exposure Report (Attachment 1) to the Corporate Health and Safety Officer within 24 hours, as well as notifying the employee's supervisor and Principal-in-Charge. If a subcontractor employee is injured, the Subcontractor Field Supervisor will also complete an injury/exposure investigation and submit a copy to the Corporate Health and Safety Officer.
- The SHSO will assume charge during a medical emergency.

Site Incident

If an incident (e.g., theft, car accident, property damage) occurs, take the following action:

- Notify the SHSO immediately. The SHSO is responsible for immediately notifying the Project Manager and preparing and submitting a Site Incident Report (Attachment 1) to the Corporate Health and Safety Officer within 24 hours.

This page intentionally left blank

General Site Requirements and Background Information

HASP Organization and Responsibilities

Key Personnel

Principal-in-Charge	Michael Spillane
Corporate Health and Safety Officer	George Iftner
Herrera Project Manager	Michael Spillane
Herrera Site Health and Safety Officer	Nigel Baummer
Herrera Field Personnel	Nigel Baummer, Michael Spillane, Mary Shanks, Tyson Wright, Dylan Anslow, Bernie Alonso
Subconsultant Field Supervisor	Bryce Hanson, Sydney Bronson
Client Project Manager	Christer Loftenius

Principal-in-Charge

The Principal-in-Charge provides a point of contact if the SHSO cannot be accessed during emergency situations.

Project Manager

The Project Manager provides technical support to the SHSO for health and safety decision-making. Prior to beginning onsite work, the Project Manager will ensure that employee training and medical clearance is current and up-to-date, and that site-specific safety and health concerns, have been addressed prior to field work. It is the responsibility of the Project Manager or designate to take reasonable steps to verify the following:

- Employee training is current and up-to-date.
- Each participant is informed of the known risks and physical requirements.
- Each participant is shown where remote communication devices are kept (e.g., mobile phones, radios).
- Each participant has read this HASP.
- Has determined what safety clothing and equipment is appropriate for this project.

- Company and personal equipment taken into the field is thoroughly checked for safety and in good working condition by a qualified person before it is used.
- Each participant is instructed in field safety, wearing of safety clothing (e.g., chemical resistant personal protective equipment (PPE), high-visibility reflective clothing, etc.), and safe use of equipment.
- Site-specific health and safety concerns (including but not limited to: known or suspected chemical hazards, etc.) have been addressed prior to field work.

Site Health and Safety Officer

The SHSO shall be responsible for coordinating emergency response measures during this project. Workers shall report to the SHSO in the event of an emergency. Within 24 hours of the end of fieldwork, the SHSO will submit the completed (signed) HASP to the Corporate Health and Safety Officer.

The SHSO will oversee the overall HASP. The SHSO has the authority to stop work or prohibit any personnel from working on the site at any time for not complying with any aspect of the HASP.

Field Lead

Depending on the activity (i.e., installation, monitoring, sampling, demobilization), one member of the field team will be designated as Field Lead for each field task. The Field Lead is responsible for preventing unauthorized entry onto the site, ensuring all appropriate equipment is available and ready for use, and knowing who is on site while activities are occurring.

Subcontractor Field Supervisor

The Subcontractor Field Supervisor is responsible for implementing health and safety for the subcontractor's own employees. The Subcontractor Field Supervisor will advise the SHSO immediately of any incidents or health and safety concerns on the site throughout the work via phone call and/or text. The SHSO will support the Subcontractor Field Supervisor with appropriate and immediate response.

Onsite Personnel

Persons on the site have responsibility for their own health and safety, as well as assisting others in carrying out the HASP. Any person observed to be in violation of the HASP should be assisted in complying with the HASP, or reported to the Project Manager, the SHSO, or the Subcontractor Field Supervisor.

Any site personnel may shut down field activities if there is a real or perceived immediate danger to life or health.

Minimum Training, Immunization, and Medical Surveillance Requirements for Site Personnel

Training

Field workers have received health and safety training required by Occupational Safety and Health Administration (OSHA) (29 CFR 1910.120) and Washington State Division of Occupational Safety and Health (Chapter 296-843-200 WAC), including some of the following:

- 40 hours Hazardous Waste Operations and Emergency Response (HAZWOPER)
- 8 hours Annual HAZWOPER Refresher training
- First Aid and cardiopulmonary resuscitation (CPR) training
- Annual Respirator Fit Testing
- Annual Medical Clearance

Copies of applicable personnel training certifications are presented in Attachment 2.

Medical Surveillance

The Herrera medical surveillance program is described in the corporate HASP. In summary, Herrera employees potentially exposed to hazardous substances or health hazards for 30 days or more a year will participate in the program. The medical surveillance program includes a determination of fitness for each individual to work in hazardous environments, including use of various levels of PPE. Medical examinations are conducted on a regular basis (usually annually) and each person's condition reviewed at that time. The Corporate Health and Safety Officer maintains medical records in a designated file and are available for review by each affected employee.

Immunizations

In accordance with recommendations provided by the United States Centers for Disease Control regarding immunizations for wastewater workers, Tetanus/Diphtheria (Td) immunizations shall be administered to field personnel prior to field work potentially associated with wastewater.

This page intentionally left blank

General Field Safety

The SHSO is responsible for establishing and coordinating procedures for evacuation of onsite personnel, including non-Herrera personnel, prior to commencement of work. This plan will be reviewed at the site safety meeting conducted at the beginning of the first day of work (and at subsequent site safety meetings as warranted by changing conditions and addition of new site workers). A Daily Tailgate Health and Safety Meeting Form is to be completed and signed by personnel who attended the site safety meetings (see Attachment 3).

In the event of a potential emergency, as determined by any onsite worker, the SHSO will be notified and site personnel assembled at an area designated during the site safety meeting. The Project Manager, with the aid of the SHSO and other site workers, will decide the appropriate response depending onsite conditions.

General Field Safety Requirements

- Prior to working on site, a general inspection of hazards will be made by the SHSO. SHSO is responsible for preventing unauthorized entry onto the site and for knowing who is onsite.
- Onsite field personnel must have a mobile phone capable of connecting to an emergency contact (i.e., Herrera office, local emergency service).
- Designate at least one vehicle for emergency use.
- High-visibility reflective safety vests, shirt, or jacket that is fluorescent yellow-green, orange-red, or red in color; sturdy boots; and hard hats will be worn.

Work Limitations and Restrictions

- No smoking, vaping, or lighting of matches or lighters is allowed in the work area.
- No rings, watches, bracelets, necklaces, or other jewelry that could trap chemical or biological contamination or get caught in moving equipment.
- If respiratory protection is required, no facial hair is allowed that would interfere with respirator fit.
- Employees will use the “buddy system,” which requires at least two qualified people, at all times while working in Level C PPE, when there is potential for contact with leachate or a LFG release, or working around heavy equipment.

Hazard Identification

Hazards may exist in multiple forms on the site and shall be classified among three general categories: **chemical, physical, and biological**. The following list is meant to convey the general hazard classes that may be encountered on the site. A Job Hazard Assessment (JHA) is provided in Attachment 4 and Herrera’s COVID-19 Response Plan is provided in Attachment 5.

Chemical Hazards		Physical Hazards		Biological Hazards	
X	Asbestos containing materials	X	Motor Vehicle Driving		Coliform Bacteria
X	Flammable Liquids/Gases	X	Heavy Equipment Operations	X	Wastewater
X	Metals	X	Drilling Rigs		Hospital Waste
X	Polychlorinated Biphenyl		Heavy Lifting	X	Stinging/Poisonous Insects
X	Pesticides/Herbicides	X	Slips, Trips, or Falls	X	Bacterial/Viral Agents
X	Petroleum Hydrocarbons		Confined Space Entry	X	Rodents/Vermin
X	Volatiles		Electrical Hazards		Large Predatory Animals
X	Semi-Volatiles		Explosives	X	Poisonous Snakes
X	Toxic Liquids/Gases		Radioactive Isotopes		
	Dioxins/Furans		Traffic Hazards		
X	Oxygen Deficiency		Water Hazards		
X	Polyaromatic Hydrocarbons	X	Excavation/trenches		
X	PFAS				

Potential Chemical Hazards

Chemical hazards will be evaluated both by visual examination of site conditions, as well as by use of monitoring equipment. Visual indications of potential chemical hazards include evidence of dead or dying vegetation, dead animals, discolored vegetation, or soil. Monitoring equipment to be used is discussed in under General Procedures for Air Monitoring section.

Work within waste at the Landfill has the potential for exposure to contaminants, including leachate, LFG, asbestos containing materials (ACM), PFAS, and treated wood. Following are general exposure hazards associated with exposure to leachate and LFG:

- Leachate may contain contaminants such as ammonia, organic nitrogen, pesticides, solvents and other hydrocarbons, heavy metals, gasoline derivatives, chlorinated compounds, hydrocarbons, bacteria such as tetanus, and other hazardous or toxic constituents.
- LFG poses explosion and flammability hazards. LFG contains methane (CH₄) and carbon dioxide. These gases pose an asphyxiation hazard therefore all confined or potentially confined spaces are considered asphyxiation hazards. By volume, LFG is about 50 percent CH₄ and 50 percent carbon

dioxide and water vapor. It also contains small amounts of nitrogen, oxygen, and hydrogen, less than 1 percent non-methane organic compounds (NMOCs), and trace amounts of inorganic compounds. Some of these compounds have strong, pungent odors (for example, hydrogen sulfide [H₂S]). NMOCs consist of certain hazardous air pollutants and volatile organic compounds. Nearly 30 organic hazardous air pollutants have been identified in uncontrolled LFG collected at other sites, including benzene, toluene, ethyl benzene, xylenes, and vinyl chloride.

- CH₄ is heavier than air and can collect in low-lying, poorly ventilated areas such as manholes, wastewater lines and underground vaults. CH₄ will be monitored based on the percentage of the lower explosive limit (% LEL). The LEL is defined as the minimum concentration of a constituent at which ignition will occur when present in the air. The LEL for CH₄ is 5% by volume.
 - H₂S is a colorless, flammable, and extremely hazardous gas with a “rotten egg” odor found in LFG. It occurs naturally and can also be produced by the breakdown of organic matter including solid waste. It is heavier than air and can collect in low-lying, poorly ventilated areas such as manholes, wastewater lines and underground vaults. H₂S can be smelled at low levels, but with continuous low-level exposure or at higher concentrations H₂S causes loss of smell even though it is still present. Smell should not be relied on for H₂S detection.
- ACM in MSW is typically associated with discarded building materials: asbestos-concrete pipe, insulation, floor or ceiling tiles, or other building products generated by demolition, renovation, or abatement activities; or brake pads from automobiles. ACM-related diseases result from inhalation or ingestion of asbestos fibers. Risk level depends mainly on amount of asbestos in the air, frequency and duration of exposure, and health of the person exposed.
 - PFAS chemicals are used in consumer products such as Teflon™ coatings and other materials to provide resistance to water, grease, or stains; emergency fire-fighting foam; and a wide range of other consumer and industrial products. PFAS-containing materials may have been landfilled at the Landfill prior to closure. During groundwater sampling in 2024, PFAS was observed in multiple wells.
 - Chemical preservatives used in treated wood to increase resistance to the elements, pests, microorganisms, and fungi may include creosote, chromium, pentachlorophenol, and arsenic. During exploratory soil pit excavation work at the Landfill in 2023, treated wood was exposed.

Regulatory Action Levels

The following table provides information regarding the relative toxicity of chemicals that may be found at the site based on established state or federal cleanup levels.

Petroleum Products			Volatiles		
Chemical	Matrix	Regulatory Action Level ¹	Chemical	Matrix	Regulatory Action Level ¹
Petroleum Hydrocarbons	Liquid	2000 mg/kg diesel	Vinyl Chloride	Air	1 ppm
			Benzene	Air	1 ppm
Petroleum Hydrocarbons	Liquid	30 mg/kg gasoline	Methylene Chloride	Liquid	25 ppm
-	-	-	Toluene	Air	100 ppm
-	-	-	Ethylbenzene	Air	100 ppm
-	-	-	Xylenes	Air	100 ppm
Ammonia	Liquid	NIOSH REL: TWA 25 ppm OSHA PEL: TWA 50 ppm			
Metals			Other		
Chemical	Matrix	Regulatory Action Level ¹	Chemical	Matrix	Regulatory Action Level ¹
Arsenic	Solid	3 ppb	Hydrogen sulfide	Air	10 ppm
-	-	-	Methane	Air	1,000 ppm ²
			Ammonia	Soil	NIOSH REL: TWA 25 ppm OSHA PEL: TWA 50 ppm
			Asbestos	Soil	N/A

Notes:

1. References for regulatory action levels are NIOSH Pocket Guide to Chemical Hazards 2006; NIOSH short term exposure limit (STEL) and Washington Department of Labor and Industries Permissible Exposure Limits (PELs).
2. There is not a PEL for methane because it is a simple asphyxiant rather than a toxic chemical. The value listed is a NIOSH 8-hour exposure limit.

Exposure Pathways and Permissible Exposure Limits

The following is a list of potential exposure pathways, and the PELs and time weighted averages (TWAs) for chemical and biological hazards that may be encountered on the site. The potential exposure pathways are not limited to those listed. Primary contaminants of concern in impacted soils include arsenic, chlorides, and vinyl chlorides. Acute systems of exposure along with odor thresholds and descriptions are given when that information is known. Odor thresholds are not exact and vary with susceptibility or sensitivity involved and will be discussed in the daily safety briefing.

Predominant Potential Site Chemical Hazards

Chemical (or Class)	Exposure Limits (TWA)			Other Pertinent Limits	Warning Properties/Description	Routes of Exposure Or Irritation	Acute Health Effects	Chronic Health Effects/Target Organs
	OSHA PEL	NIOSH REL	STEL					
Gasoline		LFC Carcinogenic		Carcinogenic	Fuel petroleum/ aromatic odor	Inhalation, absorption, ingestion, skin and/or eye contact	Irritated eyes, skin, mucous membranes; headache, weakness, exhaustion, blurred vision, dizziness, slurred speech, confusion, convulsion, chemical pneumonia	Carcinogen A1 – Eyes, skin, respiratory system, central nervous system, muscular neurological systems, liver and kidney cancer (benzene maximum of 3%)
Diesel	500 ppm			ACGIH TLV = 100 ppm	Fuel petroleum odor	Inhalation, ingestion, skin	Irritated eyes and respiratory system, headaches, dizziness, drowsiness, pulmonary function changes	Eyes, respiratory system, muscular neurological systems, cancer
Vinyl Chloride	1 ppm	Lowest feasible concentration	OSHA = 5 ppm	ACGIH = 1 ppm	Colorless gas with pleasant odor at high concentrations	Inhalation, ingestion, skin and/or eye contact	Irritated eyes, skin, nose, and respiratory system; dizziness, fatigue, headache, numbness and tingling of the extremities; abdominal pain, coma	Carcinogen A1 – Brain, liver, blood, central nervous system, respiratory system, lymphatic system, bone marrow (leukemia)
Asbestos	0.1 fiber/cm ³	0.1 fiber/cm ³ Lowest feasible concentration (no-effect exposure) Carcinogenic		Excursion limit = 1 fiber/cm ³ (30 min. exposure) Carcinogenic	White or greenish (chrysotile), blue (crocidolite), or gray-green (amosite) fibrous, odorless solids	Inhalation, ingestion, skin and/or eye contact	Irritated eyes, breathing difficulty, restricted pulmonary function	A1 Asbestosis (chronic exposure), interstitial fibrosis, finger clubbing, respiratory system, eyes (lung cancer)
Benzene	1 ppm	0.1 ppm Carcinogenic	OSHA = 1 ppm NIOSH = 5 ppm	IDLH = 500 ppm Carcinogenic	Aromatic odor	Inhalation, absorption, ingestion, skin and/or eye contact	Irritated eyes, skin, nose, and respiratory system; dizziness, headache, nausea, staggered gait, weakness, exhaustion, anorexia, dermatitis	Carcinogen A1 – Eyes, skin, respiratory system, blood, central nervous system, bone marrow (leukemia)
Methylene Chloride	25 ppm	Lowest feasible concentration	OSHA = 125 ppm	IDLH = 500 ppm CEILING (OSHA) = 1,000 ppm; 2,000 ppm (5 min max. peak) (10% lower explosive limit [LEL], 13,000 ppm)	Combustible colorless liquid with a chloroform- like color, sweet odor	Inhalation, absorption, ingestion, skin and/or eye contact	Irritated eyes, skin; dizziness, fatigue, headache, numbness and tingling of the extremities	Carcinogen A2 – Eyes, skin, liver, heart, cardiovascular system, central nervous system

Chemical (or Class)	Exposure Limits (TWA)			Other Pertinent Limits	Warning Properties/Description	Routes of Exposure Or Irritation	Acute Health Effects	Chronic Health Effects/Target Organs
	OSHA PEL	NIOSH REL	STEL					
Ethyl benzene	100 ppm (435 mg/m ³)	100 ppm (435 mg/m ³)	125 ppm (545 mg/m ³)	IDLH = 800 ppm (10% lower explosive limit [LEL])	Aromatic odor	Inhalation, ingestion, skin and/or eye contact	Irritated eyes, skin, and mucous membranes; dermatitis, headache, narcosis, coma	Eyes, skin, respiratory system, central nervous system
Toluene	200 ppm	100 ppm (375 mg/m ³)	NIOSH = 150 ppm (560 mg/m ³)	IDLH = 500 ppm CEILING (OSHA) = 300 ppm; 500 ppm (10 min. max. peak)	Sweet, pungent, benzene-like odor	Inhalation, absorption, ingestion, skin and/or eye contact	Irritated eyes, nose, weakness, exhaustion, confusion, dizziness, headache, dilated pupils, discharge of tears, nervousness, anxiety, muscle fatigue, insomnia, paresthesia	Eyes, skin, respiratory system, central nervous system, liver, and kidney damage
Xylenes	100 ppm (435 mg/m ³)	100 ppm (435 mg/m ³)	150 ppm (655 mg/m ³)	IDLH = 900 ppm	Aromatic odor	Inhalation, absorption, ingestion, skin and/or eye contact	Irritated eyes, skin, nose, and throat; dizziness, excitement, drowsiness, incoordination, staggering gait, corneal vacuolization, anorexia, nausea, vomiting, abdominal pain, dermatitis	Eyes, skin, respiratory system, central nervous system, gastrointestinal tract, blood, liver, kidneys
Arsenic	3 ppb (0.01 mg/ m ³)	0.7 ppb		IDLH = 2 ppm (5 mg/m ³) ACGIH = 3 ppb (0.01 mg/m ³)	Silver-gray or white metallic, odorless, brittle solid	Inhalation, absorption, ingestion, skin and/or eye contact	Drowsiness, headache, confusion, nausea, vomiting, abdominal pain, watery diarrhea, skin rash, seizure, excessive salivation	Carcinogen A1 – Skin, peripheral nervous system, bladder, liver, kidney, gastrointestinal system, bone marrow (leukemia)
Methane	-	-	-	IDLH = 5,000 ppm (10% of the LEL) Explosive in concentrations between 5 and 15% ; WISHA requires shut down at 10% of the LEL, which is 5,000 ppm.	No warning properties; colorless, odorless, and flammable gas	Inhalation	Respiratory system – non-toxic gas, but can be asphyxiating in high concentrations as it displaces the available oxygen	-
PFAS	-	-	-	US EPA = 0.004 ppt for PFOA, 0.02 for PFOS, 2,000 ppt for PFBS		Ingestion		Increased cholesterol, changes in liver enzymes, decreases in birth weight, lower antibody response to vaccines, pregnancy-induced hypertension and preeclampsia, kidney and testicular cancer

Chemical (or Class)	Exposure Limits (TWA)			Other Pertinent Limits	Warning Properties/Description	Routes of Exposure Or Irritation	Acute Health Effects	Chronic Health Effects/Target Organs
	OSHA PEL	NIOSH REL	STEL					
Hydrogen sulfide	10 ppm	10 ppm	15 ppm	IDLH = 100 ppm CEILING (OSHA) = 20 ppm (50 ppm [10 min. max. peak]) CEILING (NIOSH) = 10 ppm (15 mg/m ³) (10 min.)	Colorless gas with a strong odor of rotten eggs, but with olfactory fatigue lack of odor does not mean it is not present	Inhalation, skin and/or eye contact	Irritated eyes, respiratory system; apnea, coma, convulsion; conjunctivitis (pink eye), eye pain, discharge of tears, abnormal visual intolerance of light, corneal vesiculation; dizziness, headache, weakness, exhaustion, irritability, insomnia; gastrointestinal disturbance; liquid - frostbite	Eyes, respiratory system, central nervous system
1,2,4-trimethylbenzene		25 ppm (125 mg/m ³)			Clear, colorless liquid with a distinctive aromatic odor	Inhalation, ingestion, skin and/or eye contact	Irritated eyes, skin, nose, throat, respiratory system; bronchitis, hypochromic anemia, headache, drowsiness, fatigue, dizziness, nauseous, incoordination, vomiting, confusion, chemical pneumonia	Eyes, skin, respiratory system, central nervous system, blood
1,3-butadiene		800 ppm			Colorless gas with gasoline-like or natural gas odor	Inhalation, skin and/or eye contact	Irritation to eyes, throat, nose, lungs, frostbite, blurred vision, vertigo, general tiredness, decreased blood pressure, headache, nausea, decreased pulse rate, fainting	Eyes, skin, respiratory system, central nervous system, lungs
Naphthalene	10 ppm (50 mg/m ³)	10 ppm (50 mg/m ³)	15 ppm (75 mg/m ³)	IDLH = 250 ppm	Colorless to brown solid with mothball-like odor	Inhalation, absorption, ingestion, skin and/or eye contact	Irritated eyes; headache, confusion, excitement, malaise, nausea, vomiting, abdominal pain, irritated bladder, profuse sweat, jaundice, blood in urine, hemoglobinuria, renal shutdown, dermatitis, optical neuritis, corneal damage	Carcinogen A4 – Eyes, skin, blood, liver, kidneys, central nervous system
Ethylene dichloride	50 ppm	1 ppm (4 mg/m ³) Carcinogenic	2 ppm (8 mg/m ³)	IDLH = 50 ppm Carcinogenic CEILING (OSHA) = 100 ppm; 200 ppm (5-min. max. peak for any 3 hrs.)	Pleasant, sweet, chloroform-like odor	Inhalation, absorption, ingestion, skin and/or eye contact	Irritated eyes; corneal opacity, central nervous system depression, nauseous, vomiting, dermatitis	Carcinogen A2 – Eyes, skin, kidneys, liver, cardiovascular system, central nervous system (forestomach, mammary gland, and circulatory system cancer)
TCE	100 ppm	LFC Carcinogenic		IDLH = 1,000 ppm Carcinogenic CEILING (OSHA) = 200 ppm; 300 ppm (5 min. max. peak in any 2 hrs.)	Colorless liquid with a chloroform-like odor	Inhalation, absorption, ingestion, skin and/or eye contact	Irritated eyes, skin; headache, vertigo, visual disturbance, weakness, exhaustion, dizziness, tremors, sleepiness, nausea, vomiting, dermatitis, cardiac arrhythmias, paresthesia	Carcinogen A3 – Eyes, skin, respiratory system, heart, liver, central nervous system (liver, kidney cancer)

Chemical (or Class)	Exposure Limits (TWA)			Other Pertinent Limits	Warning Properties/Description	Routes of Exposure Or Irritation	Acute Health Effects	Chronic Health Effects/Target Organs
	OSHA PEL	NIOSH REL	STEL					
Vinyl Chloride	1 ppm	LFC Carcinogenic		Carcinogenic CEILING (OSHA) = 5 ppm (15 min.)	Colorless liquid or gas with a pleasant odor at high concentrations	Inhalation, skin and/or eye contact (liquid)	Weakness, exhaustion, abdominal pain, gastrointestinal bleeding, pallor or cyanosis of extremities, frostbite (liquid)	Carcinogen A1 – Enlarged liver, central nervous system, respiratory system, lymphatic system (liver cancer)
1,4-dichlorobenzene	75 ppm (450 mg/m ³)	Carcinogenic		IDLH = Carcinogenic [150 ppm]	Colorless or white crystalline solid with moth ball-like odor (insecticide)	Inhalation, absorption, ingestion, skin and/or eye contact	Eye irritation, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaundice, cirrhosis; in animals: liver, kidney injury	[Potential occupational carcinogen] – Liver, respiratory system, eyes, kidneys, skin
1,4-dioxane	100 ppm			CEILING (NIOSH REL) = 1 ppm	Colorless liquid or solid (below 53 degrees Fahrenheit) with a mil, ether-like odor	Inhalation, absorption, ingestion, eye and/or skin contact	Irritation to eyes, skin, nose, throat; drowsiness, headache; nausea, vomit, liver damage, kidney failure	Eyes, skin, respiratory system, liver, kidneys
Benzyl chloride	1 ppm			CEILING (NIOSH REL) = 1 ppm	Colorless to slightly yellow liquid with a pungent, aromatic odor	Inhalation, ingestion, eye and/or skin contact	Irritation to eyes, skin, nose; irritability; headache; skin eruption; pulmonary edema	Eyes, skin, respiratory system, central nervous system

PEL-TWA = Permissible Exposure Limit-Time Weighted Average (8 hours). Carcinogenicity Status (ACGIH)

REL-TWA = Recommended exposure limit – time weighted average. A1 - Confirmed human carcinogen

TLV-TWA = Threshold Limit Value-Time Weighted Average (8 hours).

STEL = Short Term Exposure Limit (15 minutes).

IDLH = Immediately Dangerous to Life or Health.

LFC = Lowest feasible concentration (no-effect exposure)

CEILING = Ceiling Limit (not to be exceeded, even instantaneously).

NIOSH = National Institute of Occupational Safety and Health

References:

ACGIH Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. 93-94.

NIOSH Pocket Guide to Chemical Hazards, U.S. Dept. of Health and Human Services, September 2005.

NIOSH Safety and Health Topic: Focus on Coal Mining – Safety Hazards, Health Hazards, and Mine Rescue, 2006.

General Procedures for Air Monitoring

Ambient air monitoring equipment will be used as a general survey tool to indicate the presence of potential airborne contamination. Air monitoring will be used periodically throughout the work period. If measurements exceed action levels, engineering controls (e.g., a blower, fan, or vacuor truck) are considered first and then respirators with appropriate cartridges are used. The following air monitoring equipment will be used during sampling:

- **Photoionization detector (PID)** – Monitors the presence of ionizable volatile organic vapors (not including methane) by measuring relative concentrations in parts per million (ppm). The PID features a 10.8 eV lamp and is calibrated daily using 100 ppm isobutylene calibration gas. Used for characterizing sample media and for determining whether volatile organic vapors present in the breathing zone at sample locations.
- **Explosimeter and four-gas monitor:** Monitors the presence of explosive vapors in the work zone area. The explosimeter will detect the percentage of LEL and percentage of oxygen in the atmosphere. The four-gas monitor also has hydrogen sulfide (H₂S) and carbon monoxide (CO) detectors, both measure concentrations in ppm.

Air monitoring equipment shall be operated according to manufacturer's instructions and applied to site decision-making according to Herrera's standard operating procedures. Air monitoring will be recorded on the Air Monitoring Equipment Calibration/Check Log and Air Monitoring Log (Attachment 6).

The action levels for chemical monitoring are listed in the following table. These action levels are general guidelines derived from the United States Environmental Protection Agency emergency response action levels and are minimum action levels to be observed during field work.

Other Monitoring Procedures During Excavation, Drilling, or Other Work in MSW

In addition to ambient air monitoring described above, ongoing visual and olfactory observations for dust, odors, and MSW material types will be conducted and recorded during any work within MSW. The intent of the monitoring is to help identify suspect materials that may contain chemical hazards and potential contaminants of concern exhumed during the work. Primary contaminants of concern from exhumed waste include methane, hydrogen sulfide, asbestos, ammonia, and treated wood. Methane and hydrogen sulfide are described in the following *Action Level Table for Chemical Monitoring*.

If asbestos, ammonia, or treated wood is observed during site operations, work will be stopped and the SHSO will be contacted. Work will not continue until a strategy for protecting worker safety is developed. This may include use of fans to blow potential contaminants away from workers, water spray to mitigate potential for airborne contaminants, and/or donning of Level C or greater PPE. This plan will be updated as needed to address contaminants of concern encountered during work within waste.

Action Level Table for Chemical Monitoring

Monitoring Instrument	Chemical (or Class)	Action Level		Monitoring Frequency/ Location	Level For Respirator* Use	Level For Work Stoppage
<input checked="" type="checkbox"/> PID <input type="checkbox"/> Flame Ionization Detector	Volatile organics	Unknown vapors: Background to 1 ppm above background: Level D 1 to 5 ppm above background (short-term exposure anticipated): Level C 5 to 500 ppm above background: Level B		Conduct initial monitoring at the beginning of task activities, and monitor breathing zone continuously throughout excavation activities.	≥5 ppm in breathing zone (continuous exposure)	5 ppm in breathing zone 50 ppm (in Level C PPE) NA in Level B PPE
<input checked="" type="checkbox"/> Four gas/LEL explosimeter (H ₂ S, CO, O ₂ , LEL)	Explosive atmosphere, toxic gases	Hydrogen Sulfide: 5 ppm Carbon Monoxide: 35 ppm Oxygen: <19.5% or >22.0%: Evacuate area; eliminate ignition sources; reassess conditions. 19.5% to 22.0%: Continue work in accordance with action levels for other instruments. Methane: 1%	Explosivity: ≤10% LEL: Continue work in accordance with action levels for other instruments; monitor continuously for combustible atmospheres. >10% LEL: Evacuate area; eliminate ignition sources; reassess conditions. >1% Methane: de-energize electrically powered equipment and shut down mechanical equipment (CFR 30-75).	Conduct initial monitoring at the beginning of task activities, and monitor breathing zone continuously throughout excavation activities.	NA	H ₂ S = 5 ppm CO = 50 ppm O ₂ < 19.5% or 22% LEL > 10% Methane = 1% NA in Level B PPE Methane = 1%

* Respirator is full face with combination cartridges.

See Attachment 6 for complete Air Monitoring Equipment Calibration/Check Log and Air Monitoring Log.

Potential Physical Hazards

Potential physical hazards that may be encountered at the site and hazard control measures are summarized in the table below.

"X" If Applicable	Hazards	Hazard Control Measures
X	Motor Vehicle Driving	<ul style="list-style-type: none"> ● Drive defensively. ● If you need to place or receive a phone call, pull off the road to a safe location and stop the vehicle before using your cell phone. Allow voicemail to handle your calls. ● Be aware of weather and road conditions when driving (i.e., heavy rain, snow; large puddles in roadway, black ice). ● Driver and passengers must wear seatbelts.
x	Heat Stress	<ul style="list-style-type: none"> ● Provide cool break area and adequate breaks. ● Provide cool non-caffeinated beverages. ● Promote heat stress awareness. ● Use active cooling devices (e.g., cooling vests) where specified.
x	Sunburn	<ul style="list-style-type: none"> ● Apply sunscreen. ● Wear hats/caps and long-sleeve shirts.
x	Cold Exposure	<ul style="list-style-type: none"> ● Provide warm break area and adequate breaks. ● Provide warm non-caffeinated beverages. ● Promote cold stress awareness.
x	Heavy Equipment Operation	<ul style="list-style-type: none"> ● Define equipment routes, traffic patterns, and site-specific safety measures. ● Maintain line of sight between equipment operators and ground personnel and that both are informed of proper hand signals and communication protocols prior to field operations. ● Ensure that lifting capacities, load limits, etc., are not exceeded. ● Ensure that field personnel do not work in close proximity to operating equipment.
x	Drilling (i.e., hollow-stem auger, push probe, etc.)	<ul style="list-style-type: none"> ● Identify/locate underground utilities prior to drilling activities. Complete Utility Clearance Log (Attachment 3). ● Wear hard hat, steel-toe boots, and noise protection. ● Maintain line of sight between drillers and field personnel.
x	Excavation/Trenching	<ul style="list-style-type: none"> ● Ensure that any required sloping or shoring systems are approved as per 29 CFR 1926 Subpart P. ● Identify/locate underground utilities prior to excavation/trenching activities. Complete Utility Clearance Log (Attachment 3). ● Identify special PPE and monitoring needs if personnel are required to enter approved excavated areas or trenches. ● Maintain line of sight between equipment operators and personnel in excavations/trenches. ● Suspend or shut down operations at signs of cave in, excessive water, defective shoring, changing weather, or unacceptable monitoring results.
x	Noise	<ul style="list-style-type: none"> ● Establish noise level standards for onsite equipment and operations. ● Inform personnel of hearing protection requirements. ● Define site-specific requirements for noise monitoring.

"X" If Applicable	Hazards	Hazard Control Measures
x	Holes, Ditches, Excavations	<ul style="list-style-type: none"> ● Mark off the edge of holes, ditches, or excavations with barricades or flagging. ● Field personnel shall remain several feet back from the edge of the excavation. ● Provide for possible emergency egress (e.g., ladder, full body harness, tripod) if entering holes, ditches, or excavations is required. ● Use appropriate safety gear (e.g., lanyard) to minimize the potential of falling into holes, ditches, or excavations, if needed.
	Confined Space	<ul style="list-style-type: none"> ● Ensure compliance with 29 CFR 1910.146. ● Complete a confined space entry form. ● Attach permit for confined space entry.
x	Oxygen Deficiency	<ul style="list-style-type: none"> ● Monitor oxygen level in work zone. ● Do not enter area if oxygen level is less than 19.5 percent. ● Use SCBA if area has less than 19.5 percent oxygen.
	Electrical	<ul style="list-style-type: none"> ● Locate and mark energized lines. ● De-energize lines as necessary. ● Ground all electrical circuits. ● Guard or isolate temporary wiring to prevent accidental contact. ● Evaluate potential areas of high moisture or standing water and define special electrical needs.
x	Fire / Explosion	<ul style="list-style-type: none"> ● Inform personnel of the locations(s) of potential fire/explosion hazards. ● Establish site-specific procedures for working and handling around flammables. ● Ensure that appropriate fire suppression equipment and systems are available and in good working order. ● Do not drive or park vehicles on dry vegetation during the dry season (April through October). ● Define requirements for intrinsically safe equipment. ● Identify special monitoring needs. ● Remove ignition sources from flammable atmospheres. ● Coordinate with local fire-fighting groups regarding potential fire/explosion conditions. ● Establish contingency plans and review daily with team members.
	Traffic Hazards	<ul style="list-style-type: none"> ● Establish a traffic control plan; contact local agencies for permits. ● Wear bright orange reflective vests, hard hats, and steel-toed boots when working within or alongside traffic. ● Barricade off work area and provide traffic signs as necessary, to direct traffic away from work area.
X	Slips, Trips, Falls	<ul style="list-style-type: none"> ● Be aware of obstacles, such as cords, tools, and other equipment that may be present on the ground in the work area. ● Identify and mark areas that are potentially slippery (e.g., wet or oily surfaces) with spray paint or flagging and walk around them. ● Use handholds. ● Wear boots with good traction.

Heat and Cold Stress

The SHSO will monitor weather broadcasts before the start of outdoor work each day, and more frequently as necessary. No work will be done outdoors during hazardous weather conditions (e.g., lightning storms).

For Heat Stress

- For temperatures above 75°F, each person will take their pulse at rest. At breaks, the pulse should be less than 110 beats per minute after one minute. Before returning to work, the pulse should be no more than 10 beats greater than the resting pulse.
- If the air temperature is greater than 89°F, work should be done for 30 minutes with a rest break of 10 minutes for Level 'D'. For Level 'C', work should be done for 20 minutes, with a rest break of 10 minutes. At least 8 ounces (1 cup) of non-caffeinated drinks, such as cool potable water, Gatorade-type drink, or dilute fruit juice should be consumed at each rest break or at least 1 cup every 20 minutes. At least 1 quart of cool liquids per employee per one hour is to be readily accessible at all times.
- Work should stop if any of the following symptoms occur: muscle spasm and/or pain in the limbs or abdomen (heat cramps); weak pulse, heavy sweating, dizziness, and/or fatigue (heat exhaustion); or rapid pulse, no sweating, nausea, dizziness, and/or confusion (heat stroke). Provide first aid immediately.
- Use sunscreen on unprotected skin to protect against ultraviolet exposure as necessary.

For Cold Stress

- For temperatures below 40°F, adequate insulating clothing must be worn. If the temperature is below 20°F, workers will be allowed to enter a heated shelter at regular intervals. Warm sweet drinks should be available. Coffee intake should be limited.
- No one should begin work or return to work from a heated shelter with wet clothes. Workers should be aware of signs of cold stress such as heavy shivering, pain in the fingers or toes, drowsiness, or irritability. Onsets of any of these signs are indications for immediate return to a heated shelter.

General Procedures Associated with Excavation and Trenching Activities

This section applies to all excavation and trenching work including, but not limited to, excavation and trenching activities for equipment installation, embankments, exploratory test pits, and all other construction work involving excavations.

A number of hazards are inherent to excavation work such as cave-ins, falling and rolling objects, falls, heavy equipment, buried utilities, hazardous atmospheres, etc. All field personnel must use extreme caution when working near excavations to minimize the potential for accidents. Excavations greater than

4 feet in depth require sloping or protective systems to prevent cave-ins. Field personnel will avoid entering excavations whenever possible. When soil sampling at excavation sites, samples will be collected from backhoe buckets or from soil sampling tools fitted to extension rods whenever possible to avoid entering excavations.

Washington State Division of Occupational Safety and Health has established safety standards for construction work involving excavation and trenching under Chapter 296-155 WAC, Part N. Field personnel participating in excavation and trenching projects shall familiarize themselves with these standards. The following section presents a summary of 12 general protection requirements established for excavation and trenching work:

1. **Surface encumbrances.** Surface encumbrances (obstructive objects) shall be removed as necessary to safeguard workers.
2. **Underground installations.** All underground utility installations shall be located prior to commencement of excavation work. Utility companies or owners shall be contacted prior to excavation work, advised of the work to be performed, and asked to locate utilities prior to excavation work. Where immediately present, underground utilities will be exactly located and shall be protected, supported, or removed as necessary to safeguard employees.
3. **Access and egress.** A means of egress (stairway, ladder, ramp, or other) shall be provided every 25 feet in excavations more than 4 feet in depth. A qualified person shall design ramps.
4. **Exposure to vehicles.** When working in the presence of vehicular traffic, employees shall wear high visibility or reflective warning vests or other suitable garments.
5. **Falling loads.** Employees shall not be permitted beneath loads handled by lifting or digging equipment and shall stand away during loading and unloading activities to avoid being struck by spilling or falling materials.
6. **Warning systems for mobile equipment.** When mobile equipment is operated adjacent to an excavation and the operator does not have a clear view of the edge, a warning system such as barricades, signals, or stop logs shall be utilized.
7. **Hazardous Atmospheres.** Appropriate monitoring and protective measures will be implemented to protect employees from oxygen deficient, explosive, and toxic atmospheres. Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or basket stretcher, shall be readily available when hazardous conditions are or may be present. Action levels for protective measures, such as evacuation, breathing apparatus, or ventilation, are described in the chemical monitoring table above.
8. **Accumulation of water.** Employees shall not work in excavations where water is present or is accumulating unless adequate precautions have been taken such as water removal measures, or use of a safety harness and lifeline. Use of water removal equipment or other protective measures will be monitored at all times by a qualified person.
9. **Stability of adjacent structures.** Employees shall not work in excavations where the stability of buildings, walls, sidewalks, pavement, or other structures may be endangered by excavation operations unless support systems are provided to support such structures. Excavation below the

base or footing of any foundation or retaining wall except when: a support system is provided; the excavation is in stable rock; or a professional engineer has determined the structure will not affect the building or will not pose a threat to employees.

10. **Loose rock or soil.** Employees shall not enter or work in excavations without adequate protective measures where loose rock or soil could pose a hazard by falling or rolling from an excavation face. Protective measures may include scaling loose material or installing protective barricades. Employees also shall not enter excavations where equipment or stockpile material could pose a hazard by falling or rolling. Stockpiled material and equipment shall be kept a minimum of 2 feet from the edge of the excavation unless retaining devices are used.
11. **Inspections.** Excavations and the immediate surrounding area shall be inspected daily by a competent person for indications of conditions that could result in cave-ins, failure of protective systems, hazardous atmospheres, or other hazardous conditions. Inspections shall be made at the start of each day, periodically throughout the work shift, and after every rainstorm. HEC employees shall not enter excavations where potentially hazardous conditions have been determined to exist.
12. **Fall Protection.** Employees shall not cross over excavations unless adequate bridges or walkways with standard handrails have been provided. Adequate physical barrier protection will be provided at remotely located excavations.

Noise

A noise hazard exists when working in the immediate vicinity of backhoe, drill rig, and other heavy machinery operations, as well as along busy roads and highways. In addition to the potential for hearing damage, noise may interfere with critical communication and recognition of other potential hazards at the work site, such as moving vehicles. To minimize potential injuries, field employees will utilize hearing protection devices, (ear plugs, headphones), as necessary, and maintain a high level of alertness at all times.

Potential Biological Hazards

There is a potential for encounters with stinging/poisonous insects while in the field. This hazard will be discussed during the daily tailgate safety meeting to determine if any workers onsite have known allergies to stinging insects and emergency medical attention will be sought as necessary.

Stinging Insect Allergies

Allergic Reaction Symptoms

The majority of stinging insects in the United States include bees, yellow jackets, hornets, and wasps (fire ants are also considered stinging insects, but are prevalent in the southeastern U.S.). The degree of allergy varies widely. Most people who are not allergic to insect stings generally experience localized pain, itching, swelling, and redness at the sting site (localized reaction). A single bite or sting may result in a localized reaction, but multiple bites or stings may lead to more severe allergic reactions (systemic reaction, where the entire body is affected). The most serious is called anaphylaxis, which can be life-

threatening if left untreated immediately. Severe allergic reactions are suspected if a person experiences any of the following symptoms:

- Hives (intense itching at sites other than the sting site)
- Difficulty breathing and/or swallowing
- Hoarseness
- Swelling of the tongue
- Vomiting and/or nausea
- Dizziness and/or fainting

These reactions usually occur within minutes of the sting, but have been known to be delayed up to 24 hours. Persons who have allergic reactions to stinging insects will have a worsened reaction to every subsequent sting. Prompt treatment is essential and emergency help is often needed.

Field personnel who have severe allergic reactions to stinging insects should wear a Medic Alert bracelet or necklace describing their allergy. They should also be prepared when going into the field by carrying with them a bee sting kit (a doctor-prescribed self-injection device with epinephrine [adrenaline]; i.e., Epi-Pen). **Inform team members of your allergy and how to use the bee sting kit before heading out into the field.**

Avoid Getting Stung

The US Department of Agriculture recommends the following:

- When walking single-file on a trail, allow enough space between the front person and the next person, so that if the front person disturbs an insect nest, the next person does not run into agitated insects.
- Avoid wearing brightly colored, white, or pastel clothing. Studies have found that bees find black color very irritating and blue is comforting to them.
- Don't use cosmetics, hairspray, perfume, or cologne, as well as insect repellent when in the field.
- Food odors attract insects, especially yellow jackets, so be alert when eating outdoors. Avoid open food, as in garbage cans, dumps, and open picnic areas.
- Avoid disturbing likely beehive sites, such as large trees, tree stumps, logs, and large rocks. Yellow jackets nest in the ground and in walls. Hornets and wasps often nest in bushes, trees, and under roofs. Use caution with unusual forms in walls and mounds on the ground.
- If a colony is disturbed, run and find cover as soon as possible. Running in zigzag pattern may be helpful.
- Cover as much of the head and face as possible, without obscuring vision, while running.
- Never stand still or crawl into a hole or other space with no way out.

- Do not slap at the bees. Bees are generally not aggressive and will usually not sting unless disturbed or injured.
- Once clear of stinging insects, remove stingers and seek medical care.

If Stung by a Stinging Insect:

13. Call emergency medical services if:

- Field personnel have a history of severe reactions to insect stings
- Experiencing any severe symptoms listed above
- Multiple stings, even for persons not known to have allergic reactions
- Stung in the mouth or nose, even for persons not known to have allergic reactions to stings, since they can lead to swelling and interfere with breathing

14. **Determine if the stinger is still present** (look for a small black dot at the sting site) and remove it immediately if is visible. Bee stingers are barbed stingers with a venom sac attached; it takes 2-3 minutes to release all of its venom, so prompt removal of the stinger can reduce the severity of the sting. Avoid removing the stinger by pinching it; otherwise, more venom is injected into the skin. Use a hard object like a credit card or blunt knife to swipe over the area to remove (“flick”) the stinger. Wasps, yellow jackets, and hornets have stingers without barbs that are usually retracted upon stinging; these insects can sting people multiple times.

15. **Apply ice or cold packs** to the area to reduce the body’s inflammatory response.

16. **Clean the area with soap and water**, then apply hydrocortisone cream to the site to decrease the severity of the reaction. Alternative treatments include applying a paste of meat tenderizer and water or baking soda and water.

17. **Administer an antihistamine**, such as Benadryl (diphenhydramine) and/or non-prescription pain relievers such as ibuprofen or acetaminophen.

This page intentionally left blank

Personal Protective Equipment Requirements

Level of Protection

- **Level B:** SCBA or supplied-air respirator with an escape bottle, chemically resistant suit.
- **Level C:** Full-face air-purifying respirator with organic vapor and acid gas cartridges, chemically resistant PPE.
- **Level D:** No respiratory protection. Safety glasses, hard hat, sturdy boots, long-sleeved shirt and pants. Hearing protection, gloves (an inner disposable nitrile glove and outer chemical resistant glove), and other PPE as required.

To protect workers from potential contaminants in sample media, protective clothing will be worn during sampling activities, including Tyvek coveralls, protective eyewear, and chemical resistant boots and gloves. Protective clothing will be discarded or decontaminated between uses.

The following levels of protection (LOPs) have been selected for each work task based on an evaluation of the potential or known hazards, the routes of potential hazard, and performance specifications of the PPE. Onsite monitoring results and other information obtained from onsite activities will be used to modify LOPs and PPE as necessary to ensure sufficient personnel protection.

Work Task Number	D	C	B	Modifications Allowed
All Tasks	X	-	-	No

Note: Use "X" for initial levels of protection. Use "(X)" to indicate LOPs that may be used as site conditions warrant.

Personal Protective Equipment

Personnel who perform work on site will be minimally required to meet the protective clothing and safety equipment requirements for Level D (minimum required PPE for Level D in the following table is marked by an "*"). Level D status will apply to fieldwork on the site unless the trigger mechanism(s) to Level C or B are activated. The SHSO must notify the Corporate Health and Safety Officer prior to work if Level "C" or "B" is warranted.

PPE	Task 1 and 12	Tasks 2 through 11
Protective face mask per COVID-19 precautions		
*Safety glasses/goggles	X	X
*Cotton coveralls/long-sleeved shirt and pants	X	X
Rain gear or Tyvek suit for splash protection		X
*Hard hat (required at all construction sites)	X	X
*Steel-toed safety boots (as per ANSI Z41)	X	X
*Work gloves	X	X
Neoprene safety boots (as per ANSI Z41)		
Solvex or nitrile gloves (for sample handling, Tasks 2, 3, 4, and 11)		X
Ear plugs/muffs		X
Reflective safety vest	X	X

* Represents minimum required PPE for Level D work.

Safety Equipment

The safety equipment in the following table that is marked by an "X" indicates safety equipment needed for each work task.

Safety Equipment	Tasks 1 and 12	Tasks 2 through 11
*First-aid kit	X	X
*Emergency eye wash	X	X
*Fire extinguisher (Class A, B, C)	X	X
*4-gas monitor		X

* Represents minimum required safety equipment.

Decontamination

Following are the decontamination procedures that will be employed to prevent contamination of personnel and to prevent cross contamination of sampling equipment during the collection of samples.

Personnel Decontamination

Decontamination Solutions:	Hand sanitizer
Decontamination Method:	Remove rain gear; remove and dispose of gloves; wash hands and face with hand sanitizer and wipe dry with paper towel.
Exposure Monitoring:	None
Level of Protection:	D
Location:	Support zone

Some of the personnel protective clothing that may be used, such as Tyvek suits and gloves, are disposable and no decontamination required following use.

Sampling Equipment Decontamination

A decontamination station shall be set up daily during sampling activities. The location of the decontamination station may vary based on the location of sampling activities. Bucket used for sample collection and flow measurement will be decontaminated. The station shall include one or more of the following items:

- Hand sanitizer for hands and face after disposable gloves and rain gear is removed.
- A bucket or tub with a Liquinox soap/water solution and a brush for scrubbing boots, rain gear, gloves, and other non-disposable PPE.
- A second bucket or tub filled with tap or deionized water for rinsing
- Sprayer with potable water used for final rinse.

This page intentionally left blank

Waste Characteristics

Waste Generation

Waste Anticipated:

Yes: No:

Waste Type	Description	Quantity	Disposal and/or Treatment
Solid	Potentially contaminated soil, waste.	To Be Determined	Bury with other waste at the Landfill unless otherwise determined by Ecology.
Liquid	Leachate	Not anticipated	Tank or lined structure
Debris	Materials on site at Action Materials, including sheet metal, lumber, full and empty drums, an abandoned truck, glass, hydraulic ram, tires, sheds.	Up to 1,000 cubic yards	Drums with material will be tested for proper disposal.
Sludge	-	Not anticipated	Not anticipated
Incidental	Used disposable gloves, paper towels	1 bag	Plastic trash bag
Other	-	-	

Training, Immunization, and Medical Clearance

Following is a summary of training, immunization, and/or medical clearance information for personnel who will perform work on the site. Copies of personnel training certificates are presented in Attachment 2.

1.	Name:	Nigel Baummer	Title:	SHSO	Approved personal protection level:	C
Field Responsibilities:			Every Task			

Training	Dates (Month/Year)
Current 8-Hour Refresher	March 2024
40-Hour Hazardous Waste	July 2016
First Aid; CPR	September 2020
Immunization: Tetanus/Diphtheria	July 2018
Other:	-

2.	Name:	Michael Spillane	Title:	Project Manager	Approved personal protection level:	C
Field Responsibilities:			Every Task			

Training	Dates (Month/Year)
Current 8-Hour Refresher	March 2024
40-Hour Hazardous Waste	July 2016
First Aid; CPR	September 2020
Immunization: Tetanus/Diphtheria	July 2018
Other:	-

3.	Name:	Dylan Anslow	Title:	Field Staff	Approved personal protection level:	D
Field Responsibilities:			Task 12			

Training	Dates (Month/Year)
Current 8-Hour Refresher	N/A
40-Hour Hazardous Waste	N/A
First Aid; CPR	N/A
Immunization: Tetanus/Diphtheria	September 2020
Other:	-

4.	Name:	Bernie Alonzo	Title:	Field Staff	Approved personal protection level:	D
Field Responsibilities:			Task 12			

Training	Dates (Month/Year)
Current 8-Hour Refresher	N/A
40-Hour Hazardous Waste	N/A
First Aid; CPR	N/A
Immunization: Tetanus/Diphtheria	2022
Other:	-

Health and Safety Plan — Acknowledgement and Agreement Form

The following field personnel have read this HASP and understand the potential and actual hazards present on the site and shall abide by its strictures.

Nigel Baummer			Herrera	
Name		Signature	Company	Date
Name		Signature	Company	Date
Name		Signature	Company	Date
Name		Signature	Company	Date
Name		Signature	Company	Date
Name		Signature	Company	Date
Name		Signature	Company	Date

This page intentionally left blank

Attachment 1

Injury/Exposure Report and Site Incident Report

This page intentionally left blank



INJURY/EXPOSURE REPORT

(Attach additional documentation as necessary.)

Date of Incident: _____ Case No. _____ Time of Day _____
Employee Name _____ Date of Birth _____
Home Address _____ Phone No. _____
Sex Male ___ Female ___ Age ___ Job Title _____ Social Security No. _____
Office Location _____ Date of Hire _____
Where did incident occur? (include address) _____

On employer's premises? Yes ___ No ___ Project Name/No. _____
What was employee doing when incident occurred? (be specific) _____

How did the incident occur? (describe fully) _____

What steps could be taken to prevent such an incident? _____

Object or substance that directly caused incident? _____

Describe the injury or exposure _____
Part of body affected _____
Name and address of physician _____
If hospitalized, name and address of hospital _____

Loss of one or more days of work? Yes ___ No ___ If yes, date last worked _____
Has employee returned to work? Yes ___ No ___ If yes, date returned _____
Did employee die? Yes ___ No ___ If yes, date _____

Completed by (print) _____ Employee signature _____
(Supervisor or Site Health & Safety Officer) Date _____
Signature _____ PIC Signature _____
Date _____ Date _____

This report must be completed by the employee's supervisor or Site Health and Safety Officer immediately upon learning of the incident. The completed report must be reviewed and signed by the Principal-in-Charge and transmitted to Corporate Health and Safety Officer within 24 hours of the incident, even if employee is not available to review and sign. Employee or employee's doctor must submit a copy of the doctor's report to Corporate Health and Safety Officer within 24 hours of the initial exam and any subsequent exams. For field injuries, submit a copy of the Health and Safety Plan.

Attachment 2

Personnel Training Certificates

This page intentionally left blank



Student Affiliation:

ERM Inc

9810961

This is to certify that

Nigel Baummer

has successfully completed training and passed all testing requirements for

***40-Hour HAZWOPER Initial Training
as per 29 CFR 1910.120(e)***

Presented This

Monday, July 18, 2016

Compliance Solutions Occupational Trainers, Inc.

Certificate Number: 754925143

Jeffrey Kline

President/CEO

This page intentionally left blank

Attachment 3

Daily Tailgate Health and Safety Meeting Form

This page intentionally left blank



DAILY TAILGATE SAFETY MEETING FORM

First Date of Activity: _____ Time: _____ Site Locations: _____

1. Discussed activities planned for the day
2. Individual activities are clear to each crew member
3. Physical hazards discussed
 - a. Heat stress
 - b. Cold stress
 - c. Slip, trip, and fall hazards
 - d. Water hazards (streams, boats)
 - e. Traffic hazards
 - f. Remote, forested, or hazardous areas
 - g. Heavy equipment
 - h. Other:
4. Biological hazards discussed
 - a. Stinging insect allergies
 - b. Other:
5. Personal protective equipment (PPE) discussed
 - a. Head protection (hard hat)
 - b. Eye protection (safety glasses must have side shields)
 - c. Hearing protection (at all times when working in or around traffic, heavy equipment)
 - d. Foot protection (steel toes and shanks for work boots)
 - e. Splash protection (solvent rinse)
 - f. Gloves
 - i. Environmental conditions (cold)
 - ii. Protection against cross-contamination (disposal after each use)
 - iii. Physical hazard (cut, puncture, and abrasion)
6. Decontamination procedures discussed
 - a. PPE equipment (rain gear, waders)
 - b. Sampling equipment
7. Emergency procedures discussed
 - a. Route to hospital from site locations(s) above
 - b. Evacuation procedures
 - c. Cellular phone, map to hospital, first aid kit, and eyewash with Site Health and Safety Officer/Field Lead
8. Special conditions/procedures
 - a. Escort required
 - b. Locked gates, permits, passes, etc.
9. Questions/concerns addressed
10. Other:

Meeting attended by (sign and date for each day of work on site; **USE BACK IF ADDITIONAL SPACE IS REQUIRED**):

(Print Name)	(Signature)	(Date)
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Meeting conducted by: _____ (Title) _____





UTILITY CLEARANCE LOG

Project Name _____ Date _____

Project Number _____

"One-Call" Confirmation Number and Date Contacted _____

"One-Call" Expiration Date _____

Subcontractor Locating Firm and Invoice Number _____

Facility Contact Person and Telephone Number _____

Facility Drawings Reviewed _____

Verbal/Written Sign-Off of Clearance By Facility Contact _____

Pressurized Lines/Shut-Off Valves Identified* _____

Underground Utilities/Lines Identified* _____

Underground Utilities/Lines Marked On Site By _____

Overhead Utilities/Lines Identified* _____

Overhead Utilities/Lines Marked On Site By _____

*Mark on copy of facility drawing or site sketch in HASP.

Clearance Contact:

Name (Herrera Employee Only) Signature Date

Clearance Reviewed By:

Name (Herrera Project Manager) Signature Date

Attachment 4

Pre-Activity Safety Plan

This page intentionally left blank

Pre-Activity Safety Plan

*This form is intended for simple site reconnaissance work and/or work on sites with minimal hazards. Detailed safety plans must be prepared for all other field work on more complex sites with conditions and hazards outlined in the General Field Survey Safety Plan or Site-Specific Health and Safety Plan (for contaminated sites). **This PASP does not cover or authorize confined space entry or work within HAZMAT areas.**

Trip Information	Purpose of Trip (check all that apply)
Date: 2024-2026	<input checked="" type="checkbox"/> General Site Reconnaissance
Destination: Marshall, WA	<input type="checkbox"/> Building or Roadside Investigation
Project Name: Marshall Landfill Cleanup and Closure, CSID 1022	<input checked="" type="checkbox"/> Construction Site
Project Number: 21-07716-000	<input type="checkbox"/> Other:

Potential Hazards (check all that apply)	Corresponding Mitigation & PPE Requirements
<input type="checkbox"/> Do any field teammates have allergies or medical conditions to be aware of (bee stings, food allergies, other)?	Bring Benadryl and any doctor-prescribed medicines (i.e., Epipen, etc.) with you in the field along with a first aid kit.
<input type="checkbox"/> Active or Posted Construction Site	Check in with the Site Manager for safety briefing. Wear safety vest, safety glasses, hardhat, steel-toed boots, and gloves if required. Practice situational awareness, and make positive contact with equipment operators before entering their immediate work area.
<input checked="" type="checkbox"/> Slips, Trips, Falls	Wear boots and leather gloves; watch your step; proceed slowly; and pick your path carefully.
<input type="checkbox"/> Water hazard, moving current, etc.	Stay 6 feet away from stream bank; use buddy system.
<input type="checkbox"/> Noise	Wear hearing protection.
<input checked="" type="checkbox"/> Environmental Conditions (Rain, Snow, Cold, Sun, Heat, Low Visibility, Plants, Wildlife)	Proper clothing, hat, sunglasses, sunscreen, and maintain hydration. Flashlight or headlamp. Gloves, long sleeves, trousers around known poisonous plants. Whistle and bear spray for work in remote area.
<input checked="" type="checkbox"/> Hand Hazards (cuts, bio, chemical, needles)	Wear gloves (leather work gloves, nitrile gloves, etc.).
<input checked="" type="checkbox"/> Exposure to Dust (dust, bird droppings, hantavirus)	Wear KN95 dust mask (no fit test required); avoid kicking up or stirring up dust.
<input checked="" type="checkbox"/> Steep Slopes & Fall Hazards (slopes, ladders, etc.)	Don't attempt walking any slope >45 degrees. Zig zag up or down; proceed slowly; and watch for uneven surfaces and tripping hazards. Check ladders for condition and proper set-up.
<input checked="" type="checkbox"/> Asbestos and Lead Paint	Do not disturb surfaces or materials.

Pre-Activity Safety Plan

Potential Hazards (check all that apply)	Corresponding Mitigation & PPE Requirements
<input checked="" type="checkbox"/> Excavations and Trenches	Practice situational awareness: Proper shoring in place, ground stability. No entry into trenches >4 feet deep allowed.
<input checked="" type="checkbox"/> Electrical Hazards and utilities	Be aware of overhead wires, underground electrical utilities, exposed wiring, etc.
<input type="checkbox"/> Exposure to Fumes (paint, pesticides, solvents)	Stay away from onsite sources or leave the site.
<input type="checkbox"/> Traffic	<ul style="list-style-type: none"> ● Wear high visibility safety vest. ● Do not cross traffic. ● Do not pull over or park vehicle unless it is fully outside of the fog line or in other right-of-way pull outs off of the highway. Use portable vehicle safety lights when parked in right of way. ● Be aware of opening car doors in traffic. Do not flag or direct traffic. ● Practice situational awareness at all times. Driver should not be operating cell phone, iPad, GPS, or be taking notes while driving.
<input checked="" type="checkbox"/> Other?	Majority of work is taking place on a closed landfill. Work related to exhuming waste (exploratory borings, construction of closure, installation of landfill gas probes) requires review and signature of the Site Specific Health and Safety Plan.

Pre-Activity Safety Plan

Personal Protective Equipment (PPE)	Other Equipment	
<input checked="" type="checkbox"/> Hard Hat <input checked="" type="checkbox"/> Safety Vest <input checked="" type="checkbox"/> Safety Glasses (ANSI Z87) <input checked="" type="checkbox"/> Gloves (leather, latex, rubber)* <input checked="" type="checkbox"/> Safety-toe boots <input checked="" type="checkbox"/> Ear Protection <input checked="" type="checkbox"/> KN95 Dust Mask <input checked="" type="checkbox"/> First Aid Kit/CPR Kit <input type="checkbox"/> Other _____	<input checked="" type="checkbox"/> Cell Phone (required) <input type="checkbox"/> Flashlight, headlamp <input type="checkbox"/> Blanket <input checked="" type="checkbox"/> Potable Water <input type="checkbox"/> Clip Board <input checked="" type="checkbox"/> Note Pad and Pens <input checked="" type="checkbox"/> Drawing Set & Scope of Work <input checked="" type="checkbox"/> Tape Measure <input type="checkbox"/> Measuring Wheel	<input checked="" type="checkbox"/> Sun (hat, sunglasses, sunscreen) <input type="checkbox"/> Bear spray and whistle <input checked="" type="checkbox"/> Fire Extinguisher <input type="checkbox"/> Road Flares <input type="checkbox"/> Traction Chains <input type="checkbox"/> Yellow Strobe <input checked="" type="checkbox"/> GPS Unit <input type="checkbox"/> Other _____

Pre-Activity Safety Plan

Brief Description of Planned Work Activities and Schedule:

Herrera is scoped to provide engineering services for a traditional design-bid-build public works project in conformance with Revised Code of Washington (RCW) 39.04 to provide remedial action at a former municipal solid waste (MSW) landfill per the requirements set forth in Washington Administrative Code (WAC) 173-340. Site work associated with the project includes, but is not limited to, the following:

- General site visits to assess existing conditions.
- Site survey.
- Subsurface exploratory excavation work to identify lateral extent of existing landfilled waste and to assess site conditions at a proposed infiltration pond.
- Installation and sampling of groundwater monitoring wells, including decommission of existing groundwater monitoring wells.
- Installation of landfill gas (LFG) monitoring probes, including follow-up sampling.
- Serpentine monitoring to assess potential for LFG migration through the existing cap.
- Construction oversight and support.

Pre-Activity Safety Plan

Hospital Information

Hospital Name: MultiCare Deaconess Hospital

Address:* 800 West 5th Avenue, Spokane, WA 99204

Phone Number: 509.473.5800


*See maps on next page.

Emergency Contact Information

Herrera Principal-in-Charge	Michael Spillane	Office Phone:	206.707.8201
		Cell Phone:	206.909.4343
Herrera Project Manager	Michael Spillane	Office Phone:	206.707.8201
		Cell Phone:	206.909.4343
Herrera Field Lead / Site Health and Safety Officer (SHSO)	Nigel Baummer	Cell Phone:	443.517.9787
Client Project Manager	Christer Loftenius	Cell Phone:	509.385.8380

Post Route To Hospital Map and Directions Here

← from Cheney School District, Washington
to MultiCare Deaconess Hospital, 800 W 5th Ave, ...

16 min (9.6 miles) 

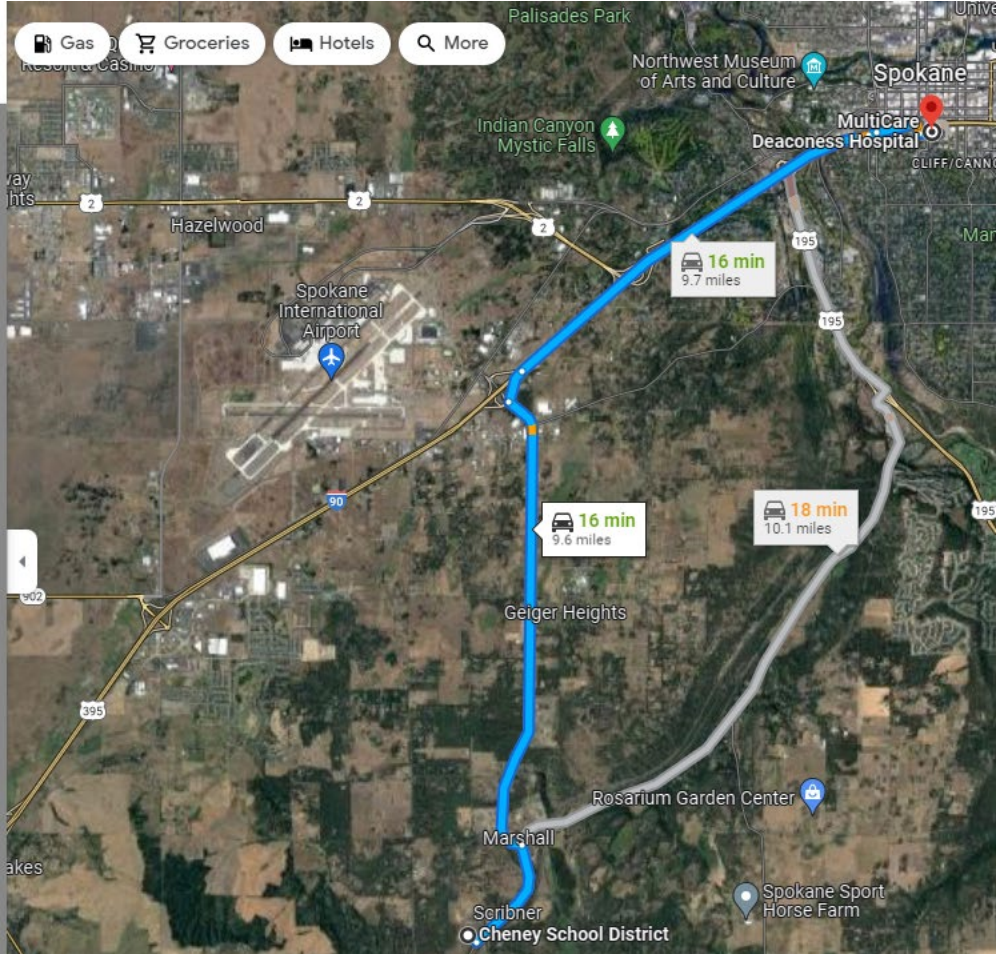
via S Grove Rd and I-90 E
Best route now due to traffic conditions

Cheney School District
Washington

- > Take S Grove Rd and I-90 E to W 5th Ave in Spokane
14 min (9.4 mi)
- > Continue on W 5th Ave to your destination
2 min (0.2 mi)

MultiCare Deaconess Hospital
800 W 5th Ave, Spokane, WA 99204

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



The map displays a satellite view of the Spokane, WA area. A blue route is plotted from the Cheney School District (Scribner) in the south to MultiCare Deaconess Hospital in the north. The route starts on S Grove Rd, heads north, and then turns east onto I-90 E. It then turns south onto W 5th Ave to reach the hospital. Key locations along the route include Geiger Heights and Marshall. Other landmarks shown include Spokane International Airport, Indian Canyon Mystic Falls, Palisades Park, Northwest Museum of Arts and Culture, and Spokane Sport Horse Farm. The map also shows major roads like I-90, I-195, and SR-2.

Plan Approval and Signatures

This form must be reviewed and approved by the Corporate Health and Safety Officer or a designee from the Health and Safety Committee prior to mobilizing to the field. This form must also be reviewed and signed by all Herrera field staff who mobilize to the field. If conditions are different than anticipated or if conditions change, update this form below and have all field staff initial the changed conditions described.

Plan Preparation and Review

	Name	Signature	Date
Plan Prepared By:	Nigel Baummer		3/22/2024
Corp. Health & Safety Officer or Designee Review:	Nigel Baummer		3/22/2024
Field Staff:			
Field Staff:			
Field Staff:			
Field Staff:			
Field Staff:			
Field Staff:			
Field Staff:			
Field Staff:			

Changed Conditions Upon Arrival On Site? Describe unanticipated conditions encountered if any.

This page intentionally left blank

Attachment 5

Groundwater Sampling Health and Safety Plan

GEOENGINEERS, INC.
SITE HEALTH AND SAFETY PLAN
MARSHALL LANDFILL GROUNDWATER MONITORING
FILE NO. 0504-104-01

This Health and Safety Plan (HASP) is to be used in conjunction with the GeoEngineers, Inc. (GeoEngineers) Safety Programs. Together, the written GeoEngineers' safety programs and this HASP constitute the site safety plan for this subject site. This HASP is required by the Hazardous Waste Operations and Emergency Response (HAZWOPER) regulation (29 Code of Federal Regulations [CFR] 1910.120) when performing mandatory or voluntary clean-up operations and initial investigations conducted to determine the presence or absence of hazardous substances unless the employer can demonstrate that the work does not involve employee exposure to safety and health hazards from hazardous substances at the site. This HASP is to be used by GeoEngineers' personnel on this site and must be available on site, as well as in project Safety folder on Sharepoint.

Standard HASPs will have to be reviewed and approved at least by the GeoEngineers' Project Manager (PM) and the Site Safety Officer (SSO). The PM will need to send an email to GeoEngineers' Health and Safety Manager (HSM) indicating the availability of the final copy of the approved standard HASP on SharePoint for review and/or reference.

All HASPs and/or HCPs are to be used in conjunction with current standards and policies outlined in the GeoEngineers' Health and Safety Programs.

Liability Clause: If requested by subcontractors, this site HASP may be provided for informational purposes only. In this case, Form 1 of this HASP shall be signed by the subcontractor. Please be advised that this site-specific HASP is intended for use by GeoEngineers' employees only. Nothing herein shall be construed as granting rights to GeoEngineers' subcontractors or any other contractors working on this site to use or legally rely on this HASP. GeoEngineers specifically disclaims any responsibility for the health and safety of any person not employed by the company.

1.0 GENERAL PROJECT INFORMATION

Project Name:	Marshall Landfill Groundwater Monitoring
Project Number:	0504-104-01
Type of Project:	Groundwater monitoring
Start/Completion:	October 2023 / December 2024
Subcontractors:	Eurofins, Able
Client:	Herrera, Washington State Department of Ecology

Chain of Command	Title	Name	Telephone Numbers (O & C)
1	Current Property Owner (c/o Herrera Project Manager)	Nigel Baumer	O: 443.517.9787
2	Principal-in-Charge	Scott Lathen	O: 509.209.2843 C: 509.251.5239
3	Health and Safety Manager (HSM)	Lucas Miller	O: 509.209.2830 C: 270.978.6222
4	Health and Safety Specialist (HSS)	Connor Jordan	O: 253.722.2426 C: 530.210.5462
6	Project Manager (PM)	Justin Orr Sydney Bronson	O: 509.570.0779 C: 406.890.1310 O: 425.861.6086 C: 509.951.9058
7	Site Safety Officer (SSO)	Justin Orr Bryce Hanson Lola Otoki Morea Schofield	See above C: 360.269.3237 C: 361.777.6086 C: 509.999.6413
8	Field Personnel	Justin Orr Bryce Hanson Lola Otoki Morea Schofield	See above See above See above See above
10	Subcontractor(s)	Eurofins Able	509.924.9200 509.466.5255

1.1. Functional Responsibility

1.1.1. Health and Safety Manager (HSM)

GeoEngineers' Health and Safety Manager (HSM) is responsible for implementing and promoting employee participation in the company Health and Safety Program. The HSM has overall responsibility for the general health and safety of GeoEngineers' personnel. The HSM issues directives, advisories and information regarding health and safety to the technical staff. Additionally, the HSM has the authority to audit on-site compliance with HASPs, suspend work or modify work practices for safety reasons, and dismiss from the site any GeoEngineers' or subcontractor employees whose conduct on the site endangers the health and safety of themselves or others.

1.1.2. Health and Safety Specialist (HSS)

GeoEngineers' Health and Safety Specialist (HSS) is a designated safety specialist. The HSS provides technical support to the PM and SSO to ensure that GeoEngineers' staff are following GeoEngineers' safety program and safe work practices during site activities. The HSS works with the PM and SSO to ensure the subcontractors' crews are following the site general HASPs, the activities HASP/JHAs and safe work practices. The HSS may periodically go on-site to perform safety observations and mentor on-site personnel on safety behavior practices. Additionally, the HSS has the authority to suspend work or modify work practices for safety reasons and dismiss from the site any GeoEngineers' or subcontractor employees

whose conduct on the site endangers the health and safety of themselves or others. The HSS shall keep the PM and HSM informed of the project's health- and safety-related matters, as necessary.

1.1.3. Project Manager (PM)

A PM is assigned to manage the activities of various projects and is responsible to the principal-in-charge of the project. The PM has the responsibility of ensuring the safety of all GeoEngineers' personnel on job sites. The PM is responsible for assessing the hazards present at a job site and incorporating the appropriate safety measures for field staff protection into the field briefing and/or Site Safety Plan. He or she is also responsible for assuring that appropriate HASPs are developed. The PM will provide a summary of chemical analysis to personnel completing the HASP. PMs shall also see that their project budgets consider health and safety costs. The PM shall keep the HSM and HSS or Health and Safety Coordinator (HSC) informed of the project's health- and safety-related matters as necessary. The PM shall designate the project SSO and help the SSO implement the specifications of the HASP. The PM is responsible for communicating information in site safety plans and checklists to appropriate field personnel. Additionally, the PM and SSO shall hold a site safety briefing before any field activities begin. The PM is responsible for transmitting health and safety information to the SSO when appropriate.

1.1.4. SSO/HAZWOPER

The SSO will have the on-site responsibility and authority to modify and stop work or remove GeoEngineers' personnel from the site if working conditions change that may affect on-site and off-site health and safety. The SSO will be the main contact for any on-site emergency situation. The SSO is First Aid and cardiopulmonary resuscitation {CPR} qualified and has current HAZWOPER training when working at hazardous waste sites. The SSO is responsible for implementing and enforcing the project safety program and safe work practices during site activities. The SSO shall conduct daily safety meetings, perform air monitoring as required, conduct site safety inspections as required, coordinate emergency medical care, and ensure personnel are wearing the appropriate personal protective equipment (PPE). The SSO shall have advanced fieldwork experience and shall be familiar with health and safety requirements specific to the project. The SSO has the authority to suspend site activities if unsafe conditions are reported or observed.

Duties of the SSO include the following:

- Implementing the HASP in the field and monitoring staff compliance with its guidelines.
- Ensuring that all GeoEngineers' field personnel have met the training and medical examination requirements. Advising other contractor employees of these requirements.
- Maintaining adequate and functioning safety supplies and equipment at the site.
- Setting up work zones, markers, signs and security systems, if necessary.
- Performing or supervising air quality measurements. Communicating information on these measurements to GeoEngineers' field staff and subcontractor personnel.
- Lead the pre-entry briefing (at the beginning of the site activities) and the site safety meetings (daily and/or weekly), with onsite personnel. These meetings should include a discussion of emergency response, site communications and site hazards associated with the planned activities.
- Communicating health and safety requirements and site hazards to field personnel, subcontractors and contractor employees, and site visitors.
- Directing personnel to wear PPE and guiding compliance with all health and safety practices in the field.

- Consulting with the PM regarding new or unanticipated site conditions, including emergency response activities. If monitoring detects concentrations of potentially hazardous substances at or above the established exposure limits, notify/consult with the PM. Consult with the PM, the HSC or HSS, and the HSM regarding new or unanticipated site conditions, including emergency response activities. If field monitoring indicates concentrations of potentially hazardous substances at or above the established exposure limits, the HSM must be notified, and corrective action taken.
- Documenting all site accidents, injuries, illnesses and unsafe activities or conditions and/or near misses, and reporting them to the PM, HSC or HSC and the HSM as soon as practical, but no later than the end of the day.
- Directing decontamination operations of equipment and personnel.

1.1.5. Field Employees

All employees working on site that have the potential of coming in contact with hazardous substances or chemical, biological and/or physical hazards are responsible for participating in the health and safety program and complying with the site-specific health and safety plans. These employees are required to:

- Read, participate and be familiar with the GeoEngineers' health and safety programs located in SharePoint. Attend to applicable specific safety training.
- Notify the SSO that when there is need to stop work to address an unsafe situation.
- Comply with the HASP and acknowledge understanding of the plan discussed during the health and safety pre-entry briefing.
- Review applicable Job Hazard Analysis (JHAs) prior starting a new activity and follow the recommended critical actions to mitigate hazards.
- Perform Task Safety Analysis (TSA) at the beginning of a new task, before changing tasks, when conditions changes and after a near miss or incident.
- Report to the SSO, PM or HSM any unsafe conditions and all facts pertaining to near misses, incidents or accidents that could result in physical injury or exposure to hazardous materials and/or equipment damage.
- Participate in health and safety training, including initial 40-hour HAZWOPER course, annual 8-hour HAZWOPER refresher, and First Aid/CPR training.
- Participate in the medical surveillance program, if applicable.
- Schedule and take a respirator fit test annually.
- Any field employee working on site may stop work if the employee believes the work is unsafe.

1.1.6. Contractors Under GeoEngineers Supervision

GEOENGINEERS WILL HIRE CONTRACTORS FOR THIS PROJECT? YES NO

Contractors working on the site directly for the Client will have their own HASPs or JHAs. Subcontractors working on the site under GeoEngineers' supervision that have the potential of coming in contact with hazardous substances or chemical, biological and/or physical hazards shall have their own health and safety programs and safety plan that is generally consistent with the requirements of this HASP.

Contractor Name		Predicted start/end dates
1. Eurofins Environment Testing		Oct. 2023 – Dec. 2024
Contractor Scope Summary:	Laboratory analysis	
2. Able Cleanup Technologies, Inc.		Nov. 2023 – Dec. 2024
Contractor Scope Summary:	IDW disposal	

1.2. GeoEngineers Field Personnel Qualifications and Readiness Status

Name of Employee on Site	Level of HAZWOPER Training (24-hr/40-hr)	Date of last 8-Hr Refresher Training	Last First Aid/ CPR Training Date
Justin Orr	40-hr	1/20/2023	11/1/2022
Bryce Hanson	40-hr	3/8/2023	11/1/2022
Lola Otoki	40-hr	6/5/2023	6/29/2023
Morea Schofield	40-hr	7/13/2023	–

1.3. Personnel Medical Surveillance

FIELD PERSONNEL ON THIS JOB SITE ARE ; ARE NOT ENTERED IN A GEOENGINEERS PROVIDED MEDICAL SURVEILLANCE PROGRAM.

2.0 WORK SITE

2.1. Site Description

The Marshall Landfill Site is located northwest of Cheney-Spokane Road about 1 mile southwest of the town of Marshall, Washington and 7 miles southwest of Spokane, Washington. The Site consists of two primary land use areas, including the approximate 25-acre Main Landfill and the Five-Acre Landfill. The landfills are generally capped and vegetated with steep slopes to the east. Access roads at the Site are generally unpaved and partially vegetated. Monitoring wells are located around the perimeter of the landfills. There is an active gravel pit to the north of the Site; trucks from the gravel pit use the main access road.

2.2. Site Map

See Figure 2, Site Plan, included with the Work Plan for the site layout and work areas.

2.3. Site History

The Main Landfill operated between 1970 and 1990 and the Five-Acre Landfill operated between 1980 and 1984. The Site history is described in the main body of this Work Plan.

2.4. Previous Investigations

GeoEngineers completed Remedial Investigation (RI) and Feasibility Study (FS) activities between 2016 and 2018. Based on RI/FS results and supplemental groundwater monitoring events conducted by Ecology, groundwater contamination is limited, discontinuous, and variable between monitoring events. Given the limited and sporadic nature of groundwater contamination, there does not appear to be a significant impact to groundwater beneath the Site.

The following table presents the most recent available data of contaminants of concern and was/were collected during the historical Site Investigation(s) conducted at the subject Site.

PREVIOUS INVESTIGATION CONTAMINANTS DATA

Key Study (Name/Company/Date [year])	Main Contaminants of Concern (TPH, VOCs, PAHs, Metals, PCBs, PFAS etc.)	Media (soil, groundwater, sediments, air)
Remedial Investigation, GeoEngineers 2018	Minor/intermittent cyanide, metals, nitrate, SVOCs, pesticides VOCs, SVOCs, PAHs, metals, pesticides, herbicides	Groundwater

3.0 GEOENGINEERS SCOPE OF WORK

3.1. Summary of Project Scope

In April 2023, Ecology sent a Request for Quotation (RFQ) to conduct additional groundwater monitoring at the Site to evaluate current groundwater conditions at the site. To evaluate groundwater conditions, GeoEngineers plans to redevelop five monitoring wells (MW-2A, MW-5A, MW-7B, MW-11A and MW-12A), install new, dedicated, PFAS-free low-flow bladder pumps in the wells, and conduct quarterly groundwater monitoring activities and submit groundwater samples for chemical analysis for four consecutive quarters.

3.2. Primary Field Tasks

Indicate the primary field tasks to be completed during the scope of this project (delete or add rows as needed). Refer back to this table for development of hazard mitigation strategies in the sections that follow.

3.2.1. Primary Field Tasks to be Performed by GeoEngineers

Task #	Primary Field Task	Predicted start/end dates
1	Redevelop wells and install new dedicated bladder pumps	Oct. 2023 – Dec. 2023
	Task Description: Five monitoring wells will be redeveloped and new dedicated, PFAS-free pumps will be installed.	
2	Groundwater depth gauging	Oct. 2023 – Dec. 2024
	Task Description: Groundwater and total depth readings will be obtained at 17 monitoring wells before groundwater samples are collected.	
3	Groundwater Sampling	Oct. 2023 – Dec. 2024
	Task Description: Five monitoring wells will be sampled using low-flow techniques.	

4.0 HAZARD ANALYSIS

From within the Primary Field Tasks (Section 3.2.1 Primary Field Tasks to be Performed by GeoEngineers, above), identify activities which may pose an elevated risk to worker’s health. A list of activities that GeoEngineers recognizes as Elevated Risk Activities (ERA) are included in the dropdowns in table below. If this project has ERA that are not present there, they are to be added. Each ERA triggers the completion of a separate ERA JHA (Form 3).

General Safe Work Practices

- Utility check: there may be site-specific procedures for preventing drilling or digging into utilities. Add these procedures to the standard GeoEngineers' utility check list. Implement additional utilities clearance activities, if deemed necessary (typically if disturbing drilling work is within 2, 5 and/or 10 feet of underground utilities, for Lower, Medium and Higher Risks, respectively)
- Lifting hazards: use proper techniques, mechanical devices where appropriate.
- Terrain obstacles: Terrain could be soft, and activities will be conducted to minimize lawn damage and the potential for vehicles to get stuck.
- Personnel will wear high-visibility vests for increased visibility by vehicle and equipment operators.
- At the beginning of the day conduct a tail gate safety meeting discussing the jobs, the hazards, exclusion zone(s) surrounding work area(s), utilities clearance and actions that will be taken to prevent injury and reduce risk. Discuss "Stop Work Authority" as it applies to each site member. Discuss appropriate PPE including high visibility clothing such as reflective vests. Discuss Competent Person's responsibilities and support of excavation (SOE) protective system(s) and potential de-watering.

4.1. Elevated Risk Activities

DOES THIS PROJECT HAVE ELEVATED RISK ACTIVITIES? YES OR NO

4.2. General Hazard Review

The Primary Field Tasks identified in Section 3.2.1 are included in the following Primary Field Task Hazard Analysis Tables. The tables list the commonly encountered field hazards for the work we do at GeoEngineers. Hazards are divided into three categories: (A) Chemical; (B) Biological; and (C) Physical.

4.3. Primary Field Task Hazard Analysis

Primary Field Tasks					
# 1	Chemical, Biological, Physical				
# 2	Chemical, Biological, Physical				
# 3	Chemical, Biological, Physical				
Task Hazard Recognition – evaluate primary field tasks for hazards					
Chemical Hazards	Task #s	Biological Hazards	Task #s	Physical Hazards	Task #s
Dermal Exposure Potential	All	Snakes	All	Lifting or Repetitive Motions	All
		Insects	All	Heat Exposure Risk	All
		Ticks	All	Cold Exposure Risk	All
		Wildlife (other)	All	Trip/Fall Hazards	All
Hazard Details and Controls - include those items checked above					
Chemical Hazards					
Hazard	When/How Exposure May Occur		Critical Actions to Mitigate Hazards		
Known or Expected Human Carcinogens	Anytime during sampling activities, especially when redeveloping wells and collecting groundwater samples		Wear gloves when handling potentially contaminated media Wash hands prior to leaving site and/or eating or drinking		

Dermal Exposure Potential	Anytime during sampling activities, especially when redeveloping wells and collecting groundwater samples	Wear gloves when handling potentially contaminated media			
Biological Hazards					
Hazard	When/How Exposure May Occur	Critical Actions to Mitigate Hazards			
Snakes	Anytime during sampling activities, especially in the summer	Wear long sleeve clothing, check surroundings before sitting or setting down equipment.			
Insects	Anytime during sampling activities, especially in the summer	Wear long sleeve clothing, check surroundings before sitting or setting down equipment. Because PFAS are contaminants of concern, insect repellent may not be used when collecting samples.			
Ticks	Anytime during sampling activities, especially in the summer	Wear long sleeve clothing, check surroundings before sitting or setting down equipment. Because PFAS are contaminants of concern, insect repellent may not be used when collecting samples.			
Wildlife (other)	Anytime during sampling activities, especially in the summer	Wear long sleeve clothing, check surroundings before sitting or setting down equipment.			
Physical Hazard					
Hazard	When/How Exposure May Occur	Critical Actions to Mitigate Hazards			
Lifting or Repetitive Motions	Anytime, especially during well redevelopment and pump installation.	Use correct lifting practices (i.e. lift with your legs, do not lift more than 50 lbs, etc.)			
Heat Exposure Risk	Work days may be hot	Take breaks and monitor hydration. Know the symptoms of heat stress/exhaustion/stroke. Because PFAS are contaminants of concern, sunscreen may not be used when collecting samples.			
Cold Exposure Risk	Work days may be cold	Dress in layers. Take breaks when necessary.			
PPE (PFAS-Free)	Task #s	Equipment	Task #s	Tools	Task #s
<input type="checkbox"/> Hard Hat		<input type="checkbox"/> Safety Beacons		<input checked="" type="checkbox"/> Cell Phone/Satellite	All
<input checked="" type="checkbox"/> Eye Protection	All	<input checked="" type="checkbox"/> First Aid Kit	All	<input checked="" type="checkbox"/> Digital Camera	All
<input type="checkbox"/> Hearing Protection		<input checked="" type="checkbox"/> Fire Extinguisher	All	<input type="checkbox"/> Radio/Spare Batteries	
<input checked="" type="checkbox"/> Gloves	All	<input checked="" type="checkbox"/> Sunglasses/Sunscreen	All	<input type="checkbox"/> Flashlight	
<input checked="" type="checkbox"/> High Visibility Vest	All	<input checked="" type="checkbox"/> Drinking Water	All	<input checked="" type="checkbox"/> Hands Tools	All
<input checked="" type="checkbox"/> Steel Toe Boots	All	<input type="checkbox"/> Survival Gear		<input type="checkbox"/> Other	
<input type="checkbox"/> Face Shield		<input checked="" type="checkbox"/> Eye Wash Kit	All	<input type="checkbox"/>	
<input type="checkbox"/>		<input type="checkbox"/> Other		<input type="checkbox"/>	

4.4. Chemical Hazards

The following table is a summary of the chemicals identified at the Site during previous groundwater sampling events and their associated occupational exposure limits (OEL). This table may be revised if additional chemicals are identified based on the groundwater sampling results.

4.4.1. Summary of Chemical Hazard Exposure Limits

Chemical Compound/ CAS #	Primary Field Task or Elevated Risk Activity With Potential Exposures	OSHA Permissible Exposure Limit (PEL)	WA-DOSH (PEL)	ACGIH Exposure Limits (TLV and/or TWA)	NIOSH Exposure Limits (REL and/or IDLH)
Cadmium	All	TWA 0.005 mg/m ³ IDLH 9 mg/m ³		TLV –TWA = 0.002 mg/m ³	
Lead	All	PEL: 0.05 mg/m ³ 50 µg/m ³	AL: 30 µg/m ³ PEL: 0.05 mg/m ³ 50 µg/m ³	TLV 0.05 mg/m ³	REL 0.05 mg/m ³ IDLH 100 mg/m ³
Cyanide	All	TWA 11 mg/m ³			REL 5 mg/m ³ IDLH 50 ppm
1,4-Dioxane	All	TWA 100 ppm 360 mg/m ³		TLV-TWA 20 ppm	C 1 ppm 3.6 mg/m ³ IDLH 500 ppm
Bis(2-Ethylhexyl) Phthalate	All	TWA 5 mg/m ³			TWA 5 mg/m ³ ST 10 mg/m ³
2,6-Dinitrotoluene	All	TWA 1.5 mg/m ³			TWA 1.5 mg/m ³ IDLH 50 mg/m ³
Mecoprop (MCP)	All	Not established			

Notes:

*If a State has established a PEL more restrictive than the OSHA limits, then the applicable State limit becomes the legal limit.

IDLH = immediately dangerous to life or health

OSHA = Occupational Safety and Health Administration

ACGIH = American Conference of Governmental Industrial Hygienists

NIOSH = National Institute of Occupational Safety & Health

mg/m³ = milligrams per cubic meter (dust or particulate conc.)

TWA = time-weighted average (Over 8 hrs.), basis of most exposure limits

PEL = permissible exposure limit, legally enforceable

TLV = threshold limit value (over 8 hrs)

REL= recommended exposure limit (over 10 hrs)

STEL = short-term exposure limit (15 min)

Ceiling (C) – concentration never to be exceeded

ppm = parts per million (vapor conc.)

4.4.2. Descriptive Summaries of Chemicals Present

Chemical Compound	Physical Characteristics of Chemical	Acute <input checked="" type="checkbox"/> and/or Chronic <input checked="" type="checkbox"/> Symptoms of Exposure
Cadmium	Soft, silvery-white metal. Usually found as dust	Pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen]
Lead	Soft heavy metal that is silvery with a hint of blue; it tarnishes to a dull gray color when exposed to air	Lassitude (weakness, exhaustion), insomnia, facial pallor, anorexia, weight loss, malnutrition, constipation, abdominal pain, colic, anemia, gingival lead line, tremor, wrist and ankle paralysis, encephalopathy, kidney disease, irritated eyes, hypotension
Cyanide	Colorless or pale-blue liquid or gas (above 78 °F) with a bitter, almond-like odor.	Asphyxia; lassitude (weakness, exhaustion), headache, confusion; nausea, vomiting; increased rate and depth of respiration or respiration slow and gasping; thyroid, blood changes
1,4-Dioxane	Colorless liquid with a faint sweet odor	Irritated eyes, skin, nose, throat; drowsiness, headache; nausea, vomiting; liver damage; kidney failure; (potential occupational carcinogen)
Bis(2-Ethylhexyl) Phthalate	Colorless, oily liquid with a slight odor	Irritation eyes, mucous membrane; in animals: liver damage; teratogenic effects; (potential occupational carcinogen)
2,6-Dinitrotoluene	Orange-yellow crystalline solid with a characteristic odor.	Anoxia, cyanosis; anemia, jaundice; reproductive effects; [potential occupational carcinogen]
Mecoprop (MCP)	Colorless to brown crystalline powder	Burning sensation; cough; nausea; redness of eyes and skin, abdominal pain, nausea; weakness; unconsciousness
Where and how exposure may occur:	Handling potentially contaminated media while purging groundwater and while collecting groundwater samples	

5.0 AIR MONITORING PLAN

AIR MONITORING FOR PERSONAL EXPOSURES WILL , WILL NOT BE IMPLEMENTED AS PART OF THIS HASP.

6.0 OTHER PERSONAL PROTECTIVE EQUIPMENT

The appropriate PPE will be selected on a daily or task-specific basis. These PPE selections will be communicated to field personnel during the pre-work briefing **before** the start of Site operations.

Gloves	Clothing
<input checked="" type="checkbox"/> Nitrile <input type="checkbox"/> Latex <input type="checkbox"/> Liners <input checked="" type="checkbox"/> Cold Weather	<input checked="" type="checkbox"/> High-vis Vest <input type="checkbox"/> Tyvek <input type="checkbox"/> Saranex <input type="checkbox"/> Snake Chaps
<input type="checkbox"/> Leather <input checked="" type="checkbox"/> General Construction Gloves	<input type="checkbox"/> Fire Retardant Clothing <input checked="" type="checkbox"/> Long Pants <input checked="" type="checkbox"/> PFAS-free rain gear
<input type="checkbox"/> Cut resistant/Kevlar <input type="checkbox"/> Rubber <input type="checkbox"/> Other	<input type="checkbox"/> Long Sleeve Shirt <input type="checkbox"/> Other

Gloves	Clothing
Head	Eye & Face
<input type="checkbox"/> Hard Hat <input type="checkbox"/> Climbing Helmet <input checked="" type="checkbox"/> Sunhat	<input checked="" type="checkbox"/> Safety Glasses <input type="checkbox"/> Face Shield <input type="checkbox"/> Goggles <input type="checkbox"/> Sun Glasses
Hearing Protection	Feet
<input checked="" type="checkbox"/> Ear Plugs <input type="checkbox"/> Ear Muffs <input type="checkbox"/> Flanges	<input checked="" type="checkbox"/> Safety Toe Work Boot/Shoe <input type="checkbox"/> Safety Toe Rubber Boot
	<input type="checkbox"/> Hiking Boot <input type="checkbox"/> Hip Wader <input type="checkbox"/> Chest Wader

6.1. Personal Protective Equipment Inspections

PPE ensemble shall be selected daily or before each separate task to provide protection against known or anticipated hazards. To obtain maximum performance from PPE, site personnel shall be trained in the proper use and inspection of PPE.

7.0 SITE CONTROL PLAN

7.1. Traffic or Vehicle Access Control Plans

WILL VEHICLES, HEAVY EQUIPMENT AND/OR PEDESTRIANS TRAFFIC BE CONTROLLED ON THIS SITE?
YES **NO** .

7.2 Site Work Zones

Exclusion zones will be established within approximately 10 to 15 feet around each working area. Only persons with the appropriate training will enter this perimeter while work is being conducted in these exclusion zones.

In addition, an exclusion zone, contamination reduction zone and support zone should be established when the project involves significant chemical contamination and potential of for exposure to contaminants to on-Site personnel. Passage through zones or out of the Site should be consistent with the level of decontamination required.

Decontamination, at a minimum, should include removing and disposing of PPE when exiting the exclusion zone and washing your hands. Decontamination may also consist of removing outer protective gloves and washing soiled boots and gloves using bucket and brush provided on site in the contamination reduction zone. If needed, inner gloves will then be removed, and hands and face will be washed in either a portable wash station or a bathroom facility at the site. Employees will perform decontamination procedures and wash before eating, drinking, or leaving the Site.

The contamination reduction zone, at a minimum, should consist of garbage bags into which used PPE should be disposed. Personnel should wash hands before eating or leaving the reduction zone.

Drinking, eating, smoking, and using phones are not allowed in the Exclusion and Reduction Zones.

A site control/site layout map was included in Section 2.2 Site Map. Yes or No .

7.1.1. Work Zone Parameters and Decontamination Procedures

Zone	Size/Location of Zone	Steps Required to Enter	Steps Required to Exit
Exclusion	15 feet around current well	Level D PPE and nitrile gloves	Discard nitrile gloves, make sure boots are clean
Reduction	Trash bags	Throw away disposable PPE and sampling equipment	Wash hands
Support Zone	Site area more than 15 feet from current well	Notify SSO	Notify SSO

Equipment or tools operated or maintained by GeoEngineers on a contaminated site may need to undergo decontamination procedures as they travel through Site work zones. The following table summarizes the steps needed to safely move these items through zones.

7.1.2. Work Zone Parameters for Equipment or Tools

Zone	Steps Required to Enter	Steps Required to Exit
Exclusion	Wear PPE	Knock large debris off equipment near the well
Reduction	Large debris has been removed from equipment	Decontaminate equipment per instructions in the Work Plan
Support Zone		

7.3 Buddy System

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

7.4 Site Communication Plan

Communication Equipment	Location Used	Phone #s/Channels
Cell phones	Site	See contact information (Section 1.0)

Positive communications (within sight and hearing distance or via radio) should be maintained between workers on Site, with the pair remaining in proximity to assist each other in case of emergencies. The field team should prearrange other emergency signals for communication when voice communication becomes impaired (including cases of dropped cell phone or radio breakdown) and an agreed upon location for an emergency assembly area.

Personnel from GeoEngineers and subcontractor(s) should be made aware of safety features during safety tailgate meetings (drill rig shutoff switch, location of fire extinguishers, cell phone numbers, etc.).

On-Site personnel will be visible to the operator at all times and will remain out of the swing and/or direction of the equipment apparatus (drilling rig, CPT unit and/or excavator) only when they are certain the operator has indicated it is safe to do so. ("Show My Hands Technique" or another agreed sign language).

7.5. Investigative Derived Waste (IDW) Disposal or Storage

IDW Type	Action
Well Water	<input checked="" type="checkbox"/> On Site, pending analysis and further action
	<input type="checkbox"/> Secured (list method):
	<input type="checkbox"/> Other (describe destination, responsible parties):
PPE	<input type="checkbox"/> On Site, pending analysis and further action
	<input type="checkbox"/> Secured (list method):
	<input checked="" type="checkbox"/> Other (describe destination, responsible parties): placed in black contractor bags and disposed in trash receptacle

7.6. Spill Containment Plans

WILL SPILL CONTAINMENT CONTINGENCIES BE NEEDED ON THIS PROJECT? YES OR NO

7.7. Sampling, Managing and Handling Drums and Containers

THERE WILL BE DRUMS OR SEALED CONTAINERS ON SITE DURING THIS PROJECT? YES OR NO

Drums and containers used during the investigation and/or cleanup activities shall meet the appropriate Department of Transportation (DOT), Occupational Safety and Health Administration (OSHA), U.S. Environmental Protection Agency (EPA) and applicable state regulations for the waste that they contain. Site operations shall be organized to minimize the amount of drum or container on-Site temporary storage and movement. When practicable, drums and containers shall be inspected, and their integrity shall be ensured before they are moved. Unlabeled drums and containers shall be considered to contain hazardous substances and handled accordingly until the contents are positively identified and labeled. Before drums or containers are moved, employees involved in the transfer operation shall be warned of the potential hazards associated with the contents. Personnel involved with the coordination of the drum or container's off-Site disposal shall ensure that the off-site disposal facility is approved by the GeoEngineers' PM and the Client.

Drums or containers and suitable quantities of proper absorbent shall be kept available and used where spills, leaks or rupturing may occur. Where major spills may occur, a spill containment program shall be implemented to contain and isolate the entire volume of the hazardous substance being transferred.

Fire extinguishing equipment shall be on hand and ready for use to control incipient fires.

7.8. Sanitation

Field staff and subcontractors must go off Site to access sanitation facilities.

7.9. Lighting

Work is anticipated to be performed during daylight hours.

8.0 EMERGENCY RESPONSE

For each potential site emergency indicate what site-specific procedures you will implement to address the occurrence.

Emergency Event	Response Plan
Medical	Get injured personnel to the hospital. If life-threatening, call 911.

8.1. General Response Guidance

- If any member of the field crew experiences any adverse exposure symptoms while on Site or an injury, the entire field crew should immediately halt work and act according to the instructions provided by the SSO.
- The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated should result in the evacuation of the field team, contact of the PM, and reevaluation of the hazard and the level of protection required.
- As soon as feasible, notify GeoEngineers' PM and follow the GeoEngineers' Incident Reporting and Investigation Program, and Health and Safety Injury Management Procedures Flowchart (see copy attached to this HASP).
- If an accident occurs, the SSO and the injured person are to complete, within 24 hours, an Incident Report (Form 4) for submittal to the PM, the HSPM, and Human Resources (HR). The PM should ensure that follow-up action is taken to correct the situation that caused the accident or exposure.

Hospital Name and Address:

Sacred Heart Medical Center

101 West 8th Avenue

Phone Numbers (Hospital ER):

509.474.3131

Distance:

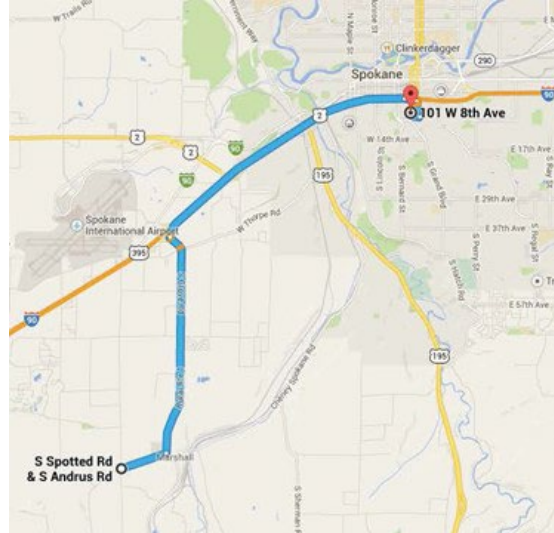
10 miles

Route to Hospital:

1. Head east on W Andrus Rd towards S Grove Rd
2. Turn left onto S Grove Rd
3. Turn right to merge onto I-90E
4. Take exit 281 for Division St toward US-2 E / US-395 N/Newport/Colville
5. Keep right at the fork, follow signs for Division St S.
6. Turn right onto South Division Street

Turn right onto W 8th Avenue

Map to Hospital:



Ambulance:

9-1-1

Poison Control:

800.732.6985

Police:

9-1-1

Fire:

9-1-1

Location of Nearest Telephone:

Cell phones are carried by field personnel. Check connectivity at work site location.

Nearest Fire Extinguisher:

Located in the GeoEngineers vehicle on site.

Nearest First-Aid Kit:

Located in the GeoEngineers vehicle on site.

Standard Emergency Procedures

Get help

- Send another worker to phone 9-1-1 (if necessary)
- As soon as feasible, notify the GeoEngineers' PM and/or GeoEngineers HSM and follow the GeoEngineers' Incident Reporting and Investigation Program, and Health and Safety Injury Management Procedures Flowchart (see copy attached to this HASP).

Reduce risk to injured person

- Turn off equipment.
- Move person from injury location to safer area (if in life-threatening situation only).
- Keep person warm.
- Perform CPR (if necessary).

Transport injured person to medical treatment facility (if necessary)

- By ambulance (if necessary) or GeoEngineers' vehicle.
- Stay with person at medical facility.
- Keep GeoEngineers' PM apprised of situation and notify HR Manager of situation.
- Accidents involving injuries requiring professional medical attention must be reported within 1 hour of occurrence to the Safety Officer.
- First aid cases not involving professional medical attention must be reported within 24 hours after occurrence.
- Incidents involving property damage must be reported within 24 hours of occurrence.
- After hours illnesses must be reported within 24 hours (i.e., flu, rashes).

9.0 DOCUMENTATION TO BE COMPLETED FOR HAZWOPER PROJECTS

- PM Checklist
- Daily Field Log
- FORM 1—Health and Safety Pre-Entry Briefing and Acknowledgment of Site Health and Safety Plan for use by employees, subcontractors and visitors
- FORM 2—Safety Meeting Record
- FORM 3—Elevated Risk Job Hazard Analyses (ERA-JHA) Form (as needed)
- FORM 4—[Near Miss Form](#) (as needed)
- FORM 4—[Incident Report Form](#) (as needed)
- FORM 5—Direct Reading Instrument Monitoring Log (as needed)

10.0 APPROVALS - HASP for Marshall Landfill Groundwater Monitoring

For HASPs with elevated risk tasks including but not limited to confined spaces, working over water, hazardous atmospheres, chemical hazards, extreme weather conditions, fall protection/rope access, or respirator usage the Health and Safety Team must review and sign lines 3 and 4. The Health and Safety Team may review other JHAs/HASPs as they have time upon request and will sign lines 3 and/or 4.

1. Plan Prepared by

Signature Date

2. Project Manager Plan Approval

PM Signature Date

3. Health and Safety
Specialist or Consultant

HSS or HSC Signature Date

4. Health and Safety Manager

HSM Signature Date

5. GeoEngineers Laboratory
Manager

GLM Signature Date

Attachments:

Form 1: HEALTH AND SAFETY PRE-ENTRY BRIEFING AND ACKNOWLEDGEMENT

Form 2: SITE SAFETY MEETING RECORD (Daily or weekly)

Form 3: ELEVATED RISK ACTIVITY JHA FORM

Form 4: NEAR MISS OR INCIDENT REPORT FORM

**FORM 3
ELEVATED RISK ACTIVITY JHA FORM**

Marshall Landfill Groundwater Monitoring, Spokane County, WA

This ERA JHA Form is to be used when the project’s Principal Field Tasks (Section 4.1) include elevated risk activities. Complete a separate ERA JHA for each identified elevated risk activity. Add activities manually if not included in drop down. Activity Phases may include staging/set-up/initiation/operations/shutdown/clean-up or others specific to this project. If all phases of this activity have the same controls, indicate this by including all applicable phase names in single row.

Elevated Risk Activity:		Choose an item.	
Written by:	Position/Title:	Reviewed by:	Position/Title:
Required Planning Actions Prior to Arriving on Site:			
1.		2.	
3.		4.	
5.		6.	
Activity Phase	How Risk May Occur	Phase Based Hazard Mitigations	
Set-up	Unfamiliar locations, congestion, unpaved roads, Mechanical Failure, Flat Tires Vehicle Fire, Exhaust Leaks, Vehicle Collision, Internal Projectiles	Actions	
		<ul style="list-style-type: none"> • Test equipment • Reset starter • Clear road of fallen trees 	
		PPE	
		•	
		Equipment	
		•	
Operations - Shut-down - Cleanup	Slipping into waste water pond from shore	Actions	
		•	
		PPE	
		•	
		Equipment	
		•	
Tools			
•			
Communication Plan			
Activity Phase	Mode Communication During Task Phase	Frequency of Communication	Related Reference Material or Plan
Set-up	Cellular Phone	Continuous	Action Level Table
Operations		Every 4 hours	River Map

**FORM 4
NEAR MISS OR INCIDENT REPORT FORM**

Marshall Landfill Groundwater Monitoring, Spokane County, WA
File No. 0504-104-01

Electronic Version Available at: <https://safety.geoengineers.com/nearmisses/new> or
<https://safety.geoengineers.com/incidents/new>

NEAR MISS

Near Miss Date	
Reported By	
Location	
Location Type	
Incident Details	
How did the incident happen?	
What led to the Near Miss occurring? (Contributing factors, constraints, the setting, behaviors, etc.)	
What is the most important thing you learned from this Near Miss that others could learn from?	

INCIDENT REPORT

Basic Information	
Incident Date	
Reported By	
Location	
Location Type	
Business Unit	
Office Information	
Project Manager	
Group Leader	

Office Manager	
Other Emails	
Incident Type (more than one OK)	
<input type="checkbox"/>	Injury
<input type="checkbox"/>	Vehicle
<input type="checkbox"/>	Utility Strike
<input type="checkbox"/>	Damaged Property
<input type="checkbox"/>	Stolen Equipment
Incident Details	
What happened? Describe how the incident occurred. Where the employee was located at the time of the incident.	
Project Number (if project related)	
Date & Time employee started working	
Date & Time supervisor notified	
Supervisor Name	
Notified Project Manager/PA	<input type="checkbox"/> Yes <input type="checkbox"/> No
Client Notified	<input type="checkbox"/> Yes <input type="checkbox"/> No
Supervisor Comments (Optional. These are usually filled out later.)	
Supervisor Comments Date	
Project Manager Comments (Optional. These are usually filled out later.)	
Project Manager Comments Date	
Health and Safety Comments (Optional. These are usually filled out later.)	
Health & Safety Rep Name	
Health & Safety Comments Date	
Corrective Action (Optional. These are usually filled out later.)	

This page intentionally left blank

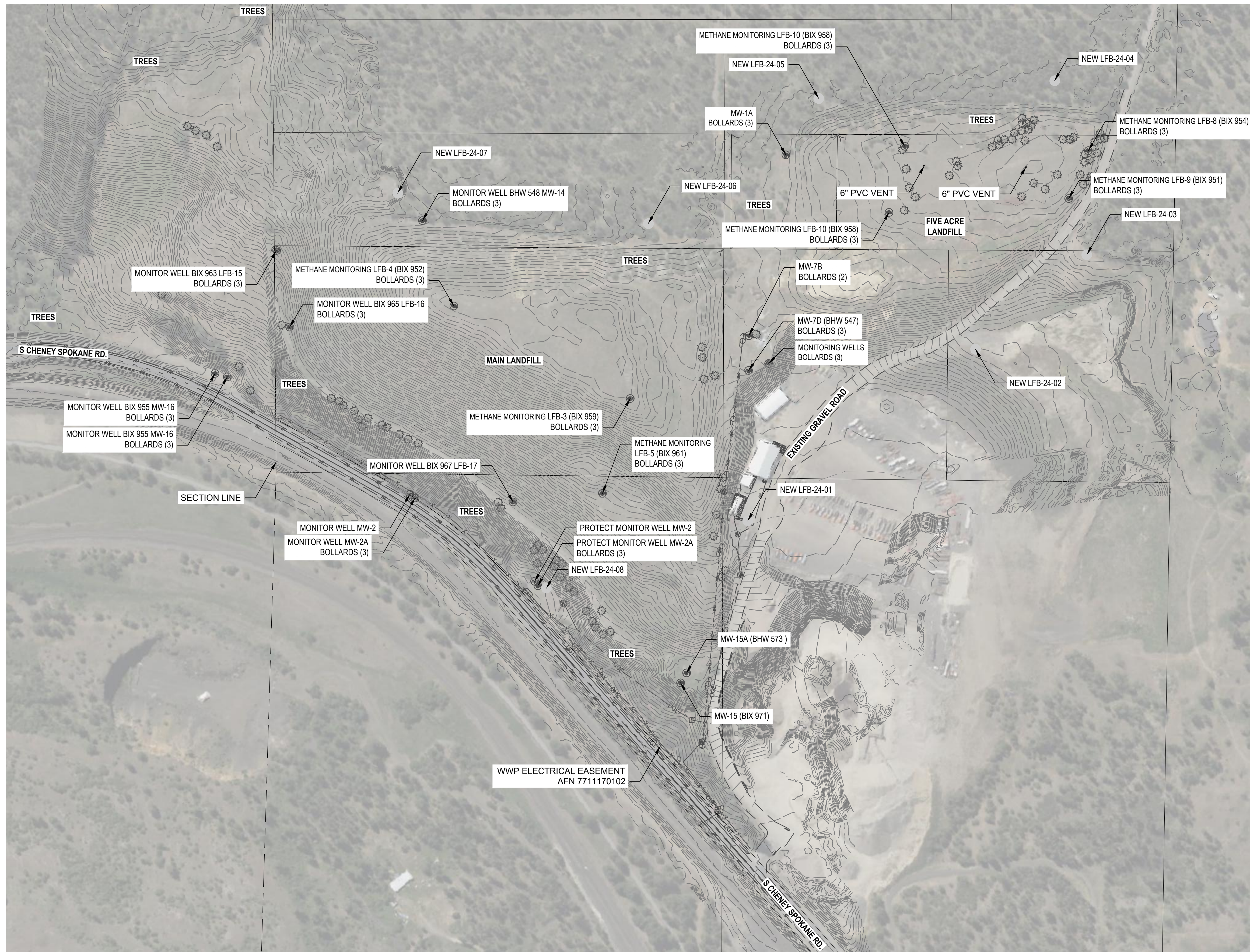
Attachment 6

Air Monitoring Equipment Calibration/Check Log and Air Monitoring Log

This page intentionally left blank

Appendix B

LFG Monitoring Probe Figures & Field Forms



NOTES:

1. INSTALL NEW LFG MONITORING PROBES AT LOCATIONS SHOWN IN THE DRAWING, PER THE TABLE BELOW, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
2. ACCESS SHALL BE FROM ACTION MATERIALS TO THE NORTH, UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
3. CONTRACTOR SHALL FOLLOW SPEED LIMITS POSTED ON SITE. IN LOCATIONS WHERE SPEED LIMIT IS NOT POSTED, CONTRACTOR SHALL NOT EXCEED SPEEDS OF 10 MILES PER HOUR.
4. EXISTING INFRASTRUCTURE SHALL BE PROTECTED IN PLACE. DAMAGE TO EXISTING INFRASTRUCTURE SHALL BE REPLACED BY THE CONTRACTOR AT NO COST TO THE OWNER.

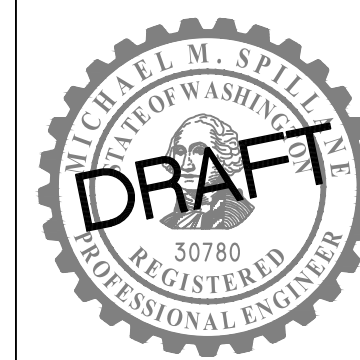
PROPOSED LFG PROBE LOACTIONS

PROBE NO.	NORTHING	EASTING	ELEVATION (AMSL)
LFG-24-01	N047.331632	W117.302647	2280.51
LFG-24-02	N047.332271	W117.303398	2315.55
LFG-24-03	N047.332582	W117.303811	2351.12
LFG-24-04	N047.332477	W117.304543	2348.55
LFG-24-05	N047.331803	W117.304441	2333.33
LFG-24-06	N047.331325	W117.303893	2326.31
LFG-24-07	N047.330605	W117.303994	2296.80
LFG-24-08	N047.331061	W117.302340	2182.27

D:\proj\2021\21-07716-000\CAD\EXISTING CONDITIONS AND LFG PROBE INSTALL PLAN.dwg | 3/19/2024 5:19 PM | Michelle McCarthy

No.	REVISION	BY	APP'D	DATE

ONE INCH
↑
AT FULL SIZE, IF NOT ONE
INCH SCALE ACCORDINGLY



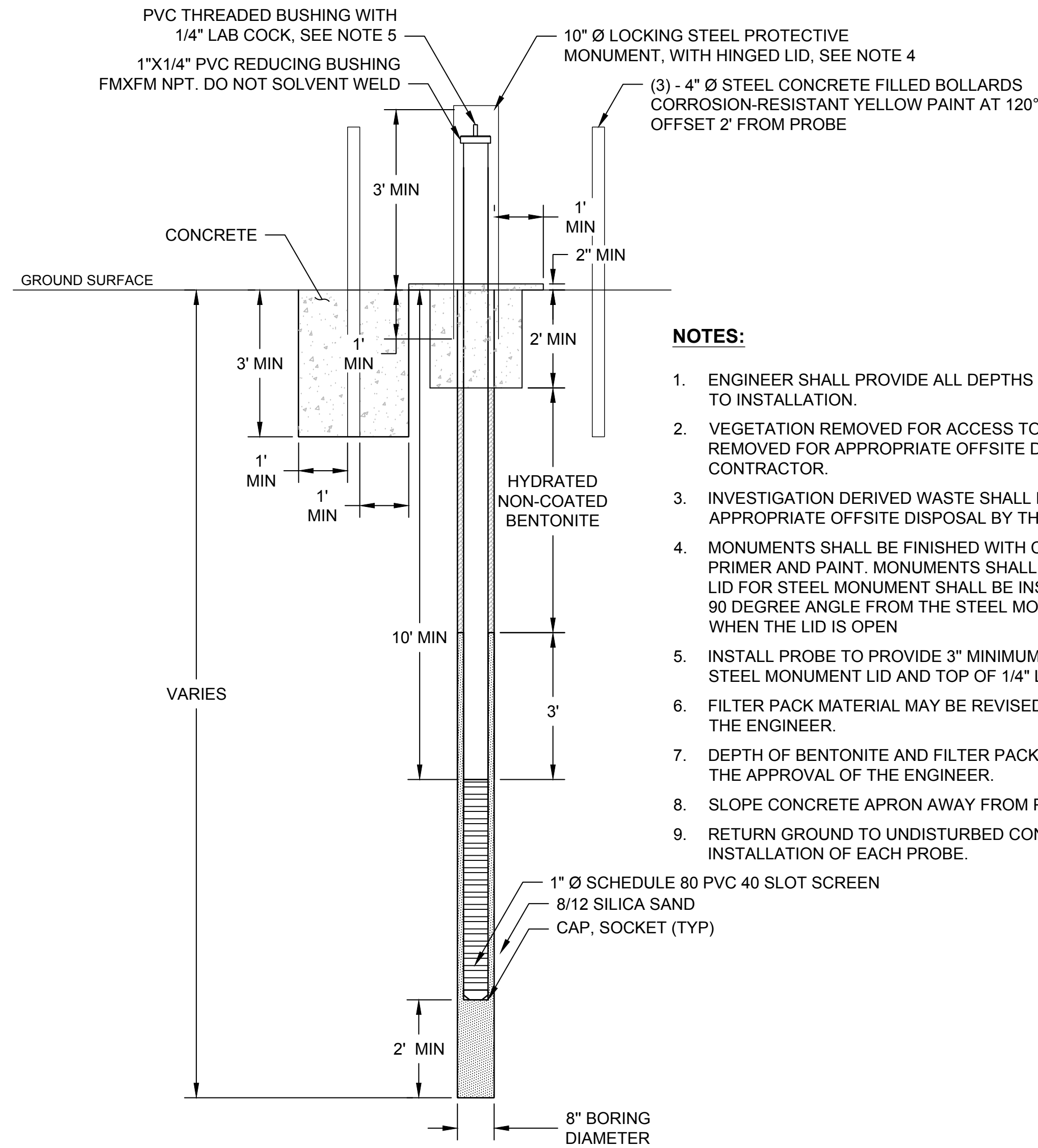
DESIGNED:	MM
DRAWN:	MM
DESIGNED:	MM
DRAWN:	MM
JE	-
DESIGNED:	CHECKED:
-	-
SCALE:	APPROVED:
AS NOTED	MMS

**MARSHALL LANDFILL
CLEANUP AND CLOSURE**

EXISTING CONDITIONS AND LFG PROBE INSTALL
PLAN

DATE:	DECEMBER 2023
PROJECT NO:	21-07716-000
DRAWING NO:	1
SHEET NO:	1 OF 2

© 2024 Herrera Environmental Consultants, Inc. All rights reserved.

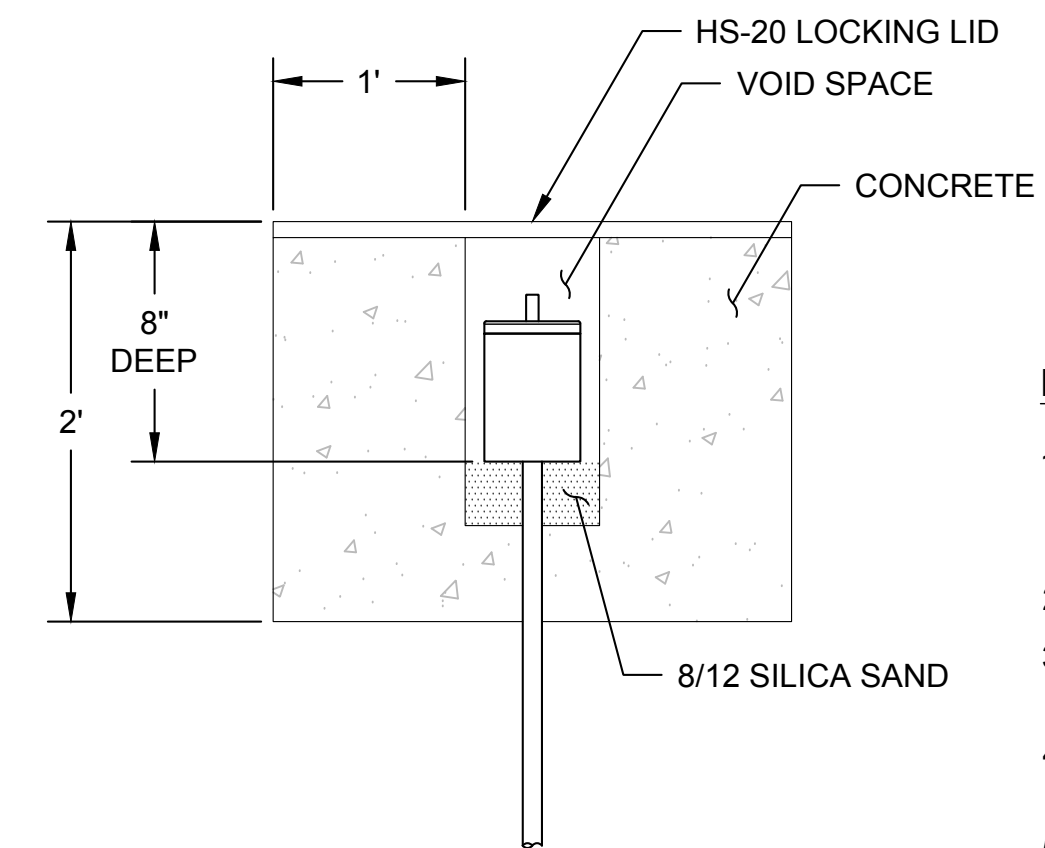
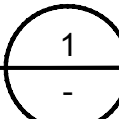


NOTES:

- ENGINEER SHALL PROVIDE ALL DEPTHS FOR EACH PROBE PRIOR TO INSTALLATION.
- VEGETATION REMOVED FOR ACCESS TO PROBES SHALL BE REMOVED FOR APPROPRIATE OFFSITE DISPOSAL BY THE CONTRACTOR.
- INVESTIGATION DERIVED WASTE SHALL BE REMOVED FOR APPROPRIATE OFFSITE DISPOSAL BY THE CONTRACTOR.
- MONUMENTS SHALL BE FINISHED WITH CORROSION-RESISTANT PRIMER AND PAINT. MONUMENTS SHALL BE PAINTED YELLOW. LID FOR STEEL MONUMENT SHALL BE INSTALLED SUCH THAT A 90 DEGREE ANGLE FROM THE STEEL MONUMENT IS MAINTAINED WHEN THE LID IS OPEN
- INSTALL PROBE TO PROVIDE 3" MINIMUM BETWEEN BOTTOM OF STEEL MONUMENT LID AND TOP OF 1/4" LAB COCK.
- FILTER PACK MATERIAL MAY BE REVISED AT THE APPROVAL OF THE ENGINEER.
- DEPTH OF BENTONITE AND FILTER PACK MAY BE REVISED AT THE APPROVAL OF THE ENGINEER.
- SLOPE CONCRETE APRON AWAY FROM PROBE.
- RETURN GROUND TO UNDISTURBED CONDITION FOLLOWING INSTALLATION OF EACH PROBE.

DETAIL - SURFACE MOUNTED LANDFILL GAS MONITORING PROBE

SCALE: NTS

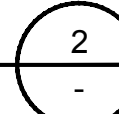


NOTES:

- BELOW GRADE ELEMENTS DESCRIBED IN DETAIL 1 SHALL BE CONSISTENT WITH SURFACE MOUNTED LANDFILL GAS MONITORING PROBES UNLESS APPROVED BY ENGINEER.
- NOTES FOR DETAIL 1 APPLY FOR DETAIL 2. EXCEPT FOR NOTE 8.
- LOCKING LID SHALL BE SUBMITTED TO ENGINEER FOR APPROVAL.
- LARGER LIDS MAY BE USED AT THE APPROVAL OF THE ENGINEER.
- PROVIDE A MINIMUM OF 3" CLEAR SPACE BETWEEN TOP OF MONITORING PROBE AND BOTTOM OF LID.

DETAIL - FLUSH MOUNTED LANDFILL GAS MONITORING PROBE

SCALE: NTS



C:\p\01\2021\21-07716-000\CAD\EXISTING CONDITIONS AND LFG PROBE INSTALL PLAN.dwg | 3/19/2024 5:19 PM | Michelle McCarthy

No.	REVISION	BY	APP'D	DATE

ONE INCH
↑
AT FULL SIZE, IF NOT ONE
INCH SCALE ACCORDINGLY



DESIGNED:	NB	DRAWN:	MM
DESIGNED:	JE	DRAWN:	-
DESIGNED:	-	CHECKED:	-
SCALE:	AS NOTED	APPROVED:	MMS

**MARSHALL LANDFILL
CLEANUP AND CLOSURE**

LFG SYSTEM DETAILS

DATE:	DECEMBER 2023
PROJECT NO:	21-07716-000
DRAWING NO:	2
SHEET NO:	2 OF 2

© 2024 Herrera Environmental Consultants, Inc. All rights reserved.



2200 Sixth Avenue | Suite 1100
 Seattle, Washington | 98121
 p 206 441 9080 | f 206 441 9108
 PORTLAND, OR | MISSOULA, MT | CASPER, WY
 BELLINGHAM, WA | SEATTLE, WA

STSII Gas Probe Data Sheet

HERRERA

Gas Probe ID: LFB- _____

Canister ID: _____

Sample ID: NA _____

Initial Canister Pressure: _____

Date and Time: _____

Final Canister Pressure _____

Total Casing Volume (cc): _____

Field Personnel _____

Casing Volume Purged	Volume Purged (cc)	Purge Rate (ml/min)	PURGE TIME				CH ₄ (% Volume)	CO ₂ (% Volume)	O ₂ (% Volume)	H ₂ S (% Volume)	CO (% Volume)
			0	min	0	sec					
0			0	min	0	sec					
1/4				min		sec					
1/2				min		sec					
3/4				min		sec					
1				min		sec					
1-1/4				min		sec					
1-1/2				min		sec					
1-3/4				min		sec					
2				min		sec					
2-1/4				min		sec					
2-1/2				min		sec					
2-3/4				min		sec					
3				min		sec					

Comments/Special Instructions:

Barometric Pressure: GP- _____

Well head Pressure: NA _____

Well Diameter: 0.75" _____

Water Level/Well Bottom: _____ Screen: _____

Equipment Used: Gem 2000 (Plus), Water Level Meter _____

Construction Site Observations

Date: _____ Inspector: _____

Project Name: _____

Arrival/Departure Time: _____ Project No.: _____

Weather: _____ Contract No.: _____

Site Activities: ***Do not enter text on this line.***

Labor (Prime and Subcontractor):	Equipment (Prime and Subcontractor):	Materials Received and Conditions:
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Site Inspection Observations: ***Do not enter text on this line.***

Action Items/Follow Up: ***Do not enter text on this line.***

Signature

Print Name

