

Remedial Investigation Work Plan

Genesee Valley Metal Finishing (Site No. 828228)

New York State Department of Environmental Conservation

Project number: 60781011

Revised May 2026



Certification

I, Mike Gutmann, PG, certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this Remedial Investigation Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the Division of Environmental Remediation (DER) Technical Guidance for Site Investigation and Remediation (DER-10) and Green Remediation (DER-31).



5/26/2026

Signature

Date

Quality information

Prepared by	Checked by	Verified by	Approved by
			
Ernie Thalhamer Geologist	Edyta Chorostkowska Senior Scientist	Mike Gutmann, PG Project Manager	Mike Gutmann, PG Project Manager

Revision History

Revision	Revision date	Details	Authorized	Name	Position
1	5/26/2026	Updates per NYSDEC and NYSDOH Comments	5/26/2026	Mike Gutmann	Project Manager

Distribution List

# Hard Copies	PDF Required	Association / Company Name

Prepared for:

New York State Department of Environmental Conservation
625 Broadway
Albany, NY 12233

Prepared by:

AECOM
257 West Genesee Street
Buffalo, NY 14202
aecom.com

Copyright © 2026 by AECOM

All rights reserved. No part of this copyrighted work may be reproduced, distributed, or transmitted in any form or by any means without the prior written permission of AECOM.

Table of Contents

1.	Introduction	1
1.1	Site Description and Background	1
1.1.1	Site History	1
1.1.2	Remaining Contamination	2
1.1.3	Geology / Hydrogeology	2
2.	Remedial Investigation Work Plan	3
2.1	Purpose	3
2.2	Scope of Work	3
2.3	Report Preparation	8
2.4	Green & Sustainable Remediation Initiative Efforts	9
2.5	General Notes.....	10
3.	Anticipated Field Schedule	11
4.	References.....	12

Figures

Figure 1	Site Location
Figure 2	Proposed Sampling Locations
Figure 3	Floor Plan
Figure 4	SSDS Plan at 85 Jay Street
Figure 5	SSDS Plan at 499 North Plymouth Avenue
Figure 6	SSDS Plan at 555 North Plymouth Avenue

Tables

Table 1	Proposed Sampling Analyses
Table 2	Contact List

Appendices

Appendix A	John Williams School No. 5 Academic Calendar
Appendix B	Health and Safety Plan (HASP)
Appendix C	Field Activities Plan (FAP)
Appendix D	Quality Assurance Project Plan (QAPP)
Appendix E	Green Remediation Best Management Practices: Remedial Investigation
Appendix F	NYSDOH Generic Community Air Monitoring Plan
Appendix G	Access Agreements

Acronyms and Abbreviations

AECOM	AECOM USA, Inc.
bgs	below ground surface
CAMP	Community Air Monitoring Program
CBS	Chemical Bulk Storage
CLCPA	Climate Leadership & Community Protection Act
DCE	dichloroethene
DER	Division of Environmental Remediation
DPT	direct push technology
DUSR	Data Usability Summary Report
ELAP	Environmental Laboratory Approval Program
EPA	Environmental Protection Agency
FAP	Field Activity Plan
FWIRA	Fish and Wildlife Resource Impact Analysis
ft	feet
GPR	ground penetrating radar
GSR	Green and Sustainable Remediation
GVMF	Genesee Valley Metal Finishing
HASP	Health and Safety Plan
ID	inner diameter
IDW	investigation derived waste
LaBella	LaBella Associates
µg/L	micrograms per liter
Miller	Miller Environmental Group Inc.
MS	matrix spike
MSD	matrix spike duplicate
NTU	nephelometric turbidity units
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
PBS	Petroleum Bulk Storage
PCBs	polychlorinated biphenyls
PCE	tetrachloroethene
PFAS	per- and polyfluoroalkyl substances
PID	photoionization detector
PVC	polyvinyl chloride
QAPP	Quality Assurance Project Plan
QA/QC	quality assurance/quality control
Ravi	Ravi Engineering & Land Surveying, P.C.
RI	Remedial Investigation
RIWP	Remedial Investigation Work Plan
ROD	Record of Decision
ROW	right of way
RV2	Vapor Intrusion Removal Action
SCG	Standards, Criteria, or Guidance
Site	Genesee Valley Metal Finishing
SSDS	sub-slab depressurization system
START	Superfund Technical Assessment and Response Team
SVOC	semi volatile organic compounds
TAL	Target Analyte List
TCE	Trichloroethene
TCL	Target Compound List
ULSD	Ultra Low Sulfur Diesel
USCS	Unified Soil Classification System
VI	Vapor Intrusion
VOC	volatile organic compound

1. Introduction

AECOM USA, Inc. (AECOM) is pleased to submit this Remedial Investigation Work Plan (RIWP) to the New York State Department of Environmental Conservation (NYSDEC) for the Genesee Valley Metal Finishing Site (“the Site”), which is part of the State Superfund Program (Site No. 828228). NYSDEC requested that a Remedial Investigation (RI) be conducted at the Site. This RIWP incorporates field investigation elements requested by the NYSDEC in their Notice to Proceed correspondence dated 15, 2026, New York State Department of Health (NYSDOH) soil vapor investigation field elements requested during our March 4, 2026, conference call, and AECOM's complete 2.11 work scope and budget package approved by NYSDEC on April 6, 2026. This RIWP will be used by AECOM personnel in conjunction with AECOM's Health and Safety Plan (HASP, in **Appendix B**), Field Activity Plan (FAP, in **Appendix C**), Quality Assurance Project Plan (QAPP, in **Appendix D**), and Green and Sustainable Remediation (GSR) Plan (in **Appendix E**). This work assignment covers the start of a remedial investigation and feasibility study which will be used to evaluate and select a remedy and complete a Record of Decision (ROD).

The Site is located at 242-244 Verona Street in the City of Rochester, Monroe County, New York and is identified as Parcel 106.69-1-81 on the Monroe County Tax Map. **Figure 1** presents the Site Location. The Site is approximately 12,000 square foot in size and occupied primarily by an approximately 10,000 square foot vacant structure. The Site is directly adjoined by mixed commercial and residential use structures to the north, a parking lot adjoining to the east, and a vacant parcel adjoining to the west. Across Jay Street to the northwest is John Williams School No. 5, and to the west there are four single-family residential homes. To the south and southwest, across Verona Street, is Brown Square Park. The Site is currently vacant and unoccupied and is zoned for industrial use.

The investigation scope of work described in this RIWP includes the following activities:

- Sub-slab soil and vapor screening;
- Soil boring advancement;
- Subsurface soil sampling;
- Overburden and bedrock monitoring well installation;
- Water level measurement;
- Groundwater sampling;
- Soil vapor probe installation and sampling; and,
- Sub-slab depressurization system (SSDS) inspection.

1.1 Site Description and Background

1.1.1 Site History

The Site is the location of a former electroplating facility that performed zinc, nickel and chrome plating. The Genesee Valley Metal Finishing (GVMF) Company formerly operated an electroplating operation at the Site, which ceased in 2019 and the property was foreclosed upon and sold to Urban City Me, LLC. In 2025, the property was sold to ROC Enterprises LLC, who subsequently failed to acquire title to the site. Title to the site was later conveyed to 7144 Enterprises Inc. on March 5, 2026. The facility plated metal items primarily with zinc, nickel, and chrome finishes. At the time of transfer of ownership plating-related chemicals, wastewater treatment materials and process wastes were reported to have been left on site, in addition to poor housekeeping, deteriorated building conditions and improper hazardous material storage. Throughout its operational use, facility upkeep and proper waste and disposal were not followed leading city, state and local regulators to cite GVMF.

In January 2020, the NYSDEC contacted and verbally requested that the Environmental Protection Agency (EPA) perform an appropriate Comprehensive Environmental Response, Compensation, and Liability Act assessment and/or removal action at the site. Emergency Removal actions, completed in February 2021, included removal and off-site disposal of electroplating chemicals and waste, and dismantling of plating lines. During this removal operation, it was discovered that trichlorethylene (TCE) was used as a degreasing solvent in the process. Subsequent soil sampling in November 2020 identified TCE contamination in soil beneath the building. In March 2021 during Removal Action 2, additional sampling including collection of soil gas, sub-slab soil gas, indoor air and groundwater samples occurred both on-site and at adjoining off-site properties. Subsequently, SSDS were designed and installed at three off-site locations. In October 2023, upon completion of the Vapor Intrusion Removal Action (RV2) activities, EPA referred the Site back to the NYSDEC for future monitoring and operations and maintenance of the SSD systems. EPA concluded that RV2 activities "mitigated the threats posed by TCE Vapor Intrusion (VI) in indoor air". With the EPA removal action complete, the Site was transferred back to NYSDEC under the State Superfund Program.

1.1.2 Remaining Contamination

The primary contaminants of concern are chlorinated volatile organic compounds (VOCs), primarily TCE in soil, groundwater, and soil vapor. Further investigation of the Site is necessary to determine the nature and extent of contaminants of concern.

Previously at the request of the NYSDEC, the EPA and the Superfund Technical Assessment and Response Team (START) conducted an assessment and subsequent Emergency Removal Action at the Site. During the removal, TCE was discovered to have been used during the electroplating process. Groundwater sampling identified dissolved-phase TCE at concentrations as high as 39,700 µg/L at the south portion of the Site (in monitoring well GW-8), expected to be within vicinity of a former inground solvent pit. Additional chlorinated VOCs including cis-1,2-dichloroethene (DCE), tetrachloroethene (PCE) and vinyl chloride were detected in groundwater both on-Site and off-Site to the northwest (GW-3), west (GW-4), south (GW-5), and southeast (GW-2).

1.1.3 Geology / Hydrogeology

The City of Rochester and vicinity is situated in the Erie-Ontario Lowlands physiographic province of New York State (Broughton, et al. 1966). The province is characterized by low plains with little relief. In the Ontario lowland south of Lake Ontario, two escarpments occur which correspond to the underlying Onondaga Limestone and Lockport Dolomite bedrock units. These rocks are Silurian in age, strike east-west, and dip gently to the south at approximately 1 degree or 40 to 50 feet per mile (Rickard, L. *et al.*, 1970). The dip of the rocks follow the structural trend of a homocline affecting the Paleozoic basement rocks across western and southern New York State. In general, dip increases from west to east across western and central New York. Bedrock joints are common in the Lockport Formation and are a result of structural stresses during the late Paleozoic Appalachian deformation (Zenger 1965). Bedrock outcrops along the nearby Genesee River are characterized by occasional near vertical joints and horizontal bedding planes.

The following geologic units underlie the Site from ground surface: 12 to 15 feet of loosely consolidated sediments composed of lacustrine silt and clay, underlain by upper Silurian Lockport Group dolostone. The depth to bedrock is approximately 12 to 15 feet (ft) below ground surface (bgs). The depth to groundwater is approximately 5 to 9 ft bgs. The direction of groundwater flow is to the southwest based upon water level information from EPA's prior investigation.

2. Remedial Investigation Work Plan

2.1 Purpose

The purpose of this RIWP is to identify the procedures and criteria to complete the RI in accordance with DER-10. The primary objectives of the proposed Remedial Investigation includes, but is not limited to, the following:

- Delineate the nature and extent of contamination in soil and groundwater within the overburden and bedrock at and surrounding the site, and assess and evaluate potential impacts on soil vapor;
- Evaluate groundwater in overburden and bedrock to characterize hydrogeologic conditions and evaluate potential contaminant migration pathways;
- Collect and analyze groundwater samples from existing and newly installed monitoring wells to assess contaminant concentrations and groundwater quality;
- Evaluate soil vapor conditions in vicinity of the Site through the collection of subsurface vapor samples; and,
- Inspect existing SSDS installed at proximate adjoining structures to confirm operational status and general system conditions.

The locations of the proposed soil borings, monitoring wells, and soil vapor implant points are shown on **Figure 2** (locations may change based on physical access constraints and soil boring findings). NYSDEC will be notified prior to any changes to the proposed sampling locations.

2.2 Scope of Work

The scope of work for the field investigation consists of the following tasks:

- Task 1 – Utility Clearance
- Task 2 – Shallow Sub-Slab Soil and Vapor Screening
- Task 3 – Soil Boring Advancement, Soil Sampling and Analysis
- Task 4 – Well Installation and Development
- Task 5 – Groundwater Monitoring, Sampling, and Analysis
- Task 6 – Soil Vapor Probe Installation and Sampling
- Task 7 – Topographic and Site Survey
- Task 8 – Investigation Derived Waste Management
- Task 9 – Sub-Slab Depressurization Systems Inspection

The field investigation tasks are further described below.

A records search will also be conducted during the RI to gain a better understanding of the Site history, since this was not previously completed. The records search will include the following:

- A radius map report;
 - The radius map report is a map that shows a circle around the target property of 1-mile. Inside the circle, the vendor plots any environmental records that appear in the database. These records can be open or closed incidents for any entries in a Federal, State, County or Municipal regulatory agency database, including the NYSDEC Petroleum Bulk Storage (PBS) and Chemical Bulk Storage (CBS) registries.
- Recovered government archives;

- Sanborn Fire Insurance maps;
- Historical aerial photos;
- Historical city directories;
- Historical topographic maps; and
- Lien and activity use limitation report (to 1980).

2.2.1 Task 1 – Utility Clearance

Prior to any intrusive work, geophysical screening will be conducted by Ravi Engineering & Land Surveying, P.C. (Ravi) to identify the presence of underground utilities or any anomalies (e.g., underground storage tanks) within the work areas. This will be done using geophysical methods (i.e., ground penetrating radar and electromagnetic conductivity).

Prior to mobilization, the drilling subcontractor, LaBella Associates (LaBella), shall have all required utility clearance mark-outs and right of way (ROW) permits necessary for commencing drilling activities at the site and surrounding areas. Additionally, at each proposed soil boring or drilling location, LaBella will hand clear/soft dig down to 5 ft bgs. If necessary, air knife and Vactron will be utilized to aid in hand clearing.

2.2.2 Task 2 – Shallow Sub-Slab Soil and Vapor Screening

An AECOM geologist will advance ten (10) shallow sub-slab soil borings (SS-01 to SS-10) via hand auger or JMC Sampler through the Site Building slab, to an approximate depth of up to 3 ft bgs, as shown on **Figure 3**. The purpose of this work is to assess contaminant concentrations in shallow soil beneath the Site Building, and to inform the placement of the deeper Geoprobe direct push soil borings advanced under Task 3.

Sub-slab samples will be collected using hand augers following penetration of the slab with a core drill.

Immediately upon coring and opening, each location will be screened with a photoionization detector (PID) for the presence of organic vapors by a geologist. Soil samples will be visually described and classified, inspected for signs of contamination, and one (1) sample from each boring will be submitted for laboratory analysis for VOCs (Method 8260C). AECOM staff will take field notes using digital EQUiS Collect Forms.

2.2.3 Task 3 – Soil Boring Advancement and Soil Analysis

An AECOM geologist will oversee the advancement of 36 soil borings throughout the Site and surrounding areas (GB-01 through GB-20, MW-01 through MW-09, BW-01 through BW-03, and SVP-01 to SVP-04, as shown on **Figure 2**) by a drilling subcontractor, LaBella. Prior to mobilization, the drilling subcontractor will complete the required utility clearance mark-outs and maintain permits necessary for commencing drilling activities.

Twenty soil borings (GB-01 through GB-20) will be advanced up to the bedrock interface, which is expected to be between approximately 12 and 15 ft bgs, using a track-mounted direct push technology (DPT) rig to characterize soil beneath the Site and within vicinity of the Site. The purpose of this work is to assess contaminant concentrations in subsurface soil beneath the Site Building and surrounding the Site Building at exterior locations.

Nine (9) soil borings (MW-01 through MW-09) will be advanced up to the bedrock interface using a track-mounted DPT rig and converted into overburden monitoring wells. The purpose of this work is to assess and horizontally delineate contaminant concentrations in overburden groundwater on-Site and the surrounding area, beyond the original program with pre-existing wells GW-1 to GW-8, and to evaluate hydrogeologic conditions.

Three (3) soil borings (BW-01 through BW-03) will be advanced into bedrock up to 30 feet bgs using a rotary/core drilling rig and converted into bedrock monitoring wells. The purpose of this work is to assess

and vertically delineate contaminant concentrations in bedrock groundwater on-Site and the surrounding area, and to evaluate hydrogeologic conditions.

Four (4) soil borings (SVP-01 to SVP-04) will be advanced up to 6 feet bgs using a DPT rig and converted into soil vapor monitoring probes. The purpose of this work is to assess soil vapor conditions in vicinity of the Site and in front of four (4) nearby residential properties.

The drilling subcontractor will hand clear/soft dig with a bucket auger down to 5-ft bgs; and, if necessary, air knifing will be used to clear the first 5 ft. The DPT drill rig will be capable of advancing a 2-inch outside diameter by 4- or 5- foot-long acetate lined macrocore sampler through the overburden material, terminating at the bedrock interface. Drilling and soil sampling will be conducted continuously to classify the subsurface material. Soil samples will be visually described and classified, inspected for signs of contamination, and screened with a PID for the presence of organic vapors by an AECOM geologist. The AECOM geologist will classify soils in accordance with the Unified Soil Classification System (USCS) and record PID measurements for each one (1) foot interval. Subsurface information will be recorded on soil boring logs.

Rock cores will be drilled at each of the bedrock monitoring wells to a target depth of approximately 30 ft bgs (or approximately 12 ft into bedrock, whichever is shallower). Rock cores will be collected to obtain additional stratigraphic data. After the geologist completes logging and takes photographs, the rock cores will be drummed for off-site disposal.

Two (2) soil samples will be collected from each boring, including one (1) from the surface (i.e., top 0 to 1 feet bgs), and one (1) from the subsurface (i.e., >1 feet bgs) from the depth with the highest PID reading, and submitted for laboratory analysis of target compound list (TCL) VOCs (Method 8260C), and total analyte list (TAL) metals (Method 6010C), including mercury (Method 7471B), hexavalent chromium (Method 7196A), trivalent chromium (Method 6010C), and cyanide (Method 9014). In addition, 20% of soil samples will also be submitted for laboratory analysis of TCL semi-volatile organic compounds (SVOCs) (Method 8270D), 1,4-dioxane (Method 8270D SIM), pesticides (Method 8081B), polychlorinated biphenyls (PCBs) (Method 8082A), and per- and poly-fluorinated alkyl substances (PFAS) (Method 1633). Furthermore, one (1) surface soil sample from the top 0 to 2 inches will be collected from five (5) borings in green space locations and submitted for laboratory analysis of TCL VOCs (Method 8260C), TAL metals (Method 6010C), mercury (Method 7471B), hexavalent chromium (Method 7196A), trivalent chromium (Method 6010C), cyanide (Method 9014), TCL SVOCs (Method 8270D), 1,4-dioxane (Method 8270D SIM), pesticides (Method 8081B), PCBs (Method 8082A), and PFAS (Method 1633). Appropriate quality assurance / quality control (QA/QC) samples will also be collected, including field duplicates, matrix spike (MS) samples, matrix spike duplicate (MSD) samples, equipment/rinse blanks, field blanks, and trip blanks. The proposed soil sampling and QA/QC plan is presented in **Table 1**.

After the AECOM geologist completes soil logging and soil sampling, drilling spoils will be placed into New York State Department of Transportation (NYSDOT)-approved 55-gallon drums as investigation-derived waste (IDW) in the IDW staging area (discussed further in Section 2.2.8). AECOM staff will take field notes using digital EQulS Collect Forms.

A community air monitoring program (CAMP) will be implemented during intrusive site activities to monitor and record potential airborne contaminants during drilling activities. In accordance with DER-10 guidance, CAMP monitoring will include continuous real-time monitoring for VOCs and particulates. Three (3) CAMP stations will be established, with one (1) CAMP station situated near the school on Jay Street. The locations of the other two (2) CAMP stations will be established at appropriate downwind positions. Refer to **Appendix F** for the NYSDOH Generic Community Air Monitoring Plan.

Any field activities conducted in front of school property (i.e., advancement and installation of MW-08 and MW-09) will be scheduled to occur when school is not in session. Work will be performed outside of normal school operating hours, during weekends, school breaks, or other periods when the facility is unoccupied by students. See **Appendix A** for school academic calendar as of April 17, 2026. During work at or adjacent to school property, a NYSDEC representative will be present during field activities.

2.2.4 Task 4 – Well Installation and Development

AECOM will oversee the installation of 12 monitoring wells by the drilling subcontractor (**Figure 2**). AECOM personnel will complete a synoptic round of groundwater level measurements prior to initiating this task to verify groundwater flow direction. AECOM may recommend adjustments to proposed monitoring well locations and will inform NYSDEC if adjustments are recommended.

Nine (9) monitoring wells (MW-01 through MW-09) will be installed in the overburden using a track-mounted DPT rig capable of advancing augers. These monitoring wells will be installed to intercept and triangulate groundwater within the overburden and advanced to approximately 12 to 15 ft bgs. Borings will be advanced using 4¼-inch diameter hollow stem auger drilling methods. Each overburden monitoring well will be constructed with a 10-foot-long, 2-inch inner diameter (ID) Schedule 40 PVC, 0.010" slot size screen and riser to grade and finished with a flush mount steel curb box.

Three (3) monitoring wells (BW-01 through BW-03) will be installed in the bedrock using a conventional drill rig. These monitoring wells will be installed to intercept and triangulate groundwater within the shallow bedrock to a depth of approximately 30 ft bgs. Borings will be advanced using 6¼-inch diameter hollow stem augers through overburden and converted to rotary drilling methods upon encountering bedrock. A nominal 6-inch rock-socket will be advanced approximately three (3) ft into the bedrock, and a four (4) inch carbon steel casing will be grouted into the bedrock rock socket to seal off the overburden. After at least 24-hours, the bedrock will be cored using an Nx-tooling to approximately 30 ft bgs. A nominal 3-7/8 - inch roller bit will then be utilized to ream the well to completion. Each bedrock monitoring well will be constructed as an open bedrock well and finished with a flush mount steel curb box.

New monitoring wells will be developed using hydrolift and peristaltic pumps to: remove residual drilling cuttings; improve pumping performance of the well; and to collect representative groundwater samples from the wells. Water quality parameters including pH, conductivity, dissolved oxygen, turbidity, temperature, and oxidation-reduction potential will be monitored at regular intervals. Existing monitoring wells will be inspected to determine their integrity and suitability for groundwater sampling. AECOM personnel will inspect the existing monitoring wells and identify if any repairs needed such as curb box replacement, redevelopment, etc. The procedures for well inspections are described in the FAP. Data from this inspection will be compared against corresponding well construction logs, provided in previous investigation reports. The existing monitoring wells are assumed to be functional and will not require well development. Well development water will be placed into NYSDOT-approved 55-gallon drums as IDW in the IDW staging area.

2.2.5 Task 5 – Groundwater Monitoring, Sampling, and Analysis

Prior to the start of the groundwater sampling event, a complete synoptic round of water levels will be collected by AECOM field staff at the 12 newly installed monitoring wells (MW-01 through MW-09 and BW-01 through BW-03) and up to eight (8) existing monitoring wells (GW-1 through GW-8). Groundwater levels will be measured from the highest point of the top of the inner well casing.

Groundwater sampling will be performed in accordance with low-flow groundwater sampling procedures as referenced in the FAP and QAPP. One (1) groundwater sample will be collected from each monitoring well and submitted for laboratory analysis of TCL VOCs (Method 8260C), and TAL metals (Method 6010C), including mercury (Method 7470A), hexavalent chromium (Method 7196A), trivalent chromium (Method 6010C), and cyanide (Method 9014). The metals analysis will include unfiltered samples for total metals; however, at locations that have high turbidity with NTU >50, both filtered and unfiltered samples will be collected for total and dissolved metals, respectively. In addition, 20% of groundwater samples will also be submitted for laboratory analysis of TCL SVOCs (Method 8270D), 1,4-dioxane (Method 8270D SIM), pesticides (Method 8081B), PCBs (Method 8082A), and PFAS (Method 1633A). Appropriate QA/QC samples will also be collected, including field duplicates, MS samples, MSD samples, equipment/rinse blanks, field blanks, and trip blanks. The proposed groundwater sampling and QA/QC analytical plan is presented in **Table 1**.

Dedicated sampling equipment will be used at each well. Purge water from monitoring wells will be placed into NYSDOT-approved 55-gallon drums as IDW in the IDW staging area. AECOM staff will take field notes using digital EQUIS Collect Forms.

2.2.6 Task 6 – Soil Vapor Probe Installation and Sampling

An AECOM geologist will oversee the installation of four (4) soil vapor probes in front of four (4) residential properties along Jay Street (SVP-01 to SVP-04, as shown on **Figure 2**) by the drilling subcontractor, up to 6 ft bgs using a DPT rig. Drilling and soil sampling will be conducted continuously to classify the subsurface material. Soil samples will be visually described and classified, inspected for signs of contamination, and screened with a PID for the presence of organic vapors by the AECOM geologist. Soil boring logs will classify soils in accordance with the USCS and display PID readings for each interval. No soil samples will be collected from the borings intended to be soil vapor probes. After the AECOM geologist completes soil logging, drilling spoils will be placed into NYSDOT-approved 55-gallon drums as IDW in the IDW staging area.

Each vapor probe will be constructed with a stainless-steel vapor implant connected to Teflon or polyethylene tubing extending to ground surface, and a flush mount steel protective casing. Implants shall be 6 inches in length and are to be constructed of double-woven stainless-steel wire screen. AECOM staff will take field notes using digital EQUIS Collect Forms.

CAMP will be implemented during the soil vapor probe installation activities and will include continuous real-time monitoring for VOCs and particulates. Three (3) CAMP stations will be used with one (1) CAMP station situated near the school on Jay Street. The locations of the other two (2) CAMP stations will be established at appropriate upwind and downwind positions.

Newly installed soil vapor probes will be purged and leak tested by AECOM field staff prior to sampling. Soil vapor sampling will be performed in accordance with sampling procedures as referenced in the FAP and QAPP. One (1) soil vapor sample will be collected from each newly installed soil vapor probe and submitted for laboratory analysis of VOCs (Method TO-15). Appropriate QA/QC samples will also be collected, including a field duplicate. The proposed soil vapor sampling and QA/QC analytical plan is presented in **Table 1**. Dedicated sampling equipment will be used at each vapor probe.

2.2.7 Task 7 – Topographic and Site survey

An AECOM NYS licensed surveyor will complete a topographic and Site survey referenced to New York State Plane coordinates and vertical datum. The survey will be conducted to establish the location and elevation of the newly advanced soil borings (GB-01 through GB-20), the newly installed monitoring wells (MW-01 through MW-09 and BW-01 through BW-03) and vapor probes (SVP-01 to SVP-04), the existing monitoring wells (GW-1 to GW-8), buildings, and notable site features. Refer to **Figures 2** and **3** for the pre-existing and proposed sampling locations.

2.2.8 Task 8 – Investigation-Derived Waste Handling

IDW generated during the field activities, including soil spoils, bedrock slurry, decontamination fluids, well development water, and purge water, will be containerized in NYSDOT approved 55-gallon drums and handled using the procedures described in the FAP. The drums with bedrock slurry will be allowed to settle and the water will be decanted into separate drums to allow for waste disposal of solids and water. The drums will be labeled as non-hazardous pending laboratory results. The IDW will be subject to waste characterization sampling as indicated in **Table 1**.

The drums will be staged on-site until transport and disposal are arranged. The proposed IDW staging area is within the eastern portion of the Site building.

Upon receipt of the waste characterization sample results, waste profiles will be generated for the IDW stored in the staging area, which will then be promptly transported under manifest by the waste subcontractor, Miller Environmental Group Inc. (Miller), for proper disposal. Rock cores will be left on-site or disposed as IDW.

2.2.9 Task 9 – Sub-Slab Depressurization Systems Inspection

AECOM will perform an inspection and assessment of the three (3) existing SSDS installed at off-site properties (as shown on **Figures 4** through **6**):

- Basement of the residential apartments at 85 Jay Street,
- Ground floor of the commercial space at 499 Plymouth Avenue, and
- Basement of the school at 555 North Plymouth Avenue.

It should be noted that the proposed SSDS within the basement of the residential apartments at 503 Plymouth Avenue was not installed due to discovery of damaged friable asbestos containing material in the basement.

Inspection activities will include verification of system operation (fan functionality, readings of vacuum/suction, and status of alarms), evaluation of system integrity including piping, penetrations, discharge points, and slab seals, and documentation of system parameters. AECOM will provide inspection reports summarizing observations, vacuum gauges readings, and photographs for each location. The procedures for well inspections are described in the FAP. AECOM will defer to NYSDEC and NYSDOH for a determination if modifications or adjustments to the SSD systems are required. It is assumed that no adjustments or modifications/maintenance to the SSD systems are required and potential/associated costs are not included in this scope of work.

NYSDEC will arrange access agreements with the property owners, to be included in **Appendix G**. A minimum of two (2) AECOM staff, accompanied by a NYSDEC representative, will be present.

2.3 Report Preparation

The Remedial Investigation Report will be prepared in accordance with DER-10 and DER-31 and submitted as a draft report within 60 days after all fieldwork has been completed and data has been received and validated.

A final version of the report will be submitted within 30 business days after the Department's comments on the draft report are received by AECOM.

The report for this task will include the following:

- A description of all field activities conducted on the Site during the RI;
- A summary of previous investigations;
- A discussion of analytical results;
- Data summary tables of analyzed compounds with available NYS standards, criteria, guidance (SCG), and non-compliance values highlighted, collected during this RI site work;
- A Site map depicting relevant Site features;
- Figures depicting soil boring, monitoring well, soil vapor probe, and key Site features;
- Figures depicting sample locations and NYS SCG non-compliance values from the soil, groundwater and soil vapor analytical data collected during this RI site work;
- Figures depicting groundwater elevation contours;
- Field notes and/or daily activity logs;
- Photographs taken at the Site during field activities;
- Soil boring logs;
- Monitoring well construction logs;
- Monitoring well development logs;

- Monitoring well purge logs with water quality measurements;
- Soil vapor probe construction logs;
- Soil vapor probe purge, leak testing and sample logs;
- Survey field notes and Site sketches;
- A survey drawing;
- CAMP data;
- Data usability summary reports (DUSRs) (including Form 1s) containing only data from the current RI fieldwork;
- Summary of GSR elements in accordance with the Climate Leadership & Community Protection Act (CLCPA) and will be certified as prepared in substantial conformance with DER-31;
- A Qualitative Human Health Risk Exposure Assessment;
- A Fish and Wildlife Resource Impact Analysis (FWIRA); and
- Conceptual Site Model.

This task includes EQUIS submittals to NYSDEC for analytical data collected by AECOM during the RI.

2.4 Green & Sustainable Remediation Initiative Efforts

Development of this RIWP was completed with the goal of implementing sustainable practices where possible in accordance with the goals of the DER-31 Green Remediation Policy (January 2011 and November 2023 Memorandum). Pursuant to the NYSDEC DER-31 GSR initiative, GSR principles and techniques shall be implemented to the extent feasible during site investigation, remedial and site management stages of projects under NYSDEC programs. The major GSR components are as follows:

- Considering the environmental impacts of investigative technologies over the long term;
- Reducing direct and indirect greenhouse gas and other emissions;
- Increasing energy efficiency and minimizing use of non-renewable energy;
- Conserving and efficiently managing resources and materials;
- Reducing waste, increasing recycling, and increasing reuse of materials which would otherwise be considered a waste; and
- Incorporating GSR principles and techniques to the extent feasible in the future development at this site.

During implementation of this work plan, the following GSR efforts will be incorporated into field activities:

- Use of battery powered pumps.
- Reduce vehicle idling. All vehicles, both on and off road (including construction equipment) will be shut off when not in use for more than 5 minutes, consistent with 6 NYCRR Part 217 Motor Vehicle Emissions, Subpart 217-3 Idling Prohibition For Heavy Duty Vehicles.
- Use of Ultra Low Sulfur Diesel (ULSD).
- Use of low-flow sampling techniques to limit waste generation.
- Segregating recyclables from disposable waste material.
- Use phosphate-free detergents in place of organic solvents or acids.
- Use local staff (including subcontractors) when possible, to limit travel and petroleum fuel consumption.
- Contract a laboratory that uses green practices and/or chemicals.

- Use of newer equipment models meeting higher energy conservation standards.
- Source newer and lower-emission Tier 4 diesel equipment for pumps and drilling/ direct push equipment where possible.
- Use appropriately sized construction equipment, and pumps for each task.
- Use lower emission vehicles such as electric vehicles or small trucks or SUVs rather than full-size, where appropriate.
- GPR will be used as a non-invasive method, in lieu of excavating, to clear for utilities as well as identify any potential previously unidentified underground structures.
- IDW drums will be grouped and stored in a secure location throughout field activities and removed from the Site in a single event at the end of each field mobilization as applicable, rather than daily pickups.
- When applicable, visits to stores to purchase field supplies, etc., and trips to the laboratory to drop off sample coolers will be limited or combined to save energy, reduce emissions, reduce localized noise, vibration, and wear and tear on roads.

Throughout the RI, material and equipment use will be tracked to assess the effectiveness of BMPs. The New York State Department of Environmental Conservation Form A (Summary of Green Remediation Metrics) will be used for reporting. A copy of Form A is included in **Appendix E**.

2.5 General Notes

The field work conducted as part of this RI will be completed and/or overseen by qualified AECOM staff, who will follow the health and safety procedures outlined in the Health and Safety Plan (HASP, in **Appendix B**), the field sampling protocols outlined in the Field Activities Plan (FAP, in **Appendix C**), and the QA/QC protocols outlines in the Quality Assurance Project Plan (QAPP, in **Appendix D**).

Samples collected as part of this RI will be analyzed by an NYSDEC call-out laboratory, to be determined by the NYSDEC PM, which will be an Environmental Laboratory Approval program (ELAP) certified lab. Proper QA/QC will be collected in accordance with the Site-specific QAPP (**Appendix D**) and the Sample Analytical Program (**Table 1**). Category B deliverables are required for all soil, groundwater, and vapor analytical data. Data validation and DUSRS will be completed by AECOM.

3. Anticipated Field Schedule

This WA will be performed according to the following anticipated time frames:

Activity	Proposed Schedule
NYSDEC Approval of 2.11 Package	4/6/2026
Preliminary Site Visit with NYSDEC	5/21/26
Utility Clearances	5/20/26, 5/21/26 and 5/29/26
Interior Hand Auger Advancement and Direct Push Drilling	Pending Site Access
Exterior Direct Push Drilling Start	6/1/2026
Exterior Direct Push Drilling End	6/12/2026
Drilling and Well Installation / SSDS Inspection Start	7/6/2026
Drilling and Well Installation / SSDS Inspection End	7/24/2026
Groundwater Monitoring & Sampling Start	8/3/2026
Groundwater Monitoring & Sampling End	8/14/2026

4. References

- Broughton, J.G., et al. 1966. Geology of New York: A Short Account. New York State Museum and Science Service Educational Leaflet No. 20. Albany, NY.
- NYSDEC, 1998. Division of Water Technical and Operational Guidance Series (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. June 1998, revised February 2023.
- NYSDEC, 2010a. DER-10 / Technical Guidance for Site Investigation and Remediation. Issued May 3, 2010.
- NYSDEC, 2010b. CP-51 / Soil Cleanup Guidance. October 2010.
- NYSDEC, 2011. DER-31 / Green Remediation. Issued August 11, 2010, Rev January 20, 2011.
- NYSDEC, 2023. Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs. Issued April 2023.
- NYSDEC and AECOM, 2019. Standby Contract No. D009803 between the State of New York Department of Environmental Conservation and AECOM for Engineering Services. October 2019.
- Rickard, L. et al. 1970. Geologic Map of New York – Finger Lakes Sheet.
- USEPA, 2016. Green Remediation Best Management Practices: Site Investigation and Environmental Monitoring. Office of Land and Emergency Management EPA 542-F-16-002. United States Environmental Protection Agency. September 2016.
- Zenger, Donald H. 1965. Stratigraphy of the Lockport Formation (Middle Silurian) in New York State. Bulletin Number 404. New York State Museum and Science Service: Albany, NY.

Figures

File Path: C:\Users\ernest.thalhamer\OneDrive - AECOM\Genesee\920 GIS\Maps\RI\RIWP\aprx Layout 01 - SITE LOCATION



NEW YORK

Site Location



Site Location



1,000 0 1,000 Feet



AECOM

50 LAKEFRONT BOULEVARD
SUITE 111
BUFFALO, NY 14202
PHONE: (716) 856-5636

Source: USGS 1:24,000-scale topographic map, 7.5 x 7.5 Minute
Quadrangle: Mallory, 1978

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
GENESEE VALLEY METAL FINISHING SITE

SITE LOCATION

REMEDIAL INVESTIGATION WORK PLAN
242-244 VERONA STREET
ROCHESTER, NEW YORK

FILE NAME:
RIWP.aprx

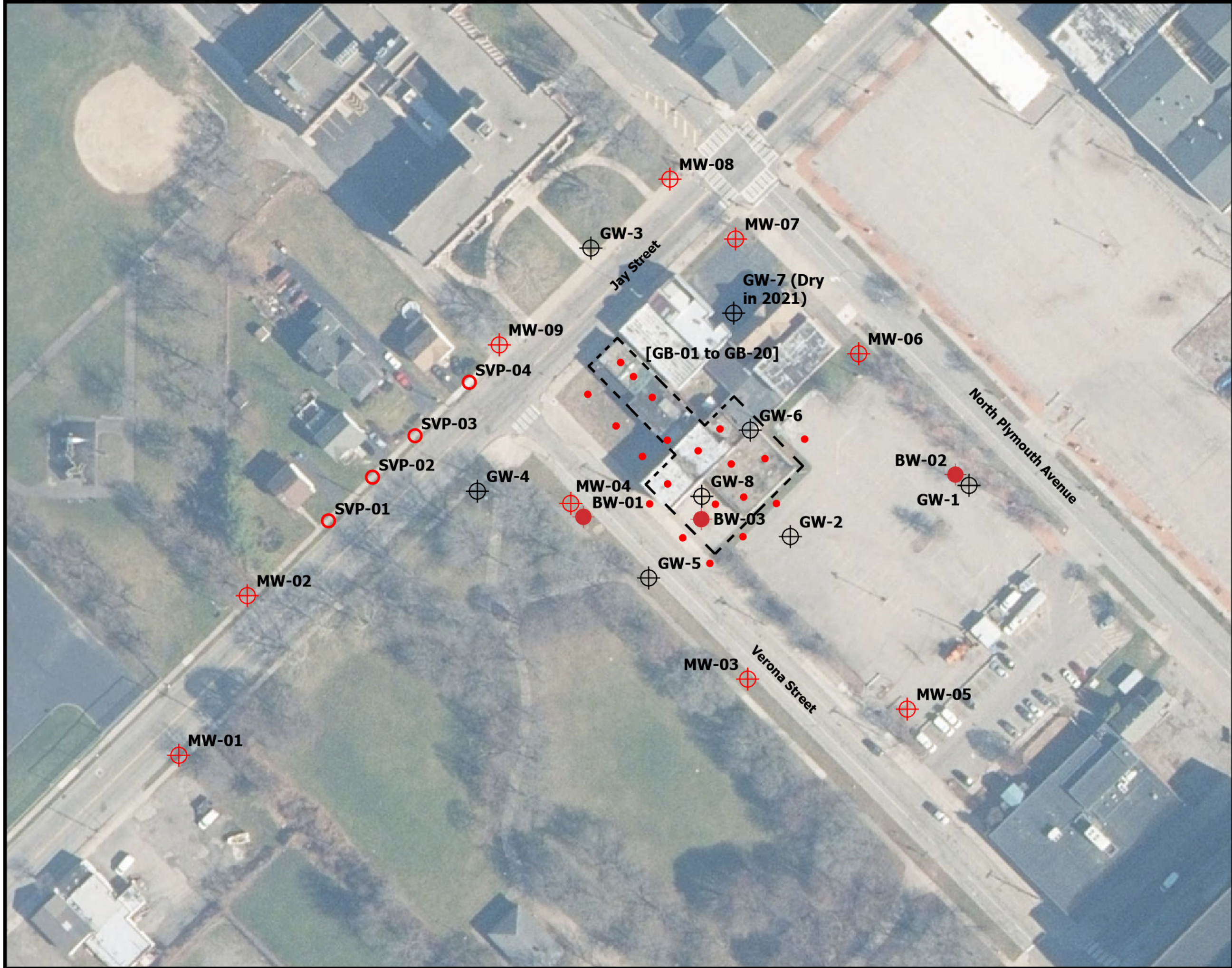
DRAWN:
ET

PROJECT NO.:
60781011

DATE:
4/10/2026

FIGURE NO.:
1

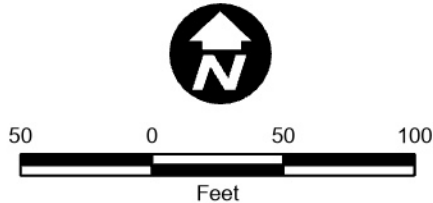
File Path: C:\Users\ernest.thalhamer\OneDrive - AECOM\Genesee020_GIS\Maps\RI\RIWP.aprx



Legend

- Site Boundary
- Proposed Bedrock Well
- Proposed Overburden Well
- Proposed Soil Vapor Point
- Proposed Soil Boring
- Pre-Existing Overburden Wells (Approximate Location)

SOURCE(S):
NYS ITS GIS Program Office, 2020



AECOM

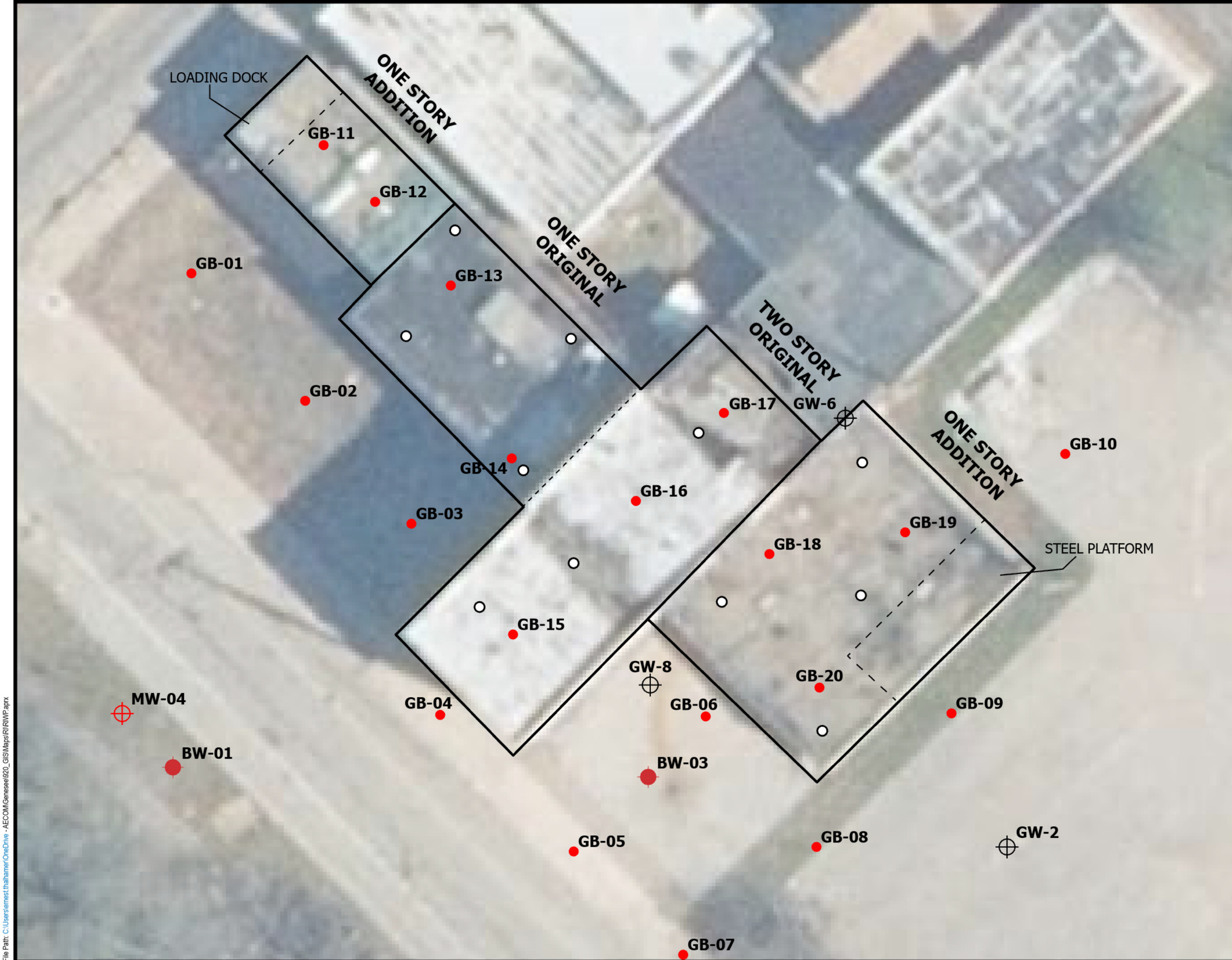
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
GENESEE VALLEY METAL FINISHING SITE

PROPOSED SAMPLING LOCATIONS

REMEDIATION INVESTIGATION WORK PLAN
242-244 VERONA STREET
ROCHESTER, NEW YORK

FILE NAME: RI.aprx	DRAWN: ET	PROJECT NO.: 60781011	DATE: 4/17/2026	FIGURE NO.: 2

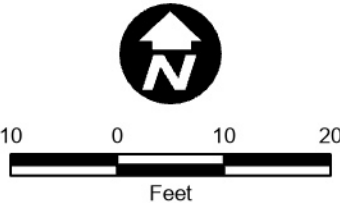
File Path: C:\Users\ernest.thalhamer\OneDrive - AECOM\Genesee020_GIS\Maps\RI\RIWP.aprx



Legend

- Site Boundary
- Proposed Bedrock Well
- Proposed Overburden Well
- Proposed Soil Boring
- Proposed Soil Vapor Point
- Pre-Existing Overburden Wells (Approximate Location)
- Proposed Shallow Sub-Slab Soil Boring

SOURCE(S):
NYS ITS GIS Program Office, 2020



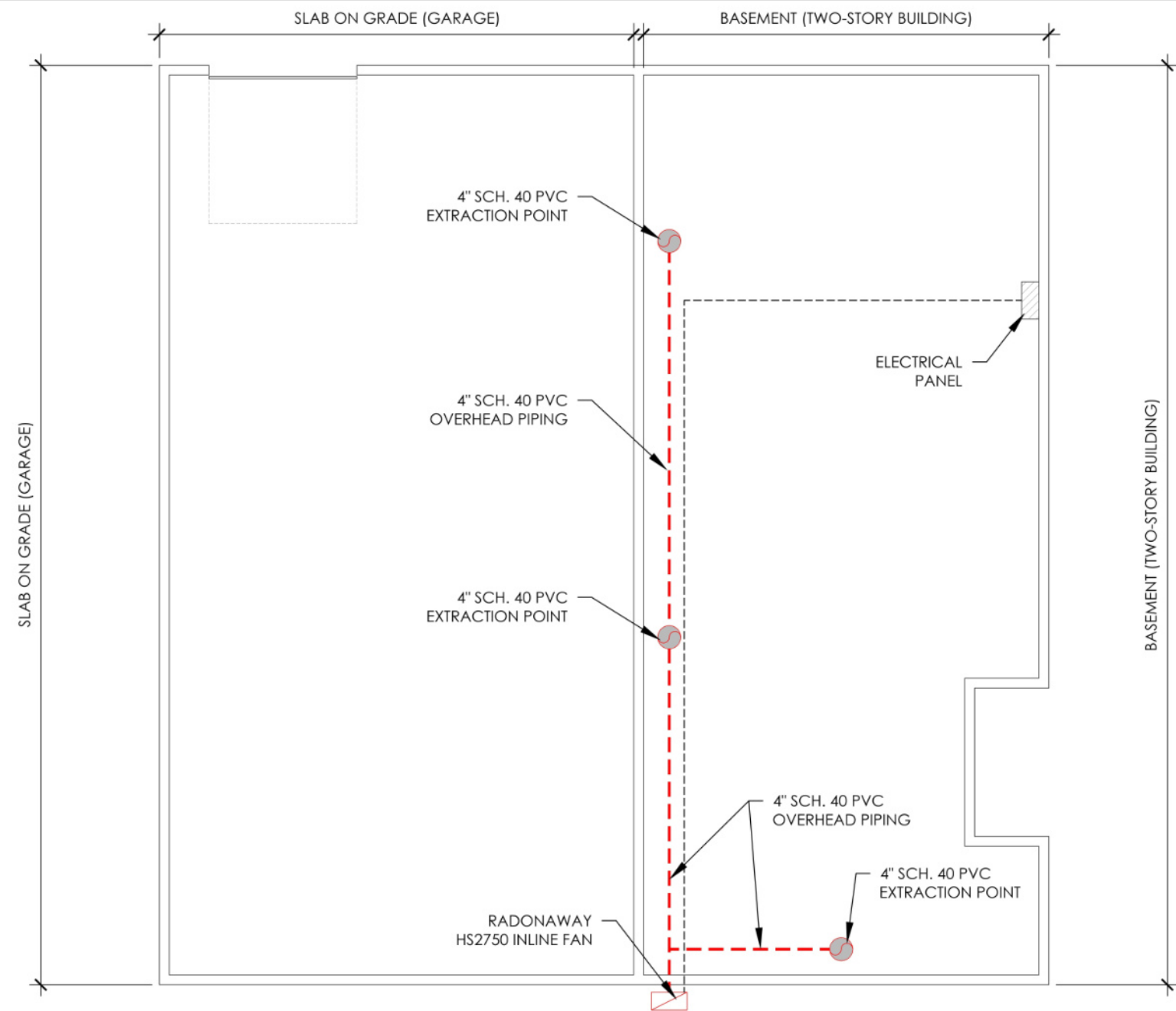
AECOM

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
GENESEE VALLEY METAL FINISHING SITE

FLOOR PLAN

REMEDIATION INVESTIGATION WORK PLAN
242-244 VERONA STREET
ROCHESTER, NEW YORK

FILE NAME: RI.aprx	DRAWN: ET	PROJECT NO.: 60781011	DATE: 4/17/2026	FIGURE NO.: 3

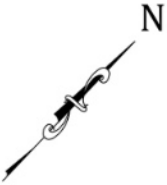


KEY PLAN



FLOOR PLAN

LEGEND			
	4" SOLID SCH. 40 PVC PIPING - OVER- HEAD		ELECTRICAL PANEL
	4" SOLID SCH. 40 PVC EXTRACTION POINT		FAN CONNECTION TO ELECTRICAL SERVICE
	RADONAWAY INLINE FAN		



AECOM

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
PROJECT SITE

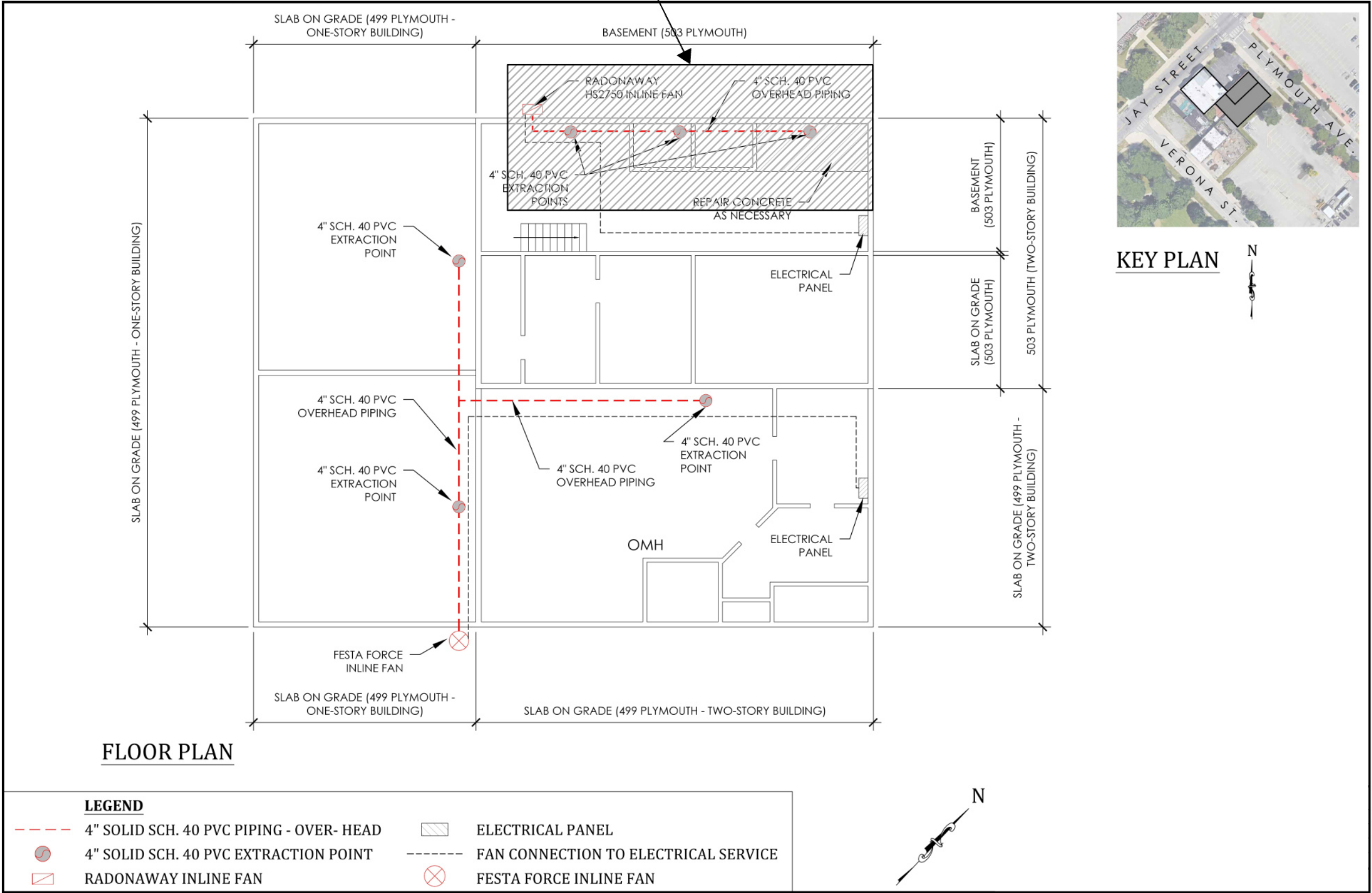
SSDS PLAN AT 85 JAY STREET

REMEDIAL INVESTIGATION WORK PLAN
242-244 VERONA STREET
ROCHESTER, NEW YORK

FILE NAME: RWPaprx	DRAWN: ET	PROJECT NO.: 60781011	DATE: 4/17/2026	FIGURE NO.: 4

NOTE: SSDS System at 503 North Plymouth Avenue Was Not Installed Due to Discovery of Friable Asbestos Containing Material in the Basement

SOURCE(S):
Final Vapor Intrusion Removal Action (RV2) Report
Genesee Valley Metal Finishing Site
Weston Solutions, Inc.
August 2023



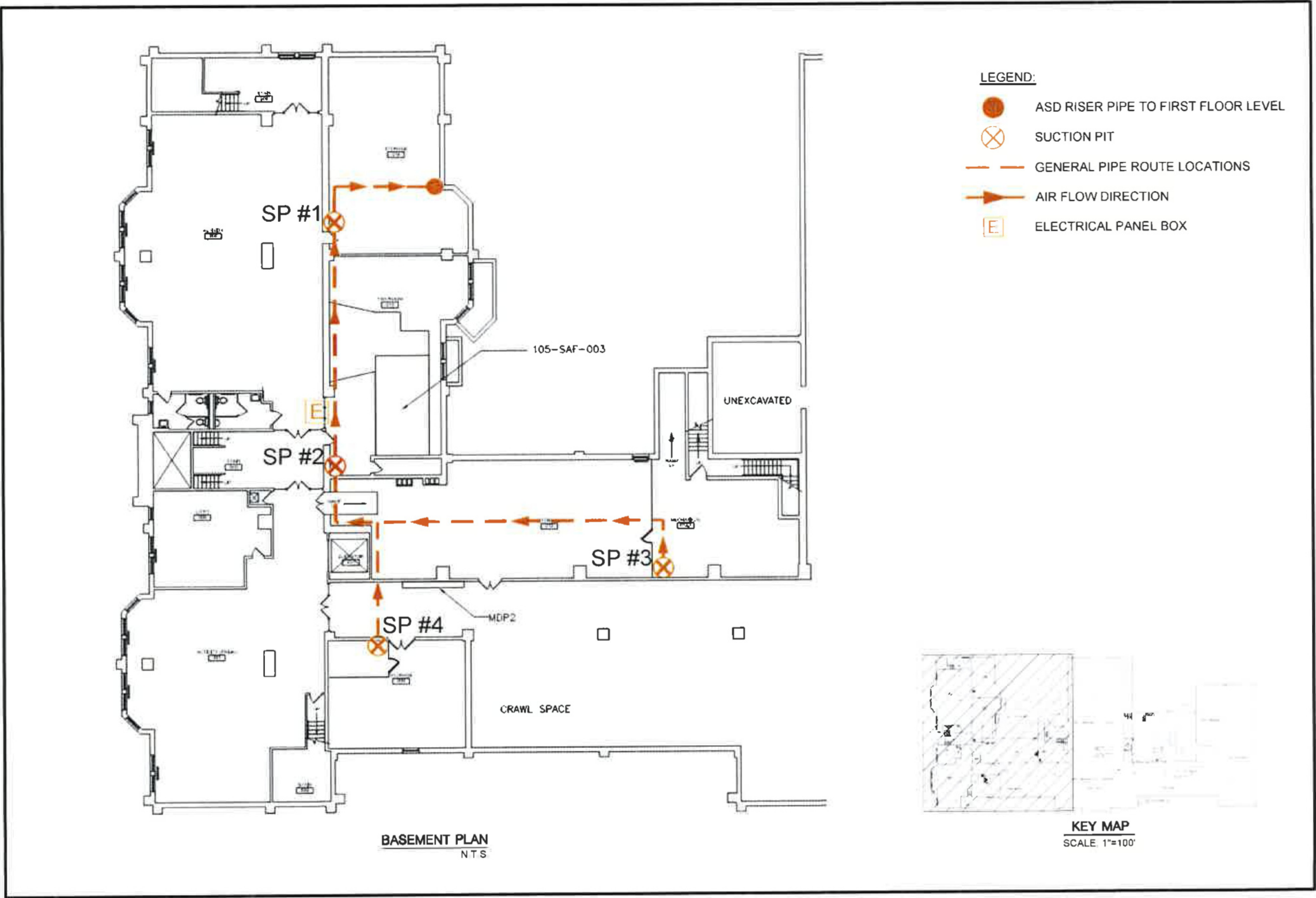
AECOM

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
PROJECT SITE

SSDS PLAN AT 499 NORTH PLYMOUTH AVENUE

REMEDIAL INVESTIGATION WORK PLAN
242-244 VERONA STREET
ROCHESTER, NEW YORK

FILE NAME: RWPaprx	DRAWN: ET	PROJECT NO.: 60781011	DATE: 4/17/2026	FIGURE NO.: 5



AECOM

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
PROJECT SITE

SSDS PLAN AT 555 NORTH PLYMOUTH AVENUE

REMEDIAL INVESTIGATION WORK PLAN
242-244 VERONA STREET
ROCHESTER, NEW YORK

FILE NAME: RWPaprx	DRAWN: ET	PROJECT NO.: 60781011	DATE: 4/17/2026	FIGURE NO.: 6

Tables

Table 1
Proposed Sampling Analyses
Remedial Investigation Work Plan
Genesee Valley Metal Finishing, Rochester, NY (Site No. 828228)



Type of Sampling Locations	Proposed Sampling Location ID	Approximate Depth (ft bgs)	Parameters																					
			Soils							Groundwater								Soil Vapor	Waste					
			TCL VOCs (8260C)	TCL SVOCs (8270D)	PFAS (1633A)	1,4-Dioxane (8270D SIM)	TCL PCBs (8082A)	TCL Pesticides (8081B)	TAL Metals (6010C) + Hg (7471B)	TCL VOCs (8260C)	TCL SVOCs (8270D)	PFAS (1633A)	1,4-Dioxane (8270D SIM)	TCL PCBs (8082A)	TCL Pesticides (8081B)	Dissolved TAL Metals (6010C) + Hg (7470A) ⁽⁵⁾	Total TAL Metals (6010C) + Hg (7470A) ⁽⁵⁾	VOCs (TO-15)	TCLP (1311/8260C/8270D/8081B/8151A/6010C/7470A)	Corrosivity, as pH (9040C/9045D)	Ignitability (1010B/1030)	Total Sulfide (9030B)	Total Cyanide (9014)	PCBs (8082A)
Shallow Soil Borings	SS-01	3	1																					
	SS-02	3	1																					
	SS-03	3	1																					
	SS-04	3	1																					
	SS-05	3	1																					
	SS-06	3	1																					
	SS-07	3	1																					
	SS-08	3	1																					
	SS-09	3	1																					
SS-10	3	1																						
Sub-Total	10	30	10	0	0	0	0	0	0									0	0	0	0	0	0	0
Geotechnical Soil Borings	GB-01	15	1	1	1	1	1	1	1									1	1	1	1	1	1	1
	GB-02	15	1						1															
	GB-03	15	1	1	1	1	1	1	1															
	GB-04	15	1						1															
	GB-05	15	2	1	1	1	1	1	1															
	GB-06	15	2						1															
	GB-07	15	2	1	1	1	1	1	1															
	GB-08	15	2						1															
	GB-09	15	2	2	2	2	2	2	2															
	GB-10	15	1						1															
	GB-11	15	2	1	1	1	1	1	1															
	GB-12	15	2						1															
	GB-13	15	2	1	1	1	1	1	1															
	GB-14	15	2						1															
	GB-15	15	2	1	1	1	1	1	1															
	GB-16	15	2						1															
	GB-17	15	2						1															
	GB-18	15	2						1															
	GB-19	15	2						1															
	GB-20	15	2						1															
Sub-Total	20	300	35	9	9	9	9	9	21									1	1	1	1	1	1	1
New Monitoring Wells	MW-01	15	2	2	2	2	2	2	2	1	1	1	1	1	1	1	1		1	1	1	1	1	1
	MW-02	15	1						1	1						1	1							
	MW-03	15	2	2	2	2	2	2	2	1						1	1							
	MW-04	15	1						1	1						1	1							
	MW-05	15	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1							
	MW-06	15	1						1	1						1	1							
	MW-07	15	2	2	2	2	2	2	2	1						1	1							
	MW-08	15	1						1	1						1	1							
	MW-09	15	2	2	2	2	2	2	2	1						1	1							
	BW-01	30	1						1	1	1	1	1	1	1	1	1							
	BW-02	30	1						1	1						1	1							
	BW-03	30	2						1	1						1	1							
Sub-Total	12	225	17	9	9	9	9	9	16	12	3	3	3	3	3	12	12		1	1	1	1	1	1
Existing Monitoring Wells	GW-1	~12-15								1						1	1							
	GW-2	~12-15								1	1	1	1	1	1	1	1							
	GW-3	~12-15								1						1	1							
	GW-4	~12-15								1						1	1							
	GW-5	~12-15								1						1	1							
	GW-6	~12-15								1	1	1	1	1	1	1	1							
	GW-7	~12-15								1						1	1							
	GW-8	~12-15								1						1	1							
Sub-Total	8									8	2	2	2	2	2	8	8							
Soil Vapor Locations	SVP-01	6																1						
	SVP-02	6																1						
	SVP-03	6																1						
	SVP-04	6																1						
Sub-Total	4	24																4						
Total Regular Samples			62	18	18	18	18	18	37	20	5	5	5	5	5	20	20	4	2	2	2	2	2	2

Table 1
Proposed Sampling Analyses
Remedial Investigation Work Plan
Genesee Valley Metal Finishing, Rochester, NY (Site No. 828228)



Type of Sampling Locations	Proposed Sampling Location ID	Approximate Depth (ft bgs)	Parameters																					
			Soils							Groundwater								Soil Vapor	Waste					
			TCL VOCs (8260C)	TCL SVOCs (8270D)	PFAS (1633A)	1,4-Dioxane (8270D SIM)	TCL PCBs (8082A)	TCL Pesticides (8081B)	TAL Metals (6010C) + Hg (7471B)	TCL VOCs (8260C)	TCL SVOCs (8270D)	PFAS (1633A)	1,4-Dioxane (8270D SIM)	TCL PCBs (8082A)	TCL Pesticides (8081B)	Dissolved TAL Metals (6010C) + Hg (7470A) ⁽⁵⁾	Total TAL Metals (6010C) + Hg (7470A) ⁽⁵⁾	VOCs (TO-15)	TCLP (1311/8260C/8270D/8081B/8151A/6010C/7470A)	Corrosivity, as pH (9040C/9045D)	Ignitability (1010B/1030)	Total Sulfide (9030B)	Total Cyanide (9014)	PCBs (8082A)
QA/QC	Duplicates ⁽¹⁾		4	1	1	1	1	1	2	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
	Matrix Spike (MS) ⁽¹⁾		4	1	1	1	1	1	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
	Matrix Spike Duplicate (MSD) ⁽¹⁾		4	1	1	1	1	1	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
	Trip Blank ⁽²⁾		0	0	0	0	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Equipment / Rinsate Blank ⁽³⁾		4	1	1	1	1	1	2	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
	Field Blank ⁽⁴⁾		0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Total QA/QC Samples			16	4	5	4	4	4	8	8	4	5	4	4	4	4	4	1	0	0	0	0	0	0
Total Samples for Laboratory Analysis				78	22	23	22	22	45	28	9	10	9	9	9	24	24	5	2	2	2	2	2	2

Notes:

(1) Duplicates, Matrix Spike and Matrix Spike Duplicate samples will be collected at a rate of 1 per 20 samples.

(2) VOC trip blanks will be collected at a rate of 1 per cooler containing VOC aqueous samples.

(3) Rinsate Blanks will be collected at a rate of 1 per week per media or 1 per 20 samples.

(4) Field Blanks will be collected at a rate of 1 per week per media or 1 per 20 samples.

(5) At locations that have high turbidity with NTU >50, both filtered and unfiltered samples will be collected for total and dissolved metals, respectively.

bgs - below ground surface

ft - feet

Hg - mercury

MW - Monitoring Well

PCBs - polychlorinated biphenyls

PFAS - per-and polyfluoroalkyl substances

QA/QC - quality assurance/quality control

SB - Soil Boring

SIM - Selected Ion Monitoring

SVOCs - Semi-volatile organic compounds

SW - Surface Water

TAL - Target Analyte List

TCL - Target Compound List

TCLP - Toxicity charecteristic leaching procedure (includes VOCs, SVOCs, pesticides, herbicides, and metals)

VOCs - Volatile organic compounds

= Location is in a green space and selected for additional surface soil sampling (0-2 inches).

Table 2
Contact List
Remedial Investigation Work Plan
Genesee Valley Metal Finishing, Rochester, NY (Site No. 828228)



Entity	Name	Title	Phone Number	Email
AECOM (Environmental Consultant)	Mike Gutmann	Project Manager	716-345-4649	mike.gutmann@aecom.com
	Edyta Chorostkowska	Task Manager	845-248-4099	edyta.chorostkowska@aecom.com
	Ernie Thalhamer	Site Supervisor	716-289-3188	ernie.thalhamer@aecom.com
	Caroline Lee	Health and Safety Manager	445-345-3568	caroline.lee@aecom.com
NYSDEC	Gavin Vlainich	Project Manager	518-402-9665	gavin.vlainich@dec.ny.gov
	Michael Cruden, PE	Bureau Director		michael.cruden@dec.ny.gov
	Samantha Salotto, PE	Section Chief		Samantha.Salotto@dec.ny.gov
NYSDOH	Julia Kenney	Health Specialist		julia.kenney@health.ny.gov
Property Owner				
242-244 Verona Street	Charles Samuels 7144 Enterprises Inc. 700 Starboard Site Lane Webster, NY 14580	Owner		
Adjacent Properties				
555 N Plymouth Avenue	John Williams School No. 5 Tom Keysa	Director of Educational Facilities	585-336-4098 (office) 585-737-3895 (cell)	
85 Jay Street	Carl Wolf	Owner		
91-93 Jay Street	Sandralee Rodgers	Owner		
491 N Plymouth Avenue	Parking Lot Eastman Kodak Company	Owner		
499 and 503 N Plymouth Avenue	Charles Disalvo	Owner		
507-511 N Plymouth Avenue	Mid-City Property Holdings Inc.	Owner		

Appendix A – John Williams School No. 5 Academic Calendar



Calendar

< MAY 2026 >								
SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY		
26	27	28	29	30	1	2		
NYS Grades 3-8 Mathematics Testing 🕒 All Day		● Free evening with the RPO at East HS 🕒 7:00 PM - 9:00 PM						
3	4	5	6	7	8	9		
10	11	12	13	14	15	16		
NYS Grades 5 & 8 Science Testing 🕒 All Day		● Board Work Session 🕒 5:30 PM - 7:30 PM	● BOE Employee Recognition 🕒 5:30 PM - 6:30 PM 📍 131 West Broad Street, Conference 3A/B					
17	18	19	20	21	22	23		
		● BOE Speaker Forum 🕒 5:30 PM - 6:00 PM						
24	25	26	27	28	29	30		
Memorial Day (All facilities closed) 🕒 All Day				● Board Business Meeting (May) 🕒 6:00 PM - 9:00 PM				
31	1	2	3	4	5	6		
		● Audit Committee Meeting 🕒 6:00 PM - 7:30 PM 📍 131 West Broad Street, Conference 3A/B						



Calendar

< JUNE 2026 >



SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
31	1	2 Audit Committee Meeting 6:00 PM - 7:30 PM 131 West Broad Street, Conference 3A/B	3	4	5	6
7	8 NYS Testing (Regents exams) All Day State Monitor Public Hearing All Day Board Work Session 5:30 PM - 8:30 PM	9 BOE Scholar Athlete Recognition 5:00 PM - 6:30 PM	10	11	12	13
14	15	16 BOE Speaker Forum 5:30 PM - 6:00 PM	17 NYS Testing (Regents exams) All Day			
21	22	23	24	25 Board Business Meeting (June) 6:00 PM - 9:00 PM	26 Juneteenth (All facilities closed) All Day	27
21 NYS Testing (Regents exams) All Day			24 Last Day of School for PreK-12 Students All Day	25	26 Regents Rating Day / Last Day for 10-Month Staff All Day	27
28	29	30	1	2	3	4

Appendix B – Health and Safety Plan (HASP)

Project-Specific SH&E Plan

Genesee Valley Metal Finishing
60781011
242-244 Verona Street
Rochester, NY 14608
U.S.A.
Latitude: 43.161483582
Longitude: -77.623128376

S3AM-209-FM2

April 2026

Quality Information

Prepared by	Checked by (Area/Regional/Business Line SH&E Manager or Delegate)	Approved by (Project Manager, Project Director, or Business Line Lead)
		
Signature	Signature	Signature
Kevin J. McGovern, PG, CHMM, STS	Caroline Lee, CSP	Mike Gutmann, PG
Print Name	Print Name	Print Name

Expiration:	April 16, 2027	Valid for 1 year maximum or until the scope of work, subcontractor(s), methods, and/or equipment change.

Revision History

Revision	Revision date	Details	Name	Position

Distribution List

# Hard Copies	PDF Required	Association / Company Name

Prepared for:

New York State Department of Environmental Conservation
Division of Environmental Remediation, Bureau of Program Management
625 Broadway, 12th Floor
Albany, NY 12233 - 7012

Prepared by:

AECOM USA, Inc.
50 Lakefront Blvd.
Suite 111
Buffalo, NY 14202

T: +1 (716) 856-5636
aecom.com

Copyright © 2026 by AECOM

All rights reserved. No part of this copyrighted work may be reproduced, distributed, or transmitted in any form or by any means without the prior written permission of AECOM.

Table of Contents

1.	Safety, Health, and Environment (SH&E) Program	1
1.1	AECOM SH&E Policy	1
1.2	Safety for Life	1
1.3	Life-Preserving Principles	1
1.4	Safety Tenets	1
2.	Project Contacts and Resources	2
2.1	Key Personnel	2
2.2	Site Safety Lead (SSL) Determination	2
2.3	Short Service Employee (SSE) Log	3
2.4	Subcontractors and Third Parties	3
2.5	Lone Worker Management Plan	3
3.	Site Description and Scope of Work	4
4.	Risk Assessment	4
4.1	Anticipated Activities, Situations, and Hazards	5
4.2	Task Hazard Assessment (THA)	8
4.3	Daily Safety Meeting	9
4.4	4-Sight	9
4.5	Stop Work Authority	10
5.	Project-Specific SH&E Training	10
5.1	Risk-Based Training	10
5.2	Competent Persons	10
6.	Personal Protective Equipment (PPE)	11
7.	Contractor Management	12
7.1	Subcontractor Details	12
8.	Monitoring Performance	14
8.1	Safety Observations and Near Miss Reporting	14
8.2	Corrective Actions for Non-Conformances	14
8.3	Incident Reporting and Response	14
8.4	Audits, Inspections, and Reviews	14
9.	Variance to SH&E Management System Requirement	14
10.	Personal Acknowledgement	15
	Appendix A Emergency Response Plan	16
A.1	Phone List	16
A.2	Additional Phone Numbers	16
A.3	Location Emergency Map(s)	18
A.4	Site Emergency Equipment and Its Location	19
A.5	Directions to Clinic	20
A.6	Directions to Hospital	21
A.7	Method(s) of Emergency Alarm	22
A.8	Evacuation and Sheltering in Place	22
A.9	Medical Emergency	22
A.10	Fire	23
A.11	Workplace Violence	23
A.12	Spill, Leak, or Release of Hazardous Materials (HAZMAT)	23
A.13	Vehicle Incident	24
A.14	Floods/Heavy Rain	24

A.15 Wildfire and Wildfire Smoke 25

A.16 Hurricane.....26

A.17 Lightning.....26

A.18 Tornado 27

A.19 Earthquake 27

A.20 Severe Weather Storms 28

A.21 Power Outage 28

A.22 Electrical Live Line Contact 28

A.23 Gas Odor or Major Leak.....29

Appendix B Pre-Task Forms 30

Appendix C Field Forms 31

Appendix D Applicable SH&E Procedures 32

1. Safety, Health, and Environment (SH&E) Program

1.1 AECOM SH&E Policy

The [SH&E Policy – AECOM Global](#) (available on AECOM's Ecosystem intranet) establishes the framework to safeguard AECOM employees and stakeholders through effective management of risk and commitment to a Culture of Caring.

1.2 Safety for Life

Safety for Life is our comprehensive global SH&E program. Its key components, our Culture of Caring, our foundational Life-Preserving Principles, and a wealth of supporting resources and tools, combine to enable AECOM personnel to contribute to and apply our Safety for Life program both on and off the job.

1.3 Life-Preserving Principles

AECOM has adopted the [Life-Preserving Principles – AECOM Global](#) (available on AECOM's Ecosystem intranet) which guide our global SH&E program, Safety for Life. These nine principles advance our commitment to achieve our ultimate objective of incident prevention, and protection of the environment while executing our work.

1.4 Safety Tenets

The safety tenets listed below must be followed. If a violation of a safety tenet is observed, the associated work activity must be stopped immediately, and corrective action must be taken.

	Use Stop Work Authority immediately upon observation of Imminent Danger. Refer to Safety Tenets and Stopping Work – Americas .
	Keep the worksite free of hazards that could cause slips, trips, and falls. For work at height, refer to Work at Height – Americas .
	Obtain authorization before entering a confined space. Refer to Confined Spaces – Americas .
	Confirm that safety precautions are in place for ground intrusive work. Refer to Ground Disturbance – Americas .
	Take precautions to prevent falling into a body of water when working on, in, and near water. Refer to Work On, In, or Near Water – Americas .
	Do not work alone when performing tasks with High Potential (HiPo) Risks or when working remotely. Refer to SH&E Risk Assessment and Planning – Americas .
	Only work on or near a roadway with proper traffic safety controls in place. Refer to Highway and Road Work – Americas .
	Only foul a railroad track with appropriate approvals, proper training, and train protection. Refer to Railroads – Americas .
	Wear a seatbelt and never use mobile communication devices or other devices while driving. Refer to Driving – Americas .
	Assess risk for all work and changes to scope of work. Refer to SH&E Risk Assessment and Planning – Americas .
	Complete SH&E training required to perform identified tasks. Refer to SH&E Training – Americas .
	Conduct site-specific safety orientation for all first-time visits. Refer to SH&E Training – Americas .
	Use the required personal protective equipment (PPE). Refer to Safety Gear – Americas .
	Only use equipment that is maintained in a safe condition and appropriate to the work performed. Refer to Heavy Equipment and Machines – Americas and Hand and Power Tools – Americas .
	Report for work fit for duty. Refer to Fitness for Duty – Americas .

2. Project Contacts and Resources

2.1 Key Personnel

Level	Title	Name	Phone #
Project Level	Project Manager (PM)	Mike Gutmann	716-345-4649
	Deputy Project Manager (DPM)	Edyta Chorostkowska	845-248-4099
	Site Supervisor (SS)	Ernie Thalhamer	716-289-3188
	Site Safety Lead (SSL): if applicable (Section 2.2)	Ernie Thalhamer	716-289-3188
	Client Contact	Gavin Vlainich	518-402-9665
*Region Level	SH&E Manager	Caroline Lee, CSP	445-345-3568
	Regional SH&E Director	Peter Gregory, CSP	201.602.3511

*Note: For guidance on who to list, refer to the appropriate SH&E Organization Chart:

East Org Chart	West Org Chart	Canada Org Chart

2.2 Site Safety Lead (SSL) Determination

AECOM SSL requirements apply if the answer is “yes” to both questions below.

1. Will an AECOM employee be tasked with directly supervising safety implementation on a program or project?	☒ Yes ☐ No
2. Do the program or project activities include one or more high hazards (see Question 3 below)?	☒ Yes ☐ No

Note: If you have questions about “high hazard” activities, please reach out to your SH&E Manager – the [Ask SH&E](#) link may be used.

3. Select one of the two options below:

☒ Site Safety Lead is approved (through the SSL Platform), and the PM acknowledges the SSL is qualified and authorizes the SSL to monitor/supervise the following high hazards (check the boxes below that apply):		
☐ Confined Spaces	☐ Hazardous Energy/Control	☐ Underground Work
☒ Hazardous Substances/Respiratory Protection	☒ Heavy Equipment/Machines	☐ Working at Heights
☒ Ground Disturbance	☐ Highway and Road Work	☐ Work On, In, or Near Water
☐ Power Tools	☐ Railroad	☐ Radiological Hazards
☐ Non-Standard Driving (e.g., utility task vehicles, all-terrain vehicles, off-road vehicles, and pulling a trailer or other equipment)	☐ Other - Specify:	Click here to enter
☐ An approved SSL is NOT required for the project scope of work.		

2.3 Short Service Employee (SSE) Log

1. An Employee is designated as an SSE if they are undertaking work in the field and have less than 6 months experience working in the industry of the work to be performed. An employee is not considered an SSE, when they have more than 6 months field work experience in a similar industry and can demonstrate competency in AECOM's safety management system and processes.
2. ☒ Project scope of work does **NOT** involve short service employees.

2.4 Subcontractors and Third Parties

1. Refer to [Subcontractor Selection and Stewardship – Americas](#).

2.	☐	Project scope of work does NOT involve AECOM subcontractors or third parties.
	☒	Project scope of work DOES involve one or more AECOM subcontractors and/or third parties. Their information is provided below.

Company/ Affiliation	Relationship to AECOM	Primary Emergency Contact Name and Phone Number	Alternate Emergency Contact Name and Phone Number
Ravi Engineering & Land Surveying, P.C.	☒ AECOM Subcontractor (Managed) ☐ Sub of AECOM Sub (Managed) ☐ Client Direct-Hire Contractor (Unmanaged) ☐ Third Party (Unmanaged)	Kiel Roeger	(585) 697-2807
LaBella Associates	☒ AECOM Subcontractor (Managed) ☐ Sub of AECOM Sub (Managed) ☐ Client Direct-Hire Contractor (Unmanaged) ☐ Third Party (Unmanaged)	Alex Steria/ Neal Short	(585) 454-6110/ (585) 770-4332
Miller Environmental Group, Inc.	☒ AECOM Subcontractor (Managed) ☐ Sub of AECOM Sub (Managed) ☐ Client Direct-Hire Contractor (Unmanaged) ☐ Third Party (Unmanaged)	Randy Klosko	(631) 603-6182

Notes:

- a. An emergency contact is someone who is capable of initiating medical case management/incident response for their company.
- b. An alternate emergency contact is recommended, but not required for client direct-hire contractors and third parties.
- c. For a subcontractor of an AECOM subcontractor, one of the emergency contacts can be a representative from the AECOM subcontractor that hired them.

2.5 Lone Worker Management Plan

1. AECOM discourages employees from working alone (i.e., where AECOM personnel are out of visual and audio range of others) when performing field tasks. If lone work is to be performed, a communications/check-in plan must be developed and implemented.
2. ☒ The project scope of work does NOT involve the lone worker operations.
- ☐ The project scope of work DOES involve lone worker operations. Lone workers will be managed as outlined below.

3. Site Description and Scope of Work

1. Site Location and Description	The Site, Genesee Valley Metal Finishing, is located at 242-244 Verona Street, Rochester, NY, 14608, in an urban area of Downtown Rochester. The site is at the intersection of Verona and Jay Street. The site is bordered by commercial properties to the north, a parking lot to the east, Brown square park to the south, and residential properties to the west. The Site is located on a 0.26-acre parcel on which a 10,000 square foot former electroplating facility is situated, is zoned industrial and is currently abandoned.					
Site Background/ History	Genesee Valley Metal Finishing (GVMF) Company Formerly operated and electroplating operation at the Site, which ceased in 2019 and the property was foreclosed upon and sold to Urban City Me, LLC. The facility plated metal items primarily zinc, nickel, and chrome finishes. Throughout its operation facility upkeep and proper waste and disposal were not followed leading city, state, and local regulators to cite GVMF. In January 2020, the New York State Department of Environmental Conservation contacted and verbally requested that EPA perform an appropriate Comprehensive Environmental Response, Compensation, and Liability Act assessment and/or removal action at the site. This investigation revealed trichlorethylene (TCE) contamination in soil beneath the building.					
Client and/or Third-Party Operations at Site	☒ There are NO client and/or third-party operations anticipated at the Site during AECOM's field activities. ☐ Client and/or third-party operations are anticipated at the Site during AECOM's field activities.					
Scope of Work	AECOM was retained by NYSDEC to conduct a remedial investigation/ feasibility study at the site. The following primary and auxiliary / supporting activities will be required to complete the scope of work and accomplish project objectives: • Site set up and utility clearance via geophysical methods. • Shallow sub-slab soil and vapor screening. • Soil boring advancement and soil analysis. • Well installation and development • Groundwater monitoring, sampling, and analysis via low-flow methods • Soil vapor probe installation and sampling • Topographic and site survey • Investigation-Derived Waste (IDW) handling and disposal. The project scope of work will be implemented as outlined below.					
	Project Start Date	1/15/2026	Field Work Start Date or Next Mobilization to Site	4/20/2026	Project Completion Date	10/30/2026

4. Risk Assessment

☐	AECOM or AECOM-managed subcontractors are NOT self-performing or exposed to any of the activities below.	
☒	AECOM or AECOM-managed subcontractors are self-performing or exposed to any of the activities/hazards below	
Drug & Alcohol Testing	Medical Surveillance	Heat and Cold Stress
Excessive Noise	Biological Hazards	Ground Disturbance
Heavy Equipment and Machines	Railroads	Underground Work
Highway and Road Work	Hazardous Substances and Communication	Hand and Power Tools
Confined Spaces	Working at Height	Work On, In, or Near Water

Respiratory Protection	Hot Work	Hazardous Energy Control
Radiological Hazards		

Non-standard driving activities, including undertaking trips more than 250 miles each way, driving in remote or hazardous areas, or operation of utility task vehicles (UTVs), all-terrain vehicles (ATVs), off-road vehicles, towing trailers, or other equipment

4.1 Anticipated Activities, Situations, and Hazards

Select all applicable boxes that describe the activities, situations, or hazards expected to occur during the project's scope of work.

Note: Project Team = AECOM employees, AECOM managed contractors, and their managed subcontractors (all tiers)

Fitness for Duty – Americas

☒	Does the project scope of work or the work location require workers to be enrolled in a medical surveillance program?	If not already enrolled and current, contact the Occupational Health Team at nurse@aecom.com and indicate any project-specific protocols. Click here to enter

Hazardous Substance and Communication – Americas

☒	Does the project scope of work require chemical materials (i.e., hazardous materials/substance and/or Materials of Trade) to be brought onto the site to perform work?	Use Project Hazardous Materials Communication Plan – Americas
☒	Is potential exposure to chemical hazards reasonably anticipated to have the potential to result in inhalation, dermal contact, ingestion, or injection routes of exposure during the performance of one or more tasks? Chemical hazards can be from materials brought on the Site to perform work, constituents of concern found or suspected to be in environmental media under investigation, and/or simultaneous operations being performed at the Site by the property owner/third party.	For the U.S., use Project Hazardous Substance Exposure Control Plan – Americas
☒	Will activities being performed at hazardous waste sites (i.e., HAZWOPER) involve or potentially involve employee or equipment exposure to and/or physical contact with hazardous materials, hazardous substances, hazardous wastes, and/or health hazards?	For the U.S., use Project Hazardous Substance Exposure Control Plan – Americas

Respiratory Protection – Americas

☐	Are respirators required for use on site?	If yes, please complete the following: Type of respirator to be used Click here to enter Type of cartridge to be used Click here to enter Hazardous material(s) being controlled by the respirator Click here to enter Cartridge change out schedule Click here to enter Respirator storage procedure

		Click here to enter
		Respirator maintenance procedure
		Click here to enter
		Locations on the site and for which task(s) respirators are required
		Click here to enter
		Add Respiratory Equipment Inspection – Americas , as required
☒	Are respirators being used voluntarily?	Add Voluntary Use of Respirators– Americas
☐	Will activities include hot work?	If yes, add contractor/client hot work procedures and permit form

Heat and Cold Stress – Americas

☒	Is there potential for heat stress to occur?	Source(s) of heat stress Weather Engineering controls Wait for cooler weather Administrative controls Cooling breaks, with drinks (e.g., Gatorade, etc.). Breaks in the shade, or in an air conditioned vehicle. Personal protective equipment Ice Vest, cooling towels, shade brim attachments for hard hats If applicable, add Heat Stress Monitoring Log – Americas Add a heat stress monitoring plan if required by the state where the work will take place (e.g., Oregon, California, Washington, Nevada, or Maryland)
☐	Is there potential for cold stress to occur?	Engineering controls Click here to enter Administrative controls Click here to enter Personal protective equipment Click here to enter

Biological Hazards – Americas

☒	Are there any known wildlife, domestic animals (including pets or livestock), biting or stinging insects, or hazardous plants present at the project site?	Complete the biological hazard control plan below. Animals of concern (select all that apply) ☐ Bears ☐ Carnivores ☐ Ungulates (hoofed mammal) ☐ Snakes ☐ Alligators ☐ Other (specify): Click here to enter Insects of concern (select all that apply) ☒ Ticks ☐ Spiders ☒ Stinging Insects (Bees/Mosquitos) ☐ Other (specify): Click here to enter Plants of concern (select all that apply) ☒ Poison ivy ☐ Poison oak ☐ Poison sumac ☐ Giant hogweed (giant cow parsnip) ☐ Wild parsnip ☐ Devils club ☐ Stinging nettle

	☐ Other (specify): Click here to enter
	Equipment to be used specific to animals, plants, and insects of concern (e.g., snake chaps, bear spray, etc.)
	Teknu Wipes, bug spray, tick key
	Identify the response procedure in case one is encountered
	If employees interact with poison ivy immediately wipe the affected area with a teknu wipe or use soap and water within 10 minutes of exposure.
	If a tick is embedded in an employee's skin take a picture for tick identification keeping a keen eye on if the tick is engorged or not. Call the incident Hotline and follow nurse instructions for tick removal. If possible, keep the tick in a zip lock bag or other container for disposal per nurse instruction.
☐	Is there potential for work in areas that may expose project team member(s) to human bodily fluids (e.g., sanitary sewers, sharps, etc.)?
	Bloodborne Pathogen – Exposure Control Plan
	Exposure Determination (source of exposure)
	Click here to enter
	Training
	Click here to enter
	Hepatitis B Vaccination offered
	Click here to enter
	Engineering Work Practice Controls
	Click here to enter
	PPE
	Click here to enter

Noise – Americas

☒	Is there potential for work activities to expose project team member(s) to an average of 85 decibels (dBA) over an 8-hour period, or 94 decibels over a 1-hour period? Note: A sign and symptom of exceeding 85 dBA may be having to shout to be heard by someone 3 feet away, and/or experiencing ringing of your ears, respectively.	Hearing protection device (HPD) selected	Ear Muffs
		Areas of required HPD use	Around drill operator
		Monitoring Procedures and Action Levels Noise Dosimeter Instrument Type	Click here to enter
		Action Level	Response Activity
		<85 dBA	Continue work activities.
		>85 dBA	- Don hearing protection (plugs or muffs) with Minimum Noise Reduction Rating (NRR) of 27. - Contact the Site Safety Lead or Supervisor.
		>95 dBA	- Don dual hearing protection (muffs over plugs). - Contact the Site Safety Lead or Supervisor.
		>100 dBA	- Cease activities and contact the Site Safety Lead or Site Supervisor. - Implement additional control measures and obtain Project Manager approval before resuming work.

Ground Disturbance – Americas

☒	Will performing/managing excavation, drilling, surface mining, and/or other ground disturbance operations be required?	Utility clearance via geophysical means supplemented by hand clearing Add Utilities and Subsurface Clearance Checklist – Americas
☒	Will working around or performing oversight of drilling operations be required?	Add Drill Site Safety Inspection Checklist – Americas
☐	Will a designated Competent Person for excavation and/or trenching operations be required?	Add Daily Excavation Checklist – Americas
☐	Is there a potential to encounter munitions and explosives of concern (MEC), which includes unexploded ordnance (UXO), discarded military munitions (DMM), and explosive compounds, on a project site?	Contact the Munitions Response Program (MRP) Technical Group
Heavy Equipment and Machines – Americas		
☒	Will there be work on sites with exposure to heavy mobile equipment (skid steers, back hoes, excavators, etc.)?	Describe onsite heavy equipment: Drill rigs
☐	Does any of the work involve directly managing employees and/or subcontractors operating heavy equipment and/or machines?	As applicable, add: Lift Classification Checklist – Americas Critical Lift Plan – Americas Personnel Platform Lifting – Americas Pre-Operations Powered Industrial Truck Checklist MEWP Pre-Operation Checklist – Americas Under Bridge Inspection Unit Pre-Operation Checklist – Americas
Hand and Power Tools – Americas		
☒	Will project team member(s) work with hand and/or power tools?	Add Tool-Specific THA and manufacturer's operating manual

4.2 Task Hazard Assessment (THA)

- THA forms must be prepared using [Task Hazard Assessment – Americas](#) or equivalent for each task to be performed as part of the scope of work as well as the hazards, associated risk, and appropriate controls for all other on-site activities and exposures. For DCS U.S. East and LATAM and DCS U.S. West, the [THA Library](#) Ecosystem page may also be used to find previously approved THAs, though these should be modified to be project and site-specific.
- Each operation being performed by AECOM and each operation performed by an AECOM subcontractor working under the AECOM SH&E Plan is summarized below, and the relevant field forms, including THAs, are included in Appendix C Field Forms

Task Name	Permit(s) Required		Primary Task Performed By	
			AECOM	Subcontractor
General Hazards	☐ Yes	☒ No	☒	☒
Utility clearance	☐ Yes	☒ No	☐	☒
Shallow sub-slab soil and vapor screening	☐ Yes	☒ No	☒	☐
Soil boring advancement and soil analysis	☐ Yes	☒ No	☐	☒
Well installation and development	☐ Yes	☒ No	☒	☒

Task Name	Permit(s) Required		Primary Task Performed By	
			AECOM	Subcontractor
Groundwater monitoring, sampling, and analysis via low-flow methods	☐ Yes	☒ No	☒	☒
Soil vapor probe installation and sampling	☐ Yes	☒ No	☒	☒
Topographic and site survey	☐ Yes	☒ No	☒	☐
IDW handling and disposal	☐ Yes	☒ No	☐	☒
*Note: All AECOM subcontractors must have a THA for each assigned task. THA(s) for AECOM subcontractors working under the AECOM SH&E Plan must be included in Appendix C .				

3. A review of THAs must take place during the Daily Safety Meeting (Section 4.3). When employees arrive on site, conditions may be different from what was originally planned or additional job steps may be required. The THA requires workers to update or 'dirty up' the THA in the 'On-Site Edits' rows to assess the risks presented by the changed condition(s) and requires the worker to describe steps to reduce the risk. If the hazard(s) cannot be successfully mitigated, the work must NOT proceed.

4.3 Daily Safety Meeting

1. A Daily Safety Meeting must be held at the start of each shift to instruct employees, managed subcontractors, and others, as necessary, on the anticipated scope, reasonably anticipated hazards, and controls. Participants in simultaneous operations are encouraged to attend each other's safety meetings, or at the very least, the supervisors should discuss the coordination of activities and associated hazards of each other's tasks.
2. [Daily Safety Meeting – Americas](#), or equivalent form, to document names of all attendees and meeting topics must be completed and retained in the project folder. Alternatively, use the appropriate QR code to download the app and/or go to the [eDaily Safety Meeting App](#) Ecosystem page for details, guides, training sessions and other information:

	iOS	Android
		

How will you conduct and document the daily safety meetings?

☒ Daily Safety Meeting – Americas	☐ eDaily Safety Meeting App	☐ Other:	Click here to enter

4.4 4-Sight

When preparing hazard assessments and throughout the day workers should use 4-Sight. This is a mental process through which workers ask themselves (and each other) four questions designed to effectively assess hazards. Answering these questions during each task, especially those without established THAs, will help workers identify hazards and condition changes so that they can control them or stop work to seek assistance.



- What am I about to do?
- What could go wrong?
- What could be done to make it safer?
- What have I done to communicate the hazard?

4.5 Stop Work Authority

AECOM empowers and expects all employees to exercise their Stop Work Authority (refer to [Safety Tenets and Stopping Work – Americas](#)). All employees have the authority and responsibility to issue a Stop Work Order for work activities deemed to present an Imminent Danger or when the control of an SH&E risk is not clearly established or understood. Employees issuing a Stop Work Order must do so without any fear of retaliation or form of intimidation.

5. Project-Specific SH&E Training

All personnel at project sites must be qualified and experienced in the tasks they are assigned. [SH&E Training - Americas](#) establishes the general training requirements for AECOM employees.

Select all boxes that describe the training that is applicable to the site and/or scope of work.

☒	Project Emergency Response Plan Review	☒	AECOM Field Safety (annual requirement)
☒	Project SH&E Plan Review	☒	Defensive Driving
☒	Site Safety Orientation	☐	AED/First Aid/CPR
☐	Client- or Host Facility-Specific Training	☐	Client- or Host Facility-Specific Training
	Specify: Click here to enter		Specify: Click here to enter

5.1 Risk-Based Training

☐	AECOM or AECOM-managed subcontractors are NOT self-performing or exposed to any of the activities below.	
☒	AECOM or AECOM-managed subcontractors are self-performing or exposed to any of the activities below. Assessment of SH&E Training Requirements – Americas	
Drug & Alcohol Testing	Medical Surveillance	Heat and Cold Stress
Excessive Noise	Biological Hazards	Ground Disturbance
Heavy Equipment and Machines	Railroads	Underground Work
Highway and Road Work	Hazardous Substances and Communication	Hand and Power Tools
Confined Spaces	Working at Height	Work On, In, or Near Water
Respiratory Protection	Hot Work	Hazardous Energy Control
Radiological Hazards		

Non-standard driving activities, including undertaking trips more than 250 miles each way, driving in remote or hazardous areas, or operation of utility task vehicles (UTVs), all-terrain vehicles (ATVs), off-road vehicles, towing trailers, or other equipment

5.2 Competent Persons

A competent person is an employee who, through education, training, and experience, has knowledge of applicable regulatory requirements, is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

[Competent Person Designation – Americas](#) must be completed, as applicable, and included in Appendix B Pre-Task Forms.

6. Personal Protective Equipment (PPE)

PPE Must	
1.	Properly fit the Employee's body including gender-specific gear and sizing.
2.	Be selected, used, cared for, and stored in accordance with recognized standards (e.g., American National Standards Institute [ANSI]) and manufacturer's specifications/instructions.
3.	Provide effective protection.
4.	Not in itself create a hazard to the wearer.
5.	Be compatible so one item of PPE does not interfere with another.
6.	Be maintained in good working order and in a sanitary condition.
7.	Not be altered in any way.
8.	Be inspected prior to use.
9.	Be removed from service and replaced if worn out, expired, damaged, and/or defective.

Site Minimum PPE	
• Hard hat or helmet • Safety glasses with side shields • High visibility safety vest • Gloves (on person) – required to be worn if handling materials, equipment, etc.	• Shirt with sleeves that cover the shoulders • Long pants • Work boots with defined heel and over-ankle support • Hearing protection (on person)

Project-Specific PPE (Above Site Minimum)		
Applicable?	Type of PPE Protection	Description of PPE
☐	Head Protection (ANSI Z89.1 / CSA Z94.1)	Click here to enter
☐	Eye Protection (ANSI Z87.1/ CSA Z94.3)	Click here to enter
☐	Face Protection (ANSI Z87.1/ CSA Z94.3)	Click here to enter
☐	Hand Protection (ANSI/ISEA 105 / ISEA 138)	Click here to enter
☐	Body and Limb Protection	Click here to enter
☐	Foot Protection (ASTM F2413/CSA Z195)	Click here to enter
☐	Fall Protection (ANSI A10.14 / ANSI Z359 / CSA Z259)	Click here to enter
☐	Water/Drowning Protection	Click here to enter
☐	Thermal (Cold/Hot) Protection	Click here to enter

7. Contractor Management

☐	Performance of the project scope of work DOES NOT involve the use of AECOM subcontractors.
☒	Performance of the project scope of work DOES involve the use of one or more subcontractors. The requirements for subcontractor selection and subcontractor safety responsibilities are outlined in Subcontractor Selection and Stewardship – Americas .

7.1 Subcontractor Details

Subcontractor 1		
Name of Subcontractor	Ravi Engineering & Land Surveying, P.C.	
Assigned Task	High Risk Task (Yes or No)	Contractor Site Supervisor Name and Number
Utility Clearance	No	Kiel Roeger, (585) 697-2807
Click here to enter	Click here to enter	Click here to enter
Required Subcontractor Documents		
The Project Manager must verify that the following documents are in place for each subcontractor:		
Select one	☐ Subcontractor's Project/Site-specific SH&E Plan OR ☒ Subcontractor will work under AECOM's SH&E Plan <u>and</u> field personnel will sign the AECOM SH&E Plan Acknowledge Form	
Select all that apply and have been verified		
☒	Copy of signed contract	
☐	Project-specific purchase order for subcontractor	
☒	Copy of the subcontractor's business license and training certificates (task specific)	
☐	Copy of task specific THAs/Job Hazard Analyses (JHAs) and inspection/tailgate forms	
☐	Competent Person documentation	
Prequalification Status		
Supplier Status	Action(s)	
☐ Approved	None – skip to the next subcontractor.	
☒ Conditionally Approved	Complete and submit a Subcontractor Variance Form – Americas with this plan for approval.	
☐ Pending Approval	Subcontractor must not be used until approved or conditionally approved.	
Subcontractor 2		
Name of Subcontractor	LaBella Associates	
Assigned Task	High-Risk Task (Yes or No)	Contractor Site Supervisor Name and Number
Soil boring advancement and soil vapor implant installation	Yes	Alex Steria, (585) 454-6110
Rock coring and well installation	Yes	Neal Short, (585) 770-4332
Required Subcontractor Documents		
The Project Manager must verify that the following documents are in place for each subcontractor:		
Select one	☐ Subcontractor's Project/Site-specific SH&E Plan OR	

Subcontractor 2

- ☐ Subcontractor will work under AECOM's SH&E Plan and field personnel will sign the AECOM SH&E Plan Acknowledge Form

Select all that apply and have been verified

☒	Copy of signed contract
☐	Project-specific purchase order for subcontractor
☒	Copy of the subcontractor's business license and training certificates (task specific)
☐	Copy of task specific THAs/Job Hazard Analyses (JHAs) and inspection/tailgate forms
☐	Competent Person documentation

Prequalification Status

Supplier Status	Action(s)
☐ Approved	None – skip to the next subcontractor.
☒ Conditionally Approved	Sub will use AECOM's QMS. PM to provide requirements to implement QMS.
☐ Pending Approval	Subcontractor must not be used until approved or conditionally approved.

Subcontractor 3

Name of Subcontractor	Miller Environmental Group, Inc	
Assigned Task	High-Risk Task (Yes or No)	Contractor Site Supervisor Name and Number
IDW Management	Yes	Randy Klosko, (631) 603-6182
Click here to enter	Click here to enter	Click here to enter

Required Subcontractor Documents

The Project Manager must verify that the following documents are in place for each subcontractor:

Select one	☐ Subcontractor's Project/Site-specific SH&E Plan OR ☒ Subcontractor will work under AECOM's SH&E Plan <u>and</u> field personnel will sign the AECOM SH&E Plan Acknowledge Form

Select all that apply and have been verified

☒	Copy of signed contract
☐	Project-specific purchase order for subcontractor
☒	Copy of the subcontractor's business license and training certificates (task specific)
☐	Copy of task specific THAs/Job Hazard Analyses (JHAs) and inspection/tailgate forms
☐	Competent Person documentation

Prequalification Status

Supplier Status	Action(s)
☐ Approved	None – skip to the next subcontractor.
☒ Conditionally Approved	Complete and submit a Subcontractor Variance Form – Americas with this plan for approval.
☐ Pending Approval	Subcontractor must not be used until approved or conditionally approved.

8. Monitoring Performance

8.1 Safety Observations and Near Miss Reporting

1. Safety observations are a tool used by AECOM to identify both at-risk behaviors, including unsafe conditions and acts, and positive safety behaviors. These observations can be made informally during normal site operations when conditions or behaviors are addressed or as part of a more formal observation program. Employees may perform a formal safety observation on another AECOM employee or subcontractor.
2. Following the activity, the Observer must provide immediate one-on-one feedback to the Employee, noting the safe behaviors and at-risk behaviors identified during the observation. The Observer and the person being observed (employee or contractor) are required to discuss the identified barriers to safe behaviors and the potential solutions.
3. Formal Safety Observations must be entered into Vector EHS Management (a.k.a. IndustrySafe), or project-based system, where applicable. If an individual does not have access to a system, a member of the Regional SH&E Team must be contacted to obtain hard stock observation cards.

8.2 Corrective Actions for Non-Conformances

1. The intent of issuing non-conformances, observations and corrective and preventive actions is to confirm criteria and systems deviations are logged, actioned, and closed out as part of the continuous improvement process. When non-conformances are identified in audits, inspections, reviews, and observations, corrective actions should be created and tracked to completion in the appropriate online data management system (e.g., Vector EHS Management [a.k.a. IndustrySafe], or a project-based system).



2. The Project Manager, SH&E Manager, and Regional Management Team, as required, must document necessary follow-up actions, assign accountability for corrective actions, and confirm that all corrective actions are closed within the assigned timeframe. Corrective actions identified must be taken in a timely manner by the responsible parties who have been identified. Immediate corrective action must be taken for Imminent Danger. When it is not possible to immediately rectify non-conformances, interim actions must be implemented to prevent injury, illness, property loss, or impairment to the environment until planned/long-term corrective measures are implemented.

8.3 Incident Reporting and Response

Refer to Appendix A Emergency Response Plan.

8.4 Audits, Inspections, and Reviews

1. Refer to [Monitoring SH&E Performance and Continuous Improvement – Americas](#) for definitions of the different types of audits, inspections, and reviews.

9. Variance to SH&E Management System Requirement

The Project Manager request for variance to or waiver of any SH&E Management System requirement must provide an equal or greater level of protection, be substantiated with the relevant SH&E Plan and THA(s) for the activity seeking a variance, and must be documented using the [SH&E Management System Variance Request – Americas](#) or equivalent documentation.

10. Personal Acknowledgement

By signing below, the undersigned acknowledges that they, including managed subcontractors, have reviewed the AECOM SH&E Plan for the Genesee Valley Metal Finishing site. The undersigned people also acknowledge that they have been instructed in the contents of this document and understand the information pertaining to the specified work and will comply with the provisions contained therein. The undersigned people understand that they are **NOT** to perform any work that they have not been adequately trained for and that they are to stop work if it is unsafe to proceed. Finally, the undersigned people understand to notify the Site Supervisor or Site Safety Lead and the **Incident Hotline at 800-348-5046** for any incident, **including ANY injury even if no first aid or medical treatment is required.**

Print Name Clearly	Signature	Organization	Date
Click here to enter		Click here to enter	Click or tap to enter a date.
Click here to enter		Click here to enter	Click or tap to enter a date.
Click here to enter		Click here to enter	Click or tap to enter a date.
Click here to enter		Click here to enter	Click or tap to enter a date.
Click here to enter		Click here to enter	Click or tap to enter a date.
Click here to enter		Click here to enter	Click or tap to enter a date.
Click here to enter		Click here to enter	Click or tap to enter a date.
Click here to enter		Click here to enter	Click or tap to enter a date.
Click here to enter		Click here to enter	Click or tap to enter a date.
Click here to enter		Click here to enter	Click or tap to enter a date.
Click here to enter		Click here to enter	Click or tap to enter a date.
Click here to enter		Click here to enter	Click or tap to enter a date.
Click here to enter		Click here to enter	Click or tap to enter a date.
Click here to enter		Click here to enter	Click or tap to enter a date.
Click here to enter		Click here to enter	Click or tap to enter a date.
Click here to enter		Click here to enter	Click or tap to enter a date.
Click here to enter		Click here to enter	Click or tap to enter a date.
Click here to enter		Click here to enter	Click or tap to enter a date.
Click here to enter		Click here to enter	Click or tap to enter a date.
Click here to enter		Click here to enter	Click or tap to enter a date.
Click here to enter		Click here to enter	Click or tap to enter a date.

Disclaimer: This SH&E Plan, and each of its provisions, is applicable only to, and for use only by, AECOM, its affiliates, and its subcontractors. Any use of this Plan by other parties, including, without limitation, third-party contractors on industrial sites or projects where AECOM is providing engineering, construction management, or similar services, without the express written permission of AECOM, will be at that party's sole risk, and AECOM Corporation shall have no responsibility. The existence and use of this SH&E Plan by AECOM shall not be deemed an admission or evidence of any acceptance of any safety responsibility by AECOM for other parties unless such responsibility is expressly assumed in writing by AECOM in a specific project contract.

Appendix A Emergency Response Plan

A.1 Phone List

All incidents and near misses, regardless of type and perceived severity, must be reported in accordance with [SH&E Incident Response and Investigation – Americas](#).

Contact Type	Phone Number	Availability	Instructions
SH&E Incident Hotline	1-800-348-5046	24/7	After the scene has been stabilized, immediately report all incidents including any potential work-related injuries, illnesses, discomfort/pain, property damage, security issues, regulatory inspections, and environmental impacts/spills
AECOM Nurse Line Direct	U.S.: 512-419-5016 Canada: 1-877-424-5256	24/7	The SH&E Incident Hotline operator (number above) will transfer injured/ill employee to nurse. If the transfer fails or employee's condition worsens following initial consultation, call direct.

Resource Type	Phone #	Site-Specific Name	Address	Hours of Operation
Site Emergency Response	911	N/A	N/A	24/7

Note: If, during your injury reporting call to the Incident Hotline you could not speak with an AECOM or Workcare Nurse and feel your condition requires immediate attention, you should utilize the clinic identified below.

Clinic	(585) 368-3531	RRH Urgent Care	65 Genesee St, Rochester, NY 14611	S-S 9AM-9PM
Hospital	(585) 341-6880	Highland Hospital	1000 South Ave, Rochester, NY 14620	24/7
First Aid/CPR Providers	716-289-3188	Ernie Thalhamer	On-site	During operational hours
Fire	911	Rochester Fire Department Engine 5	N/A	24/7
Police	911	Rochester Police Department	N/A	24/7
U.S. Poison Control	1-800-222-1222	N/A	N/A	24/7

A.2 Additional Phone Numbers

Support Resource / Company	Name	Phone #
Fleet Management	Holman	1-800-227-2273
HazMat Shipping Emergency Response Support	INFO TRAC AECOM Account Number: 74984	

Utility and Pipeline Information

Select one based on the scope of work.

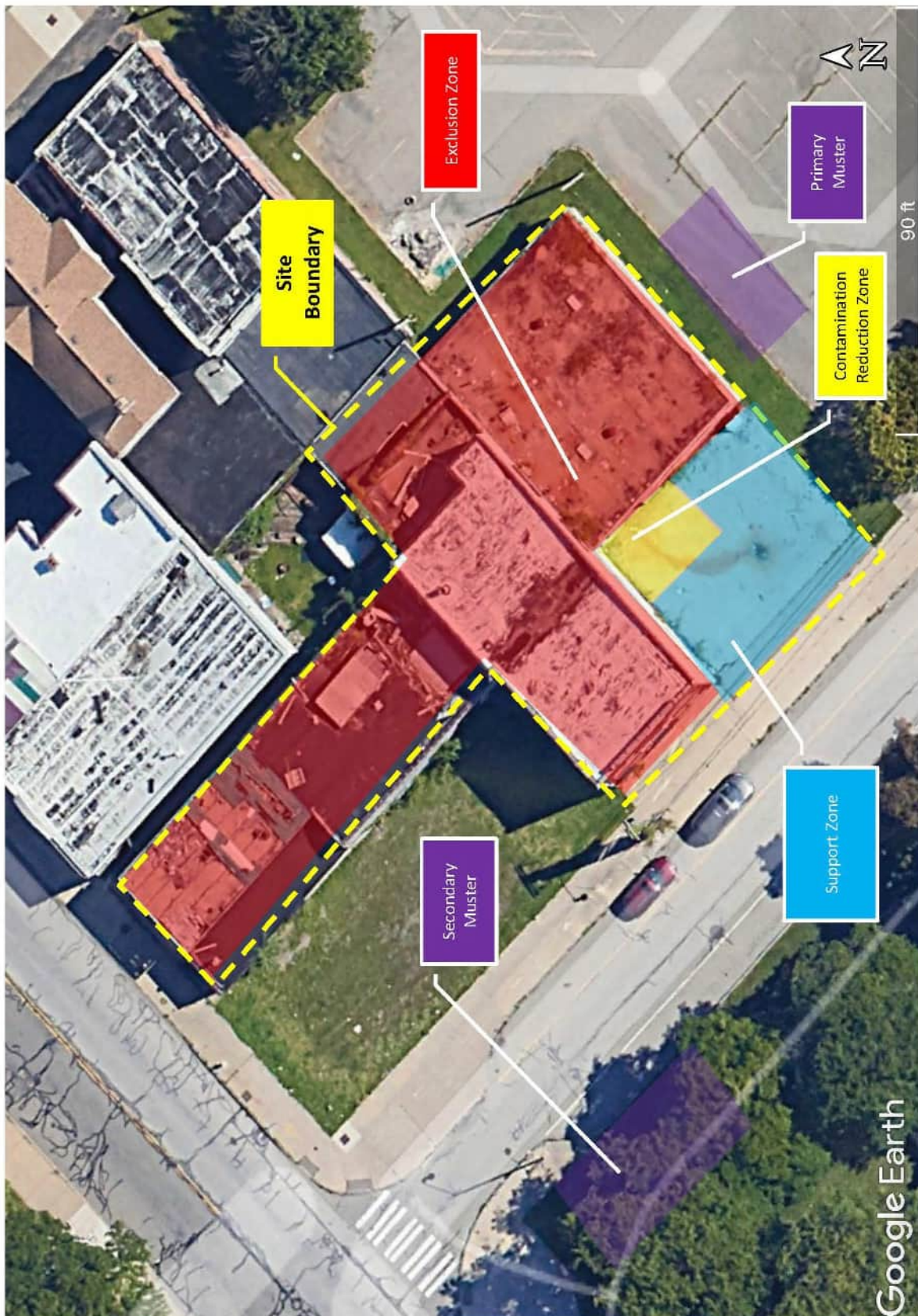
- ☐ Scope of work does NOT involve activities that could interfere with overhead or underground utilities or facilities.
- ☒ Scope of work DOES involve activities that could interfere with overhead or underground utilities or facilities.

Utility Type	Name	Phone #

State One-Call System	N/A	811
Cable/Telecommunications	Spectrum	833-949-0036
Electric	RG&E	800.743.1701
Natural Gas	RG&E	800.743.1702
Sewer	Monroe County Pure Waters	(585) 753-7600
Water	City of Rochester Bureau of Water	585-428-5990
Pipeline	Name	

Note: Verify the above information against the 811 / Dig ticket prior to starting any activity that could impact overhead and/or underground utilities or facilities.

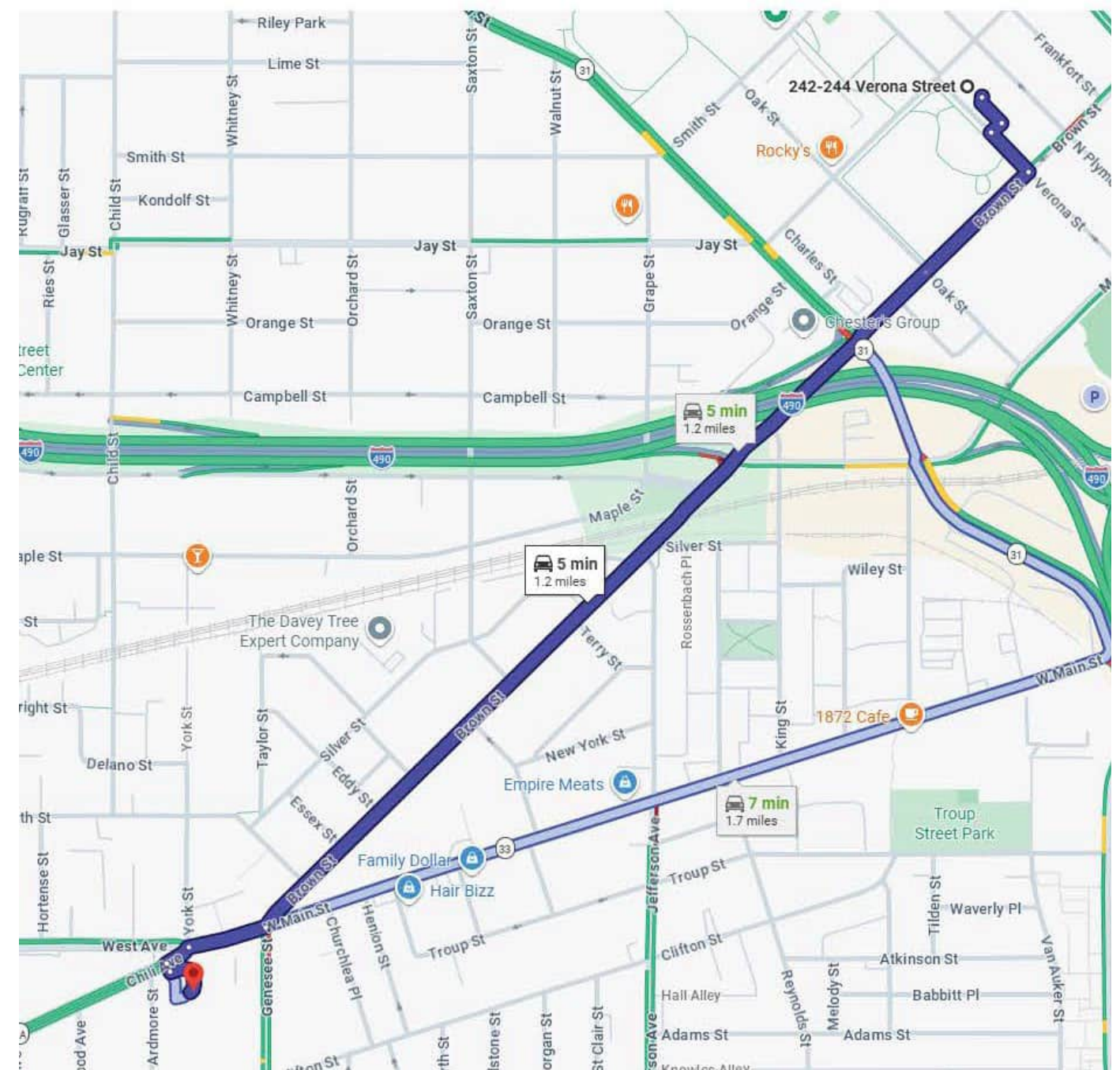
A.3 Location Emergency Map(s)



A.4 Site Emergency Equipment and Its Location

Item	Item Description	Location(s)
First Aid Kit(s)	ANSI Z308.1 Class A, Type III; Qty=1	AECOM Field Vehicle
Fire Extinguisher(s)	2A:10B:C (5 lb. ABC) 4A:80B:C (10 lb. ABC) 4A:80B:C (10 lb. ABC) 8A:120B:C (20 lb. ABC)	AECOM Fleet Vehicle(s) Drill Rig or Support Vehicle Heavy Equipment Cabin(s) Hot Work Area(s)
Spill Kit(s)	PIG® Spill Kit in 5-Gallon HighVisibility Economy Container (or similar)	Field Vehicle(s) Construction Trailer
Eye Wash	Single Use Saline	Field Vehicle(s) Construction Trailer
Cold/Heat Stress Aid(s)	- Climate-Controlled Environment - Other (specify)	- Field Vehicle(s) - Location

A.5 Directions to Clinic



Map of Rochester, NY, showing the route from the airport to the city center.

Legend:

- Blue line:** Route from the airport to the city center.
- Green line:** Route from the city center to the airport.
- Red line:** Route from the airport to the city center (via the Inner Loop).
- Yellow line:** Route from the city center to the airport (via the Inner Loop).

Key Landmarks and Streets:

- Inner Loop:** The central business district, including the Blue Cross Arena, Eastman Theatre, and the Rochester Convention Center.
- Corn Hill:** A historic neighborhood with the Phillis Wheatley Community Library and the Cornhill Plaza.
- South Wedge:** A residential neighborhood with the Highland Hospital and the Rockingham Street.
- Streets:** State St, W Main St, S Clinton Ave, S Union St, S Broadway, S Pearl St, S Elm St, S Madison St, S Washington St, S Franklin St, S Clinton Ave, S Union St, S Broadway, S Pearl St, S Elm St, S Madison St, S Washington St, S Franklin St.

Travel Time and Distance:

- Blue line:** 12 min, 2.6 miles.
- Green line:** 9 min, 2.7 miles.
- Red line:** 10 min, 2.8 miles.
- Yellow line:** 10 min, 2.8 miles.

A.7 Method(s) of Emergency Alarm

Vehicle horn

A.8 Evacuation and Sheltering in Place

1. If a situation requires an evacuation or emergency muster/assembly, the pre-determined alarm must be initiated.
2. All personnel (e.g., employees, consultants, visitors) in the office requiring evacuation must immediately assemble at the designated muster point, assembly point or shelter-in-place as determined by the alarm or communication.
3. Employees accompanying visitors working directly with AECOM must escort the visitors to the muster point.
4. Elevators must not be used unless pre-arranged due to known circumstances.
5. The Site Supervisor or designee must take action to account for all personnel, including visitors (i.e., head count, roll call).
6. Upon evacuation or dismissal, only authorized or essential employees are allowed access to the facility or project area during an emergency. Other personnel must await further instruction (e.g., all clear and re-entry or further evacuation) from the Site Supervisor or designee.

A.9 Medical Emergency

1. Stop the work activity.
2. Assess the cause of the injury to avoid injury to yourself (e.g., live wires, gases, hazardous materials).
3. Do not move the casualty unless they remain in danger.
4. A First Aid Provider must designate an individual to call for medical assistance (e.g., 911, ambulance, site medic).
5. A First Aid Provider must designate an individual to retrieve the first aid kit and blankets.
6. Request assistance from other First Aid Providers, as necessary. Administer first aid:
 - a. Assess responsiveness: ask permission.
 - b. Send for medical help.
 - c. Place casualty face up.
 - d. Check airway, breathing and circulation (ABCs)
 - e. Control severe bleeding.
7. If CPR is deemed necessary:
 - a. Begin chest compressions at a rate of at least 100-120 compressions per minute.
 - b. CPR shall be continued until:
 - i. An AED is applied,
 - ii. casualty begins to respond,
 - iii. Another First Aid Provider takes over,
 - iv. A medical responder takes over, or
 - v. The Aid Provider is physically unable to continue.
8. If the casualty begins to breathe on their own, place them in the recovery position, monitor and treat for shock as appropriate.
9. The individual in communication with the designated medical assistance must attempt to answer any questions, stay on the line until information is verified and follow instructions.
10. Arrange for medical transport as needed. A designated individual should be positioned to direct medical transport to the casualty.
11. Personnel must await further instruction from the Site Supervisor or designee (e.g., resume activity).

A.10 Fire

1. Alert others in the area of the fire.

Sound the alarm or confirm that the applicable notification system is initiated.

All personnel must vacate the building or site and proceed to the muster point. DO NOT use elevators.

The Site Supervisor or designee must confirm that all personnel have exited.

Employees are not expected to extinguish a fire. However, if the fire is small enough to be contained and if trained to do so, employees can decide to attempt to extinguish a fire with the correct type of extinguisher, applying the contents from an upwind position. Remember PASS:

- a. P – pull the pin.
- b. A – aim the hose at the base of the fire.
- c. S – squeeze the handle.
- d. S – sweep from side to side until the fire is out or the extinguisher is empty

Employees must:

- a. Retreat and call the local fire department if the fire cannot be contained or there is any concern of an extinguished fire reigniting. Give directions to the location; stay on the line until information is verified.
- b. Never face away from a fire. Always back away until at a safe distance.
- c. Stay low and close to the floor if smoke and heat are strong.
- d. Never return a discharged fire extinguisher to its normal location. Take it out of service, tag the extinguisher for recharging, and replace it with a fully charged unit.

The Site Supervisor or designee must take action to account for all personnel, including visitors (e.g., head count, roll call).

A designated individual should be positioned to direct the fire truck to the fire location.

Personnel must await further instruction (e.g., all clear and re-entry or further evacuation) from the Site Supervisor or designee.

A.11 Workplace Violence

1. **Active Workplace Violence Event:** If you become aware of an active workplace violence incident posing a threat to AECOM employees, contractors, or visitors, immediately contact local emergency services using the appropriate emergency number. If you are in the vicinity of the incident, evacuate the area if it is safe to do so, or seek shelter where possible.

Potential for Workplace Violence: All AECOM employees are responsible for reporting any information related to potential workplace violence. Reports should be made to your manager, Human Resources, or through the AECOM Ethics and Compliance Hotline.

AECOM Workplace Violence Procedure: AECOM's [Workplace Violence Procedure – Americas](#) outlines the company's zero-tolerance policy toward workplace violence. It defines what constitutes workplace violence, details employee responsibilities, explains reporting mechanisms, and describes the procedures followed during investigations and follow-up actions.

Training: AECOM Global Security & Resilience (GSR) has a Field Security Briefing and Office Security Briefing available to offices and projects through Teams. Topics included in both trainings cover situational awareness, active shooter awareness, tips on how to identify someone who could be a threat and tips on how to de-escalate a situation. Active Shooter Awareness training is also available on AECOM University. Contact GSR@aecom.com for details or to schedule the training.

A.12 Spill, Leak, or Release of Hazardous Materials (HAZMAT)

1. Identify the product and assess the risk of injury, fire, or explosion.
2. If there is insufficient information on the product or inadequate PPE, move upwind if possible and leave the area immediately (initiate personnel evacuation if required).
3. Isolate the area and deny access to any unauthorized personnel.
4. Only if safe to do so, take measures to stop and control the spill, leak, or release.

5. Eliminate all ignition sources, if required (no smoking, flares, sparks / flames, engines running).
6. As applicable, designate an individual to notify the Emergency Response Coordinator or designee.
7. Consult the product Safety Data Sheet for accidental release / handling procedures.
8. If it is not possible to stop or control the release, call 911 or appropriate emergency services.
9. Tend to any injured personnel (follow Medical Emergency steps).
10. Personnel must await further instruction (e.g., further evacuation or resume activity) from the Site Supervisor or designee.

A.13 Vehicle Incident

The Employee(s) involved in a collision must:

1. Assess the situation to confirm everyone is safe and remove any vehicle occupants from harm's way if safe to do so.
2. Turn on the vehicle's flashers to warn other motorists.
3. Call or have someone else call the appropriate local emergency phone number (e.g., 911) immediately when necessary.
4. As appropriate, remain at the scene of a collision for police to arrive. If the scene is unsafe, immediately move to a safe place of refuge proximate to the incident.
5. As applicable, consider moving the vehicle out of the traffic flow if it is safe to do so. Do not operate a damaged vehicle if its:
 - a. safety is questionable,
 - b. operating condition is illegal per applicable local law, or
 - c. condition is such that further damage would likely result from its operation.
6. Obtain:
 - a. Names, phone numbers, and addresses of owner(s), driver(s), and occupants of the other car(s) involved.
 - b. Other party's insurance company's name, address, phone number, policy number, and insurance agent.
 - c. Names, phone numbers, and addresses of all witnesses.
 - d. Photographs of the accident scene when safe to do so.
7. Do not discuss liability (e.g., who is at fault), agree to pay for damage, or sign a document related to an incident except as required by local law.
8. If requested, provide information to the police. Obtain the officer's jurisdiction, name, and badge number, as well as a copy of the police report.
9. If contacted by a third party, do not answer any questions. Immediately report this contact to the Project Manager and AECOM Legal.

A.14 Floods/Heavy Rain

1. If external to a building:
 - a. Monitor conditions and escape routes.
 - b. Monitor Regional Resiliency communications, television, radio, or other sources identified as reliable (e.g., social media, websites) for information, updates, and evacuation orders.
 - c. Shut off electrical power and utilities if flooding is imminent.
 - d. Implement measures to minimize rain or flood damage if time permits (e.g., stacking sandbags, clearing drainpipes, clearing culverts, confirming sump pump operation).
 - e. If ordered to evacuate, do so immediately as directed. Evacuation should be to higher ground and/or appropriate shelter, as floodwaters often rise rapidly.
 - f. Avoid walking through water-covered areas as hazards may not be visible.
 - g. Watch for and avoid low-lying areas. Don't drive through flooded areas. If your vehicle stalls, abandon it immediately.

- h. Don't attempt to cross a flowing stream, or to swim to safety.
 - i. Beware of wildlife displaced by floodwater.
 - j. Do not return unless the Site Supervisor, designee, or authorities permit.
2. If internal to a building:
- a. Assume any electrical equipment that may not be disconnected, is live and should be treated as a potential electrocution threat.
 - b. Protect contents from damage by relocating them if time permits.
 - c. Begin cleanup operations as quickly as possible.

A.15 Wildfire and Wildfire Smoke

1. During a wildfire

- a. The most important information will come from your local government. Authorities will let you know when you should leave to stay safe. If wildfire impacts your home, follow instructions from the local government. If wildfire impacts your office, follow instructions from AECOM and the local government. Your Human Resources/SH&E partners will reach out to confirm your safety.
- b. All wildfire events will be monitored and responded to by the Regional Resilience Team. Employees should access AECOM's website and phone message systems for status or direction updates.
- c. Do not return to a closed office until it is authorized by the Regional Resilience Team.
- d. Follow SH&E and Facilities guidance for office re-entry.

2. During wildfire smoke

- a. The Site Supervisor or designee must take steps to reduce or eliminate continued exposure to wildfire smoke as appropriate. Warning signs to consider include an individual's symptoms, intensity of exposure, air quality index levels, and exposure controls in place. Actions to take include but are not limited to:
 - i. Stop work;
 - ii. Reschedule work;
 - iii. Stay inside a building or vehicle with proper ventilation;
 - iv. Reduce the work schedule;
 - v. Contact the SH&E Manager for guidance; and
 - vi. Wear respiratory protection.
- b. Air quality should be monitored using the appropriate national index (e.g., the U.S. Air Quality Index [AQI] or Canada's Air Quality Health Index [AQHI]) which provides real-time information on outdoor air pollution levels and associated health risks through government websites and mobile apps.
- c. Symptoms of wildfire smoke-related illness can include:
 - i. Coughing, difficulty breathing, wheezing, shortness of breath, asthma attack, runny nose, sore throat, sinus pain, or pressure.
 - ii. Chest pain or discomfort; fast or irregular heartbeat; feeling weak, light-headed, faint, or dizzy; pain or discomfort in the jaw, neck, or back.
 - iii. Sudden numbness or weakness in the face, arm, or leg—especially on one side of the body; sudden confusion; trouble speaking or difficulty understanding speech; sudden trouble seeing in one or both eyes; sudden trouble walking, dizziness, loss of balance, or lack of coordination; sudden severe headache with no known cause.
 - iv. Headache, scratchy or irritated eyes, fatigue, or tiredness.
- d. The following actions should be taken if an individual is experiencing a wildfire smoke exposure related illness:

- i. Move individual to a safe location away from the hazards.
- ii. Let the individual(s) rest and move them to an area of better air quality.
- iii. The Employee must call the AECOM Incident Hotline (800-348-5046) if experiencing symptoms of wildfire smoke exposure and submit an incident report of the incident within 24 hours into IndustrySafe. In the event of a medical emergency related to smoke inhalation, call 911.

A.16 Hurricane

1. Monitor Regional Resiliency communications, television, radio, or other sources identified as reliable (e.g., social media, websites) for information, updates, and evacuation orders.
2. Monitor the progress of the storm and estimate the amount of time required to perform all essential tasks.
3. If ordered to evacuate, do so immediately.
4. Move valuables out of the area or to upper floors if located in a flood or storm surge zone.
5. Secure or store furniture, equipment, signs, or other objects outside the building.
6. If required to remain, stay inside and away from windows, doors, and outside walls. Watch for roof leaks, pipe breakage, fire, or structural damage. Workers should never remain alone.
7. During the height of the hurricane, personnel should remain in a place that has been identified as safe from wind and flood.
8. During a power failure, turn off electrical switches to prevent reactivation before necessary checks are completed.
9. Remember that a lull often signifies the storm's eye—not its end. Anyone riding out a hurricane should wait for authorities to announce that the danger has passed.

A.17 Lightning

1. Lightning can strike several miles/kilometers from its source, so early precautions are crucial. If thunderstorms are in the forecast, reassess your plans for outdoor activities.
2. If you can hear thunder, then you are close enough to the storm to be at risk. Use the 30/30 Rule to help you. If you can count 30 seconds or less between seeing lightning and hearing thunder, you should seek shelter immediately. Take cover and lower elevated equipment (e.g., booms) if possible.
3. Seek shelter inside a house, large building or motor vehicle and keep windows and doors shut. Stand clear from windows, doors and electrical appliances and avoid contact with piping, including sinks and faucets.
4. Unplug equipment well before a storm nears—never during.
5. Avoid contact with metal and water. If boating, head for shore or if the threat is immediate, crouch low in the boat.
6. If no shelter is readily available, stay clear of high ground, open spaces, trees, sheds and small or open buildings. If in a flat open field:
 - a. Crouch as low as possible but do not lie flat
 - b. Only the balls of the feet should contact the ground with heels together
 - c. Bend forward with head down
 - d. Cover ears with hands, elbows pointing down
 - e. Maintain at least 17 feet (5 meters) between personnel
 - f. Refer to Figure 1 for a sketch of the lightning position described above.

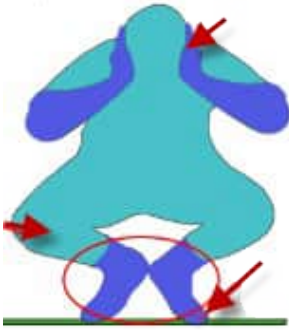


Figure 1. Lightning Position

7. Contact emergency services and First Aid Provider(s) if someone is struck by lightning.
8. Look for cardiopulmonary distress, broken bones, burns, and entry and exit wounds when treating lightning-related injuries.
9. Avoid contact with piping including sinks and faucets.
10. Check for and extinguish fires.
11. If power is lost, shut down equipment.

A.18 Tornado

1. Monitor Regional Resiliency communications, television, radio, or other sources identified as reliable (e.g., social media, websites) for information, updates, and evacuation orders.
2. Go to a center stairwell or corridor of the building's lowest level possible. Move away from the perimeter of the building and exterior glass.
3. Close any exterior office doors.
4. Sit or kneel down to protect yourself from a possible head injury.
5. Take shelter under a desk if there is no stairwell, basement, or other protected location.
6. Avoid seeking shelter in large open shop areas. Seek shelter in interior rooms, preferably with concrete surround. **AVOID TAKING SHELTER IN ANY TRAILER UNIT OR VEHICLE.**
7. Tornadoes generate considerable static electricity and can damage electrical lines, creating electrical shock hazards through telephone lines; therefore, do not use "land-line" telephone systems until they are rendered safe.
8. If the facility is so equipped, listen for information and directions via the Public Address system.
9. Follow the directions of the Site Supervisor or designee or Emergency Services personnel.
10. If outside, seek a safe place in a sturdy nearby building. As a last resort, take cover in a ditch or low-lying area away from trees; lie flat with hands covering head and neck.
11. If driving pull over, exit the vehicle and take cover in a ditch away from the vehicle as described above OR if flying debris is encountered, stay in the vehicle, seatbelt on, and cover your head with your hands, keeping your head below closed windows.

A.19 Earthquake

1. **If inside, DUCK, COVER, and HOLD:**
 - a. Take cover under a desk or table, or sit or stand against an inside wall (not inside a doorway, unless you know it is strongly supported and load bearing).
 - b. Hold tightly to the desk or table until the shaking stops.
 - c. Move away from windows or objects that may fall and utilize suitable material to shield head and face if available.
 - d. Do not run outside during the shaking.

- e. After the shaking has stopped, evacuate the building if structural damage is apparent (per local guidance; use stairs, not the elevator).
 - f. Avoid use of the telephone. Replace telephone handsets shaken off the hook.
 - g. Do not create an ignition source due to possible gas leaks.
- 2. If outside:**
- a. Do not enter any building.
 - b. Move clear of buildings, falling glass, utility poles, wires, and large trees.
 - c. Get on the ground — DUCK, COVER, HOLD.
 - d. After the shaking stops, watch for falling glass, electrical wires, poles, and other debris.
- 3. If driving:**
- a. Drive away from overpasses and underpasses.
 - b. Stop in a safe place.
 - c. Set the parking brake.
 - d. Stay in the vehicle. If wires fall onto the vehicle, stay inside until rescued.
- 4. Be prepared for aftershocks and fires.**
- 5. Personnel must obtain or wait for instructions (i.e., all clear and re-entry or further evacuation) from the Site Supervisor, his or her designee, or Emergency Services personnel.**

A.20 Severe Weather Storms

1. Monitor Regional Resiliency communications, television, radio, or other sources identified as reliable (e.g., social media, websites) for information, updates, and road closures.
2. Consider requesting staff to work from home to reduce travel risk or sending staff home prior to the start of a storm.
3. Locate the emergency supplies, such as flashlights, water, and medical supplies.
4. If conditions deteriorate to the point of closure, confirm that employees know road conditions and that remaining on site may be the best decision.

A.21 Power Outage

1. If it is safe to do so, shut down any equipment or processes that could be hazardous if the power suddenly returns.

Ensure appropriate personnel have been notified if there are critical areas that require power.

Retrieve flashlights from emergency supplies.

If unsafe to continue working due to inadequate lighting or any other hazard, evacuation to the designated in-place shelter location should be initiated.

The Site Supervisor or designee must conduct a roll call to confirm all personnel are accounted for.

If it is unsafe to go to the in-place shelter location continue to the designated muster point.

If unable to proceed to the designated location (e.g., it is unsafe to leave the area due to inadequate lighting) inform other personnel of the situation and wait for assistance. Do not attempt to proceed unless there is immediate danger.

Personnel should await further instruction (i.e., all clear and re-entry or further evacuation) from the emergency response coordinator or designee.

A.22 Electrical Live Line Contact

1. All personnel must evacuate to the designated muster point if safely able to do so.
2. Establish the danger zone: 33-foot (10-meter) radius from anything in contact with the live line.

3. If contact was made while operating a vehicle or equipment, the operator should, if feasible:
 - a. Remain on the equipment or inside the cab. All other personnel must keep away from the machine and any other applicable connected or contacted components such as rope or load.
 - b. Try, unaided and without anyone approaching the machine, to back off the equipment until it is well clear of the power line.
 - c. If the machine cannot be self-propelled away or disentangled from the line, remain inside the machine until the electrical authorities de-energize the circuit and confirm that conditions are safe.
 - d. If the cable or equipment appears to be welded to the line do not try to back the equipment off. This could cause the line to whip or snap.
4. If hazards such as fire are present that require the operator to leave the equipment or vehicle, the operator must jump to the ground, taking critical care to keep both feet together and not fall or touch the equipment or ground with any other body part.
5. To leave the danger zone the individual must Hydro Shuffle* or bunny hop with both feet leaving and making contact with the ground at the same time. Hopping should be the secondary choice as the potential to fall is increased.
6. Notify emergency response coordinator or designee. Contact the electrical company.
7. Assess the scene. Lock out power supply if it is possible to do so safely. Identify potential hazards, such as fire, explosion, or slack lines away from the immediate area.
8. Take appropriate control measures to prevent further hazards if it is safe to do so.
9. Should it be determined that a worker is still within the hazard zone, establish whether a rescue can be safely attempted. Follow emergency rescue procedures if a rescue attempt will not put another life in danger.
10. Ensure any piece of equipment that has sustained a live line contact is inspected.

A.23 Gas Odor or Major Leak

1. If safe to do so, restrict ignition sources from the area (e.g., electrical devices, engines, smoking, etc.) from the area.
2. Leave the area immediately and warn others in the area to leave as well.
3. Sound the alarm or confirm applicable notification system is initiated.
4. All personnel must vacate the building or site and proceed to the Muster Point.
5. If gas is burning, call **911**. Give directions to the location; stay on the line until information is verified.
6. Notify the appropriate authorities (e.g., utility owner emergency line, client).
7. Provide responding utility and emergency personnel with any relevant information.
8. Personnel should await further instructions (i.e., all clear and re-entry or further evacuation) from the Site Supervisor or designee.

* Note on how to Hydro Shuffle: To avoid electrical shock keep both feet tightly together. Shuffle, using short steps where the heel of one foot never moves beyond the toe of the other foot. Hopping with both feet together can also prevent shock as you leave the hazard area.

Appendix B Pre-Task Forms

1. [Assessment of SH&E Training Requirements – Americas](#)
2. Competent Person Designation – Americas
3. [Project Hazardous Materials Communication Plan – Americas](#)
4. [Project Hazardous Substance Exposure Control Plan – Americas](#)
5. [Utilities and Subsurface Clearance Checklist – Americas](#)

Assessment of SH&E Training Requirements

S3AM-003-FM1

Instructions

1. This form must be completed in accordance with [SH&E Training – Americas S3AM-003-PR2](#).
2. This form should be used as a guideline for providing SH&E training to employees per the requirements of their role, in relation to the specific risks posed by their work activity, and in accordance with legal, client, and industry requirements. Other applicable region-, business line-, or project-specific training assessments should also be consulted.
3. The completed form must be retained in the employee or project files.

If the assessment is for an individual		For project-based assessments, or optionally for individual assessments	
Employee	....	Project Number	60781011
Employee Email	....	Project Location	242-244 Verona Street, Rochester, NY, 14608

Required Training for All Employees

Applies?	Course Title	Regulatory	Frequency	Additional Information
☒	Core Curriculum	N	Annual	Based on regional training plans.
☒	Global SH&E Orientation	N	Within one week of starting at AECOM	Training will set the expectations of the AECOM Safety for Life program.
☒	New Employee SH&E Orientation	Y	Once	Accomplished via a combination of AECOM U modules and region-specific training plans.
☒	Emergency Preparedness Plan/ Emergency Action Plan	Y	As needed	For office personnel, this is covered as part of office-specific orientation. For field/site personnel, this is covered in project/site-specific orientation

Risk- and Role-Based Training

Applies?	Course Title	Regulatory	Frequency	Should You Attend?	Additional Information
SH&E Risk Assessment and Planning					
☒	Field Safety Training	N	Annual	Required for all employees performing field work who are not in the hazardous waste or mine safety training programs. This training is also required for any DCS Project Manager that manages projects where field work is performed.	Specific content and delivery method will depend on the office and the employees' expected work.
☒	10-Hour Construction Safety & Health Course 30-hour Construction Safety & Health Course - Equivalent level of certification, with prior approval obtained by SH&E	N	Once	U.S. only: 1. You perform work that exposes you to active construction/demolition. 2. You perform work that exposes you to construction-like hazards. 3. As required by client or local law.	1. Project sites where we, our client, or another contractor (whether AECOM managed or not) are presently building, removing, or disassembling structures or digging excavations of any size by mechanical means. 2. On sites where the focus is NOT construction/ demolition, but where our work scope includes use of heavy machinery movement, work at heights, confined space, hot work, lifting/hoisting loads, and/or ground breaking (includes drill rig, direct push and vac truck use).

Applies?	Course Title	Regulatory	Frequency	Should You Attend?	Additional Information
					3. Some jurisdictions, clients and/or controlling contractors require OSHA refresher training. Note: It is not applicable if your work area is separated from the construction/demolition with enough distance or physical barriers that fully prevent exposure of our team to those hazards. Note: If an AECOM employee is escorted by another employee, contractor, client, or third party, with training equivalent to 10-hour Construction training, for the entire duration of their site visit, 10-hour training for the escortee may not be required. The escort's level of training must be confirmed prior to conducting the site visit.
SH&E Incident Response and Investigation					
☐	Cardiac Pulmonary Resuscitation (CPR)	Y	As established by the training provider – typically biennial	Required: - For employees who are designated as first aid responders; - For employees who are performing high hazard activities (e.g., potential for falls, suffocation, electrocution, amputation) and medical attention is more than 4 minutes away; or - by client contract.	Acquire training from recognized source (e.g., Red Cross, American Heart).
☐	Automated External Defibrillator (AED)	Y	As established by the training provider	You are designated to be an AED user at an office or project site.	
☐	First Aid	Y	As established by the training provider – typically biennial	Required for - employees who are designated as first aid responders; - employees who are performing high hazard activities (e.g., potential for falls, suffocation, electrocution, amputation) and medical attention is more than 4 minutes away; or - required by client contract.	Acquire training from a recognized source (e.g., Red Cross, American Heart).
☐	Bloodborne Pathogens	Y	Annual	Required for employees designated as a first aid responder or others who have a potential bloodborne pathogen exposure.	May be included in first aid or CPR class.
☐	Fire Extinguisher	Y	Annual	You may be expected to use fire extinguishers (fixed facilities and project sites).	

Applies?	Course Title	Regulatory	Frequency	Should You Attend?	Additional Information
Safety Gear					
☒	Risk-Based Personal Protective Equipment	Y	Minimally once and then as required by procedure and/or regulation.	When PPE is required to complete the project/program.	Staff will receive adequate instruction on the correct use, limitations, and assigned maintenance duties for the equipment to be used. The following information, at a minimum, will be covered during PPE training: - What, when, and why PPE is required. - How to properly don, doff, adjust, and wear the PPE described. - The limitations of the PPE, including its expected useful life. - How to properly care for, maintain, and dispose of the PPE
Confined Spaces					
☐	Confined Space Entry Awareness	N	As needed	Employees who work around confined spaces but are not responsible for performing entry/authorizer/attendant duties.	Available online through AECOM U.
☐	Confined Space Entry (Performance Based)	Y	Once	You perform confined space entry/authorizer/attendant duties (including anyone performing non-entry rescue activities).	
☐	Confined Space Refresher	N	As needed	Recommended if you perform entry activities.	
☐	Confined Space Rescuer (Performance Based)	Y	Once	You may have to enter a confined space to perform a rescue.	
Driving					
☒	Vehicle/Driver Safety	N	Once	Required for all employees who drive on behalf of AECOM.	Generally completed upon hire by employees who may become authorized drivers. Available online through the AECOM U.
☐	Defensive Driving	N	Once, followed by refresher every three years	Required for all DCS employees who drive on behalf of AECOM.	National Safety Council, Alert Driving, Smith System or equivalent.
☐	Off-Highway Vehicle (OHV) Driving	N	As required	Required for all employees who operate an OHV.	Refer to local law and OHV manufacturer instructions.
Ground Disturbance					
☐	Excavations/Trenching Awareness	N	As needed	Employees who could potentially be exposed to or directly involved with excavation and trenching activities.	Available online through AECOM U.
☐	Competent Person – Excavations	Y	Once and as required by client or training provider	Required for employees serving the role of Competent Person. To be completed via formal training or documented experience reviewed and approved by SH&E.	Frequency may be established by an applicable standard
☐	Driller's Safety Training	N	Once and as required by client or training provider	Required for employees involved in overseeing drilling activities.	Frequency may be established by an applicable standard. Available online through AECOM U.
☐	24-Hour Surface Miner Training	Y	Once	You perform work at surface mine sites regulated by MSHA.	Training is conducted by MSHA-approved instructors under MSHA-approved training plan.

Applies?	Course Title	Regulatory	Frequency	Should You Attend?	Additional Information
Hand and Power Tools					
☒	Hand Safety Awareness	N	As needed	Recommended for employees who are required to work with various hand and/or power tools	Available online through AECOM U.
☒	Hand and Power Tool-Specific Training (Performance-based)	Y	As needed	Required for employees whose job duties include these activities.	This includes site-level training. Manufacturer's specifications must be reviewed and followed in addition to regulatory requirements.
Hazardous Energy Control					
☐	Lockout/Tagout Awareness – Affected Person	Y	Once; refresher as required by local law	You work with and around equipment that may need to be locked out/tagged out. (You are not responsible for applying tags/locks).	May be included in OSHA 10 or other classes
☐	Lockout/Tagout – Authorized Person	Y	Once; refresher as required by local law	You lock out or tag out machines or equipment in order to perform servicing or maintenance on that machine or equipment.	Specific to individual machines.
☐	Electrical Safety (Awareness level)	Y	Once	Employees who have potential exposures to electrical hazards but are not working on live electrical equipment (not including power tools)	Available online through AECOM U.
Heavy Equipment and Machines					
☐	Powered Industrial Trucks (Forklifts)	Y	Once	Your job assignments include operating a powered industrial truck (forklift).	Required more frequently if assessments indicate the need.
☒	Heavy Equipment Safety	N	As needed	You work around heavy equipment but are not operating them.	Available online through AECOM U. May be included as part of a 10- or 30- hour Construction Health and Safety course.
Railroads					
☐	Agency-Specific Roadway Worker Protection Training	Y	As required		
Underground Work					
☐	24-Hour New Surface Miner Training	Y	Once	You perform work at surface mine sites regulated by the U.S. Mine Safety and Health Administration (MSHA). Training is conducted by MSHA-approved instructors under MSHA-approved training plan.	
☐	Experienced Miner Training	Y	Once, followed by annual refreshers	You meet the MSHA definition of an "Experienced Miner."	See Surface Miner and Underground Miner training for information on annual refreshers.
☐	8-Hour Surface Miner Training – Annual Refresher	Y	Annual	You perform work at surface mine sites regulated by MSHA.	Training is conducted by MSHA-approved instructors under MSHA-approved training plan.
☐	40-Hour Underground Miner Training – New	Y	Once	You perform work in underground mine sites regulated by MSHA.	Training is conducted by MSHA-approved instructors under MSHA-approved training plan.
☐	8-Hour Underground Miner Training – Annual Refresher	Y	Annual	You perform work in underground mine sites regulated by MSHA.	Training is conducted by MSHA-approved instructors under MSHA-approved training plan.

Applies?	Course Title	Regulatory	Frequency	Should You Attend?	Additional Information
Work at Height					
☐	Fall Protection – Awareness	Y	Once and as needed	You are able to recognize hazards to avoid areas where fall protection is needed.	May be included in OSHA 10 or other classes
☐	Fall Protection Authorized User	Y	Once and as needed	You perform duties at a locations where exposure to fall hazards and personal fall arrest systems are required.	
☐	Fall Protection – Competent	Y	Once and as needed	You review/approve fall protection plans. You supervise, implement and monitor fall protection programs.	
☐	Fall Protection – Qualified Person	Y	Once and as needed	You possess a recognized degree or professional certificate and can design/analyze fall protection systems via extensive knowledge, training, and experience.	
☐	Mobile Elevating Work Platform (MEWP) Training (Performance Based)	Y	Once	You are required to operate MEWPs such as bucket trucks, manlifts, and under bridge inspection units.	
☐	Under Bridge Inspection Units (Awareness Level)	N	Once	You are required to occupy/operate Under Bridge Inspection Units (UBIUs) or to manage a project involving UBIUs.	Available online through AECOM U. This training is an AECOM requirement and <u>not</u> a substitute for ANSI/SAIA A92.24-2018 training requirements adopted by AECOM.
Work On, In, and Near Water					
☐	U.S. Coast Guard Safe Boating Course or equivalent	N	Once	Required if you operate watercraft.	
☐	Water and Ice Safety Awareness	N	Annually	Recommended if you work over or near water.	
☐	Marine Trash and Debris Awareness and Limitation	Y	Annual	You work on contract operations for lessees and/or operators of oil and gas operations in the Gulf of Mexico.	Provided by lessee or operator.
Biological and Wildlife					
☒	Biological Hazards	N	As required	Employees potentially exposed to wildlife or poisonous plants.	Available online through AECOM U.
☐	Bloodborne Pathogens	Y	Annually, as required	Employees working in areas that may expose them to human bodily fluids (waste treatment plants, sanitary sewers, etc.).	Available online through AECOM U.
☐	Bear Aware	N	As required	Employees working in areas with known bear populations.	Available online through AECOM U.
Ergonomics					
☐	Ergonomics Self-Assessment	N	Once	For Employees who work in a home office, AECOM office, or project office.	Generally completed upon hire or change in assignment. Available online through the AECOM U.
Fitness for Duty					
☒	Fitness for Duty	N	Once, refresher as needed.	Recommended for applicable field projects (i.e., safety sensitive, night work, etc.)	Available online through AECOM U.
☐	Reasonable Suspicion for Supervisors	N	Once, refresher as needed.	For People Managers.	Available online through AECOM U.

Applies?	Course Title	Regulatory	Frequency	Should You Attend?	Additional Information
Injury and Illness Claims Management					
☐	Injury and Illness Claims Management Flow	N	As required	Required for Employees who sustain an injury or illness that involves claims management.	Available online through AECOM U.
Heat and Cold Stress					
☒	Heat Stress	N	Once, refresher as required by local law	For employees that might be exposed to heat stress	Can be completed via AECOM U or other approved training, including 10-/30-hour Construction Health and Safety courses.
☐	Cold Stress	N	Once, refresher as required by local law	For employees that might be exposed to cold stress.	Can be completed via AECOM U or other approved training, including 10-/30-hour Construction Health and Safety courses.
Noise					
☒	Hearing Conservation	Y	Annual	Employees exposed to noise ≥ 85 decibels averaged over an 8-hour day, or who otherwise utilize hearing protectors.	Project-specific hearing conservation training and available online through AECOM U.
Radiological					
☐	Nuclear Density Gauge Operator	Y	Contact your Business Group Radiation Safety Officer for region-specific training requirements	You <u>operate</u> nuclear density gauges / densometers.	Troxler or equivalent training.
☐	Nuclear Density Gauge Transporter	Y		You <u>transport</u> nuclear density gauges / densometers.	Hazardous Materials shipping - ground and/or air.
☐	Radiation Worker (Nuclear Energy Worker)	Y		You may require non-routine or short-term unescorted access to radiological controlled areas (excluding High Radiation Areas and Airborne Radiation Areas), or you work in areas where radioactive materials are stored.	Occupational dose limits apply.
☐	Radiation Safety Officer	Y		You are designated as a Radiation Safety Officer.	
Respirator Usage					
☒	Respiratory Protection	Y	Annual	Required for any employee who may be required to wear a respirator.	May be included in HAZWOPER refresher training
☐	Self-Contained Breathing Apparatus (SCBA)/Cascade Systems	Y	Once	Required for any employee required to wear SCBAs or to operate a supplied air system.	Part of Project Safety training as needed.
Hazardous Substances and Communication					
☒	40-Hour Hazardous Waste Operations	Y	Once	Anyone performing work or expected to perform at hazardous waste sites or treatment, storage, and disposal facilities or those responding to emergency releases of hazardous substances.	Training must have a 'hands-on' component (i.e., donning/doffing PPE). Any exceptions must be approved by a Regional SH&E Manager.
☒	8-Hour Hazardous Waste Operations – Refresher	Y	Annual	Only attend if you have completed the 40-Hour Hazardous Waste Operations training - see above.	When offered as a combination of online modules and classroom instruction, online modules must be completed prior to the classroom portion for participants to receive credit. Both portions (online and classroom) need to be completed within the same calendar year.

Applies?	Course Title	Regulatory	Frequency	Should You Attend?	Additional Information
☒	8-Hour Hazardous Waste Operations – Supervisor	Y	Once	Required for anyone serving as the site supervisor or overseeing subcontractor activities at a hazardous waste site.	When offered as a combination of online modules and classroom instruction, online modules must be completed prior to the classroom portion for participants to receive credit. Both portions (online and classroom) need to be completed within the same calendar year.
☐	Anhydrous Ammonia Awareness	Y	Once - refresher as required by local law	You perform work where you may be potentially exposed to anhydrous ammonia. This may include tasks associated with industrial refrigeration equipment or piping, petroleum refineries, and agricultural fertilizer.	Available online through AECOM U and provided by Vector Solutions.
☐	Asbestos Awareness	Y	Once; refresher as required by local law	You perform work where you work in areas that contain or may contain asbestos and have the potential to disturb the asbestos-containing material	Available online through AECOM U.
☐	Asbestos Inspector	Y	Annual	You perform asbestos sampling tasks.	
☐	Asbestos Planner	Y	Annual	You serve as the project asbestos planner.	
☐	Cadmium Awareness	Y	Once, followed by annual refreshers		Available through AECOM U – Vector Solutions.
☐	Crystalline Silica Awareness	Y	Once; refresher as required by local law	You perform work where you may be potentially exposed to silica.	Available through AECOM U – Vector Solutions.
☒	Hazard Communication	Y	Initially and if hazards change	Required for anyone who is potentially exposed to/works with hazardous chemicals.	Training must occur before any work with hazardous chemicals. Included (as needed) in safety orientation. After the initial training, required updates will typically be handled as part of project-specific safety training.
☐	Hazardous Materials Shipping	Y	Every 3 years	Required for anyone who packages, labels, transports, completes paperwork for, or offers for shipment, hazardous materials/dangerous goods.	
☐	Hot Work	Y	Once	Your job duties include these activities.	
☐	Hydrogen Sulfide (H ₂ S) Alive	Y	Annual	For employees performing ground disturbance activities in the oil and gas industries.	
☐	Hydrogen Sulfide (H ₂ S) Awareness	Y	Annual	For employees performing ground disturbance activities who are at risk of hydrogen sulfide exposure, but do not work in the oil or gas industry	
☐	Laboratory Safety (Awareness Level)	Y	Once	You work in a laboratory.	Available through AECOM U – Vector Solutions.
☐	Lead Awareness	Y	Once - refresher as required by local law	You perform work where you may be potentially exposed to lead.	
☐	Lead Project Designer	Y	Every 3 years	You are a lead project designer.	
☐	Lead Risk Assessor	Y	Every 3 years	You are a project lead risk assessor inspector.	

Applies?	Course Title	Regulatory	Frequency	Should You Attend?	Additional Information
☐	Substance Specific	Y	Once	Any U.S. employee potentially exposed to a substance covered by the 29 CFR substance specific regulations.	Includes Ammonia, Benzene, Cadmium, Chromium (VI), Hydrogen Sulfide, Silica and Lead. Offered as part of project-specific training.
☐	Waste Specialist	Y	Once with annual refresher	You are responsible for waste management at a small or large quantity generator facility.	
☐	Workplace Hazardous Materials Information System (WHMIS)	Y	Annual	You are assigned to a Canadian facility and work with or around hazardous materials.	Canadian Hazard Communications
Highway and Road Work					
☐	Flagger Training	Y	Once	Anytime a worker is responsible for directing or controlling traffic on a construction site, road maintenance project, or any other area where they need to manage vehicular or pedestrian flow	Available through external vendor approved by SH&E Manager.
☐	Work Zone Safety (Awareness Level)	N	Once	Work on or adjacent to roadway live traffic.	Available online through AECOM U.

Americas

Utilities and Subsurface Clearance Checklist

S3AM-303-FM4

Instructions

1. This form must be used to document the identification of all underground and overhead utilities and to carefully plan work locations to avoid any potential for inadvertent contact with them. See [Ground Disturbance – Americas S3AM-303-PR2](#) for more information.
2. The form must be completed, reviewed, and signed by the Project Manager.
3. Once completed, this form must be retained in the project files.

Details					
Location	....	Project #	60668742	Date & Time	....
Manager	....	Contractor (if applicable)	....	Weather	....
Client	NYCDDC	Inspector	....		
Notes	....				

Part 1 and Part 2 must be completed prior to any intrusive subsurface work. DO NOT DISTURB GROUND if a “No” answer to any of the Part 1 questions has not been initialed as authorized by the AECOM Manager.

For any exceptions to any of the requirements of the utility clearance process, [SH&E Management System Variance Request – Americas S3AM-215-FM2](#) must be completed and approved.

Part 1				
a. Permits and Access Agreements		Yes	No	N/A
i.	Have all appropriate permits and agreements been identified and obtained (e.g., client, drilling, encroachment, working near railroads, etc.)?	☐	☐	☐
ii.	Have all client requirements been identified and obtained?	☐	☐	☐
iii.	If working off site is (are) site access agreement(s) executed?	☐	☐	☐
b. Identification and Mapping of Utility and Subsurface Structures		Yes	No	N/A
i.	Is a site plan showing proposed subsurface locations and utility locations attached to this check list?	☐	☐	☐
ii.	Have above-/below-ground utilities and subsurface installations been investigated (Part 2 of this form)?	☐	☐	☐
iii.	Have all federal/state/provincial/territorial and other “One Call” providers marked their facilities or otherwise notified AECOM that they do not have any facilities near the proposed subsurface/intrusive locations?	☐	☐	☐
iv.	Have you identified what utilities are <u>not</u> included in the “One Call” provider system?	☐	☐	☐
v.	As noted in the exception at the bottom of Section V of this checklist, has a utility locating contractor performed geophysical and/or other surveys of the proposed subsurface/intrusive locations?	☐	☐	☐
c. Site Walk		Yes	No	N/A
Has a site walk been performed that includes the following:		☐	☐	☐

c. Site Walk		Yes	No	N/A
i.	Reviewing all planned intrusive locations?	☐	☐	☐
ii.	Adjusting locations away from subsurface utilities and installations?	☐	☐	☐
iii.	Determining the appropriate utility clearance activities for each location?	☐	☐	☐
iv.	Determining the presence and location of overhead utilities and obstructions?	☐	☐	☐
v.	Walking around perimeter of the site to observe physical hazards?	☐	☐	☐
vi.	Visually surveying approximately 50 feet (15.2 meters) from the perimeter of the site to observe physical hazards and a 50-foot (15.2-meter) radius from each proposed subsurface location?	☐	☐	☐
vii.	Visually verifying that each of the proposed locations does not lie on a line connecting two similar manhole covers (e.g., sanitary sewer or storm drain)?	☐	☐	☐
viii.	Visually verifying that the ground in the vicinity of each of the proposed subsurface locations has not subsided, been excavated and patched, gives the appearance it may be covering a former trench (e.g., linear cracks, sagging curbs, linear re-pavements, etc.), and does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas?	☐	☐	☐

d. Proposed Subsurface Investigation Locations		Yes	No	N/A
i.	Are all of the proposed subsurface locations at least 5 feet (1.5 meters) from any identified subsurface utility?	☐	☐	☐
ii.	Are all of the proposed subsurface locations at least 7 feet (2.1 meters) from the pad surrounding any underground storage tanks (USTs) shown on the Site Plan?	☐	☐	☐

Note: These setback distances are a minimum; government regulations and utility requirements may dictate a greater setback distance

e. Utility Clearance Investigation Location Confirmation*		Yes	No	N/A
i.	Have the hand clearance/tolerance zones of subsurface locations been observed and utilities exposed through the use of non-destructive techniques as follows? Hand/non-destructive technique clearance should be extended if locations of deep utilities and structures are not known. In non-urban areas, hand clearing should be conducted if possible and according to local requirements.	☐	☐	☐
ii.	For soil borings/monitoring wells, excavated to a minimum of 5 feet (1.5 meters) below ground surface using non-mechanical methods?	☐	☐	☐

Comments:

....

Documentation supplied by One Call or private utility and installation locators, including email or written field confirmation/maps of mark-out requests and status must accompany this form. If this form is supporting multiple ground disturbance activities, a copy of this completed form should be provided to each activity.

Part 2					
Public Utility Locate (One Call)			Prior Locate Ticket#		....
Date Called	....	Called By	....	Valid Until	....
Ticket Number	....	Area Requested to Be Cleared		....	

Part 2

Private Utility Locate		Prior Locate Ticket#	....
Company Performing Locate	....	Date Completed	....
Area(s) Requested to Be Cleared (including distance around marked locations)	....		
Method(s) Used (e.g., GPR, EM)	....		
Confirm Area(s) Cleared	....		

One Call Utilities					
Utility	Notified by	Comments	Field Observation – Marked (mains & services)		
			Yes	No	Above
Electric (Red)	☐ One Call ☐ Other	....	☐	☐	☐
Gas/Petroleum Pipeline (Yellow)	☐ One Call ☐ Other	....	☐	☐	NA
Sewer/Drainage (Green)	☐ One Call ☐ Other	....	☐	☐	NA
Water (Blue)	☐ One Call ☐ Other	....	☐	☐	NA
Communications (Orange)	☐ One Call ☐ Other	....	☐	☐	☐
Other	☐ One Call ☐ Other	....	☐	☐	☐
Were all circuits on during subsurface checks if the checks were for identifying energized lines (e.g., circuits on timers or light sensing switches)?			☐	☐	NA

Utilities Not Identified by One Call (Includes both Public and Private along with Regional and Site Utilities)						
Utility (Colors may vary)	Owner / Contact / Phone #	Notified		Field Observation - Marked		
		Yes	No	Yes	No	Above
Communications: (Orange) TV, computer, phone, cell towers, site communication, cameras, security, etc.		☐	☐	☐	☐	☐
Electricity: (Red) Mains / Supplies / Interior / Exterior (signs, fuel pumps, low voltage security perimeters, gates, property light posts, equipment, substations, etc.)		☐	☐	☐	☐	☐
Gas: (Yellow) Mains / Supplies / Equipment / Pipelines (Natural, Process, Oil, Crude, Refined (Gas, Diesel, Jet), etc.)		☐	☐	☐	☐	☐
Steam: (Yellow)		☐	☐	☐	☐	☐

Utilities Not Identified by One Call (Includes both Public and Private along with Regional and Site Utilities)						
Utility (Colors may vary)	Owner / Contact / Phone #	Notified		Field Observation - Marked		
		Yes	No	Yes	No	Above
Structures: Possible horizontally installed facilities, vaults, basements, tunnels, sub-grade structures, foundations, overhead obstructions, underground parking, etc.		☐	☐	☐	☐	☐
UST Systems (Tanks / piping / electric)		☐	☐	☐	☐	NA
Sewer: (Green) Sanitary, storm, combined, septic, drainage (parking, buildings, fields), irrigation		☐	☐	☐	☐	NA
Water: (Blue) Process, Plant, potable, well, cooling, return/makeup, fire, sprinkler, landscape irrigation, reclaim (Purple) other		☐	☐	☐	☐	☐
Other: Abandoned lines, invisible dog fences, shopping cart perimeter monitoring, traffic lights		☐	☐	☐	☐	☐

Project Manager Review and Approval		
....		
Project Manager Name	Signature	Date/Time

Americas

Drill Site Safety Inspection Checklist

S3AM-303-FM3

Instructions

1. This form is to be completed in accordance with [Ground Disturbance – Americas S3AM-303-PR2](#).
2. Each shift must inspect all applicable items. If an unsatisfactory condition (fail) is observed, suspend the operation of the equipment, and report the condition to the site supervisor immediately.
3. Submit a safety observation each day before leaving the project site.
4. The completed form must be retained in the project files.

Details

Site / Project Name	....
Name of Inspector	....
Date and Time Inspected	....

Checklist	Yes	No	N/A
a. Morning			
i. Did a daily safety meeting occur and were all parties engaged and fit for duty?	☐	☐	☐
ii. Did the driller complete their rig inspection checklist?	☐	☐	☐
iii. Has equipment and Personal Protective Equipment (PPE) been verified, including the spill kit, fire extinguisher, first aid kit?	☐	☐	☐
iv. Have drill rig emergency shut-off switches been verified to be functioning?	☐	☐	☐
b. Site Set/Rig Up			
i. Have overhead lines been identified and accidental contact controlled?	☐	☐	☐
ii. Are paint markings for underground utilities still visible?	☐	☐	☐
iii. Is the rig at the correct drill location, with GPS/maps/etc. checked?	☐	☐	☐
iv. Is there plastic under the rig?	☐	☐	☐
v. Is site control in place, such as cones and tape, as well as fencing?	☐	☐	☐
vi. If needed, are leveling jacks in place/rig leveled/cribbing in place?	☐	☐	☐
vii. Are line of fire hazards identified?	☐	☐	☐
c. Drilling			
i. Are augers/rods stored properly (e.g., not leaning on rig or truck)?	☐	☐	☐
ii. Are spoils being removed from borehole safely?	☐	☐	☐
iii. Are rods removed from the winchline when not in use (e.g., not left strung)?	☐	☐	☐
iv. Are drillers communicating with each other (e.g., all hands clear when using wrenches and rotating augers)?	☐	☐	☐
v. Are loads secured on forklifts?	☐	☐	☐
vi. Are loads 50 pounds (22.7 kilograms) or greater either team or mechanically lifted?	☐	☐	☐
vii. Are gloves and safety glasses in use?	☐	☐	☐

Checklist	Yes	No	N/A
viii. Are dust masks used when mixing grouting?	☐	☐	☐
ix. Are five (5) minutes taken after lunch and before cleanup for a safety check-in?	☐	☐	☐
x. Are three (3) points of contact used when entering/exiting equipment?	☐	☐	☐
xi. Are drums properly labelled?	☐	☐	☐
xii. Has equipment been observed for leaks of hydraulic fluid, fuel, etc.?	☐	☐	☐
d. Decontamination			
i. Has decontamination occurred per the approved location-specific safety plan?	☐	☐	☐
e. End of Day			
i. Is the borehole covered?	☐	☐	☐
ii. Has feedback been provided to drillers?	☐	☐	☐
iii. Has the plan been made for the next workday?	☐	☐	☐

Comments

Inspector Review and Approval		
Inspector Name	Signature	Date/Time

Americas

Project Hazardous Materials Communication Plan

S3AM-110-FM2

Instructions

1. This form, or equivalent, is to be completed in accordance with [Hazardous Substances and Communication – Americas S3AM-110-PR2](#).
2. This form, or equivalent, must be completed and attached as an appendix as part of the [Project-Specific SH&E Plan – Americas S3AM-209-FM2](#) when the project scope of work requires chemical materials (i.e., hazardous materials/substance and/or Materials of Trade) to be brought onto the site to perform work.
3. Materials to be brought to the Site by AECOM and/or its subcontractors and chemical hazards that will be encountered on the Site must have a Safety Data Sheet (SDS) maintained in an accessible location for workers to review.
4. Applicable SDSs must be attached to this form.
5. The completed form must be retained in the project files as part of the project-specific SH&E plan.

Materials to be brought or encountered on the Site will include the following (add rows as necessary):

Chemical Name		Purpose/use/source
1.	Hydrogen Chloride	Bottleware Preservative
2.	Nitric acid	Bottleware Preservative
3.	Isobutylene	Cal Gas
4.	Alconox	Detergent
5.	Gasoline	Possible Contaminant/ Generator Fuel
6.	Trichloroethene	Possible Contaminant
7.		
8.		
9.		
10.		
11.		

The applicable SDSs are attached to this form below:

Project Hazardous Substance Exposure Control Plan

S3AM-110-FM3

Instructions

1. This form, or equivalent, is to be completed in accordance with [Hazardous Substances and Communication – Americas S3AM-110-PR2](#).
2. This form must be completed and attached as an appendix to the [Project-Specific SH&E Plan Template – Americas S3AM-209-FM2](#) only when there is a potential for employee exposure to any chemicals listed in the table below. This determination should be based on information obtained from historical investigations and other relevant sources indicating that the chemicals may be present at elevated concentrations at the site. When any chemicals listed in the table below are known or suspected to be present at elevated concentrations at the site based on information obtained from historical investigations and other sources.
3. For the first table, add rows as necessary and delete rows of the chemicals not applicable to your project.
4. For Occupational Exposure Limits to Chemical and Biological Agents in other Canadian provincial or territorial areas refer to the applicable jurisdictional legislation.
5. The completed form must be retained in the project files as part of the project-specific SH&E plan.

Materials to be brought or encountered on the Site will include the following:

Note: Max. Conc. = Maximum Concentration | PEL = Permissible Exposure Limit | TLV = Threshold Limit Value | IP = Ionization Potential | eV = Electron Volt | mg = milligrams | µg = micrograms | cm³ = centimeters cubed | m³ = meters cubed | f = fiber | ppm = parts per million

Chemical Name	Media	Exposure Route(s)	Max. Conc. Observed at Site	PEL– U.S. OSHA (Cal/OSHA or Canadian province where noted)	TLV	IP (eV)
Other Common Site Constituents of Concern						
Trichloroethene	Other If 'Other', please specify: Soil and Groundwater	Inhalation	....	100 ppm	10 ppm	9.45

Exposure Monitoring Needs Assessment

During the performance of the scope of work, there is a reasonable potential for exposure to chemical hazards. These may originate from materials brought on site, constituents of concern present in environmental media under investigation, or simultaneous operations conducted by the property owner or third parties. Such exposures could result in vapors, fumes, aerosols, mists, or airborne particulates/dusts approaching permissible exposure limits. Therefore, the worker exposure monitoring measures to be implemented are described below.

Industrial Hygiene Sampling

X Industrial hygiene (IH) sampling will **NOT** be used as part of worker exposure monitoring

☐ Industrial hygiene (IH) sampling **WILL** be used as part of worker exposure monitoring. IH sampling will consist of ____.

Point Source Monitoring

☐ Direct-read instruments will **NOT** be used to collect point source readings to guide field investigation and sample selection.

X One or more direct-read instruments **WILL** be used to collect point source readings, as a standard industry practice, to guide field investigation and sample selection. These readings are **NOT** representative of worker exposure.

Instrument Selection

Worker exposure monitoring will be conducted using a combination of direct-read instruments and industrial hygiene sampling methods, as outlined below. Monitoring will take place within the work area to detect the presence and relative levels of toxic substances. All monitoring activities will be performed in accordance with the work permit and Task Hazard Analysis (THA). Instruments used on site must be intrinsically safe to prevent fire or explosion.

Instrument	Manufacturer/Model	Hazard Detected/Measured
☒ Photo Ionization Detector (PID)	RAE Systems mini-RAE min. 10.6 eV bulb)	Petroleum hydrocarbons Organic solvents
☒ Multi or 4 Gas Detectors	RAE Systems Multi-RAE	Lower Explosive Limit Oxygen Carbon Monoxide Hydrogen Sulfide
☒ Particulate Monitor	MIE Model PDM-3 mini-RAM	Aerosols, mist, dust, and fumes

Instrument Calibration/Bump Checks

Direct-read instruments must be calibrated prior to use each day following the procedure outlined by the manufacturer in the instrument manual. Calibration results shall be documented in a digital or hardcopy field form or logbook. Full calibration records from the instrument provider (i.e., rental company) shall be retained in the central project file.

Direct-Read Instrument Monitoring Procedures and Action Levels

The monitoring procedures shown below are general guidelines for sampling activities. In general, readings are considered actionable if sustained readings are observed for 5 minutes or more or if intermittent peaks are seen more than 1 time the action level. A reading more than action level outlined below will require additional ventilation (natural or mechanical) for 30 minutes, followed by re-monitoring.

Parameter	Zone Location and Monitoring Interval	Action Level	Response Activity
☒ Volatile Organic Compounds (VOCs) and Volatile Hydrocarbons (total by PID)	Breathing zone, continuously during tasks where exposure to VOCs and volatile hydrocarbons is possible	<5 ppm	Continue monitoring, may continue work in required PPE

		5- 25 ppm (sustained for 5 minutes)	STOP WORK and notify PM. Investigate the cause of elevated VOC measurements and identify measures to reduce concentrations (cover impacted soils, ventilation, etc.). Work activities shall only continue once levels have decreased to or below 5 units above background. If levels continue above 5 units, only individuals who are medically qualified to wear respiratory protection are permitted to continue work activities with Project Manager approval. Don Level C PPE (organic vapor respirator cartridges), continue monitoring, and initiate continuous air monitoring for benzene.
		> 25 ppm (sustained for 5 minutes)	Cease work, exit, and contact the Site Safety Lead, Site Supervisor, and Project Manager.
☒ VOCs and Volatile Hydrocarbons (total by PID)	Edge of Exclusion Zone. See guidance in NYSDOH's Generic Community Air Monitoring Plan (Attached).	See guidance in NYSDOH's Generic Community Air Monitoring Plan (Attached).	
☒ Hydrogen Sulfide (multi-gas detector or individual H2S meter)	Breathing zone, continuously during tasks where exposure to hydrogen sulfide is possible	< 5 ppm	Continue work activities. Contact the Site Safety Lead to investigate the potential for contributing factors.
		> 5 ppm	Cease work, exit the area or confined space, and contact the Site Safety Lead, Site Supervisor and Project Manager.
☒ Combustible Gas (multi-gas meter or individual combustible gas indicator, CGI)	Breathing zone or in the immediate work area continuously during tasks where explosive atmospheres are possible	> 5% of LEL	Cease work, exit, and contact the Site Safety Lead, Site Supervisor, and Project Manager.

☒ Oxygen (O₂) (multi-gas detector or individual O ₂ meter)	Breathing zone, continuously during tasks were oxygen enriched or deficient atmospheres are possible	< 19.5 % O ₂	Cease work (deficient atmosphere), exit the area or confined space, and contact the Site Safety Lead, Site Supervisor, and Project Manager.
		> 23.5 % O ₂	Cease work (enriched atmosphere), exit the area or confined space, and contact the Site Safety Lead, Site Supervisor, and Project Manager.
☒ Dust not otherwise classified (total by aerosol monitor)	Breathing zone every 30 minutes during field activities where exposure to excessive dusts are possible	< 5 mg/m ³	Continue work in Level D and continue monitoring
		> 5 mg/m ³	Upgrade to Level C (P100 respirator cartridges), implement dust suppression measures; contact the Site Safety Officer & Site Supervisor.
		> 10 mg/m ³	Cease activities, implement more effective dust suppression measures; contact the Site Safety Officer & Site Supervisor.
☒ Dust not otherwise classified (total by aerosol monitor)	Edge of Exclusion Zone. See guidance in NYSDOH's Generic Community Air Monitoring Plan (Attached).	See guidance in NYSDOH's Generic Community Air Monitoring Plan (Attached).	Edge of Exclusion Zone. See guidance in NYSDOH's Generic Community Air Monitoring Plan (Attached).

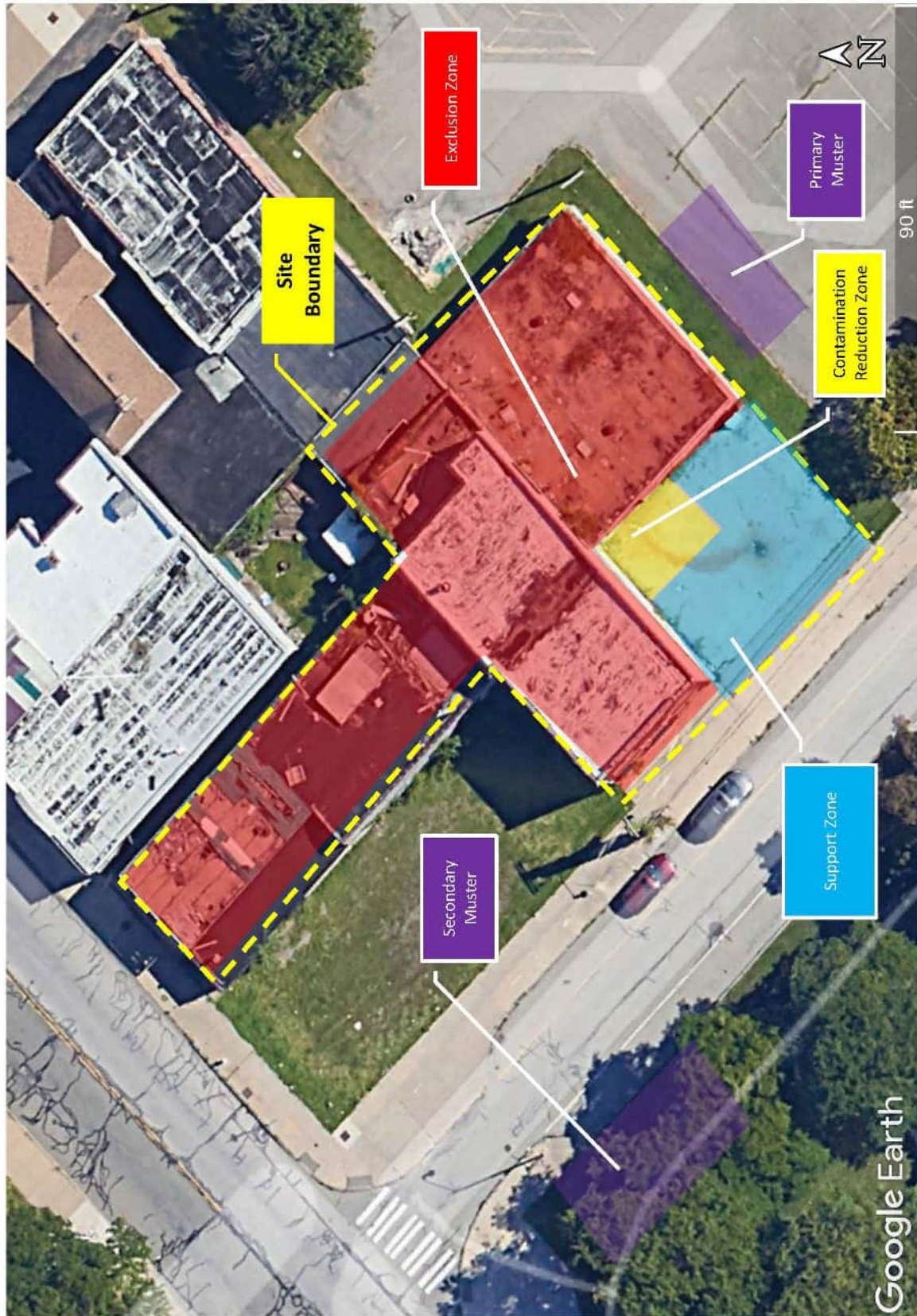
Instrument Recordkeeping

Instrument readings collected for the purpose of monitoring or determining worker exposure will include the date, time, activity being performed, location, and result/reading. Results will be recorded at the following frequency:

Decontamination

Contact with chemicals and/or contaminated/impacted materials while performing field activities may occur. All practical steps shall be taken to reduce or minimize contact with chemicals and contaminated/impacted materials while performing field activities. All decontaminated equipment shall be visually inspected for contamination prior to leaving the Contaminant Reduction Zone (CRZ). Decontamination procedures, solutions and equipment are summarized in the table(s) below.

Site Control



Personnel Decontamination		
Procedure	Decontamination Solution	Equipment & Materials Needed
Remove all equipment, sample containers, and notes to the CRZ. Obtain decontamination solutions and decontaminate the tools (shovels, auger flights, etc.) by brushing them under a water rinse. A high-pressure steam cleaner also may be used for decontamination. All waste and spent decontamination solutions will be properly contained. Remove disposable booties, or scrub boots with a stiff bristle brush and water, when necessary. Washtubs and chairs will be provided. Remove outer gloves (and boot covers, if used). Remove Tyvek® coveralls; discard in provided container. Remove hardhat and eye protection. Remove respirator. Remove inner gloves. Wash hands and face. The decontamination area will be covered with plastic sheeting that will be replaced when torn or heavily soiled and at the end of each shift.	Alconox solution Deionized water	Brushes Plastic sheeting

Equipment Decontamination		
Equipment Type	Decontamination Solution	Procedure
Respirator	Alconox solution and deionized water	Washing: Disassemble and wash with an Alconox solution in deionized water. A stiff bristle (not wire) brush may be used. Rinsing: Rinse in deionized water to remove all traces of detergent. This is important to prevent dermatitis. Disinfecting: Thoroughly rinse or immerse in a sanitizer provided by the manufacturer. Final Rinsing: Rinse thoroughly in clean water to remove all traces of disinfectant. Drying: Drain and dry by hanging by the straps from racks or by towel drying with clean, soft cloths or paper towels.
Water quality meter, oil/water interface probe, down-hole water sampling pumps, reusable sampling tools/ equipment		Washing: Disassemble and wash with an Alconox solution in deionized water. Rinsing: Rinse in deionized water to remove all traces of detergent.
Drilling & Heavy Equipment/ Tools	High-pressure steam cleaner	Apply steam cleaner to used equipment/ tools

Waste Management

AECOM and AECOM subcontractor activities that generate waste on behalf of our client must be appropriately managed and disposed of in accordance with regulatory requirements. The following waste streams/products are anticipated to be generated by the project scope of work and be handling, management and disposed of as outlined in the table below.

DELETE THIS SECTION IF NO WASTE WILL BE GENERATED

Summary of Investigation and Site Activities Derived Waste

Waste Streams/Products	Handling and Disposal Procedures
Purge Water	55-gallon drums, to be hauled off site to an approved facility for treatment/disposal.
Soil from drilling	

Medical Surveillance

Medical surveillance is required for employees who:

1. Are or may be exposed to hazardous substances or health hazards at or above the permissible exposure limits or, if there is no permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year;
2. All employees who wear a respirator for 30 days or more a year.
3. All employees who are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation; and
4. Members of HAZMAT teams.

Based on potential exposures is supplemental medical surveillance appropriate?

☐ Yes (contact a SH&E Manager for assistance) ☒ No

The applicable SDSs are attached to this form below:

Appendix 1A

New York State Department of Health Generic Community Air Monitoring Plan

Overview

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical- specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for VOCs and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate DEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or

overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions, particularly if wind direction changes. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.
4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed $150 \text{ mcg}/\text{m}^3$ above the upwind level and provided that no visible dust is migrating from the work area.

2. If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than $150 \text{ mcg}/\text{m}^3$ above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within $150 \text{ mcg}/\text{m}^3$ of the upwind level and in preventing visible dust migration.

3. All readings must be recorded and be available for State (DEC and NYSDOH) and County Health personnel to review.

December 2009

Appendix 1B

Fugitive Dust and Particulate Monitoring

A program for suppressing fugitive dust and particulate matter monitoring at hazardous waste sites is a responsibility on the remedial party performing the work. These procedures must be incorporated into appropriate intrusive work plans. The following fugitive dust suppression and particulate monitoring program should be employed at sites during construction and other intrusive activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.
2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.
3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM₁₀) with the following minimum performance standards:
 - (a) Objects to be measured: Dust, mists or aerosols;
 - (b) Measurement Ranges: 0.001 to 400 mg/m³ (1 to 400,000 :ug/m³);
 - (c) Precision (2-sigma) at constant temperature: +/- 10 :g/m³ for one second averaging; and +/- 1.5 g/m³ for sixty second averaging;
 - (d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
 - (e) Resolution: 0.1% of reading or 1g/m³, whichever is larger;
 - (f) Particle Size Range of Maximum Response: 0.1-10;
 - (g) Total Number of Data Points in Memory: 10,000;
 - (h) Logged Data: Each data point with average concentration, time/date and data point number
 - (i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
 - (j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
 - (k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
 - (l) Operating Temperature: -10 to 50° C (14 to 122° F);
 - (m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.
4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.
5. The action level will be established at 150 ug/m³ (15 minutes average). While conservative,

this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m³, the upwind background level must be confirmed immediately. If the working site particulate measurement is greater than 100 ug/m³ above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see paragraph 7). Should the action level of 150 ug/m³ continue to be exceeded work must stop and DER must be notified as provided in the site design or remedial work plan. The notification shall include a description of the control measures implemented to prevent further exceedances.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM₁₀ at or above the action level. Since this situation has the potential to allow for the migration of contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

- (a) Applying water on haul roads;
- (b) Wetting equipment and excavation faces;
- (c) Spraying water on buckets during excavation and dumping;
- (d) Hauling materials in properly tarped or watertight containers;
- (e) Restricting vehicle speeds to 10 mph;
- (f) Covering excavated areas and material after excavation activity ceases; and
- (g) Reducing the excavation size and/or number of excavations.

Experience has shown that the chance of exceeding the 150ug/m³ action level is remote when the above-mentioned techniques are used. When techniques involving water application are used, care must be taken not to use excess water, which can result in unacceptably wet conditions. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. The evaluation of weather conditions is necessary for proper fugitive dust control. When extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended. There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require additional monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.



Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950
US GHS

Synonyms: Hess Conventional (Oxygenated and Non-oxygenated) Gasoline; Reformulated Gasoline (RFG); Reformulated Gasoline Blendstock for Oxygenate Blending (RBOB); Unleaded Motor or Automotive Gasoline

*** Section 1 - Product and Company Identification ***

Manufacturer Information

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

Phone: 732-750-6000 Corporate EHS
Emergency # 800-424-9300 CHEMTREC
www.hess.com (Environment, Health, Safety Internet Website)

*** Section 2 - Hazards Identification ***

GHS Classification:

Flammable Liquid - Category 2
Skin Corrosion/Irritation - Category 2
Germ Cell Mutagenicity - Category 1B
Carcinogenicity - Category 1B
Toxic to Reproduction - Category 1A
Specific Target Organ Toxicity (Single Exposure) - Category 3 (respiratory irritation, narcosis)
Specific Target Organ Toxicity (Repeat Exposure) - Category 1 (liver, kidneys, bladder, blood, bone marrow, nervous system)
Aspiration Hazard - Category 1
Hazardous to the Aquatic Environment – Acute Hazard - Category 3

GHS LABEL ELEMENTS

Symbol(s)



Signal Word

DANGER

Hazard Statements

Highly flammable liquid and vapour.
Causes skin irritation.
May cause genetic defects.
May cause cancer.
May damage fertility or the unborn child.
May cause respiratory irritation.
May cause drowsiness or dizziness.
Causes damage to organs (liver, kidneys, bladder, blood, bone marrow, nervous system) through prolonged or repeated exposure.
May be fatal if swallowed and enters airways.
Harmful to aquatic life.

Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

Precautionary Statements

Prevention

Keep away from heat/sparks/open flames/hot surfaces. No smoking
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/protective clothing/eye protection/face protection.
Wash hands and forearms thoroughly after handling.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe mist/vapours/spray.
Use only outdoors or in well-ventilated area.
Do not eat, drink or smoke when using this product.
Avoid release to the environment.

Response

In case of fire: Use water spray, fog, dry chemical fire extinguishers or hand held fire extinguisher.
IF ON SKIN (or hair): Wash with plenty of soap and water. Remove/Take off immediately all contaminated clothing and wash before reuse. If skin irritation occurs, get medical advice/attention.
IF exposed or concerned: Get medical advice/attention.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a poison center or doctor/physician if you feel unwell.
Get medical advice/attention if you feel unwell.
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Do not induce vomiting.

Storage

Store in a well-ventilated place.
Keep cool. Keep container tightly closed.
Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

*** Section 3 - Composition / Information on Ingredients ***

CAS #	Component	Percent
86290-81-5	Gasoline, motor fuel	100
108-88-3	Toluene	1-25
106-97-8	Butane	<10
1330-20-7	Xylenes (o-, m-, p- isomers)	1-15
95-63-6	Benzene, 1,2,4-trimethyl-	<6
64-17-5	Ethyl alcohol	0-10
100-41-4	Ethylbenzene	<3
71-43-2	Benzene	0.1-4.9

Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

110-54-3	Hexane	0.5-4

A complex blend of petroleum-derived normal and branched-chain alkane, cycloalkane, alkene, and aromatic hydrocarbons. May contain antioxidant and multifunctional additives. Non-oxygenated Conventional Gasoline and RBOB do not have oxygenates (Ethanol). Oxygenated Conventional and Reformulated Gasoline will have oxygenates for octane enhancement or as legally required.

*** Section 4 - First Aid Measures ***

First Aid: Eyes

In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

First Aid: Skin

Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or with waterless hand cleanser. Obtain medical attention if irritation or redness develops.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

First Aid: Inhalation

Remove person to fresh air. If person is not breathing, provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

*** Section 5 - Fire Fighting Measures ***

General Fire Hazards

See Section 9 for Flammability Properties.

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. Flowing product may be ignited by self-generated static electricity. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

Hazardous Combustion Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

Extinguishing Media

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO₂, water spray, fire fighting foam, or gaseous extinguishing agent.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

Firefighting foam suitable for polar solvents is recommended for fuel with greater than 10% oxygenate concentration.

Unsuitable Extinguishing Media

None

Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

Fire Fighting Equipment/Instructions

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

*** Section 6 - Accidental Release Measures ***

Recovery and Neutralization

Carefully contain and stop the source of the spill, if safe to do so.

Materials and Methods for Clean-Up

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Caution, flammable vapors may accumulate in closed containers.

Emergency Measures

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Personal Precautions and Protective Equipment

Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

Environmental Precautions

Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Prevention of Secondary Hazards

None

*** Section 7 - Handling and Storage ***

Handling Procedures

USE ONLY AS A MOTOR FUEL.
DO NOT SIPHON BY MOUTH

Handle as a flammable liquid. Keep away from heat, sparks, and open flame! Electrical equipment should be approved for classified area. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil) is loaded into tanks previously containing low flash point products (such as this product) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents."

Storage Procedures

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

Incompatibilities

Keep away from strong oxidizers.

*** Section 8 - Exposure Controls / Personal Protection ***

Component Exposure Limits

Gasoline, motor fuel (86290-81-5)

ACGIH: 300 ppm TWA
500 ppm STEL

Toluene (108-88-3)

ACGIH: 20 ppm TWA
OSHA: 200 ppm TWA; 375 mg/m³ TWA
150 ppm STEL; 560 mg/m³ STEL
NIOSH: 100 ppm TWA; 375 mg/m³ TWA
150 ppm STEL; 560 mg/m³ STEL

Butane (106-97-8)

ACGIH: 1000 ppm TWA (listed under Aliphatic hydrocarbon gases: Alkane C1-4)
OSHA: 800 ppm TWA; 1900 mg/m³ TWA
NIOSH: 800 ppm TWA; 1900 mg/m³ TWA

Xylenes (o-, m-, p- isomers) (1330-20-7)

ACGIH: 100 ppm TWA
150 ppm STEL
OSHA: 100 ppm TWA; 435 mg/m³ TWA
150 ppm STEL; 655 mg/m³ STEL

Benzene, 1,2,4-trimethyl- (95-63-6)

NIOSH: 25 ppm TWA; 125 mg/m³ TWA

Ethyl alcohol (64-17-5)

ACGIH: 1000 ppm STEL
OSHA: 1000 ppm TWA; 1900 mg/m³ TWA
NIOSH: 1000 ppm TWA; 1900 mg/m³ TWA

Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

Ethylbenzene (100-41-4)

ACGIH: 20 ppm TWA
OSHA: 100 ppm TWA; 435 mg/m³ TWA
125 ppm STEL; 545 mg/m³ STEL
NIOSH: 100 ppm TWA; 435 mg/m³ TWA
125 ppm STEL; 545 mg/m³ STEL

Benzene (71-43-2)

ACGIH: 0.5 ppm TWA
2.5 ppm STEL
Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA: 5 ppm STEL (Cancer hazard, Flammable, See 29 CFR 1910.1028, 15 min); 0.5 ppm Action Level; 1 ppm TWA
NIOSH: 0.1 ppm TWA
1 ppm STEL

Hexane (110-54-3)

ACGIH: 50 ppm TWA
Skin - potential significant contribution to overall exposure by the cutaneous route
OSHA: 500 ppm TWA; 1800 mg/m³ TWA
NIOSH: 50 ppm TWA; 180 mg/m³ TWA

Engineering Measures

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

Personal Protective Equipment: Respiratory

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

Personal Protective Equipment: Hands

Gloves constructed of nitrile, neoprene, or PVC are recommended.

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment: Eyes

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

Personal Protective Equipment: Skin and Body

Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

*** Section 9 - Physical & Chemical Properties ***

Appearance:	Translucent, straw-colored or light yellow	Odor:	Strong, characteristic aromatic hydrocarbon odor. Sweet-ether like
Physical State:	Liquid	pH:	ND
Vapor Pressure:	6.4 - 15 RVP @ 100 °F (38 °C) (275-475 mm Hg @ 68 °F (20 °C)	Vapor Density:	AP 3-4
Boiling Point:	85-437 °F (39-200 °C)	Melting Point:	ND
Solubility (H2O):	Negligible to Slight	Specific Gravity:	0.70-0.78
Evaporation Rate:	10-11	VOC:	ND
Percent Volatile:	100%	Octanol/H2O Coeff.:	ND
Flash Point:	-45 °F (-43 °C)	Flash Point Method:	PMCC
Upper Flammability Limit (UFL):	7.6%	Lower Flammability Limit (LFL):	1.4%
Burning Rate:	ND	Auto Ignition:	>530°F (>280°C)

*** Section 10 - Chemical Stability & Reactivity Information ***

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources.

Incompatible Products

Keep away from strong oxidizers.

Hazardous Decomposition Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke). Contact with nitric and sulfuric acids will form nitrocresols that can decompose violently.

*** Section 11 - Toxicological Information ***

Acute Toxicity

A: General Product Information

Harmful if swallowed.

B: Component Analysis - LD50/LC50

Gasoline, motor fuel (86290-81-5)

Inhalation LC50 Rat >5.2 mg/L 4 h; Oral LD50 Rat 14000 mg/kg; Dermal LD50 Rabbit >2000 mg/kg

Toluene (108-88-3)

Inhalation LC50 Rat 12.5 mg/L 4 h; Inhalation LC50 Rat >26700 ppm 1 h; Oral LD50 Rat 636 mg/kg; Dermal LD50 Rabbit 8390 mg/kg; Dermal LD50 Rat 12124 mg/kg

Butane (106-97-8)

Inhalation LC50 Rat 658 mg/L 4 h

Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

Xylenes (o-, m-, p- isomers) (1330-20-7)

Inhalation LC50 Rat 5000 ppm 4 h; Inhalation LC50 Rat 47635 mg/L 4 h; Oral LD50 Rat 4300 mg/kg; Dermal LD50 Rabbit >1700 mg/kg

Benzene, 1,2,4-trimethyl- (95-63-6)

Inhalation LC50 Rat 18 g/m³ 4 h; Oral LD50 Rat 3400 mg/kg; Dermal LD50 Rabbit >3160 mg/kg

Ethyl alcohol (64-17-5)

Oral LD50 Rat 7060 mg/kg; Inhalation LC50 Rat 124.7 mg/L 4 h

Ethylbenzene (100-41-4)

Inhalation LC50 Rat 17.2 mg/L 4 h; Oral LD50 Rat 3500 mg/kg; Dermal LD50 Rabbit 15354 mg/kg

Benzene (71-43-2)

Inhalation LC50 Rat 13050-14380 ppm 4 h; Oral LD50 Rat 1800 mg/kg

Hexane (110-54-3)

Inhalation LC50 Rat 48000 ppm 4 h; Oral LD50 Rat 25 g/kg; Dermal LD50 Rabbit 3000 mg/kg

Potential Health Effects: Skin Corrosion Property/Stimulativeness

Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

Potential Health Effects: Eye Critical Damage/ Stimulativeness

Moderate irritant. Contact with liquid or vapor may cause irritation.

Potential Health Effects: Ingestion

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

Potential Health Effects: Inhalation

Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

Respiratory Organs Sensitization/Skin Sensitization

This product is not reported to have any skin sensitization effects.

Generative Cell Mutagenicity

This product may cause genetic defects.

Carcinogenicity

A: General Product Information

May cause cancer.

Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

IARC has determined that gasoline and gasoline exhaust are possibly carcinogenic in humans. Inhalation exposure to completely vaporized unleaded gasoline caused kidney cancers in male rats and liver tumors in female mice. The U.S. EPA has determined that the male kidney tumors are species-specific and are irrelevant for human health risk assessment. The significance of the tumors seen in female mice is not known. Exposure to light hydrocarbons in the same boiling range as this product has been associated in animal studies with effects to the central and peripheral nervous systems, liver, and kidneys. The significance of these animal models to predict similar human response to gasoline is uncertain.

This product contains benzene. Human health studies indicate that prolonged and/or repeated overexposure to benzene may cause damage to the blood-forming system (particularly bone marrow), and serious blood disorders such as aplastic anemia and leukemia. Benzene is listed as a human carcinogen by the NTP, IARC, OSHA and ACGIH.

B: Component Carcinogenicity

Gasoline, motor fuel (86290-81-5)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

Toluene (108-88-3)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Xylenes (o-, m-, p- isomers) (1330-20-7)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

IARC: Monograph 71 [1999]; Monograph 47 [1989] (Group 3 (not classifiable))

Ethyl alcohol (64-17-5)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

IARC: Monograph 100E [in preparation] (in alcoholic beverages); Monograph 96 [2010] (in alcoholic beverages) (Group 1 (carcinogenic to humans))

Ethylbenzene (100-41-4)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

IARC: Monograph 77 [2000] (Group 2B (possibly carcinogenic to humans))

Benzene (71-43-2)

ACGIH: A1 - Confirmed Human Carcinogen

OSHA: 5 ppm STEL (Cancer hazard, Flammable, See 29 CFR 1910.1028, 15 min); 0.5 ppm Action Level; 1 ppm TWA

NIOSH: potential occupational carcinogen

NTP: Known Human Carcinogen (Select Carcinogen)

IARC: Monograph 100F [in preparation]; Supplement 7 [1987]; Monograph 29 [1982] (Group 1 (carcinogenic to humans))

Reproductive Toxicity

This product is suspected of damaging fertility or the unborn child.

Specified Target Organ General Toxicity: Single Exposure

This product may cause drowsiness or dizziness.

Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

Specified Target Organ General Toxicity: Repeated Exposure

This product causes damage to organs through prolonged or repeated exposure.

Aspiration Respiratory Organs Hazard

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

*** Section 12 - Ecological Information ***

Ecotoxicity

A: General Product Information

Very toxic to aquatic life with long lasting effects. Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Gasoline, motor fuel (86290-81-5)

Test & Species

Conditions

96 Hr LC50 Alburnus alburnus	119 mg/L [static]
96 Hr LC50 Cyprinodon variegatus	82 mg/L [static]
72 Hr EC50 Pseudokirchneriella subcapitata	56 mg/L
24 Hr EC50 Daphnia magna	170 mg/L

Toluene (108-88-3)

Test & Species

Conditions

96 Hr LC50 Pimephales promelas	15.22-19.05 mg/L [flow-through]	1 day old
96 Hr LC50 Pimephales promelas	12.6 mg/L [static]	
96 Hr LC50 Oncorhynchus mykiss	5.89-7.81 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	14.1-17.16 mg/L [static]	
96 Hr LC50 Oncorhynchus mykiss	5.8 mg/L [semi-static]	
96 Hr LC50 Lepomis macrochirus	11.0-15.0 mg/L [static]	
96 Hr LC50 Oryzias latipes	54 mg/L [static]	
96 Hr LC50 Poecilia reticulata	28.2 mg/L [semi-static]	
96 Hr LC50 Poecilia reticulata	50.87-70.34 mg/L [static]	
96 Hr EC50 Pseudokirchneriella subcapitata	>433 mg/L	
72 Hr EC50 Pseudokirchneriella subcapitata	12.5 mg/L [static]	
48 Hr EC50 Daphnia magna	5.46 - 9.83 mg/L [Static]	
48 Hr EC50 Daphnia magna	11.5 mg/L	

Xylenes (o-, m-, p- isomers) (1330-20-7)

Test & Species

Conditions

96 Hr LC50 Pimephales promelas	13.4 mg/L [flow-through]

Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

96 Hr LC50 Oncorhynchus mykiss	2.661-4.093 mg/L [static]
96 Hr LC50 Oncorhynchus mykiss	13.5-17.3 mg/L
96 Hr LC50 Lepomis macrochirus	13.1-16.5 mg/L [flow-through]
96 Hr LC50 Lepomis macrochirus	19 mg/L
96 Hr LC50 Lepomis macrochirus	7.711-9.591 mg/L [static]
96 Hr LC50 Pimephales promelas	23.53-29.97 mg/L [static]
96 Hr LC50 Cyprinus carpio	780 mg/L [semi- static]
96 Hr LC50 Cyprinus carpio	>780 mg/L
96 Hr LC50 Poecilia reticulata	30.26-40.75 mg/L [static]
48 Hr EC50 water flea	3.82 mg/L
48 Hr LC50 Gammarus lacustris	0.6 mg/L

Benzene, 1,2,4-trimethyl- (95-63-6)

Test & Species

Conditions

96 Hr LC50 Pimephales promelas	7.19-8.28 mg/L [flow-through]
48 Hr EC50 Daphnia magna	6.14 mg/L

Ethyl alcohol (64-17-5)

Test & Species

Conditions

96 Hr LC50 Oncorhynchus mykiss	12.0 - 16.0 mL/L [static]
96 Hr LC50 Pimephales promelas	>100 mg/L [static]
96 Hr LC50 Pimephales promelas	13400 - 15100 mg/L [flow-through]
48 Hr LC50 Daphnia magna	9268 - 14221 mg/L
24 Hr EC50 Daphnia magna	10800 mg/L
48 Hr EC50 Daphnia magna	2 mg/L [Static]

Ethylbenzene (100-41-4)

Test & Species

Conditions

96 Hr LC50 Oncorhynchus mykiss	11.0-18.0 mg/L [static]
96 Hr LC50 Oncorhynchus mykiss	4.2 mg/L [semi- static]
96 Hr LC50 Pimephales promelas	7.55-11 mg/L [flow- through]
96 Hr LC50 Lepomis macrochirus	32 mg/L [static]
96 Hr LC50 Pimephales promelas	9.1-15.6 mg/L [static]
96 Hr LC50 Poecilia reticulata	9.6 mg/L [static]
72 Hr EC50 Pseudokirchneriella subcapitata	4.6 mg/L
96 Hr EC50 Pseudokirchneriella subcapitata	>438 mg/L
72 Hr EC50 Pseudokirchneriella subcapitata	2.6 - 11.3 mg/L [static]

Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

96 Hr EC50 Pseudokirchneriella subcapitata	1.7 - 7.6 mg/L [static]
48 Hr EC50 Daphnia magna	1.8 - 2.4 mg/L

Benzene (71-43-2)

Test & Species

Conditions

96 Hr LC50 Pimephales promelas	10.7-14.7 mg/L [flow-through]
96 Hr LC50 Oncorhynchus mykiss	5.3 mg/L [flow-through]
96 Hr LC50 Lepomis macrochirus	22.49 mg/L [static]
96 Hr LC50 Poecilia reticulata	28.6 mg/L [static]
96 Hr LC50 Pimephales promelas	22330-41160 µg/L [static]
96 Hr LC50 Lepomis macrochirus	70000-142000 µg/L [static]
72 Hr EC50 Pseudokirchneriella subcapitata	29 mg/L
48 Hr EC50 Daphnia magna	8.76 - 15.6 mg/L [Static]
48 Hr EC50 Daphnia magna	10 mg/L

Hexane (110-54-3)

Test & Species

Conditions

96 Hr LC50 Pimephales promelas	2.1-2.98 mg/L [flow-through]
24 Hr EC50 Daphnia magna	>1000 mg/L

Persistence/Degradability

No information available.

Bioaccumulation

No information available.

Mobility in Soil

No information available.

***** Section 13 - Disposal Considerations *****

Waste Disposal Instructions

See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

Disposal of Contaminated Containers or Packaging

Dispose of contents/container in accordance with local/regional/national/international regulations.

Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

*** Section 14 - Transportation Information ***

Component Marine Pollutants

This material contains one or more of the following chemicals required by US DOT to be identified as marine pollutants.

Component	CAS #	
Gasoline, motor fuel	86290-81-5	DOT regulated marine pollutant

DOT Information

Shipping Name: Gasoline

UN #: 1203 Hazard Class: 3 Packing Group: II

Placard:



*** Section 15 - Regulatory Information ***

Regulatory Information

A: Component Analysis

This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65) and/or CERCLA (40 CFR 302.4).

Toluene (108-88-3)

SARA 313: 1.0 % de minimis concentration
CERCLA: 1000 lb final RQ; 454 kg final RQ

Xylenes (o-, m-, p- isomers) (1330-20-7)

SARA 313: 1.0 % de minimis concentration
CERCLA: 100 lb final RQ; 45.4 kg final RQ

Benzene, 1,2,4-trimethyl- (95-63-6)

SARA 313: 1.0 % de minimis concentration

Ethylbenzene (100-41-4)

SARA 313: 0.1 % de minimis concentration
CERCLA: 1000 lb final RQ; 454 kg final RQ

Benzene (71-43-2)

SARA 313: 0.1 % de minimis concentration
CERCLA: 10 lb final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule); 4.54 kg final RQ (received an adjusted RQ of 10 lbs based on potential carcinogenicity in an August 14, 1989 final rule)

Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

Hexane (110-54-3)

SARA 313: 1.0 % de minimis concentration

CERCLA: 5000 lb final RQ; 2270 kg final RQ

SARA Section 311/312 – Hazard Classes

Acute Health

X

Chronic Health

X

Fire

X

Sudden Release of Pressure

--

Reactive

--

Component Marine Pollutants

This material contains one or more of the following chemicals required by US DOT to be identified as marine pollutants.

Component	CAS #	
Gasoline, motor fuel	86290-81-5	DOT regulated marine pollutant

State Regulations

Component Analysis - State

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA	RI
Gasoline, motor fuel	86290-81-5	No	No	No	No	Yes	No
Toluene	108-88-3	Yes	Yes	Yes	Yes	Yes	No
Butane	106-97-8	Yes	Yes	Yes	Yes	Yes	No
Xylenes (o-, m-, p- isomers)	1330-20-7	Yes	Yes	Yes	Yes	Yes	No
Benzene, 1,2,4-trimethyl-	95-63-6	No	Yes	Yes	Yes	Yes	No
Ethyl alcohol	64-17-5	Yes	Yes	Yes	Yes	Yes	No
Ethylbenzene	100-41-4	Yes	Yes	Yes	Yes	Yes	No
Benzene	71-43-2	Yes	Yes	Yes	Yes	Yes	No
Hexane	110-54-3	No	Yes	Yes	Yes	Yes	No

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):

WARNING! This product contains a chemical known to the state of California to cause cancer.

WARNING! This product contains a chemical known to the state of California to cause reproductive/developmental effects.

Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

Component Analysis - WHMIS IDL

The following components are identified under the Canadian Hazardous Products Act Ingredient Disclosure List:

Component	CAS #	Minimum Concentration
Toluene	108-88-3	1 %
Butane	106-97-8	1 %
Benzene, 1,2,4-trimethyl-	95-63-6	0.1 %
Ethyl alcohol	64-17-5	0.1 %
Ethylbenzene	100-41-4	0.1 %
Benzene	71-43-2	0.1 %
Hexane	110-54-3	1 %

Additional Regulatory Information

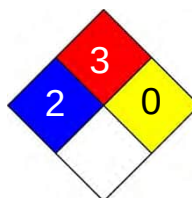
Component Analysis - Inventory

Component	CAS #	TSCA	CAN	EEC
Gasoline, motor fuel	86290-81-5	No	DSL	EINECS
Toluene	108-88-3	Yes	DSL	EINECS
Butane	106-97-8	Yes	DSL	EINECS
Xylenes (o-, m-, p- isomers)	1330-20-7	Yes	DSL	EINECS
Benzene, 1,2,4-trimethyl-	95-63-6	Yes	DSL	EINECS
Ethyl alcohol	64-17-5	Yes	DSL	EINECS
Ethylbenzene	100-41-4	Yes	DSL	EINECS
Benzene	71-43-2	Yes	DSL	EINECS
Hexane	110-54-3	Yes	DSL	EINECS

*** Section 16 - Other Information ***

NFPA® Hazard Rating

Health	2
Fire	3
Reactivity	0



HMIS® Hazard Rating

Health	2	Moderate
Fire	3	Serious
Physical	0	Minimal

*Chronic

Key/Legend

EPA = Environmental Protection Agency; TSCA = Toxic Substance Control Act; ACGIH = American Conference of Governmental Industrial Hygienists; IARC = International Agency for Research on Cancer; NIOSH = National Institute for Occupational Safety and Health; NTP = National Toxicology Program; OSHA = Occupational Safety and Health Administration., NJTSR = New Jersey Trade Secret Registry.

Literature References

None

Safety Data Sheet

Material Name: Gasoline All Grades

SDS No. 9950

Other Information

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

End of Sheet

MATERIAL SAFETY DATA SHEET

ALCONOX®

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS, Australian WorkSafe, Japanese Industrial Standard JIS Z 7250:2000, and European Union REACH Regulations



SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: **ALCONOX®**
CHEMICAL FAMILY NAME: Detergent.
PRODUCT USE: Critical-cleaning detergent for laboratory, healthcare and industrial applications
U.N. NUMBER: Not Applicable
U.N. DANGEROUS GOODS CLASS: Non-Regulated Material
SUPPLIER/MANUFACTURER'S NAME: Alconox, Inc.
ADDRESS: 30 Glenn St., Suite 309, White Plains, NY 10603. USA
EMERGENCY PHONE: **TOLL-FREE in USA/Canada** 800-255-3924
International calls 813-248-0585
BUSINESS PHONE: 914-948-4040
DATE OF PREPARATION: May 2011
DATE OF LAST REVISION: February 2008

SECTION 2 - HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: This product is a white granular powder with little or no odor. Exposure can be irritating to eyes, respiratory system and skin. It is a non-flammable solid. The Environmental effects of this product have not been investigated.

US DOT SYMBOLS

Non-Regulated

CANADA (WHMIS) SYMBOLS



EUROPEAN and (GHS) Hazard Symbols



Signal Word: **Warning!**

EU LABELING AND CLASSIFICATION:

Classification of the substance or mixture according to Regulation (EC) No1272/2008 Annex 1

EC# 205-633-8 This substance is not classified in the Annex I of Directive 67/548/EEC

EC# 268-356-1 This substance is not classified in the Annex I of Directive 67/548/EEC

EC# 231-838-7 This substance is not classified in the Annex I of Directive 67/548/EEC

EC# 231-767-1 This substance is not classified in the Annex I of Directive 67/548/EEC

EC# 207-638-8 Index# 011-005-00-2

EC# 205-788-1 This substance is not classified in the Annex I of Directive 67/548/EEC

GHS Hazard Classification(s):

Eye Irritant Category 2A

Hazard Statement(s):

H319: Causes serious eye irritation

Precautionary Statement(s):

P260: Do not breath dust/fume/gas/mist/vapors/spray

P264: Wash hands thoroughly after handling

P271: Use only in well ventilated area.

P280: Wear protective gloves/protective clothing/eye protection/face protection/

Hazard Symbol(s):

[Xi] Irritant

MATERIAL SAFETY DATA SHEET

ALCONOX®

Risk Phrases:

R20: Harmful by inhalation
R36/37/38: Irritating to eyes, respiratory system and skin

Safety Phrases:

S8: Keep container dry
S22: Do not breath dust
S24/25: Avoid contact with skin and eyes

HEALTH HAZARDS OR RISKS FROM EXPOSURE:

ACUTE: Exposure to this product may cause irritation of the eyes, respiratory system and skin. Ingestion may cause gastrointestinal irritation including pain, vomiting or diarrhea.

CHRONIC: This product contains an ingredient which may be corrosive.

TARGET ORGANS:

ACUTE: Eye, respiratory System, Skin

CHRONIC: None Known

SECTION 3 - COMPOSITION and INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENTS:	CAS #	EINECS #	ICSC #	WT %	HAZARD CLASSIFICATION; RISK PHRASES
Sodium Bicarbonate	144-55-8	205-633-8	1044	33 - 43%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Sodium (C10 – C16) Alkylbenzene Sulfonate	68081-81-2	268-356-1	Not Listed	10 – 20%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Sodium Tripolyphosphate	7758-29-4	231-838-7	1469	5 - 15%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Tetrasodium Pyrophosphate	7722-88-5	231-767-1	1140	5 - 15%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Sodium Carbonate	497-19-8	207-638-8	1135	1 - 10%	HAZARD CLASSIFICATION: [Xi] Irritant RISK PHRASES: R36
Sodium Alcohol Sulfate	151-21-3	205-788-1	0502	1 – 5%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Balance of other ingredients are non-hazardous or less than 1% in concentration (or 0.1% for carcinogens, reproductive toxins, or respiratory sensitizers).					

NOTE: ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-2004 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR, EU Directives and the Japanese Industrial Standard JIS Z 7250: 2000.

SECTION 4 - FIRST-AID MEASURES

Contaminated individuals of chemical exposure must be taken for medical attention if any adverse effect occurs. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to health professional with contaminated individual.

EYE CONTACT: If product enters the eyes, open eyes while under gentle running water for at least 15 minutes. Seek medical attention if irritation persists.

SKIN CONTACT: Wash skin thoroughly after handling. Seek medical attention if irritation develops and persists. Remove contaminated clothing. Launder before re-use.

INHALATION: If breathing becomes difficult, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention if breathing difficulty continues.

INGESTION: If product is swallowed, call physician or poison control center for most current information. If professional advice is not available, do not induce vomiting. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow. Seek medical advice. Take a copy of the label and/or MSDS with the victim to the health professional.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Pre-existing skin, or eye problems may be aggravated by prolonged contact.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and reduce over-exposure.

MATERIAL SAFETY DATA SHEET

ALCONOX®

SECTION 5 - FIRE-FIGHTING MEASURES

FLASH POINT:

Not Flammable

AUTOIGNITION TEMPERATURE:

Not Applicable

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): NA Upper (UEL): NA

FIRE EXTINGUISHING MATERIALS:

As appropriate for surrounding fire. Carbon dioxide, foam, dry chemical, halon, or water spray.

UNUSUAL FIRE AND EXPLOSION HAZARDS:

This product is non-flammable and has no known explosion hazards.

Explosion Sensitivity to Mechanical Impact:

Not Sensitive.

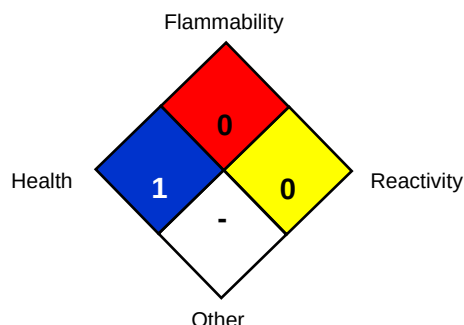
Explosion Sensitivity to Static Discharge:

Not Sensitive

SPECIAL FIRE-FIGHTING PROCEDURES:

Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Isolate materials not yet involved in the fire and protect personnel. Move containers from fire area if this can be done without risk; otherwise, cool with carefully applied water spray. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

NFPA RATING SYSTEM



HMIS RATING SYSTEM

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM			
HEALTH HAZARD (BLUE)			1
FLAMMABILITY HAZARD (RED)			0
PHYSICAL HAZARD (YELLOW)			0
PROTECTIVE EQUIPMENT			
EYES	RESPIRATORY	HANDS	BODY
	See Sect 8		See Sect 8
For Routine Industrial Use and Handling Applications			

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic hazard

SECTION 6 - ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Personnel should be trained for spill response operations.

SPILLS: Contain spill if safe to do so. Prevent entry into drains, sewers, and other waterways. Sweep, shovel or vacuum spilled material and place in an appropriate container for re-use or disposal. Avoid dust generation if possible. Dispose of in accordance with applicable Federal, State, and local procedures (see Section 13, Disposal Considerations).

SECTION 7 - HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing dusts generated by this product. Use in a well-ventilated location. Remove contaminated clothing immediately.

STORAGE AND HANDLING PRACTICES: Containers of this product must be properly labeled. Store containers in a cool, dry location. Keep container tightly closed when not in use. Store away from strong acids or oxidizers.

MATERIAL SAFETY DATA SHEET

ALCONOX®

SECTION 8 - EXPOSURE CONTROLS - PERSONAL PROTECTION

EXPOSURE LIMITS/GUIDELINES:

Chemical Name	CAS#	ACGIH TWA	OSHA TWA	SWA
Sodium Bicarbonate	144-55-8	10 mg/m ³ Total Dust	15 mg/m ³ Total Dust	10 mg/m ³ Total Dust
Sodium (C10 – C16) Alkylbenzene Sulfonate	68081-81-2	10 mg/m ³ Total Dust	15 mg/m ³ Total Dust	10 mg/m ³ Total Dust
Sodium Tripolyphosphate	7758-29-4	10 mg/m ³ Total Dust	15 mg/m ³ Total Dust	10 mg/m ³ Total Dust
Tetrasodium Pyrophosphate	7722-88-5	5 mg/m ³	5 mg/m ³	5 mg/m ³
Sodium Carbonate	497-19-8	10 mg/m ³ Total Dust	15 mg/m ³ Total Dust	10 mg/m ³ Total Dust
Sodium Alcohol Sulfate	151-21-3	10 mg/m ³ Total Dust	15 mg/m ³ Total Dust	10 mg/m ³ Total Dust

Currently, International exposure limits are not established for the components of this product. Please check with competent authority in each country for the most recent limits in place.

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided below. Use local exhaust ventilation to control airborne dust. Ensure eyewash/safety shower stations are available near areas where this product is used.

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132) or equivalent standard of Canada, or standards of EU member states (including EN 149 for respiratory PPE, and EN 166 for face/eye protection), and those of Japan. Please reference applicable regulations and standards for relevant details.

RESPIRATORY PROTECTION: Based on test data, exposure limits should not be exceeded under normal use conditions when using Alconox Detergent. Maintain airborne contaminant concentrations below guidelines listed above, if applicable. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, the European Standard EN149, or EU member states.

EYE PROTECTION: Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

HAND PROTECTION: Use chemical resistant gloves to prevent skin contact.. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

BODY PROTECTION: Use body protection appropriate to prevent contact (e.g. lab coat, overalls). If necessary, refer to appropriate Standards of Canada, or appropriate Standards of the EU, Australian Standards, or relevant Japanese Standards.

SECTION 9 - PHYSICAL and CHEMICAL PROPERTIES

PHYSICAL STATE:	Solid
APPEARANCE & ODOR:	White granular powder with little or no odor.
ODOR THRESHOLD (PPM):	Not Available
VAPOR PRESSURE (mmHg):	Not Applicable
VAPOR DENSITY (AIR=1):	Not Applicable.
BY WEIGHT:	Not Available
EVAPORATION RATE (nBuAc = 1):	Not Applicable.
BOILING POINT (C°):	Not Applicable.
FREEZING POINT (C°):	Not Applicable.
pH:	9.5 (1% aqueous solution)
SPECIFIC GRAVITY 20°C: (WATER =1)	0.85 – 1.1
SOLUBILITY IN WATER (%)	>10% w/w
COEFFICIENT OF WATER/OIL DIST.:	Not Available
VOC:	None
CHEMICAL FAMILY:	Detergent

MATERIAL SAFETY DATA SHEET

ALCONOX®

SECTION 10 - STABILITY and REACTIVITY

STABILITY: Product is stable

DECOMPOSITION PRODUCTS: When heated to decomposition this product produces Oxides of carbon (COx)

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Strong acids and strong oxidizing agents.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Contact with incompatible materials and dust generation.

SECTION 11 - TOXICOLOGICAL INFORMATION

TOXICITY DATA: Toxicity data is available for mixture:

CAS# 497-19-8 LD50 Oral (Rat)	4090 mg/kg
CAS# 497-19-8 LD50 Oral (Mouse)	6600 mg/kg
CAS# 497-19-8 LC50 Inhalation (Rat)	2300 mg/m ³ 2H
CAS# 497-19-8 LC50 Inhalation (Mouse)	1200 mg/m ³ 2H
CAS# 7758-29-4 LD50 Oral (Rat)	3120 mg/kg
CAS# 7758-29-4 LD50 Oral (Mouse)	3100 mg/kg
CAS# 7722-88-5 LD50 Oral (Rat)	4000 mg/kg

SUSPECTED CANCER AGENT: None of the ingredients are found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC and therefore is not considered to be, nor suspected to be a cancer-causing agent by these agencies.

IRRITANCY OF PRODUCT: Contact with this product can be irritating to exposed skin, eyes and respiratory system.

SENSITIZATION OF PRODUCT: This product is not considered a sensitizer.

REPRODUCTIVE TOXICITY INFORMATION: No information concerning the effects of this product and its components on the human reproductive system.

SECTION 12 - ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: No Data available at this time.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: No evidence is currently available on this product's effects on plants or animals.

EFFECT OF CHEMICAL ON AQUATIC LIFE: No evidence is currently available on this product's effects on aquatic life.

SECTION 13 - DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations, those of Canada, Australia, EU Member States and Japan.

SECTION 14 - TRANSPORTATION INFORMATION

US DOT; IATA; IMO; ADR:

THIS PRODUCT IS NOT HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Non-Regulated Material

HAZARD CLASS NUMBER and DESCRIPTION: Not Applicable

UN IDENTIFICATION NUMBER: Not Applicable

PACKING GROUP: Not Applicable.

DOT LABEL(S) REQUIRED: Not Applicable

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2004): Not Applicable

MARINE POLLUTANT: None of the ingredients are classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101, Appendix B)

U.S. DEPARTMENT OF TRANSPORTATION (DOT) SHIPPING REGULATIONS:

This product is not classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101.

TRANSPORT CANADA, TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:

This product is not classified as Dangerous Goods, per regulations of Transport Canada.

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA):

This product is not classified as Dangerous Goods, by rules of IATA:

INTERNATIONAL MARITIME ORGANIZATION (IMO) DESIGNATION:

This product is not classified as Dangerous Goods by the International Maritime Organization.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR):

MATERIAL SAFETY DATA SHEET

ALCONOX®

This product is not classified by the United Nations Economic Commission for Europe to be dangerous goods.

SECTION 15 - REGULATORY INFORMATION

UNITED STATES REGULATIONS

SARA REPORTING REQUIREMENTS: This product is not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act., as follows: None

TSCA: All components in this product are listed on the US Toxic Substances Control Act (TSCA) inventory of chemicals.

SARA 311/312:

Acute Health: Yes Chronic Health: No Fire: No Reactivity: No

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): None

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): None of the ingredients are on the California Proposition 65 lists.

CANADIAN REGULATIONS:

CANADIAN DSL/NDL INVENTORY STATUS: All of the components of this product are on the DSL Inventory

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: No component of this product is on the CEPA First Priorities Substance Lists.

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: This product is categorized as a Controlled Product, Hazard Class D2B as per the Controlled Product Regulations

EUROPEAN ECONOMIC COMMUNITY INFORMATION:

EU LABELING AND CLASSIFICATION:

Classification of the mixture according to Regulation (EC) No1272/2008. See section 2 for details.

AUSTRALIAN INFORMATION FOR PRODUCT:

AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES (AICS) STATUS: All components of this product are listed on the AICS.

STANDARD FOR THE UNIFORM SCHEDULING OF DRUGS AND POISONS: Not applicable.

JAPANESE INFORMATION FOR PRODUCT:

JAPANESE MINISTER OF INTERNATIONAL TRADE AND INDUSTRY (MITI) STATUS: The components of this product are not listed as Class I Specified Chemical Substances, Class II Specified Chemical Substances, or Designated Chemical Substances by the Japanese MITI.

INTERNATIONAL CHEMICAL INVENTORIES:

Listing of the components on individual country Chemical Inventories is as follows:

Asia-Pac:	Listed
Australian Inventory of Chemical Substances (AICS):	Listed
Korean Existing Chemicals List (ECL):	Listed
Japanese Existing National Inventory of Chemical Substances (ENCS):	Listed
Philippines Inventory of Chemicals and Chemical Substances (PICCS):	Listed
Swiss Giftlist of Toxic Substances:	Listed
U.S. TSCA:	Listed

SECTION 16 - OTHER INFORMATION

PREPARED BY: Paul Eigbrett Global Safety Management, 10006 Cross Creek Blvd. Suite 440, Tampa, FL 33647

MATERIAL SAFETY DATA SHEET

ALCONOX®

Disclaimer: To the best of Alconox, Inc. knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness is not guaranteed and no warranties of any type either express or implied are provided. The information contained herein relates only to this specific product.

ANNEX:

IDENTIFIED USES OF ALCONOX® AND DIRECTIONS FOR USE

Used to clean: Healthcare instruments, laboratory ware, vacuum equipment, tissue culture ware, personal protective equipment, sampling apparatus, catheters, tubing, pipes, radioactive contaminated articles, optical parts, electronic components, pharmaceutical apparatus, cosmetics manufacturing equipment, metal castings, forgings and stampings, industrial parts, tanks and reactors. Authorized by USDA for use in federally inspected meat and poultry plants. Passes inhibitory residue test for water analysis. FDA certified.

Used to remove: Soil, grit, grime, buffing compound, slime, grease, oils, blood, tissue, salts, deposits, particulates, solvents, chemicals, radioisotopes, radioactive contaminations, silicon oils, mold release agents.

Surfaces cleaned: Corrosion inhibited formulation recommended for glass, metal, stainless steel, porcelain, ceramic, plastic, rubber and fiberglass. Can be used on soft metals such as copper, aluminum, zinc and magnesium if rinsed promptly. Corrosion testing may be advisable.

Cleaning method: Soak, brush, sponge, cloth, ultrasonic, flow through clean-inplace. Will foam—not for spray or machine use.

Directions: Make a fresh 1% solution (2 1/2 Tbsp. per gal., 1 1/4 oz. per gal. or 10 grams per liter) in cold, warm, or hot water. If available use warm water. Use cold water for blood stains. For difficult soils, raise water temperature and use more detergent. Clean by soak, circulate, wipe, or ultrasonic method. Not for spray machines, will foam. For nonabrasive scouring, make paste. Use 2% solution to soak frozen stopcocks. To remove silver tarnish, soak in 1% solution in aluminum container. RINSE THOROUGHLY—preferably with running water. For critical cleaning, do final or all rinsing in distilled, deionized, or purified water. For food contact surfaces, rinse with potable water. Used on a wide range of glass, ceramic, plastic, and metal surfaces. Corrosion testing may be advisable.

SAFETY DATA SHEET

Hydrogen Chloride

Section 1. Identification

GHS product identifier	: Hydrogen Chloride
Chemical name	: Hydrogen chloride
Other means of identification	:
Product use	: Synthetic/Analytical chemistry.
Synonym	:
SDS #	: 001028
Supplier's details	: Airgas USA, LLC and its affiliates 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253
24-hour telephone	: 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	: GASES UNDER PRESSURE - Compressed gas ACUTE TOXICITY (inhalation) - Category 3 SKIN CORROSION/IRRITATION - Category 1 SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1 SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Respiratory tract irritation) - Category 3

GHS label elements

Hazard pictograms



Signal word : Danger

Hazard statements : Contains gas under pressure; may explode if heated.
Toxic if inhaled.
Causes severe skin burns and eye damage.
Causes serious eye damage.
May cause respiratory irritation.

Precautionary statements

General

: Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction.

Prevention

: Wear protective gloves. Wear eye or face protection. Wear protective clothing. Use only outdoors or in a well-ventilated area. Avoid breathing gas. Wash hands thoroughly after handling.

Section 2. Hazards identification

Response	: IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or physician. IF SWALLOWED: Immediately call a POISON CENTER or physician. Rinse mouth. Do NOT induce vomiting. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. Wash contaminated clothing before reuse. Immediately call a POISON CENTER or physician. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or physician.
Storage	: Store locked up. Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.
Disposal	: Dispose of contents and container in accordance with all local, regional, national and international regulations.
Hazards not otherwise classified	: In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

Section 3. Composition/information on ingredients

Substance/mixture	: Substance
Chemical name	: Hydrogen chloride
Other means of identification	:

CAS number/other identifiers

CAS number	: 7647-01-0
Product code	: 001028

Ingredient name	%	CAS number
hydrogen chloride	100	7647-01-0

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact	: Get medical attention immediately. Call a poison center or physician. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.
Inhalation	: Get medical attention immediately. Call a poison center or physician. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
Skin contact	: Get medical attention immediately. Call a poison center or physician. Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Ingestion	: As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Section 4. First aid measures

- Eye contact** : Causes serious eye damage. Contact with rapidly expanding gas may cause burns or frostbite.
- Inhalation** : Toxic if inhaled. May cause respiratory irritation.
- Skin contact** : Causes severe burns. Contact with rapidly expanding gas may cause burns or frostbite.
- Frostbite** : Try to warm up the frozen tissues and seek medical attention.
- Ingestion** : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

- Eye contact** : Adverse symptoms may include the following: pain, watering, redness
- Inhalation** : Adverse symptoms may include the following: respiratory tract irritation, coughing
- Skin contact** : Adverse symptoms may include the following: pain or irritation, redness, blistering may occur
- Ingestion** : Adverse symptoms may include the following: stomach pains

Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

- Suitable extinguishing media** : Use an extinguishing agent suitable for the surrounding fire.
- Unsuitable extinguishing media** : None known.

- Specific hazards arising from the chemical** : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

- Hazardous thermal decomposition products** : Decomposition products may include the following materials: halogenated compounds

- Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not breathe gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

Section 6. Accidental release measures

- For emergency responders** : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
- Environmental precautions** : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

- Small spill** : Immediately contact emergency personnel. Stop leak if without risk.
- Large spill** : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Do not get in eyes or on skin or clothing. Do not breathe gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.
- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.
- Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Store locked up. Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
hydrogen chloride	ACGIH TLV (United States, 3/2015). C: 2 ppm NIOSH REL (United States, 10/2013). CEIL: 7 mg/m ³ CEIL: 5 ppm OSHA PEL (United States, 2/2013). CEIL: 7 mg/m ³ CEIL: 5 ppm OSHA PEL 1989 (United States, 3/1989). CEIL: 7 mg/m ³ CEIL: 5 ppm

- Appropriate engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Section 8. Exposure controls/personal protection

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.
- Skin protection**
- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

- Physical state** : Gas. [Liquefied compressed gas.]
- Color** : Colorless. Yellowish.
- Molecular weight** : 36.46 g/mole
- Molecular formula** : Cl-H
- Boiling/condensation point** : -85°C (-121°F)
- Melting/freezing point** : -114°C (-173.2°F)
- Critical temperature** : 51.45°C (124.6°F)
- Odor** : Pungent.
- Odor threshold** : Not available.
- pH** : Not available.
- Flash point** : [Product does not sustain combustion.]
- Burning time** : Not applicable.
- Burning rate** : Not applicable.
- Evaporation rate** : Not available.
- Flammability (solid, gas)** : Not available.
- Lower and upper explosive (flammable) limits** : Not available.

Section 9. Physical and chemical properties

Vapor pressure	: 613 (psig)
Vapor density	: 1.3 (Air = 1)
Specific Volume (ft³/lb)	: 10.5263
Gas Density (lb/ft³)	: 0.095
Relative density	: Not applicable.
Solubility	: Soluble in the following materials: cold water.
Solubility in water	: Not available.
Partition coefficient: n-octanol/water	: 0.25
Auto-ignition temperature	: Not available.
Decomposition temperature	: Not available.
SADT	: Not available.
Viscosity	: Not applicable.

Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	: No specific data.
Incompatible materials	: No specific data.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
hydrogen chloride	LC50 Inhalation Gas.	Rat	3124 ppm	1 hours
	LC50 Inhalation Gas.	Rat	1562 ppm	4 hours

IDLH : 50 ppm

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
hydrogen chloride	Eyes - Mild irritant	Rabbit	-	0.5 minutes 5 milligrams	-
	Skin - Mild irritant	Human	-	24 hours 4 Percent	-

Sensitization

Not available.

Mutagenicity

Not available.

Section 11. Toxicological information

Carcinogenicity

Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP
hydrogen chloride	-	3	-

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
hydrogen chloride	Category 3	Not applicable.	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

- Eye contact** : Causes serious eye damage. Contact with rapidly expanding gas may cause burns or frostbite.
- Inhalation** : Toxic if inhaled. May cause respiratory irritation.
- Skin contact** : Causes severe burns. Contact with rapidly expanding gas may cause burns or frostbite.
- Ingestion** : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

- Eye contact** : Adverse symptoms may include the following: pain, watering, redness
- Inhalation** : Adverse symptoms may include the following: respiratory tract irritation, coughing
- Skin contact** : Adverse symptoms may include the following: pain or irritation, redness, blistering may occur
- Ingestion** : Adverse symptoms may include the following: stomach pains

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

- Potential immediate effects** : Not available.
- Potential delayed effects** : Not available.

Long term exposure

- Potential immediate effects** : Not available.
- Potential delayed effects** : Not available.

Potential chronic health effects

Not available.

- General** : No known significant effects or critical hazards.
- Carcinogenicity** : No known significant effects or critical hazards.

Section 11. Toxicological information

Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Developmental effects	: No known significant effects or critical hazards.
Fertility effects	: No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
hydrogen chloride	Acute LC50 240000 µg/l Marine water	Crustaceans - Carcinus maenas - Adult	48 hours
	Acute LC50 282 ppm Fresh water	Fish - Gambusia affinis - Adult	96 hours

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
hydrogen chloride	0.25	-	low

Mobility in soil

Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1050	UN1050	UN1050	UN1050	UN1050
UN proper shipping name	HYDROGEN CHLORIDE, ANHYDROUS	HYDROGEN CHLORIDE, ANHYDROUS	HYDROGEN CHLORIDE, ANHYDROUS	HYDROGEN CHLORIDE, ANHYDROUS	HYDROGEN CHLORIDE, ANHYDROUS
Transport hazard class(es)	2.3 (8)  	2.3 (8)  	2.3 (8)  	2.3 (8)  	2.3 (8)  
Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional information	Inhalation hazard zone C Reportable quantity 5000 lbs / 2270 kg Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements. Limited quantity Yes. Packaging instruction Passenger aircraft Quantity limitation: Forbidden. Cargo aircraft Quantity limitation: Forbidden. Special provisions 3	Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2), 2.40-2.42 (Class 8). Explosive Limit and Limited Quantity Index 0 ERAP Index 25 Passenger Carrying Ship Index Forbidden Passenger Carrying Road or Rail Index Forbidden Special provisions 38	-	-	Passenger and Cargo Aircraft Quantity limitation: 0 Forbidden Cargo Aircraft Only Quantity limitation: 0 Forbidden

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption:** Not determined
United States inventory (TSCA 8b): This material is listed or exempted.
Clean Water Act (CWA) 311: Hydrogen chloride
Clean Air Act (CAA) 112 regulated toxic substances: Hydrogen chloride

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Section 15. Regulatory information

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Listed

SARA 302/304

Composition/information on ingredients

Name	%	EHS	SARA 302 TPQ		SARA 304 RQ	
			(lbs)	(gallons)	(lbs)	(gallons)
hydrogen chloride	100	Yes.	500	-	5000	-

SARA 304 RQ : 5000 lbs / 2270 kg

SARA 311/312

Classification : Sudden release of pressure
Immediate (acute) health hazard

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
hydrogen chloride	100	No.	Yes.	No.	Yes.	No.

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	Hydrogen chloride	7647-01-0	100
Supplier notification	Hydrogen chloride	7647-01-0	100

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : This material is listed.

New York : This material is listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

International regulations

International lists

National inventory

Australia : This material is listed or exempted.

Canada : This material is listed or exempted.

China : This material is listed or exempted.

Europe : This material is listed or exempted.

Japan : This material is listed or exempted.

Malaysia : This material is listed or exempted.

New Zealand : This material is listed or exempted.

Philippines : This material is listed or exempted.

Republic of Korea : This material is listed or exempted.

Taiwan : This material is listed or exempted.

Section 15. Regulatory information

Canada

WHMIS (Canada)

: Class A: Compressed gas.
 Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
 Class E: Corrosive material

CEPA Toxic substances: This material is not listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information

Canada Label requirements : Class A: Compressed gas.
 Class D-1A: Material causing immediate and serious toxic effects (Very toxic).
 Class E: Corrosive material

Hazardous Material Information System (U.S.A.)

Health	3
Flammability	0
Physical hazards	3

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)



Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
Press. Gas Comp. Gas, H280 Acute Tox. 3, H331 Skin Corr. 1, H314 Eye Dam. 1, H318 STOT SE 3, H335	According to package On basis of test data Expert judgment Expert judgment Expert judgment

History

Date of printing : 6/24/2016
Date of issue/Date of revision : 6/24/2016

Section 16. Other information

Date of previous issue : No previous validation

Version : 0.01

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



Fisher Scientific

Part of Thermo Fisher Scientific

SAFETY DATA SHEET

Creation Date 12-Mar-2009

Revision Date 28-Nov-2016

Revision Number 5

1. Identification

Product Name Nitric acid (65 - 70%)

Cat No. : A198C-212, A200-212, A200-212LC, A200-500, A200-500LC, A200-612GAL, A200C-212, A200S-212, A200S-212LC, A200S-500, A200SI-212, A467-1, A467-2, A467-250, A467-500, A483-212; S719721

Synonyms Azotic acid; Engraver's acid; Aqua fortis

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company

Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number

CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Oxidizing liquids	Category 3
Corrosive to metals	Category 1
Skin Corrosion/Irritation	Category 1 A
Serious Eye Damage/Eye Irritation	Category 1
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word

Danger

Hazard Statements

May intensify fire; oxidizer
May be corrosive to metals
Causes severe skin burns and eye damage
May cause respiratory irritation

**Precautionary Statements****Prevention**

Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Use only outdoors or in a well-ventilated area
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep/Store away from clothing/ other combustible materials
Take any precaution to avoid mixing with combustibles
Keep only in original container

Response

Immediately call a POISON CENTER or doctor/physician

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

Skin

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

Ingestion

IF SWALLOWED: Rinse mouth. DO NOT induce vomiting

Fire

In case of fire: Use CO₂, dry chemical, or foam for extinction

Spills

Absorb spillage to prevent material damage

Storage

Store locked up
Store in a well-ventilated place. Keep container tightly closed
Store in corrosive resistant polypropylene container with a resistant inliner
Store in a dry place

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

None identified

3. Composition / information on ingredients

Component	CAS-No	Weight %
Nitric acid	7697-37-2	65 - 70
Water	7732-18-5	30 - 35

4. First-aid measures

General Advice

Immediate medical attention is required. Show this safety data sheet to the doctor in attendance.

Eye Contact

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. Remove and wash contaminated clothing before re-use. Call a physician immediately.
Inhalation	If breathing is difficult, give oxygen. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Remove from exposure, lie down. Call a physician immediately.
Ingestion	Do not induce vomiting. Never give anything by mouth to an unconscious person. Clean mouth with water. Call a physician immediately.
Most important symptoms/effects	Causes burns by all exposure routes. Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation: Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	CO ₂ , dry chemical, dry sand, alcohol-resistant foam.
Unsuitable Extinguishing Media	No information available
Flash Point	Not applicable
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Oxidizing Properties	Oxidizer
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical

Thermal decomposition can lead to release of irritating gases and vapors. The product causes burns of eyes, skin and mucous membranes. Oxidizer: Contact with combustible/organic material may cause fire. May ignite combustibles (wood, paper, oil, clothing, etc.).

Hazardous Combustion Products

Nitrogen oxides (NO_x) Thermal decomposition can lead to release of irritating gases and vapors

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health
4

Flammability
0

Instability
0

Physical hazards
OX

6. Accidental release measures

Personal Precautions	Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Use personal protective equipment.
Environmental Precautions	Should not be released into the environment. Do not flush into surface water or sanitary sewer system. See Section 12 for additional ecological information.
Methods for Containment and Clean Up	Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Sweep up and shovel into suitable containers for disposal.

7. Handling and storage

Handling	Use only under a chemical fume hood. Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Do not ingest. Do not breathe vapors or spray mist. Keep away from clothing and other combustible materials.
Storage	Keep containers tightly closed in a cool, well-ventilated place. Do not store near combustible materials.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Nitric acid	TWA: 2 ppm STEL: 4 ppm	(Vacated) TWA: 2 ppm (Vacated) TWA: 5 mg/m ³ (Vacated) STEL: 4 ppm (Vacated) STEL: 10 mg/m ³ TWA: 2 ppm TWA: 5 mg/m ³	IDLH: 25 ppm TWA: 2 ppm TWA: 5 mg/m ³ STEL: 4 ppm STEL: 10 mg/m ³
Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Nitric acid	TWA: 2 ppm TWA: 5.2 mg/m ³ STEL: 4 ppm STEL: 10 mg/m ³	TWA: 2 ppm TWA: 5 mg/m ³ STEL: 4 ppm STEL: 10 mg/m ³	TWA: 2 ppm STEL: 4 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures	Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection	Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Tightly fitting safety goggles. Face-shield.
Skin and body protection	Long sleeved clothing.
Respiratory Protection	Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
Hygiene Measures	Keep away from food, drink and animal feeding stuffs. When using, do not eat, drink or smoke. Contaminated work clothing should not be allowed out of the workplace. Provide regular cleaning of equipment, work area and clothing. Avoid contact with skin, eyes and clothing. For environmental protection remove and wash all contaminated protective equipment before re-use. Wear suitable gloves and eye/face protection.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Clear Colorless, Light yellow
Odor	Strong Acid
Odor Threshold	No information available
pH	< 1.0 (0.1M)
Melting Point/Range	-41 °C / -41.8 °F
Boiling Point/Range	Not applicable
Flash Point	Not applicable

Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	0.94 kPa (20°C)
Vapor Density	No information available
Specific Gravity	1.40
Solubility	miscible
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	HNO ₃
Molecular Weight	63.02

10. Stability and reactivity

Reactive Hazard	Yes
Stability	Oxidizer: Contact with combustible/organic material may cause fire.
Conditions to Avoid	Incompatible products. Combustible material. Excess heat. Exposure to air or moisture over prolonged periods.
Incompatible Materials	Combustible material, Strong bases, Reducing agents, Metals, Powdered metals, Organic materials, Aldehydes, Alcohols, Cyanides, Ammonia, Strong reducing agents
Hazardous Decomposition Products	Nitrogen oxides (NO _x), Thermal decomposition can lead to release of irritating gases and vapors
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Oral LD50	Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Dermal LD50	Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Vapor LC50	Based on ATE data, the classification criteria are not met. ATE > 20 mg/l.

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Nitric acid	Not listed	Not listed	LC50 = 2500 ppm. (Rat) 1h
Water	-	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation	Causes severe burns by all exposure routes
Sensitization	No information available
Carcinogenicity	The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Nitric acid	7697-37-2	Not listed	Not listed	Not listed	Not listed	Not listed
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects	No information available.
Developmental Effects	No information available.
Teratogenicity	No information available.
STOT - single exposure	Respiratory system
STOT - repeated exposure	None known
Aspiration hazard	No information available
Symptoms / effects, both acute and delayed	Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation: Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated
Endocrine Disruptor Information	No information available
Other Adverse Effects	The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Do not empty into drains. Large amounts will affect pH and harm aquatic organisms.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Nitric acid	Not listed	LC50: = 72 mg/L, 96h (Gambusia affinis)	Not listed	Not listed

Persistence and Degradability Miscible with water Persistence is unlikely based on information available.
Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Nitric acid	-2.3

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No	UN2031
Proper Shipping Name	NITRIC ACID
Hazard Class	8
Subsidiary Hazard Class	5.1
Packing Group	II

TDG

UN-No	UN2031
Proper Shipping Name	NITRIC ACID
Hazard Class	8
Subsidiary Hazard Class	5.1
Packing Group	II

IATA

UN-No	UN2031
Proper Shipping Name	NITRIC ACID
Hazard Class	8
Subsidiary Hazard Class	5.1
Packing Group	II

IMDG/IMO

UN-No	UN2031
Proper Shipping Name	NITRIC ACID
Hazard Class	8
Subsidiary Hazard Class	5.1
Packing Group	II

15. Regulatory information

All of the components in the product are on the following Inventory lists: X = listed

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Nitric acid	X	X	-	231-714-2	-		X	X	X	X	X
Water	X	X	-	231-791-2	-		X	-	X	X	X

Legend:

X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.

F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.

N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.

P - Indicates a commenced PMN substance

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

S - Indicates a substance that is identified in a proposed or final Significant New Use Rule

T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.

XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B)).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.

Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Nitric acid	7697-37-2	65 - 70	1.0

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	Yes

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Nitric acid	X	1000 lb	-	-

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Nitric acid	-	TQ: 500 lb

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive

Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Nitric acid	1000 lb	1000 lb

California Proposition 65 This product does not contain any Proposition 65 chemicals**U.S. State Right-to-Know Regulations**

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Nitric acid	X	X	X	X	X
Water	-	-	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ): Y
 DOT Marine Pollutant N
 DOT Severe Marine Pollutant N

U.S. Department of Homeland Security

This product contains the following DHS chemicals:

Component	DHS Chemical Facility Anti-Terrorism Standard
Nitric acid	2000 lb STQ

Other International Regulations**Mexico - Grade** No information available**Canada**

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class

C Oxidizing materials
 E Corrosive material
 D2B Toxic materials

**16. Other information**

Prepared By Regulatory Affairs
 Thermo Fisher Scientific
 Email: EMSDS.RA@thermofisher.com

Creation Date 12-Mar-2009
Revision Date 28-Nov-2016
Print Date 28-Nov-2016
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Isobutylene

Airgas
an Air Liquide company

Section 1. Identification

GHS product identifier	: Isobutylene
Chemical name	: 2-methylpropene
Other means of identification	: 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene); 1, 1-Dimethylethylene; Isopropylidenemethylene; iso-Butene; i-Butene; 2-Methylpropylene; 2-Methyl-2-propene; 2-Methyl-1-propene
Product type	: Gas.
Product use	: Synthetic/Analytical chemistry.
Synonym	: 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene); 1, 1-Dimethylethylene; Isopropylidenemethylene; iso-Butene; i-Butene; 2-Methylpropylene; 2-Methyl-2-propene; 2-Methyl-1-propene
SDS #	: 001031
Supplier's details	: Airgas USA, LLC and its affiliates 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253
24-hour telephone	: 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status	: This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Classification of the substance or mixture	: FLAMMABLE GASES - Category 1 GASES UNDER PRESSURE - Liquefied gas

GHS label elements

Hazard pictograms



Signal word : Danger

Hazard statements : Extremely flammable gas.
May form explosive mixtures with air.
Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements

General

: Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Always keep container in upright position. Approach suspected leak area with caution.

Prevention

: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Response

: Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.

Storage

: Protect from sunlight. Store in a well-ventilated place.

Disposal

: Not applicable.

Hazards not otherwise classified

: In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

Section 3. Composition/information on ingredients

Substance/mixture	: Substance
Chemical name	: 2-methylpropene
Other means of identification	: 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene); 1, 1-Dimethylethylene; Isopropylidenemethylene; iso-Butene; i-Butene; 2-Methylpropylene; 2-Methyl-2-propene; 2-Methyl-1-propene
Product code	: 001031

CAS number/other identifiers

CAS number : 115-11-7

Ingredient name	%	CAS number
Isobutylene	100	115-11-7

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact	: Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.
Inhalation	: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
Skin contact	: Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Ingestion	: As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact	: No known significant effects or critical hazards.
Inhalation	: No known significant effects or critical hazards.
Skin contact	: No known significant effects or critical hazards.
Frostbite	: Try to warm up the frozen tissues and seek medical attention.
Ingestion	: As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact	: No specific data.
Inhalation	: No specific data.
Skin contact	: No specific data.
Ingestion	: No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician	: Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
Specific treatments	: No specific treatment.

Section 4. First aid measures

- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

- Suitable extinguishing media** : Use an extinguishing agent suitable for the surrounding fire.
- Unsuitable extinguishing media** : None known.

- Specific hazards arising from the chemical** : Contains gas under pressure. Extremely flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.

- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

- Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance. Eliminate all ignition sources if safe to do so.

- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : Accidental releases pose a serious fire or explosion hazard. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
- For emergency responders** : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

- Environmental precautions** : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

- Small spill** : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.
- Large spill** : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.
- Use only non-sparking tools. Avoid contact with eyes, skin and clothing. Empty containers retain product residue and can be hazardous. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment.
- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.
- Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Eliminate all ignition sources. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F). Keep container tightly closed and sealed until ready for use. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Isobutylene	ACGIH TLV (United States, 3/2017). TWA: 250 ppm 8 hours.

- Appropriate engineering controls** : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Section 8. Exposure controls/personal protection

- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

- Physical state** : Gas. [Compressed gas.]
- Color** : Colorless.
- Odor** : Characteristic.
- Odor threshold** : Not available.
- pH** : Not available.
- Melting point** : -140.7°C (-221.3°F)
- Boiling point** : -6.9°C (19.6°F)
- Critical temperature** : 144.75°C (292.6°F)
- Flash point** : Closed cup: -76.1°C (-105°F)
- Evaporation rate** : Not available.
- Flammability (solid, gas)** : Extremely flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and oxidizing materials.
- Lower and upper explosive (flammable) limits** : Lower: 1.8%
Upper: 9.6%
- Vapor pressure** : 24.3 (psig)
- Vapor density** : 1.94 (Air = 1)
- Specific Volume (ft³/lb)** : 6.6845
- Gas Density (lb/ft³)** : 0.1496 (25°C / 77 to °F)
- Relative density** : Not applicable.
- Solubility** : Not available.
- Solubility in water** : 0.26 g/l
- Partition coefficient: n-octanol/water** : 2.34
- Auto-ignition temperature** : 465°C (869°F)
- Decomposition temperature** : Not available.
- Viscosity** : Not applicable.
- Flow time (ISO 2431)** : Not available.
- Molecular weight** : 56.12 g/mole
- Aerosol product**
- Heat of combustion** : -45029034 J/kg

Section 10. Stability and reactivity

- Reactivity** : No specific test data related to reactivity available for this product or its ingredients.
- Chemical stability** : The product is stable.
- Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.
- Conditions to avoid** : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
- Incompatible materials** : Oxidizers
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
- Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Isobutylene	LC50 Inhalation Vapor	Rat	550000 mg/m ³	4 hours

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Section 11. Toxicological information

- Inhalation** : No known significant effects or critical hazards.
Skin contact : No known significant effects or critical hazards.
Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

- Eye contact** : No specific data.
Inhalation : No specific data.
Skin contact : No specific data.
Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

- Potential immediate effects** : Not available.
Potential delayed effects : Not available.

Long term exposure

- Potential immediate effects** : Not available.
Potential delayed effects : Not available.

Potential chronic health effects

Not available.

- General** : No known significant effects or critical hazards.
Carcinogenicity : No known significant effects or critical hazards.
Mutagenicity : No known significant effects or critical hazards.
Teratogenicity : No known significant effects or critical hazards.
Developmental effects : No known significant effects or critical hazards.
Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
Isobutylene	2.34	-	low

Mobility in soil

- Soil/water partition coefficient (K_{oc})** : Not available.

Section 12. Ecological information

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1055	UN1055	UN1055	UN1055	UN1055
UN proper shipping name	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE
Transport hazard class(es)	2.1 	2.1 	2.1 	2.1 	2.1 
Packing group	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

Additional information

DOT Classification

: **Limited quantity** Yes.
Quantity limitation Passenger aircraft/rail: Forbidden. Cargo aircraft: 150 kg.
Special provisions 19, T50

TDG Classification

: Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2).
Explosive Limit and Limited Quantity Index 0.125
ERAP Index 3000
Passenger Carrying Ship Index Forbidden
Passenger Carrying Road or Rail Index Forbidden
Special provisions 29

IATA

: **Quantity limitation** Passenger and Cargo Aircraft: Forbidden. Cargo Aircraft Only: 150 kg.

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : TSCA 8(a) CDR Exempt/Partial exemption: Not determined
Clean Air Act (CAA) 112 regulated flammable substances: Isobutylene

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Refer to Section 2: Hazards Identification of this SDS for classification of substance.

State regulations

Massachusetts : This material is listed.

New York : This material is not listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia : This material is listed or exempted.

Canada : This material is listed or exempted.

China : This material is listed or exempted.

Europe : This material is listed or exempted.

Japan : **Japan inventory (ENCS):** This material is listed or exempted.
Japan inventory (ISHL): Not determined.

Malaysia : Not determined.

New Zealand : This material is listed or exempted.

Philippines : This material is listed or exempted.

Republic of Korea : This material is listed or exempted.

Section 15. Regulatory information

Taiwan	: This material is listed or exempted.
Thailand	: Not determined.
Turkey	: Not determined.
United States	: This material is listed or exempted.
Viet Nam	: Not determined.

Section 16. Other information

Hazardous Material Information System (U.S.A.)

Health	/	1
Flammability		4
Physical hazards		3

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

National Fire Protection Association (U.S.A.)



Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
FLAMMABLE GASES - Category 1	Expert judgment
GASES UNDER PRESSURE - Liquefied gas	Expert judgment

History

Date of printing : 5/10/2018

Date of issue/Date of revision : 5/10/2018

Date of previous issue : 7/11/2016

Version : 0.02

Key to abbreviations

: ATE = Acute Toxicity Estimate
 BCF = Bioconcentration Factor
 GHS = Globally Harmonized System of Classification and Labelling of Chemicals
 IATA = International Air Transport Association
 IBC = Intermediate Bulk Container
 IMDG = International Maritime Dangerous Goods
 LogPow = logarithm of the octanol/water partition coefficient
 MARPOL = International Convention for the Prevention of Pollution From Ships, 1973

Section 16. Other information

as modified by the Protocol of 1978. ("Marpol" = marine pollution)

UN = United Nations

References

: Not available.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

SAFETY DATA SHEET

Creation Date 03-Feb-2010

Revision Date 18-Dec-2025

Revision Number 4

This safety data sheet was created pursuant to the requirements of: US OSHA Hazard Communication Standard 2024 (29 CFR 1910.1200)

1. Identification

Product Name Trichloroethylene

Cat No. : T340-4; T341-4; T341-20; T341-500; T403-4

CAS No 79-01-6
Synonyms Trichloroethene (Stabilized/Technical/Electronic/Certified ACS)

Recommended Use Laboratory chemicals.
Uses advised against .

Details of the supplier of the safety data sheet

Company

Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number

CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous according to [US] OSHA (29 CFR 1910.1200, 2024)

Skin Corrosion/Irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Skin Sensitization	Category 1
Germ Cell Mutagenicity	Category 2
Carcinogenicity	Category 1A
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver, Heart, spleen, Blood.	

Label Elements

Signal Word

Danger

Hazard Statements

Causes skin irritation

Causes serious eye irritation

May cause an allergic skin reaction

May cause drowsiness or dizziness

Suspected of causing genetic defects

May cause cancer

May cause damage to organs through prolonged or repeated exposure

**Precautionary Statements****Prevention**

Obtain special instructions before use

Do not handle until all safety precautions have been read and understood

Wash face, hands and any exposed skin thoroughly after handling

Contaminated work clothing should not be allowed out of the workplace

Do not breathe dust/fume/gas/mist/vapors/spray

Use only outdoors or in a well-ventilated area

Wear protective gloves/protective clothing/eye protection/face protection

Response

IF exposed or concerned: Get medical attention/advice

Inhalation

IF INHALED: Remove person to fresh air and keep comfortable for breathing

Skin

IF ON SKIN: Wash with plenty of soap and water

Take off contaminated clothing

If skin irritation or rash occurs: Get medical advice/attention

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

If eye irritation persists: Get medical advice/attention

Storage

Store locked up

Store in a well-ventilated place. Keep container tightly closed

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Harmful to aquatic life with long lasting effects

Hazards classified under paragraph (d)(1)(ii) of 1910.1200

No information available

WARNING. Cancer and Reproductive Harm - <https://www.p65warnings.ca.gov/>.

3. Composition/information on Ingredients

Component	CAS No	Weight %
Trichloroethylene	79-01-6	<=100

4. First-aid measures

General Advice	Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.
Eye Contact	In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.
Inhalation	Remove to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.
Ingestion	Do NOT induce vomiting. Call a physician or poison control center immediately.
Most important symptoms and effects	May cause allergic skin reaction. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	Water spray, carbon dioxide (CO ₂), dry chemical, alcohol-resistant foam.
Unsuitable Extinguishing Media	No information available
Flash Point	No information available
Method -	No information available
Autoignition Temperature	410 °C / 770 °F
Explosion Limits	
Upper	44.8 vol %
Lower	8 vol %
Oxidizing Properties	Not oxidising
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical

Thermal decomposition can lead to release of irritating gases and vapors. Containers may explode when heated. Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products

Chlorine. Phosgene. Carbon monoxide (CO). Carbon dioxide (CO₂). Hydrogen chloride gas.

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health
2

Flammability
1

Instability
0

Physical hazards
N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment as required. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas.

Environmental Precautions Should not be released into the environment. Do not flush into surface water or sanitary sewer system.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and Storage

Handling Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe mist/vapors/spray. Do not ingest. If swallowed then seek immediate medical assistance.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Protect from light. Do not store in aluminum containers. Incompatible Materials. Strong oxidizing agents. Strong bases. Amines. Alkali metals. Metals. .

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH	Mexico OEL (TWA)
Trichloroethylene	TWA: 10 ppm STEL: 25 ppm	(Vacated) TWA: 50 ppm (Vacated) TWA: 270 mg/m ³ Ceiling: 200 ppm (Vacated) STEL: 200 ppm (Vacated) STEL: 1080 mg/m ³ TWA: 100 ppm	IDLH: 1000 ppm	TWA: 10 ppm STEL: 25 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Use only under a chemical fume hood. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Recommended Filter type: Organic gases and vapours filter. Type A. Brown. conforming to EN14387.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Appearance

Physical State

Color

Liquid
Colorless

Odor	Characteristic		
Odor Threshold	No information available		
Property	Values	Remarks	• Method
Melting Point/Range	-85 °C / -121 °F		
Softening Point	No data available		
Boiling Point/Range	87 °C / 188.6 °F	Literature reference	
Flash Point	No information available	Method -	No information available
Flammability (liquid)	No data available		
Flammability (solid,gas)	Not applicable	Liquid	
Explosion Limits	Lower 8,0 vol % Upper 44.8 vol %	Literature reference	
Autoignition Temperature	410 °C / 770 °F	DIN 51794	
Decomposition Temperature	> 120°C		
pH	No information available		
Viscosity	0.55 mPa.s (25°C)	Based on available literature	
Water Solubility	Insoluble		
Solubility in other solvents	No information available		
Partition Coefficient (n-octanol/water)			
Component	log Pow		
Trichloroethylene	2.4		
Vapor Pressure	77.3 mbar @ 20 °C		
Density / Specific Gravity	1.460		
Bulk Density	Not applicable	Liquid	
Vapor Density	4.5 (Air = 1.0)	Literature reference	
Particle characteristics	Not applicable (liquid)		
Other Information			
Molecular Formula	C2 H Cl3		
Molecular Weight	131.39		
Explosive Properties	Not explosive explosive air/vapour mixtures possible		
Oxidizing Properties	Not oxidising		
Evaporation Rate	0.69 (Carbon Tetrachloride = 1.0)		

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Light sensitive.
Conditions to Avoid	Incompatible products. Excess heat. Exposure to light. Exposure to moist air or water.
Incompatible Materials	Strong oxidizing agents, Strong bases, Amines, Alkali metals, Metals,
Hazardous Decomposition Products	Chlorine, Phosgene, Carbon monoxide (CO), Carbon dioxide (CO ₂), Hydrogen chloride gas
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Information on expected route of exposure

Inhalation	INHALATION MAY CAUSE CENTRAL NERVOUS SYSTEM EFFECTS. May cause irritation of respiratory tract. May be harmful if inhaled.
Ingestion	Aspiration hazard. May be harmful if swallowed. May cause central nervous system effects. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.
Eyes	Irritating to eyes.
Skin	Irritating to skin. May be harmful in contact with skin.

Toxicology data for the components

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Trichloroethylene	LD50 = 4920 mg/kg (Rat)	LD50 = 29000 mg/kg (Rabbit)	LC50 = 26 mg/L (Rat) 4 h

Toxicologically Synergistic Products No information available

(b) skin corrosion/irritation; Category 2
Test method OECD 404
Test species rabbit
Observational endpoint Irritating

(c) serious eye damage/irritation; Category 2

(d) respiratory or skin sensitization;
Respiratory Based on available data, the classification criteria are not met
Skin Category 1

Component	Test method	Test species	Study result
Trichloroethylene 79-01-6 (<=100)	OECD Test Guideline 429	mouse	Sensitization

May cause sensitization by skin contact

(e) germ cell mutagenicity; Category 2
 Mutagenic effects have occurred in humans

(f) carcinogenicity; Category 1B
 The table below indicates whether each agency has listed any ingredient as a carcinogen

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Trichloroethylene	79-01-6	Group 1	Known	A2	X	A2

IARC (International Agency for Research on Cancer)

IARC (International Agency for Research on Cancer)

Group 1 - Carcinogenic to Humans

Group 2A - Probably Carcinogenic to Humans

Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)

NTP: (National Toxicity Program)

Known - Known Carcinogen

Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

A1 - Known Human Carcinogen

A2 - Suspected Human Carcinogen

A3 - Animal Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

(g) reproductive toxicity; Based on available data, the classification criteria are not met

(h) STOT-single exposure; Category 3
Results / Target organs Central nervous system (CNS).

(i) STOT-repeated exposure; Based on available data, the classification criteria are not met
Target Organs None known.

(j) aspiration hazard; Based on available data, the classification criteria are not met

Symptoms / effects, both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing.

Other Adverse Effects The toxicological properties have not been fully investigated.

Endocrine Disrupting Properties This product does not contain any known or suspected endocrine disruptors.

12. Ecological information

Ecotoxicity

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Do not empty into drains. The product contains following substances which are hazardous for the environment. Contains a substance which is: Harmful to aquatic organisms. Toxic to aquatic organisms.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Trichloroethylene	EC50: = 450 mg/L, 96h (Desmodesmus subspicatus) EC50: = 175 mg/L, 96h (Pseudokirchneriella subcapitata)	LC50: 31.4 - 71.8 mg/L, 96h flow-through (Pimephales promelas) LC50: 39 - 54 mg/L, 96h static (Lepomis macrochirus)	EC50 = 0.81 mg/L 24 h EC50 = 115 mg/L 10 min EC50 = 190 mg/L 15 min EC50 = 235 mg/L 24 h EC50 = 410 mg/L 24 h EC50 = 975 mg/L 5 min	EC50: = 2.2 mg/L, 48h (Daphnia magna)

Persistence and Degradability Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its volatility.

Component	log Pow
Trichloroethylene	2.4

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Trichloroethylene - 79-01-6	U228	-

14. Transport information

DOT

UN-No UN1710
 Proper Shipping Name TRICHLOROETHYLENE
 Hazard Class 6.1
 Packing Group III

TDG

UN-No UN1710
 Proper Shipping Name TRICHLOROETHYLENE
 Hazard Class 6.1
 Packing Group III

IATA

UN-No UN1710
 Proper Shipping Name TRICHLOROETHYLENE
 Hazard Class 6.1

Packing Group	III
IMDG/IMO	
UN-No	UN1710
Proper Shipping Name	TRICHLOROETHYLENE
Hazard Class	6.1
Packing Group	III

15. Regulatory Information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Trichloroethylene	79-01-6	X	ACTIVE	R,S

Legend:

TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)

X - Listed

'-' - Not Listed

R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.

TSCA - Per 40 CFR 751, Regulation of Certain Chemical Substances & Mixtures, Under TSCA Section 6(h) (PBT) Not applicable

TSCA 12(b) - Notices of Export

Component	CAS No	TSCA 12(b) - Notices of Export
Trichloroethylene	79-01-6	Section 5(a)(2) Section 6

International Inventories

Canada (DSL/NDL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Trichloroethylene	79-01-6	X	-	201-167-4	X	X	X	X	X	X

KECL - NIER number or KE number (<http://ncis.nier.go.kr/en/main.do>)

U.S. Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

Component	CAS No	Weight %	SARA 313 - Threshold Values %	SARA 313 - Reporting thresholds
Trichloroethylene	79-01-6	<=100	0.1 %	-

SARA 311/312 Hazard Categories

Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Trichloroethylene	X	100 lb	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Trichloroethylene	X		-

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355).

Component	Hazardous Substances RQs	CERCLA Extremely Hazardous Substances RQs	SARA Reportable Quantity (RQ)
Trichloroethylene	100 lb	-	100 lb 45.4 kg

California Proposition 65 This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Trichloroethylene	79-01-6	Carcinogen Developmental Male Reproductive	14 µg/day 50 µg/day	Developmental Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Trichloroethylene	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Authorisation/Restrictions according to EU REACH

Component	CAS No	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Trichloroethylene	79-01-6	Carcinogenic Category 1B, Article 57 Application date: October 21, 2014 Sunset date: April 21, 2016 Exemption - None	Use restricted. See entry 28. (see link for restriction details) Use restricted. See entry 75. (see link for restriction details)	SVHC Candidate list - 201-167-4 - Carcinogenic, Article 57a

After the sunset date the use of this substance requires either an authorization or can only be used for exempted uses, e.g. use in scientific research and development which includes routine analytics or use as intermediate.

REACH links

<https://echa.europa.eu/authorisation-list>
<https://echa.europa.eu/substances-restricted-under-reach>
<https://echa.europa.eu/candidate-list-table>

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Trichloroethylene	79-01-6	Listed	Not applicable	Not applicable	Not applicable

Contains component(s) that meet a 'definition' of per & poly fluoroalkyl substance (PFAS)?

Not applicable

Other International Regulations

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Trichloroethylene	79-01-6	Not applicable	Not applicable	Not applicable	Annex I - Y45

16. Other Information

Prepared By

Product stewardship (Regulatory Affairs)
Thermo Fisher Scientific
email - begel.sdsdesk@thermofisher.com

Creation Date

03-Feb-2010

Revision Date

18-Dec-2025

Print Date

18-Dec-2025

Revision Summary

Updated to the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA) which published its Final Rule in the Federal Register revising the Hazard Communication Standard (HCS/HazCom), 29 CFR 1910.1200 (2024) (HCS §1910.1200, 2024), May 20, 2024, effective July 19, 2024.

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

Appendix C Field Forms

1. [Task Hazard Assessment – Americas](#)
2. [Daily Safety Meeting – Americas](#)
3. [Heat Stress Monitoring Log – Americas](#)
4. [Vehicle Inspection Checklist – Americas](#)
5. [Drill Site Safety Inspection Checklist – Americas](#)

Americas

Task Hazard Assessment

S3AM-209-FM6

Instructions

1. This form or other applicable region- or business line-specific form is to be completed in accordance with [SH&E Risk Assessment and Planning – Americas S3AM-216-PR2](#).
2. Task Hazard Assessments (THA)s are required for any field work involving AECOM activities outside of the office and must be used onsite to review site hazards and confirm necessary controls are in place.
3. The THA must be reviewed in its entirety and modified at the work site (as needed) immediately prior to commencement of work to account for actual conditions and any changes (weather, scope of work, simultaneous operations, etc.). All necessary revisions must be written on the THA.
4. Acknowledgement of THAs must be recorded via electronic or physical signature as part of the Daily Safety Meeting – refer to [Daily Safety Meeting – Americas](#).
5. The completed form must be retained in the project files.

Project Name and Number	NYSDEC Genesee Valley Metal Finishing, 60781011			Overall Risk (Highest Post-Mitigation Risk)	LOW	
Task Name	General Hazards			Date	4/11/2026	
Work Location	242-244 Verona Street, Rochester, NY, 14608			Client	NYSDEC	
Does this include High Hazard Tasks (HHTs)? (Refer to Table 1 of SH&E Risk Assessment and Planning – Americas S3AM-216-PR2.)				See Appendix D		
☐ No ☒ Yes – Specify HHT procedure number(s) and any permits/plans:						
Required PPE	☒ Hard Hat Specify type: ☒ Type I (standard) ☐ Type II (climbing style)	☒ Eyewear (with side shields) Choose 1 or 2 as required: ☒ Safety glasses ☐ Spoggles ☐ Safety goggles ☐ Face shield	☒ High-Visibility Vest Choose type: ☒ Class 2 ☐ Class 3	☒ Ankle Height Footwear Choose 1 or more as required: ☐ Work boots ☐ Steel toe ☒ Composite toe ☐ Metatarsal guard ☐ Electric rated	☒ Gloves Choose 1 or 2 as required: ☒ Nitrile ☐ Cut- resistant ☐ Thermal ☐ Vibration ☐ Electrical	☒ Hearing Protection Choose 1 or both as required: ☐ Ear plugs ☐ Earmuffs
Other:	Click or tap here to enter text.					

Note: Employees must have gloves readily available, even if the task does not require their use.

Note: All employees must wear shirts with sleeves that cover their shoulders and long pants at a minimum.

Tools and Equipment (Examples: air/noise monitoring equipment, tools, generators, traffic control devices, fire prevention equipment, etc.)

Click or tap here to enter text.

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Trip to the site	Route hazards/accident	M	Consider the safest method of travel – use public transport where available and practical. Choose the safest routes Avoid conspicuous displays of personal valuables. Only use licensed local taxis – check before you travel. Request the taxi driver not to use a mobile phone while driving.	L
On-Site Edits:				
Manual Handling	Get injured when handling tools or equipment	M	Minimize or avoid manual handling activities and loads. When having to transport and lift items: ○ Be aware of potential back injuries and ensure correct techniques for lifting and bending are used. Use lifting aids where practical, e.g., trolleys. Do not lift more than 50 pounds – evaluate maximum. weight to lift depending on activity. Use proper tools for each task. Avoid using tools in bad conditions; replace them if observed. Use proper gloves Get help from co-workers as needed.	L
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Any	Fatigue Management	M	Identify factors in the workplace that may contribute to fatigue. Inform employees of potential fatigue-producing activities and how to manage them. Re-evaluate work tasks periodically to control fatigue. Monitor employees for the signs and symptoms of fatigue. Provide employees with sufficient breaks for food, water, and rest throughout the workday. Calling for unscheduled breaks/meals where fatigue factors are evident may be necessary. Getting adequate, undisturbed, regular, and consistent amounts of sleep each night. A minimum of 7 hours is recommended. Eating well-balanced and nutritious meals at regular intervals. Ensuring adequate consumption of water throughout the day.	L
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Any	Slips, Trips and Falls.	M	Slip-Trip-Fall hazards are common at field sites due to various obstructions, weather conditions, and human error. While it is difficult to eliminate all slip-trip-fall hazards, the risk of injury can be minimized by using safe work practices and following the procedures outlined below: • Keep cell phone camera and clipboard/writing items tucked in your pants and/or safety vest pocket. • Avoid uneven terrain and wet surfaces • Keep the work area free of obstructions • Plan your path and watch where you step • Monitor work area for good housekeeping practices. • Be alert to weather conditions. • Use designated walkways and routes. • Wear appropriate safety footwear – with good grip, ankle support, toe and mid sole protection, etc. • Ensure there is sufficient light for the tasks being undertaken. • Hold the handrail when using stairs. • Avoid stepping on debris, loose sheets, temporary hole covers or manhole covers. • Do not undertake tasks whilst walking; e.g. note taking / talking on mobile phone. • Review site conditions including areas of uneven pavement, oily staining, tight openings, stairs, etc. , do not run. • Stay off steep hillside, loose soils/gravel on a hill or parking lot, and stained/wet areas. • Stay proper distance from open service pits on main floor level (no closer than 6 ft from edge)	L
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Any	Unknown hazardous activities and site arrangements	H	• Liaise with those in charge of the site regarding current key site hazards and other work activities. • Attend site induction (if provided) and adhere to site rules and instructions. Sign in and out as required by site security. Stay with your guide (if provided) and follow their instruction in case of any emergency. • Ensure you are familiar with alarms and evacuation procedures and assembly points for the location. • Ensure correct PPE is worn. • If any site hazards are not covered in the JSA or have changed, complete a THA card and brief the team. • Use '4Sight' before starting each task. Use 'Stop Work Policy' – if you feel uncomfortable about anything, stop and resolve the issue before starting work.	L
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Any	Weather Related hazards	M	Monitor weather conditions and changes to weather during work. In inclement weather a review of the tasks and procedures should be made, and if necessary work should be stopped and advice sought from the PM prior to re-commencing activities. Heat and cold stress may vary based upon work activities, PPE/clothing selection, geographical locations, and weather conditions. To reduce the potential of developing heat/cold stress, be aware of the signs and symptoms of heat/cold stress and watch fellow employees for signs of heat/cold stress. Use vehicles or covered area for shelter and take breaks as needed In hot weather keep hydrated, prevent over exposure to the sun with clothing or use of sun cream and take frequent breaks out of the sun. Use the "buddy system" to monitor effects of heat stress Create shaded work areas if appropriate Use a strong sunscreen and wear a full-brimmed hat when in the sun to protect the back of the neck and shoulders In cold/wet weather, be aware of potentially slippery surfaces (wet or icy). Wear warm / waterproof clothing and take breaks in a warm location. In inclement weather stop work if necessary and seek advice sought from the PM prior to re-commencing activities.	L
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Any	Personal Security	H	- Assess area and potential risk of confrontation prior to starting work and only begin work if considered safe to do so. - Avoid potentially confrontational situations. Remain calm and do not raise voice. - Avoid carrying valuable items. - Keep mobile phones, cameras etc., out of general sight when not in use. - Report incidences of strangers entering the site to security or the client. - Avoid capturing the general public in photographs – ask their permission to be photographed. If you feel threatened, stop work, leave site, retreat to a safe place and telephone the project manager / police.	L
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Any	Biological Hazards – (diseases, insects, animals, etc.)	M	Mosquitos, poisonous plants, and other biological hazards will most likely be present on or around the site where work will be performed. It is important for AECOM personnel to follow the outlined procedures below: • Identify relevant biological hazards • Wear long sleeves/ trousers/ gloves to cover the body as far as possible • Tape them in case it is assessed necessary. • Use insect repellents to reduce potential for bites. • Ensure Tetanus and other relevant inoculations are current. • Be aware of surrounding elements and do your best to avoid places hazards might be present • Speak up if you see any person that might be in danger from a biological hazard • Implement body inspections for ticks when field work is completed in areas where they are prevalent. • All cuts and grazes will be covered with a suitable dressing before going on site. • Always wash face and hands before drinking or eating. • Do not attempt to manually clear debris or items at ground level or in vegetation - keep hands / arms away from areas where used syringe needles may be present. • Avoid contact with hazardous plants. • Remain vigilant for bulls, dogs, and other animals in the work area. • If flu-like symptoms experienced after contact with static bodies of water, visit doctor and make aware of possible contact with Weil's disease.	L
On-Site Edits:				

Driving - Vehicle	Vehicle accident	H	• Driver to be fully licensed and comply with all driving and safety regulations. • Driving online modules or hands-on defensive driver course. • Leave enough time to arrive at your destination without hurrying • Use defensive driving techniques. Maintain situational awareness. Allow sufficient stopping distance between vehicles. • Understand procedures for breakdown assistance and have appropriate contact numbers available for summoning assistance. • Stay away from flooded roadways – Turnaround • Use caution when entering roadways • Check vehicle safety equipment (use approved vehicle). Use defensive driving techniques, avoid distracted driving; no use of mobile communication devices when driving (driving includes time spent in traffic or while stopped at red lights or stop signs). GPS units and GPS units on smart phones may only be used if factory installed or secured to the vehicle with a bracket that allows the driver to view the image without having to take their eyes off the road; rest stops when needed. ANSI Class 2, retro-reflective vest in the vehicle. • Secure all loads, including equipment within the vehicle • Wear seat belts at all times • Select appropriate vehicle for the task (vans have a bulkhead between the rear and passenger cabins). • Vehicle to be checked before setting off and to correct any noted deficiencies: ○ lights, mirrors, tires, windscreen, etc. are fully operational. ○ The vehicle is roadworthy and appears in good mechanical order; • Where the hire vehicle is found to be unsuitable it should not be accepted and a suitable replacement requested. • Make sure each vehicle is equipped with a first aid kit • Drivers will not operate vehicles when fatigued or under the influence of alcohol or medication. A 15-minute break at least every 2 hours is recommended - more breaks will be taken if the driver feels tired. No employee should operate a vehicle if they have worked 14 consecutive hours within a 24-hour period. Refer to • S3AM-009-PR1 Fatigue Management. • Cars will be parked so as not to cause a hazard or obstruction and in accordance with site or local parking requirements. • When practicable, drivers will always reverse park or choose a space that they can drive out of in a forward direction. • Check the parking area before maneuvering / seek assistance in maneuvering if needed.	M
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>		Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
On-Site Edits:					
On-Site Edits:					

Additional Notes

....

All Employees

STOP WORK if uncertain about safety or if a hazard or additional precaution is not recorded on the THA.

Be alert, recognize and communicate any changes in scope, personnel or conditions at the worksite to the supervisor.

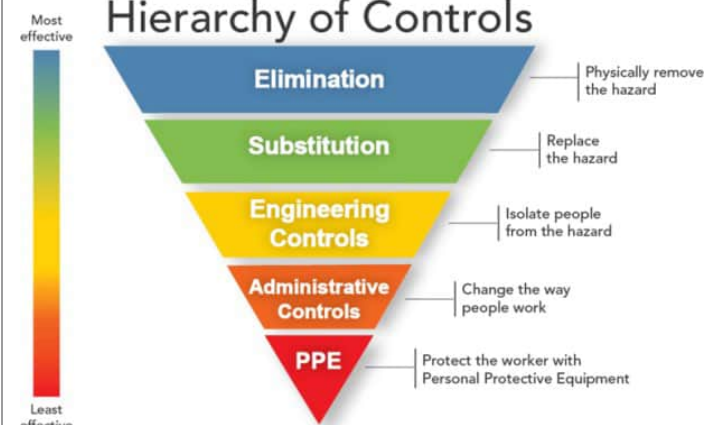
Use **4-Sight**, AECOM's last minute risk assessment process continuously throughout the day by asking yourself and your co-workers to assess your task, hazards, and mitigations. Amend the THA when needed.

- **What am I about to do?**
- **What can go wrong?**
- **What can be done to make it safer?**
- **What have I done to communicate the hazards?**

For a more thorough identification of hazards, ask "What else could go wrong?" using the Hazard



Hierarchy of Controls



- **Most hazards need more than one control**
- **What should you do? Stack your controls**
- **PPE can NEVER be your only means of protection**

Probability	Severity				
	5 - Catastrophic	4 - Critical	3 - Major	2 - Moderate	1 - Minor
5 - Frequent	25	20	15	10	5
4 - Probable	20	16	12	8	4
3 - Occasional	15	12	9	6	3
2 - Remote	10	8	6	4	2
1 - Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Supervisor or equivalent
10 to 25 (High)	Risk requires the approval of the Project Manager & SH&E Director

Send THA improvement suggestions to

DCSA.THA.Library@AECOM.com

Include a copy of the new THA or a photo of the THA modifications as appropriate.

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>\$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>\$250K to \$1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> \$10K to \$250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> \$1K to \$10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</\$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

Americas

Task Hazard Assessment

S3AM-209-FM6

Instructions

1. This form or other applicable region- or business line-specific form is to be completed in accordance with [SH&E Risk Assessment and Planning – Americas S3AM-216-PR2](#).
2. Task Hazard Assessments (THA)s are required for any field work involving AECOM activities outside of the office and must be used onsite to review site hazards and confirm necessary controls are in place.
3. The THA must be reviewed in its entirety and modified at the work site (as needed) immediately prior to commencement of work to account for actual conditions and any changes (weather, scope of work, simultaneous operations, etc.). All necessary revisions must be written on the THA.
4. Acknowledgement of THAs must be recorded via electronic or physical signature as part of the Daily Safety Meeting – refer to [Daily Safety Meeting – Americas](#).
5. The completed form must be retained in the project files.

Project Name and Number	NYSDEC Genesee Valley Metal Finishing, 60781011			Overall Risk (Highest Post-Mitigation Risk)	MEDIUM	
Task Name	Air Knifing			Date	4/11/2026	
Work Location	242-244 Verona Street, Rochester, NY, 14608			Client	NYSDEC	
Does this include High Hazard Tasks (HHTs)? (Refer to Table 1 of SH&E Risk Assessment and Planning – Americas S3AM-216-PR2.) ☐ No ☒ Yes – Specify HHT procedure number(s) and any permits/plans: See Appendix D						
Required PPE	☒ Hard Hat Specify type: ☒ Type I (standard) ☐ Type II (climbing style)	☒ Eyewear (with side shields) Choose 1 or 2 as required: ☒ Safety glasses ☐ Spoggles ☐ Safety goggles ☐ Face shield	☒ High-Visibility Vest Choose type: ☒ Class 2 ☐ Class 3	☒ Ankle Height Footwear Choose 1 or more as required: ☐ Work boots ☐ Steel toe ☒ Composite toe ☐ Metatarsal guard ☐ Electric rated	☒ Gloves Choose 1 or 2 as required: ☒ Nitrile ☐ Cut- resistant ☐ Thermal ☐ Vibration ☐ Electrical	☒ Hearing Protection Choose 1 or both as required: ☐ Ear plugs ☐ Earmuffs
	Other:	Click or tap here to enter text.				

Note: Employees must have gloves readily available, even if the task does not require their use.

Note: All employees must wear shirts with sleeves that cover their shoulders and long pants at a minimum.

Tools and Equipment (Examples: air/noise monitoring equipment, tools, generators, traffic control devices, fire prevention equipment, etc.)	Click or tap here to enter text.

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Identify/Lockout Utilities	Electrocution/contact with energized electrical lines	H	Locate all sources of electricity to site parking lights, air compressor, vacuum, car wash, and ID sign and if possible de-energize lines by using locks and tags. • Call public utility locating service prior to initiating work activities. • Use private locating service to mark out areas on private property. • Verify location of utility marks; do not perform intrusive work if utility location marks cannot be found or if marks are destroyed. Preserve utility marks as much as possible. Call to have utilities remarked if unsure as to their location • If lockout/tagout procedures are used, notify all affected employees on-site of the de-energized condition. Verify all public and private utility mark outs.	L
On-Site Edits:				
Position Rig	Injury from or damage to overhead utilities from direct contact with or proximity to (arcing) Rig stuck in soft/slippery ground Intrusion by 3rd parties Stabilize Vehicles	H	Check area for hazards. • While moving the rig on site, keep a minimum 4 foot clearance under any electrical lines. • While planning the working position of the rig, keep a minimum 10 foot clearance away from any electrical lines. • Use a spotter when backing. Choose the most level path for travel with the rig. • If needed, consider the use of wood, sand, or crushed stone to create a stable working/traveling platform. Observe the site pedestrian and vehicular traffic patterns. Use cones, flags, and caution tape to establish traffic control and exclusion zones. Chock wheels on all vehicles and trailers.	M
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Remove concrete or asphalt by use of jackhammer to open/ cut concrete/asphalt at location	Vibrational or contact injuries and excessive noise	H	Wear leather or vibration-absorbing gloves, safety glasses, face shield, hearing protection, and a hard hat. • Use shovels to push debris out of way. • Follow manufacturer's operating procedures for equipment. • Have a stable stance; feet shoulder width apart, hold jackhammer lightly and balanced. • Do not wear excessively loose, baggy clothing or jewelry. • Take a 10-minute break every hour of operation during operation of jackhammer to prevent vibration/repetitive motion injuries.	L
	Fire/explosion from sparks igniting a fuel/vapor source		If sparks are generated within 35 feet of a vapor source (i.e., an operating pump island) a Hot Work permit must be furnished and air monitoring must take place throughout the cutting procedure if the possibility of flammable vapors exists.	
	Struck-by injury from disconnected pressurized air lines/hoses		All hose connections must be secure. All lines should be inspected prior to use. Locking pins and whip checks must be used for all connections that could fail or become disconnected causing the hose to "whip."	
On-Site Edits:				
Air knife operation Note: If any evidence of pea stone is observed during any subsurface activity, STOP WORK and notify the project manager immediately.	Bodily injury or hearing damage from air compressor and associated air lines.	H	Safety glasses, hearing protection, and work gloves must be worn at all times when compressor is running. • Keep hands and clothing away from rotating machinery. • All hose connections must be secure. All lines should be inspected prior to use. Locking pins and whip checks must be used for all connections that could fail or become disconnected causing the hose to "whip." • Ensure hopper door is securely fastened before work begins. • Ensure all personnel on site know how to shut down machine in case of an emergency. • If dust is generated by operation, use water spray to control. Note: Staff must ensure that prior to turning on the air compressor that it is confirmed that the air knife is manned and that the air valve is closed.	M

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
	Personal injury and property damage from contact with high pressure jet and associated flying debris		Do not spray persons with high-pressure jet. • Ensure air lance is equipped with a metal guard attachment, near the nozzle, that is capable of shielding the operator from airborne debris exiting the excavation. • A face shield <u>and</u> safety glasses shall be worn in addition to the Level D PPE within a 10 foot area where high-pressure jet is being utilized. Use caution when using high-pressure jet assembly around known underground utilities. • Do not direct high-pressure jet at one point for long periods of time; continually rotate high-pressure spray assembly. • Do not use unit indoors. • Pull the trigger while turning off the machine to make sure piping is not under pressure. • Inform all personnel of restricted area and do not permit unauthorized individuals (i.e., those not properly trained [40-hour OSHA training, etc.] or wearing appropriate PPE) access to the exclusion zone. • If in the vicinity of known pedestrian traffic, use a spotter to alert crew to stop operations to allow pedestrian to pass.	
	Exposure to or ignition of elevated levels of gasoline vapors		If there is any gasoline odor or if air knifing activities are occurring in an impacted area, monitoring with a PID and LEL meter is required. Action levels are defined in the HASP.	
	Equipment damage/failure due to cold temperatures		When temperatures drop below 20°F or when the water used to conduct subsurface clearance freezes, subsurface clearance should stop until warmer temperatures occur or the safe operation of the machinery is no longer impacted.	
	Injury from or damage to overhead utilities from direct contact with or proximity to (arcing)		Maintain a distance of at least 10 feet from energized overhead power line. For other overhead lines such as phone or cable lines, if there is a chance of contacting and/or damaging the lines, the appropriate service company should be contacted so that the lines can be relocated or protected.	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Vacuum operation	Personal injury (burns, pinch points, cuts, hearing damage) from vacuum blower		Keep hands, clothing, and equipment an arms length away from rotating machinery, inlet and discharge openings. - Avoid contact with blower casing and associated piping; may cause major skin burns on contact. - Ensure guards are in place on external moving parts. - Develop suction line vacuum break mechanism in the event of a vacuum emergency (object caught by the suction hose). - Wear hearing protection when unit is operational	
	Fire/explosion from ignition of elevated vapors		Air monitoring must take place on ungrounded Vac-Trons - If LEL levels of breathing zone or working zone (air which is traveling through the Vac-Tron) air exceeds 10%, STOP WORK. - Vac-Tron is not to be used to vacuum free-phase petroleum products or soils saturated with petroleum products	
	Injury from or damage to overhead utilities from direct contact with or proximity to (arcing		Maintain a distance of at least 10 feet from energized overhead power line. For other overhead lines such as phone or cable lines, if there is a chance of contacting and/or damaging the lines, the appropriate service company should be contacted so that the lines can be relocated or protected.	
On-Site Edits:				
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps	Potential Hazards	Risk	Critical Actions To Mitigate Hazards	Risk
List all steps required to perform a task in the sequence they are performed	How could you be hurt? What would the injury be?	(initial)	List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.	(final)

Additional Notes

....

All Employees

STOP WORK if uncertain about safety or if a hazard or additional precaution is not recorded on the THA.

Be alert, recognize and communicate any changes in scope, personnel or conditions at the worksite to the supervisor.

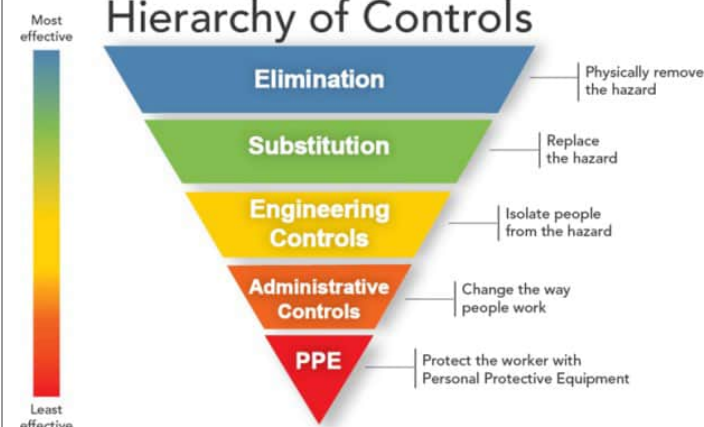
Use **4-Sight**, AECOM's last minute risk assessment process continuously throughout the day by asking yourself and your co-workers to assess your task, hazards, and mitigations. Amend the THA when needed.

- **What am I about to do?**
- **What can go wrong?**
- **What can be done to make it safer?**
- **What have I done to communicate the hazards?**

For a more thorough identification of hazards, ask "What else could go wrong?" using the Hazard



Hierarchy of Controls



- **Most hazards need more than one control**
- **What should you do? Stack your controls**
- **PPE can NEVER be your only means of protection**

Probability	Severity				
	5 - Catastrophic	4 - Critical	3 - Major	2 - Moderate	1 - Minor
5 - Frequent	25	20	15	10	5
4 - Probable	20	16	12	8	4
3 - Occasional	15	12	9	6	3
2 - Remote	10	8	6	4	2
1 - Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Supervisor or equivalent
10 to 25 (High)	Risk requires the approval of the Project Manager & SH&E Director

Send THA improvement suggestions to

DCSA.THA.Library@AECOM.com

Include a copy of the new THA or a photo of the THA modifications as appropriate.

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>\$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>\$250K to \$1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> \$10K to \$250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> \$1K to \$10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</\$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

Americas

Task Hazard Assessment

S3AM-209-FM6

Instructions

1. This form or other applicable region- or business line-specific form is to be completed in accordance with [SH&E Risk Assessment and Planning – Americas S3AM-216-PR2](#).
2. Task Hazard Assessments (THA)s are required for any field work involving AECOM activities outside of the office and must be used onsite to review site hazards and confirm necessary controls are in place.
3. The THA must be reviewed in its entirety and modified at the work site (as needed) immediately prior to commencement of work to account for actual conditions and any changes (weather, scope of work, simultaneous operations, etc.). All necessary revisions must be written on the THA.
4. Acknowledgement of THAs must be recorded via electronic or physical signature as part of the Daily Safety Meeting – refer to [Daily Safety Meeting – Americas](#).
5. The completed form must be retained in the project files.

Project Name and Number	NYSDEC Genesee Valley Metal Finishing, 60781011			Overall Risk (Highest Post-Mitigation Risk)	HIGH	
Task Name	Drilling - Well Installation / Soil Sampling			Date	4/11/2026	
Work Location	242-244 Verona Street, Rochester, NY, 14608			Client	NYSDEC	
Does this include High Hazard Tasks (HHTs)? (Refer to Table 1 of SH&E Risk Assessment and Planning – Americas S3AM-216-PR2.) ☐ No ☒ Yes – Specify HHT procedure number(s) and any permits/plans: See Appendix D.						
Required PPE	☒ Hard Hat Specify type: ☒ Type I (standard) ☐ Type II (climbing style)	☒ Eyewear (with side shields) Choose 1 or 2 as required: ☒ Safety glasses ☐ Spoggles ☐ Safety goggles ☐ Face shield	☒ High-Visibility Vest Choose type: ☒ Class 2 ☐ Class 3	☒ Ankle Height Footwear Choose 1 or more as required: ☐ Work boots ☐ Steel toe ☒ Composite toe ☐ Metatarsal guard ☐ Electric rated	☒ Gloves Choose 1 or 2 as required: ☒ Nitrile ☐ Cut- resistant ☐ Thermal ☐ Vibration ☐ Electrical	☒ Hearing Protection Choose 1 or both as required: ☐ Ear plugs ☐ Earmuffs
Other:	Click or tap here to enter text.					

Note: Employees must have gloves readily available, even if the task does not require their use.

Note: All employees must wear shirts with sleeves that cover their shoulders and long pants at a minimum.

Tools and Equipment (Examples: air/noise monitoring equipment, tools, generators, traffic control devices, fire prevention equipment, etc.)	Click or tap here to enter text.

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk (initial)	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk (final)
Contact One-Call, private utility contractor, and/or site personnel to locate and mark underground utilities.	<i>Failure to have underground utilities identified could result in explosion, electrocution, injury, death, property damage.</i>	M	Call public utility locating service prior to initiating work activities. Use private locating service to mark out areas on private property. Verify location of utility marks; do not perform intrusive work if utility location marks cannot be found or	L
On-Site Edits:				
Set up work zone	Struck by vehicle or equipment traffic Sprain or broken bones due to slip, trip or fall Contact with overhead utilities. Hydraulic failure causing release to the environment.	H	Verify that drilling contractor inspects equipment daily using S3AM-321-FM1 Daily Drilling, Boring & Direct-Push Equipment Inspection or equivalent. Verify that kill switch on rig is tested and operational. Establish work zone using traffic control devices, signs, cones, etc. in advance of initiating monitoring well abandonment activities. Restrict access to observers and passersby. Maintain required housekeeping in work area, do not carry equipment where visibility of ground is impaired, remove or mark all trip hazards in work area. 2d. Keep a minimum of 15 feet from overhead power lines (20 ft. if 230-285 KV, 25 ft. if 285-345 KV, 35 ft. if 345-500 KV) Check HASP to ensure client/site does not have stricter requirements. Mast shall be down when rig is in motion. Place secondary containment on ground under rig. Ensure that secondary containment is setup with 'berms/barriers' or containment is securely clipped onto the rig tracks/wheels to protect from any fluid leaking off the plastic.	L
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk (initial)	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk (final)
Commence drilling	Pinch points	H	Never place hands, fingers, feet under the bottom of an auger flight, or other location where these heavy items could be set down or could fall suddenly.	H
	Entanglement		Ensure rotating parts are properly guarded. Remove loose clothing and jewelry that could become entangled in moving parts. Use a long handled shovel to remove cuttings from the auger/rods.	
	Noise		Wear hearing protection while equipment is in use.	
	Back strain/ overexertion when unloading equipment		Stretch before working. Bend and lift with legs and arms, not back. Team-lift any items that are awkward or over 50 pounds.	
	Flying/shattering objects		Have bystanders maintain a 5 foot distance from the operation at all times. Wear all required	
	Hand positioning/pinch points		Wear leather or thick puncture-resistant gloves, communication between driller, helpers, and logger. All pinch point hazards should be labeled on rig with warnings.	
On-Site Edits:				
Pulling out core barrel/sampler and extruding core/sample into bag	Injury due to struck by or crush injuries	H	Keep all limbs out of line of fire. Ensure all guards are in place any time the drill rig is in operation. Only the authorized personal are to be in the immediate vicinity of the Drill Rig. Wear cut/impact resistant gloves.	M
	Cut/laceration on sharp edges or core barrel/sampler		5b. Inspect core barrel/sampler for sharp edges and remove. Wear cut/impact resistant gloves.	
	Pinch points using hammer to hammer side of core barrel/sampler.		Never place hands, fingers, feet under the bottom of an auger flight, or other location where these heavy items could be set down or could fall suddenly. Ensure rotating parts are properly guarded. Remove loose clothing and jewelry that could become entangled in moving parts. Use a long handled shovel to remove cuttings from the auger/rods.	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Well Casing Assembly and Installation	Muscle strain.	M	Stretch before working. Bend and lift with legs and arms, not back. Team-lift any items that are awkward or over 50 pounds.	L
	Slip, trip, and fall (STF) hazards from uneven		Check walking/movement path for STF obstructions. Conduct pre-site walk with crew prior to work and remove or isolate STF hazards.	
	Injury from improper tool use.		Do not use tools for unintended purposes (such as a saw to open bags of bentonite instead of an approved cutting tool).	
	Dust inhalation.		Wear a dust mask and minimize dust when pouring powdered bentonite, concrete, or cement.	
	Cutting PVC, cuts, lacerations		Use PVC cutter for cutting PVC. Wear cut-resistant gloves (Level 2), keep fingers and other body parts away from cutting tool blade.	
	Exposure to airborne chemicals or explosive atmosphere		Conduct air monitoring with PID and 4-gas in background areas and breathing zone of all workers, Stop work if PID or LEL indicates action level, Wear respirator with organic vapor cartridge if VOCs cannot be controlled.	
	Crushed by, pinch point on drill rig		Keep body parts away from moving parts on drill rig.	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk (initial)	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk (final)
Installation of sand filter pack/bentonite	Injury from cutting bags open	M	Use a safety knife. No fixed-blade knives allowed on site. Cut away from the body. Wear minimum Level 2 cut-resistant gloves	L
	Eye and respiratory injury due to dust and other airborne particles		Refer to the SDS for use information. Pour from the upwind side of the well construction activity. Wear long sleeved shirt, long pants, gloves, and safety glasses.	
	Back or muscle strain due to improper load or lifting techniques		Do not lift anything over 50 lbs. without assistance (partner or appropriate mechanical device). Use proper lifting techniques, lift with legs, keep back straight, and carry object close to body.	
On-Site Edits:				
Grouting	Exposure to cement dust and mixed cement, skin, eye, and inhalation	H	Exposure to cement dust and mixed cement, skin, eye, and inhalation	L
	Injury from entanglement in drive shaft or mixing paddles		Do not reach into the mixing tank during operation. Do not wear loose clothing or use tools that could become entangled in drive shaft or mixing paddles. Turn the unit off before attempting to service the mixer or clear debris.	
	Splashes and spills		Wear face shield to guard against splashes. Add water or other liquid additives in a controlled manner to avoid splashes. Do not exceed the capacity of the mixing tank	
	Muscle strain		Stage bags of dry materials as close to mixer as possible. Use a buddy to help move heavy bags. If possible, lower the height of mixer to minimize lifting.	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>		Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Excavating Well Pad Area		Underground Utility Strike	H	Ensure area of well pad was cleared during underground utility clearance procedure for well.	M
		Back or muscle strain		Keep shovel loads and twisting motions to a minimum. Do not lift anything over 50 lbs. without assistance (partner or appropriate mechanical device). Use proper lifting techniques, lift with legs, keep back straight, and carry object close to body.	
		Struck by shovel		When shoveling, know area of shovel movement is clear from people or objects. Do not use shovel in the direction of people and objects. If in area of shoveling, do not approach shoveled area unless they acknowledge you and stop working.	
On-Site Edits:					
Installing Well Pad Frame		Cutting Wood Frame	M	Wear cut-resistant gloves (Level 2), keep fingers and other body parts away from blades, watch for jumping of saw, work in area where other employees will not enter	L
		Injury from assembling well frame		Wear cut resistant gloves at all times and watch hand placement to avoid sharp edges and pinch points. Keep face, hands, fingers, and feet out of the line of fire of moving parts and tools	
On-Site Edits:					

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk (initial)	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk (final)
Pouring and Troweling Concrete Pad	Exposure to cement dust and mixed cement, skin, eye, and inhalation irritation.	M	Refer to the SDS for use information. Wear long sleeved shirt, long pants, gloves, and safety glasses. Wear a P, N, or R-95 dust respirator when dealing with dry cement (moving bags, pouring, mixing, and putting bags in trash).	L
	Back or muscle strain		Keep shovel loads and twisting motions to a minimum. Do not lift anything over 50 lbs. without assistance (partner or appropriate mechanical device). Use proper lifting techniques, lift with legs, keep back straight, and carry object close to body.	
On-Site Edits:				

Additional Notes

....

All Employees

STOP WORK if uncertain about safety or if a hazard or additional precaution is not recorded on the THA.

Be alert, recognize and communicate any changes in scope, personnel or conditions at the worksite to the supervisor.

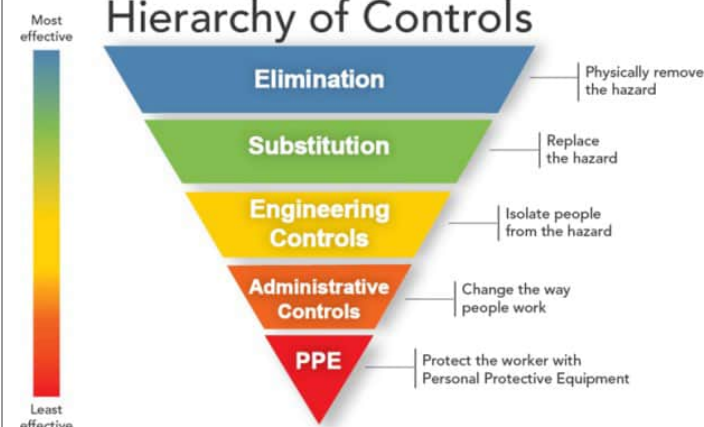
Use **4-Sight**, AECOM's last minute risk assessment process continuously throughout the day by asking yourself and your co-workers to assess your task, hazards, and mitigations. Amend the THA when needed.

- **What am I about to do?**
- **What can go wrong?**
- **What can be done to make it safer?**
- **What have I done to communicate the hazards?**

For a more thorough identification of hazards, ask "What else could go wrong?" using the Hazard



Hierarchy of Controls



- **Most hazards need more than one control**
- **What should you do? Stack your controls**
- **PPE can NEVER be your only means of protection**

Probability	Severity				
	5 - Catastrophic	4 - Critical	3 - Major	2 - Moderate	1 - Minor
5 - Frequent	25	20	15	10	5
4 - Probable	20	16	12	8	4
3 - Occasional	15	12	9	6	3
2 - Remote	10	8	6	4	2
1 - Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Supervisor or equivalent
10 to 25 (High)	Risk requires the approval of the Project Manager & SH&E Director

Send THA improvement suggestions to

DCSA.THA.Library@AECOM.com

Include a copy of the new THA or a photo of the THA modifications as appropriate.

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>\$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>\$250K to \$1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> \$10K to \$250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> \$1K to \$10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</\$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

Americas

Task Hazard Assessment

S3AM-209-FM6

Instructions

1. This form or other applicable region- or business line-specific form is to be completed in accordance with [SH&E Risk Assessment and Planning – Americas S3AM-216-PR2](#).
2. Task Hazard Assessments (THA)s are required for any field work involving AECOM activities outside of the office and must be used onsite to review site hazards and confirm necessary controls are in place.
3. The THA must be reviewed in its entirety and modified at the work site (as needed) immediately prior to commencement of work to account for actual conditions and any changes (weather, scope of work, simultaneous operations, etc.). All necessary revisions must be written on the THA.
4. Acknowledgement of THAs must be recorded via electronic or physical signature as part of the Daily Safety Meeting – refer to [Daily Safety Meeting – Americas](#).
5. The completed form must be retained in the project files.

Project Name and Number	NYSDEC Genesee Valley Metal Finishing, 60781011			Overall Risk (Highest Post-Mitigation Risk)	MEDIUM	
Task Name	Oversight of Drilling Activities			Date	4/11/2026	
Work Location	242-244 Verona Street, Rochester, NY, 14608			Client	NYSDEC	
Does this include High Hazard Tasks (HHTs)? (Refer to Table 1 of SH&E Risk Assessment and Planning – Americas S3AM-216-PR2.) ☐ No ☒ Yes – Specify HHT procedure number(s) and any permits/plans: See Appendix D.						
Required PPE	☒ Hard Hat Specify type: ☒ Type I (standard) ☐ Type II (climbing style)	☒ Eyewear (with side shields) Choose 1 or 2 as required: ☒ Safety glasses ☐ Spoggles ☐ Safety goggles ☐ Face shield	☒ High-Visibility Vest Choose type: ☒ Class 2 ☐ Class 3	☒ Ankle Height Footwear Choose 1 or more as required: ☐ Work boots ☐ Steel toe ☒ Composite toe ☐ Metatarsal guard ☐ Electric rated	☒ Gloves Choose 1 or 2 as required: ☒ Nitrile ☐ Cut- resistant ☐ Thermal ☐ Vibration ☐ Electrical	☒ Hearing Protection Choose 1 or both as required: ☐ Ear plugs ☐ Earmuffs
	Other:	Click or tap here to enter text.				

Note: Employees must have gloves readily available, even if the task does not require their use.

Note: All employees must wear shirts with sleeves that cover their shoulders and long pants at a minimum.

Tools and Equipment (Examples: air/noise monitoring equipment, tools, generators, traffic control devices, fire prevention equipment, etc.)	Click or tap here to enter text.

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Mobilization	Striking unidentified underground utilities	H	Call public utility locating service prior to initiating work activities. Use private locating service to mark out areas on private property. Verify location of utility marks; do not perform intrusive work if utility location marks cannot be found or if marks are destroyed. Preserve utility marks as much as possible. Call to have utilities remarked if unsure as to their location.	L
	Striking overhead utilities		Follow the requirements of S3AM-322-PR1 Overhead Lines. Verify adequate clearance of all drilling locations prior to setting up at drilling location.	
On-Site Edits:				
Setting up at drilling location	Biological hazards causing bites, stings or other injury	H	Examine ground surface for biological hazards prior to setting up equipment. If biological hazards exist, move equipment to a different area for set up if possible. Machetes, or other fixed open blade tools, are not permitted for clearing vegetation. Use insect repellent and check clothing for ticks periodically when applicable.	L
	Struck by traffic causing serious bodily injury		Be alert to other vehicles or pedestrians if work area is in an area with public access. Communicate with any heavy equipment operators in the area to ensure they know where you and the equipment are located. Don high visibility vest.	
	Unstable Rig platform causing tip/fall with crushing injuries		Verify with contractor that rig is set up level and properly chocked and blocked.	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Oversight of rig inspection	Mechanical failure of equipment	H	Verify that drilling contractor inspects equipment daily using S3AM-321-FM1 Daily Drilling, Boring & Direct-Push Equipment Inspection or equivalent.	L
	Emergency shut off disabled		Verify that kill switch on rig is tested and operational	
On-Site Edits:				
Drilling Oversight	Flying debris, caught by/ struck by injuries	H	Keep a safe distance away during rig operation. Always stand outside of the tip/fall radius of the mast, recommended safe distance is to be no less than 30 feet away from the rig, or the mast height plus 5 feet. Do not talk on cell phone or be distracted by paperwork when in immediate proximity to rig. Stay a safe distance (minimum 5') from outriggers. Do not place or store any equipment on the rig. Verify that all personnel follow S3NA_321_PR1 Drilling, Boring, Direct Push Probing. Wear PPE including hard hats, steel-toe safety boots, safety glasses, and hearing protection.	M
	Caught in/by equipment		Keep hands, feet and other body parts shall be kept a minimum of 5' away from moving parts. When augers are rotating, stay clear of the rotating auger and other rotating/moving components of the drill rig, i.e. outriggers. Do not approach operator without making eye contact and getting approval. Watch for loose clothing (hooded sweatshirts, baggy clothing, loose shoelaces).	
	Exposure to contaminants causing injury or illness		Position yourself upwind of the borehole whenever possible. Perform air monitoring using a PID as described in the HASP. STOP WORK if the action level is exceeded.	
	Noise-induced hearing loss from loud drilling operations		Setup at least 30' away from noisy operations. Don't be near the rig when hammering. Measure dB levels with a noise meter. Wear hearing protection.	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
On-Site Edits:				

Additional Notes

.....

All Employees

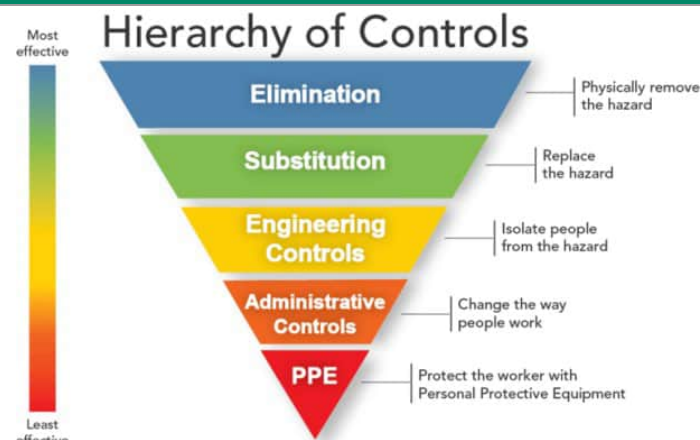
STOP WORK if uncertain about safety or if a hazard or additional precaution is not recorded on the THA.

Be alert, recognize and communicate any changes in scope, personnel or conditions at the worksite to the supervisor.

Use **4-Sight**, AECOM's last minute risk assessment process continuously throughout the day by asking yourself and your co-workers to assess your task, hazards, and mitigations. Amend the THA when needed.

- **What am I about to do?**
- **What can go wrong?**
- **What can be done to make it safer?**
- **What have I done to communicate the hazards?**

For a more thorough identification of hazards, ask "What else could go wrong?" using the Hazard



- **Most hazards need more than one control**
- **What should you do? Stack your controls**
- **PPE can NEVER be your only means of protection**

Probability	Severity				
	5 - Catastrophic	4 - Critical	3 - Major	2 - Moderate	1 - Minor
5 - Frequent	25	20	15	10	5
4 - Probable	20	16	12	8	4
3 - Occasional	15	12	9	6	3
2 - Remote	10	8	6	4	2
1 - Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Supervisor or equivalent
10 to 25 (High)	Risk requires the approval of the Project Manager & SH&E Director

Send THA improvement suggestions to

DCSA.THA.Library@AECOM.com

Include a copy of the new THA or a photo of the THA modifications as appropriate.

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>\$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>\$250K to \$1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> \$10K to \$250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> \$1K to \$10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</\$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

Americas

Task Hazard Assessment

S3AM-209-FM6

Instructions

1. This form or other applicable region- or business line-specific form is to be completed in accordance with [SH&E Risk Assessment and Planning – Americas S3AM-216-PR2](#).
2. Task Hazard Assessments (THA)s are required for any field work involving AECOM activities outside of the office and must be used onsite to review site hazards and confirm necessary controls are in place.
3. The THA must be reviewed in its entirety and modified at the work site (as needed) immediately prior to commencement of work to account for actual conditions and any changes (weather, scope of work, simultaneous operations, etc.). All necessary revisions must be written on the THA.
4. Acknowledgement of THAs must be recorded via electronic or physical signature as part of the Daily Safety Meeting – refer to [Daily Safety Meeting – Americas](#).
5. The completed form must be retained in the project files.

Project Name and Number	NYSDEC Genesee Valley Metal Finishing, 60781011			Overall Risk (Highest Post-Mitigation Risk)	MEDIUM	
Task Name	Soil Sampling with Hand Auger			Date	4/11/2026	
Work Location	242-244 Verona Street, Rochester, NY, 14608			Client	NYSDEC	
Does this include High Hazard Tasks (HHTs)? (Refer to Table 1 of SH&E Risk Assessment and Planning – Americas S3AM-216-PR2.) ☐ No ☒ Yes – Specify HHT procedure number(s) and any permits/plans: See Appendix D						
Required PPE	☒ Hard Hat Specify type: ☒ Type I (standard) ☐ Type II (climbing style)	☒ Eyewear (with side shields) Choose 1 or 2 as required: ☒ Safety glasses ☐ Spoggles ☐ Safety goggles ☐ Face shield	☒ High-Visibility Vest Choose type: ☒ Class 2 ☐ Class 3	☒ Ankle Height Footwear Choose 1 or more as required: ☐ Work boots ☐ Steel toe ☒ Composite toe ☐ Metatarsal guard ☐ Electric rated	☒ Gloves Choose 1 or 2 as required: ☒ Nitrile ☐ Cut- resistant ☐ Thermal ☐ Vibration ☐ Electrical	☒ Hearing Protection Choose 1 or both as required: ☐ Ear plugs ☐ Earmuffs
	Other:	Click or tap here to enter text.				

Note: Employees must have gloves readily available, even if the task does not require their use.

Note: All employees must wear shirts with sleeves that cover their shoulders and long pants at a minimum.

Tools and Equipment (Examples: air/noise monitoring equipment, tools, generators, traffic control devices, fire prevention equipment, etc.)	Click or tap here to enter text.

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk (initial)	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk (final)
Setup equipment	Cuts or hand injuries from pinch points	L	Inspect for broken welds on auger. If broken welds or cracks – STOP WORK . Wear cut resistant gloves at all times and avoid handling the sharp edges of the auger cup. Keep face, hands, fingers, and feet out of the line of fire of moving parts and tools	L
	Back strain/ overexertion when unloading equipment		Stretch before working. Bend and lift with legs and arms, not back. Team-lift any items that are awkward or over 50 pounds. If removing from the back of a truck, slide the case to the tailgate and lift from tailgate and not from the side of the truck bed	
On-Site Edits:				
Advancing hand auger	Contacting utilities causing serious personal injury or death.	H	Ensure subsurface clearance protocol and permit requirements are being followed before beginning work. Turn the auger slowly and if refusal is met, remove the auger from the borehole and inspect the cause of refusal. If a utility, pea gravel, or non-native fill material is encountered, STOP WORK and call the PM.	M
	Back strain or pulled muscle from rotating hand auger.		Do not yank on the auger handle. Do not turn at waist, turn with arms and shoulders, keep feet square and lift with legs, do not work with arms above head. Take breaks and rotate work. Use short extensions as you advance to avoid.	
	Injury from slip, trip, fall		Clear the work area of trip hazards. Walk around bore hole, never over it and cover hole with delineator when unattended.	
	Injury to eyes from flying debris.		If it is windy, stand upwind and switch to goggles to prevent dirt entering eye	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Collecting soil samples	Contact with contaminated soil	M	Use clean sampler to touch soil. Wear nitrile gloves over the cut resistant gloves at all times. If nitrile tears, stop work and replace glove. For samples with high volatile organics content (PID in breathing zone is constantly above site limits stated in HASP (>5 ppm)) wear breathing protection as stated in HASP. Change Nitriles between samples to avoid cross contamination	L
	Cut from handling auger, sampling tools, jars		Inspect containers before and during filling. Do not use if chipped or cracked. Pack containers in coolers so that they will not shift (spacers/ packing materials as needed). Do not over pack coolers.	
	Muscle strain in back or legs from bending over or squatting		Evaluate work surface height (see if chair/ table needed) and sample jar placement to eliminate ergonomic issues. Avoid squatting and bending	
On-Site Edits:				
Adding extensions to auger	Cuts or hand injuries from pinch points	H	Avoid placing hands near connection points of extensions and avoid the sharp edges of the auger cup. Wear cut resistant gloves at all times	L
	Striking another person		Check that the swing radius of the auger is clear before moving it	
	Contacting overhead structure		Before raising the auger vertically, verify that no overhead lines or structures are present STOP WORK and move if electrical lines are in the area	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>		Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Breakdown and decontaminate equipment		Contact with contaminants and cut hazards	M	Inspect before handling for chips or cracks in glass containers. Wear nitrile gloves over cut resistant gloves. If nitrile tears, stop work and replace glove.	L
		Breaking a sample container resulting in cut, or contact with contents/preservatives		Handle containers with care and position over padded or soft surface in case it slips from hand. Place in packing materials that will protect against collisions.	
		Striking another person		Before disassembling auger, verify that no one is in the swing radius	
On-Site Edits:					
On-Site Edits:					

Additional Notes

....

All Employees

STOP WORK if uncertain about safety or if a hazard or additional precaution is not recorded on the THA.

Be alert, recognize and communicate any changes in scope, personnel or conditions at the worksite to the supervisor.

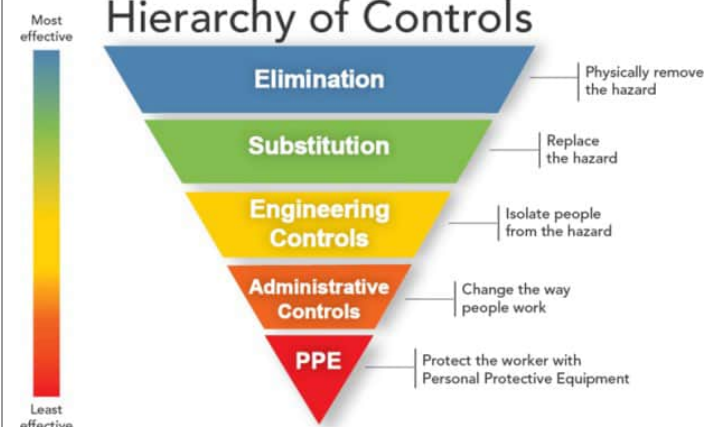
Use **4-Sight**, AECOM's last minute risk assessment process continuously throughout the day by asking yourself and your co-workers to assess your task, hazards, and mitigations. Amend the THA when needed.

- **What am I about to do?**
- **What can go wrong?**
- **What can be done to make it safer?**
- **What have I done to communicate the hazards?**

For a more thorough identification of hazards, ask "What else could go wrong?" using the Hazard



Hierarchy of Controls



- **Most hazards need more than one control**
- **What should you do? Stack your controls**
- **PPE can NEVER be your only means of protection**

Probability	Severity				
	5 - Catastrophic	4 - Critical	3 - Major	2 - Moderate	1 - Minor
5 - Frequent	25	20	15	10	5
4 - Probable	20	16	12	8	4
3 - Occasional	15	12	9	6	3
2 - Remote	10	8	6	4	2
1 - Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Supervisor or equivalent
10 to 25 (High)	Risk requires the approval of the Project Manager & SH&E Director

Send THA improvement suggestions to

DCSA.THA.Library@AECOM.com

Include a copy of the new THA or a photo of the THA modifications as appropriate.

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>\$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>\$250K to \$1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> \$10K to \$250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> \$1K to \$10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</\$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

Americas

Task Hazard Assessment

S3AM-209-FM6

Instructions

1. This form or other applicable region- or business line-specific form is to be completed in accordance with [SH&E Risk Assessment and Planning – Americas S3AM-216-PR2](#).
2. Task Hazard Assessments (THA)s are required for any field work involving AECOM activities outside of the office and must be used onsite to review site hazards and confirm necessary controls are in place.
3. The THA must be reviewed in its entirety and modified at the work site (as needed) immediately prior to commencement of work to account for actual conditions and any changes (weather, scope of work, simultaneous operations, etc.). All necessary revisions must be written on the THA.
4. Acknowledgement of THAs must be recorded via electronic or physical signature as part of the Daily Safety Meeting – refer to [Daily Safety Meeting – Americas](#).
5. The completed form must be retained in the project files.

Project Name and Number	NYSDEC Genesee Valley Metal Finishing, 60781011	Overall Risk (Highest Post-Mitigation Risk)	HIGH
Task Name	Investigation Derived Waste Management	Date	4/11/2026
Work Location	242-244 Verona Street, Rochester, NY, 14608	Client	NYSDEC

Does this include High Hazard Tasks (HHTs)? (Refer to Table 1 of [SH&E Risk Assessment and Planning – Americas S3AM-216-PR2](#).) ☐ No ☒ Yes – Specify HHT procedure number(s) and any permits/plans: See Appendix D

Required PPE	☒ Hard Hat	☒ Eyewear (with side shields)	☒ High-Visibility Vest	☒ Ankle Height Footwear	☒ Gloves	☐ Hearing Protection
	Specify type: ☒ Type I (standard) ☐ Type II (climbing style)	Choose 1 or 2 as required: ☒ Safety glasses ☐ Spoggles ☐ Safety goggles ☐ Face shield	Choose type: ☒ Class 2 ☐ Class 3	Choose 1 or more as required: ☐ Work boots ☐ Steel toe ☒ Composite toe ☐ Metatarsal guard ☐ Electric rated	Choose 1 or 2 as required: ☒ Nitrile ☒ Cut- resistant ☐ Thermal ☐ Vibration ☐ Electrical	Choose 1 or both as required: ☐ Ear plugs ☐ Earmuffs
	Other:	Click or tap here to enter text.				

Note: Employees must have gloves readily available, even if the task does not require their use.

Note: All employees must wear shirts with sleeves that cover their shoulders and long pants at a minimum.

Tools and Equipment (Examples: air/noise monitoring equipment, tools, generators, traffic control devices, fire prevention equipment, etc.)	Click or tap here to enter text.

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>		Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Prepare work area		Trips & falls	M	Clear any trip/fall hazards from work area. Scan ground prior to moving or walking	L
		Tools and emergency equipment not present		Obtain tools and emergency equipment and stage adjacent to work area	
On-Site Edits:					
Remove drum lid		Pinch points at drum ring	M	Use socket set to loosen drum ring, avoid placing fingers in to pinch points. Make sure cut-resistant gloves fit properly (not too big so fingertips get caught)	L
		Sharp edges on drum ring or rim		Evaluate rim and ring for sharp edges, avoid handling as much as possible. Wear cut resistant gloves	
On-Site Edits:					

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Load soil into drums	Exertion/sprains/strains	M	Exertion/sprains/strains - Use proper lifting techniques; this consists of bending your knees and lifting with your back straight. - Shovel loads heavier than 50 lbs or awkward to handle use a mechanical loading device or ask for help. - Grasp shovel handle properly: Position one hand at base of shovel handle and your other hand near the top of the handle. - Rotate task with others if needed and take breaks.	L
	Exposure to contaminants		Exposure - Set up upwind of drum. - Wear PPE (e.g., eye protection-goggles, long pants, Nitrile exam gloves, Nitrile over-gloves (11-mil), long wrist) Tyvek coveralls, shirt with sleeves, steel-toed shoes with boot covers, half-face air purifying respirator fitted with an organic vapor, acid, HEPA filter combination cartridge). - Perform air monitoring as per HASP. STOP WORK if action level is exceeded.	
	Slips/trips/falls		Be alert for uneven and slippery terrain. Keep tools and equipment away from walking paths.	
	Sharp edges on drum rim		Inspect rim for sharp and rough edges, avoid leaning into drum or placing hands onto rim edge Wear cut-resistant gloves	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Replacing drum ring	Pinch Points	M	Use socket set to tighten drum ring, avoid placing fingers in to pinch points. Make sure gloves fit properly (not too big so fingertips get caught)	L
On-Site Edits:				
Moving/relocating drums	Exertion	M	Exertion - If drums must be moved utilize a drum dolly. - DO NOT ATTEMPT TO "WALK" or "ROCK" DRUMS TO MOVE THEM. - Drums can become unstable and easily tip-over causing possible damage and personal injury as well as releasing the material contained.	L
	Trips and Falls		Clear any trip/fall hazards from work area. Scan ground prior to moving or walking	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps	Potential Hazards	Risk	Critical Actions To Mitigate Hazards	Risk
List all steps required to perform a task in the sequence they are performed	How could you be hurt? What would the injury be?	(initial)	List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.	(final)
On-Site Edits:				
On-Site Edits:				
Additional Notes				

....

All Employees

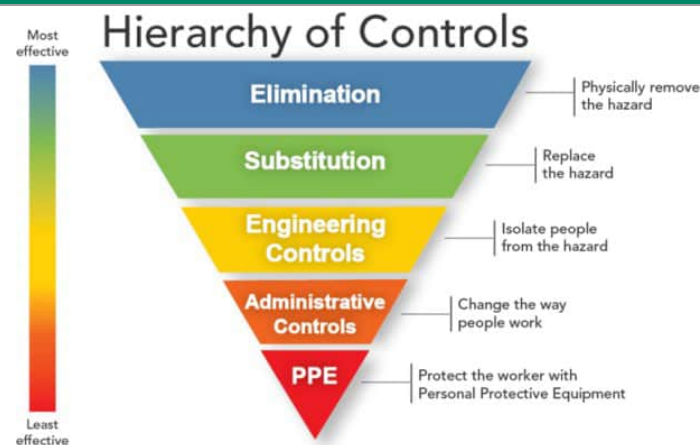
STOP WORK if uncertain about safety or if a hazard or additional precaution is not recorded on the THA.

Be alert, recognize and communicate any changes in scope, personnel or conditions at the worksite to the supervisor.

Use **4-Sight**, AECOM's last minute risk assessment process continuously throughout the day by asking yourself and your co-workers to assess your task, hazards, and mitigations. Amend the THA when needed.

- **What am I about to do?**
- **What can go wrong?**
- **What can be done to make it safer?**
- **What have I done to communicate the hazards?**

For a more thorough identification of hazards, ask "What else could go wrong?" using the Hazard



- **Most hazards need more than one control**
- **What should you do? Stack your controls**
- **PPE can NEVER be your only means of protection**

Probability	Severity				
	5 - Catastrophic	4 - Critical	3 - Major	2 - Moderate	1 - Minor
5 - Frequent	25	20	15	10	5
4 - Probable	20	16	12	8	4
3 - Occasional	15	12	9	6	3
2 - Remote	10	8	6	4	2
1 - Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Supervisor or equivalent
10 to 25 (High)	Risk requires the approval of the Project Manager & SH&E Director

Send THA improvement suggestions to

DCSA.THA.Library@AECOM.com

Include a copy of the new THA or a photo of the THA modifications as appropriate.

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>\$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>\$250K to \$1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> \$10K to \$250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> \$1K to \$10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</\$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

Americas

Task Hazard Assessment

S3AM-209-FM6

Instructions

1. This form or other applicable region- or business line-specific form is to be completed in accordance with [SH&E Risk Assessment and Planning – Americas S3AM-216-PR2](#).
2. Task Hazard Assessments (THA)s are required for any field work involving AECOM activities outside of the office and must be used onsite to review site hazards and confirm necessary controls are in place.
3. The THA must be reviewed in its entirety and modified at the work site (as needed) immediately prior to commencement of work to account for actual conditions and any changes (weather, scope of work, simultaneous operations, etc.). All necessary revisions must be written on the THA.
4. Acknowledgement of THAs must be recorded via electronic or physical signature as part of the Daily Safety Meeting – refer to [Daily Safety Meeting – Americas](#).
5. The completed form must be retained in the project files.

Project Name and Number	NYSDEC Genesee Valley Metal Finishing, 60781011			Overall Risk (Highest Post-Mitigation Risk)	LOW	
Task Name	Monitoring Well Sampling			Date	4/11/2026	
Work Location	242-244 Verona Street, Rochester, NY, 14608			Client	NYSDEC	
Does this include High Hazard Tasks (HHTs)? (Refer to Table 1 of SH&E Risk Assessment and Planning – Americas S3AM-216-PR2.)				☐ No	☒ Yes – Specify HHT procedure number(s) and any permits/plans: See Appendix D	
Required PPE	☒ Hard Hat	☒ Eyewear (with side shields)	☒ High-Visibility Vest	☒ Ankle Height Footwear	☒ Gloves	☒ Hearing Protection
	Specify type: ☒ Type I (standard) ☐ Type II (climbing style)	Choose 1 or 2 as required: ☒ Safety glasses ☐ Spoggles ☐ Safety goggles ☐ Face shield	Choose type: ☒ Class 2 ☐ Class 3	Choose 1 or more as required: ☐ Work boots ☒ Steel toe ☐ Composite toe ☐ Metatarsal guard ☐ Electric rated ☐ Other - Specify:	Choose 1 or 2 as required: ☒ Nitrile ☒ Cut- resistant ☐ Thermal ☐ Vibration ☐ Electrical ☒ Other - Specify: Leather	Choose 1 or both as required: ☐ Ear plugs ☐ Earmuffs
	Other:	Knee Pads				

Note: Employees must have gloves readily available, even if the task does not require their use.

Note: All employees must wear shirts with sleeves that cover their shoulders and long pants at a minimum.

Tools and Equipment (Examples: air/noise monitoring equipment, tools, generators, traffic control devices, fire prevention equipment, etc.)

Click or tap here to enter text.

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Visually clear proposed sampling locations	Exposure to biologic hazards: insects, poisonous plants and animals. Injuries could include anaphylactic shock, allergic reaction, rabies	H	Identify and avoid hazardous plants and animals on site. Look for signs (spider webs, droppings, etc.). Wear cut resistant gloves, insect repellent; use a broom or a rake to move vegetation, not your hand or foot; move slowly	L
	Damage to equipment or vehicles due to surface / subsurface obstructions		Investigate travel path. Look for surface obstructions such as rubble, debris, old foundations or rebar. Use spotter if available or park in such a manner as to not have to back-up.	
On-Site Edits:				
Opening and closing well casings / flush-mount covers and well plug lock	Cuts / lacerations / crushing, bruises	M	Avoid touching sharp materials/ edges. Wear cut resistant ANSI 2 gloves. Keep face, hands, fingers, and feet clear when opening and closing well cover. Inspect ground before kneeling, don knee pads.	L
	Back strain		Stretch before working. DO NOT use awkward positioning. Keep back straight. Take regular rest/stretch breaks. Change position regularly.	
	Vapor exposure resulting in inhalation hazards or illness		Stand upwind from the well opening to avoid vapor exposure. Loosen well cap slowly, keeping control if pressure is released due to vapors. Keep face out of line-of-fire.	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Gauge water level of well	Aches and strains from repetitive motion	L	Do not use awkward positioning. Keep back straight, take regular rest/stretch breaks. Change position regularly.	L
	Exposure to chemical hazards in groundwater resulting in skin irritation or illness		Use smooth movements to avoid splashes. Don nitrile gloves over cut resistant gloves and safety glasses with side shields. Check gloves for damages/ rips.	
	Cross contamination of equipment		Clean the tape and probe using non-phosphate soap and distilled water. Wipe with clean paper towel. Collect decontamination materials for waste disposal. Wear disposable nitrile gloves.	
	Trips / falls from entanglement in measuring tape		Check for location of measuring tape before walking or moving around.	
On-Site Edits:				
Insert sampling device (bailer, tubing, hydrosleeve) into well	Cuts/lacerations/crushing, bruises	M	Avoid touching sharp material/edges. Keep face, hands, fingers feet clear when cutting tubing and setting up equipment. Wear cut resistant ANSI 2 gloves with disposable nitrile over gloves.	L
	Pressurized systems		Bleed pressure off when making connections and disconnections from pump regulator assembly. Check pressures – operate within proper range. Cylinder should be transported upright, secured, with regulator removed.	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>		Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Sample well		Exposure to chemical hazards in groundwater resulting in splash or inhalation hazard or illness	L	Stay upwind to avoid vapor exposure. Retrieve sampling device at a steady controlled rate to avoid splashing. Wear safety glasses and nitrile gloves.	L
		Cuts/lacerations/bruises to knee (flush mount)		Don knee pads and inspect ground before kneeling down and take frequent breaks to stand and stretch	
On-Site Edits:					
Gather sampling equipment and tools, place in work vehicle		Cuts/lacerations/crushing/bruises from gathering or dropping equipment	L	Maintain a secure grip on equipment and only carry manageable amount of equipment when demobilizing.	L
		Aches and strains from improper lifting		Bend and lift with legs. Keep back straight. Take regular rest/stretch breaks. Change position regularly. Team lift is required for items over 50 lbs (or awkward items)	
On-Site Edits:					
Additional Notes					

....

All Employees

STOP WORK if uncertain about safety or if a hazard or additional precaution is not recorded on the THA.

Be alert, recognize and communicate any changes in scope, personnel or conditions at the worksite to the supervisor.

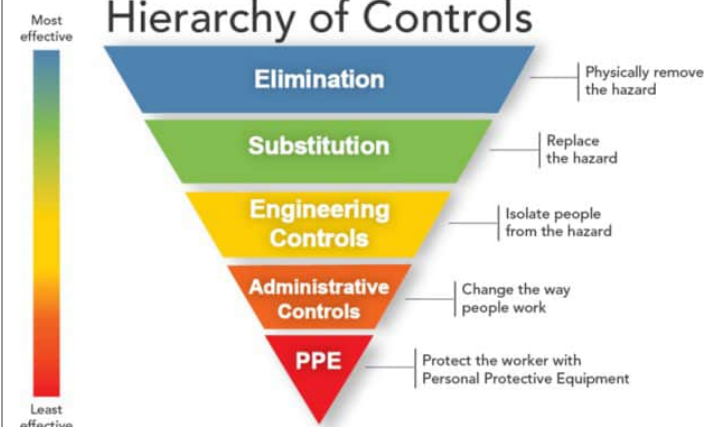
Use **4-Sight**, AECOM's last minute risk assessment process continuously throughout the day by asking yourself and your co-workers to assess your task, hazards, and mitigations. Amend the THA when needed.

- **What am I about to do?**
- **What can go wrong?**
- **What can be done to make it safer?**
- **What have I done to communicate the hazards?**

For a more thorough identification of hazards, ask "What else could go wrong?" using the Hazard



Hierarchy of Controls



- **Most hazards need more than one control**
- **What should you do? Stack your controls**
- **PPE can NEVER be your only means of protection**

Probability	Severity				
	5 - Catastrophic	4 - Critical	3 - Major	2 - Moderate	1 - Minor
5 - Frequent	25	20	15	10	5
4 - Probable	20	16	12	8	4
3 - Occasional	15	12	9	6	3
2 - Remote	10	8	6	4	2
1 - Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Supervisor or equivalent
10 to 25 (High)	Risk requires the approval of the Project Manager & SH&E Director

Send THA improvement suggestions to

DCSA.THA.Library@AECOM.com

Include a copy of the new THA or a photo of the THA modifications as appropriate.

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>\$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>\$250K to \$1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> \$10K to \$250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> \$1K to \$10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</\$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

Americas

Task Hazard Assessment

S3AM-209-FM6

Instructions

1. This form or other applicable region- or business line-specific form is to be completed in accordance with [SH&E Risk Assessment and Planning – Americas S3AM-216-PR2](#).
2. Task Hazard Assessments (THA)s are required for any field work involving AECOM activities outside of the office and must be used onsite to review site hazards and confirm necessary controls are in place.
3. The THA must be reviewed in its entirety and modified at the work site (as needed) immediately prior to commencement of work to account for actual conditions and any changes (weather, scope of work, simultaneous operations, etc.). All necessary revisions must be written on the THA.
4. Acknowledgement of THAs must be recorded via electronic or physical signature as part of the Daily Safety Meeting – refer to [Daily Safety Meeting – Americas](#).
5. The completed form must be retained in the project files.

Project Name and Number	NYSDEC Genesee Valley Metal Finishing, 60781011			Overall Risk (Highest Post-Mitigation Risk)	MEDIUM	
Task Name	Remediation Systems Operation, Maintenance, Inspection, Decommissioning			Date	4/11/2026	
Work Location	242-244 Verona Street, Rochester, NY, 14608			Client	NYSDEC	
Does this include High Hazard Tasks (HHTs)? (Refer to Table 1 of SH&E Risk Assessment and Planning – Americas S3AM-216-PR2.)				See Appendix D		
☐ No				☒ Yes – Specify HHT procedure number(s) and any permits/plans:		
Required PPE	☒ Hard Hat	☒ Eyewear (with side shields)	☒ High-Visibility Vest	☒ Ankle Height Footwear	☒ Gloves	☐ Hearing Protection
	Specify type: ☒ Type I (standard) ☐ Type II (climbing style)	Choose 1 or 2 as required: ☒ Safety glasses ☐ Spoggles ☐ Safety goggles ☐ Face shield	Choose type: ☒ Class 2 ☐ Class 3	Choose 1 or more as required: ☒ Work boots ☒ Steel toe ☐ Composite toe ☐ Metatarsal guard ☐ Electric rated ☐ Other - Specify:	Choose 1 or 2 as required: ☒ Nitrile ☒ Cut- resistant ☐ Thermal ☐ Vibration ☐ Electrical ☒ Other - Specify: Leather	Choose 1 or both as required: ☐ Ear plugs ☐ Earmuffs
	Other:	Click or tap here to enter text.				

Note: Employees must have gloves readily available, even if the task does not require their use.

Note: All employees must wear shirts with sleeves that cover their shoulders and long pants at a minimum.

Tools and Equipment (Examples: air/noise monitoring equipment, tools, generators, traffic control devices, fire prevention equipment, etc.)	Reciprocating Saw, Straps or chains/load binders, Fork lift, Hand Tools, camera, Interface probe, Sampling equipment, Fire extinguisher, SVE/AS System, Monitoring equipment, Bag filters, 5 gallon bucket, Carbon Vacuum, cones/barricades, ladder (check for Ladder THA), Gas meter, Decon supplies,

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!					
Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>	
Access trailer and collect system measurements	Cuts and lacerations to hands from sharp edges.	M	Note and remove/shield/avoid components with sharp edges. Wear leather gloves to protect hands from cuts/lacerations.	L	
	Pinch points, cuts, lacerations		Wear leather gloves to protect hands from cuts/lacerations when handling components with sharp edges.		
	Exposure to noise causing hearing damage/loss		Measure interior with decibel meter/app. Wear hearing protection while collecting system measurements inside or adjacent to SVE system. Readings >105 dBA require double hearing protection (plugs and muffs)		
	Stuck by SVE vapor sampling syringe needle.		Use needle-stick resistant gloves to prevent sharps injuries. Handle sampling syringes with care. Do not assemble the sampling syringe until ready to collect vapor samples. Carefully disassemble used sampling syringes and dispose of sharps in a suitable container. Do not dispose of loose sharps with regular trash.		
On-Site Edits:					

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
De-energize the system	Electrical shock	H	Turn off power to system and implement Lock Out Tag Out procedures at electrical service on the pole prior to conducting any maintenance. Complete and obtain approvals for LOTO permit. Use insulated tools when working on electrical components. Verify the absence of voltage before starting work. Keep fire extinguishers accessible and ensure they are regularly inspected. Avoid smoking or open flames/sparks, non intrinsically safe tools near the system.	L
	Unexpected movement of system components, pinch points		Ensure all equipment guards are in place. Do not initiate work until you verify system is de-energized.	
	Exposure to noise		Wear hearing protection while powering down equipment.	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Maintenance	Equipment damage from improper maintenance	M	Read and understand operators manual and/or ask for assistance if you are unsure of how the SVE system operates. Check tightness of equipment fittings to prevent loss. Do not restart system if any broken or worn components could compromise personnel safety or safe equipment operation. Schedule repairs as necessary or take equipment out of service until repairs can be made.	L
	Entanglement in equipment		Ensure all equipment guards are in place and functioning. Ensure all system warning placards are visible and understood prior to beginning work. Do not wear loose clothing or jewelry, or long hair that could get caught in rotating equipment.	
	Pinch points		Note pinch points. Mark with warning stickers as applicable and remain out of the line of fire. Wear leather or mechanic gloves when performing system O&M.	
	Exposure to noise		Wear hearing protection while system is operating. Readings >105 dBA require double hearing protection (plugs and muffs)	
	Burns from contact with hot surfaces		Note location of hot surfaces, mark with warning sticker/placard. Wear leather gloves when handling components to protect against burns.	
	Contact with contaminated fluids		Check hoses/piping and fittings for damage and wear and replace as needed. Wear nitrile gloves over leather gloves when inspecting/replacing hoses and fittings, changing grease/oil, etc. Ensure safety glasses are on in case of chemical spray, and ensure eye wash is located nearby.	
	Spills		Have absorbent pads available to clean up spills. Don nitrile gloves	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Inspect and maintain wells	Injury from stinging or biting insects or animals	M	Inspect well lid, pad, and area around well pad for biological hazards. Gently tap on the closed protective casing and listen for signs of insect activity; avoid suddenly opening protective well casing to prevent tearing open a bee or wasp nest. Have appropriate insecticide, or other suitable product, on hand to manage stinging/biting insects. Do not attempt to handle snakes, or other animals, present at the wells.	L
	Contact with contaminated fluids or inhalation		Wear nitrile gloves to prevent contact with contaminated fluids. Stand upwind when opening well lid to avoid inhaling any accumulated vapors. Allow the well sufficient time to off-gas any accumulated vapors before inspecting well. Ensure proper ventilation when working with volatile substances. Continuously monitor air quality for volatile organic compounds (VOCs) when inspecting wells	
	Pinch points; sharp edges		Wear leather gloves when opening and closing well vaults or connecting and disconnecting SVE hoses to well heads.	
	Hand injury from falling well vault lids		Wear leather gloves when opening and closing well vaults. Ensure you have a firm grip on lids to avoid unexpected release and contact with hands.	
On-Site Edits:				
Re-energize the system	Unexpected movement of system components, pinch points	H	Do not re-start the system until you verify all equipment guards are in place. Conduct a thorough inspection to ensure all components are properly installed and secured before re-energizing.	L
	Electrical shock		Verify all work has been completed before discontinuing LOTO procedures. Close out LOTO permit. Ensure clear communication among team members during the re-energizing process.	
	Exposure to noise		Wear hearing protection when restarting equipment.	
	Spills		Following maintenance, inspect system components for proper operation and leaks before demobilizing from site. Have absorbent pads available to clean up spills.	
	Contact with contaminated groundwater or NAPL.		Wear nitrile gloves to prevent contact with contaminated groundwater or NAPL.	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Inspection of Sub-Slab Depressurization System / Vapor Intrusion Mitigation System	Skin rash or allergic reaction due to contact with poisonous plants	H	Identify poisonous plant in immediate work area.. STOP WORK and communicate the identification of poisonous plants to the team and Project Manager (PM). Don safety glasses and leather gloves. Upgrade to a Tyvek suit to maximize protection.	L
	Allergic reaction due to contact with insects		Do not approach and vacate the area if an insect infestation is present. Perform a visual inspection from a distance if necessary and conduct an insect check post-inspection. Utilize specific insect repellent (poison) or call a professional to remove the nest. Call the supervisor before using any spray.	
	Physical threat due to contact with owners/tenants		Make contact with the tenant/owner prior to entering the exterior portion of the property to ensure your presence is known. No lone worker is allowed without approval from the Project Manager (PM) or Health, Safety, Security, and Environment (HSSE) team. Wear high-visibility PPE to be visible. Leave immediately if a threat is present.	
	Bites or scratches to hands, arms or legs due to contact with domesticated pet(s)		Ensure that owner/tenant pet(s), if present, have been secured and/or removed from the area. Leave the area immediately if pet(s) are not secured; do not approach, and do not attempt to pet or play with pets. Be aware of surroundings and know that an unsecured pet, whether belonging to the owner or not, can be a hazard.	
	Physical threat due to contact with owners/tenants		Ensure that all residents are aware of your presence inside the home/basement. Be professional and polite; answer questions to the best of your knowledge. Leave immediately if a threat is sensed or present. Be aware of surroundings and all exit points.	
	Allergic reaction due to contact with insects (fleas and bedbugs)		Discuss with the owner before using chemical insect repellants (option: citrus-based repellants). Scan the area for signs of insects (cleanliness, damp or dark areas within the home) upon entry and exit to ensure a possible infestation is quickly identified and treated. If historical evidence of past infestations is known, perform exterior inspection only; do not enter the interior. Conduct inspections of person and tools/equipment to ensure no insects.	

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
	Bites or scratches to hands, arms or legs due to contact with domesticated pet(s)		Explain to the tenant/owner that entry is required and to secure all animals away from the work/inspection area. Leave the area immediately if pets are not secured; do not approach or attempt to play with pets. Be aware of surroundings and understand that an unsecured pet, whether belonging to the owner or not, can be a hazard. Request an exterior inspection if the refusal to secure pets is ignored.	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
SVE - Position vehicle close to well location and open wells	Severe injury from being struck by moving vehicle	M	Be alert to other vehicles or pedestrians if work area is in an area with public access. Communicate with any heavy equipment operators in the area to ensure they know where you and the equipment are located. Chock tires and set emergency brake. Don high visibility vest.	L
	Pinch points/abrasion from opening well lid		Remove and replace manhole covers carefully to avoid pinching fingers. Use a screwdriver or crowbar as appropriate, and wear work gloves to prevent hand injuries. Use kneeling pads when kneeling on hard surfaces.	
	Back strain from improper bending and lifting well lid		Utilize proper lifting procedure when removing covers. Bend down at the knees and lift with your legs rather than bending and/or lifting with your back	
	Shoulder strain resulting from using a socket wrench to loosen and remove bolts from the lid		Always keep your wrist straight when using a wrench. Ensure the opening of the socket is in full contact with the bolt before applying pressure. Pull, don't push, and use a slow, steady motion. If the bolt cannot be loosened with normal force, use the correct breaking bar; do not place a pipe on the end of the wrench to improve leverage. Protect yourself from losing balance if the wrench slips or a bolt breaks. Kneel on a solid surface with one foot firmly planted on the floor and avoid leaning into the work. Never use hand sockets with power or impact wrenches. Replace sockets showing cracks or wear.	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
SVE - Connect to the AS/SVE wells	Slip/Trip/Fall causing sprain/broken bone	H	Set-up equipment away from marked hazards. Check area immediately around work zone to confirm area has been cleared of hazards.	L
	Biological hazards causing bites, stings or other injury.		Examine ground surface and inside of well vaults/manways for biological hazards. Use insect repellent and check clothing for ticks periodically when applicable. Check for ticks regularly.	
	Exposure to chemicals causing dermal injury/irritation or eye injury		Secure all pipe clamps, camlocks, cords, hoses, and appropriate fittings prior to startup. Check all lines for leaks during setup. Wear eye protection, long pants, nitrile gloves, a hard hat, and steel-toed boots.	
On-Site Edits:				
SVE - Operate AS/SVE system and remove connections	Slip/Trip/Fall causing sprain/broken bone	H	Check area around work zone to confirm no new hazards have occurred during operation of system. Watch for hose, cable, equipment placement. Where possible, walk around instead of over equipment.	L
	Mechanical failure of equipment causing severe injury		Check equipment before operation. Confirm all fluids are at appropriate levels and cables are secured. During start up, monitor liquid and vapor carbon drums for any signs of bulging to assure drums are not under pressure. Don safety glasses.	
	Burns to hands from hot parts		Note and avoid hot equipment. Wear heat-protective or leather gloves if required to touch hot parts.	
	Hearing damage from noise		Screen the sound level with a decibel meter or phone app to determine initial sound levels. Setup away from noisy operations (>85 dBA). Don't be near the system when not required. Wear hearing protection.	
	Burn to hands from hot parts		Allow equipment to cool before touching. Wear heat-protective or leather gloves.	
	Back strains from improper lifting		Bend down at the knees and lift with your legs rather than bending and lifting with your back when pulling equipment from wells.	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Unload Carbon	Cuts or hand injuries from pinch points	M	Inspect equipment for damage and sharp edges, replace all broken or damaged equipment. Wear cut resistant gloves at all times and watch hand placement to avoid sharp edges and pinch points. Keep face, hands, fingers, and feet out of the line of fire of moving parts and tools	L
	Back strain/ overexertion when unloading equipment		Stretch before working. Bend and lift with legs and arms, not back. Team-lift any items that are awkward or over 50 pounds. If removing from the back of a truck, slide the case to the tailgate and lift from tailgate and not from the side of the truck bed.	
On-Site Edits:				
Set up work zone for carbon changeout	Struck by vehicle or equipment traffic	M	Establish work zone using traffic control devices, signs, cones, etc. in advance of initiating carbon changeout activities. Restrict access to observers and passersby.	L
	Slip, Trip or Fall		Maintain good housekeeping in work area, do not carry equipment where visibility of ground is impaired, remove or mark all trip hazards in work area.	
On-Site Edits:				
Open and/or remove carbon vessel lid/port	Pinch points	M	Note and avoid pinch points. Wear leather gloves when handling the lids.	L
	Muscle strain		Use buddy system to lift and open and or remove lids from carbon vessels.	
	Potential for explosive environment.		Monitor breathing zone with 4 gas multi-meter and record LEL measurements prior to and during carbon change out activities and understand action levels for the monitoring equipment being used, per HASP.	
	Falls from heights or dropping material or tools on workers below		Workers must wear a full body harness when working at heights above 4 ft. and should be tied off to designated tie off point using a lanyard with safety hooks. Workers on the ground must use caution and stay clear from those working above them.	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Operate vacuum equipment to remove carbon from vessel and transfer to drums	Injury from contacting moving parts and vacuum suction.	M	Do not stand in the way of vacuum or moving parts while equipment is operating. Avoid loose clothing and keep hands and limbs away from vacuum nozzle and moving parts. Ensure unauthorized personnel maintain an appropriate distance from operator.	L
	Noise from vacuum operation.		Limit duration of exposure. Don hearing protection. Double up (plugs and muffs) if noise exceeds 100 dBA	
	Chemical vapors and dust particles.		Wear a dust mask or half face respirator.	
	Muscle strain		Stretch before working. Bend and lift with legs and arms, not back. Team-lift any items that are awkward or over 50 pounds.	
	Falls from heights or dropping material or tools on workers below		Workers must wear a full body harness when working at heights above 4 ft. and should be tied off to designated tie off point using a lanyard with safety hooks. Workers on the ground must use caution and stay clear from those working above them.	
On-Site Edits:				
Containerize carbon to be sampled or removed	Exposure to contaminated carbon and groundwater.	M	Pour slowly. Label storage containers properly, and coordinate proper and timely off-site disposal. Wear nitrile gloves if in contact with carbon or groundwater while containerizing it to be sampled or removed.	L
	Muscle strain		Use proper lifting techniques when lifting carbon in buckets and use buddy system if items >50 pounds.	
	Chemical vapors and dust particles.		Pouring carbon will stir up dust particles and chemical vapors. Wear a dust mask or a half-face respirator.	
	Spilling carbon resulting in waste or dust.		Pour carbon from buckets carefully and slowly into funnel leading into carbon vessel port. Pouring too quickly may result in spilled carbon.	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Operation and Maintenance (Bag Filter Maintenance)	Splash of system water	M	Remove the filter carefully as it may contain system water at this stage of the task. If possible, remove water from the filter housing prior to removing the bag filter (e.g., use a pump, being aware of the hazardous area classification and rating of the pump being used—may require system de-energization). While lifting the filter, watch for contact with system water. Wear safety glasses and nitrile gloves. Place the filter into a bucket to capture residual fluids (this can be heavy if all the liquid hasn't drained out).	L
	Muscle strain/back injury		Use proper lifting mechanics (lifting with your legs and avoid twisting during the lift).	
	Contact with system water; iron fouling		Wipe down the cage/basket, o-ring, and lid. Wear safety glasses and nitrile gloves.	
	Improper fit can create a leak potential		Lift the cage/basket and filter back into the housing. Swing the lid back onto the housing. Secure the lid with the supplied bolts, wingnuts, or other positive sealing device. Close the sample port and drain valve. Open the isolation valves and check for leaks following restart to ensure that none are present.	
	Contaminated water contact		Replace basket/filter slowly to avoid splashing. Wear safety glasses and nitrile gloves.	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Dismantling remediation system components	Injury from tool use	M	Look around and behind you before starting. Inspect tools prior to use. Repair or replace broken or worn tools. Use tools for their intended purpose to avoid unexpected failure. Do not swing or apply tools until the area is free of bystanders. Do not use extreme force. Use controlled motions and avoid having prying tools "break free." Don all required PPE listed above.	L
	Eye or body injury from flying debris		1c. Wear safety glasses/face shield when using tools that may generate sparks/flying debris	
On-Site Edits:				
Debris handling and disposal	Cuts and abrasions and pinch points during debris handling	M	Note pinch points and sharp edges on concrete, well vaults, protective casings, metal skirts, and bollard debris and avoid. Don leather gloves	L
	Ergonomic Injury from lifting heavy objects		Stretch before working. Bend at knees and lift with legs and arms, not back. Team-lift any items that are awkward or over 50 pounds	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Loading out equipment (Forklift)	Unsafe forklift condition leading to mechanical failure or accident	H	Inspect the entire vehicle and confirm that the forklift is in a safe operating condition	M
	Tipping or injury from lifting and moving of large system components		Ensure forklift operator is qualified and familiar with the make/model if forklift. Inspect the route prior to moving system equipment from the shed to the truck. Ensure that equipment is capable of properly lifting large equipment. Use a spotter to ensure that no objects/personnel will be in the planned route.	
	Severe injury or property damage when loading system components on trailer for removal		Ensure that the cargo trailer is of the appropriate size to move the equipment. Inspect the vehicle prior to loading to ensure it is in safe working condition. Chock the tires on the trailer to prevent movement. Ensure equipment is properly secured on the trailer prior to removal from the site. Do not throw tie-down straps or chains over the load as they may strike someone on the other side. Wear hard hats, hi-vis vests, leather gloves, safety toe boots, and safety glasses.	
On-Site Edits:				
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps	Potential Hazards	Risk	Critical Actions To Mitigate Hazards	Risk
List all steps required to perform a task in the sequence they are performed	How could you be hurt? What would the injury be?	(initial)	List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.	(final)
Additional Notes				

....

All Employees

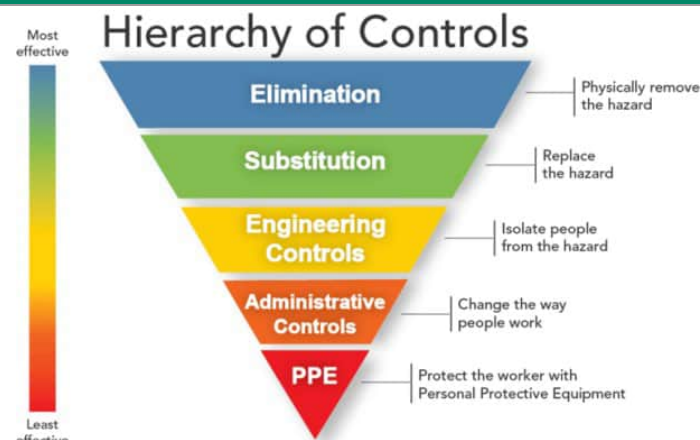
STOP WORK if uncertain about safety or if a hazard or additional precaution is not recorded on the THA.

Be alert, recognize and communicate any changes in scope, personnel or conditions at the worksite to the supervisor.

Use **4-Sight**, AECOM's last minute risk assessment process continuously throughout the day by asking yourself and your co-workers to assess your task, hazards, and mitigations. Amend the THA when needed.

- **What am I about to do?**
- **What can go wrong?**
- **What can be done to make it safer?**
- **What have I done to communicate the hazards?**

For a more thorough identification of hazards, ask "What else could go wrong?" using the Hazard



- **Most hazards need more than one control**
- **What should you do? Stack your controls**
- **PPE can NEVER be your only means of protection**

Probability	Severity				
	5 - Catastrophic	4 - Critical	3 - Major	2 - Moderate	1 - Minor
5 - Frequent	25	20	15	10	5
4 - Probable	20	16	12	8	4
3 - Occasional	15	12	9	6	3
2 - Remote	10	8	6	4	2
1 - Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Supervisor or equivalent
10 to 25 (High)	Risk requires the approval of the Project Manager & SH&E Director

Send THA improvement suggestions to

DCSA.THA.Library@AECOM.com

Include a copy of the new THA or a photo of the THA modifications as appropriate.

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>\$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>\$250K to \$1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> \$10K to \$250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> \$1K to \$10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</\$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

Americas

Task Hazard Assessment

S3AM-209-FM6

Instructions

1. This form or other applicable region- or business line-specific form is to be completed in accordance with [SH&E Risk Assessment and Planning – Americas S3AM-216-PR2](#).
2. Task Hazard Assessments (THA)s are required for any field work involving AECOM activities outside of the office and must be used onsite to review site hazards and confirm necessary controls are in place.
3. The THA must be reviewed in its entirety and modified at the work site (as needed) immediately prior to commencement of work to account for actual conditions and any changes (weather, scope of work, simultaneous operations, etc.). All necessary revisions must be written on the THA.
4. Acknowledgement of THAs must be recorded via electronic or physical signature as part of the Daily Safety Meeting – refer to [Daily Safety Meeting – Americas](#).
5. The completed form must be retained in the project files.

Project Name and Number	NYSDEC Genesee Valley Metal Finishing, 60781011	Overall Risk (Highest Post-Mitigation Risk)	LOW
Task Name	Soil Sampling	Date	4/11/2026
Work Location	242-244 Verona Street, Rochester, NY, 14608	Client	NYSDEC

Does this include High Hazard Tasks (HHTs)? (Refer to Table 1 of [SH&E Risk Assessment and Planning – Americas S3AM-216-PR2](#).) ☐ No ☒ Yes – Specify HHT procedure number(s) and any permits/plans: See Appendix D

Required PPE	☒ Hard Hat	☒ Eyewear (with side shields)	☒ High-Visibility Vest	☒ Ankle Height Footwear	☒ Gloves	☐ Hearing Protection
Specify type: ☒ Type I (standard) ☐ Type II (climbing style)	Choose 1 or 2 as required: ☒ Safety glasses ☐ Spoggles ☐ Safety goggles ☐ Face shield	Choose type: ☒ Class 2 ☐ Class 3	Choose 1 or more as required: ☒ Work boots ☒ Steel toe ☐ Composite toe ☐ Metatarsal guard ☐ Electric rated ☐ Other - Specify:	Choose 1 or 2 as required: ☒ Nitrile ☒ Cut- resistant ☐ Thermal ☐ Vibration ☐ Electrical ☒ Other - Specify: Leather	Choose 1 or both as required: ☐ Ear plugs ☐ Earmuffs	
Other:	Click or tap here to enter text.					

Note: Employees must have gloves readily available, even if the task does not require their use.

Note: All employees must wear shirts with sleeves that cover their shoulders and long pants at a minimum.

Tools and Equipment (Examples: air/noise monitoring equipment, tools, generators, traffic control devices, fire prevention equipment, etc.)	Click or tap here to enter text.

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Setup equipment	Cuts or hand injuries from pinch points	L	Inspect for broken welds on auger. If broken welds or cracks – STOP WORK . Wear cut resistant gloves at all times and avoid handling the sharp edges of the auger cup. Keep face, hands, fingers, and feet out of the line of fire of moving parts and tools	L
	Back strain/ overexertion when unloading equipment		Stretch before working. Bend and lift with legs and arms, not back. Team-lift any items that are awkward or over 50 pounds. If removing from the back of a truck, slide the case to the tailgate and lift from tailgate and not from the side of the truck bed	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Collecting soil samples (with trowel, hand auger, dynamic cone penetrometer (DCP))	Contacting utilities causing serious personal injury or death.	H	Ensure subsurface clearance protocol and permit requirements are being followed before beginning work. Advance sampling tool slowly and if refusal is met, remove the tool from the soil and inspect the cause of refusal. If a utility, pea gravel, or non-native fill material is encountered, STOP WORK and call the PM.	L
	Back strain or pulled muscle from rotating hand auger.		Do not yank on the auger or DPT handle. Do not turn at waist, turn with arms and shoulders, keep feet square and lift with legs, do not work with arms above head. Take breaks and rotate work. Use short extensions as you advance to avoid.	
	Muscle strain in back or legs from bending over or squatting		Evaluate work surface height (see if chair/ table needed) and sample jar placement to eliminate ergonomic issues. Avoid squatting and bending	
	Contact with contaminated soil.		Use clean sampler to touch soil. Wear nitrile gloves over the cut resistant gloves at all times. If nitrile tears, stop work and replace glove. For samples with high volatile organics content (PID in breathing zone is constantly above site limits stated in HASP (>5 ppm)) wear breathing protection as stated in HASP. Change Nitriles between samples to avoid cross contamination	
	Contacting overhead structure		Before raising the auger or DCP vertically, verify that no overhead lines or structures are present STOP WORK and move if electrical lines are in the area	
	Cut from handling auger, sampling tools, jars		Inspect containers before and during filling. Do not use if chipped or cracked. Pack containers in coolers so that they will not shift (spacers/ packing materials as needed). Do not over pack coolers.	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>		Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Breakdown and decontaminate equipment		Contact with contaminants and cut hazards	M	Inspect before handling for chips or cracks in glass containers. Wear nitrile gloves over cut resistant gloves. If nitrile tears, stop work and replace glove.	L
		Breaking a sample container resulting in cut, or contact with contents/preservatives		Handle containers with care and position over padded or soft surface in case it slips from hand. Place in packing materials that will protect against collisions.	
		Striking another person		Before disassembling auger, verify that no one is in the swing radius.	
On-Site Edits:					
On-Site Edits:					

Additional Notes

....

All Employees

STOP WORK if uncertain about safety or if a hazard or additional precaution is not recorded on the THA.

Be alert, recognize and communicate any changes in scope, personnel or conditions at the worksite to the supervisor.

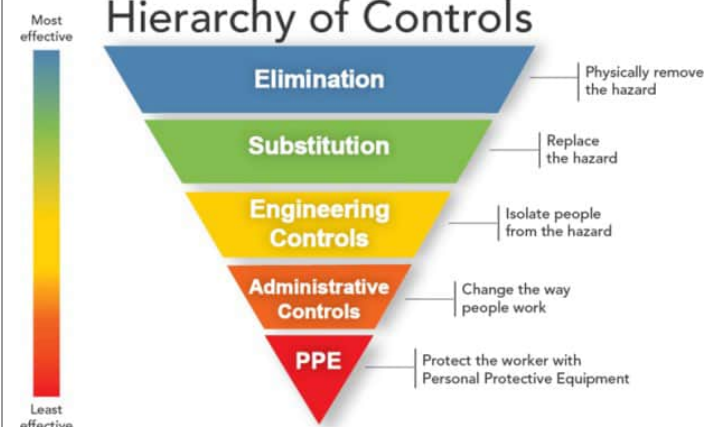
Use **4-Sight**, AECOM's last minute risk assessment process continuously throughout the day by asking yourself and your co-workers to assess your task, hazards, and mitigations. Amend the THA when needed.

- **What am I about to do?**
- **What can go wrong?**
- **What can be done to make it safer?**
- **What have I done to communicate the hazards?**

For a more thorough identification of hazards, ask "What else could go wrong?" using the Hazard



Hierarchy of Controls



- **Most hazards need more than one control**
- **What should you do? Stack your controls**
- **PPE can NEVER be your only means of protection**

Probability	Severity				
	5 - Catastrophic	4 - Critical	3 - Major	2 - Moderate	1 - Minor
5 - Frequent	25	20	15	10	5
4 - Probable	20	16	12	8	4
3 - Occasional	15	12	9	6	3
2 - Remote	10	8	6	4	2
1 - Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Supervisor or equivalent
10 to 25 (High)	Risk requires the approval of the Project Manager & SH&E Director

Send THA improvement suggestions to

DCSA.THA.Library@AECOM.com

Include a copy of the new THA or a photo of the THA modifications as appropriate.

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>\$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>\$250K to \$1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> \$10K to \$250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> \$1K to \$10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	<=\$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

Americas

Task Hazard Assessment

S3AM-209-FM6

Instructions

1. This form or other applicable region- or business line-specific form is to be completed in accordance with [SH&E Risk Assessment and Planning – Americas S3AM-216-PR2](#).
2. Task Hazard Assessments (THA)s are required for any field work involving AECOM activities outside of the office and must be used onsite to review site hazards and confirm necessary controls are in place.
3. The THA must be reviewed in its entirety and modified at the work site (as needed) immediately prior to commencement of work to account for actual conditions and any changes (weather, scope of work, simultaneous operations, etc.). All necessary revisions must be written on the THA.
4. Acknowledgement of THAs must be recorded via electronic or physical signature as part of the Daily Safety Meeting – refer to [Daily Safety Meeting – Americas](#).
5. The completed form must be retained in the project files.

Project Name and Number	NYSDEC Genesee Valley Metal Finishing, 60781011	Overall Risk (Highest Post-Mitigation Risk)	MEDIUM
Task Name	Vapor Sampling	Date	4/11/2026
Work Location	242-244 Verona Street, Rochester, NY, 14608	Client	NYSDEC

Does this include High Hazard Tasks (HHTs)? (Refer to Table 1 of [SH&E Risk Assessment and Planning – Americas S3AM-216-PR2](#).) ☐ No ☒ Yes – Specify HHT procedure number(s) and any permits/plans: Appendix D

Required PPE	☒ Hard Hat	☒ Eyewear (with side shields)	☒ High-Visibility Vest	☒ Ankle Height Footwear	☒ Gloves	☐ Hearing Protection
	Specify type: ☒ Type I (standard) ☐ Type II (climbing style)	Choose 1 or 2 as required: ☒ Safety glasses ☐ Spoggles ☐ Safety goggles ☐ Face shield	Choose type: ☒ Class 2 ☐ Class 3	Choose 1 or more as required: ☐ Work boots ☒ Steel toe ☐ Composite toe ☐ Metatarsal guard ☐ Electric rated ☐ Other - Specify:	Choose 1 or 2 as required: ☒ Nitrile ☒ Cut- resistant ☐ Thermal ☐ Vibration ☐ Electrical ☐ Other - Specify:	Choose 1 or both as required: ☐ Ear plugs ☐ Earmuffs
Other:	Click or tap here to enter text.					

Note: Employees must have gloves readily available, even if the task does not require their use.

Note: All employees must wear shirts with sleeves that cover their shoulders and long pants at a minimum.

Tools and Equipment (Examples: air/noise monitoring equipment, tools, generators, traffic control devices, fire prevention equipment, etc.)	Click or tap here to enter text.

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Pre-mobilization, Equipment Inspection	Injury from equipment malfunction	M	If using rental equipment, ensure that PM or person responsible for scheduling rental equipment requests that the vendor inspects the equipment prior to site delivery to ensure all appliances are in working order and fit for use	L
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Setup and Use of Hammer Drill	Injury from improper operation	M	Prior to acceptance of equipment from the vendor (if rented equipment), review the operating procedures and maintenance logs with the vendor representative (if applicable).	L
	Contact with cutting tools		Wear appropriate PPE (i.e., eye protection, long pants, nitrile sampling gloves (inner), leather gloves (outer), hard hat, hearing protection, shirt with sleeves, steel-toed boots.) No loose sleeves – may get caught in rotating drill.	
	Noise-related hearing loss		Minimize duration of exposure by taking breaks or alternating operators. Wear hearing protection.	
	Electric shock causing injury or electrocution		Utilize protective equipment as follows: • Plug into GFCI-protected outlet or GFCI-protected extension cord. • Use appropriate gauge extension cord. Amperage issues from electric motor could trip breaker • Make sure cord is in good shape • Ensure water used in coring doesn't affect electric cords or equipment	
	Rotating machinery		Review and understand the following: • Make sure bit is sharp and bit is securely in place. • Place the drill bit on a debris-free level surface before starting. • Make sure drill is straight to ensure a vertical hole is drilled. • Ensure that area is clear of power/extension cords. Position power cords behind body.	
	Flying/shattering objects		Have bystanders maintain a 5 foot distance from the operation at all times. Wear all required	
	Back strain from moving drill		Bend knees to lift out drill out of case to prevent back strain. Stretch before working. Do not use awkward positioning.	
	Strain or sprain from hammer drill binding in hole		Gently and slowly apply force to penetrate the slab surface. DO NOT FORCE. Let the drill bit do the work. This is not good for drill bit and may cause machine to bind up. Potential to spin and strain wrists. Let go of drill assembly immediately. If too much force is required then switch out dull bit with new.	
	Hand positioning/pinch points		Use leather gloves to install drill bits and lock in place. While moving drill, keep hands away from the top of the drill bit.	

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>		Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
On-Site Edits:					
Sub-Slab Vapor Implant Install		Flying debris, caught by/ struck by injuries	M	Eye protection. Utilize Shop-Vac as described in 3a. Clear away anything that has a chance of interfering with the operation. Remove debris that could cause you to slip or lose your balance or accidentally contact the drill bit. Keep hands away from the rotating drill bit.	L
		Wedged drill bit, wrist/back strain		If bit gets stuck in borehole, bend at the knees and apply gentle upwards pressure while turning and moving the drill back and forth gently, keep finger from trigger or unplug. Upon removal, re-drill hole if required	
		Dust from mixing cement		Small amount of cement required for cementing implant in place. Minimize dust while handling and mixing cement. Don nitrile gloves when mixing and handling cement.	
		Noise related hearing loss		Shop-Vac use while vacuuming out any cuttings from hole. Minimize duration of exposure by taking breaks or alternating operators. Wear hearing protection.	
On-Site Edits:					

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Set up sampling equipment	Muscle strain	M	Use proper precautions (lift with legs, not back) when lifting equipment into/out of vehicle. If lifting >50 lbs, use the buddy system. Avoid twisting, stooping, and/or extended reaching positions when handling or moving equipment.	L
	Equipment damage		Use a solid work surface when assembling summa canisters to avoid dropping or damaging equipment. Work from the ground surface, floor, or the tailgate of the truck when applicable. Adhere to laboratory assembly instructions. Use correct size wrenches to connect fittings. Ensure wrenches are properly seated on fittings prior to loosening or tightening fittings.	
	Pinch points, lacerations		Wear leather gloves to prevent hand injury in case the wrench slips off a fitting or while cutting tubing.	
	Tool/equipment failure caused by use		Conduct physical inspection of all equipment. Worn or broken tools should be repaired or replaced.	
On-Site Edits:				
Collect Sample	Injury from poor ergonomics	M	Maintain proper body positioning/good ergonomic form. Avoid stooping and twisting.	L
	Chemical exposure		Stay upwind to avoid vapor exposure. Wear safety glasses and nitrile gloves.	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>		Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Work area clean-up		Back strain	M	Bend knees to lift equipment and supplies case to prevent back strain. Continue to stretch before lifting. Do not use awkward positioning. Get help for anything >50 lbs.	L
		Pinch points, slips, trips, falls		Wear leather gloves. Practice good housekeeping, have a clear path established.	
On-Site Edits:					
On-Site Edits:					
Additional Notes					

....

All Employees

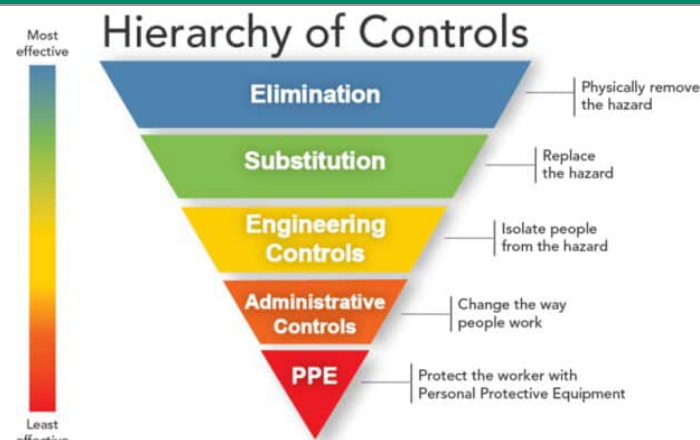
STOP WORK if uncertain about safety or if a hazard or additional precaution is not recorded on the THA.

Be alert, recognize and communicate any changes in scope, personnel or conditions at the worksite to the supervisor.

Use **4-Sight**, AECOM's last minute risk assessment process continuously throughout the day by asking yourself and your co-workers to assess your task, hazards, and mitigations. Amend the THA when needed.

- **What am I about to do?**
- **What can go wrong?**
- **What can be done to make it safer?**
- **What have I done to communicate the hazards?**

For a more thorough identification of hazards, ask "What else could go wrong?" using the Hazard



- **Most hazards need more than one control**
- **What should you do? Stack your controls**
- **PPE can NEVER be your only means of protection**

Probability	Severity				
	5 - Catastrophic	4 - Critical	3 - Major	2 - Moderate	1 - Minor
5 - Frequent	25	20	15	10	5
4 - Probable	20	16	12	8	4
3 - Occasional	15	12	9	6	3
2 - Remote	10	8	6	4	2
1 - Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Supervisor or equivalent
10 to 25 (High)	Risk requires the approval of the Project Manager & SH&E Director

Send THA improvement suggestions to

DCSA.THA.Library@AECOM.com

Include a copy of the new THA or a photo of the THA modifications as appropriate.

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>\$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>\$250K to \$1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> \$10K to \$250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> \$1K to \$10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</\$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

Americas

Task Hazard Assessment

S3AM-209-FM6

Instructions

1. This form or other applicable region- or business line-specific form is to be completed in accordance with [SH&E Risk Assessment and Planning – Americas S3AM-216-PR2](#).
2. Task Hazard Assessments (THA)s are required for any field work involving AECOM activities outside of the office and must be used onsite to review site hazards and confirm necessary controls are in place.
3. The THA must be reviewed in its entirety and modified at the work site (as needed) immediately prior to commencement of work to account for actual conditions and any changes (weather, scope of work, simultaneous operations, etc.). All necessary revisions must be written on the THA.
4. Acknowledgement of THAs must be recorded via electronic or physical signature as part of the Daily Safety Meeting – refer to [Daily Safety Meeting – Americas](#).
5. The completed form must be retained in the project files.

Project Name and Number	NYSDEC Genesee Valley Metal Finishing, 60781011			Overall Risk (Highest Post-Mitigation Risk)	LOW	
Task Name	Water Sampling			Date	4/11/2026	
Work Location	242-244 Verona Street, Rochester, NY, 14608			Client	NYSDEC	
Does this include High Hazard Tasks (HHTs)? (Refer to Table 1 of SH&E Risk Assessment and Planning – Americas S3AM-216-PR2.)				☐ No	☒ Yes – Specify HHT procedure number(s) and any permits/plans: See Appendix D	
Required PPE	☒ Hard Hat	☒ Eyewear (with side shields)	☒ High-Visibility Vest	☒ Ankle Height Footwear	☒ Gloves	☐ Hearing Protection
	Specify type: ☒ Type I (standard) ☐ Type II (climbing style)	Choose 1 or 2 as required: ☒ Safety glasses ☐ Spoggles ☐ Safety goggles ☐ Face shield	Choose type: ☒ Class 2 ☐ Class 3	Choose 1 or more as required: ☐ Work boots ☒ Steel toe ☐ Composite toe ☐ Metatarsal guard ☐ Electric rated ☐ Other - Specify:	Choose 1 or 2 as required: ☒ Nitrile ☒ Cut- resistant ☐ Thermal ☐ Vibration ☐ Electrical ☐ Other - Specify:	Choose 1 or both as required: ☐ Ear plugs ☐ Earmuffs
	Other:	Click or tap here to enter text.				

Note: Employees must have gloves readily available, even if the task does not require their use.

Note: All employees must wear shirts with sleeves that cover their shoulders and long pants at a minimum.

Tools and Equipment (Examples: air/noise monitoring equipment, tools, generators, traffic control devices, fire prevention equipment, etc.)

Click or tap here to enter text.

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Inspect area of approach	Slips, trips, fall hazards	M	Evaluate approach: - Investigate planned approach for rocks, branches, debris and other slip/trip/fall hazards. - Evaluate angle of approach and minimize as best as possible. If necessary, secure self to a stationary object using a body harness to provide additional stability. - Have a buddy system in place. - Use a pack to secure tools, sample jars, etc. to have hands free - Wear safety toed boots with slip resistant tread, may upgrade to slip resistant safety toed rubber muck boots.	L
	Falls associated with unstable terrain or stream banks causing injury		Use the buddy system. Check stability of stream banks. Maintain awareness of surroundings and maintain communication between team members; identify potential hazards prior to entering area and avoid, when possible.	
	Exposure to water/drowning from falling into water		Use the buddy system. Stay back from the water's edge as far as possible. Wear a PFD if within 6' of water 3' deep or deeper. Maintain awareness of surroundings and maintain communication between team members; identify potential hazards prior to entering area and avoid, when possible.	
	Confrontation with property owner		For residential potable well sampling, obtain permission to access well tap. Perform sampling and site access with 2 people until personnel feel safe with property owner / inhabitants	
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Collect water sample (storm water, surface water, potable well)	Exposure to sample preservatives causing burns to skin/eyes	M	Avoid contact with preservatives. If contacted: • Flush skin/eyes with water. • Refer to the SDS for specific information relating to the type of preservative • Wear long sleeves, nitrile gloves over cut-resistant gloves and safety glasses	L
	Cuts to skin from cracked or broken glassware		Inspect all glassware before handling. Wear cut resistant gloves when handling broken glassware.	
On-Site Edits:				
Soak/spray durable equipment to prevent cross-contamination	Exposure to decontamination chemicals	M	Avoid contact with all decontamination chemicals including (Liquinox, Simple Green, Methanol and any other solvents used on sampling equipment. Avoid splashing. Wear disposable nitrile gloves.	L
On-Site Edits:				

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Removing/replacing man hole covers (if applicable)	Pinch Points/Abrasion	H	Remove and replace manhole covers so that they do not pinch fingers or toes. Use a manhole cover hook or hydraulic lifter and wear work gloves to prevent injuries to hands and steel toe boots to prevent injury to feet. For hinged catch basins, Use a pickaxe with the longest handle possible to increase leverage, remove accumulated debris around hinges before opening.	L
	Back strain		Determine if you can use a thin diameter sampling device to collect sample instead of opening the cover. Utilize proper lifting procedure when removing covers; bend down at the knees, keep core engaged and lift with your legs rather than bending and lifting with your back. For hinged catch basins, insert tool as far as possible from hinge and keep your hands at the end of your tool. Ensure catch basin lid is open past 90 degrees. If catch basin lid starts to drop, let it go and do not try to stop it.	
	Animals/Insect bites		Inspect inside of manhole/catch basin for small animals and keep hands away from bottom of manhole cover without using work gloves to avoid spider bites or wasp stings	
	Serious injury or death from O2 deficient/toxic atmosphere		Do not enter or place head into manhole./ break plane of entry	
On-Site Edits:				

Additional Notes

....

All Employees

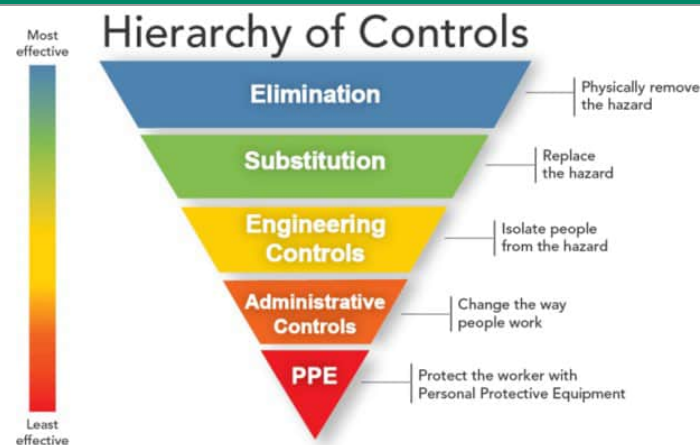
STOP WORK if uncertain about safety or if a hazard or additional precaution is not recorded on the THA.

Be alert, recognize and communicate any changes in scope, personnel or conditions at the worksite to the supervisor.

Use **4-Sight**, AECOM's last minute risk assessment process continuously throughout the day by asking yourself and your co-workers to assess your task, hazards, and mitigations. Amend the THA when needed.

- **What am I about to do?**
- **What can go wrong?**
- **What can be done to make it safer?**
- **What have I done to communicate the hazards?**

For a more thorough identification of hazards, ask "What else could go wrong?" using the Hazard



- **Most hazards need more than one control**
- **What should you do? Stack your controls**
- **PPE can NEVER be your only means of protection**

Probability	Severity				
	5 - Catastrophic	4 - Critical	3 - Major	2 - Moderate	1 - Minor
5 - Frequent	25	20	15	10	5
4 - Probable	20	16	12	8	4
3 - Occasional	15	12	9	6	3
2 - Remote	10	8	6	4	2
1 - Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Supervisor or equivalent
10 to 25 (High)	Risk requires the approval of the Project Manager & SH&E Director

Send THA improvement suggestions to

DCSA.THA.Library@AECOM.com

Include a copy of the new THA or a photo of the THA modifications as appropriate.

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>\$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>\$250K to \$1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> \$10K to \$250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> \$1K to \$10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</\$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

Americas

Task Hazard Assessment

S3AM-209-FM6

Instructions

1. This form or other applicable region- or business line-specific form is to be completed in accordance with [SH&E Risk Assessment and Planning – Americas S3AM-216-PR2](#).
2. Task Hazard Assessments (THA)s are required for any field work involving AECOM activities outside of the office and must be used onsite to review site hazards and confirm necessary controls are in place.
3. The THA must be reviewed in its entirety and modified at the work site (as needed) immediately prior to commencement of work to account for actual conditions and any changes (weather, scope of work, simultaneous operations, etc.). All necessary revisions must be written on the THA.
4. Acknowledgement of THAs must be recorded via electronic or physical signature as part of the Daily Safety Meeting – refer to [Daily Safety Meeting – Americas](#).
5. The completed form must be retained in the project files.

Project Name and Number	NYSDEC Genesee Valley Metal Finishing, 60781011		Overall Risk (Highest Post-Mitigation Risk)		MEDIUM
Task Name	Hand and Power Tools		Date		4/11/2026
Work Location	242-244 Verona Street, Rochester, NY, 14608		Client	NYSDEC	
Does this include High Hazard Tasks (HHTs)? (Refer to Table 1 of SH&E Risk Assessment and Planning – Americas S3AM-216-PR2.)			☐ No	☒ Yes – Specify HHT procedure number(s) and any permits/plans:	See Appendix D
Required PPE	☒ Hard Hat	☒ Eyewear (with side shields)	☒ High-Visibility Vest	☒ Ankle Height Footwear	☒ Gloves
	Specify type: ☒ Type I (standard) ☐ Type II (climbing style)	Choose 1 or 2 as required: ☒ Safety glasses ☐ Spoggles ☐ Safety goggles ☐ Face shield	Choose type: ☒ Class 2 ☐ Class 3	Choose 1 or more as required: ☐ Work boots ☐ Steel toe ☒ Composite toe ☐ Metatarsal guard ☐ Electric rated	Choose 1 or 2 as required: ☒ Nitrile ☒ Cut- resistant ☐ Thermal ☐ Vibration ☐ Electrical
	Other:	Click or tap here to enter text.			

Note: Employees must have gloves readily available, even if the task does not require their use.

Note: All employees must wear shirts with sleeves that cover their shoulders and long pants at a minimum.

Tools and Equipment (Examples: air/noise monitoring equipment, tools, generators, traffic control devices, fire prevention equipment, etc.)

Click or tap here to enter text.

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
Use of tools	Broken bones or cuts due to improper tools for task	H	Inspect tools prior to use. Broken or worn tools should be repaired or replaced. Use tools for their intended purpose to avoid unexpected failure. Don leather gloves and safety glasses when inspecting tools.	M
	Cuts, contusions or sprains to various body parts due to tool use		Look around and behind you before starting. - Inspect tools prior to use. Broken or worn tools should be repaired or replaced. Use tools for their intended purpose to avoid unexpected failure. - Ensure work area is free of clutter or other workers which may interfere with ability to handle tools safely. - Do not swing or apply tool (sledge hammer, shovel, digging bar) until area is free of bystanders. - Do not use extreme force. Use controlled motions and avoid having prying tool "break free". - Ensure limbs such as hands, and digits such as fingers and toes, are out of the "line of fire" prior to undertaking the task. - Review and understand manufacturer's instructions and ensure they are followed. - Use tools only for tasks they were designed/intended, not as stand-in for tools unavailable. - Don safety glasses, leather gloves	
	Eye or body injury from flying debris		Observers should maintain a 2' distance from the area of work, have donned protective PPE, and are outside of the "line of fire". Remain vigilant as a support to the worker handling the tools, and do not distract or interfere abruptly with that worker.	
On-Site Edits:				

On-Site Edits:					
Additional Notes					

.....

All Employees

STOP WORK if uncertain about safety or if a hazard or additional precaution is not recorded on the THA.

Be alert, recognize and communicate any changes in scope, personnel or conditions at the worksite to the supervisor.

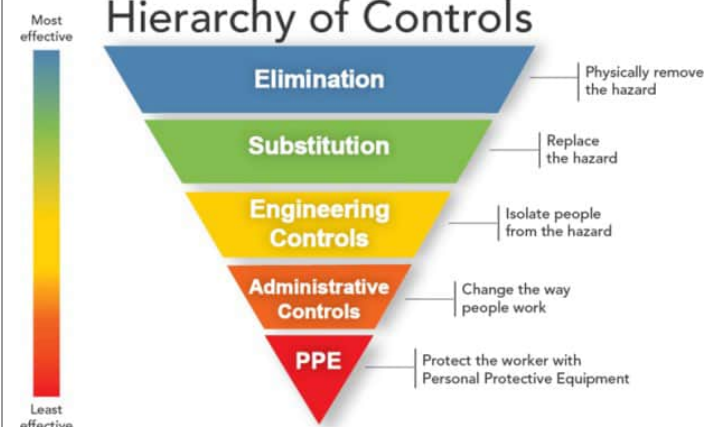
Use **4-Sight**, AECOM's last minute risk assessment process continuously throughout the day by asking yourself and your co-workers to assess your task, hazards, and mitigations. Amend the THA when needed.

- **What am I about to do?**
- **What can go wrong?**
- **What can be done to make it safer?**
- **What have I done to communicate the hazards?**

For a more thorough identification of hazards, ask "What else could go wrong?" using the Hazard



Hierarchy of Controls



- **Most hazards need more than one control**
- **What should you do? Stack your controls**
- **PPE can NEVER be your only means of protection**

Probability	Severity				
	5 - Catastrophic	4 - Critical	3 - Major	2 - Moderate	1 - Minor
5 - Frequent	25	20	15	10	5
4 - Probable	20	16	12	8	4
3 - Occasional	15	12	9	6	3
2 - Remote	10	8	6	4	2
1 - Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Supervisor or equivalent
10 to 25 (High)	Risk requires the approval of the Project Manager & SH&E Director

Send THA improvement suggestions to

DCSA.THA.Library@AECOM.com

Include a copy of the new THA or a photo of the THA modifications as appropriate.

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>\$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>\$250K to \$1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> \$10K to \$250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> \$1K to \$10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</\$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

Americas

Task Hazard Assessment

S3AM-209-FM6

Instructions

1. This form or other applicable region- or business line-specific form is to be completed in accordance with [SH&E Risk Assessment and Planning – Americas S3AM-209-PR2](#).
2. Task hazard assessments (THAs) are required for any field work involving AECOM activities outside of the office and must be used onsite to review site hazards and confirm necessary controls are in place.
3. The THA must be reviewed in its entirety and modified at the work site (as needed) immediately prior to commencement of work to account for actual conditions and any changes (weather, scope of work, simultaneous operations, etc.). All necessary revisions must be written on the THA.
4. Acknowledgement of THAs must be recorded via electronic or physical signature as part of the Daily Safety Meeting – refer to [Daily Safety Meeting – Americas S3AM-209-FM5](#).
5. The completed form must be retained in the project files.

Project Name and Number	NYSDEC Genesee Valley Metal Finishing, 60781011		Overall Risk (Highest Post-Mitigation Risk)		Choose an item.	
Task Name	Click or tap here to enter text.		Date		4/11/2026	
Work Location	242-244 Verona Street, Rochester, NY, 14608		Client	NYSDEC		
Does this include High Hazard Tasks (HHTs)? (Refer to Table 1 of SH&E Risk Assessment and Planning – Americas S3AM-209-PR2.)			☐ No	Click or tap here to enter text.		
			☐ Yes – Specify HHT procedure number(s) and any permits/plans:			
Required PPE	☒ Hard Hat	☒ Eyewear (with side shields)	☒ High-Visibility Vest	☒ Ankle Height Footwear	☒ Gloves	☒ Hearing Protection
	Specify type: ☒ Type I (standard) ☐ Type II (climbing style)	Choose 1 or 2 as required: ☒ Safety glasses ☐ Spoggles ☐ Safety goggles ☐ Face shield	Choose type: ☒ Class 2 ☐ Class 3	Choose 1 or more as required: ☐ Work boots ☐ Steel toe ☒ Composite toe ☐ Metatarsal guard ☐ Electric rated ☐ Other - Specify:	Choose 1 or 2 as required: ☒ Nitrile ☐ Cut- resistant ☐ Thermal ☐ Vibration ☐ Electrical ☐ Other - Specify:	Choose 1 or both as required: ☐ Ear plugs ☐ Earmuffs
	Other:	Click or tap here to enter text.				
Note: Employees must have gloves readily available, even if the task does not require their use.						
Note: All employees must wear shirts with sleeves that cover their shoulders and long pants at a minimum.						
Tools and Equipment (Examples: air/noise monitoring equipment, tools, generators, traffic control devices, fire prevention equipment, etc.)			Click or tap here to enter text.			

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>		Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
On-Site Edits:					
On-Site Edits:					
On-Site Edits:					

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>		Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
On-Site Edits:					
On-Site Edits:					
On-Site Edits:					

REMINDER: Use 4-Sight at the start of, and continuously throughout the job/task to identify additional and/or hazards to act on!

Job Steps <i>List all steps required to perform a task in the sequence they are performed</i>	Potential Hazards <i>How could you be hurt? What would the injury be?</i>	Risk <i>(initial)</i>	Critical Actions To Mitigate Hazards <i>List control measures required to eliminate, control or protect against the potential hazards associated with each job step to minimize the risk of injury or environmental impact. Identify any 'Stop Work' triggers.</i>	Risk <i>(final)</i>
On-Site Edits:				
On-Site Edits:				

Additional Notes

....

All Employees

STOP WORK if uncertain about safety or if a hazard or additional precaution is not recorded on the THA.

Be alert, recognize and communicate any changes in scope, personnel or conditions at the worksite to the supervisor.

Use **4-Sight**, AECOM's last minute risk assessment process continuously throughout the day by asking yourself and your co-workers to assess your task, hazards, and mitigations. Amend the THA when needed.

- **What am I about to do?**
- **What can go wrong?**
- **What can be done to make it safer?**
- **What have I done to communicate the hazards?**

For a more thorough identification of hazards, ask "What else could go wrong?" using the Hazard Categories



Hierarchy of Controls



- **Most hazards need more than one control**
- **What should you do? Stack your controls**
- **PPE can NEVER be your only means of protection**

Probability	Severity				
	5 - Catastrophic	4 - Critical	3 - Major	2 - Moderate	1 - Minor
5 - Frequent	25	20	15	10	5
4 - Probable	20	16	12	8	4
3 - Occasional	15	12	9	6	3
2 - Remote	10	8	6	4	2
1 - Improbable	5	4	3	2	1

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Supervisor or equivalent
10 to 25 (High)	Risk requires the approval of the Project Manager & SH&E Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>\$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>\$250K to \$1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> \$10K to \$250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> \$1K to \$10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	<=\$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Expected to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur during task/activity	1/1,000
Improbable	Highly unlikely to occur, but possible during task/activity	1/10,000

Send THA improvement suggestions to DSCA.THA.Library@AECOM.com
Include a copy of the new THA or a photo of the THA modifications as appropriate.

Daily Safety Meeting

S3AM-209-FM5

Instructions

1. Complete this form or equivalent in accordance with [SH&E Risk Assessment and Planning – Americas S3AM-209-PR2](#).
2. Conduct the Daily Safety Meeting at the start of each shift. Require attendance of all AECOM employees and subcontractors. Invite personnel from simultaneous operations for coordination purposes. Retain the completed form in the project files.

AECOM Project Manager		Mike Gutmann		Phone #	(716) 345-4649
AECOM SH&E Contact		Caroline Lee (Env East)		Phone #	(445) 345-3568
Meeting Leader		....	Project Name/Location	NYSDEC, 242-244 Verona Street, Rochester, NY, 14608	Project # 60781011
Date	.....	Today's Scope of Work	....		

Simultaneous Ops	☐ No ☐ Yes - Specify impacts:

☐	List Task Hazard Assessments (THAs; e.g., FLRAs) completed and reviewed for today's tasks	

Muster Point Location:	First Aid Kit Location:	Fire Extinguisher Location:	Spill Kit Location:
....			

1. Required Topics - Employees & Managed Subcontractors (Check if completed)

☐	Fitness for Duty requirements (all sign in/sign out)	☐	Personal Protective Equipment (PPE) (Required items per THAs are in good condition / in use by all.)
☐	Required training (including task specific) completed and current	☐	Specify Specialized PPE Needs:
☐	SH&E Plan onsite (understood, reviewed, signed by all)	☐	Work area set up and demarcation/ barricades in place to protect workers, site staff, and the public
☐	STOP WORK Right & Responsibility (all task changes/changed conditions must be reassessed with THA)	☐	Short Service Employees (SSE) (mentor/ oversight assignment for employees with less than 6 months experience working in the industry of the work to be performed)
☐	Requirement to report to supervisor any incidents (e.g., injury, illness, damage, near miss, unsafe act / condition)	☐	Required checklists/records available and understood
☐	Emergency Response Plan (including muster point, first aid kit, fire extinguisher, and clinic/hospital location)	☐	Describe:

2. Discuss if Applicable to Today's Work (Check 'Yes' if reviewed, or 'NA' if Not Applicable. Work marked with [*] is considered high hazard work.)

Yes	NA		Yes	NA		Yes	NA	
☐	☐	Ergonomics (lifting, body position)	☐	☐	Hazardous Substances and Communication	☐	☐	Weather Hazards / Heat Stress / Cold Stress
☐	☐	Biological Hazards	☐	☐	* Railroads	☐	☐	* Hazardous Energy Control
☐	☐	*Ground Disturbance	☐	☐	* Underground Work	☐	☐	* Hand and Power Tools
☐	☐	*Work at Height	☐	☐	*Confined Spaces	☐	☐	* Working On, In or Near Water
☐	☐	*Highway & Road Work	☐	☐	*Heavy Equipment & Machines	☐	☐	Subcontractor Management (Review subcontractor plans and THAs)
☐	☐	* Required Work Permits/Plans are in place and understood.	☐	☐	Other Topics	☐	☐	Client Specific Requirements
		Identify/ attach:			Describe/ attach:			Describe/ attach:

3. Daily Check-Out by Site Supervisor

Describe incidents, near misses, observations, or Stop Work interventions from today		Describe lessons learned / improvement areas from today	

The site is being left in a safe condition and work crew checked out as fit unless otherwise specified as above.

....		
Site Supervisor Name	Signature	Date/Time

4. Worker Acknowledgement and Sign In/Sign Out

SITE WORKERS (including AECOM Employees and Managed Contractors/Subcontractors): Your signature below indicates you understand the requirement to:

- Participate in creating, reviewing, & updating task hazard assessments (THAs) for all your tasks.
- Understand and continuously reassess tasks, hazards and mitigations, amending THAs as needed.
- Follow permit to work requirements if applicable to the work you are about to perform.
- Communicate any changes in personnel or conditions at the worksite to the supervisor.
- Exercise your authority and obligation to "Stop Work", intervene, and speak up / listen up if you are concerned or uncertain about safety or hazards, or if additional precautions are not recorded on the THA.

Note: If you identify an imminent danger related to a contractor for which AECOM does not have contractual oversight, remove yourself and communicate your concerns to the contractor, site representative, and AECOM management immediately.

Your initials below certify you arrived and departed fit for duty, and have reported all incidents/near misses, meaning:

- You are physically and mentally fit for duty and have inspected your required PPE to ensure it is in satisfactory condition.
- You are not under the influence of any medication, drugs, or alcohol that could affect your ability to work safely.
- You are aware of your responsibility to immediately report any illness, injury (regardless of where or when it occurred); or impairment/fatigue issue to the AECOM Supervisor.
- You signed out as fit and uninjured unless you have otherwise informed the AECOM Supervisor.

Print Name & Company	Signature	Initials & Sign In Time	Initials & Sign Out Time
....		In & Fit	Out & Fit
....		In & Fit	Out & Fit
....		In & Fit	Out & Fit
....		In & Fit	Out & Fit
....		In & Fit	Out & Fit
....		In & Fit	Out & Fit
....		In & Fit	Out & Fit
....		In & Fit	Out & Fit
....		In & Fit	Out & Fit

Attach additional Site Worker sign-in/out sheets if needed. Identify the number of attached sheets:

....

5. Site Visitor / Site Representative Sign In/Sign Out

Print Name & Company	Signature	Arrival Time	Departure Time
....			
....			
....			
....			

Appendix D Applicable SH&E Procedures

Minimum Global Safety, Health & Environment Requirements

S2-001-WI3

Table of Contents

0.	SH&E Essentials.....	1
0.1	Stop Work	1
0.2	Induction / Orientation and Training	1
0.3	Newly Hired or Transferred Employee	2
0.4	Fit for Duty.....	2
0.5	Fatigue Management	3
0.6	Drugs & Alcohol (Including Prescription Medication)	3
0.7	Emergency Planning	4
0.8	Incident Reporting, Notifications, Investigation, and Injury Management.....	4
0.9	Ground Transportation / Motor Vehicles	5
0.10	Consultation & Communication.....	6
0.11	Recognition and Rewards.....	7
1	Exposure Management.....	7
1.1	Toxic and Hazardous Substances	7
1.2	Industrial Hygiene & Medical Screening	7
2	Planning & Oversight.....	8
2.1	Safety in Design	8
2.2	Hazard Identification and Risk Management	8
2.3	Personal Protective Equipment (PPE)	11
2.4	Permit Required Activities	11
2.5	Oversight of AECOM Subcontractors / Subconsultants	11
2.6	Environmental Procedures.....	12
2.7	Regulatory Agency Visits	12
2.8	Office Safety.....	13
3	Field	13
3.1	Confined Space Entry	13
3.2	Working at Heights / Fall Protection.....	14
3.3	Demolition	14
3.4	Energy Isolation	14

3.5	<i>Electrical Safety</i>	15
3.6	<i>Excavation & Trenching</i>	15
3.7	<i>Underground Work / Tunneling</i>	16
3.8	<i>Heavy Equipment</i>	16
3.9	<i>Lifting Operations</i>	16
3.10	<i>Working Alone</i>	17
3.11	<i>Temporary Works</i>	17
3.12	<i>Unmanned Aircraft Systems (UAS)</i>	18
3.13	<i>Working on or Near Water</i>	18
3.14	<i>Marine Safety & Vessel Operations</i>	18
3.15	<i>Rail Corridors</i>	18
3.16	<i>Munitions & Explosives of Concern / Unexploded Ordnance (MEC/UXO)</i>	19
4	Change Log	19

Global

Minimum Global Safety, Health & Environment Requirements

S2-001-WI3

Global Safety, Health and Environment (SH&E) requirements have been developed and shall be implemented as the minimum requirements to be met by AECOM operations. Global SH&E documents are identified with document numbers beginning with S2. Supplementary SH&E procedures to the Global SH&E Requirements shall be developed and implemented when additional detail is necessary based on differences in services offered by Business Lines, and in laws and statutes across geographies and regions. These supplementary SH&E procedures are identified with document numbers beginning with S3 for documents applying to the super-geographies, (Americas [AM], Asia-Pacific [APAC], Europe, Middle East & Africa [EMEA]), and with S4 for Region, Business Line, or country-specific documents.

The Global SH&E Requirements are as follows:

0. SH&E Essentials

0.1 Stop Work

- a. All employees have the authority and responsibility to stop work if SH&E is being compromised without fear of reprisal or retribution. Nothing is ever so urgent or important that we cannot take the time to do it safely.
- b. Work associated with the affected area or operation will not resume unless the corrective actions identified have been resolved to an acceptable level and management approval obtained to restart.
- c. AECOM's Safety Red Card is a tangible reminder of stop work authority for AECOM employees and subcontractors. The cards are designed to be paired with Company and / or customer ID badges; every employee shall have or have access to their own Red Card. An equivalent tool shall be established where the red card cannot be used (e.g., cultural significance of red, conflicts with client badging, etc.).

0.2 Induction / Orientation and Training

- a. Each employee shall be trained and competent to perform tasks that may impact on SH&E in the workplace and as required by legislation, company procedures and client expectations.
 - i. Assessment of competence and training will consider responsibility, ability, literacy and exposure to risk.
 - ii. Comprehension of training shall be appropriately verified (e.g., demonstration of skills, quiz, etc.).
- b. Potential employees are required to bring evidence of their qualifications to job interviews. Project Managers or supervisors, in coordination with Human Resources (HR), use employee training records and resumes to confirm potential employees have the required skills, knowledge, training and experience for the proposed tasks. Where appropriate, resumes are included in job tenders for client perusal.
- c. Within one week of starting at AECOM, project managers or supervisors are responsible for ensuring each new employee receives induction / orientation training to set the expectations of the AECOM Safety for Life program including incident reporting, stop work authority, accessing SH&E resources and tools, and a clear expectation of zero injuries.
- d. Employees shall also complete any applicable site-specific field or office orientations.
- e. Supervisors shall confirm visitors complete an orientation appropriate to the location or site they are to visit, supplemented by appropriate visual material (e.g., handout, iPad, etc.) and subsequently abide by AECOM SH&E policies and procedures when visiting our premises or sites.

- f. Visitors to AECOM premises or sites shall be escorted by an AECOM employee who shall confirm local security arrangements are applied, appropriate Personal Protective Equipment (PPE) is provided, and the visitor is aware of SH&E management requirements, including those for emergency response and incident reporting.
- g. Project Managers and Supervisors shall complete appropriate training to support AECOM's Culture of Caring and to enable effective execution of our Safety for Life program.
- h. The responsibility for ensuring that employees receive adequate SH&E training rests with the operation leaders based on the requirements of these minimum requirements and the jurisdiction's applicable SH&E procedures.
 - i. Supervisors are responsible for confirming that each employee within their direct control is competent to undertake their job as specified.
 - ii. AECOM Regional and Business Line leadership shall develop a training matrix for employees of their area of responsibility. Managers are required to arrange the appropriate training as identified in the training matrix and on a timely basis (e.g., upon hire, or upon commencement of a new task).
 - iii. On-going employee competence and training needs are assessed as part of our annual performance and review process.
 - iv. SH&E training needs may also be identified through individual risk assessments, incident investigations, observed non-compliance, or when procedures change. As required, appropriate training will be arranged, and may be provided through AECOM University courses, safety meetings, and / or classes delivered by internal or external providers. Employees identifying a particular training requirement are expected to discuss this with their managers if the requirement cannot wait until their next appraisal.
 - v. Employees are encouraged to take part in continuing professional development activities to enable retention, competency, and remaining abreast of emerging techniques and processes.
- i. Supervisors shall confirm employee training is adequately documented and records are maintained.

0.3 Newly Hired or Transferred Employee

Employees who have been newly hired or transferred to a different position in the company shall be:

- a. Trained to AECOM procedures and client requirements prior to performing work.
- b. Supervised by a competent person.
- c. Visually identifiable and their presence in field locations recorded.

0.4 Fit for Duty

- a. Employees shall come to work in a fit state that does not place themselves or others at risk due to physical, mental, and emotional factors.
- b. Employees who come to work in an unfit state shall inform their supervisor so that adjustments to their activities can be made accordingly. This may include but is not limited to:
 - i. Temporary conditions (e.g., fatigue, stress)
 - ii. Physical limitations (e.g., eyesight, hearing, flexibility, lifting restrictions)
 - iii. Cognitive limitations (e.g., brain damage)
 - iv. Psycho-social factors (e.g., depression, anxiety, fears)
- c. Employees who observe another employee that may be working in an impeded manner or unfit state are expected to inform a supervisor immediately.

- d. Employees who have experienced an off-the-job injury should consult their supervisor, Human Resources (HR) business partner and/or AECOM's Occupational Health Team for assistance in assessing their scope of work to determine any potential for risk of further complications. Adjustments to activities may be appropriate to facilitate a return to full health.
- e. Specific work environments and/or activities may warrant a fitness for duty assessment program to assess employees' / candidates' fitness for duty prior to assignment to identify potential physical, mental, and emotional risk to the individual, and to take appropriate action given the identified risk.

When risks indicate a fitness for duty assessment program is necessary, an appropriate program shall be developed specific to that identified risk through consultation with Regional HR, Legal (labor and employment counsel) and SH&E (including the Occupational Health Team) and approved by the applicable Regional Executive and AECOM's Corporate labor and employment counsel. Programs shall identify:

- i. Assessment requirements (including methods to restrict results to those needed to assess the risk).
 - ii. Involved parties and associated responsibilities.
 - iii. Methods to maintain confidentiality in accordance with Global Privacy Notice – AECOM Global.
 - iv. Actions appropriate to the assessment results and the risk prior to assignment (e.g., who is consulted when a risk to the individual is identified).
 - v. Fitness for duty assessment prior to assignment shall involve informing the employee / candidate of the work environment and/or activity's exposures and expectations.
- f. Where an incident has occurred and there is reason to believe the individual may not have been fit for duty the local SH&E team and HR business partner shall be contacted immediately.

0.5 Fatigue Management

- a. The responsible manager or supervisor shall assess the activity and task specific risks, duration and exertion level as appropriate, and mitigate them to an appropriate level to enable the employee to effectively manage fatigue hazards.
- b. Employees shall work within prescribed guidelines, including a maximum of 14 hours a day, 60 hours a week, unless additional risk management strategies are implemented, such as increased supervision or additional rest breaks, to combat the effects of fatigue.
- c. The SH&E Plan shall address fatigue issues as part of the risk assessment.

0.6 Drugs & Alcohol (Including Prescription Medication)

- a. AECOM prohibits employee use, possession, presence in the body, distribution, manufacture, concealment, transportation, promotion or sale of the following items or substances when providing services on behalf of AECOM or when on or in AECOM / client property:
 - i. Illegal drugs (or their metabolites), designer and synthetic drugs, mood- or mind-altering substances and drug use related paraphernalia unless authorized for administering currently prescribed medication.
 - ii. Controlled substances that are not used in accordance with physician instructions or non-prescribed controlled substances.
 - iii. Alcoholic beverages while at work or while on any customer or AECOM controlled property. This prohibition on alcohol applies whenever an employee is on-duty, including during meal or break periods, while on Company premises, or while representing AECOM. AECOM may make exceptions and permit the consumption of alcohol beverages at work-related events, such as Company-sponsored or approved business meals, conferences, or holiday events. Employees who choose to consume alcohol on approved occasions are expected to exercise good judgment and to refrain from becoming intoxicated or impaired. If an employee has consumed alcohol and needs transportation home, the Company will reimburse the cost of a taxicab or other reasonable costs of transportation so that the employee may avoid driving.

- b. AECOM does not prohibit lawful use and possession of current medication prescribed in the employee's name or over-the-counter medications. Employees are expected to consult with their health care provider about any prescribed medication's effect on their ability to perform work safely and/or any associated work restrictions.
- c. An employee whose ability to perform work safety may be impaired due to consumption of a prescribed or over-the-counter medication shall disclose to their supervisor, HR business partner, or Occupational Health Team, only those effects or restrictions applicable to safe performance of work.

0.7 Emergency Planning

- a. Each AECOM office and worksite SH&E Plan shall include a site-specific Emergency Response Plan (ERP) suitable to the location and local requirements. The author of the ERP shall check with applicable stakeholders (e.g., client, site owner, building manager, landlord, etc.) regarding the various parties' current emergency procedures and will incorporate these, as appropriate, into the AECOM Emergency Response Plan.
- b. Project Managers are responsible for emergency planning regarding SH&E risks on project work and for recording their arrangements within the project documentation. Plans shall include confirming appropriately trained personnel are on site as required, and emergency equipment and supplies are available and in operable condition. Inspection, testing and maintenance of emergency and first aid equipment shall be identified, scheduled and undertaken in accordance with local legislative and manufacturer requirements. Affected personnel shall be briefed on the arrangements, trained in their roles and responsibilities, and be knowledgeable about alarm and communication requirements. Testing and evaluation of the plan is achieved through review of actual incidents and mock drills.
- c. SH&E Plans shall comply with client requirements and specifications, shall be appropriately posted, and will typically contain the following:
 - i. Reporting Procedures for Fires, Environmental Incidents and Other Emergencies.
 - ii. Alarm System and Security Measures.
 - iii. Evacuation Routes, Assembly Points, Shelter In Place Procedures.
 - iv. Extreme / Severe Weather Planning.
 - v. Natural Disaster Planning (e.g., earthquake, flood, etc.).
 - vi. Critical Equipment / Operations Procedures.
 - vii. Assisting Disabled or Medically Restricted Personnel.
 - viii. Personnel Accounting Procedures.
 - ix. Rescue and Medical Duties.
- d. Emergency response personnel (e.g., evacuation coordinators, first aid responders, fire wardens, etc.) shall be identified in accordance with potential emergencies, legislation, and requirements of the site-specific SH&E Plan.
- e. The number of first aid persons / appointed persons and standard of qualifications will differ due to the varying risk level associated with different environments and activities. First aid or appointed persons shall be identified to meet first aid requirements in accordance with legislation and the requirements of the site-specific SH&E Plan.

0.8 Incident Reporting, Notifications, Investigation, and Injury Management

- a. All work-related injuries, illnesses and incidents, including those of employees and subcontractors under direct AECOM control, shall be reported to an AECOM supervisor immediately. Any associated regulatory notification requirements of the applicable jurisdiction shall be met.
- b. Injuries, illness and incidents shall be entered into IndustrySafe using the initial incident form within one business day of the event.
- c. For company-wide SH&E statistics, OSHA recordkeeping requirements shall be used in all Regions / Business Lines. To comply with local regulations, additional SH&E reporting and statistics may be required to be maintained.
- d. Where required, injury logs shall be signed by senior management of Operations.

- e. A formal investigation process (e.g., Why Tree, 5-Why) shall be utilized to determine root causes and contributing factors for all recordable and high potential incidents ([HiPos] assessed at a risk rating of 10 or above using the AECOM Risk Matrix). Refer to section 'Hazard Identification & Risk Management' for an explanation of the AECOM Risk Matrix.
- f. All records applicable to an incident shall be retained as defined in the AECOM Records Retention Procedure and as necessary to manage any future action associated with the incident.
- g. Executive Incident Reviews shall be performed for all high potential or high actual consequence (HiPo) incidents.
- h. The Executive Incident Review (EIR) shall be presented by the respective Project Manager to the appropriate executive / leadership (Geography, Business Line, Region, Legal, Human Resources, etc.) and Regional SH&E Director. The following table provides direction concerning EIR content:

Required EIR Content	Optional EIR Content
Cover slide	Agenda
Project Description / Scope	Invitee Guidance
Incident Summary - Overview and Actual Risk	Incident Summary - Potential Risk
Investigation - Investigation Team / Interviewees	Incident Summary - Involved Employee Background
Investigation - Applicable Photos / Sketches	Investigation - Hazard Assessment (Photo of document)
Investigation - Timeline / Details	Investigation - Project Planning & Execution Efficacy
Immediate Incident Response and Care Management	Results - Cost
Ongoing Care Management	Invited / Attended
Why Tree or other Root Cause Analysis	
Results - Corrective and Preventative Actions	
Results - Lessons Learned Summary	
Discussion / Questions / Comments	

- i. Injuries shall be managed in accordance with the procedure(s) applicable to the jurisdiction.
- j. When possible and unless restricted by local regulation or law, labor agreement or client provided treatment, a supervisor (or designee) should escort an injured employee to the initial physician visit. The Supervisor shall confirm that the Company's return to work policy is followed and assist in communication between the injured employee and management.

0.9 Ground Transportation / Motor Vehicles

- a. When traveling for business purposes (excluding commute to and from work), two-wheeled modes of transportation (e.g., bicycles, motorbikes, etc.) are prohibited unless specified and approved in the applicable SH&E Plan.
- b. The below requirements apply to employees who operate motor vehicles that are owned, rented, or leased by AECOM and to employees who use personal, client or government-supplied vehicles while conducting AECOM business.
 - i. Motor vehicles shall be selected, equipped, operated, and maintained in a way that protects personnel from harm.
 - ii. At-risk driving behavior by AECOM employees shall be identified and managed appropriately (e.g., retraining, driving restrictions, disciplinary action, etc.).

- iii. Motor vehicle operators shall adhere to all local laws including, signs, postings, regulations, ordinances, and codes applicable for the jurisdiction in which the motor vehicle is being operated.
- iv. Commercial motor vehicles and operators are required to meet the jurisdiction's applicable commercial motor vehicle regulatory requirements.
- v. Only licensed and appropriately insured drivers, who are fit for duty, shall operate a motor vehicle.
- vi. Travel shall be assessed to allow for safe management of the journey.
 - 1. Drivers who are to undertake trips in excess of 250 miles (400 km) each way, drive in remote or hazardous areas, or when otherwise deemed necessary, shall develop and document a Journey Management Plan.
 - 2. Plans typically include the route, location of route hazards, timing, rest periods and locations, communications, emergency response and security arrangements.
 - 3. Appropriate planning shall include, but not be limited to, personal protective equipment, competence in vehicle recovery, positive communications, and ensuring adequate drinking water and supplies are available in the event personnel become stranded.
- vii. The use of electronic devices that may distract the driver while driving is prohibited. This includes cell phones, two-way radios and other items whether hand-held or hands-free.
 - 1. GPS units and devices (e.g., smart phones, tablets) used for navigation may only be used if factory installed or secured to the vehicle with a bracket that allows the driver to view the image without having to take their eyes off the road.
 - 2. Electronic devices shall be setup for operation prior to commencing driving activities and shall not be changed by the driver while driving.
- viii. Motor vehicle occupants are required to wear seatbelts at all times when the vehicle is in operation.
- ix. When driving in off-road conditions employees shall confirm they have a fit for purpose vehicle and have experience or training for the conditions.

0.10 Consultation & Communication

- a. AECOM shall provide appropriate resources, time, training, and methods to facilitate SH&E communication and consultation between management and employees. Any identified barriers to effective communication and consultation, such as language barriers, or fear of reprimand, shall be appropriately addressed and removed to allow for employee participation.
- b. AECOM leadership shall promote awareness of SH&E issues in AECOM offices, facilities, and worksites through such approaches as the use of banners, SH&E notice boards, AECOM's intranet, newsletters, alerts (including those issued by clients), key performance indicators and other SH&E-related material.
- c. Communication and coordination amongst key stakeholders (e.g., AECOM personnel, subcontractors, clients, teaming partners, regulatory bodies, etc.) shall be conducted as appropriate throughout the lifecycle of a project to safeguard our employees, subcontractors, the public and the environment.
- d. Values moments should be shared in every meeting via webcast, telephone, video conference, or live. When the Values moment is not safety-related, safety should be included in the agenda.
- e. As appropriate, employees shall be consulted during SH&E activities. Associated SH&E documentation shall be completed and provided to affected personnel as a method of SH&E communication (e.g., SH&E hazard assessments, plans, permits, inspections, investigations, lessons learned, etc.).
- f. All personnel are encouraged to discuss any SH&E concerns, good practices or ideas with their Supervisor, and to enter SH&E observations within LifeGuard or IndustrySafe. Content shall be monitored by the SH&E Team and appropriate response or close-out action taken.

- g. Regular SH&E meetings shall be conducted between management and employees. Frequency as established in the applicable SH&E Plan shall be met.
- h. AECOM encourages the establishment of SH&E committees, including Safety Leadership Teams (SLTs), with the aim of allowing a direct interface between management, SH&E team, and other employees.
- i. Where established, the requirements of these committees or SLTs should be developed; basic agenda, membership composition, frequency of meetings (at least quarterly), with meeting minutes published and posted for employees to access.
- j. Requests for information from external interested parties shall be reviewed and dealt with on a case-by-case basis and in accordance with legal, AECOM and client requirements. Project related requests shall be managed by the associated Project Manager, with necessary assistance provided by the SH&E Team.

0.11 Recognition and Rewards

- a. Rewards and recognition programs shall be developed and implemented to recognize individuals, teams, projects, and offices that meet established criteria in SH&E performance. Project rewards and recognition programs shall be included in the project's SH&E Plan.
- b. All levels of supervision are encouraged to recognize the SH&E initiatives, milestones and efforts made by those who work with them on an ongoing basis. This recognition may be as simple as publicly thanking an employee for reporting hazards, taking the time to do a job safely, participating in SH&E Committees, or refusing unsafe work. This recognition will also include team, project, and office recognition of achievements in SH&E.

1 Exposure Management

1.1 Toxic and Hazardous Substances

- a. Where there is a risk of exposure to toxic and hazardous substances, the activity and task shall be assessed for employee exposure and, as applicable, appropriate hazard controls developed, implemented, communicated, and maintained.
 - i. While hazardous substances commonly encountered on worksites include asbestos, silica, benzene, cadmium, chromium (VI), hydrogen sulfide, and lead, any other toxic or hazardous substances that may be encountered by AECOM employees (e.g., ammonia, arsenic, coal dust, isocyanates, mercury, etc.) shall also be assessed.
- b. When the assessment identifies the potential hazard of toxic or hazardous substance exposure, medical screening and surveillance requirements shall be defined if applicable to the substance and jurisdiction.
- c. Employees shall be informed of the hazards of the chemicals to which they may be exposed in the course of their work (e.g., container labeling, training, etc.). The Global Harmonization System shall be applied in alignment with the applicable jurisdictional requirements.
- d. Appropriate training and guidance shall be provided to employees to eliminate or control occupational exposures to toxic or hazardous substances (gas, vapor, aerosol [dust], mist, fume, fog, fiber, smoke) to the lowest level practicable.

1.2 Industrial Hygiene & Medical Screening

- a. Industrial hygiene hazards shall be identified, including as applicable, toxic and hazards substances, physical agents (acoustic, thermal, etc.) and biological airborne contaminants. To the extent possible, the associated risks shall be reduced to as low as reasonably practicable, given the available technology and known toxicological or adverse human health effects.
- b. Only competent and trained personnel shall perform work where employees and subcontractors are exposed to industrial hygiene hazards.

- c. Current exposure limits identified by the *American Conference of Governmental Industrial Hygienists* (ACGIH) shall be used as the maximum exposure limit. Exposure limits established by local regulatory standards or consensus standards that are more conservative than those identified by ACGIH shall be applied in the applicable jurisdiction.
- d. Medical screening and surveillance shall be conducted as necessary based on potential exposures and regulatory requirements.
- e. Appropriate hazard control measures shall be in place where exposures will be above established occupational exposure levels.
- f. Project SH&E Plans shall specify exposure limits and action levels.

2 Planning & Oversight

2.1 Safety in Design

- Safety in design shall be incorporated into the design and constructability aspects of temporary and permanent facilities, structures, and processes from concept to completion, including proposals and marketing, engagement of subcontractors, construction operations and subsequent operation, maintenance, and demolition of the product.
- Where the principles of safety in design are not required by law, the practices of safety in design shall be incorporated in the design and building aspects of temporary and permanent facilities, structures and processes to minimize risk to people, and capitalize on intrinsic efficiencies of an enhanced design process.

2.2 Hazard Identification and Risk Management

- a. The Project Manager shall confirm risk assessment processes are conducted to identify hazards and manage the associated risks applicable to the location. Risk assessment processes shall be utilized throughout the lifecycle of the project:
 - i. SH&E risk assessment during the pre-bid stage of a project is conducted to inform the go / no go decision as well as identify potential SH&E planning, budgetary and staffing requirements. Please refer to *S2-001-ATT4 Catastrophic and Critical Consequences Guidance* for a listing of potential events or outcomes to be considered in relation to a project's work scope.
 - ii. Project start-up activities require appropriate SH&E planning prior to work commencing, including identification of hazards, associated risk, and appropriate controls for each task and operation found in the work scope. Completed risk registers / hazard assessments shall be incorporated into the Project's SH&E Plan.
 - iii. Project execution activities shall confirm the Project SH&E Plan is reviewed and hazards are further assessed given current conditions. To capture nuances or site-specific conditions immediately present that are otherwise unacknowledged, task hazard assessments (THAs, also known as Safe Work Method Statements, Field Level Risk Assessments, Risk Assessment Method Statements, etc.) must be completed and reviewed immediately prior to initiating the task at the work location by those conducting the task.
 - iv. SH&E performance reviews at close-out of a project shall be conducted to identify successes and any potential improvement opportunities. As appropriate, preventive actions shall be developed with the goal of continual improvement to industry-, client-, or location-specific SH&E activities, as well as the AECOM SH&E Management System.
- b. The manager shall plan required SH&E activities and incorporate SH&E procedures into the location or project SH&E Plan. The SH&E documentation for any project lasting twelve (12) months or longer will be reviewed at periodic intervals, but at least annually.
- c. Where necessary, the Project Manager shall seek input from the relevant SH&E team and affected workers into the planning process.

- d. Risk assessment processes shall identify the hazards and mitigations or controls required to eliminate or reduce the associated risk to as low as reasonably practical for each hazard.
- e. Those involved in a documented risk assessment shall include trained and competent personnel in hazard identification and use of risk management tools and processes.
- f. Results shall be communicated to affected personnel (e.g., SH&E Plans, Tailgate meetings, daily safety huddles, review of documented assessments, etc.).
- g. Risk mitigations or controls shall be monitored on an ongoing basis for effectiveness.
- h. A risk ranking shall be performed for pre- and post-mitigation efforts. The risk ranking shall be completed using the following AECOM Risk Matrix:

Probability	Severity				
	5 - Catastrophic	4 – Critical	3 – Major	2 – Moderate	1 - Minor
5 – Frequent	25	20	15	10	5
4 – Probable	20	16	12	8	4
3 – Occasional	15	12	9	6	3
2 – Remote	10	8	6	4	2
1 - Improbable	5	4	3	2	1

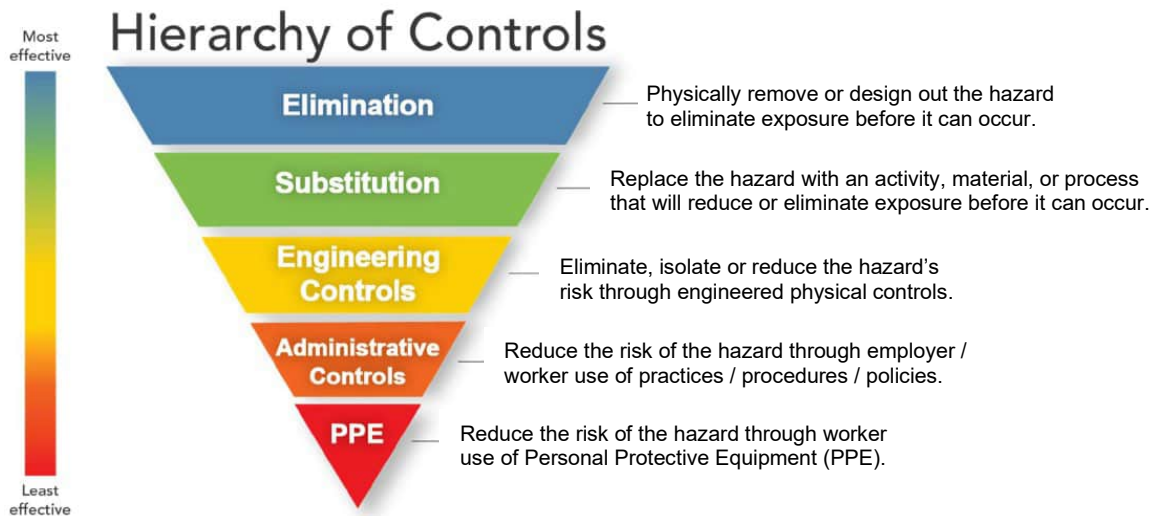
- i. If the final risk rating is a 5-9 (medium risk) or 10-25 (high risk), additional hazard controls shall be identified and applied until the final risk rating is reduced to 4 or below. If the final risk rating cannot be reduced to 4 or lower, additional approvals, as shown below, are required before the activity can begin.

Risk Rating (Probability x Severity)	Risk Acceptance Authority
1 to 4 (Low)	Risk is tolerable, manage at local level
5 to 9 (Medium)	Risk requires approval by Supervisor or equivalent
10 to 25 (High)	Risk requires the approval of the Project Manager & SH&E Director

Severity – Potential Consequences				
	People	Property Damage	Environmental Impact	Public Image/Reputation
Catastrophic	Fatality, Multiple Major Incidents	>\$1M USD, Structural collapse	Offsite impact requiring remediation	Government intervention
Critical	Permanent impairment, Long term injury/illness	>\$250K to \$1M USD	Onsite impact requiring remediation	Media intervention
Major	Lost/Restricted Work	> \$10K to \$250K USD	Release at/above reportable limit	Owner intervention
Moderate	Medical Treatment	> \$1K to \$10K USD	Release below reportable limit	Community or local attention
Minor	First Aid	</\$1K USD	Small chemical release contained onsite	Individual complaint

Probability		
Frequent	Almost certain to occur during task/activity	9/10
Probable	Likely to occur during task/activity	1/10
Occasional	May occur during the task/activity	1/100
Remote	Unlikely to occur, though possible during task/activity	1/1,000
Improbable	Highly unlikely to occur during task/activity	1/10,000

- j. The Project Manager shall review the risk assessments incorporated in the SH&E Plan on site and modify them if circumstances are different or change during the work. Site personnel shall sign the SH&E Plan initially and after any changes to show they have read and understood it.
- k. Situations may arise that were not foreseen or accounted for when the operating procedures or plans were developed. The purpose of Management of Change is to protect personnel from hazards caused by major changes in the scope of work. Stop work shall be initiated and appropriate changes in the way the operations are conducted shall be identified so the work can recommence and be performed safely. The changes may be temporary or permanent. A record of the Management of Change shall be documented and employee training on the change completed before work restarts.
- l. Mitigation of Hazards
 - i. Supervisors shall refer to the SH&E Plan to confirm task-based risks are managed in accordance with the hierarchy of controls.



- ii. Advance planning enables Safety in Design to be applied to systems, equipment and work areas in order to eliminate, substitute, or apply engineering controls to the hazard.
- iii. When determining appropriate controls to mitigate the risk presented by each hazard, the most effective controls (ordered from the most effective at the top of the image above to the least effective at the bottom) shall be assessed and applied as is practicable, with PPE considered the last line of defense.
- iv. Layers of control or redundancy shall be established whenever possible (utilizing multiple means e.g., engineered control further supplemented by safe work practices and PPE).
- v. When PPE is required, specific basic and/or specialized PPE shall be identified in the SH&E Plan. Supervisors will verify workers and visitors have access to the appropriate PPE and that workers and visitors are properly trained and competent in the use and requirements related to the given PPE. Advice on the use, care, storage and maintenance of PPE is available on the company intranet, or from the SH&E Team.
- vi. Managers shall assess the workplace for potential violence scenarios and incorporate findings into the emergency preparedness and response planning where applicable.

2.3 Personal Protective Equipment (PPE)

- a. The following basic PPE is required to be worn at all times on industrial sites:
 - i. Hard hat/ bump cap (selected based on applicable hazards), safety glasses with side-shields, work boots, full length trousers, shirt with sleeves, gloves.
 - ii. All personnel shall have gloves in their immediate possession 100% of the time when in a shop or on a work site. Appropriate gloves shall be worn when employees work with or near any materials or equipment that present the potential for hand injury due to sharp edges, corrosives, flammable and irritating materials, extreme temperatures, splinters, etc.
 - iii. PPE shall be worn at all times on industrial sites unless the employee is in an area clearly marked and the differing PPE requirements defined, in which case the area's requirements shall be met.
- b. All personal protective equipment required for the identified hazards shall meet applicable standards (e.g., approved safety glasses worn in environments presenting eye hazards [meaning prescriptive eyewear shall also meet applicable safety standards when eye hazards are present], appropriate class / type of hard hat in a high voltage electrical environment, etc.).
- c. All personal protective equipment shall be in good working condition and maintained to manufacturer's specifications. Defective or damaged equipment shall be discarded and replaced.

2.4 Permit Required Activities

- a. All work activities shall be evaluated to determine if work permits or specific plans are required.
- b. Activities requiring a completed permit or specific plans before work begins (e.g., confined space, lockout / tagout, electrical, hot work, fall protection, radiation, blasting and explosives, temporary protection, critical lifts, excavation, underground work) to safely perform work shall be planned, managed, and executed by competent personnel.
- c. Additional tasks (e.g., core drilling, perimeter work, elevator shaft work, stair installation, etc.) shall be assessed based on risk, regulatory requirements and client requirements to determine whether Permit to Work processes are required.
- d. The responsibilities, accountabilities, training and competency requirements for the permit issuer, individual permit holders and persons performing permitted tasks shall be clearly defined.
- e. All personnel undertaking work requiring a permit shall be made aware of the hazards, how the hazards are being controlled, and the permit conditions that are required to be met.

2.5 Oversight of AECOM Subcontractors / Subconsultants

- a. Subcontractors / subconsultants that work for or on behalf of AECOM will be selected/ prequalified in accordance with AECOM's subcontractor management procedure / process.
- b. Subcontractor / subconsultant SH&E plans and applicable procedures shall be reviewed prior to initiation of work.
- c. Subcontractors / subconsultant SH&E plans and applicable procedures shall comply with the client and AECOM site specific SH&E plan.
- d. AECOM shall monitor performance and conduct and report on routine inspections of work activities of subcontractors / subconsultants. Feedback shall be provided as appropriate.
- e. Subcontractors / subconsultants shall immediately report all incidents to AECOM and investigate as appropriate.
- f. Subcontractors / subconsultants shall follow equivalent due diligence processes for any lower-tiered subcontractors.

2.6 Environmental Procedures

- a. AECOM project and office SH&E Plans shall document the identification and assessment of the various environmental aspects and impacts resulting from our business activities. These can be positive or adverse, direct (under AECOM direct control) or indirect (e.g., those created by the activities of our partners and contractors / suppliers).
- b. Full account is taken at each stage of office and project activities including under normal / abnormal operating conditions and contingencies (incidents, emergency situations), past / present / foreseeable activities, partner / supplier activities and so on.
- c. As applicable to the activities and tasks, the environmental impacts and aspects shall each be assessed for significance to develop, document, and implement suitable and sufficient controls, emergency arrangements, and procedures for identifying, assessing, and managing environmental sustainability for the following considerations:

– Air Quality and Pollution. – Contaminated Land. – Ecology, Archaeology and Cultural Heritage. – Noise. – Resource Consumption. – Statutory Nuisance. – Traffic Management.	– Waste Management. – Water Quality and Pollution. – Dust Control Measures. – Storm Water Management. – Spill Response. – Delivery, Storage and Refueling of Fuel, Oil and Chemicals. – Energy and Water Use, Recycling.
- d. In addition, when planning new processes, the environmental risks and impacts are re-assessed in light of any specific, new, or changed factors posed by the proposed new activity and location in accordance with the procedures for risk management and management of change.
 - i. The results of these assessments are collated into a country-specific Register of Environmental Aspects and Impacts (as applicable) which is reviewed upon major activity change and / or at least annually and updated accordingly.

2.7 Regulatory Agency Visits

- a. Visits or inspections by regulatory agencies for the purpose of these requirements include:
 - i. Any non-routine announced or unannounced visit or inspection of an AECOM office or project site by a regulatory agency involved with Occupational Health and Safety and Environmental laws and regulations.
 - ii. Periodic visits from service or local agencies to project sites to approve certain activities such as utility hook-up, utility clearance, etc. are not considered regulatory visits or inspections.
- b. The Project Manager shall:
 - i. Confirm a senior AECOM employee meets with the agency representative to obtain copies of credentials, determine the purpose of the visit or inspection and to request applicable documentation.
 - ii. Confirm the visit or inspection is reported in IndustrySafe as an incident within one business day.
 - iii. Confirm notification of the relevant Regional SH&E Director and SH&E Manager of the visit or inspection.
 - iv. Notify the client a regulatory visit or inspection is occurring on their project site so the client may have representation during the visit or inspection, at their discretion.
 - v. Confirm an appropriate AECOM escort is identified and accompanies the agency representative at all times to address questions, observe activities and monitor evidence gathering (this may include obtaining duplication of evidence, such as dual photos and split samples).

- vi. Confirm copies of the visit record and other documents or postings that the agency representative may issue are obtained.
- vii. Request a debrief session.
- viii. Where a citation, violation, or penalty was issued:
 - 1. Confirm direction is given to the local employees to stop the performance of the cited activity until the appropriate corrective actions are implemented.
 - 2. Confirm any required posting is completed in accordance with the directions outlined by the agency.
 - 3. Confirm a formal response is submitted to the issuing agency and facilitate payment of any associated monetary fine after approval from Counsel.
 - 4. As applicable, serve, or designate an appropriate individual to serve, as AECOM's informal and formal agency negotiation meeting representative to discuss the citation, violation, or penalty.

2.8 Office Safety

- a. Each AECOM office will develop an Office SH&E Plan in accordance with the template provided on the company intranet.
- b. Managers shall confirm that employees understand any specific risks, are briefed in the correct emergency response procedures, and have access to emergency equipment.
- c. All visitors to the office shall sign in and be given an SH&E orientation / induction.
- d. All offices shall have an SH&E noticeboard in place with current relevant materials posted to include but are not limited to the AECOM SH&E Policy, Life Preserving Principles as well as any other local regulatory or geography specific information.
- e. Offices shall be inspected to identify and address any specific hazards. Hazards shall be controlled or have actions in place to mitigate the risk.
- f. Safety committees shall be established in accordance with jurisdictional requirements and as a minimum, in AECOM offices of more than 50 employees.
- g. All office equipment and workstation design and installation shall take ergonomic performance into account. Equipment and workstations shall be, as far as practicable, designed and installed to suit the individual(s) interacting with them.
- h. Workplace ergonomic hazard assessments shall be performed when necessary and required controls implemented as far as practicable.

3 Field

3.1 Confined Space Entry

- a. All confined spaces shall be evaluated and classified by a competent person as permit or non-permit.
- b. Efforts shall be made to eliminate the need to enter a confined space where practicable.
- c. Confined space entries shall be planned and managed by competent personnel.
- d. Only trained, authorized, and fit for duty personnel shall enter, or attend the entry of, a confined space.
- e. No entry shall occur without an assessment that includes hazard identification and appropriate hazard control measures (e.g., suitable atmospheric testing requirements defined, inspection requirements to confirm equipment is fit for purpose, etc.).
- f. A rescue plan shall be prepared and communicated to the entry and rescue teams.
- g. Confined space entry shall never be conducted alone.

- h. Atmospheric testing is required for all permit-required confined spaces, and if necessary to confirm absence of atmospheric hazards in non-permit confined spaces.

3.2 Working at Heights / Fall Protection

- a. An assessment shall be completed prior to the start of working at heights.
- b. Where practicable eliminate the need to work at heights. Alternatively, a safe working platform shall be a priority (e.g., elevated lift or scaffolds). Fall prevention shall take preference over fall arrest systems.
- c. As a minimum standard, fall protection is required and will be provided for any work/job/task to be performed above the normal walking/working surface at heights of 6 feet (2 meters) or greater in the construction, mining, and demolition industry, and 4 feet (1.2 meters) or greater in all other industries. Local regulatory standards or consensus standards that are more conservative than this minimum standard shall be applied in the applicable jurisdiction.
- d. Only competent / qualified / trained personnel shall select and use personal fall prevention/arrest systems or access equipment that provides appropriate protection from falls (e.g., aerial lift, scaffold).
- e. Edges shall be considered when evaluating proper fall protection.
- f. Only competent / A rescue plan for personal fall arrest systems shall be in place for work at heights.
- g. Material and tools used at heights shall be adequately secured or prevented from falling and an appropriate exclusion zone shall be established when working at heights.
- h. Three points of contact (two hands and one foot, one hand and two feet) shall be maintained when accessing ladders or other structures. Ladders shall not be used as a working platform.

3.3 Demolition

- a. Demolition operations shall be planned and managed by competent personnel. Where appropriate to accurately identify applicable hazards, an engineering survey of the structure shall be incorporated into the work planning (e.g., planning for mechanical equipment, debris containment, etc.).
- b. Applicable permit to work processes shall be followed prior to demolition work commencing.
- c. An assessment shall be completed that identifies and documents the hazards and controls associated with the planned demolition activities.
- d. The demolition structure shall be assessed for the presence of harmful materials. Methods for monitoring, testing and management of potential exposures to atmospheric contaminants will be established and evaluated by a qualified person.
- e. All activities involving demolition equipment, explosives and blasting shall be managed by competent and authorized personnel.
- f. All sources of energy including, but not limited to, electric, gas, water, steam, sewer, and other service lines shall be isolated.

3.4 Energy Isolation

- a. Where the release of energy during major replacement, repair, renovation, or modification of machinery, equipment, or systems or during installation of new machines, equipment or systems may cause injury to personnel, an assessment shall be conducted.
- b. Lockout tagout (LOTO) activities are required when:
 - i. An unexpected energization or start-up of machines and/or equipment would result in the release of stored energy which could cause injury to an employee.
 - ii. Any employee (or contractor) is required to remove or bypass a guard or other safety device.

- iii. Any employee (or contractor) is required to place any part of their body into the mechanism of a piece of equipment or path of hazardous energy.
- c. No work shall be initiated (including LOTO procedures) prior to obtaining any required work permits.
- d. Only qualified and licensed personnel shall be allowed to work on energized systems including testing and tagging of equipment.
- e. Competent personnel shall verify systems are de-energized prior to conducting work activities.
- f. Locks shall not be removed without proper authorization.
- g. Identify and communicate to all affected personnel and to all employees whose work operations may be in an area where LOTO procedures may be utilized.
- h. LOTO procedures shall include requirements applicable to:
 - i. Shut-down of equipment or request for de-energization of an energy source(s).
 - ii. Lockout of energy source(s) and tagging to identify the lockout controls and parties involved.
 - iii. Inspection and verification of de-energization, and application of locks and tags.
 - iv. Methods to coordinate multiple locks and the continuation of LOTO protection through shift or personnel changes.
 - v. Control and accountability of locks and tags, including processes for emergency lock removal.
 - vi. Equipment-specific LOTO procedures.

3.5 Electrical Safety

- a. All applicable electrical codes, SH&E procedures and manufacturer's specifications shall be followed to eliminate the need to directly work on live electrical systems where practicable.
- b. Electrical work, (meaning work associated with equipment or systems of 50 volts or greater, or a current of 20 amps or greater) shall be assessed, planned, and managed by competent personnel.
- c. Only competent and authorized personnel shall perform work on live electrical system components.
- d. Written and approved justification is required to work on energized systems and is only authorized when de-energizing introduces additional or increased hazards or is infeasible due to equipment design or operational limitations (life supporting interruptions, deactivation of emergency alarms, shutdown of ventilation equipment in hazardous location).
- e. A permit to work process shall be established and implemented for live electrical work.

3.6 Excavation & Trenching

- a. Excavation and trenching operations shall be planned, managed, and executed by competent personnel.
- b. Applicable permit to work processes shall be followed prior to excavation or trenching activities commencing.
- c. Before any excavation work is undertaken, an assessment shall be conducted to identify, assess, and manage the hazards present.
- d. Overhead obstructions and underground utilities / installations shall be clearly identified.
- e. Appropriate control measures to prevent contact with overhead obstructions and underground utilities / installations, including establishing suitable clearances, shall be in place prior to work commencing.
- f. Fit-for-purpose equipment, protective systems (e.g., barriers, lighting, signage, etc.), and means of access/egress shall be selected, installed, operated, and maintained in a way that minimizes the risk of injury to personnel and the public, and damage to property.

- g. Inspection of excavations (as a minimum, any excavation greater than 1.5 meters [5 feet]) and any protective systems shall be undertaken by a competent person as appropriate to the conditions and in compliance with regulatory requirements.

3.7 Underground Work / Tunneling

- a. Tunneling operations shall be planned, managed, and executed by competent personnel.
- b. Project managers or supervisors are responsible for confirming employees involved in underground work possess any required training, registrations, or certifications.
- c. Applicable permit to work processes shall be followed prior to underground work / tunneling activities commencing.
- d. Before any underground work is undertaken, an assessment shall be conducted to identify, assess and manage the hazards present.
- e. A safe means of access to and egress from all work locations shall be provided and access to all openings controlled to prevent unauthorized entry.

3.8 Heavy Equipment

Heavy equipment (also referred to as mobile equipment) includes, but is not limited to, equipment such as backhoes, excavators, skid steers, graders, loaders, dozers, tractors, cranes, drills, and draglines.

- a. Verify that employees comply with applicable regulatory, client and supplier requirements relevant to operating heavy equipment.
- b. Tower cranes and personnel hoists shall be inspected by an independent third party both at the third party's facility and at the site prior to mobilization.
- c. Heavy equipment shall be selected, equipped, operated, inspected, and maintained in a way that enables safe operation, protects personnel from harm, and conforms with regulatory and manufacturer requirements.
- d. Ground guides / spotters shall be used to facilitate safe movement of heavy equipment near personnel, equipment and utilities, and when obstructions or congestion present hazards to safe operation.
- e. Back up alarms or equivalent means to allow for safe reverse movement, are required on all heavy equipment.
- f. Daily documented inspections shall be completed on all heavy equipment prior to operation.
- g. Only authorized operators who are fit for duty and meet jurisdictional requirements shall operate heavy equipment.
- h. All local laws including signs, postings, regulations, and codes applicable for the jurisdiction in which the equipment is being operated shall be observed.
- i. Heavy equipment operations shall be adequately separated from light vehicles, workers and pedestrians. If separation is not possible, appropriate procedures shall be implemented to maintain the safety and health of personnel involved.
- j. Positive communication shall be implemented between ground personnel and heavy equipment operators.

3.9 Lifting Operations

- a. Lifting operations shall be planned, managed, and executed by competent personnel.
- b. Operators, riggers, banks-man, and inspectors shall be certified according to jurisdictional requirements to carry out their work as it relates to lifting operations.

- c. Fit-for-purpose lifting equipment shall be selected, positioned, installed, operated, and maintained in a way that minimizes the risk of injury to personnel or property damage. This is to include equipment used for incidental lifts.
- d. Inspection and testing of lift equipment shall be undertaken by a qualified person.
- e. No lifts shall commence without a lift plan in place and approval by a qualified person.
- f. Critical lifts require a formal, written plan. A critical lift is a non-routine crane lift (e.g., more than one crane or hoisting device, lifts over structures or equipment, load may be out of the operator's view, hoisting personnel, etc.) requiring detailed planning and additional or unusual safety precautions.
- g. Lift plans shall specify wind restrictions in accordance with jurisdictional requirements, manufacturer requirements. As a minimum 30 mph (48 km/h) shall be the maximum wind speed for material hoisting, and 20 mph (32 km/h) for hoisting of personnel.
- h. Audible alarms or equivalent communications means shall be utilized to alert personnel in the area immediately prior to the imminent lifting operation.
- i. Appropriate exclusion zones shall be defined and in place prior to lifting operations commencing so as to prevent the risk of injury from the equipment or the load falling or striking personnel, and may be comprised of physical barriers, warning signs, signage and/or spotters.
- j. Taglines shall be used to control load movement. If tagline usage poses a safety hazard this shall be reflected in the planned procedure and the task hazard assessment, and a short line of suitable length shall be attached to allow the worker to catch the load.

3.10 Working Alone

- a. An employee is considered a lone worker if he / she is performing work with no line of sight or direct voice communication with another person who is aware of their assignment and capable of initiating emergency response.
- b. When traveling alone, staff shall take appropriate precautions, including notifying their manager of the travel plans, check in times, as well as carrying a communication device and appropriate safety equipment.
- c. Managers shall plan work to restrict personnel from working alone on any site without an appropriate risk assessment, controls, and approvals. If an employee will be out of contact with other personnel, the manager shall establish a buddy system or check-in procedure with another employee or responsible person.
- d. Employees shall not conduct permit required or high residual risk tasks (e.g., confined space entry, work on an energized system) while working alone.
- e. Where employees are undertaking office / computer-based work alone outside of normal working hours, they shall confirm security measures are in place (e.g., lock doors), support can be contacted and provided in the event of an emergency, and where appropriate, check-in procedures are established.

3.11 Temporary Works

Temporary works are the structures and installations enabling permanent construction to take place (e.g., formwork, false work, precast, shoring, scaffolding, back propping, temporary structures, etc.).

- a. Temporary works shall be identified, designed and independently verified by appropriately qualified persons, and shall be installed in accordance with the design. Installation shall be verified by an appropriately qualified and competent person prior to initial use and loading.
- b. Temporary works shall be regularly inspected by competent persons.
- c. No changes to installed temporary works shall be made without prior acceptance of the designer, and if necessary, further design certification and independent verification of the changes.

- d. Temporary works shall be physically protected and secured where there is a risk of collision, or damage through adverse weather conditions or adjacent work practices.

3.12 Unmanned Aircraft Systems (UAS)

All AECOM operations using UAS shall be properly planned, managed, and executed to enable compliance to applicable requirements and prevent harm. AECOM has established the UAS Working Group; a team comprised of SH&E, Insurance, Operations, and UAS expertise. The UAS Working Group provides oversight of UAS operations to:

- a. Provide expertise and support for commercial UAS operations within AECOM to enable compliant, professional, and responsible operations.
- b. Review proposed UAS activities in AECOM for adherence to established procedures and operating guidelines, approval of personnel, performance in accordance with project work plans, and approval by UAS subject matter experts.
- c. Approve UAS operations as appropriate and coordinate approved UAS activities with the Insurance function for appropriate insurance coverage.
- d. Confirm field-level risk mitigation strategies are developed and integrated with the project work plans, and that flight safety briefings with all project personnel are conducted prior to the flights.

3.13 Working on or Near Water

- a. Work activities that entail operations on, above, under or near water shall be assessed for hazards and the hazards appropriately mitigated.
- b. If applicable to the identified hazards, a rescue plan and communication arrangements shall be established.
- c. The hiring or leasing of watercraft shall take into consideration the seaworthiness of the vessel and that only licensed personnel can operate the craft.
- d. Diving activities are prohibited unless specifically approved by the applicable Regional SH&E Director or designee (e.g., Diving Board).

3.14 Marine Safety & Vessel Operations

- a. Project managers shall confirm boats / vessels selected are appropriate to the planned work activities and vessel operators are licensed to operate in the applicable jurisdiction.
- b. All boats and vessels shall be properly equipped and operated by a qualified vessel operator (e.g., Marine Operations Superintendent, Master Mariner, Barge Captain, or similar authority and title) in accordance with the applicable jurisdiction's Marine Safety Laws.
- c. A site-specific SH&E Plan, Float Plan and any other SH&E planning documents shall be developed and in place prior to vessel operation.

3.15 Rail Corridors

- a. AECOM employees shall not enter a railroad right of way without appropriate coordination and approval by a local railway employee (or representative of the railway owner) with knowledge of the operation and means and authority to enable on track safety.
- b. Prior to performing work in a railroad right of way or railyard, AECOM employees will be provided with clear instructions applicable to the specific railroad operations, associated hazards, procedures, and requirements to enable employee safety associated with occupying the railroad right-of-way / fouling of tracks and the means of communication.
- c. AECOM employees and equipment shall not foul the track (be in such proximity to a track that the individual or equipment could be struck by a moving train or on-track equipment) without securing appropriate approvals.

- d. An on-site safety briefing shall be conducted at the start of the shift, after work breaks, and any time there is a change in the nature of the work, a change in method of on-track safety being provided, or a change in the work area environment. Additional parties shall be engaged and included as required and appropriate (e.g., host railroad employee with the means and authority to provide on track safety protection).
- e. Written documentation of the on-site safety briefing shall be provided by the AECOM employee-in-charge (EIC) of the work being performed on railway property.

3.16 Munitions & Explosives of Concern / Unexploded Ordnance (MEC/UXO)

- a. Prior to beginning any activities on a site suspected of MEC / UXO, every effort shall be made to determine whether munitions-related activities ever occurred on the specific work area or within waters on which AECOM operations/activities will take place.
- b. All MEC / UXO encountered or suspected on AECOM jobsites shall be treated as extremely dangerous. Employees shall not touch the suspected material and shall retreat. Employees shall identify the location, notify other team members, keep all employees out of the area, and report the finding to their supervisor.
- c. MEC support activities, including surface and subsurface removal activities, shall be handled by UXO-qualified personnel only.

4 Change Log

Rev #	Change Date	Description of Change	Location of Change
1	15-Jun-2015	Complete rewrite – integration of URS & AECOM programs	Various locations
2	01-Aug-2016	Refer to SH&E Management System Manual Edit Summary – August 2016	Various locations
3	01-Aug-2017	Refer to SH&E Management System Manual Edit Summary – August 2017	Various locations
4	14-Jan-2019	Rewrite and restructure into 1 manual and 3 attachments (this document as ATT3). Refer to SH&E Management System Manual Edit Summary – January 2019	Various locations
5	03-May-2019	Added reference to S2-001-ATT4 SH&E High Risk Events Guidance	Section 2.2
6	14-Jun-2023	Revisions throughout to align with current organizational terminology. Renumber from ATT3 to WI3.	Various locations
7	13-Dec-2023	Remove EIR Template reference and revise required / optional EIR content.	Section 0.8 h
8	21-Mar-2024	Added new bullet (e) and sub-bullets to section 0.4 Fit for Duty	Section 0.4 e
9	22-July-2025	Updated core value reference. Updated hazard assessment content and probability table.	Section 0.10 and Section 2.2
10	13-Nov-2025	Revised Risk Acceptance Authority for Medium Risk to “Risk requires approval by Supervisor or equivalent”	Section 2.2 (h.i.)

Safety Health and Environment

S4[DCS](EC)-001-PR1

1. Purpose and Scope

The purpose of this procedure is to define methods for project execution in accordance with the AECOM Global Corporate SH&E policies and programs. It has been developed to enable EC employees, to fully understand, and commit to this corporate responsibility.

All EC Employees are required to comply with and ensure adherence to fundamental office safety, health, and environmental requirements. When EC staff are seconded to a Lead Team office, they will work under the Lead Team office SH&E Management System.

This procedure applies to all projects undertaken by EC and all EC offices, and is based on five areas of emphasis:

- a. **Management Leadership:** As one of the 9 AECOM life preserving principles, the importance of our leadership team to exhibit safety as a core value is paramount. There are specific responsibilities for management outlined herein.
- b. **Safety for Life:** AECOM's "culture of caring" sets the vision and expectation for each employee, contractor, and business partner to take personal responsibility for keeping ourselves, colleagues, and others associated with our work safe and personally adopt safety as a core value. "Safety for Life" defines our commitment to achieving zero work-related injuries and/or illnesses, preventing damage to property and the environment, and maintaining an environment friendly and sustainable workplace.
- c. **Planning:** A comprehensive action plan supporting SH&E Policy – AECOM Global objectives is provided.
- d. **Implementation and Operation:** Systematic controls for implementing the SH&E Management System are provided. Training for effective SH&E implementation will be provided.
- e. **Monitoring and Continuous Improvement:** SH&E performance is continuously monitored and evaluated. Corrective action is taken as appropriate.
- f. **Management Review:** SH&E performance is reviewed on an on-going basis by EC senior management to assure continuous improvement and application of best practices.

2. Procedure

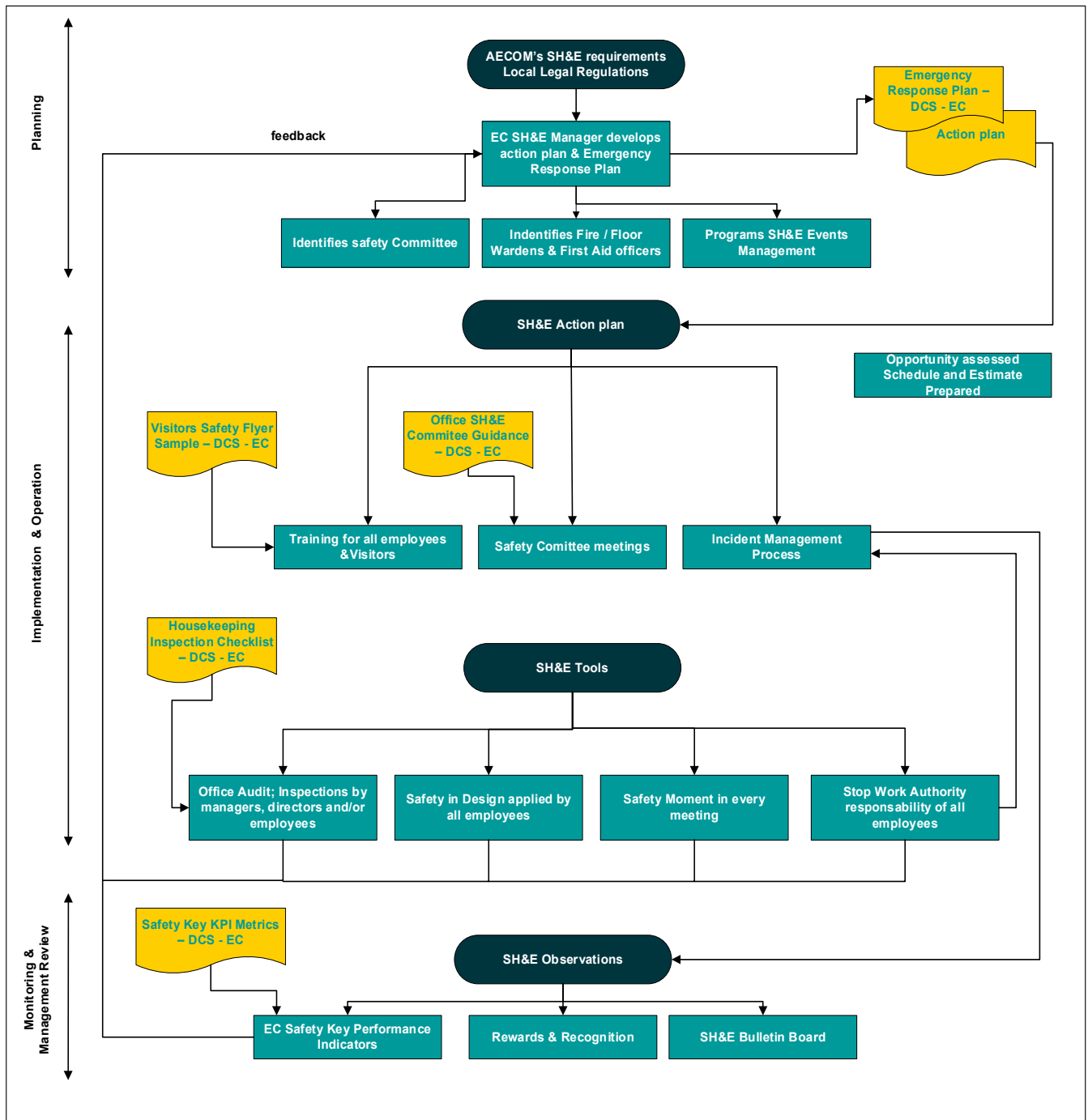


Figure 1 SH&E Processes and Tools

All employees are expected to promote safety, perform, and document safety inspections, and implement appropriate corrective actions to minimize risk and enhance SH&E performance. Each office shall assess the potential for violation and establish appropriate security procedures consistent with building manager's protocol.

3. Terms and Definitions

a.	Emergency Response Plan	A Specific Emergency Response Plan shall be developed at each EC office for an emergency evacuation of the office. All employees shall be familiar with the Emergency Evacuation Plan as part of their Induction Training. They shall know what to do in an emergency and how to obtain assistance, and follow the directions provided by the floor wardens and proceed to the designated assembly area. In the event of: – natural disasters, fire, medical incident, hazardous chemical spill, elevator malfunction, security incident, power failure, or any other situation which you judge as an emergency – notify your Supervisor and SH&E Manager as soon as practicable. SH&E Manager shall ensure that the appropriate resources are allocated and that the Emergency Response Plan is implemented. EC Leadership will decide the need for periodical testing across each office. Refer to Emergency Response Plan Template – DCS – EC.
b.	Fire / Floor Wardens and First Aid Officers / Providers	In the event of a medical, fire, or natural disaster emergency, fully trained and competent First Aid Officers and Floor wardens are to be in their designated location to provide assistance. In some localities, the property management provides appropriately trained Floor Wardens. A legible copy of the list of floor wardens (Fire Marshals & First Aiders) shall be maintained at respective EC office location by facilities discipline. Floor wardens shall be easily identified by a high visibility vest or other similar highly visible identification. A legible copy of list, inventory, and distribution record of First aid kit shall be maintained at respective EC office location by facilities discipline. Purchase of First Aid Kit shall be from an approved source.
c.	Safety Key Performance Indicator Metrics	Metrics established by EC Management for implementation, monitoring, and continual improvement of SH&E at EC offices. Refer to Safety KPI Metrics– DCS – EC. The leading metrics target is set by the local safety team in conjunction with EC management. However, the lagging metrics is governed by the regional AECOM SH&E guidelines.
d.	Safety Committee	The Safety Committee is a group of employees chosen to represent SH&E principles at each EC. They shall meet periodically to help assure that our "Safety for Life" commitment is visible to all employees, to collect and make decisions to ensure offices are safe places to work and uphold and proactively manage SH&E concerns with the collaborative participation of all employees. Refer to Office SH&E Committee Guidance – DCS - EC.
e.	Safety in Design (SiD)	Safety in design shall be incorporated in the design and building aspects of facilities, structures, and processes to minimize risk to people, and capitalize on intrinsic efficiencies of an enhanced design process from concept to completion, including proposals and marketing, engagement of sub-consultants, and subsequent operation.
f.	ESG/Safety Moment	Every meeting of five or more attendees (employees and non-employees) shall start with a Safety or Wellbeing Moment intended to share a Safety topic with all attendees. Meeting organizers are responsible for identifying an attendee to present or facilitate the Safety Moment (preferably other than an SH&E professional). Meeting agendas shall identify Safety Moments as a meeting item and meeting minutes shall include the Safety Moment topic.

- g. SH&E Bulletin Board Bulletin board dedicated to SH&E showing updated, relevant materials regarding Life-Preserving Principles as well as any other local legislative or geography-specific information. All postings shall be in the appropriate local language and in English.
- h. Management Sponsored SH&E Events EC provides an environment where employees are encouraged to voice their concerns on any SH&E issues within the business through participation in SH&E campaigns and awareness programs. Safety communication and advisory shall be shared with employees to keep them informed of SH&E matters that may contribute to maintaining a safe and healthy working environment. From time-to-time management will sponsor various communication and participation events to highlight various SH&E topics and help improve the overall core value of safety. Employees with suggestions about such events should use the employee observation box or speak directly to their supervisor.
- i. Stop Work Authority All employees have the responsibility and authority to stop work by using the Safety Time-Out card if they believe a danger exists for any persons, property, or the environment in any kind of work. Prior to commencing a formal Stop Work, the affected employees shall immediately discuss the concern and attempt to remove, mitigate, or isolate the hazard in coordination with the supervisor and SH&E manager. Work associated with the affected area or operation shall not resume unless all corrective actions identified have been resolved to an acceptable level. Employees shall never be penalized for exercising their responsibility to Stop Work.
- j. Observation and Incident Management Process Observations and Incidents shall be reported by employees. AECOM makes available to all employees a reporting system which encourages the raising of observations related to safe/unsafe behavior/condition or other SH&E incident.

Employees may raise an observation related to SH&E in several ways, including online (Lifeguard tool on Ecosystem), Safety Observation Cards, or even verbally with their supervisor or local office management. Employees may report an incident through [IndustrySafe](#). Refer to the [SH&E Management System Manual – AECOM Global](#) for incident management.
- k. Visitors Safety Visitors shall be made aware of the Emergency Response Plan. Offices shall have identifiable means of designating office visitor(s). The badge is used to identify visitors and shall be worn for the duration of the visit. Refer to 208-02, Visitor Safety Flyer Sample.
- l. Office Audits Periodic office inspections shall be performed, preferably on a twice monthly basis as well as prior to the occupation of any new facility, when new tasks that were not previously performed at this location are now performed, when new hazards are introduced to the office environment, or when office conditions or local regulations require an inspection.

Actions to eliminate or reduce hazards and risks are to be implemented immediately or referred to the Safety Committee and/or Senior Management dependent upon severity. All inspections and walkthrough shall be documented and retained as required. Refer to Housekeeping Inspection Checklist – DCS - EC.
- m. Senior Management Safety “Walk Downs” A periodic “walk down” of the work areas shall be made by senior management. Best practice is to have an employee accompany the senior manager during the safety “walk down.” Please utilize [LifeGuard](#) for Senior Management Assessment.

- n. **Rewards & Recognition** All levels of supervision are encouraged to recognize the SH&E initiatives, milestones, and efforts made by those who work with them on an ongoing basis. This recognition could be publicly thanking an employee. This recognition may also include team, project, and office recognition of achievements in SH&E

4. References

- a. [SHE Policy – AECOM Global S1-001-PL1](#)
- b. [Safety, Health and Environment Management System Manual – AECOM Global S2-001-SM1](#)
- c. [Life Preserving Principles – AECOM Global S2-001-W11](#)
- d. [Safety for Life Program - Ecosystem.](#)
- e. [Project Document and Records Control - DCS Q2\[DCS\]-222-PR1](#)
- f. [Office SH&E Committee Guidance – DCS – EC S4\[DCS\]\(EC\)-001-W11](#)
- g. [Visitor Safety Flyer Sample – DCS – EC S4\[DCS\]\(EC\)-013-W11](#)

5. Records

Copies of all SH&E Management System documents and data shall be managed and retained in accordance with [Safety Key Performance Indicators Metrics – DCS – EC](#).

- a. [Housekeeping Inspection Checklist – DCS – EC S4\[DCS\]\(EC\)-013-FM1](#)
- b. [Emergency Response Plan – DCS – EC S4\[DCS\]\(EC\)-209-FM1](#)
- c. Visitor Safety Flyers

6. Issue Authorization and Maintenance for Use

The applicable EC Functional Leader is responsible for the maintenance of this procedure and will review the procedure annually to determine any necessary updates. Should an individual employee have a suggestion for improvement or modification to this procedure, they may mark-up a copy of the document and send to the applicable EC Functional Leader for review. Changes to the procedure will be distributed to other functional leads for their input prior to finalizing changes to this procedure.

7. Change Log

Rev #	Change Date	Description of Change	Location of Change
0	05-Dec-2022	Initial release as S4[DCS](EC)-001-PR1	All
1	14-Oct-2024	2024 Review; updated references by removing the “GEP” number from titles and linking to “DCS” level Quality Management procedures and forms as part of the EC/DCS Integration project; minor edits and updated links.	Section 3, 4, 5

SH&E Training

S3AM-003-PR2

1. Purpose and Scope

- a. This procedure establishes the minimum Safety, Health, and Environment (SH&E)-related orientation and training requirements for employees to identify and control SH&E risks in their work, dictated by the work each employee performs (or is expected to perform), and the geographic area(s) where the Employee performs these activities.
- b. This procedure outlines the process and minimum requirements for classifying an AECOM employee as a “Competent Person” to oversee and/or self-perform work activities. Local law may contain alternate definitions for Competent Person, and it is the responsibility of the Project Manager, in conjunction with an SH&E Manager/Director to determine and resolve conflicts, if any, existing between AECOM and applicable regulatory definitions.
- c. This procedure defines recordkeeping requirements, aims to maintain consistency in SH&E training content, and provides a framework to assess participant competency and understanding.
- d. This procedure applies to all AECOM Americas-based employees and operations, as well as contracted personnel required to comply with this document’s content.

2. Procedure

2.1 New Employee SH&E Orientation

- a. Employees must complete the required SH&E training assigned through Learning Management System (LMS) – AECOM University (AECOM U) or other approved platform.
- b. Employees must complete a “new hire” SH&E orientation on the AECOM SH&E systems including hazard reporting, risk management, and accessing procedures/resources.
- c. Employees must also be provided with a local office-specific orientation to include information on safety reporting, emergency response plans, and other office-specific SH&E topics.
- d. Orientation should be completed within 1 week, but no longer than 1 month, from the employee’s hire date and must be completed prior to undertaking any field work.
- e. [New Employee SH&E Orientation – Americas](#) form or equivalent may be used to document new employee SH&E orientation progress.

2.2 Project- / Site-Specific SH&E Orientation

- a. Employees must complete a relevant project- and/or site-specific orientation provided by AECOM, the controlling contractor, and the client, where applicable, within the specified timeframes of the project and before initiating site work.
- b. Staff and AECOM-managed subcontractors must not enter a site unless they have received the relevant orientation.
- c. The Project Manager is responsible for confirming that the on-site orientation for AECOM employees and AECOM-managed subcontractors has been completed prior to the commencement of work.

- d. Orientation requirements can be outlined in the project-specific SH&E Plan / Safe Work Plan (SWP) / Task Hazard Assessment (THA ; e.g., Field Level Risk Assessment [FLRA] in Canada) and should, at a minimum, cover the following items:
 - i. Scope of work / project overview;
 - ii. Key personnel;
 - iii. Local law, client, and any other requirements;
 - iv. Incident reporting and management process including the importance of near miss and observation reporting to enhance safety awareness and culture - refer to [SH&E Incident Response and Investigation – Americas](#);
 - v. Communication and consultation arrangements, including the safety escalation and resolution process - refer to [SH&E Communication and Consultation – Americas](#);
 - vi. Site-specific safety procedures and rules (as applicable) regarding minimum personal protective equipment (PPE) requirements, alcohol and drugs policy, smoking areas, parking, deliveries, visitors, exclusion zones, permits, hours of work and fatigue policy, etc. - refer to [SH&E Risk Assessment and Planning – Americas](#) and [Safety Gear – Americas](#);
 - vii. Risk management processes, such as critical risks and critical controls, SH&E plans/SWPs/THAs (e.g., FLRAs in Canada), and 4-Sight - refer to [SH&E Risk Assessment and Planning – Americas](#);
 - viii. Red Card – Stop Work Authority - refer to [Safety Tenets and Stopping Work – Americas](#);
 - ix. Key workplace hazards/risks and control requirements;
 - x. Emergency management;
 - xi. Environment, community, and stakeholder requirements; and
 - xii. Safety observations.
- e. The Project Manager must maintain a record (e.g., acknowledgement page of the SH&E Plan, orientation sign-off page) of all site orientations conducted (including AECOM-managed subcontractors) in the project folder.

2.3 Risk-Based Approach to SH&E Training

- a. [Assessment of SH&E Training Requirements – Americas](#) should be used as a guideline for providing SH&E training to employees per the requirements of their role, in relation to the specific risks posed by their work activity, and in accordance with legal, client, and industry requirements. Other applicable region-, business line-, or project-specific training assessments should also be consulted.
- b. In Canada, project-specific training is identified and listed in the [Project-Specific SH&E Plan – DCS – Americas – Canada](#).
- c. All employees who will perform work outside of the office setting must discuss and develop their training needs with their direct supervisor within 1 week of hire and annually thereafter. Employees should review their SH&E training requirements in conjunction with their annual performance review.
- d. SH&E training needs may be identified through individual risk assessments, incident investigations, observed non-compliance, when procedures change, or through the annual staff appraisals process. As required, appropriate training must be arranged and may be provided through LMS – AECOM U courses, safety meetings, and/or classes delivered by internal or external providers.
- e. All personnel who are required to fulfill a designated emergency response role must be trained in their responsibilities and be well-versed in the specific Emergency Response Plan for the workplace. Minimum training requirements are detailed in [Assessment of SH&E Training Requirements – Americas](#).

- f. All workers and visitors at AECOM-controlled workplaces must be trained (workers) or briefed (visitors) on emergency evacuation and response protocols during the orientation process and must be required to participate in any emergency-related training as required (e.g., evacuation drills and simulated response exercises).
- g. For larger scale projects, a site-specific training matrix can be developed to identify specific training requirements, including competency, licensing, and qualifications, for specific project personnel including contractors if applicable. It is the responsibility of the Project Manager to confirm that this document is maintained.
- h. Project managers must review the relevant training and certification records of all employees on their projects prior to mobilization into the field to confirm that they have current and appropriate training.

2.4 Visitors and Delivery Drivers

- a. Where visitors to project sites are required to enter operational work areas, it is recommended that they receive a brief site-specific orientation and always be supervised by fully orientated and safety trained site personnel while on site.
- b. Where delivery drivers are required to enter an operational project zone, it is recommended they participate in a brief delivery driver orientation to familiarize themselves with the site specifics.
- c. Where regular deliveries are expected on the project, the Project Manager should make early contact with the transport companies involved to arrange for orientation to be programmed well in advance of deliveries commencing.

2.5 Short Service Employees (SSE)

- a. An employee is designated as an SSE if they are undertaking work in the field and have less than 6 months of experience working in the industry of the work to be performed.
- b. An employee is not considered an SSE if they have more than 6 months of fieldwork experience in a similar industry and can demonstrate competency in AECOM's safety management system and processes.
- c. Former employees who return to AECOM within 12 months and are placed into the same job assignment may not be designated as SSEs.
- d. Specific circumstances may warrant the extension of the SSE designation, reduction of the required time identified in the schedule, or an exemption. Project managers must consult the Regional SH&E Manager with any SSE schedule variance or exemption requests, if applicable. Refer to [SH&E Management System Variance Request – Americas](#).
- e. SSEs must receive all required training and certification prior to being mobilized into a field environment. Until training has been provided, SSEs may only attend work sites under the direct supervision of a trained employee who is competent to perform the work activity. This supervision must continue until the SSE has received training and is deemed competent to undertake the task.
- f. Where specific training is not immediately required, a training plan must be established. The training plan should outline the schedule for the required training to be achieved prior to the SSE being mobilized into a field environment.
- g. SSEs must not be assigned to field projects unless they are supervised on site by safety oriented and trained personnel. It is the responsibility of the Project Manager to ensure that all new employees are suitably supervised by a Competent Person in all situations where they may be exposed to harm and while performing high risk work, until such time as they have had sufficient training and/or have demonstrated competence.
- h. SSEs are not permitted to work alone or away from their field team at any time.
- i. As required, project managers must notify the client and/or host facility when an SSE will be working at their site.

- j. An identification system (e.g., green hard hats) to readily differentiate SSEs from other employees must be implemented when required by the client and/or local law.

2.6 Competency

- a. A designation of Competency may be required for certain tasks. The competencies required for a particular employee must be established by the Employee's Supervisor at the time of orientation and whenever new equipment or tasks are introduced to the workplace.
- b. The [Competent Person Designation – Americas](#) form or equivalent must be used for documenting Competent Person designations. Documentation must be filled out completely and updated as necessary. Project-specific competency designation requirements may be defined in the SH&E Plan, SWP, and/or THA (e.g., FLRA in Canada).
- c. Employees are not allowed to carry out high-risk work unless they have the required certificates/licenses for the type of work being conducted (refer to the SH&E Manager for further information). High-risk work license/training records must be available for review.
- d. Where competency is not yet established, the Supervisor or Project Manager must confirm that gaps are documented on the training plan. The Employee must be provided with sufficient instruction and an opportunity to undertake the task under supervision by a Competent Person until their competency is established.
- e. All training records, work licenses, and certificates must be maintained by each Supervisor or Project Manager in the project files.

2.7 Safety Training – General Requirements

- a. Training Competency Levels
 - i. Awareness Level: The primary goal of awareness-level training is to transfer basic knowledge to enable employees to recognize and avoid hazards. Additionally, employees must learn what precautions are necessary when they are exposed to hazards, and the precautions may necessitate additional training. Training typically takes the form of instructor-led discussions, presentation of related video content, and/or self-directed e-learning modules. Comprehension may be assessed through discussion of the training topic with the participants and/or a simple quiz.
 - ii. Performance Level: Performance-level training must build upon the awareness-level training for certain high-risk tasks. The goal of performance-level training is to have employees successfully demonstrate they can apply the knowledge discussed during training and perform the desired skills necessary to perform higher-risk tasks. Training materials are provided and discussed and must incorporate a demonstration of the skills to be completed. The instructor must gauge the level of understanding through interactive discussion with participants and a pass/fail designation of demonstrated skills by the employees. A test or quiz of moderate difficulty must be provided followed by the successful demonstration of the desired skill to receive certification.
- b. Training Delivery
 - i. Internal Training: Internal training is performed by AECOM's internal resources and may include online webinar and classroom-based training. Peer-reviewed AECOM training materials must be used for training whenever they are available to facilitate consistency in content and duration of training. AECOM-based training materials can be supplemented as appropriate with content specific to the program, project, customer, office, or geographic unit. Trainers should be approved by an SH&E Manager. Training format and material must be appropriate to the topic and audience. Course content must be periodically reviewed and updated as appropriate, or multiple versions of training may be developed for rotating use to provide participants with new learning materials and avoid stagnation or to meet specific regulatory requirements.
 - ii. External Training: External vendors must be pre-approved by an SH&E Manager to conduct training not available through internal training sources. This training may be classroom, web seminar, or online training.

- c. Training Evaluation
 - i. At the conclusion of a training event, participants should be provided with the opportunity to anonymously evaluate the training session. Instructors must review evaluations at the conclusion of training, and information from the evaluations must be considered when revising training content.
- d. Ongoing Training Maintenance
 - i. Training should be tracked electronically using LMS – AECOM U or Workday whenever possible.
 - ii. Training may expire in accordance with requirements specified in applicable local law or policy.
 - iii. If training required by AECOM or local law expires, employees must be disqualified from performing associated tasks until training has been renewed.
 - iv. Refresher training may be provided in the following circumstances if:
 - 1. an employee is observed working or operating equipment in an unsafe manner
 - 2. an employee is involved in an incident
 - 3. an employee is assigned a new task or type equipment; or
 - 4. a condition in the workplace changes in a manner affecting personal safety or the safe operation of equipment.
 - 5. As required by local law.

3. Training

Individuals administering LMS – AECOM U SH&E training are required to undertake LMS training from the implementation team.

4. Terms and Definitions

- a. Competent Person An employee who, through education, training, and experience, has knowledge of applicable regulatory requirements, is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
- b. LMS – AECOM U Learning Management System – AECOM University – An electronic training delivery and data management system utilized to implement and document the SH&E training program.
- c. SH&E Safety, Health, and Environment.
- d. SSE Short Service Employee – SSEs are those who have been newly hired or transferred to a different position in the company (e.g., one with new and possibly unfamiliar hazards and safe operating procedures).

5. References

- a. [Safety Tenets and Stopping Work – Americas S3AM-001- PR2](#)
- b. [SH&E Incident Response and Investigation – Americas S3AM-004-PR2](#)
- c. [SH&E Communication and Consultation – Americas S3AM-006-PR2](#)
- d. [Safety Gear – Americas S3AM-208-PR2](#)
- e. [SH&E Risk Assessment and Planning – Americas S3AM-209-PR2](#)

6. Records

- a. Records include the following:
 - i. [Assessment of SH&E Training Requirements – Americas S3AM-003-FM1](#)
 - ii. [New Employee SH&E Orientation – Americas S3AM-003-FM6](#)
 - iii. [Orientación de seguridad y salud para nuevos empleados - Américas S3AM-003-FM6\(ES\)](#)
 - iv. [Competent Person Designation – Americas S3AM-003-FM7](#)
 - v. [Daily Safety Meeting – Americas S3AM-209-FM5](#)
 - vi. [Project-Specific SH&E Plan – DCS – Americas – Canada S4\[DCS\]AM\(CA\)-209-FM1](#)
 - vii. [SH&E Management System Variance Request – Americas S3AM-215-FM2](#)
- b. Completion of the orientation provided by AECOM must be documented, initialed, or signed by the orientee and stored in the project folder or in a local (office) folder.
- c. On or prior to completion of the orientation, copies of the orientee's safety training certificates must be collected as appropriate to their scope of work. Employees are also required to keep copies of certificates and provide these as requested by the SH&E team, their supervisors, or project managers.
- d. Companywide training must be captured and recorded through LMS – AECOM U. LMS - AECOM U can also be used to deploy and track local courses as required.
- e. External training must be tracked through use of LMS – AECOM U where an applicable course code has been established, or it is acceptable to capture this through business line or other local training registers or in Workday. These must be reviewed periodically for accuracy.
- f. Courses denoted in [Assessment of SH&E Training Requirements – Americas](#) or commonly required training must be tracked in LMS – AECOM U when completed. Employee training tracked in LMS – AECOM U must be retained for the duration of the Employee's employment.
- g. Classroom training must be documented using an attendance record and course agenda.
- h. For training provided by customers/vendors, training documentation must be entered into a training database, and documentation must be maintained by the Employee.
- i. In some cases, objective evidence of comprehension is required (passing a test), and this information may be tracked in addition to the course information.
- j. Attendance sheets, agendas, course evaluations, completed tests, and copies of certificates must be maintained and filed in program or project training files by course.
- k. Locations, projects, and programs must maintain records on any project-, program-, location-, or site-specific training requirements.
- l. Managers should verify that employees have the required training prior to assigning or authorizing specific roles and responsibilities to each employee.

7. Change Log

Rev #	Change Date	Description of Change	Location of Change
0	01-Dec-2025	Initial release as S3AM-003-PR2; consolidated portions of the contents from the following retired documents: SH&E Training – Americas S3AM-003-PR1, Newly Hired or Transferred Employees – Americas S3AM-015-PR1, and Competent Person Designation – Americas S3AM-202-PR1.	All

Driving

S3AM-005-PR2

1. Purpose and Scope

- a. This procedure establishes requirements for when operating:
 - i. AECOM-owned, rented, or leased vehicles, client- or customer-owned vehicles, and personal vehicles used by AECOM employees on AECOM business.
 - ii. Off-Highway Vehicles (OHVs), including all-terrain vehicles (ATVs), utility task vehicles (UTVs), and snowmobiles used to transport AECOM site personnel.
- b. This procedure applies to all AECOM Americas-based employees and operations, as well as contracted personnel required to comply with this document's content.
- c. Additional driving requirements are set forth in the [Travel Policy – AECOM Global](#).

1.1 Critical Controls

The following is a list of the minimum required critical controls to be implemented as applicable by the Project Manager or Designee to prevent high potential/significant incidents:

- a. Only Authorized Drivers are to operate a motor vehicle on AECOM business (this applies to rental, personal, client- or customer-owned, and AECOM-owned or leased vehicles). An Authorized Driver is an employee who receives Supervisor/Manager and, as applicable, Fleet Manager approval following evaluation of driver criteria to drive and maintain an AECOM-owned, leased, or rented vehicle, a client- or customer-owned vehicle, or a personal vehicle while conducting AECOM business.
- b. Authorized Drivers must maintain a valid and current driver's license with full privileges applicable to the vehicle to be operated and location. AECOM-owned, rented, or leased vehicles are for official business use only and are not to be used for personal activities.
- c. Personal vehicles driven by Authorized Drivers on AECOM business must satisfy the registration and insurance legal requirements. Refer to the [Travel Policy – AECOM Global](#), local travel procedures, and local Employee Handbook (refer to the [Employee Handbooks](#) Ecosystem page) for any additional requirements or approvals for personal vehicle use.
- d. The Manager/Supervisor must work with the Safety, Health, and Environment (SH&E) Manager to determine driver training and qualifications specific to the project and vehicle. Refer to Section 3 - Training for additional information.
- e. Prior to use of electric or hybrid electric vehicles, employees must review manufacturer charging instructions.
- f. The use of fully autonomous, self-driving features is prohibited.
- g. Employees with conditional licenses are prohibited from operating vehicles on AECOM business.
- h. Drivers must follow all traffic laws and are prohibited from being under the influence of alcohol or drugs or improperly using medication in a way that could diminish an employee's ability to drive. Refer to [Substance Abuse Prevention – Americas](#).
- i. Authorized Drivers must immediately report the following:
 - i. A change or limitation(s) to their operating license to the appropriate AECOM Human Resources Representative or Manager/Supervisor.
 - ii. Receipt of a legal summons associated with a moving violation related to the use of a company vehicle to the appropriate Manager/Supervisor and SH&E Manager.

- j. All Authorized Drivers must perform a walk-around inspection of the vehicle prior to operation on company business and confirm the vehicle is in good working condition before operating. Pre-operation vehicle inspections can be documented by Authorized Drivers utilizing [Vehicle Inspection Checklist – Americas](#) or similar.
- k. A roadside assistance service should be identified prior to operation of a vehicle on AECOM business. Employees must never change tires or make repairs to vehicles in the field unless this activity is covered in an approved project-specific SH&E plan, with justification provided.
- l. The use of portable electronic devices, consumption of food, smoking, or other activities that may distract the driver while driving is prohibited. Electronic devices include, but are not limited to, all mobile phones, laptops, radios, GPS units, DVD players, tablets, and other portable electronic devices that can cause driver distraction whether hand-held or hands-free.

 Note: GPS units and devices (e.g., smart phones, tablets) used for navigation may only be used if factory installed or secured to the vehicle with a bracket that allows the driver to view the image without having to take their eyes off the road. Consult jurisdictional requirements and with the SH&E Manager.
- m. The vehicle may not move until the driver:
 - i. and all passengers have fastened their restraints in the proper manner.
 - ii. has adjusted their seat, all mirrors, steering wheel, and any other adjustable driver devices.
 - iii. has adequately secured all transported cargo.
- n. Authorized Drivers are responsible for monitoring their assigned AECOM-owned/leased/rented vehicle for any service or maintenance requirements and are expected to coordinate repairs and service through their respective Fleet Manager. Vehicles are to be maintained according to manufacturers' specifications, local law, and the applicable environmental and operating factors (e.g., winterized with appropriate fluids, winter tires installed, and appropriate coolant for hot climates).
- o. AECOM-owned or leased vehicles are to have a first aid kit, portable fire extinguisher, safety triangle, and two reflective safety vests. If not available, contact the Project Manager/Supervisor or SH&E Manager to determine how to obtain a kit. The kit should be modified based upon the project Task Hazard Assessment (THA; e.g., field level risk assessment [FLRA] in Canada) or client requirements, with additional equipment such as additional means of communication for remote locations.
- p. Motorcycles may not be operated on AECOM business unless specific written approval is received from the SH&E Manager.
- q. Reverse parking of vehicles while on business is recommended. A spotter must be used when the backing of trucks and heavy equipment presents a risk of collision.
- r. AECOM-owned/rented/leased vehicles, personal vehicles, and specialty vehicles must not be modified beyond manufacturer's specifications without relevant approvals from SH&E.
- s. When practical, alternatives to road travel including teleconferencing/video conferencing, the use of public transportation, or carpooling should be evaluated.
- t. Employees must never operate motor vehicles while excessively fatigued. Refer to [Fitness for Duty – Americas](#).

1.2 Journey Management

- a. Drivers who will undertake trips more than 250 miles (400 km) each way, drive in remote or hazardous areas, or when otherwise deemed necessary or specified in project-specific requirements, must develop and document a journey management plan (JMP) using [Journey Management Plan - Americas](#) or equivalent.
- b. Refer to [SH&E Risk Assessment & Planning – Americas](#) for additional requirements.
- c. A JMP typically includes the route; location of route hazards; timing; rest periods and locations; and communications, emergency response, and security arrangements.

1.3 Commercial Motor Vehicles

Prior to operating a Commercial Motor Vehicle (CMV), an SH&E Manager must be engaged to clarify and confirm that CMV operator requirements have been met. This may include the following:

- a. Additional training.
- b. Driver's logs.
- c. Appropriate marking of vehicles.
- d. Medical exams.
- e. Drug and alcohol testing requirements.

1.4 Off-Highway Vehicles (OHVs)

- a. Prior to operation, employees must obtain approval to operate OHVs from the Project Manager and SH&E Manager. Examples of OHVs include ATVs, utility task vehicles (UTVs), and snowmobiles.
- b. For OHVs, the following minimum personal protective equipment (PPE) must be worn and equipment available:
 - i. Helmet including the appropriate institute label.
 - ii. Eye and face protection (conduct THA for appropriate selection).
 - iii. Ear protection as needed.
 - iv. Gloves.
 - v. Clothing: Wear protective over-the-ankle footwear with low heels, sturdy jackets and pants. Dress for cold and wind chill as appropriate (e.g., face guard, helmet liner, etc.). Do not wear scarves or loose clothing that could potentially become entangled with moving parts.
 - vi. OHVs with seating for more than one person must be manufacturer-equipped with seat belts and rollover protection systems.
 - vii. First aid kit.
 - viii. Small fire extinguisher, as required.
- c. Refer to [Safety Gear – Americas](#) for additional PPE requirements.
- d. Prior to starting an OHV, the entire vehicle must be inspected using [Off-Highway \(OHV\) Inspection – Americas](#) or equivalent to confirm that the OHV is in a safe operating condition.

2. Training

- a. Authorized Drivers must review this procedure and complete required training. Refer to [SH&E Training – Americas](#) and its associated [Assessment of SH&E Training Requirements – Americas](#) for training requirements.
- b. Vehicles such as ATVs, four-wheel drive vehicles, motorized carts, snowmobiles, box vans, and trailers (towing) require specialized training and supervision.
- c. All OHV operators must be trained by an SH&E Manager or approved training vendor. Training must include at a minimum:
 - i. The operator's pre-trip inspection,
 - ii. Use of personal protective apparel,
 - iii. Operating skills according to the OHV manufacturer's specifications,
 - iv. Basic mechanical requirements, and
 - v. Loading and unloading the vehicle.

- vi. Employees unfamiliar with OHVs will also receive hands-on instruction on site by experienced and trained personnel.

3. Terms and Definitions

- a. **AECOM Business** Any activity performed in the name of AECOM. This includes, but is not limited to, vehicle travel between work locations, client sites, and meeting locations as well as driving performed as a part of work-related travel (e.g., driving to and from airports, hotels, train stations), and all other reimbursable travel. AECOM business does not include driving part of a daily routine commute from home to an AECOM location.
- b. **AECOM Owned/Leased Vehicle** A vehicle that is purchased or leased by AECOM for business use.
- c. **ATV** All-Terrain Vehicle. An ATV can also be referred to as a quad, quad bike, three wheeler (illegal), or four wheeler. The ATV is defined by the American National Standards Institute (ANSI) as “a vehicle that travels on low pressure tires, with a seat that is straddled by the operator, along with handlebars for steering control.” This type of ATV requires an active rider and includes snowmobiles. For the purpose of this procedure and in alignment with various jurisdictions, the definition of ATV also includes all-terrain vehicles that instead require a passive rider and utility vehicles such as Argos, Gators, etc.
- d. **Authorized Driver** An AECOM employee who receives Supervisor/Manager and, as applicable, Fleet Manager approval following evaluation of driver criteria to drive and maintain an AECOM-owned, leased, or rented vehicle, a client or customer-owned vehicle, or a personal vehicle operated while conducting AECOM business. Authorized Drivers must maintain a current driver’s license with full privileges applicable to the vehicle to be operated.
- e. **Client- or Customer-Owned Vehicle** A vehicle that is owned by a client or customer—not AECOM—but is used for AECOM business.
- f. **CMV** Commercial motor vehicle. Any self-propelled or towed motor vehicle used for AECOM business (e.g., to transport passengers or property) when the vehicle is one of the following:
 - i. Has a gross vehicle weight rating (GVWR) or gross combination weight rating equal to or greater than the weight specified by the applicable jurisdiction; or
 - ii. Is designed or used to transport more than the number of passengers specified by the applicable jurisdiction, including the driver, for compensation; or
 - iii. Is designed or used to transport more than the number of passengers specified by the applicable jurisdiction, including the driver, and is not used to transport passengers for compensation; or
 - iv. Is used in transporting hazardous material in quantities specified by the applicable jurisdiction at any time.
- g. **Collision** Any incident in which a motor vehicle (whether in motion, temporarily stopped, or parked) makes contact with another vehicle or pedestrian, or results in property damage and/or bodily injury, regardless of who was injured, what property was damaged, or who was responsible.
- h. **Distracted Driving** An activity that takes the driver’s attention away from the primary task of driving.
- i. **Local Laws** Signs, postings, laws, regulations, ordinances, and codes applicable to the jurisdiction in which the motor vehicle is being operated.
- j. **Personal Vehicle** A motorized vehicle owned or leased by an employee.
- k. **PPE** Personal protective equipment.

- l. **Portable Electronic Device** A mobile electronic device that is used to receive or communicate voice, email, internet, and/or public media. The device requires user interaction (typing, dialing, reading, keying, etc.) that distracts the motor vehicle operator. Example devices include, but are not limited to, Mobile Communication Devices (MCDs); Personal Data Assistants (PDAs); iPads, iPods, or other tablet models; computers; and Global Positioning System (GPS) receivers.
- m. **Rental Vehicle** A vehicle that is rented from AECOM's preferred suppliers and reserved through a Company-approved travel management company or Company-approved online booking tool.
- n. **Spotters** Trained personnel may provide guidance when maneuvering in close and/or complex situations in order to avoid the occurrence of an incident.

4. References

- a. [SH&E Training – Americas S3AM-003-PR2](#)
- b. [Fitness for Duty – Americas S3AM-008-PR2](#)
- c. [Substance Abuse Prevention – Americas S3AM-019-PR1](#)
- d. [Safety Gear – Americas S3AM-208-PR2](#)
- e. [SH&E Risk Assessment and Planning – Americas S3AM-209-PR2](#)
- f. [Travel Policy – AECOM Global TR1-001-PL1](#)
- g. [Employee Handbooks – Ecosystem page](#)

5. Records

- a. [Journey Management Plan – Americas S3AM-005-FM1](#)
- b. [Vehicle Inspection Checklist – Americas S3AM-005-FM2](#)
- c. [Off-Highway Vehicle \(OHV\) Inspection – Americas S3AM-005-FM3](#)
- d. [Assessment of SH&E Training Requirements – Americas S3AM-003-FM1](#)

6. Change Log

Rev #	Change Date	Description of Change	Location of Change
0	01-Dec-2025	Initial release as S3AM-005-PR2; consolidated portions of the contents from the following retired documents: Driving – Americas S3AM-005-PR1, Authorized Driver Safety – Americas S3AM-005-ATT1, All-Terrain Vehicles – Americas S3AM-319-PR1, ATV Safety – Americas S3AM-319-ATT1, and Commercial Motor Vehicles – Americas S3AM-320-PR1.	All

Journey Management Plan

S3AM-005-FM1

Instructions

1. This form or equivalent must be completed in accordance with [Driving – Americas S3AM-005-PR2](#).
2. This form or equivalent must be completed by drivers who will undertake trips more than 250 miles (400 km) each way, drive in remote or hazardous areas, or when otherwise deemed necessary or specified in project-specific requirements.
3. All Journey Management Plans shall be reviewed and acknowledged by the driver and the Driver's Manager / Supervisor.
4. Once completed, copies of this form or equivalent must remain with the Driver and the Manager/Supervisor for the duration of the journey. A copy must also be retained in the project files.

Project Name	....	Project Number	....
Project Specific Requirements	....		
Driver Name	....	Driver training completed	☐ Yes ☐ No

Vehicle Information

Type	☐ Company Owned ☐ Rental/Leased ☐ Personal	
Year	....	Make Model
Color	....	Vehicle License No.

Trip Information

Purpose of the trip	....	Estimated distance	....
Single or reoccurring trip	☐ Single trip ☐ Reoccurring trip		
Have alternate modes of travel (telepresence, public transportation, air, train) been evaluated?	☐ Yes ☐ No		
Has a site-specific SH&E plan or hazard assessment been completed and attached?	☐ Yes ☐ No		☐ NA
Route of travel (Insert map or give detailed instructions. Assess gas stations/chargers in the route to avoid running out of gas/battery.)	....		
Is the return route of travel the same?	☐ Yes ☐ No		
Destination Name	Departure		Arrival
	Date	Time	Date Time (ETA)
1. ....	....	....	....
2. ....	....	....	....
3. ....	....	....	....
4. ....	....	....	....
Additional comments	....		

Special Conditions/Hazards (Check all that may apply)

☐ Night driving	☐ Rugged terrain (4 x 4)
☐ Weather	☐ Large vehicles
☐ Road conditions (e.g., construction, ice, snow)	☐ Animals
☐ Rush hour / heavy traffic	☐ Towing (e.g., trailer)
☐ Long driving / fatigue (over 2 hours)	☐ Other:
☐ Potential for distraction	

Additional conditions/hazards details	....
Weather forecast (Driver and passengers to review weather and road conditions immediately prior to journey.)	....

Contact Information

	Name	Phone Number
Traveler 1 (Driver)		
Traveler 1 Emergency Contact		
Traveler 2		
Traveler 2 Emergency Contact		
Traveler 3		
Traveler 3 Emergency Contact		
Traveler 4		
Traveler 4 Emergency Contact		
Check-In Contact		
Alternate Check-In Contact		
Destination Contact (if applicable)		
Other		
Other		

Check-In Procedure

Check-in interval	

- Advise Manager and any other applicable personnel of travel plans and supply with a copy of this form (including attachments)
- Confirm availability of Manager or Check-In Contact. Confirm check-in interval with Manager or Check-In Contact.
- Discuss with contacts the possibility of travel within a cell phone “dead zone”.
- Advise Manager or Check-In Contact of departure.
- Call Manager or Check-In Contact upon arrival at destination (e.g. worksite, office, home).
- If multiple destinations, the process is repeated.

Missed Check-In Procedure for Manager

- Attempt to call traveler(s) using contact number(s) listed above.
- Contact traveler's emergency contact listed above.
- If unsuccessful, discuss options with Manager, Check-In Contact (is anyone nearby who can be sent out along the route to destination, how much daylight remains, etc.?).
- Call 911 or local police.

Emergency Planning

AECOM Supervisor Name	....	Phone Number	....
AECOM Manager Name	....	Phone Number	....
Roadside Service Phone Number	....		
Emergency Phone Number	☐ 911	☐ Other:	....
Incident Reporting Hotline	☐ For DCS: 800-348-5046	☐ For CM: Contact the Occupational Health Team using the AECOM-dedicated line at 512-419-5016.	

General Procedure for Vehicle Incidents

The Employee(s) involved in a collision must:

- Assess the situation to confirm everyone is safe and remove any vehicle occupants from harm's way if safe to do so.
- Turn on the vehicle's flashers to warn other motorists.
- Call or have someone else call the appropriate local emergency phone number (e.g., 911) immediately when necessary.
- As appropriate, remain at the scene of a collision for police to arrive. If the scene is unsafe, immediately leave to a safe place of refuge proximate to the incident.
- As applicable, consider moving the vehicle out of the traffic flow if it is safe to do so. Do not operate a damaged vehicle if its:
 - safety is questionable,
 - operating condition is illegal per applicable local law, or
 - condition is such that further damage would likely result from its operation.
- Obtain:
 - Names, phone numbers, and addresses of owner(s), driver(s), and occupants of the other car(s) involved.
 - Other party's insurance company's name, address, phone number, policy number, and insurance agent.
 - Names, phone numbers, and addresses of all witnesses.
 - Photographs of the accident scene when safe to do so.
- Do not discuss liability (e.g. who is at fault), agree to pay for damage, or sign a document related to an incident except as required by local law.
- If requested, provide information to the police. Obtain the officer's jurisdiction, name, and badge number, as well as a copy of the police report.

Note: If contacted by a third party, do not answer any questions. Immediately report this contact to the Project Manager and AECOM Legal.

Approvals

....		
Driver Name	Signature	Date
....		
Supervisor or Manager Name	Signature	Date

Americas

Vehicle Inspection Checklist

S3AM-005-FM2

Instruction

1. This form or equivalent is to be completed in accordance with [Driving – Americas S3AM-005-PR2](#).
2. This Vehicle Inspection Checklist is intended to be completed by the vehicle's driver prior to departing on a trip.
3. Checking boxes in the "Yes" column means that item is present and functioning.
4. Deficiencies that affect or could potentially affect the safe operation of the vehicle must be repaired or corrected before departure.
5. This checklist is not intended to replace a regular, comprehensive vehicle maintenance program.
6. The completed form must be retained in the project files.

Vehicle Tag No	Mileage	Date	Time	Driver Name	Location
....					

Item	Yes	No	N/A
1. General			
a. Proof of insurance and registration available and current?	☐	☐	☐
b. Is the date of the last regular maintenance known, or is the mileage/date of next scheduled maintenance known?	☐	☐	☐
c. Is the overall condition of the vehicle good (no body damage, unusual sounds, leaks, odors, etc.)?	☐	☐	☐
2. Tires			
a. Do all tires have sufficient tread for driving conditions? Legal limit: 2/32" (for rain/snow: > 4/32")	☐	☐	☐
b. Are tires sufficiently inflated for driving conditions?	☐	☐	☐
c. Are the lug nuts and stem caps present and tight for each tire?	☐	☐	☐
d. Is the spare tire and jack present and in good condition?	☐	☐	☐
3. Vehicle Interior			
a. Are the brake and accelerator pedal pads in good condition?	☐	☐	☐
b. Are the floor mats in good condition and not interfering with the brake or accelerator pedals?	☐	☐	☐
c. Is the seat properly adjusted (including the headrest)?	☐	☐	☐
d. Is the seatbelt in good condition?	☐	☐	☐
e. Are the mirrors in good condition (not broken, dirty)?	☐	☐	☐
f. Are the dashboard/instrument lights working?	☐	☐	☐
g. Is the dashboard free of warning lights and do the gauges appear to work when the car is started?	☐	☐	☐
h. Does the horn work?	☐	☐	☐
i. Are distractions such as cell phones and GPS units secured so they do not encourage use?	☐	☐	☐
4. Lights and Signals			
a. Do the headlights and high beams work?	☐	☐	☐
b. Do the tail lights function properly?	☐	☐	☐
c. Do the turn signals work (front and rear)?	☐	☐	☐

Item	Yes	No	N/A
d. Do the brake lights work (including high light in the rear window if applicable)?	☐	☐	☐
e. Do the hazard lights (emergency flashers) work?	☐	☐	☐
f. Do back up / reverse lights work?	☐	☐	☐
g. If equipped with a back-up alarm, can it be heard clearly?	☐	☐	☐
5. Mechanical			
a. Do the brakes work and feel solid (not soft)?	☐	☐	☐
b. Does the parking/emergency brake work?	☐	☐	☐
c. Is the steering in good working condition (not loose)?	☐	☐	☐
d. Is the engine oil level full or in the operating zone?	☐	☐	☐
e. Excessive vehicle bounce going over bumps reported (possible sign of worn shock absorbers)?	☐	☐	☐
f. Is the fuel level full or at an adequate level for the proposed usage?	☐	☐	☐
6. Windows and Windshield			
a. Is the windshield clean and unbroken?	☐	☐	☐
b. Are the wiper blades in good condition (front and rear)?	☐	☐	☐
c. Are all the windows clean and unbroken and windshield fluid available and operational?	☐	☐	☐
7. Emergency Equipment (as needed per conditions/project requirements)			
a. Is there a "Safety Kit" (fire extinguisher, first aid, safety triangle and 2 reflective vests)?	☐	☐	☐
b. Is survival gear and equipment available (blanket, water, heat source, flashlight, etc.)?	☐	☐	☐
c. Is a means for emergency communication available?	☐	☐	☐
8. Other Equipment (as needed per conditions/project requirements)			
a. Is there a means to secured loads (cargo next, container)?	☐	☐	☐
b. Are cones or other warning devices available?	☐	☐	☐
c. Is weather specific equipment (snow chains, tired etc.)?	☐	☐	☐
d. Does the vehicle have a snow brush/ice scraper?	☐	☐	☐
9. Comments			
Inspector Name	Signature	Date	

Heat and Cold Stress

S3-AM-112-PR2

1. Purpose and Scope

- a. Provide guidance to employees on the effects of heat and cold stress and controlling exposure to hot and cold working conditions.
- b. This procedure applies to all AECOM Americas-based employees and operations, as well as contracted personnel required to comply with this document's content.

2. Procedure

2.1 Critical Controls

- a. The Project Manager must monitor weather forecasts and current conditions and identify potentially hazardous heat or cold exposures. If potential for hazardous heat or cold exposure exists, the Project Manager must develop a heat/cold stress exposure control plan, incorporate the plan in the project-specific Safety, Health, and Environment (SH&E) plan, and confirm implementation in the field. Refer to [SH&E Risk Assessment and Planning – Americas](#).
- b. During a task hazard assessment (THA; e.g., field level risk assessment [FLRA] in Canada), potential heat and cold stress hazards must be evaluated, and appropriate control measures must be implemented to mitigate associated risks. Refer to [SH&E Risk Assessment and Planning – Americas](#).
- c. Employees must not be exposed to levels exceeding those specified for the given work level and work-rest regimen.
- d. Employees must immediately report any signs or symptoms of heat or cold stress they may experience or observe in fellow employees. Refer to [SH&E Incident Response and Investigation – Americas](#). Project managers should use such information to adjust the work-rest schedule.
- e. Initiate emergency response procedures when necessary, including contacting emergency medical services as appropriate and in accordance with the project-specific SH&E plan. If an employee shows signs or reports symptoms of heat or cold stress, they must be removed from the hot or cold environment and treated by a first aid-trained person or by a physician, as needed.
- f. The Project Manager should include costs in project budgets for specialized equipment and supplies needed to complete the field activities.

2.2 Heat Stress Planning and Prevention

- a. Requirements for working in extreme heat may be triggered by regulatory criteria (e.g., state law in California, Washington, Oregon, Nevada, and Maryland) or as a result of a hazard analysis assessing various contributing factors.
- b. Monitor ambient temperatures and conduct heat stress monitoring, as required, in accordance with the project-specific SH&E plan. Revise the heat stress monitoring and controls if there are any reports of discomfort due to heat stress.
- c. Monitor temperatures in each unique environment in which employees perform work. Follow manufacturer's specifications on proper use of the thermometer.
- d. Assess and apply as is practicable the hierarchy of controls (ordered by level of effectiveness) to reduce employees' exposure.

2.2.1 Engineering Controls

- a. Wherever possible, a designated break area should be established in an air-conditioned space, or in shaded areas where air conditioning is impractical.
- b. The break area should be equipped to allow employees to loosen or remove protective clothing, and sufficient seating should be available for all employees.
- c. If shade is not available, shaded areas must be constructed. This same type of canopy can be set up to shade personnel performing various types of work in hot weather.
- d. Cooling measures other than shade (e.g., misting, air-conditioned break areas, and air-conditioned vehicles) can be used in lieu of shade provided it can be demonstrated they are at least as effective in cooling employees.
- e. Employees should have access to these rest areas at break times and at any other time when suffering from heat illness or believing a preventive recovery period is needed.

2.2.2 Administrative Controls

- a. Employees must:
 - i. Review the heat stress exposure control plan within the SH&E plan and/or THAs.
 - ii. Confirm a reliable method of communication is in place to allow for contact with supervision.
 - iii. Take frequent short breaks in areas sheltered from direct sunlight, frequently eat and drink small amounts, and avoid performing manual labor during breaks (other than paperwork or similar light tasks).
 - iv. Avoid strenuous physical activity outdoors during the hottest part of the day.
 - v. Avoid sudden changes of temperature.
 - vi. Avoid working alone in extreme heat and instead use the buddy system.
 - vii. Air out a hot vehicle before getting into it.
 - viii. Obtain medical direction if taking diuretics during hot weather (a lower dose may be necessary).
 - ix. Perform a self-assessment to evaluate their body's reaction to the heat and work conditions.
- b. The Project Manager must:
 - i. Develop appropriate work-rest schedules based on recognized technical standards (e.g., those published by National Institute for Occupational Safety and Health [NIOSH], American National Standards Institute [ANSI], and American Conference of Governmental Industrial Hygienists [ACGIH]) or as required by the most stringent applicable local law. Appendix 1– Heat Stress Work-Rest Schedule, adapted from ACGIH guidelines, may be used as a reference where no conflicting local law exists. The frequency and length of work breaks should be based on the ambient temperature, amount of sunshine, humidity, the amount of physical labor being performed, the physical condition of the employees (e.g., acclimated or unacclimated), and protective clothing being used.
 - ii. Once a work-rest schedule is established, continually evaluate its effectiveness through observation of employees for signs/symptoms of heat stress such as dizziness, heat cramps, and/or extreme thirst.
 - iii. Consider physiological monitoring of each employee's vitals (pulse, blood pressure, and temperature) and engage with SH&E and the Occupational Health Team in support of the assessment and implementation. Physiological monitoring can provide additional information in determining if the schedule is adequate or needs to be adjusted. Physiological monitoring of heat stress may be documented using [Heat Stress Monitoring Log – Americas](#), or equivalent.

Note: Monitoring of the extent of water loss may be considered. Water loss may be monitored by weighing the Employee at the start and end of each workday. A weight loss exceeding 1.5% of total body weight indicates the need for increased fluid intake.

- iv. Allow for acclimatization when work is performed by new and returning employees (absent 1 week or more) who have not had time to acclimatize, as they may be more susceptible to heat-related illnesses.
 - 1. Minimize workload and gradually increase as tolerance is built up.
 - 2. Allow for more frequent breaks.
 - 3. While acclimatization normally takes approximately 5 to 7 days, heightened monitoring of these employees must be maintained for the first 14 days.
 - 4. When possible, employees should begin hydrating at least 3 days prior to working in high heat conditions.
- v. Try scheduling work at night or during the cooler parts of the day.
- vi. Have cool (not cold), fresh, potable water available in the break area, and in the work area itself unless hygiene/chemical exposure issues prevent it.
- vii. Have dry clothing or towels available to minimize chills when taking breaks.

2.2.3 Personal Protective Equipment (PPE)

- a. Auxiliary cooling should be considered when ANY of the following conditions exist:
 - i. Ambient temperature is over 80°F (26°C).
 - ii. Employees are wearing impermeable garments (i.e., Tyvek, Saranex, and Chemrel).
 - iii. It is desirable to have long work shifts with minimum interruption.
- b. If cooling devices are worn, only physiological monitoring must be used to determine work activity.
- c. Cooling devices should be worn beneath protective garments, but over any underclothing.
- d. Heat/flame-resistant gloves or mittens, tested in accordance with legal standards, should be selected when handling extremely hot or cold materials.

2.3 Cold Stress Planning and Prevention

- a. Requirements for working in extreme cold may be triggered by regulatory criteria or because of a hazard analysis assessing various contributing factors.
- b. Monitor ambient temperatures and implement controls in accordance with the project-specific SH&E plan. Revise the cold stress controls if there are any reports of discomfort due to cold stress.
- c. Assess and apply as practicable the hierarchy of controls (ordered by level of effectiveness) to reduce employees' exposure.

2.3.1 Engineering Controls

- a. The Project Manager can make shelters or screens available around the work area to provide protection from wind and rain and insulation from the ground. If a shelter is not readily available, consider supplying temporary shelters.
- b. Prevent body heat loss by providing appropriate sources of heat (e.g., warm packs and portable heaters) and/or using insulating materials on equipment handles. Adequate protection, such as general ventilation, must be incorporated into any warming shelter design to prevent carbon monoxide poisoning.

2.3.2 Administrative Controls

- a. Employees must:
 - i. Review the cold stress exposure control plan within the SH&E plan and/or THAs.
 - ii. Confirm a reliable method of communication is in place to allow for contact with supervision.
 - iii. Get adequate rest and nutrition. Eat high-calorie snacks to maintain body metabolism and replenish energy stores.
 - iv. Drink plenty of warm liquids to avoid dehydration.
 - v. Limit time of exposure to the cold. Take advantage of heat from the sun and stay out of the wind as much as possible.
 - vi. Take frequent short breaks in warm dry areas to allow the body to warm up.
 - vii. For a wind chill below 10°F or -12°C, adopt a “buddy system” of constantly watching the faces of others in the party for white skin tissue, which is evidence of frostbite (frostnip).
 - viii. Be informed of the hazards associated with unstable snow or ice build ups.
- b. The Project Manager must:
 - i. Develop appropriate work-to-warming-break periods based on ambient temperature, wind speed for workers wearing dry clothing, wind chill temperature (refer to Appendix 2– Wind Chill Temperature Index), physical exertion, and acclimatization.
 - ii. Confirm appropriate protection measures are in place.
 - iii. Confirm walking and working surfaces are cleared of ice and snow to prevent slips and falls.
 - iv. Allow for acclimatization when work is performed by new and returning employees (absent 1 week or more) who have not had time to acclimatize, as they may be more susceptible to cold-related illnesses.
 - v. Make special provisions to prevent hypothermia and freezing of damaged tissue in addition to providing for first aid treatment.
 - vi. Confirm extra blankets or sleeping bags are on site and provide opportunities for employees to change into dry clothing when heavy work is performed.
 - vii. Specify, make available, and confirm supplies are regularly inspected/restocked when necessary, including heating/cooling enclosures, de-icing, traction aids, warm or replenishing drinks, and batteries.

2.3.3 Personal Protective Equipment

- a. Wear multiple layers of insulating clothing to help prevent cold stress. When applicable, PPE should include:
 - i. An outer layer to break the wind and allow some ventilation.
 - ii. Head coverings and gloves or mittens for cold, wet, and windy conditions.
 - iii. A hat or hard hat liner.
 - iv. Insulated footwear with adequate traction to prevent slips and falls. Traction devices may need to be applied to the soles of work boots if the Employee may be walking on icy surfaces. Confirm the addition of ice cleats or other traction devices do not pose additional hazards.
 - v. A change of dry clothing available in case work clothes become wet.
 - vi. Eye and face protection when working outdoors in a snow and/or ice-covered terrain.
 - vii. Sunglasses (with UVA and UVB protection) and sunscreen when there is a persistent combination of snow and direct sun.

- viii. Special safety goggles to protect against potential eye hazards such as blowing ice crystals, snow, ultraviolet light, and glare.
- ix. Face guards to protect skin in cold, windy conditions, including riding in an unshielded vehicle.
- b. Avoid cotton, especially blue jeans.
- c. Confirm these items are approved and do not introduce additional unacceptable hazards (e.g., insufficient visibility and conductivity).

3. Training

- a. All employees potentially exposed to heat or cold stress, including their supervisors, will receive the appropriate training prior to work commencing. Refer to [SH&E Training – Americas](#) for additional training requirements.
- b. Training will include, but is not limited to:
 - i. Sources of exposure
 - ii. Use and impact of protective clothing
 - iii. Importance of acclimatization
 - iv. Safe work practices
 - v. Recognition of heat- or cold-related illness symptoms
 - vi. Preventive/corrective measures
 - vii. Weather monitoring
 - viii. Proper eating and drinking practices
 - ix. Buddy system
 - x. Proper use of PPE.
 - xi. First aid and emergency response procedures for symptoms on heat- or cold-related stress

4. Terms and Definitions

a. Acclimatization	The process of physiologically adjusting or becoming accustomed to a new climate or environment.
b. ACGIH	American Conference of Governmental Industrial Hygienists.
c. Auxiliary Cooling	Cooling devices worn beneath protective garments, but over any underclothing.
d. BEI	Biological Exposure Index.
e. Cold Stress	The physiological effects due to cold temperatures and/or wind chill.
f. Heat Cramps	A form of heat stress brought on by profuse sweating and the resultant loss of salt from the body.
g. Heat Rash	A heat-induced condition characterized by a red, bumpy rash with severe itching.
h. Heat Stress	The combination of environmental and physical work factors that constitute the total heat load imposed on the body. Symptoms include heavy sweating, headache, dizziness, nausea, and fast heart rate.
i. Hypothermia	Condition of reduced core body temperature to 95°F (35°C) resulting in loss of dexterity, loss of mental alertness, collapse, and possible death.
j. TLV	Threshold Limit Value.
k. Wind Chill	The combined effect of air temperature and wind velocity. Wind chill on exposed skin can cause heat loss.

5. References

- a. [SH&E Training – Americas S3AM-003-PR2](#)
- b. [SH&E Incident Response and Investigation – Americas S3AM-004-PR2](#)
- c. [Safety Gear – Americas S3AM-208-PR2](#)
- d. [SH&E Risk Assessment and Planning – Americas S3AM-209-PR2](#)
- e. [Work On, In, Or Near Water – Americas S3AM-315-PR2](#)

6. Records

- a. [Heat Stress Monitoring Log – Americas S3AM-112-FM1](#)

7. Appendices

- a. Appendix 1 – Heat Stress Work-Rest Schedule
- b. Appendix 2 – Wind Chill Temperature Index

8. Change Log

Rev #	Change Date	Description of Change	Location of Change
0	01-Dec-2025	Initial release as S3AM-112-PR2; consolidated portions of the contents from the following retired documents: Cold Stress – Americas S3AM-112-PR1, Temperature Thresholds – Americas S3AM-112-ATT1, Heat Stress – Americas S3AM-113-PR1, and Temperature Thresholds – Americas S3AM-113-ATT1.	All

Appendix 1 Heat Stress Work-Rest Schedule

- a. ACGIH defines heat stress as the net heat load to which a worker may be exposed from the combined contributions of metabolic heat, air temperature, air movement, humidity, radiant energy, and clothing. The ACGIH gives these limits in units of WBGT (wet bulb globe temperature) degrees Celsius (°C), which considers environmental factors such as air temperature, humidity, and air movement (see Table 1). WBGT values are not the same as humidex values. In some workplace situations, solar load (heat from radiant sources) is also considered in determining the WBGT.

Table 1. ACGIH Screening Criteria for Heat Stress Exposure (WBGT values in °C) for 8-Hour Work Day 5 Days per Week with Conventional Breaks

Allocation of Work in a Work/Rest Cycle	Acclimatized				Action Limit (Unacclimatized)			
	Light	Moderate	Heavy	Very Heavy	Light	Moderate	Heavy	Very Heavy
75-100%	31.0	28.0	--	--	28.0	25.0	--	--
50-75%	31.0	29.0	27.5	--	28.5	26.0	24.0	--
25-50%	32.0	30.0	29.0	28.0	29.5	27.0	25.5	24.5
0-25%	32.5	31.5	30.5	30.0	30.0	29.0	28.0	27.0

Note: Assumes 8-hour workdays in a 5-day workweek with conventional breaks. Threshold Limit Values (TLVs) assume that workers exposed to these conditions are adequately hydrated, are not taking medication, are wearing lightweight clothing (long-sleeve shirts and pants), and are in generally good health.

Examples of workloads:

Rest – sitting (quietly or with moderate arm movements)

Light work – sitting or standing to control machines; performing light hand or arm work (e.g., using a table saw); occasional walking; driving

Moderate work – walking about with moderate lifting and pushing or pulling; walking at moderate pace; e.g., scrubbing in a standing position

Heavy work – pick and shovel work, digging, carrying, pushing/pulling heavy loads; walking at fast pace; e.g., carpenter sawing by hand

Very heavy – very intense activity at fast to maximum pace; e.g., shoveling wet sand

Source: Adapted from 2024 TLVs® and BEIs® - Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. Cincinnati, Ohio: American Conference of Governmental Industrial Hygienists (ACGIH), 2024, pp. 236 and 237.

- b. The ACGIH exposure limits are intended to protect most workers from heat-related illnesses. If you are wearing heavier clothing, then the exposure limit should be lowered per ACGIH recommendations suggested in Table 2.

Table 2. Correction of TLV for Clothing (Values cannot be added when wearing multiple layers)

Clothing Type	WBGT Correction (°C)
Work clothes (long-sleeve shirt and pants)	0
Cloth (woven material) coveralls	0
SMS (Spunbonded – Meltdown – Spunbonded) polypropylene coveralls	+ 0.5
Polyolefin coveralls	+ 1
Double-layer woven clothing	+ 3
Limited-use vapor-barrier coveralls	+ 11
Note: These values are not to be used for completely encapsulating suits. Coveralls assume only modest clothing is underneath, not a second layer of clothing.	
Source: Adapted from 2024 TLVs® and BEIs®: Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. Cincinnati, Ohio: American Conference of Governmental Industrial Hygienists (ACGIH), 2024, p. 235.	

Appendix 2 Wind Chill Temperature Index

Table 3 gives temperatures for various combinations of wind and air temperature, as well as guidelines on the danger of skin exposure.

Table 3. Wind Chill Temperature Index

Wind Chill Temperature Index (Frostbite Times Are for Exposed Facial Skin)												
Wind Speed (km/h)	Air Temperature (°C)											
	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45	-50
5	4	-2	-7	-13	-19	-24	-30	-36	-41	-47	-53	-58
10	3	-3	-9	-15	-21	-27	-33	-39	-45	-51	-57	-63
15	2	-4	-11	-17	-23	-29	-35	-41	-48	-54	-60	-66
20	1	-5	-12	-18	-24	-30	-37	-43	-49	-56	-62	-68
25	1	-6	-12	-19	-25	-32	-38	-44	-51	-57	-64	-70
30	0	-6	-13	-20	-26	-33	-39	-46	-52	-59	-65	-72
35	0	-7	-14	-20	-27	-33	-40	-47	-53	-60	-66	-73
40	-1	-7	-14	-21	-27	-34	-41	-48	-54	-61	-68	-74
45	-1	-8	-15	-21	-28	-35	-42	-48	-55	-62	-69	-75
50	-1	-8	-15	-22	-29	-35	-42	-49	-56	-63	-69	-76
55	-2	-8	-15	-22	-29	-36	-43	-50	-57	-63	-70	-77
60	-2	-9	-16	-23	-30	-36	-43	-50	-57	-64	-71	-78
65	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79
70	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-80
75	-3	-10	-17	-24	-31	-38	-45	-52	-59	-66	-73	-80
80	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81

FROSTBITE GUIDE	
Increasing risk of frostbite for most people in 10 to 30 minutes of exposure	
High risk for most people in 5 to 10 minutes of exposure	
High risk for most people in 2 to 5 minutes of exposure	
High risk for most people in 2 minutes of exposure or less	

Source: Adapted from 2024 TLVs® and BEIs®: Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices. Cincinnati, Ohio: American Conference of Governmental Industrial Hygienists (ACGIH), 2024, p. 226.

Americas

Heat Stress Monitoring Log

S3AM-112-FM1

Instructions

1. This form is to be completed in accordance with [Heat and Cold Stress – Americas S3AM-112-PR2](#).
2. The purpose of this form is to monitor employees for heat illness when applicable.
3. It is the responsibility of the Foreman or Supervisor-in-Charge to confirm that each person completes the required information.
4. The completed form shall be retained in the project files.

Details													
Project Name				Date		.....		Foreman/Supervisor Name		....			
Work/Rest Duration:				Work (minutes)		....		Rest (minutes)		Temperature Measured in		☐ Celsius ☐ Fahrenheit	
Employee Name	Water Provided ¹		Acclimated ²		Vitals ³	Period 1		Period 2		Period 3		Period 4	
	Yes	No	Yes	No		In	Out	In	Out	In	Out	In	Out
....	☐	☐	☐	☐	P	....	....	....	....	....	....	....	....
	☐	☐	☐	☐	BP	....	....	....	....	....	....	....	....
	☐	☐	☐	☐	Temp	....	....	....	....	....	....	....	....
....	☐	☐	☐	☐	P	....	....	....	....	....	....	....	....
	☐	☐	☐	☐	BP	....	....	....	....	....	....	....	....
	☐	☐	☐	☐	Temp	....	....	....	....	....	....	....	....
....	☐	☐	☐	☐	P	....	....	....	....	....	....	....	....
	☐	☐	☐	☐	BP	....	....	....	....	....	....	....	....
	☐	☐	☐	☐	Temp	....	....	....	....	....	....	....	....

Employee Name	Water Provided ¹		Acclimated ²		Vitals ³	Period 1		Period 2		Period 3		Period 4	
	Yes	No	Yes	No		In	Out	In	Out	In	Out	In	Out
....	☐	☐	☐	☐	P	....	....	....	....	....	....	....	....
	☐	☐	☐	☐	BP	....	....	....	....	....	....	....	....
	☐	☐	☐	☐	Temp	....	....	....	....	....	....	....	....
....	☐	☐	☐	☐	P	....	....	....	....	....	....	....	....
	☐	☐	☐	☐	BP	....	....	....	....	....	....	....	....
	☐	☐	☐	☐	Temp	....	....	....	....	....	....	....	....
....	☐	☐	☐	☐	P	....	....	....	....	....	....	....	....
	☐	☐	☐	☐	BP	....	....	....	....	....	....	....	....
	☐	☐	☐	☐	Temp	....	....	....	....	....	....	....	....

¹ Each employee should be provided a sufficient amount of water or sports drink before entering the hot zone. Drinks such as coffee and cola should be discouraged.

² An employee is “acclimated” if he/she has worked in a hot environment for at least 5 - 7 consecutive days. If an employee is acclimated, check “Yes.” If an employee is not acclimated, check “No” and reduce the work duration by 50 percent for that Employee until the 5 – 7 -day period is reached.

³ P = pulse rate, BP = blood pressure, Temp = body temperature

1. Purpose and Scope

- a. This procedure establishes requirements for the following:
 - i. An effective hearing conservation program.
 - ii. Confirming that personal noise exposure remains within acceptable limits.
- b. This procedure applies to all AECOM Americas-based employees and operations, as well as contracted personnel required to comply with this document's content.

2. Procedure

2.1 Critical Controls

The following is a list of minimum mandatory critical controls to be implemented, as applicable, by the Project Manager or Designee to prevent high potential and/or significant incidents:

- a. Safety, Health, and Environment (SH&E) plans and task hazard assessments (THAs; e.g., field level risk assessments [FLRAs] in Canada) must identify:
 - i. Applicable hazards related to noise exposure via established exposure limits and action levels specified by local law.
 - ii. In the absence of specifications, an 8-hour time-weighted average (TWA) of 85 decibels A (dBA) as the action level.

Note: Refer to [SH&E Risk Assessment and Planning – Americas](#).

- b. When processes or areas present potential or actual noise exposures at or above the action level identified by local law, a trained and competent individual must conduct a noise survey and interpret results to measure the extent of the hazard.
- c. Resulting documentation (e.g., noise maps, and results of the sound level survey data) must be communicated to affected employees in writing within 15 days from receipt of results, or less where required by local law, and posted or available at the location.
- d. Noise assessments must be repeated when there is any change in processes or equipment affecting the noise level or the exposure duration.
- e. Eliminate noise sources or use engineering controls to reduce noise levels when practicable prior to implementing hearing protection personal protective equipment (PPE).
- f. Where practicable, a clearly visible warning sign must be posted at every approach to an area in the workplace where the sound level regularly exceeds 85 dBA.

2.2 Hearing Protectors

The Project Manager is responsible for confirming the following:

- a. At a minimum, hearing protectors must provide a level of protection bringing actual or anticipated exposure below the established exposure limit in accordance with local law.

- b. Hearing protection is mandatory for all employees who:
 - i. Work on or near heavy equipment unless personal dosimetry or other techniques have been used to document actual exposure is below the action level;
 - ii. Are exposed to 85 dBA or higher at any time; and/or
 - iii. Have experienced a standard threshold shift (STS).
- c. Hearing protection must be made available at no cost to all employees exposed to the action level.

Note: At least two types of hearing protectors must be available to employees free of charge, and the type of hearing protector must be suitable to the task and in accordance with local law.
- d. Hearing protectors must be used in accordance with manufacturer's specifications to effectively protect hearing.
- e. Refer to [Safety Gear – Americas](#) for additional information.

2.3 Audiometric Testing

- a. Employees with exposure greater than the action level must be enrolled in the medical surveillance program at no cost to the employees, which includes that the enrolled employees receive:
 - i. Baseline audiograms within 6 months of the first exposure (consult local law for more stringent timelines).
 - ii. Audiograms annually and compared with the baseline exam to determine if the audiogram is valid, and if there is an STS.
 - iii. Audiograms during their exit physicals.
- b. For more information on medical surveillance, refer to [Fitness for Duty – Americas](#).
- c. Audiometric testing and employee notification of results must be in accordance with local law.

2.4 Employee Monitoring

- a. When information indicates employees' exposure may equal or exceed the applicable action level, the Project Manager and SH&E Manager must develop and implement a site-specific monitoring program to identify inclusion in the hearing conservation program and enable the proper selection of hearing protectors.
- b. Noise surveys must be conducted in a manner reasonably reflecting the exposure of affected employees. Surveys must be conducted under supervision of a competent person.

3. Training

- a. All employees with potential exposure above the applicable action levels, or who otherwise utilize any type of hearing protector, must participate in a hearing conservation training program.
- b. Training must occur within 30 days of enrollment into the hearing conservation program and address the use of hearing protectors. Refer to [SH&E Training – Americas](#) and its associated [Assessment of SH&E Training Requirements – Americas](#) for additional training requirements.
- c. Hearing protection training must be conducted annually for all affected employees or more frequently for employees who do not properly use hearing protectors or otherwise fail to comply with this policy.

4. Terms and Definitions

- a. Action Level May also be referred to as Monitoring Level. An 8-hour, time-weighted average established by local law, measured on the A-scale, slow response. Depending on local law, this can vary anywhere from 74 dBA to 85 dBA, and may additionally be defined as 50% of the allowable noise dose. In the absence of an action level specified by local law, 85 dBA must be used as the default action level.
- b. dB Decibel – Logarithmic unit of measurement of sound level.
- c. Established Exposure Limit The maximum regulatory noise exposure to which an individual may be exposed to for an 8-hour time weighted average (TWA).
This limit is referred to by different terminology depending upon local law (e.g., Permissible Exposure Limit [PEL], Contamination Limit, Occupational Exposure Limit [OEL], Threshold Limit Value [TLV], etc.).
Acceptable methods of adjusting this limit to correspond to a different exposure period (e.g., 10 hours) vary by local law.
- d. PPE Personal Protective Equipment.
- e. SH&E Safety, Health, and Environment.
- f. STS Standard Threshold Shift – When one's hearing threshold has changed (relative to the baseline audiogram) an average of 10 dB or more at 2000, 3000, or 4000 Hz in either ear.
- g. TWA Sound Level Time-Weighted Average Sound Level – The average noise level a person is exposed to over a specific period of time, usually an 8-hour workday, taking into account variations in the noise level during that time. It considers both noise levels and how long the employee is exposed at each noise level.

5. References

- a. [SH&E Training – Americas S3AM-003-PR2](#)
- b. [Fitness for Duty – Americas S3AM-008-PR2](#)
- c. [SH&E Risk Assessment and Planning – Americas S3AM-209-PR2](#)
- d. [Safety Gear – Americas S3AM-208-PR2](#)

6. Records

- a. Noise exposure measurement records, surveys, and site-specific hearing conservation plans must be retained at the project or facility for the duration of the project.
- b. Audiogram records must be retained in the employee's medical records.
- c. [Assessment of SH&E Training Requirements – Americas S3AM-003-FM1](#)

7. Change Log

Rev #	Change Date	Description of Change	Location of Change
0	01-Mar-2016	Initially released as S3NA-118-PR1	
1	31-July-2019	Re-released as S3AM-118-PR1	
2	01-Dec-2025	2025 review; comprehensive revision as part of the Americas SH&E IMS simplification; converted to new IMS Procedure Template and AECOM Style.	All

Safety Gear

S3AM-208-PR2

1. Purpose and Scope

- a. The purpose of this procedure is to define the process and criteria for the selection, issuance, and maintenance of personal protective equipment (PPE) and other safety equipment, including emergency safety equipment.
- b. PPE must be used when identified hazards cannot be eliminated through substitution, engineering, or administrative controls or to provide additional protection (see [Safety, Health, and Environment \(SH&E\) Risk Assessment and Planning – Americas](#)).
- c. This procedure applies to all AECOM Americas-based employees and operations as well as personnel contractually required to comply with this document's content.

2. Procedure

2.1 Determining the Need for PPE

- a. The Project Team must:
 - i. Identify necessary PPE-related control measures in task-specific risk assessments. Refer to [SH&E Risk Assessment and Planning – Americas](#) for risk assessment requirements.
 - ii. Include PPE requirements in the applicable SH&E plan and task hazard assessments (THAs; e.g., field level risk assessments [FLRAs] in Canada).
- b. Prior to entering any controlled or restricted work area, employees must review the project-specific SH&E plan and corresponding THA(s) to confirm that they are equipped with the required PPE appropriate to the specific work area's hazards.
- c. As required, the Project Team and SH&E Manager should evaluate employee use of PPE and adequacy of PPE protection on a routine basis. This may be documented using [Personal Protective Equipment \(PPE\) Inspection – Americas](#), or equivalent.

2.2 Minimum PPE Requirements

- a. Minimum PPE requirements for employees working at locations outside of an AECOM office include:
 - Safety glasses
 - Hardhat
 - Sleeves that cover the shoulders and long pants or coveralls
 - Class 2 high-visibility reflective vests
 - Work boots with defined heel and over-ankle support
 - Protective gloves, carried on the person
- b. PPE must also:
 - i. Properly fit the Employee's body, with consideration given to gender-specific gear and sizing.
 - ii. Be selected and used in accordance with recognized standards (e.g., applicable American National Standards Institute [ANSI]/Canadian Standards Association [CSA] standards) and provide effective protection. Employees must follow instructions and manufacturers' specifications on the care, use, and storage of PPE.
 - iii. Not in itself create a hazard to the wearer.
 - iv. Be compatible so one item of PPE does not interfere with another.

- v. Be maintained in good working order and in a sanitary condition. Employees must inspect their required PPE prior to use. Worn out, expired, damaged, and/or defective equipment must be removed from service and replaced.
- vi. Not be altered in any way.
- a. Employees must obtain basic PPE (e.g., safety glasses, hardhat, reflective vest, gloves, and hearing protection) and required specialized PPE (e.g., fall protection equipment and respirators) from AECOM at no charge. Reimbursement approvals for any additional PPE (e.g., prescription safety glasses, safety-toed work boots, etc.) must be in accordance with employee's regional and/or business line policy, and legal requirements.
- b. AECOM locations must maintain, or otherwise have readily accessible, a supply of PPE of appropriate types and sizes, such as hardhats, high-visibility vests, safety glasses, gloves, hearing protection, and chemical-resistant clothing as applicable to the nature of their field activities. The Project Manager or designee will be responsible for maintaining this inventory.
- c. AECOM locations should review their PPE program on at least an annual basis.
- d. Deviation from these minimum requirements may be allowed if the risk assessment deems appropriate and this deviation is approved by the Project Manager and SH&E Manager via the completion of [SH&E Management System Variance Request– Americas](#) or equivalent documentation.

2.3 Eye and Face Protection

- a. AECOM employees must use appropriate eye and face protection when eye or face hazards are present or there is a potential for flying particles, molten metal, liquid chemicals, acid and caustic liquids, chemical gases or vapors, injurious light radiation, or arc flash when working on or near exposed energized apparatus.
- b. The level of eye and face protection will be based on the risk assessment. Refer to Table 1 for several types of eye and face protection to consider.
- c. Contact lenses must not be worn in areas where there is potential exposure to a welding arc or in chemical environments as required by the safety data sheet (SDS).

Table 1. Types of Eye and Face Protection

Type of Eye and Face Protection	Specifications and Usages
Safety glasses	The most used form of eye protection is safety glasses. To prevent lateral exposure to impact fragments, safety glasses should be equipped with side shields. Depending on the hazard, side shields can be either a cup-type or flat-folded. The cup-type provides more complete protection. Prescription safety glasses may be provided to employees who require vision correction and are working in areas where eye protection is mandatory. Alternatively, safety glasses designed to go over prescription glasses can be worn, when allowed by law.
Spoggles (foam or rubber lines)	Spoggles are safety glasses that include foam seals on frames to improve sealing against the face. They should be used when there is a potential for flying particles small enough to enter behind standard safety glasses.
Safety goggles (direct, indirect, or non-vent)	Goggles form a complete seal around the eye area, providing more coverage than safety glasses, and are more appropriate for chemical hazards and conducting tasks such as power washing or when working in an area or at a process involving high dust or particulate concentrations.

Type of Eye and Face Protection	Specifications and Usages
Face shields	Face shields should be used when there is danger from impact from flying particles or chemical splash. Face shields are secondary protectors and must be worn over safety glasses or goggles when using welding, cutting, chipping, grinding, or buffing tools. Hazards associated with drilling or operations involving striking should also be assessed for the need for dual eye protection.
Dual eye protection	This may be required to be worn by any employee undertaking or in proximity to a task producing projected particles or material due to hand tool use as determined by the project-specific risk assessment and/or THAs.

2.4 Head Protection

- a. The main type of head protector is the hardhat. Hardhats are designed to protect employees from impact and penetration caused by objects hitting their head. The shell of the hardhat is designed to absorb some of the impact. The suspension, which consists of a headband and strapping, not only holds the hardhat in place but is critical for absorbing and distributing impact shock loads. Refer to Table 2 for types of hardhats.
- b. Employees must:
 - i. Not use bump caps as protection against head injury.
 - ii. Use hardhats designed for a face shield attachment for tasks requiring face shields. Some hardhats also include attachment slots for hearing protection muffs.
 - iii. Only wear AECOM-approved hardhats (cowboy style are not acceptable).
 - iv. Avoid storing a hardhat in direct sunlight (e.g., vehicle back window), as it will be subjected to unnecessary UV exposure.
 - v. Wear hardhats in the forward position. A hardhat can be worn backwards with written verification and instructions from the hardhat manufacturer indicating the hardhat has been tested and found compliant.
 - vi. Wear hardhats whenever there is a danger of falling objects.
 - vii. Avoid any contact of the hardhat with insect repellent. Some insect repellents can degrade hardhat materials.

Table 2. Head Protection Types

Type of Hardhat	Specifications and Usages
Type I	- Provides crown protection from penetration and impact. - Intended to reduce the force resulting from a blow only to the top (crown) of the head.
Type II	- Provides crown and lateral penetration and impact protection. - Intended to reduce the force resulting from a blow received off center or to the top of the head. - Typically lined on the inside with thick, high-density foam.

2.5 Foot Protection

- a. Safety-toed (steel or composite) boots with a minimum of 6 inches (15.2 centimeters) of ankle support, an oil-resistant sole, and a distinctive heel must be the minimum footwear requirement of all employees engaged in construction, operation, maintenance, or when hazards to feet are present or have the potential to be present (this includes impact, puncture, cut, electrical, thermal, or chemical hazards).
- b. Employees assigned to field projects who are not required to wear specified protective footwear (e.g., steel-toed boots) will wear substantial, high-sided work boots.

2.6 Hand Protection

- a. Employees must have gloves in their immediate possession whenever they are on a work site.
- b. Employees must use appropriate hand protection when their hands are exposed to hazards such as skin absorption of harmful substances, severe cuts or lacerations, severe abrasions, punctures, chemical burns, thermal burns, harmful temperature extremes, high hand vibration, and sharp objects.
- c. Gloves must be sized correctly for the Employee.
- d. After physical guards, gloves provide the most common hand protection.
- e. In most cases there are trade-offs between hazard protection and functional performance of a glove. These factors are equally important. The higher the severity of the hazard, the more important hazard protection is. Table 3 offers additional guidance on key considerations when selecting a glove for certain protection and performance properties.

Table 3. Key Considerations and Selection Criteria for Gloves

Category	Properties	Protection and Performance Needs	Key Considerations and Selection Criteria
Mechanical	Cut Resistance	Protection from sharp edges, blades, and other cutting hazards	Testing Standard: American Society for Testing and Materials (ASTM) F1790 and ASTM F1970-05 There are 5 levels of cut resistance; 5 is the highest.
	Puncture Resistance	Protection from sharp objects like nails, pins, needles, and wire	Testing Standard: EN 388:2003 This testing measures the force required to pierce the sample with a standard sized point.
	Abrasion Resistance	Durability and resistance to abrasive objects or materials	Testing Standard: ASTM D3389-05 and ASTM D3884-09 Abrasion resistance testing measures how well the glove material resists loss of material from rubbing on rough surfaces.
	Shielding	Protection from impact, ricochet, and small projectiles	Some gloves have thick padding or hard guards around the back of the hand or knuckles. These can offer good protection against impact.
Chemical	Degradation & Absorption Resistance	Durability and resistance to breaking down and/or permeating the glove from exposure to chemicals	Identify products/chemicals that present potential exposure risks. Refer to the chemical's SDS and glove manufacturer's specifications for the appropriate glove choice.
Thermal	Heat Resistance	Thermal protection from hot objects or materials	Testing Standard: ASTM F1060-08 This testing measures the insulation provided by the glove when contacting a hot surface. Higher temperatures reported indicate a glove with greater insulation.
	Cold Resistance	Thermal protection from cold weather, objects, or materials	Testing Standard: EN 511:1994 (for ambient temperature) Testing Standard: International Organization for Standardization (ISO) 5085:1989-1 (for cold surfaces) Choosing the right glove depends on whether protection is needed from cold weather or cold surfaces.

Category	Properties	Protection and Performance Needs	Key Considerations and Selection Criteria	
Vibration	Anti-Vibration	Vibration reduction from operating certain tools and equipment	Testing Standard: ANSI S2.73-2002 (R2007) This testing method measures the vibration transmission of the glove.	
Electrical	Insulation	If performing work on electrical equipment, this must be the top priority	Testing Standard: ASTM D120-09 Glove protection depends on the maximum voltage of energized components:	
			50 – 480 V	Class 00 with Leather Protectors
			480 – 600 V	Class 0 with Leather Protectors
Function	Dexterity	Ability to manipulate objects and control hands in the desired manner	Testing Method: EN 420:2003 This testing method assesses the wearer's ability to pick up small diameter pins lying on a flat surface with their thumb and forefinger. If high dexterity is needed, and the hazards are relatively low to the forefinger and thumb, consider a glove that is tipless for those two digits.	
			There is no standard test. However, a common field test is to determine if the wearer can feel a pulse while wearing the glove. This is affected by the thickness of the glove, presence of liners, glove surface characteristics, and properties of the coating material.	
	Grip	Ability to exert pressure on an object when holding it	Testing Standard: National Fire Protection Association (NFPA) 1971 (Grip)	

2.6.1 Hazardous Substances

- Review SDSs for project or task-specific chemicals to determine appropriate gloves. Consult with an SH&E Manager for assistance, as needed.
- Review glove manufacturer specifications for both physical and chemical protection.
- When both chemical and physical protection is of concern, wear the chemical protection gloves (e.g., nitrile) inside the physical protection gloves (e.g., leather, Kevlar®).
- Nitrile or equivalent chemical-resistant gloves must always be used for protection from hazardous fluids or non-corrosive chemicals.

2.6.2 Cuts, Lacerations, and Punctures

- If cut or laceration hazards are present, appropriate gloves with the applicable ANSI/CSA cut resistance rating for the task should be selected.
- Gloves providing cut resistance may be constructed of leather, synthetic materials (e.g., polyester and nylon), high-performance materials (e.g., Kevlar®), or metal mesh.

Note: Not all gloves providing cut/laceration resistance provide equal puncture resistance. Thus, when selecting a glove for puncture protection, review the manufacturer's specifications specific to puncturing.

2.6.3 Abrasions

- a. Leather gloves offer some abrasion protection but should only be selected for light abrasion protection. Appropriate activities for leather gloves may include moving light equipment where cuts and lacerations are of minimal concern.
- b. Gloves with abrasion-resistant surfaces in high contact areas (e.g., knuckles and palm) should be considered for tasks involving high potential for abrasion hazards (e.g., construction activities).

2.6.4 Vibration

Gloves meeting the applicable ANSI/CSA standard for vibration reduction (also known as anti-vibration gloves) should be selected if performing activities requiring handling of vibrating tools (chainsaw, jackhammer, grinder, etc.). Anti-vibration gloves should completely cover the fingers.

2.7 High-Visibility Apparel

- a. “High-visibility safety apparel” means personal protective safety clothing intended to provide conspicuity during both daytime and nighttime usage and meeting ANSI/International Safety Equipment Association (ISEA)/CSA standards. Refer to Table 4 for more information on high-visibility apparel.
- b. The color of apparel (orange or lime) may be client or project specific.
- c. Work conducted at night may require that the minimum level of safety apparel worn be ANSI/CSA Class 3, and in accordance with local law.

Table 4. High-Visibility Safety Apparel

Class Type	Specification	Usage	Examples of Pedestrian Workers
2	Provides superior visibility for the wearers by the additional coverage of the torso.	- Inclement weather conditions - Complex backgrounds - Work activities near vehicle traffic 0 mph to 25 mph (40 kph)	- Construction managers/inspectors - Survey crews - Bridge inspectors
3	- Offers greater visibility to the wearer in both complex backgrounds and through a full range of body movements. - Visibility is enhanced beyond Class 2 by the enhancement of background and reflective materials to arms and/or legs. - Typically consists of coveralls, jumpsuits, long- or short-sleeved jackets, or long-sleeved shirts with retro-reflective bands.	- High vehicle speeds (50 mph [80 kph] or more) - Reduced sight distances - Worker and vehicle operator have high task loads, clearly placing the worker in danger - The wearer must be conspicuous through a full range of body motions at a minimum of 1,280 feet (390 m)	- Utility workers - Environmental samplers - Resident engineers

- d. Other high-visibility apparel includes Class E and headwear:
 - i. Class E apparel includes trousers that are part of a Class 3 apparel ensemble. Frequently a Class 2 vest is paired with Class E trousers, creating an overall ensemble that meets Class 3 apparel requirements. Class E garments are not intended to be worn without Class 2 or 3 garments.
 - ii. Headwear is considered an important accessory and compliments the overall visibility of the wearer. High-visibility headwear enhances visibility of the head of a moving worker in daylight and helps define the shape of the human form during nighttime.

2.8 Personal Clothing

- a. Employees on a project site must wear full-length trousers and shirts covering shoulders.
- b. For personal safety on the job site, do not wear:
 - i. Loose or unsecured clothing or loose-fitting cuffs;
 - ii. Greasy or oily clothing, gloves, or boots;
 - iii. Torn or ragged clothing; or
 - iv. Jewelry (e.g., rings, bracelets, neck chains) when working around moving parts.
- c. Long hair must be tied back or otherwise confined when there is a risk of entanglement with moving parts.
- d. Cotton or wool fabrics are recommended for general use.
- e. Shoes made of leather, canvas, tennis, deck, or other types of non-protective material, including sandals and high-heeled shoes, are not allowed on field project sites. Refer to Section 2.5 for requirements.

2.9 Specialized PPE

In addition to basic PPE, additional specialized PPE may be required to provide appropriate protection to the Employee. Protective equipment must be of heat-, fire-, chemical-, and/or electrical-resistive material when conditions require protection against such hazards. Refer to applicable law, related SH&E procedures, and the SH&E Manager for additional information on PPE requirements.

2.9.1 Temperature Extremes

Refer to the [Heat and Cold Stress – Americas](#) for detailed requirements related to temperature extremes.

2.9.2 Chemical-Resistant Clothing

- a. The Project Team must consult the SDS of the material(s) being handled, as well as the SH&E Manager and subject matter experts (e.g., Certified Industrial Hygienist), as needed, to appropriately select chemical-resistant clothing, gloves, and boots.
- b. The objective of chemical-resistant clothing is to separate the person from a hazardous material. Whenever there is a potential for chemical exposures, chemical-resistant clothing (e.g., latex or nitrile gloves, Tyvek coveralls or aprons, and chemical-resistant boots) should be considered during the risk assessment.
- c. Consideration must be given to allergies, and alternatives must be provided if necessary.

2.9.3 Fall Protection

- a. Selection and use of fall arrest equipment/systems must be planned and established by a competent person as defined in applicable local law, code of practice, or standards. Personal fall protection equipment and systems (to include fall arrest, positioning, and restraint) must be used when a person is working at heights and/or exposed to a fall hazard. Integral chinstraps should be worn when working overhead.
- b. Refer to [Work at Height – Americas](#) for detailed requirements related to fall protection and arrest system requirements.
- c. Confined space hazards may necessitate the use of specific harnesses attached to retrieval lines to facilitate rescue. Refer to [Confined Spaces – Americas](#).

2.9.4 Respiratory Protection

- a. Respiratory protection must be selected based on the contaminant and concentration to which the Employee will be exposed. The use of respirators is required when occupational exposure levels approach or exceed Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs) or American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs), and engineering or administrative exposure controls are not feasible to implement.
- b. For specific requirements, refer to [Respiratory Protection – Americas](#), the task- or project-specific hazard assessments, and the applicable SDSs.

2.9.5 Hearing Protection

- a. Noise levels in the work environment that cannot be eliminated or reduced to acceptable levels by elimination or engineering controls require employees to be protected from exposure. Hearing protection devices must be able to attenuate noise to acceptable levels (i.e., 85 dBA for continuous [steady-state] noise). If necessary to hear audible warnings, hearing protection devices should not attenuate hearing levels below an individual's hearing threshold.
- b. Dual hearing protection (i.e., earplugs and a second method such as earmuffs worn concurrently) must be based on the attenuation of the specific hearing protection. Generally, double hearing protection should be used whenever employees are exposed to continuous noise greater than 115 dBA.
- c. The attenuation of the specific hearing protection must be determined using the National Institute for Occupational Safety and Health (NIOSH) de-rating scheme. Ear insert devices, to include disposable, pre-formed, or custom-molded earplugs, must be fitted to the exposed individual. Plain cotton is not an acceptable hearing protection device.
- d. Refer to [Noise – Americas](#) for additional information.

2.9.6 Protection from Drowning

Whenever there exists the possibility of falling into water, personnel must wear personal flotation devices (PFDs) or life jackets. Refer to [Work On, In, or Near Water – Americas](#) for requirements on PFDs and related PPE.

2.9.7 Fire-Resistant Clothing (FRC)

- a. Fire-resistant clothing (FRC) is required to be worn by all personnel under the following circumstances:
 - i. Where they are exposed to hot work in hazardous areas unless deemed unnecessary through risk assessment.
 - ii. Where there is a risk of exposure to an electrical arc flash (e.g., work in electrical substations).
 - iii. FRC use is mandated by the client or site owner/operator.
- b. FRC should be worn as the outermost layer of clothing.

2.9.8 Electrical Safety

- a. Work on or around electrical utilities and equipment should only be done in accordance with [Hazardous Energy Control – Americas](#).
- b. PPE must be appropriate for the level of electrical hazard present based on a risk assessment conducted according to the applicable standard (e.g., National Fire Protection Association [NFPA] 70E Standard for Electrical Safety in the Workplace and Canadian Standards Association [CSA] Z462 Workplace Electrical Safety Standard), which also specify PPE requirements based on hazard risk classifications.
- c. Synthetic clothing must not be worn; synthetic clothing includes acetate, nylon, polyester, and rayon (either alone or in blends with cotton).

- d. Gloves made from layers of flame-resistant material provide the highest level of protection.
- e. Leather glove protectors should be worn over voltage-rated rubber gloves.
- f. Dielectric overshoes are required where electrically insulated footwear is used for protection against step and touch potential.
- g. Safety shoes/boots must be in good condition with no evidence of exposed metal such as steel toe-caps.

2.9.9 Limb Protection

- a. Employees must wear the appropriate chainsaw chaps when operating a chainsaw and snake chaps if potentially exposed to snake bites. Protective leg chaps must meet ASTM specifications.
- b. Limb and body protection should not be modified without manufacturer's approval, as the protective qualities may be compromised.
- c. Boots providing metatarsal protection provide above-the-toe protection from rolling or crushing hazards, as well as punctures or cuts from equipment such as chainsaws.

2.10 Emergency Safety Equipment

2.10.1 First Aid Supplies

- a. All AECOM locations must maintain an adequate amount of first aid supplies in an easily identifiable and accessible location. All locations must be equipped with a complete first aid kit appropriate to the number of staff, location of work, and site hazards, according to applicable law.
- b. First aid kits must be inspected to confirm the contents meet legal requirements given the number of staff, work location, and potential hazards prior to being placed in the determined location or sent to a job site and, as a minimum, monthly thereafter.
- c. An inventory (listing required and approved items) and inspection form must be included with each first aid kit. Any items not listed on the inventory (listed as required or approved for the kit) will be removed during the inspection unless specifically approved by a health care professional for inclusion and added to the inventory.
- d. At no time will over-the-counter medications such as antacids, aspirin, cold or cough drops, or other sundry items be stored in the kits without the prior approval of a health care professional (where permitted by local law) and inclusion in the kit's listed inventory.
- e. Each item in first aid kits must be individually sealed to protect the contents from contamination. The first aid equipment and supplies must be maintained in a clean, dry, and serviceable condition, contained in a material that protects the contents from the environment, and clearly identified as first aid equipment and supplies.

2.10.2 Automated External Defibrillator (AED)

- a. While locations are not mandated to acquire AEDs, an AED should be considered based on the number of employees, response time of local Emergency Medical Services (EMS), and access to other AED units (e.g., those provided by the office building management).
- b. The selection of AED equipment will be based on the most current listing of approved AED manufacturers as provided by the American Heart Association, Heart and Stroke Foundation of Canada, or country equivalent.
- c. Local law may require notification to EMS of AED locations. This allows the servicing or responding agency to know that an AED is at a particular location.
- d. AEDs should be placed in a location that optimizes the fastest response time for an individual walking at a rapid pace to reach the victim. A general rule of thumb by the American Heart Association is that it should take no longer than 3 minutes to retrieve an AED and return to the victim. The AED should be in an easily accessible position with the location well-communicated to all staff.

- e. To confirm readiness for use and integrity of the device, AEDs must be inspected monthly, and maintained, cleaned, serviced, and tested according to manufacturer's specifications. All documentation (e.g., inspections, service records) will be delivered to the Designated Individual and maintained in the applicable project/location files.
- f. AEDs must be used in conjunction with cardiopulmonary resuscitation (CPR) according to training and the equipment's operating directions when a victim is unresponsive and not breathing.

2.10.3 Eyewash and Body Flush (Shower) Facilities

- a. If corrosive, irritating, or otherwise hazardous materials are used, review applicable SDSs to assist in determining whether eyewash and body flush (shower) facilities must be provided. This may include permanent or portable eyewash stations.
- b. Employees who may be exposed to corrosive, irritating, or otherwise hazardous materials must be instructed in the location and proper use of emergency eyewash units and body flush (shower) facilities.
- c. Eyewash and body flush (shower) facilities must be assembled and installed in accordance with the manufacturer's specifications.
- d. These facilities must be readily available and should be highly visible, clearly identified, and, if possible, within 10 seconds of the hazard. The water source / flushing fluid must be tepid, pressure controlled, and maintained to prevent freezing and contamination of the fluid.
- e. All eyewash and body flush (shower) equipment must be inspected for compliance with applicable ANSI and CSA standards, as well as the manufacturer's specifications.

2.10.4 Fire Extinguishers

- a. Portable fire extinguishers must be selected, located, inspected, maintained, and installed in accordance with local law and building and fire life safety code.
- b. Fire extinguishers must be readily available wherever the potential for fire exists, properly maintained, regularly inspected, and promptly recharged and replaced immediately after use.
- c. Class B (or ABC) fire extinguishers must also be available in locations where flammable or combustible liquids are stored, handled, or used.
- d. In the event of a fire, follow the emergency response plan (ERP) outlined in the applicable SH&E plan to contact the appropriate firefighting personnel (e.g., local fire department, plant fire crew). Refer to SH&E Risk Assessment and Planning – Americas for ERP and SH&E plan requirements.
- e. Only trained employees should use a fire extinguisher, and only if operation does not endanger the user.
- f. Portable extinguishers must be of suitable types and sizes. Refer to Table 5 for the different fire extinguisher classifications and what types of fires they are meant for.

Table 5. Fire Extinguisher Classifications

Classification	Type of Fire
Class A	Combustible materials
Class B	Flammable liquid, gas, or grease
Class C	Electrical equipment
Class D	Combustible metal

- g. The use or discharge of any fire extinguisher by an AECOM employee must be immediately reported to the Supervisor and in accordance with [SH&E Incident Response and Investigation – Americas](#).

- h. Extinguishers must be inspected monthly to ensure that they are still in the proper location, have not been used or tampered with, are still properly charged, and have no obvious external damage. The initials of the inspector and the date of inspection must be noted on the tag attached to the extinguisher.
- i. A thorough inspection will be performed annually by personnel specifically trained in the inspection (e.g., extinguisher supplier).

3. Training

- a. If PPE is planned to be used for a high-risk task, the person approving the purchase and issue of PPE must consult with the SH&E Manager. The SH&E Manager must provide or arrange for appropriate training.
- b. Where training on the use and maintenance of specific PPE has been identified, the PPE must only be used by employees who have undergone training or have been assessed as competent by holding the relevant certification.
- c. Training and demonstrated competency is mandatory prior to using any specialized PPE.
- d. Employees will receive adequate instruction on the correct use, limitations, and assigned maintenance duties for the equipment to be used. The following information, at a minimum, will be covered during PPE training:
 - i. What, when, and why PPE is required.
 - ii. How to properly don, doff, adjust, and wear the PPE described.
 - iii. The limitations of the PPE, including its expected useful life.
 - iv. How to properly care for, maintain, and dispose of the PPE.
- e. Retraining may be required as applicable (e.g., observed non-compliance, changes in procedure).
- f. Employees must confirm they have reviewed and understand the manufacturer's specifications for the relevant PPE before work commences.
- g. For training on the use of first aid supplies, AEDs, and fire extinguishers, refer to [SH&E Incident Response and Investigation – Americas](#) and [Assessment of SH&E Training Requirements– Americas](#).

4. Terms and Definitions

a.	ANSI	American National Standards Institute
b.	ASTM	American Society for Testing and Materials
c.	CSA	Canadian Standards Association
d.	NFPA	National Fire Protection Association
e.	PPE	Personal Protective Equipment
f.	SDS	Safety Data Sheet
g.	SH&E	Safety, Health, and Environment
h.	THA	Task Hazard Assessment

5. References

- a. [SH&E Incident Response and Investigation – Americas S3AM-004-PR2](#)
- b. [Heat and Cold Stress – Americas S3AM-112-PR2](#)
- c. [Noise – Americas S3AM-118-PR1](#)
- d. [Respiratory Protection – Americas S3AM-123-PR1](#)
- e. [SH&E Risk Assessment and Planning – Americas S3AM-209-PR2](#)

- f. [Confined Spaces – Americas S3AM-301-PR1](#)
- g. [Hazardous Energy Control – Americas S3AM-302-PR2](#)
- h. [Work at Height – Americas S3AM-304-PR2](#)
- i. [Work On, In, or Near Water – Americas S3AM-315-PR2](#)
- j. NFPA 70E – U.S. Standard for Electrical Safety in the Workplace
- k. CSA Z462 – Canadian Standard for Electrical Safety in the Workplace

6. Records

- a. [Personal Protective Equipment \(PPE\) Inspection – Americas S3AM-208-FM2](#)
- b. [Assessment of SH&E Training Requirements – Americas S3AM-003-FM1](#)
- c. [SH&E Management System Variance Request – Americas S3AM-215-FM2](#)

7. Change Log

Rev #	Change Date	Description of Change	Location of Change
0	01-Dec-2025	Initial release as S3AM-208-PR2; consolidated portions of the contents from the following retired documents: Personal Protective Equipment – Americas S3AM-208-PR1, Eye & Face Protection – Americas S3AM-208-ATT1, Head Protection – Americas S3AM-208-ATT2, Foot Protection – Americas S3AM-208-ATT3, Hand Protection – Americas S3AM-208-ATT4, Limb & Body Protection – Americas S3AM-208-ATT5, High Visibility Safety Apparel – Americas S3AM-208-ATT6, Fire Protection – Americas S3AM-011-PR1, Portable Fire Extinguishers – Americas S3AM-011-ATT1, First Aid – Americas S3AM-012-PR1.	All

Ground Disturbance

S3AM-303-PR2

1. Purpose and Scope

- a. The purpose of this procedure is to safeguard employees, property, and the environment from hazards associated with excavation, drilling, surface mining, and other ground disturbance operations.
- b. For underground work, including underground mines, refer to [Underground Work – Americas](#).
- c. This procedure applies to all AECOM Americas-based employees and operations, as well as contracted personnel required to comply with this document's content.

2. Procedure

2.1 Critical Controls

The following are the minimum required critical controls to prevent high-potential and/or significant incidents to be implemented by the Project Manager or Designee.

- a. Protective systems must be used to protect workers entering an excavation and are required when an excavation is greater than 5 feet deep (1.22 meters in Canada) and is not entirely in stable rock, unless local law is more stringent.
- b. If there is a danger of a worker or equipment falling into an excavation, or whenever the edge is not clearly visible, identify the trench or excavation perimeter with visual markers (e.g., barricade tape, wooden railings, stop logs, etc.). If the trench or excavation is 4 feet (1.22 meters) or greater in depth, the visual barrier must be a minimum of 6 feet (1.83 meters) from the edge. If possible, the grade should be away from the excavation.
- c. Prior to beginning ground disturbance work at a site, the location of all underground and overhead utilities must be identified, and work locations must be carefully planned to avoid any potential for inadvertent contact with them. Appendix 1 provides a summary of these requirements. Also, the [Utilities and Subsurface Clearance Checklist – Americas](#) must be completed, reviewed, and signed by the Project Manager.
- d. Refer to [Hazardous Energy Control – Americas](#) for additional requirements regarding overhead utilities present at a work location.

2.1 Utilities

2.1.1 Utility Locating Services

- a. Contact the regional one-call/click-before-you-dig provider at least 3 working days prior to commencing ground disturbance.
- b. The route and/or area of the proposed ground disturbance must be identified using flags, paint, or stakes prior to the arrival of the locator.
- c. In urban areas, roadways, areas of high utility density, and/or areas where one-call/click-before-you-dig services are not available, private utility locating companies must be called to identify and locate the presence of underground utilities through geophysical surveys and/or other means.

2.1.2 Surface Markings

- a. Markings must be maintained and remain visible throughout the duration of the ground disturbance activities on the project of the.

- b. If the surface over a buried installation is to be removed, supplemental offset markings must be used. Offset markings must be on a uniform alignment and must clearly indicate the actual installation is a specific distance away.
- c. Uniform Color Coding – The colors and corresponding installation type are listed in Table 1 unless otherwise contract-specified:

Table 1. Color Coding for Marking of Buried Facilities

White	Proposed Ground Disturbance Area
Pink	Temporary Survey Markings
Red	Electric Power Lines, Cables, Conduit and Lighting Cables
Yellow	Gas, Oil, Steam, Petroleum Lines or Gaseous Materials
Orange	Conduit, Cable, Communication, Alarm or Signal Lines
Blue	Potable Water
Green	Sewer, Storm Sewer and Drain Lines
Purple	Reclaimed Water, Irrigation and Slurry Lines (non-potable)

2.1.3 Mapping Underground Utilities

- a. The locations of subsurface utilities and subsurface installations must be documented on a site plan (a scaled site plan must be used when feasible).
- b. The site plan must be available on the worksite where ground disturbance activities will be conducted.

2.1.4 Site Walk

- a. A site walk will be conducted by the Project Manager, or their designee, and any other appropriate personnel with the objectives of reviewing all planned ground disturbance locations, the location of subsurface and overhead utilities, overhead obstructions, and the potential for subsurface installations, to determine the appropriate utility clearance activities, and to observe other physical hazards.
- b. Site walks should be repeated as necessary following the identification and mapping of utility and subsurface structures as visual verification of the hazards.

2.1.5 Ground Disturbance Set Back Distance

Minimum set back distances from subsurface and overhead utilities and subsurface installations must be established including 5 feet (1.5 meters) from any subsurface utility, 7 feet (2.1 meters) from the pad surrounding any underground storage tanks, and 10 feet (3 meters) from any overhead energized electrical line (or farther depending on the voltage of the line). Government regulations, client requirements, and utility requirements may dictate a greater set back distance.

2.1.6 Utility Clearance Investigation / Location Confirmation

- a. The [Utilities and Subsurface Clearance Checklist – Americas](#) must be completed, reviewed, and signed by the Project Manager.
- b. At a minimum, all underground utilities and subsurface installations within a 5-foot (1.5-meter) radius of the work site must be identified and physically located (seen) using non-destructive techniques before use of mechanical excavation equipment is permitted. Legal, client, landowner, and utility owner requirements must be consulted, as the required hand exposure radius may be larger.
- c. Non-destructive ground disturbance techniques must be acceptable by project stakeholders.
- d. Equipment must be designed and operated with proper grounding controls in place.

- e. In urban areas, roadways, and/or areas of high utility density, proposed subsurface locations must be cleared by hand / non-destructive technique to 5 feet (1.5 meters) using non-mechanical methods. If boring depth is less than 5 feet, clearance depth must be discussed with the Project Manager and Safety, Health, and Environment (SH&E) Manager.
- f. In non-urban areas, clearing by hand/non-destructive technique is still recommended or conducted if required by local law.
- g. Hand/non-destructive technique clearance should be extended if locations of deep utilities and structures are not known, or if frost line depth indicates the potential presence of deep utilities.
- h. Large mechanical equipment and attachment dimensions may require expanding the established zone around underground utilities and subsurface installations physically located (seen) prior to the use of the equipment. Borehole diameters must be cleared to 120% of the proposed borehole diameter.
- i. Warning tape, pea gravel, sand, non-indigenous material, bentonite, red concrete (indicative of electrical duct banks), and any departure from native soil or backfill may be evidence of subsurface installations and utilities.

2.2 Drilling, Boring, and Direct-Push Probing

2.2.1 Site Set-up

The Project Manager and/or Site Supervisor must:

- a. Confirm the work area is adequately identified:
 - i. Including the zone around the drilling, boring, or direct-push equipment, as well as fluid carrying equipment, entry point, exit point, and any excavated areas.
 - ii. Utilize barricades, signage, pylons, snow fence, etc. as appropriate.
- b. Implement traffic control as necessary.
 - i. When operating near public vehicular and pedestrian traffic, the on-site personnel must take every precaution necessary to see that the work zone is properly established, identified, and isolated from both moving traffic and pedestrians.
 - ii. All traffic control devices must be installed, placed, and maintained in accordance with a Traffic Control Plan, [Highway and Road Work – Americas](#), client specifications, and/or the Manual of Uniform Traffic Control Devices.
- c. Coordinate concurrent operations to identify their associated hazards and controls.
- d. Provide sufficient lighting.
- e. Confirm that the cleared/levelled area is large enough to accommodate the drill rig and supplies.
- f. Set up any sample tables and general work areas for employees at a safe distance from the rig. The recommended minimum safe distance is the height of the fully extended mast plus 5 feet (1.5 meters).

2.2.2 Equipment Inspections

- a. Drillers are required to inspect all equipment prior to the initiation of operations and daily during operations. [Drill Site Safety Inspection Checklist – Americas](#), or equivalent, must be completed by AECOM staff responsible to confirm that drill inspections are being conducted by the drillers prior to the start of drilling each day.
- b. Defective equipment must be immediately tagged and taken out of service until repaired, altered, or replaced, and appropriately verified as safe for operation by a Competent Person.

2.2.3 Operating Requirements

- a. Operation of the rotary drilling, coring, boring or direct-push equipment must be restricted to the designated operator except to activate the emergency shut-off as required.
- b. Sit-on track mounted direct push rigs are not permitted unless the rig has been modified (in accordance with manufacturer's requirements) to be operated by remote control
- c. The use of J-hooks and catheads are prohibited.
- d. Consult local law and client requirements regarding the use of auger guards, which may be required during hollow-stem auger drilling operations.
- e. The following safety measures must be taken during drilling, boring or probing operations on site:
 - i. The rig operator and helper must be present during all active rig operations.
 - ii. Hands, feet, and other body parts must be kept away from moving parts (e.g., hoisted, rotating, pushing, etc.) including augers, drill rods, and reamers.
 - iii. When observing drilling, stand upwind and uphill of the drill rig to prevent potential exposure to vapors emitted from the borehole. Gas monitoring must be conducted at all sites.
 - iv. The rig's emergency shut-off switch must be identified to site personnel and tested daily by the operator.
 - v. Unauthorized personnel must be kept outside of the established work zone.
 - vi. Rig crew and other worksite personnel must not use a cell phone while operating the drill rig or other equipment or within the rig work zone.
 - vii. Do not drive the rig from hole to hole with the mast (derrick) in the raised position.
 - viii. Before raising the mast (derrick), look up to check for overhead obstructions.
 - ix. Before the mast (derrick) of a drill rig is raised and drilling is commenced, the drill rig must be first levelled and stabilized with levelling jacks and / or solid cribbing.
 - x. Before raising the mast (derrick), all non-essential personnel and visitors should be cleared from, any area within the fall radius of the mast All rig personnel and visitors should be informed the mast is being raised prior to raising it.
 - xi. The drill rig must be releveled immediately if it settles after initial set up or at any time during operation that the rig becomes unlevel
 - xii. Lower the mast (derrick) only when the levelling jacks are down and engaged, and do not retract the levelling jack pads until the mast (derrick) is lowered completely.
 - xiii. After the rig has been positioned to begin drilling, all brakes and / or locks must be set before drilling begins.
 - xiv. The rig operator must only operate the drill rig from the position of the controls. The rig must not be in operation if the operator of the rig leaves the area of the controls.
 - xv. If it is necessary to operate the rig within an enclosed area, make certain exhaust fumes are ventilated out of the area.
 - xvi. All unattended bore holes must be adequately covered and marked or otherwise protected to prevent rig personnel, site visitors, or animals from stepping or falling into the bore hole.
 - xvii. Upon completion of the drilling project, all open bore holes must be covered, protected, or backfilled adequately and according to local law.
- f. Stop work if unanticipated concrete, gravel, or other types of fill material are encountered and/or a void is encountered, as these conditions may indicate the presence of underground utilities or subsurface installations. If these conditions are encountered. drilling may only proceed with Project Manager or SH&E Manager approval.

2.3 Excavation and Trenching

2.3.1 Excavation Requirements

- a. A Professional Engineer must be engaged if specified by the applicable local law and as appropriate to the soil conditions and proposed excavation considerations (e.g., wall slope, shoring requirements, load calculations, etc.).
- b. Excavated (spoil) material must be kept at least 2 feet (0.61 meters) from the edge of the excavation, or farther if local law is more stringent.
- c. Excavated (spoil) material must be piled in a manner to prevent sloughing of loose material. Local law may specify spoil pile sloping requirements.
- d. If the walls of an excavation or trench are 6 feet (1.83 meters) in depth and not sloped or cut back, barriers must be placed around the perimeter. The barrier must be at least 3.5 feet (1.07 meters) in height.
- e. Regularly monitor water removal equipment controlling water accumulation to confirm proper operation.
- f. If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means must be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation.
- g. All excavations must be appropriately secured at the end of the day to prevent unauthorized or inadvertent entry into the excavation. This may require a protective covering, barriers, fencing, signage, or other measures appropriate to the excavation and associated conditions.
- h. Backfill as soon as reasonably possible after work is complete.

2.3.2 Soil Classification

- a. Soil classification must be conducted to confirm appropriate measures are taken to protect workers and to secure excavation walls.
- b. Soil characteristics evaluated when classifying include, but are not limited to:
 - i. Cohesiveness/compaction/compressive strengths (e.g., fissured, hardpan, fractured rock, etc.).
 - ii. Composition (sand, clay, gravel, layered, etc.).
 - iii. Moisture content/submersion.
 - iv. Compaction.
 - v. Exposure to vibration (e.g., traffic, pile driving, etc.).
 - vi. Previous disturbances.
- c. Consult the applicable local law, as classification methods, definitions, and terms can vary. In general classifications or types, include:
 - i. Stable soil, dense, and heavy and primarily consisting of clay.
 - ii. Soil with a medium level of stability and generally including silt, sandy loam, and medium clay.
 - iii. Unstable soil, which generally includes gravel, loamy sand, and soft clay.
- d. Methods of soil classification include:
 - i. Plasticity Test
 - ii. Dry Strength Test
 - iii. Thumb Penetration Test
 - iv. Pocket Penetrometer

- e. Type A Soil:
 - i. Type A soils are cohesive soils with an unconfined compressive strength of 1.5 ton per square foot (tsf) or greater. Examples of cohesive soils are clay, silty clay, sandy clay, clay loam, and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A.
 - ii. However, no soil is Type A if ANY of the following conditions apply:
 - 1. The soil is fissured.
 - 2. The soil is subject to vibration from heavy traffic, pile driving, or similar effects.
 - 3. The soil has been previously disturbed.
 - 4. The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of 4 horizontal to 1 vertical (4H:1V) or greater.
 - 5. The material is subject to other factors requiring it to be classified as a less stable material.
- f. Type B Soil includes ANY of the following:
 - i. Cohesive soil with an unconfined compressive strength greater than 0.5 tsf but less than 1.5 tsf.
 - ii. Granular cohesionless soils including angular gravel (similar to crushed rock), silt, silt loam, sandy loam, and, in some cases, silty clay loam and sandy clay loam.
 - iii. Previously disturbed soils except those which would otherwise be classed as Type C soil.
 - iv. Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration.
 - v. Dry rock that is not stable.
 - vi. Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than 4H:1V, but only if the material would otherwise be classified as Type B.
- g. Type C Soil includes ANY of the following:
 - i. Cohesive soil with an unconfined compressive strength of 0.5 tsf or less.
 - ii. Granular soils including gravel, sand, and loamy sand.
 - iii. Submerged soil or soil from which water is freely seeping.
 - iv. Submerged rock that is not stable.
 - v. Material in a sloped, layered system where the layers dip into the excavation on a slope of 4H:1V or steeper.

2.3.3 Protective System Requirements

- a. Protective systems must be used to protect workers entering an excavation and are required when an excavation is greater than 5 feet deep (1.22 meters in Canada), unless otherwise noted per local law, and is not entirely in stable rock.
- b. The protective system may include sloping the excavation walls, shoring the excavation walls, and/or installing a shielding system. The protective system(s) chosen must have the capacity to resist, without failure, all loads to be applied to the system as determined by the Competent Person. All sloping, shielding, or shoring must be conducted in accordance with applicable local law.
- c. Slope angle, or type of shoring or shielding, must be determined by:
 - i. Soil classification, including structure, strength, moisture content.
 - ii. Depth of the excavation.
 - iii. Weather and environmental conditions.

- iv. Anticipated duration of excavation activities.
- v. Loading of soil and soil stress (e.g., proximity of structures, location of equipment, stored material, anticipated vibration, etc.).
- d. Refer to Figure 1 for an example diagram of slope height-to-depth ratio and angle, and refer to Figure 2 for an example drawing of a simple 34-degree slope sketch commonly used around the site for cave-in protection.

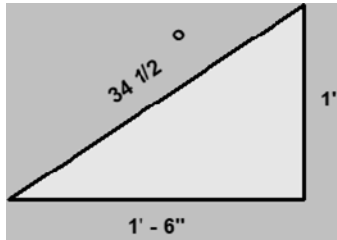


Figure 1. Slope Height-to-Depth Ratio and Angle Example Diagram

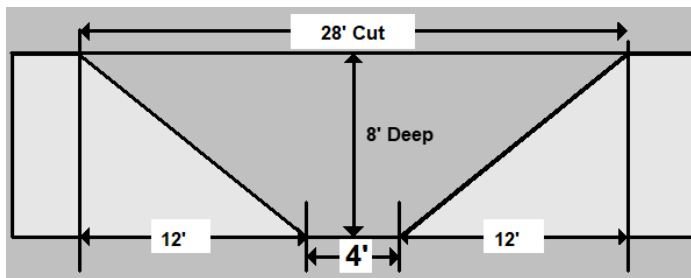


Figure 2. Example of a simple 34-degree slope commonly used around the site for cave-in protection

- e. If an excavation may affect the stability of an adjacent building or structure, precautions must be taken to prevent damage to the structure. The precautions must be specified in writing by a Professional Engineer.
- f. The depth of the excavation or trench is to be measured at its greatest vertical dimension. Be aware that crouching or kneeling in any unprotected trench, regardless of depth, may still pose significant hazard for the employee involved.
- g. Use of Sloping or Benching as a Means of Protection:
 - i. If sloping is used as the means of protection, the trench or excavation walls must be sloped back so the ratio of the horizontal distance to the vertical rise (H:V ratio) of the sloped wall or degree from horizontal is appropriate to the soil type as determined by the Competent Person.
 - ii. If benching is used as the means of protection, the soil must be classified as Type A or Type B as determined by the Competent Person.
- h. Use of Shoring as a Means of Protection:
 - i. Workers must be protected whenever shoring is being installed or removed.
 - ii. Shoring, stringers, or bracing must be installed from the top of the trench or excavation down. Removal must be completed from the bottom up unless conditions exist that would make doing so unsafe. A removal method must be developed without worker entry.
 - iii. Check hydraulic shoring (leaking hoses and/or cylinders, broken connections, cracked nipples, bent bases, other damaged or defective parts) once per shift at a minimum and more frequently as required.
 - iv. Hydraulic or pneumatic trench jacks must have a means of ensuring they will not collapse in the event of loss of internal pressure.

- i. Use of Shielding as a Means of Protection:
 - i. Other protective systems meeting applicable legislative regulations must be utilized (e.g., shield systems, trench jacks, aluminum hydraulic shoring, etc.), and the manufacturer's data must be explicitly followed.
 - ii. Shielding and trench boxes may be used in combination with sloping and benching.
 - iii. The excavated area between the outside of the trench box and the face of the trench should be as small as possible and must be backfilled to prevent lateral movement of the shield.
 - iv. The box must extend at least 18 inches (0.45 meters) above the surrounding area, or as specified by local law.
 - v. Earth excavation below the shield is permitted only if:
 - 1. The excavation does not exceed a depth of 2 feet (0.61 meters) below the shield,
 - 2. The shield can withstand the forces calculated for the full depth of the trench, and
 - 3. There are no indications while the trench is open of possible loss of soil from behind or below the bottom of the support system.
 - vi. A shield must not be subjected to loads exceeding those for which it was designed to withstand.

2.3.4 Work Around the Trench/Excavation

- a. Structural ramps used for excavation access or egress of equipment must be constructed in accordance with local law and the instructions or designs of an individual competent and qualified in structural design.
- b. If the ramp has an open side, it must have a curb or a restraining device.
- c. Confirm equipment placement does not compromise the integrity of the excavation wall and optimizes visibility of the work zone and any contact hazards (spoil placement should also take these into consideration). Use wheel chocking or barricades as necessary to prevent encroachment of the edge.
- d. If the appropriate setback of equipment is not possible, confirm appropriate blocking or matting is used to disperse weight. These requirements may need to be determined by a Professional Engineer.
- e. While workers are in a trench, an aboveground observer or spotter must be present to warn of earth movements and to advise equipment operators of the presence and location of those in the trench to avoid vibrating equipment near trenches or excavations.
- f. If there is a danger of a worker or equipment falling into an excavation, or whenever the edge is not clearly visible, identify the trench or excavation perimeter with visual markers (e.g., barricade tape, wooden railings, stop logs, etc.). If the trench or excavation is 4 feet (1.22 meters) or greater in depth, the visual barrier must be a minimum of 6 feet (1.83 meters) from the edge. If possible, the grade should be away from the excavation.
- g. If walkways are permitted over excavations or trenches (e.g., trench over 6 feet [1.8 meters] in depth and wider than 30 inches [76 centimeters]), the installation must be in such a manner as to not compromise the stability of the excavation.
- h. Crossings and/or walkways must be equipped with guardrails and constructed in accordance with local law.
- i. If vehicle crossings over excavations are required, they must be designed by and installed under the direction of a Professional Engineer.
- j. Precautions must be taken to isolate or remove loose rocks, trees, or other materials that may slide, roll, or fall into the trench and onto workers prior to entry by workers into an excavation.

2.3.5 Work Within the Trench/Excavation

- a. Personnel must not be permitted on the faces of sloped or benched excavations at levels above other workers unless those workers at lower levels are adequately protected from the hazard of falling, rolling, or sliding material or equipment.
- b. Employees must not work in excavations in which there is accumulated water or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation.
- c. The precautions necessary to protect employees adequately vary with each situation but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and retrieval line.
- d. A stairway, ladder, ramp, or other safe means of egress must be in excavations or trenches that are 4 feet (1.22 meters) or more in depth to minimize lateral travel for employees. Maximum lateral travel distances must be no more than 25 feet (7.6 meters). Ladders should extend at least 3 feet (0.91 meters) above the trench top.
- e. Structural ramps used by employees or equipment as a means of access or egress from excavations must be designed by a Competent Person.

2.3.6 Confined Spaces and Hazardous Atmospheres

- a. An excavation may contain hazardous gases, vapors, dusts, fumes or an oxygen-deficient or -enriched atmosphere:
 - i. To prevent exposure to harmful levels of atmospheric contaminants, the task hazard assessment (THA; e.g., field level risk assessment [FLRA] in Canada) must evaluate atmospheric hazards when workers are required to enter trenches and excavations.
 - ii. Appropriate atmospheric testing is necessary to accurately identify these hazards. Ongoing atmospheric monitoring, use of attendants, and rescue equipment may be necessary to address the identified hazards.
- b. Hazardous atmospheres may exist in excavations where there is limited access or egress and in which a hazardous gas, vapor, dust, or fume or an oxygen-deficient atmosphere may occur. Consult local law, as the excavation may or may not be subject to confined space requirements.

2.3.7 Stability of Adjacent Structures

- a. Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning must be provided to confirm the stability of such structures for the protection of employees.
- b. Excavation below the level of the base or footing of any foundation or retaining wall that could reasonably be expected to pose a hazard to employees must not be permitted except when:
 - i. A support system, such as underpinning, is provided to confirm the safety of employees and the stability of the structure; or
 - ii. The excavation is in stable rock; or
 - iii. A Professional Engineer has approved the determination that the structure is sufficiently distanced from the excavation and will not pose a hazard to employees.
- c. In addition, sidewalks, pavements, and secondary structures must not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

2.3.8 Inspections

- a. Daily inspections of excavations, the adjacent areas, and protective systems must be made by a Competent Person for evidence of situations that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. In these situations, exposed employees must be removed from the hazardous area until the necessary precautions have been taken to confirm their safety. Refer to [Daily Excavation Checklist – Americas](#).
- b. An inspection must be conducted by the Competent Person prior to the start of work and as needed throughout the shift. Inspections must also be made after every rainstorm or other hazard-increasing occurrence.

2.3.9 Backfilling

- a. Perform any required notifications within the necessary timeframes prior to backfilling.
- b. Confirm accurate classification of soil types of backfill material and absence of signs of contamination, discoloration, and smell.
- c. Confirm the re-establishment of the original soil integrity using the original material (if suitable) or designated fill material(s).
- d. Backfilling must be done with care to prevent damage to any exposed utilities or facilities.
- e. A spotter may be necessary to avoid encroachment (e.g. working around other equipment, traveling under overhead lines, working in close conjunction to underground facilities and other workers, compromised line of vision) and to watch for any rocks falling into the excavation, which may damage exposed facilities. If fill contains rocks or hard material, a shield or alternate fill material may be used to protect the facilities.
- f. Confirm piping or facilities are properly supported prior to backfilling.
- g. If shoring was used, remove from the bottom up.
- h. If a trench box has been used, it should be placed no more than 24 inches above the base of the excavation or a sub-trench bed containing the pipe.
- i. Appropriate measures must be taken to confirm proper backfilling and compaction of soil below the trench box.
- j. No worker must occupy a trench box while it is being moved.
- k. If compaction is required, confirm the appropriate method is employed and compaction testing is conducted in a manner that does not damage any facilities or pipelines in the excavation.
- l. Final grading and cover of the ground disturbance should be done so that erosion is controlled. The original state of the area and access must be considered when backfilling.
- m. Any excess excavation material must be properly disposed of.

2.4 Ground Disturbance at Potential MEC / UXO Sites

If there is a potential to encounter munitions and explosives of concern (MEC), which includes unexploded ordnance (UXO), discarded military munitions (DMM), and explosive compounds, on a project site, the Project Manager must contact the SH&E Manager who must then engage the AECOM Munitions Response Program (MRP) Technical Group to determine what type of site-specific documents and staffing are required to safely conduct the project.

3. Responsibilities

- a. A Competent Person must:
 - i. Be present during all work that involves excavations greater than 5 feet (1.52 meters) in depth and/or whenever workers need to enter an excavation.
 - ii. Identify prompt corrective measures to eliminate recognized present or anticipated hazards.

- iii. Determine the maximum allowable slope for the walls of the trench or excavation.
- iv. Classify the soil in the trench or excavation.
- v. Inspect the excavation or trench daily when the potential for employee exposure to the hazards of the trench or excavation exists (use the [Daily Excavation Checklist – Americas](#)).
- vi. Training
- vii. The list below includes the most common training that may apply to ground disturbance activities. requirements.
- viii. Excavations/Trenching
- ix. Competent Person – Excavations
- x. Confined Spaces Training
- xi. Ground Disturbance/Utility Clearance Training
- xii. Driller Safety Training
- xiii. Occupational Safety and Health Administration (OSHA) 10-Hour Construction Safety Training
- xiv. OSHA 30-Hour Construction Training
- xv. Hazardous Waste Operations and Emergency Response (HAZWOPER)
- xvi. Hydrogen sulfide (H₂S) Alive
- xvii. H₂S Awareness
- b. Refer to [SH&E Training – Americas](#) and its associated [Assessment of SH&E Training Requirements – Americas](#) for additional training.

4. Terms and Definitions

a.	Clearance	Includes the following: The positive locating of underground utilities or subsurface installations in or near the work area and/or a signed statement by an appropriate representative attesting to the location of underground utilities and/or the positive de-energizing (including lockout) and testing of electrical utilities.
b.	Competent Person	Person, who, by way of training, knowledge, and/or experience, is capable of classifying soils and is also capable of identifying existing and predictable hazards in excavation/trenching work areas and who has the authority to take prompt corrective measures to eliminate them.
c.	Excavation	A manmade cut, cavity, trench, or depression in an earth surface formed by earth removal.
d.	Faces (or sides)	The vertical or inclined earth surfaces formed as a result of excavation work.
e.	Ground Disturbance	Any indentation, interruption, intrusion, excavation, construction, or other activity in the earth's surface as a result of work in which the ground is penetrated. Examples: Excavation of soil borings, installations of monitoring wells, installation of soil gas sampling probes, excavation of test pits/trenches or other man-made cut, cavity, trench, or depression in an earth surface formed by earth removal.
f.	Hazardous Atmosphere	An atmosphere that by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen-deficient, toxic, or otherwise harmful may cause death, illness, or injury.
g.	HAZWOPER	Hazardous Waste Operations and Emergency Response.
h.	Non-Destructive Ground Disturbance Technique	A safe excavation method that is used to visually expose an underground utility without causing damage. Non-destructive ground disturbance techniques may include, but are not limited to:

- i. Hand digging.
 - ii. Use of non-conductive tools.
 - iii. Air knifing.
 - iv. Hydro-vacuuming.
- i. OSHA Occupational Safety and Health Administration.
- j. Protective Systems Devices or methods that protect employees in an excavation from cave-ins, a collapse, or falling material. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.
- k. Subsurface Installations Structures beneath the surface. Examples: Subterranean tunnels, underground parking garages, and other structures beneath the surface.
- l. Tolerance Zone A pre-defined horizontal distance (5 feet) extending from the outer edge of a line or pipe, or 7 feet extending from the outer edge of subsurface structures, that acts as a warning to proceed with caution while digging in this area. Ground disturbance within the tolerance zone requires use of non-destructive techniques. Visual exposure of the utility is required before mechanical excavation equipment may be used. Tolerance zones may be larger based on local utility requirements.
- m. Trench An open, narrow excavation made below the surface of the ground. In general, the depth is greater than the width.
- n. Underground Utilities All utility systems located beneath grade level, including, but not limited to, gas, electrical, water, compressed air, sewage, signaling, and communications, etc.

5. References

- a. [SH&E Training – Americas S3AM-003-PR2](#)
- b. [Hazardous Substances and Communication – Americas S3AM-110-PR2](#)
- c. [Noise – Americas S3AM-118-PR1](#)
- d. [Safety Gear – Americas S3AM-208-PR2](#)
- e. [SH&E Risk Assessment and Planning – Americas S3AM-209-PR2](#)
- f. [Subcontractor Selection and Stewardship – Americas S3AM-213-PR1](#)
- g. [Confined Spaces – Americas S3AM-301-PR1](#)
- h. [Hand and Power Tools – Americas S3AM-305-PR2](#)
- i. [Highway and Road Work – Americas S3AM-306-PR1](#)
- j. [Heavy Equipment and Machines – Americas S3AM-309-PR2](#)
- k. [Hazardous Energy Control – Americas S3AM-302-PR2](#)
- l. [Underground Work – Americas S3AM-330-PR2](#)

6. Records

- a. [Daily Excavation Checklist – Americas S3AM-303-FM1](#)
- b. [Drill Site Safety Inspection Checklist – Americas S3AM-303-FM3](#)
- c. [Utilities and Subsurface Clearance Checklist – Americas S3AM-303-FM4](#)
- d. [Assessment of SH&E Training Requirements – Americas S3AM-003-FM1](#)

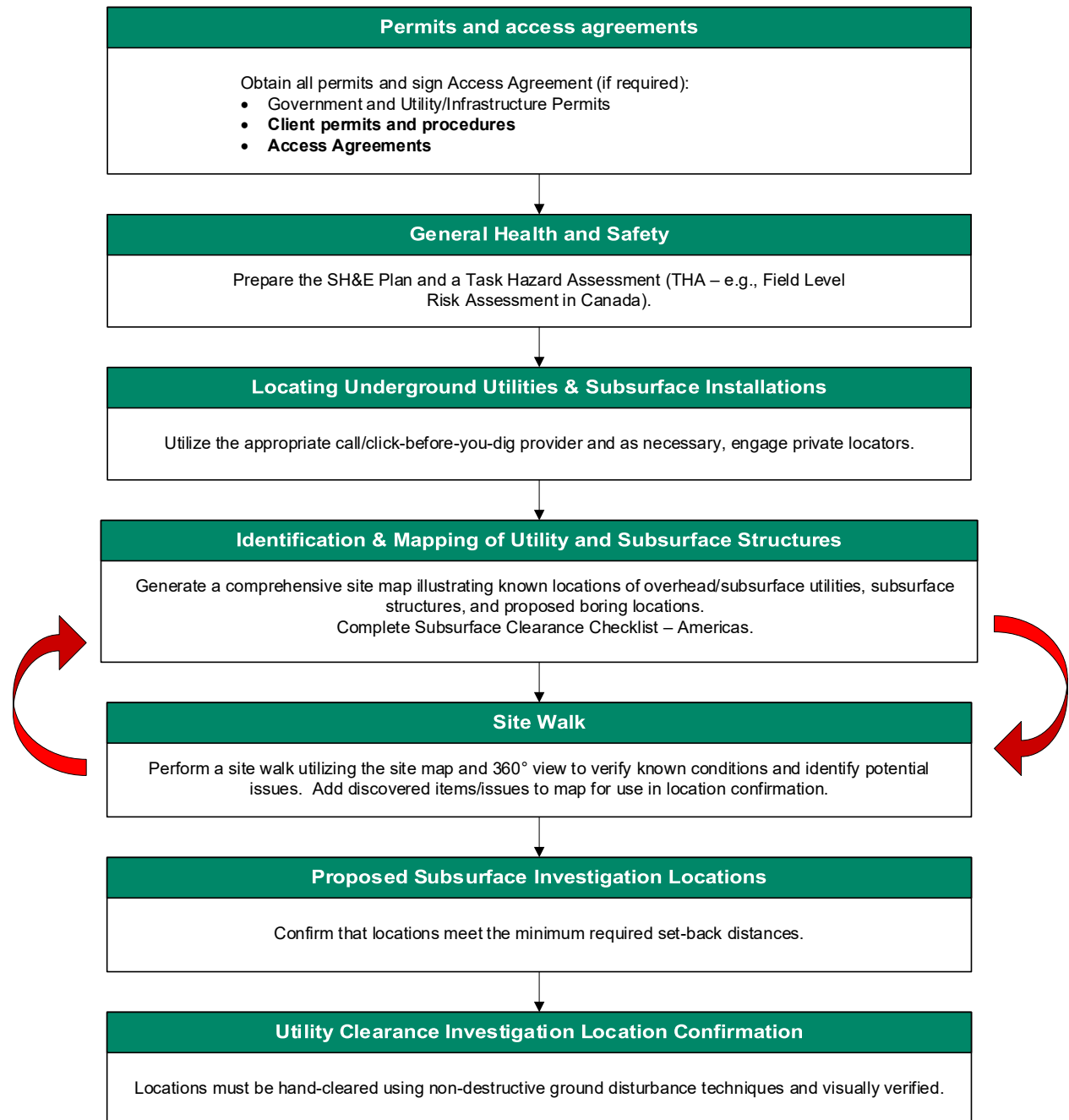
7. Appendices

- a. Appendix 1 – Underground Utilities and Subsurface Installation Flow Chart

8. Change Log

Rev #	Change Date	Description of Change	Location of Change
0	01-Dec-2025	Initial release as S3AM-303-PR2; consolidated portions of the contents from the following retired documents: Excavation – Americas S3AM-303-PR1, Drilling, Boring, & Direct Push Probing – Americas S3AM-321-PR1, Core Drilling, Boring & Direct Push Probing Flow Chart – Americas S3AM-321-ATT1, Underground Utilities– Americas S3AM-331-PR1, and Underground Utilities & Subsurface Installation Clearance Flow Chart – Americas S3AM-331-ATT2.	All

Appendix 1 Underground Utilities and Subsurface Installation Flow Chart



Americas

Drill Site Safety Inspection Checklist

S3AM-303-FM3

Instructions

1. This form is to be completed in accordance with [Ground Disturbance – Americas S3AM-303-PR2](#).
2. Each shift must inspect all applicable items. If an unsatisfactory condition (fail) is observed, suspend the operation of the equipment, and report the condition to the site supervisor immediately.
3. Submit a safety observation each day before leaving the project site.
4. The completed form must be retained in the project files.

Details

Site / Project Name	....
Name of Inspector	....
Date and Time Inspected	....

Checklist	Yes	No	N/A
a. Morning			
i. Did a daily safety meeting occur and were all parties engaged and fit for duty?	☐	☐	☐
ii. Did the driller complete their rig inspection checklist?	☐	☐	☐
iii. Has equipment and Personal Protective Equipment (PPE) been verified, including the spill kit, fire extinguisher, first aid kit?	☐	☐	☐
iv. Have drill rig emergency shut-off switches been verified to be functioning?	☐	☐	☐
b. Site Set/Rig Up			
i. Have overhead lines been identified and accidental contact controlled?	☐	☐	☐
ii. Are paint markings for underground utilities still visible?	☐	☐	☐
iii. Is the rig at the correct drill location, with GPS/maps/etc. checked?	☐	☐	☐
iv. Is there plastic under the rig?	☐	☐	☐
v. Is site control in place, such as cones and tape, as well as fencing?	☐	☐	☐
vi. If needed, are leveling jacks in place/rig leveled/cribbing in place?	☐	☐	☐
vii. Are line of fire hazards identified?	☐	☐	☐
c. Drilling			
i. Are augers/rods stored properly (e.g., not leaning on rig or truck)?	☐	☐	☐
ii. Are spoils being removed from borehole safely?	☐	☐	☐
iii. Are rods removed from the winchline when not in use (e.g., not left strung)?	☐	☐	☐
iv. Are drillers communicating with each other (e.g., all hands clear when using wrenches and rotating augers)?	☐	☐	☐
v. Are loads secured on forklifts?	☐	☐	☐
vi. Are loads 50 pounds (22.7 kilograms) or greater either team or mechanically lifted?	☐	☐	☐
vii. Are gloves and safety glasses in use?	☐	☐	☐

Checklist	Yes	No	N/A
viii. Are dust masks used when mixing grouting?	☐	☐	☐
ix. Are five (5) minutes taken after lunch and before cleanup for a safety check-in?	☐	☐	☐
x. Are three (3) points of contact used when entering/exiting equipment?	☐	☐	☐
xi. Are drums properly labelled?	☐	☐	☐
xii. Has equipment been observed for leaks of hydraulic fluid, fuel, etc.?	☐	☐	☐
d. Decontamination			
i. Has decontamination occurred per the approved location-specific safety plan?	☐	☐	☐
e. End of Day			
i. Is the borehole covered?	☐	☐	☐
ii. Has feedback been provided to drillers?	☐	☐	☐
iii. Has the plan been made for the next workday?	☐	☐	☐

Comments

Inspector Review and Approval		
Inspector Name	Signature	Date/Time

Hand and Power Tools

S3AM-305-PR2

1. Purpose and Scope

- a. The purpose of this procedure is to provide a set of minimum controls for the use of hand and power tools, including portable and powered equipment used on sites such as chain saws, brush cutters, powder-actuated tools, and similar high-hazard implements.
- b. This procedure applies to all AECOM Americas-based employees and operations, as well as contracted personnel required to comply with this document's content.

2. Procedure

2.1 Critical Controls

The following is a list of the minimum required critical controls to be implemented as applicable by the Project Manager or Designee to prevent high potential/significant incidents.

- a. All tools and equipment used by employees or managed subcontractors to conduct work on projects or sites under AECOM control must be maintained and operated in compliance with local law and the manufacturer's specifications.
- b. No employee or subcontractor must use any hand or power tool unless they are familiar with the use and operation of the equipment and have received specific instruction on its use and operation.
- c. A task hazard assessment (THA; e.g., field level risk assessment [FLRA] in Canada) or equivalent must be completed, reviewed, and approved before beginning any activity involving tools, machines, and/or equipment. Any task involving high-risk work requires review and approval by a Safety, Health, and Environment (SH&E) Manager. See [SH&E Risk Assessment and Planning – Americas](#).
- d. All tools must be used for the jobs for which they were designed and in accordance with manufacturer's specifications. Do not use tools for jobs they are not intended for. For example, do not use a slot screwdriver as a chisel, pry bar, wedge, or punch, or use wrenches as hammers.
- e. Confirm lockout devices (padlocks, multiple lock hasps, tags) are utilized as necessary. Refer to [Hazardous Energy Control – Americas](#).

2.2 General Requirements

- a. Use approved tools only. Never modify or use makeshift tools.
- b. Keep surfaces and handles clean and free of excess oil and grease to prevent slipping.
- c. Do not carry sharp tools (e.g., knives, chisels, screwdrivers) in pockets; this practice may cause puncture wounds.
- d. All tools must be properly maintained. Clean, dry, lubricate, and repair tools as applicable, and return to a suitable toolbox, room, rack, or other storage area upon completion of a job.
- e. All tools designed to accommodate guards must have the guard(s) in place when the tool is in use. Do not modify, remove, or disable any machine guards.
- f. Do not allow loose clothing, long hair not tied up, loose jewelry, rings, and chains to be worn while working with power tools.
- g. Utilize good housekeeping practices to confirm tools do not present a tripping hazard.

- h. Do not throw tools from place to place or from person to person or drop tools from heights. Hand them, handle first, directly to other workers.
- i. Screens must be set up to protect nearby workers from being struck by flying fragments around chippers, riveting guns, staplers, or air drills.
- j. Confirm that proper ergonomic principles are being observed when using hand and power tools, such as but not limited to:
 - i. Avoid static and awkward positions when possible by doing the following:
 - 1. Move at intervals to reduce muscle fatigue.
 - 2. Consider tools with a trigger strip, rather than a trigger button. This strip exerts force over a greater area of the hand that, in turn, reduces muscle fatigue.
 - ii. Do not apply excessive force or pressure on tools.
 - iii. If possible, use tools with comfortable grips that are designed to allow the wrist to stay straight. Avoid using a bent wrist.
 - iv. Choose hand tools that have a center of gravity within or close to the handle.
 - v. Frequently used tools weighing more than 1 pound (0.45 kilograms) should be counterbalanced.
 - vi. Position the body properly when using a tool to prevent slips or falls in the event of unanticipated tool behavior (slip, kickback, etc.). Avoid over-reaching.
 - vii. Pull on tools such as wrenches or pliers whenever possible. Loss of balance is more likely when pushing if the tool slips. If pushing is necessary, hold the tool with an open palm.
 - viii. Reduce power to the lowest setting that can complete the job safely. This action reduces hand-arm vibration exposure associated with the use of hand tools.
 - ix. Consider the need for controls such as limiting time of use.
 - x. If safe to do so, adjust to a looser but stable grip, and use anti-vibration gloves.
 - xi. Use of heavy tools such as jackhammers can cause fatigue and strains. Heavy rubber grips can reduce these effects by providing a secure handhold.
 - xii. Do not increase a tool's leverage by adding sleeved additions (e.g., a pipe) to increase tool handle length.
- k. Avoid placing fingers and hands in danger zones by doing the following:
 - i. Confirm hands and fingers have enough clearance in the event the tool slips.
 - ii. Confirm stability of the workpiece. Use workpiece holders (e.g., vice and chisel holder) whenever possible to prevent injury to hands or deflection of tool or workpiece.
 - iii. Use push sticks or guides when cutting or machining smaller material.
- l. If the task presents electrical hazards, the Employee must be competent and/or qualified and use the appropriate insulated tools to perform work that includes the risk of electrical shock. Cushioned grip handles do not protect against electrical shock. Refer to [Hazardous Energy Control – Americas](#).
- m. Secure or tether tools when working from heights to prevent them from falling. Never leave tools on ladders, scaffolds, or overhead work areas when they are not in use. Refer to [Work at Height – Americas](#).
- n. Make provisions to prevent tools from automatically restarting upon restoration of power. Refer to [Hazardous Energy Control – Americas](#).
- o. Use non-sparking and intrinsically safe tools in atmospheres with flammable or explosive characteristics and where highly volatile liquids and other explosive substances are stored or used. Refer to [Hazardous Substances and Communication – Americas](#).

2.3 Cutting Tools

- a. When using cutting tools, employees must fully observe the following precautions when possible:
 - i. Use the correct tool and correct size tool for the job. Tubing cutters, snips, self-retracting knives, concealed blade cutters, and related tools are task specific and minimize the risk of hand injury. For more information about cutting tools, see Appendix 1 – Alternative Cutting Tools.
 - ii. Cut in a direction away from yourself and not toward other workers in the area. Direct the tools away from aisle areas and away from other employees working in proximity whenever possible.
 - iii. Maintain the noncutting hand and arm toward the body and out of the direction of the cutting tool if it were to slip out of the material being cut.
 - iv. Confirm the tool is sharp and clean; dirty and dull tools typically cause poor cuts and more hazard than a sharp, clean cutting tool.
 - v. Store these tools correctly with covers in place or blades retracted, as provided by the manufacturer. Place sharp tools on benches so sharp points or edges face away from the edge.
 - vi. On tasks where cutting may be very frequent or last all day (e.g., liner samples), consider cut-resistant (e.g., Kevlar®) gloves in the Personal Protective Equipment (PPE) evaluation for the project. Refer to [Safety Gear – Americas](#).
- b. Paper cutters must always be kept in a locked position when not in use. Do not remove guards on paper cutters.
- c. Fixed open-blade knives (FOBKs) are prohibited from use during AECOM work. A FOBK is a tool with an exposed, prominent, sharp-edged blade that is fixed or can be locked into a fixed position. Examples of FOBKs include pocket knives, multi-tools, hunting knives, and standard utility knives.

Note: Any exception to this requirement requires approval of the Project Manager and SH&E Manager via [SH&E Management System Variance Request – Americas](#) or an equivalent form.

2.4 Battery Powered Tools

- a. Use only the type of battery specified by the tool manufacturer for the battery-powered tool to be used.
- b. Recharge a battery or battery-powered tool only with a charger specified for the battery.
- c. Store battery packs safely to prevent contact between the battery terminals and metal objects such as nails, screws, or wrenches. Such contact could cause a short circuit, potentially resulting in sparks, fire, or burns.
- d. Battery storage and charging areas should be located in designated spaces that are dry, well-ventilated, and free from potential hazards such as combustible materials or incompatible substances. These areas should also include fire protection, adequate ventilation, and protection from foot or vehicle traffic.

2.5 Personal Protective Equipment (PPE)

- a. Use PPE appropriate to the task: gloves, safety-toed boots, hard hats, safety glasses with side shields, goggles, hearing protection, respiratory protection, etc. Refer to [SH&E Risk Assessment and Planning – Americas](#) and [Safety Gear – Americas](#).
- b. Head and face protection is recommended for employees working with pneumatic tools.
- c. Noise hazard is associated with pneumatic and many other tools. Working with noisy tools such as jackhammers requires proper, effective use of appropriate hearing protection. Refer to [Noise – Americas](#).

2.6 Inspections

- a. Inspect all hand tools on a regular basis and always prior to use. Defective tools must be immediately removed from service and tagged or destroyed to prevent further use.

- b. Where hand tools are identified as not fit for purpose, an observation report must be raised along with a corrective action. The corrective action must confirm that any non-compliant items identified during the inspection are rectified.
- c. All tools must be inspected to confirm compliance with manufacturer's specifications. All tools must be inspected to ascertain all safety devices are present and functioning properly.

3. Training

- a. Instruction in the proper use, safe handling, and maintenance of tools must be provided to employees unfamiliar with the tool. Training must include applicable manufacturer's specifications.
- b. Employees must demonstrate knowledge and competency in the use, safe handling, and maintenance of the applicable tool prior to operation, especially in relation to the use of powered tools.
- c. Refer to [SH&E Training – Americas](#) and its associated [Assessment of SH&E Training Requirements – Americas](#) for additional training requirements.

4. Terms and Definitions

- a. High Potential/Significant Incident An incident with potential or actual consequences assessed at a severity level of Major, Critical or Catastrophic using the Severity Table found in [SH&E Risk Assessment and Planning – Americas](#).
- b. PPE Personal Protective Equipment.
- c. THA Task Hazard Assessment.

5. References

- a. [SH&E Training – Americas S3AM-003-PR2](#)
- b. [Hazardous Substance and Communication – Americas S3AM-110-PR2](#)
- c. [Noise – Americas S3AM-118-PR1](#)
- d. [Safety Gear – Americas S3AM-208-PR2](#)
- e. [SH&E Risk Assessment and Planning – Americas S3AM-209-PR2](#)
- f. [Hazardous Energy Control – Americas S3AM-302-PR2](#)
- g. [Work at Height – Americas S3AM-304-PR2](#)
- h. Manufacturer's specifications

6. Records

- a. The following documents, when applicable, must be maintained in the project file:
 - i. Site briefings regarding appropriate use of tools and equipment.
 - ii. Records of inspections of tools and equipment.
 - iii. Copies of any required tool operating licenses (as applicable, e.g., powder-actuated tools).
 - iv. Records of tools and equipment removed from service.
- b. [Assessment of SH&E Training Requirements – Americas S3AM-003-FM1](#)
- c. [SH&E Management System Variance Request – Americas S3AM-215-FM2](#)

7. Appendices

- a. Appendix 1 – Alternative Cutting Tools

8. Change Log

Rev #	Change Date	Description of Change	Location of Change
0	01-Dec-2025	Initial release as S3AM-305-PR2; consolidated portions of the contents from the following retired documents: Hand and Power Tools – S3AM-305-PR1, Hand Safety – Americas S3AM-317-PR1, and Safe Alternative Tools – Americas S3AM-317-ATT1.	All

Appendix 1 Alternative Cutting Tools

The following are types of safety knives or alternative cutting tools:



Figure 1. Self-retracting utility knives (brands – OLFA, Martor, Allway Tools)



Figure 2. Guarded utility knives (brands – The Safety Knife Co., Martor)



Figure 3. Shears, snips, scissors (brands – Ridgid, Craftsman, Wolfcraft)



Figure 4. Concealed blade cutters (brands – The Safety Knife Co., Martor)



Figure 5. Pipe cutters (brands – Ridgid, Empire)



Figure 6. Specialty cutter (brand – Geoprobe)

Heavy Equipment and Machines

S3AM-309-PR2

1. Purpose and Scope

- a. This procedure establishes safety requirements for heavy equipment activities and working near heavy equipment and machines, including but not limited to excavating equipment, cranes, powered industrial trucks, other lifting equipment, and concrete pump trucks and parts (i.e., pump, boom, piping, and hoses).
- b. For the purposes of this procedure, unmanned aircraft systems (UAS) are considered machines and managed UAS operations must be completed under a UAS plan approved by the UAS Working Group (UASWG) – refer to the [UAS Ecosystem](#) page.
- c. This procedure applies to all AECOM Americas-based employees and operations, as well as contracted personnel required to comply with this document's content.

2. Procedure

2.1 Critical Controls

The following is a list of the minimum required critical controls to be implemented by the Project Manager or Designee to prevent high potential and/or significant incidents:

- a. For all field work:
 - i. Implement control measures to allow Ground Personnel and third parties to move safely around heavy equipment activities.
 - ii. Establish and maintain controlled access into designated areas of heavy equipment activity.
- b. For AECOM-managed sites, the Project Manager must confirm the following:
 - i. A task hazard assessment (THA – e.g., field level risk assessment [FLRA] in Canada) or equivalent hazard analysis has identified the heavy equipment activity hazards associated with the equipment.
 - ii. Lifting operations are planned and executed by Competent Persons.
 - iii. Operators may only operate heavy equipment if they are trained, qualified, and authorized for the specific heavy equipment they intend to operate.
 - iv. Rigging is certified and inspected by a Competent Person.
 - v. The rated load and all required information for equipment used for lifting or hoisting must be legible, clearly visible to the Operator, and on the lifting devices.
 - vi. Operator has completed required heavy equipment inspections.
 - vii. Stability and ground bearing pressure is for equipment setup and operation has been verified where risk of overturn or damage to services exists.
- c. Those involved in any type of heavy equipment activity must follow applicable manufacturer's specifications, technical standards, and regulatory requirements. When the manufacturer's specifications are more stringent than the requirements of this procedure and local law, the manufacturer's instructions or recommendations must apply.
- d. Cranes, hoists or other lifting appliances used for lifting or suspending a load must not be loaded beyond their established load limit and the load must be secured for safe transport.

- e. If safety is being compromised during any heavy equipment activity, all employees have the authority and responsibility to stop work without fear of reprisal or retribution. Please refer to [Safety Tenets and Stopping Work – Americas](#).
- f. Competent Person(s) completing a lift must:
 - i. Properly classify and plan the lift by completing [Lift Classification – Americas](#) or equivalent for every lift or series of lifts to determine the type of lift to be conducted.
 - ii. When the lift is classified as a critical lift, complete [Critical Lift Plan – Americas](#), or equivalent.
 - iii. Complete [Personnel Platform Lifting – Americas](#) or equivalent when the lift involves lifting of personnel.
 - iv. Supervise the crane, hoist, or lifting device operation within the vicinity of the work area safely distanced from the operation.
- g. Operators must be fit for duty and remain distraction free when operating heavy equipment. Refer to [Fitness for Duty – Americas](#).

Note: Mobile phone use is not permitted when operating or supporting the operation of equipment. Where fitted, seatbelts must be worn.
- h. The Project Manager must confirm a diligent approach to planning is implemented and all requirements in this procedure are followed for all managed work involving heavy equipment and lifting operations. Refer to [Safety, Health, and Environment \(SH&E\) Risk Assessment and Planning – Americas](#) for more general planning requirements.

2.2 Heavy Equipment General Requirements

Where AECOM is the controlling entity or directly managing heavy equipment contractors on a project, the Project Manager or qualified designee must confirm the following:

- a. The presence and functionality of critical safety devices, such as Roll-Over Protective Structures (ROPS), Falling Object Protective Structures (FOPS), guarding, edge protection, noise attenuation, hose burst protection valves, operational controls, emergency stops, etc.
- b. The hazards associated with simultaneous operations have been addressed.
- c. The risk of fall from height during heavy equipment activities has been reviewed. Refer to [Work at Height – Americas](#) procedure for work at height requirements.
- d. Ground disturbance activity with heavy equipment is conducted according to the [Ground Disturbance – Americas](#).
- e. Employees keep all extremities, hair, tools, and loose clothing away from pinch points and other moving parts on heavy equipment.
- f. Emissions, such as noise and exhaust fumes, have been managed to prevent/minimize harm to people and the environment and to prevent equipment or machines from acting as an ignition.
- g. Rubber/pneumatic-tired earthmoving haulage equipment is equipped with fenders on all wheels. Mud flaps may be used in lieu of fenders whenever motor vehicle equipment is not designed for fenders.
- h. Steering or spinner knobs are not attached to steering wheels.
- i. Operational controls can be locked in an off position to prevent inadvertent energization during cleaning, maintenance, and repair. Refer to [Hazardous Energy Control – Americas](#).
- j. The operating zone of heavy equipment was considered with regards to contact with underground and overhead services such as power lines. Appropriate risk control measures must be adopted to protect against inadvertent contact with services. Refer to the [Hazardous Energy Control – Americas](#) for further guidance on identifying underground and above ground services.

- k. Operation manuals and other relevant instructions are readily available to operators and any person requiring information on the equipment. Operators must be familiar with the manual(s) and the safe and efficient operation of the heavy equipment.
- l. Heavy equipment has required safety equipment such as serviced and inspected fire extinguishers.

2.3 Heavy Equipment Exclusion Zones

- a. Heavy Equipment Exclusion Zones (HEEZ) must be implemented on managed sites by the Project Manager or qualified designee AND the Operator with due consideration to operating zones (e.g. swing radius of excavator or crane) and equipment operator blind spots.
- b. HEEZ must be implemented such that they eliminate or minimize the likelihood of any inadvertent access to the immediate area where equipment is operating.
- c. Where practicable, HEEZ should be physically demarcated using items such as safety cones, caution tape/flagging, rigid barriers, temporary fencing, etc.
- d. Ground Personnel are not allowed to enter HEEZ until given permission by the Operator and the equipment has come to a complete stop and/or has been made safe. Employees must never work or pass under the buckets or booms of heavy equipment in operation.
- e. When operating conditions are such that the boom of a crane or load swings over facility equipment, trailers, public roads, sidewalks, property lines or operating transportation systems, the owners of adjacent properties or systems must be consulted. A diagram should be prepared detailing the proposed swing paths for the crane.

2.4 Communication and Spotting

- a. A reliable means of communication must be established between the Operator and Ground Personnel. The following general principles must be followed:
 - i. Maintain constant visual or audio communication between the Operator and any support personnel.
 - ii. Identify operator line of sight limitations (blind spots) of the heavy equipment and establish optimal line of sight locations when the equipment is stationary and in-motion.
 - iii. Voice communication equipment must be used if line of sight with spotters or signal persons is not possible.
 - iv. If communication is interrupted or lost, the Operator must stop moving immediately until re-established.
 - v. During any lifting activity with multiple personnel involved, there can be only one designated signal person.
- b. Spotters must:
 - i. Be used based on risk assessment of the task and the working environment.
 - ii. Remain in a position clearly visible to the Operator and establish an agreed-upon means of communication.
 - iii. Be properly trained and dedicated to effectively perform their task, especially during set-up and movement of heavy equipment.
- c. Equipment Operators and Ground Personnel must be trained on the radio instructions and/or hand signals used to communicate between Operators and Ground Personnel.
- d. All heavy equipment with limited visibility operated around people or on a construction site must meet the following requirements:
 - i. The operator must warn personnel in the vicinity of the start-up of the equipment using an alarm audible above the existing operations, or other suitable method providing sufficient warning
 - ii. Have an audible back-up alarm that functions automatically when the vehicle or equipment is put into rear motion. The alarm must be clearly heard over equipment and other background noise. Reverse signaling lights must be in working order.

- iii. If it is bi-directional equipment, it must be equipped with a horn, distinguishable from the surrounding noise level, which must be operated as needed when the machine is moving in either direction.
- iv. If alarms or horns are not feasible, backing up or movement in both directions for bidirectional equipment must occur only when a signal person communicates it is safe to do so.

2.5 Heavy Equipment Inspection, Testing, and Maintenance

- a. The Project Manager must request and confirm that equipment inspections and maintenance records are documented, compliant with manufacturers' specifications and regulatory requirements, and readily available for review by the Operator or any person requiring this information.
- b. All equipment must be inspected at defined frequencies, with commissioning inspections completed prior to use on the project.
- c. A thorough and detailed inspection and assessment is required prior to initial use of equipment assembled or commissioned on-site.
- d. The Operator assigned to a specific piece of equipment must carry out daily pre-start inspections as per the equipment's manual.
- e. Any deficiencies found during inspection must be corrected, repaired, or mitigated by a qualified person before the item is placed into service. The Operator should approve and sign off on the repairs and mitigating actions prior to use.
- f. A logbook must be completed for each piece of equipment or machine and reflect any inspections, repairs, testing, and maintenance completed. The logbook is to remain with the equipment.
- g. Cranes must be inspected:
 - i. Prior to using a crane for the first time
 - ii. At least every 12 months thereafter
 - iii. At the start of each shift
 - iv. Each month the crane is in service
 - v. When the crane has been idle for 3 months or more
- h. Wire ropes and hooks of cranes must be inspected:
 - i. Visually prior to each shift.
 - ii. Monthly.
 - iii. At least every 12 months by a Qualified Person.
- i. For powered industrial trucks, use the [Pre-Operation Powered Industrial Truck Checklist – Americas](#) or equivalent.
- j. Mobile elevated working platforms (MEWPs) must be inspected:
 - i. Prior to using the MEWP and be documented using the [Mobile Elevating Work Platforms \(MEWP\) Pre-Operation Checklist – Americas](#), [Under Bridge Inspection Unit Pre-Operation Checklist – Americas](#), and/or equivalent;
 - ii. In accordance with the manufacturer's specifications initially and when:
 - 1. The MEWP has been in service for 3 months or 150 hours, whichever comes first; or
 - 2. The MEWP has been out of service for more than 3 months, or if environmental conditions require a shorter period; and
 - iii. Annually no more than 13 months from the date of the prior annual inspection;

- k. The inspection will be made in person by a person qualified as a mechanic on the specific type of MEWP or one having similar design characteristics.
- l. For hoists, a qualified person must make a thorough, annual inspection of all hoisting machinery. Additionally, the Operator must test control and safety devices daily before operations commence.
- m. Prior to operating heavy equipment, ground conditions and weather conditions must be inspected and assessed.
- n. Where applicable, an equipment inventory must be established and maintained.

2.6 Guarding

- a. Exposed moving parts on equipment or machines that are a hazard to either the Operator or other employees must be guarded to protect them from the hazard, when possible. Moving parts include belts, gears, shafts, pulleys, sprockets, spindles, drums, fan belts, flywheels, and chains.
- b. Platforms, foot walks, steps, handholds, guardrails, and toe boards must be present on machinery and equipment to provide safe footing and access ways.
- c. If specific guidance on guard design is available in American National Standards Institute (ANSI) / Canadian Standards Association (CSA) standards and applicable regulations, compliance with the guidance is highly recommended. Commercially available guards should be used when feasible.
- d. If possible, a machine guard covering rotating parts should be interlocked with the machine itself so the machine cannot be operated unless the machine guard is in place.
- e. If a part will be exposed during proper function it must be guarded as much as is practicable consistent with the intended function of the component.
- f. All hot surfaces of equipment, including exhaust pipes or other lines, presenting a possible injury or fire hazard, must be guarded or insulated when possible.
- g. All equipment having a charging skip must be provided with guards on both sides and the open end of the skip area to prevent persons from walking under the skip while it is elevated.
- h. All haulage equipment/trucks whose payload is loaded by means of cranes, power shovels, loaders, or similar equipment, must be adequately shielded (i.e., with a cable shield and/or canopy) to protect the Operator from shifting or falling material. If protection is not available for the Operator, the Operator must leave the vehicle and wait in a designated safe location until it is loaded.

2.6.1 Ground Personnel Requirements

Ground Personnel must:

- a. Keep clear of the designated work and travel areas of all heavy equipment and yield to active heavy equipment.
- b. Maintain eye contact with operators to the greatest extent possible (always face equipment). Never approach equipment from a blind spot or angle.
- c. Only enter a designated area of any operating equipment such as a HEEZ when:
 - i. They have attracted the Operator's attention and established eye contact; and,
 - ii. The Operator has idled the equipment down, placed it in neutral, grounded engaging tools, set brakes and communicated entry is permitted.
- d. Never stand below buckets or booms or between two pieces of operating heavy equipment or other objects (e.g., steel support beams, trees, buildings, etc.) where a caught-between hazard exists.
- e. Stay clear of blind spots around heavy equipment and never assume that the operators are aware of any Ground Personnel nearby. Maintain a distance of at least 2 feet (60 centimeters) between the counterweight of swing machines and the nearest obstacle. If this distance cannot be maintained, a spotter must observe and be in constant communication with the Operator to prevent contact.

- f. Stay away from stacked material that may be knocked over by a swinging load.
- g. Never stand directly below heavy equipment located on higher ground.

2.7 Crane and Lifting Device Requirements

2.7.1 General Requirements

When using any type of lifting equipment, the Project Manager must confirm the following:

- a. All lifts must be planned and managed under a documented risk assessment.
- b. Cranes and lifting devices must not be operated without direct approval from the Project Manager and SH&E Manager.
- c. Tag lines are the preferred method to control the load. Evaluate the need for tag lines, and where determined not to be necessary, the Project Manager or qualified designee will approve the decision to omit tag lines. Any additional risks associated with handling a load without tag lines will be addressed in the lift plan. Loads are not permitted to be manipulated by hand.
- d. Suspended loads must not be passed over employees, and all parties on site must not work or walk under a suspended load.
- e. Workers must never ride on loads being moved by cranes or derricks.
- f. Suspended loads must be attended unless they are physically secured to prevent unintended movement.
- g. The Operator must not leave the controls when the load is suspended.
- h. When loading or unloading trucks, confirm the truck's cab is unoccupied when the crane is lifting loads over it.
- i. Any safety devices installed on lifting equipment must be operational.

2.7.2 Critical Lift Operations

- a. A lift is critical if it has one or more of the following conditions present:
 - i. Lifts made when the load is greater than 75 percent of the rated capacity of the crane in the configuration that the lift will be made;
 - ii. Lifts that require the load to be lifted, swung, or placed out of the Operator's view;
 - iii. Lifts made with more than one crane or hoisting device;
 - iv. Lifts involving non-routine or technically difficult rigging arrangements;
 - v. Lifts of long lead time permanent materials;
 - vi. Lifts that involve lifting loads over structures or equipment;
 - vii. Lifts taking place in a confined or limited access area;
 - viii. Hoisting personnel with a crane or derrick; or
 - ix. Any lift which the lift Supervisor, Operator, or other management personnel believes should be considered critical.
- b. The Project Manager or their delegate must designate lifts meeting any of the conditions that define it as a critical lift. The Project Manager may also designate other lifts that do not meet these conditions as critical, based on consideration of lift sensitivity, risk and/or cost.
- c. Preparation for critical lifts must include completing [Critical Lift Plan – Americas](#) or equivalent.
- d. If the critical lift involves lifting of personnel, [Personnel Platform Lifting – Americas](#) or equivalent must be completed.

2.7.3 Lifting Appliances Other Than Cranes – Incidental Lifts

- a. Incidental lifts can present as many, if not more, hazards than critical lifts because they often do not receive the same level of attention. Earthmoving equipment (excavators, backhoes, front-end loaders, etc.), crane trucks (HIABs), overhead gantry hoists, forklifts, telehandlers, piling rigs, etc. must only be used for incidental lifting as they are designed.
- b. Where machines require the use of outriggers, they must be always used when lifting.

2.7.4 Lifting and Rigging Equipment

- a. The Project Manager must request and confirm that records on all approved lifting and rigging equipment are retained by a Qualified Rigger, compliant with applicable manufacturers' specifications and local law, and readily available for review by the Operator or any person requiring this information.
- b. Lifting and rigging equipment must be inspected before use and includes slings, hooks, spreader bars, and all other specialty equipment designated for each lifting apparatus.
- c. Hooks, clamps, or other lifting accessories custom designed for hoisting modular structures, panels or other similar materials shall be proof-tested to 125 percent of the rated load and marked with the safe working capacity prior to use.
- d. Chain or wire rope slings shall not be shortened with knots or bolts or other makeshift devices. Slings must not be kinked or knotted. Hooks must have safety latches.
- e. Lifting and rigging equipment records include the following:
 - i. A register of all lifting and rigging equipment that is maintained at each workplace to keep a log of all particulars associated with various gear including serial numbers, manufacturer details, certifications, ratings and inspection history.
 - ii. Lifting and rigging equipment inspections
 - iii. Copies of the designs and seals of custom lifting devices (including spreader bars and eye pads) which must be on site prior to use and engineered.
 - iv. Manufacturer's specifications sheets for each specific lifting device that must be on site.
- f. Any defective lifting and rigging equipment must be removed from service immediately and made permanently unusable. Refer to the manufacturer's specifications for determining when lifting and rigging equipment is defective, such as a sling missing a legible load rating. Damaged or defective rigging equipment must be tagged "Out of Service: Do Not Use", rendered unusable and removed from site as soon as practicable.

2.7.5 Modified Equipment

- a. Lifting devices and cranes that have modifications or additions that affect the safe operation of the equipment or capacity must be inspected by a Qualified Person after such modifications/additions have been completed and prior to initial use.
- b. Prior to initial use, a Qualified Person or a Competent Person who is under the direction of a Qualified Person, must load-test all lifting devices and cranes in which load-sustaining parts have been altered, replaced, or repaired. The replacement of wire rope is specifically excluded from this requirement; however, a functional test of the crane under a normal operating load will be made prior to putting a crane back into service.
- c. Modifications or additions that affect the capacity or safe operation of the equipment are prohibited except where the requirements listed below apply.
 - i. Manufacturer's review and approval
 - ii. The manufacturer approves the modifications/additions in writing.

- iii. The load charts, procedures, instruction manuals, and instruction plates/tags/decals are modified as necessary to accord with the modification/addition.
- iv. The original safety factor of the equipment is not reduced.

2.8 Personal Protective Equipment (PPE)

At a minimum, all Ground Personnel and Operators outside of heavy equipment must wear the following:

- a. High visibility safety vest (fluorescent background material and retro-reflective striping) visible from all angles and meeting jurisdictional requirements.
- b. Hazards may require high visibility garments that cover torso, legs and arms.
- c. American National Standards Institute/Canadian Standards Association (ANSI/CSA) - approved hard hat
- d. ANSI/CSA-approved safety glasses with side shields
- e. Canadian Standards Association or American Society for Testing and Materials (CSA or ASTM) - approved, high-cut (min. 6") impact and compression resistant footwear.
- f. ANSI/CSA-approved hearing protection, as needed
- g. Appropriate work clothes.
- h. Refer to [Safety Gear – Americas](#) for any other PPE requirements.

3. Training

Refer to [SH&E Training – Americas](#) and its associated [Assessment of SH&E Training Requirements – Americas](#) for additional training requirements.

4. Terms and Definitions

a. ANSI	American National Standards Institute.
b. Competent Person	A person capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.
c. Controlling entity	A prime contractor, general contractor, or construction manager, or any other legal entity having the overall planning, quality, and completion responsibility for the construction of the project.
d. CSA	Canadian Standards Association.
e. Ground personnel	Personnel performing work around heavy equipment (note: operators are considered ground personnel when outside of the equipment cab).
f. Guard	A barrier or enclosure that prevents any body part from reaching over, under, around, through, or entry into the point of operation.
g. Heavy equipment	All excavating equipment, cranes, lift trucks, drills, etc. This includes off-highway trucks.
h. HEEZ	Heavy Equipment Exclusion Zones.
i. Machine safeguarding	Employing guards, devices, distance, location, and limited opening to protect employees who may be exposed to moving parts of equipment or machines.
j. Operator	A person who operates the controls while the heavy equipment is in motion or the engine is running.
k. Point of operation	That point at which cutting, shaping, boring, or forming is accomplished upon the stock.

- l. Powered Industrial Truck A mobile, power-propelled truck used to carry, push, pull, lift, stack, or tier materials. Forklifts, pallet trucks, rider trucks, fork trucks, lift trucks, pallet jacks, motorized hand trucks, and skid steer loaders are all types of powered industrial trucks.
- m. Qualified Person is a person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, successfully demonstrated the ability to solve/resolve problems relating to the subject matter, the work, or the project.
- n. UAS Unmanned Aircraft System - Aircraft without a human pilot aboard. Unmanned aircraft are commonly referred to as a UAS, Unmanned Aerial Vehicle (UAV) or drone. UAS vehicles may be either fixed wing or rotorcraft.
- o. UASWG Unmanned Aircraft System Working Group - A group of AECOM employees who are responsible for the development of standard procedures, oversight and support for all AECOM UAS operations. The UASWG is comprised of employees from Operations, Insurance, Legal, Safety, Health and Environment, and UAS pilots and aviation pilots.

5. References

- a. [Safety Tenets and Stopping Work – Americas S3AM-001-PR2](#)
- b. [SH&E Training – Americas S3AM-003-PR2](#)
- c. [Fitness for Duty – Americas S3AM-008-PR2](#)
- d. [Safety Gear – Americas S3AM-208-PR2](#)
- e. [SH&E Risk Assessment and Planning– Americas S3AM-209-PR2](#)
- f. [Hazardous Energy Control – Americas S3AM-302-PR2](#)
- g. [Ground Disturbance – Americas S3AM-303-PR2](#)
- h. [Work at Height – Americas S3AM-304-PR2](#)
- i. [Unmanned Aircraft Systems – Ecosystem page](#)

6. Records

- a. Project Managers must confirm the following:
 - i. Maintenance records are maintained and available on all heavy equipment, or onsite if unfeasible to keep on equipment. Maintenance records should be maintained for at minimum the duration of the project and in accordance with manufacturer and client requirements.
 - ii. Records of all heavy equipment inspections and rigging inspections are retained and are readily available upon request. Documented inspections must be maintained for at minimum the duration of the project and in accordance with manufacturer and client requirements.
 - iii. Records of Operator and Qualified Rigger qualifications and training must be provided to the Project Manager upon initiation of the project and maintained for the duration of the project.
- b. Equipment manuals must be provided to the Project Manager upon equipment use and onboarding.
- c. Training records must be maintained according to [SH&E Training – Americas](#).
- d. Records include the following:
 - i. [Lift Classification – Americas S3AM-309-FM14](#)
 - ii. [Critical Lift Plan – Americas S3AM-309-FM15](#)
 - iii. [Personnel Platform Lifting – Americas S3AM-309-FM16](#)

- iv. [Pre-Operation Powered Industrial Truck Checklist – Americas S3AM-309-FM17](#)
- v. [Mobile Elevating Work Platforms \(MEWP\) Pre-Operation Checklist – Americas S3AM-309-FM18](#)
- vi. [Under Bridge Inspection Unit Pre-Operation Checklist – Americas S3AM-309-FM19](#)
- vii. [Assessment of SH&E Training Requirements – Americas S3AM-003-FM1](#)

7. Change Log

Rev #	Change Date	Description of Change	Location of Change
0	01-Dec-2025	Initial release as S3AM-309-PR2; consolidated portions of the contents from the following retired documents: Heavy Equipment – Americas S3AM-309-PR1; Cranes & Lifting Devices – Americas S3AM-310-PR1; Definitions – Americas S3AM-310-ATT1; Rigging – Americas S3AM-310-ATT3; Powered Industrial Trucks – Americas S3AM-324-PR1; Machine Guarding – Americas S3AM-326-PR1; Hoists, Elevators, and Conveyors – Americas S3AM-343-PR1; and Mobile Elevated Work Platforms – Americas S3AM-323-PR1.	All

Biological Hazards

S3AM-313-PR2

1. Purpose and Scope

- a. This procedure communicates the requirements and precautions to be taken by AECOM employees to protect against bloodborne pathogens, insects, arachnids, snakes, poisonous plants, feral animals, and other wildlife referred to herein collectively as “biological hazards.”
- b. This procedure applies to all AECOM Americas employees and operations, as well as its contracted personnel required to comply with this document’s content.

2. Procedure

2.1 Critical Controls

- a. The project team should identify potential biological hazard encounters during field work and develop a location-specific Safety, Health, and Environment (SH&E) plan and related task hazard assessments (THAs; e.g., field level risk assessments [FLRAs]) prescribing precautions to mitigate exposures and eliminate or reduce the severity of resulting illnesses. Refer to [SH&E Risk Assessment and Planning – Americas](#).
- b. The precautions to be taken by employees to decrease the risk of exposure to biological hazards can often directly increase the risk of heat-related illness due to thermal stresses. Refer to [Heat and Cold Stress – Americas](#).
- c. Employees must immediately notify their Project Manager or Supervisor of any biological hazard-related incident (e.g., imbedded tick, insect sting, animal bite, rash, abnormal reaction, or bloodborne pathogen-related exposure) and follow the reporting requirements found in [SH&E Incident Response and Investigation – Americas](#). The Occupational Health Manager must be consulted in the event of any exposure incident.
- d. Employees must be given information on how to respond to the applicable biological hazard-related incidents in their emergency response plan. Refer to [SH&E Risk Assessment and Planning – Americas](#).
- e. Employees with a history of severe allergic reactions to insect bites or stings should undertake work in areas infested with the allergens only after all required precautions are met. Specifically, such employees are encouraged to inform their project team of their allergies, avoid working alone, carry medications (e.g., Epi-pen) on them, and wear a medical identification bracelet or necklace.

2.2 Animals of Concern – General Requirements

- a. Working in the field with or around small mammals, larger carnivores, and reptiles has inherent risks of injury or exposure to infectious diseases transmitted from animals to humans.
- b. Wild animals can carry a variety of diseases that humans can contract i.e., viral, parasitic, bacterial, and protozoal. The risks can be either because of direct contact with a wild animal (i.e., break in the skin, or contact with the animal’s blood, saliva, or excrement) or through airborne diseases (e.g., hantavirus, histoplasmosis).
- c. Full-length clothing, gloves, and a respiratory mask can greatly reduce the risk of exposure. Refer to [Safety Gear – Americas](#) and [Respiratory Protection – Americas](#).
- d. Wildlife biologists directly handling wildlife, dead or alive, or working with wildlife feces or in enclosed habitats (such as caves), have an increased risk of exposure to a wider range of zoonotic diseases and should take extra precautions. Any staff handling wildlife must be adequately trained and/or supervised by a wildlife biologist experienced in the task.
- e. Employees must not work alone in areas where the risk of encounter with dangerous wildlife is high.

2.2.1 Dogs

- a. Treat unknown dogs encountered in field activities in the same manner as a wild animal.
- b. Be conscious of behaviors indicating anxiety (e.g., tail under the belly), defensiveness, or aggressiveness, and attempt to leave the area if identified.
- c. Gloves, catch sticks, caging, and other appropriate equipment should be considered and may be necessary.

2.2.2 Rodents

- a. Rodents can carry a variety of diseases (e.g., hantavirus and bubonic plague). Although infections are rare, they can be fatal. Infection can be spread to humans when they:
 - i. Breathe air contaminated by rodent saliva, urine, or feces containing infectious materials; or
 - ii. Accidentally rub eyes, mouth, or broken skin with infected rodent mouse saliva, urine, or feces.
- b. Rodent control measures must be employed at AECOM locations where there is a potential or evidence of rodent infestation. In these situations, the following precautions should be taken during field operations:
 - i. Limit exposure to soil handling and use gloves where appropriate.
 - ii. Wash or sanitize hands often throughout the day and before meals.
 - iii. Equipment bags, storage areas, and vehicles should be frequently inspected for signs of mouse infestation.
 - iv. Rodent-proof storage containers should be used when practical.
 - v. Do not enter buildings infested with mice without adequate respiratory protection.
 - vi. Droppings should never be removed by vacuuming or sweeping. Wetting down an area with a mixture of 1:9 household bleach and water solution will reduce risk of airborne exposure.
 - vii. Repellent (i.e., DEET applied to skin or permethrin to clothing) should be used if there is potential exposure to rodent fleas.

2.2.3 Large Mammals – General Requirements

Most negative encounters with large mammals (e.g., bears, carnivores, and ungulates) can be avoided with a few key preventive measures:

- a. When working in wilderness isolation, always travel in pairs and make lots of noise.
- b. Always store food in air-tight containers away from sleeping areas (if camping), and never carry strong-smelling foods, which could attract animals.
- c. Keep your eyes open for fresh animal signs that may indicate a dangerous situation.
- d. Maintaining a distance of at least 100 feet (30 meters) allows large animals an escape route. If you notice any signs of aggression or behavioral changes, move away to a safe location. Wildlife should not be enticed by reaching out or simulating calls.

2.2.4 Bears

- a. An encounter with a bear of any species can have a wide variety of outcomes, ranging from a simple sighting to a false charge, to a serious mauling or even death. Consequently, the risk of a bear encounter must be taken very seriously and can vary significantly depending on the location.
- b. It is important to research the project area before field work commences to determine the expected probability of encountering bears and what type. Remoteness from urbanized areas should not be a criterion, as bears have been encountered within city limits, especially near landfills. The risk associated with a bear encounter also varies with the species of bear, the season, and the circumstances under which the bear is encountered.
- c. The best defense against bears is to actively practice bear avoidance techniques when working in the field.

2.2.5 Carnivores

- a. Most wild carnivores in the feline family (cougars, lynx, and bobcat) or the canine family (wolves and coyotes) are more predictable than bears and are not predatory toward humans. However, all wild animals can be dangerous if they feel threatened or if they are sick or starving.
- b. A fresh kill or carcass might indicate the presence of a carnivore that may become aggressive to defend its food.

2.2.6 Ungulates

- a. Most ungulates (deer, moose, elk, and caribou) will avoid humans and will flee as soon as a human is sighted. However, females with young (during May and June) and males during mating season (September to November) can be very aggressive, especially if provoked.
- b. Extensive fresh rubbing on branches in the fall might indicate the presence of a rutting male ungulate that may become aggressive to defend a potential mate.

2.2.7 Snakes

- a. Staff working in areas known to be inhabited by venomous reptiles should take extra precautions, be able to identify the local species, and understand the best practices for administering first aid. Most venomous reptiles are non-aggressive and will only attack humans if immediately threatened.
- b. The following precautions should be taken when there is a risk of a snake encounter:
 - i. Be careful near heavy vegetation in or near the water's edge. This is where reptiles like to reside during the daylight hours.
 - ii. Stay on trails where possible, and watch where you place your hands and feet, especially when climbing or stepping over fences, large rocks, and logs.
 - iii. Take care when overturning any objects on the ground.
 - iv. If you see a hazardous reptile, give it as much room as possible. Most snakes have a strike distance only half the length of their body.
 - v. If venomous snakes are a risk, staff should contact local hospitals to determine availability of appropriate anti-venom and include all snakebite emergency response guidance in the applicable SH&E plan and THA.

2.2.8 Alligators

- a. The chance of encountering an alligator is greatest during the animal's courtship and mating season (March to September). Also, July to September is when mother alligators are guarding their nests.
- b. When trying to get past an alligator, do not walk between the alligator and the water in case the alligator gets frightened and runs toward the water. The alligator is not a natural runner and can tire out in a relatively short time. An alligator will often give up a chase when it sees the runner is moving away and too much effort is required.

2.3 Insects of Concern

Employees working outdoors may be exposed to a variety of insects, including but not limited to, ticks, mosquitos, spiders, and scorpions. Bites or stings from these insects may result in outcomes ranging from minor irritations to serious allergic reactions and/or illnesses.

2.3.1 Flying Insects

Outdoor workers are at risk of being stung by flying insects (mosquitos, bees, wasps, and hornets). While most stings cause only mild discomfort, some may result in severe allergic reactions requiring immediate medical care and may cause death. As such, employees must take the following precautionary measures when working in habitat areas for flying insects:

- a. Wear light-colored, smooth-finished clothing.
- b. Avoid wearing perfume and cologne and strong-smelling deodorants, lotions, soaps, and shampoos.
- c. Wear clean clothing and bath daily.
- d. Wear clothing to cover as much of the body as possible.
- e. Avoid flowering plants when possible.
- f. Keep work areas clean. Some insects are attracted to discarded food.
- g. Remain calm and still if a single stinging insect is flying around.
- h. If an insect is inside your vehicle, stop slowly, and open all the windows.
- i. Mosquitoes are known to breed in standing water; therefore, when standing water is found at a job site, actions should be taken to drain the water.

2.3.2 Ticks

- a. The Centers for Disease Control and Prevention works with states, health authorities, and other experts on research to define and monitor the occurrence of disease-carrying ticks. See [cdc.gov/ticks](https://www.cdc.gov/ticks) for additional information.
- b. Employees working in or adjacent to areas where there are established tick populations must take the precautionary measures below.
 - i. Before you go outdoors:
 1. Know where to expect ticks. Ticks live in grassy, brushy, or wooded areas, or even on animals. Avoid wooded and brushy areas with high grass and leaf litter and walk in the center of trails when possible.
 2. Treat clothing and gear with products containing 0.5% permethrin. Permethrin can be used to treat boots, clothing, and gear and remain protective through several washings. Alternatively, you can buy permethrin-treated clothing and gear.
 3. Tuck loose-cuff trousers into socks, wrap with duct tape completely around the cuff of the sock up to the surface of the pant leg to prevent entry of insects between the sock and pants, and preferably reverse wrap the tape with the sticky side out.
 4. Use government-approved repellants containing DEET, picaridin, IR3535, Oil of Lemon Eucalyptus (OLE), para-menthane-diol (PMD), or 2-undecanone. Always follow product instructions.
 - ii. After you come indoors:
 1. Check your clothing for ticks. Ticks may be carried into the house on clothing. Turn clothing inside out and shake them at the end of day. Any ticks found should be removed. Tumble dry clothes in a dryer on high heat for 10 minutes to kill ticks on dry clothing after you come indoors. If the clothes are damp, additional time may be needed. If the clothes require washing first, hot water is recommended. Cold and medium temperature water will not kill ticks.
 2. Examine gear and pets. Ticks can ride into the home on clothing and pets, then attach to a person or pet later, so carefully examine pets, coats, and daypacks.
 3. Shower within 2 hours of coming indoors. Showering may help wash off unattached ticks and it is a good opportunity to do a tick check.

4. Check your body for ticks. Conduct a full body check upon return from potentially tick-infested areas. Use a hand-held or full-length mirror to view all parts of your body. Check these parts of your body and your child's body for ticks:

- Under the arms
- In and around the ears
- Inside belly button
- Back of the knees
- In and around the hair
- Between the legs
- Around the waist

Note: Tick testing is not recommended because results are unreliable for treatment decisions, may give false reassurance, and symptoms typically appear before results are available.

2.3.3 Spiders

- a. The most common venomous spiders are the black widow and the brown recluse. Venomous spiders can be dangerous to outdoor workers. Spiders are not usually aggressive, and most bites occur because a spider is trapped or unintentionally contacted. It's important to know the risk of exposure to venomous spiders and how to protect yourself and what to do if you are bitten.
- b. Workers can take the following preventive steps:
 - i. Inspect or shake out any clothing, shoes, towels, or equipment before use.
 - ii. Wear protective clothing such as a long-sleeved shirt and long pants, hat, gloves, and boots when handling stacked or undisturbed piles of materials.
 - iii. Minimize the empty spaces between stacked materials.
 - iv. Remove and reduce debris and rubble from around the outdoor work areas.
 - v. Trim or eliminate tall grasses from around outdoor work areas.
 - vi. Store apparel and outdoor equipment in tightly closed plastic bags.
 - vii. Keep your tetanus boosters up to date (every 10 years). Spider bites can become infected with tetanus spores.

2.3.4 Scorpions

- a. Scorpions usually hide during the day and are active at night. They may be hiding under rocks, wood, or anything else lying on the ground. Some species may also burrow into the ground. Most scorpions live in dry, desert areas. However, some species can be found in grasslands, forests, and inside caves.
- b. Workers can take the following preventive steps:
 - i. Wear long sleeves and pants.
 - ii. Wear leather gloves.
 - iii. Shake out clothing or shoes before putting them on.

2.4 Plants of Concern

- a. Employees working outdoors may be exposed to a variety of plants of concern, including but not limited to, poison ivy, poison oak, poison sumac, giant hogweed (giant cow parsnip), wild parsnip, devils club, and stinging nettle. This hazard still exists in the fall and winter in the form of stubble and roots.

- b. Many plants are not harmful to the touch but may contain poisonous berries or foliage that could cause serious complications or death if they are ingested. Never eat any plants or berries, even if you are sure of their identity.
- c. Workers should take the following preventive steps:
 - i. Beware of your surroundings and the potential irritants in your work area.
 - ii. Identify and avoid areas of poisonous plants.
 - iii. Use skin guards to prevent the transfer of oils from clothes or equipment to skin.
 - iv. If areas of poisonous plants need to be entered, consider clearing the area, when feasible, and wear protective clothing such as Tyvek.

2.5 Bloodborne Pathogens

There are a few activities for which potential occupational exposures to blood or other potentially infectious materials are of concern. These activities may include:

- a. Investigations of properties receiving regulated wastes.
- b. Site visits or audits at treatment, storage, and disposal facilities where wastewater or medical waste is handled.
- c. Site visits or audits at medical or health care facilities.
- d. Site work in areas where there is a potential risk for the presence of used hypodermic needles.
- e. The provision of first aid or cardiopulmonary resuscitation (CPR).

Note: First aid and CPR training is often on a voluntary basis and not directed by AECOM. As such, potential exposures may not be considered occupational exposures within the context of the OSHA Bloodborne Pathogens Standard.

- f. Occasionally, potentially infectious material is encountered during an activity where none was expected. When this occurs, the work must be stopped, employee training conducted, and an exposure control plan prepared prior to resuming activities with potential exposures.

2.6 Exposure Control Plan for Bloodborne Pathogens

- a. A site-specific exposure control plan (ECP) must be established for employees at risk for exposure to and possible transmission of infectious diseases from bloodborne pathogen sources. The ECPs must describe how employees are effectively informed of potential workplace health hazards, and the protective measures necessary to eliminate or effectively minimize the risk of bloodborne exposure incidents. ECPs for projects or programs extending over 1 year must be reviewed annually by the SH&E Manager and affected employees.
- b. Sections 2.6.1 to 2.6.5 summarize key elements to be included in the ECP.

2.6.1 Potential Exposure Determination

Employees must consult with the Occupational Health Manager to determine if a Hepatitis A or B vaccination is appropriate given the site conditions and the proposed scope of work. These determinations should differentiate voluntary first-aid duties from occupational exposures as a component of the exposure determination.

2.6.2 Training

Refer to Section 3.

2.6.3 Hepatitis B Vaccination

- a. Employees will be offered the Hepatitis B vaccination, at no cost to the employee, when assigned to tasks with potential occupational exposure to bloodborne pathogens or if incidental contact with potential sources of bloodborne pathogens occurs.
- b. Employees choosing to take the vaccination series must sign a consent form. Employees who decline the Hepatitis B vaccine must sign a copy of a waiver form. All forms are to be stored by the Occupational Health Manager.

2.6.4 Engineering and Work Practice Controls

- a. "Universal precautions" are a required method of control to prevent exposure to blood and body fluids. This term refers to the concept that all human blood and certain human body fluids are treated as if known to be infectious for human immunodeficiency virus (HIV), hepatitis B virus (HBV), hepatitis C virus (HCV), and other bloodborne pathogens, regardless of the perceived risk status of another individual. Universal precautions apply to blood, and other body fluids containing visible blood. Universal precautions do not apply to feces, nasal secretions, saliva, sweat, tears, sputum, urine, and vomitus unless they contain visible blood.
- b. Special provisions should be made so hand washing facilities are available on sites where bloodborne pathogens are suspected or present. If soap and running water are not available, an antiseptic hand cleaner in conjunction with clean paper towels or antiseptic towelettes are acceptable temporary alternatives to running water. When this alternative method is used, employees must wash their hands with soap and running water as soon as feasible.
- c. Eating, drinking, smoking, applying cosmetics, and handling of contact lenses is prohibited in work areas where there is a reasonable likelihood of occupational exposure.
- d. Fluorescent red or orange-red warning labels bearing the universal biohazard symbol and the legend BIOHAZARD must be firmly affixed to all containers (e.g., waste cans, sharps containers, and refrigerators) used for the storage or shipment of blood or other potentially infectious materials. Disposal manifests must be maintained in accordance with local law.
- e. Any areas or equipment that are contaminated by potentially infectious material will be decontaminated using a 10% solution of household bleach. Utilize appropriate personal protective equipment to control exposure to the bleach (e.g. safety goggles, and gloves). Refer to Section 2.6.5.

2.6.5 Personal Protective Equipment

- a. Personal protective equipment (PPE) will be provided at no cost to the employee and will be chosen based on the anticipated exposure to blood. PPE is considered appropriate if it does not permit blood or other potentially infectious materials to reach or pass through clothes, skin, or mucous membranes of the eyes or mouth under normal conditions of use, and for the duration of time the equipment is used.
- b. Disposable single-use gloves must be used as a protective barrier in all situations in which contact with body fluids is anticipated. Gloves of the correct size will be provided. Disposable gloves must not be washed or disinfected for reuse and must be replaced between employees and if they become torn or punctured. Gloves are especially important if the Employee has cuts, abraded skin, chapped hands, or dermatitis.
- c. Liquid-impermeable gowns, boots, and masks, in combination with eye-protective devices such as goggles and shatterproof glasses with solid-side shields or chin-length face shields, must be worn whenever splashing, spraying, or spattering of blood droplets or body fluids can be reasonably anticipated.
- d. Disposable pocket mask ventilation devices must be provided in all first aid kits and used to avoid mouth-to-mouth contact during emergency cardiopulmonary resuscitation.

- e. Examples of recommended PPE include the following listed in Table 1 (depending on task, more PPE may be needed):

Table 1. PPE by Task

Task	Gloves	Gown	Mask	Goggles
Bleeding control w/ minimal bleeding	Yes	No	No	No
Bleeding control w/ spurting blood	Yes	Yes	Yes	Yes
Cardiopulmonary resuscitation	No	No	Yes	No
Decontamination/cleanup	Yes	No	No	No
Medical laboratory activities	Yes	Yes	Yes	Yes

2.6.6 Incident Response

- All incidents in which an employee has been exposed to blood or other potentially infectious materials must be reported to the Employee's Supervisor and to the SH&E Manager immediately. The Occupational Health Manager must be consulted in the event of an exposure incident.
- Post-exposure hepatitis vaccination will be offered to employees involved in an occupational exposure incident within 24 hours of possible exposure at no cost if required by the exposure determination.

3. Training

- Employees must take appropriate training from AECOM University and third-party vendors to assist in the identification and control of biological hazards. Refer to [SH&E Training – Americas](#) and its associated [Assessment of SH&E Training Requirements – Americas](#).
- All personnel who will work on projects or programs that involve potential contact with bloodborne pathogens are required to attend a training class prior to the start of the project or program and annually for continuing projects or programs. Refer to [SH&E Training – Americas](#).
- The specific requirements and provisions of the written ECP will be provided to each employee and any managed subcontractor assigned to work at the program/project site.

4. Terms and Definitions

- Bloodborne Pathogen Exposure**
Exposure to blood containing pathogens including, but not limited to, HBV, HIV, hepatitis C, malaria, syphilis, babesiosis, brucellosis, leptospirosis, arboviral infections, relapsing fever, human T-lymphotropic virus Type I, and viral hemorrhagic fever (Ebola).
- CPR**
Cardiopulmonary resuscitation.
- ECP**
Exposure Control Plan – A plan addressing the requirements applicable to specific AECOM projects and activities designed to eliminate or minimize employee exposure. The ECP must be incorporated into the location-specific SH&E Plan and must be accessible to all employees.
- Field Work**
Any activity conducted in outdoor settings; or at a site containing brush, overgrown grass, leaf litter, or poisonous plants; or located near mosquito breeding areas, including work in structures where animals harboring fleas or ticks might exist or where spiders and mites could be present.
- HBV**
Hepatitis B virus.
- HCV**
Hepatitis C virus.
- HIV**
Human immunodeficiency virus.

- h. Occupational Exposure (Exposed) Reasonably anticipated skin, eye mucous membrane, or parenteral contact with blood or other potentially infectious materials resulting from the performance of an employee's duties. Employees are considered to be potentially exposed, even if they are using the universal precautions specified for the project or program.
- i. Poisonous Capable of harming or killing by poison; toxic or venomous.
- j. PPE Personal Protective Equipment.
- k. SH&E Safety, Health, and Environment.
- l. Universal Precautions All body fluids and materials potentially contaminated by body fluids will be considered to be infectious unless the fluids were from the person performing the cleanup or decontamination activities. All employees coming in contact with another person's body fluids must assume that the fluids are infectious and must wear prescribed personal protective equipment.

5. References

- a. [SH&E Training – Americas S3AM-003-PR2](#)
- b. [SH&E Incident Response and Investigation – Americas S3AM-004-PR2](#)
- c. [Heat and Cold Stress – Americas S3AM-112-PR2](#)
- d. [Safety Gear – Americas S3AM-208-PR2](#)
- e. [SH&E Risk Assessment and Planning – Americas S3AM-209-PR2](#)
- f. [Respiratory Protection – Americas S3AM-123-PR1](#)

6. Records

- a. Bloodborne pathogens training class records must be maintained for at least 3 years from the date of training. The records will include the date of the training class, a summary of the class contents, the names of the qualified instructors, and the names and job titles of personnel attending the training.
- b. [Assessment of SH&E Training Requirements – Americas S3AM-003-FM1](#)

7. Change Log

Rev #	Change Date	Description of Change	Location of Change
0	01-Dec-2025	Initial release as S3AM-302-PR2; consolidated portions of the contents from the following retired documents: Wildlife, Plants & Insects – Americas S3AM-313-PR1, Biological Hazard Assessment Decision Flowchart – Americas, S3AM-313-ATT01, Ticks – Americas S3AM-313-ATT02, Poisonous Spider Identification – Americas S3AM-313-ATT03, Mosquito-Borne Diseases – Americas S3AM-313-ATT04, Plants of Concern – Americas S3AM-313-ATT05, Wild Parsnip Identification – Americas S3AM-313-ATT06, Alligators – Americas S3AM-313-ATT07, Bird Droppings Safe Practices – Americas S3AM-313-ATT08, Large Carnivores & Ungulates – Americas S3AM-313-ATT09, Bear Safety – Americas S3AM-313-ATT10, Small Mammals – Americas S3AM-313-ATT11, Snakes & Scorpions – Americas S3AM-313-ATT12, Bloodborne Pathogens – Americas S3AM-111-PR1, and Bloodborne Pathogens Exposure Control Plan – Americas S3AM-111-ATT1.	All

Appendix C – Field Activities Plan (FAP)

Field Activities Plan (FAP)

Remedial Investigation
Genesee Valley Metal Finishing (Site No.
828228)
Work Assignment D009803.62

April 2026

Prepared for:

New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233

Prepared by:

AECOM USA, Inc.
40 British American Boulevard
Latham, New York 12110

Table of Contents

1.0 Introduction.....	1-1
1.1 Work Assignment Objectives	1-1
1.2 Site Description and Background Information	1-1
2.0 General and Preparatory Field Activities	2-1
2.1 Mobilization	2-1
2.2 Health and Safety	2-1
2.3 Utility Clearance: Callout	2-2
2.4 Geophysical Surveys	2-2
2.5 Utility Clearance: Hand Clearing	2-2
2.6 Community Air Monitoring	2-2
2.7 Site Survey	2-2
2.8 Green and Sustainable Remediation	2-2
2.8.1 Best Practices and Techniques	2-3
2.8.2 Reporting	2-3
3.0 Drilling / Coring Procedures	3-1
3.1 Hollow-Stem Auger Drilling Procedures	3-1
3.2 NX-Rock Coring Procedures	3-1
4.0 Groundwater Investigation Tasks.....	4-1
4.1 Groundwater Elevation Survey.....	4-1
4.2 Monitoring Well Installation.....	4-1
4.2.1 Overburden Monitoring Well Construction Procedures	4-1
4.2.2 Bedrock Monitoring Well Construction Procedures	4-2
4.3 Well Development.....	4-3
4.4 Groundwater Sampling from Monitoring Wells	4-3
4.4.1 Low-Flow Sampling Technique	4-3
4.4.2 Sample Collection Procedures	4-4
4.5 Monitoring Well Decommissioning	4-4
5.0 Soil Sampling Activities.....	5-1
5.1 Near-Surface Soil Sampling (by Hand Auger)	5-1
5.2 Subsurface Soil Sampling	5-1
5.2.1 Subsurface Soil Sampling from Direct Push Borings	5-1
5.2.2 Split Spoon Sampling Procedures	5-3
5.2.3 Unified Soil Classification System	5-3
5.2.4 Visual Identification	5-4
6.0 Soil Vapor Intrusion Sampling	6-1
6.1 Location Mark-Out and Utility Clearance Activity	6-1
6.2 Soil Vapor Implant Installation	6-1
6.3 Soil Vapor Sample Collection and Analysis	6-2
6.3.1 Soil Vapor Sampling	6-2
6.3.2 Soil Vapor Sample Analytical Requirements	6-3
6.3.3 Decontamination Procedures	6-3
7.0 Decontamination and Management of Investigation Derived Waste.....	7-1
7.1 Equipment Decontamination	7-1
7.1.1 Decontamination Procedures	7-1
7.1.2 Small Equipment Decontamination	7-1
7.1.3 Heavy Equipment Decontamination.....	7-2
7.1.4 Personnel Decontamination	7-2
7.2 Management of Investigation Derived Waste	7-2
8.0 Community Air Monitoring Program	8-1
8.1 Monitoring.....	8-1
8.1.1 Continuous Air Monitoring	8-1
8.1.2 Periodic (As-Needed) Air Monitoring.....	8-1

8.2	Action Levels and Response.....	8-1
8.2.1	Volatile Organic Compounds.....	8-1
8.2.2	Particulates.....	8-2
9.0	Field Records and Documentation	9-1
9.1	Field Log Books	9-1
9.2	Standard Forms	9-2
9.3	Sample Identification	9-2
9.4	Sample Labeling	9-3
9.5	Sample Shipping.....	9-3
10.0	References	10-1

List of Appendices

Appendix A NYSDEC PFAS Sampling and Analysis Guidance

Appendix B Field Activity Forms

1.0 Introduction

On behalf of the New York State Department of Environmental Conservation (NYSDEC), AECOM USA, Inc. (AECOM) has prepared this Field Activities Plan (FAP) to collect data necessary to compile a comprehensive Remedial Investigation (RI) Report for the Genesee Valley Metal Finishing site (Site No. 828228).

The data gathering effort outlined in this FAP includes advancement of boreholes, installation of monitoring wells, installation of soil vapor implants, and analysis of soil, groundwater, soil vapor, and air samples. This information will be necessary to delineate subsurface impacts, provide data related to Site conditions and to determine the extent of the contaminant source area. All data collected will be compiled into a RI Report in response to the request from NYSDEC.

This FAP is designed to provide typical procedures for the field activities on work assignments (WAs) issued under NYSDEC Contract D009803. It will serve as the field procedures manual for all AECOM personnel. Adherence to these procedures will ensure the quality and defensibility of the field data collected. In addition to the field procedures outlined in this document, all personnel performing field activities must do so in compliance with: (1) the quality assurance/quality control (QA/QC) measures outlined in the Quality Assurance Project Plan (QAPP); (2) the appropriate health and safety guidelines found in the Health and Safety Plan (HASP); (3) the scope of work outlined in the WAs; and (4) the time schedule outlined in the WAs.

1.1 Work Assignment Objectives

Field activities are planned and conducted in general accordance with NYSDEC DER-10, Technical Guidance for Site Investigation and Remediation (NYSDEC, 2010), NYSDEC DER-31: Green Remediation (2010b) the United States Environmental Protection Agency (USEPA) Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (USEPA, 1988), and New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH, 2006).

The FAP is intended to be a companion document to the site-specific RI Work Plan (RIWP) prepared for each work assignment. This site-specific FAP has been prepared using the NYSDEC Generic FAP and included as Appendix C to the site-specific RIWP to address site-specific conditions and project-specific requirements for Work Assignment #62.

1.2 Site Description and Background Information

The Site is the location of a former electroplating facility that performed zinc, nickel and chrome plating. The business was foreclosed upon and subsequently sold in 2019. At the time of transfer of ownership plating-related chemicals, wastewater treatment materials and process wastes were reported to have been left on site, in addition to poor housekeeping, deteriorated building conditions and improper hazardous material storage.

Available site information is presented in the site-specific RIWP.

2.0 General and Preparatory Field Activities

The scope of work has been established in the work assignment as documented in the site-specific RIWP.

The work assignment includes a variety of field activities intended to obtain site-specific data pertaining to the extent of contamination and the extent to which releases or potential releases from the site pose a threat to human health and the environment. Typical project objectives include:

- Assess site geology;
- Assess site hydrogeology;
- Evaluate areal and vertical extent of contamination, including transport mechanisms;
- Assess the source(s) of contamination and determine if this source(s) has impacted off-site properties; and
- Collect additional data to support the design and implementation of remedial actions.

To accomplish these objectives, the field subtasks described in this FAP will be utilized. Additional methodology information is provided in the QAPP. Unless otherwise noted, it is assumed that all field work will be completed at Level D personal protection in accordance with the HASP. Field activities will be monitored by a qualified AECOM representative(s).

2.1 Mobilization

Following authorization to proceed with the field investigation from NYSDEC, AECOM and its subcontractors will mobilize necessary materials and equipment to the site. Due to the intrusive nature of the work being performed, LaBella Associates (LaBella), as the subcontractor performing the work, will call UDig New York for a utility markout. Utility clearance is detailed in Section 2.3.

The site-specific RIWP describes the provisions made for providing all necessary facilities and material, independent of the site owners/occupants. Site preparation will be performed by AECOM's drilling subcontractor, LaBella, under direction of AECOM. Site preparation will include construction of a temporary decontamination pad for decontamination of tools and equipment and obtaining necessary City of Rochester work permits. The temporary decontamination pad will be lined with plastic sheeting for purposes of collecting, containerizing, and properly disposing of decontamination water. Following field work, the temporary decontamination pad will be disassembled and removed from the Site. A drum storage area will also be established for the temporary storage of investigation derived waste (IDW), including soil cuttings, monitoring well development water, decontamination fluids and purge water from groundwater sampling. Necessary materials will be stored in a vehicle (e.g., box truck).

A project kick-off meeting will be held prior to initiating field work to orient field team members and subcontractors with the site and to familiarize all site workers with site background, potential dangers, health and safety requirements and emergency contingencies and other field procedures.

2.2 Health and Safety

It is anticipated that the work to be completed will be performed in Level D personal protection with the potential to upgrade to Level C. Field workers will be instructed to keep Level C equipment available should it be needed. Should health and safety monitoring during field activities indicate a threat to field personnel or warrant an upgrade beyond Level C protection, work will stop, and site conditions will be re-evaluated by NYSDEC and AECOM. An upgrade to Level B protection will require modification of the HASP and review by AECOM's regional safety manager.

The site-specific HASP is included in the site-specific RIWP as Appendix B and submitted concurrently with the site-specific FAP (Appendix C), and site-specific QAPP (Appendix D).

2.3 Utility Clearance: Callout

Intrusive activities will include soil borings, monitoring well installations, and soil vapor probe installations. Prior to the start of intrusive activities, a call will be placed to UDig New York CALL CENTER at Dig Safely New York (for all areas north of New York City) 811 (<http://www.digsafelynewyork.com>) or 1-800 272-4480 for utility markouts to minimize the risk of encountering subsurface utilities. Site personnel will be contacted to determine if detailed utility plans are available for the Site.

2.4 Geophysical Surveys

A geophysical survey will be conducted by Ravi Engineering & Land Surveying, P.C. (Ravi) to screen for and identify the presence of underground utilities or any anomalies (e.g., underground storage tanks) within the work areas where Direct Push and hollow stem auger drilling will be conducted. The subcontractor will use both ground penetrating radar (GPR) and electromagnetic conductivity (EMC) methods necessary to confirm utility clearance. Subsurface utilities and/or anomalies shall be identified and marked in the field with spray paint as they are located and a report that summarizes the findings of the survey shall be submitted seven calendar days of completion of the survey.

2.5 Utility Clearance: Hand Clearing

Excavation with hand tools allows for excavation near subsurface utilities with reduced chance of impacting the utilities. Hand clearing will be conducted for all soil boring locations by AECOM's drilling subcontractor, Labella, under direction by AECOM.

Procedure:

1. Excavate a two-foot square by approximately five-foot deep area manually using post-hole diggers, pry bars, and/or hand digging. An air knife or Vac-Tron® will be used as contingency if needed to advance through areas of dense overburden.
2. After the location is cleared for drilling, the hole will be backfilled flush with the ground surface using the excavated spoils (small rocks and debris removed).
3. Excavated material not returned to the hole will be drummed for proper disposal.

2.6 Community Air Monitoring

Community air monitoring will be performed as outlined in the NYSDOH Generic Community Air Monitoring Plan (CAMP). During drilling proximate to John Williams School No. 5, located northeast of the Site, an additional work area CAMP station will be utilized. AECOM's approach to implementing CAMP is provided in Section 8.0 of this FAP.

2.7 Site Survey

Project surveying will be performed by qualified AECOM staff, and will provide data necessary to plot soil borings, groundwater monitoring wells, and soil vapor probes on the existing base map. All surveying will be performed by a New York State licensed land surveyor, following the requirements of the Scope of Work and HASP.

The horizontal positions will be tied into the North American Datum 1983 and UTM Zone 18N coordinate system. The vertical positions will be tied to the North American Vertical Datum 1988 (NAVD88). The measuring point associated with the existing monitoring wells or other site reference features will be recorded to a vertical accuracy of 0.01 ft. The final survey will be supplied in a digital CAD format (i.e., .dwg or .dxf files in the cited coordinate systems).

2.8 Green and Sustainable Remediation

The work to be completed will comply with NYSDEC guidance documents including DER-31: Green Remediation (2010b). To ensure compliance with DER-31, the work will be completed using the best management practices (BMPs) and techniques described below. In addition to the items discussed in Section 10.0 – Field Records and Documentation, specific reporting methods relative to DER-31 are further described in the following subsection.

2.8.1 Best Practices and Techniques

DER-31 provides some examples of BMPs that could be applied during all phases of remediation (see Attachment 1 of the DER-31 policy). Additional resources to identify potential BMPs and techniques applicable to this work include:

- United States Environmental Protection Agency CLU-IN Green Remediation (www.clu-in.org/greenremediation/);
- Interstate Technology & Regulatory Council Green and Sustainable Remediation (www.itrcweb.org/teampublic_GSR.asp);
- NAVFAC Green and Sustainable Remediation (www.ert2.org/t2gsrportal/);
- Air Force Center for Engineering and the Environment Sustainable Remediation (www.afcee.af.mil/resources/technologytransfer/programsandinitiatives/sustainableremediation/index.asp); and
- Sustainable Remediation Forum (www.sustainableremediation.org).

Lastly, NYSDEC expects that the BMPs identified below will be implemented at sites unless a site-specific evaluation demonstrates impracticability or favors an alternative green approach:

- Use renewable energy where possible or purchase Renewable Energy Credits (RECs);
- Use of remediation technologies with an intermittent energy supply;
- Incorporate green building design;
- Reuse existing buildings and infrastructure to reduce waste;
- Reuse and Recycle construction and demolition (C&D) debris and other materials (i.e., grind waste wood and other organics for on-site use);
- Design cover systems to be usable (i.e., habitat or recreation);
- Reduce vehicle idling;
- Use of Low Sulfur Diesel Fuel (LSDF) or alternate fuels (i.e., biodiesel or E85);
- Sequence work to minimize double-handling of materials; and
- Use energy efficient systems and office equipment in the job trailer.

The Project Manager has identified applicable BMPs to be used, as presented in the site-specific RIWP as Appendix E. The NYSDEC Form A: Summary of Green Remediation Metrics tracking form will also be utilized during the RI, and has been included in the site-specific RIWP as Appendix E.

2.8.2 Reporting

All Green and Sustainable BMPs employed during field activities will be discussed within the field log books described in Section 9.0 – Field Records and Documentation. Specifically, the field log books will acknowledge that the practices and techniques identified for the site work were taken each day (if applicable). In addition, the following information will be recorded within the field log books at the close of each day:

- Estimated quantity of fuel consumed by onsite vehicles and equipment;
- Estimated distance traveled by trucks and equipment delivering goods or removing waste; and
- Estimated water used during onsite activities.

The information will be compiled in a form suitable to the site-specific work completed.

3.0 Drilling / Coring Procedures

Drilling activities will comprise of 36 soil borings from which nine (9) overburden monitoring wells, three (3) bedrock monitoring wells, and four (4) soil vapor monitoring points will be installed according to the RIWP and will utilize a combination of direct push technology (DPT) drilling, hollow-stem auger (HSA) drilling and NX-Rock coring.

Procedures for specific sampling activities are described below. The procedures proposed for this investigation are discussed in this section and will be implemented by a subcontractor under the direct supervision of an AECOM employee.

3.1 Hollow-Stem Auger Drilling Procedures

A standard method of subsurface drilling which enables the recovery of representative subsurface samples for identification and laboratory testing. When sampling for per and polyfluoroalkyl substances (PFAS), see **Appendix A** for special field procedures.

Procedure:

1. HSAs, drill rods, and the drill rig will be thoroughly decontaminated prior to initial borehole installation and between each borehole at the centralized decontamination area. All decontamination liquids will be collected and placed in DOT-approved 55-gallon drums.
2. The drill rig will be inspected for oil leaks and any leaks reported prior to starting drilling operations.
3. Advance the boring by rotating and advancing the HSAs to the desired depth. The borings will be advanced incrementally to permit continuous or intermittent subsurface soil sampling, as required.
4. Remove center plug from the HSAs and collect a split spoon sample per the method stipulated by the project geologist or hydrogeologist.

References: American Society for Testing and Materials (ASTM) D1452/D1452M-16.

3.2 NX-Rock Coring Procedures

NX-Coring is a standard method of subsurface drilling which enables the recovery of bedrock cores for identification. When sampling for PFAS, see **Appendix A** for special field procedures.

Procedure:

1. Advance the boring into the bedrock by core drilling using an NX-size, double-tube, swivel-type core barrel. Continue drilling until core blockage occurs or until the net length of the core barrel has been drilled.
2. Remove the core barrel from the hole and disassemble it as necessary to remove the core. Reassemble the core barrel and return it to the hole. Resume coring.
3. Place recovered core in the core box with the upper (surface) end of the core at the upper-left corner of the core box. Fit fractured, bedded, or jointed pieces of core together as they naturally occurred.
4. Label core box with borehole ID, date, time, and depth interval of core.
5. The following observations will be recorded from the rock core:
 - a. Core recovery percent
 - b. Color
 - c. Rock classification
 - d. Rock hardness
 - e. Rock fractures, including descriptions of natural breaks

f. Rock Quality Designation (RQD),

$$\text{RQD} = \frac{\text{Sum of core lengths} > 4''}{\text{Total length of core run}} \times 100\%$$

Total length of core run

Reference: ASTM D2113-14.

4.0 Groundwater Investigation Tasks

A groundwater investigation will be conducted as part of the RI. Field activities implemented as part of a groundwater investigation include (but are not limited to) the following:

- Groundwater Elevation Survey
- Monitoring Well Installation
- Monitoring Well Development
- Groundwater Sampling from Monitoring Wells

When sampling for PFAS, see **Appendix A** for special field procedures.

4.1 Groundwater Elevation Survey

To better understand the hydrogeologic conditions, synoptic water level readings will be collected by AECOM prior to groundwater sampling.

Water levels in monitoring wells scheduled to be sampled during the field work will be measured using an electronic water level indicator. Initially, measurements will be taken following well development once the well has recovered to anticipated static conditions. Water level measurement procedures are presented below.

Procedure:

1. Clean the water level probe and the lower portion of cable following standard decontamination procedures (Section 7.1) and test water level meter to ensure that the batteries are charged.
2. Lower the probe slowly into the monitoring well until the audible alarm indicates water.
3. Read the depth to the nearest hundredth of a foot from the graduated cable using the V-notch on the riser pipe as a reference point.
4. Repeat the measurement for confirmation and record the water level.
5. Remove the probe from the well slowly, drying the cable and probe with a clean "Chem Wipe" or paper towel.
6. Replace the well cap and lock protective cap in place.
7. Decontaminate the water level meter (Section 7.0) if additional measurements are to be taken.

Reference: ASTM D4750-87(2001).

4.2 Monitoring Well Installation

The proposed number and locations of monitoring wells are detailed in the RIWP. The actual location and number of monitoring wells will be determined by the on-site supervising AECOM geologist and/or NYSDEC Project Manager.

The default method for advancing borings in overburden will be using 4¼-inch HSAs with a center plug. The HSAs will be advanced to bedrock. If difficulties with running sands are encountered which hinder drilling, potable water may be introduced into the HSAs to maintain a positive hydrostatic head. NX-Rock coring will be implemented for advancing in bedrock.

Monitoring well borings will be advanced to the target depths listed in the site-specific RIWP. Subsurface soil samples will be obtained in accordance with Section 5.2 and logged in accordance with Section 5.2.1. Soil cuttings will be screened for organic vapors using a PID.

4.2.1 Overburden Monitoring Well Construction Procedures

The overburden groundwater monitoring wells that will be installed during this investigation will use the procedures described below.

Procedure:

1. Advance subsurface boring to the desired depth by means of hollow-stem auger drilling.
2. While boring, collect split spoon samples on a continuous basis to geologically log the boring.
3. Remove center plug from augers and verify borehole depth using weighted measuring tape.
4. Add washed and graded medium sand as needed to base of borehole.
5. Insert 10 feet of 2-inch ID #10 slot PVC screen attached to a 2-inch ID, Schedule 40 PVC riser to the ground surface and cap the riser to prevent well construction materials from entering the well.
6. Add sand to screen section of well while slowly removing augers. Sand pack should extend at least two feet above the top of the screen section. Measure with a tape.
7. Slowly add bentonite pellet seal to borehole as augers are slowly removed. The bentonite seal should extend at least two feet above the top of the sand pack section. Measure with tape.
8. Note: The rate of removal of the auger from the borehole should closely follow the rate that the sand pack and bentonite pellets fill the borehole.
9. If bentonite seal is placed above the groundwater level within the borehole, add water to the borehole to hydrate the bentonite pellets. Allow pellets to hydrate for at least 30 minutes.
10. Mix cement/bentonite grout per manufacturer's specifications.
11. Add grout to borehole through tremie pipe or hose from the top of the bentonite seal to the ground surface.
12. Remove remaining augers from the borehole.
13. Top off grout in borehole. Grout should extend to approximately two feet below ground surface.
14. Cut well-riser pipe to about three feet above the ground surface for stickup type wells. Flush-mount well risers should be cut off just below surface grade.
15. Backfill the remaining two feet of the borehole with concrete.
16. Install a protective casing over the well riser pipe and set it into the concrete backfill.
17. Lock the protective casing cover.
18. Document well construction in the field notebook and on a Well Construction Detail diagram (**Appendix B**).

Reference: ASTM D5092/D5092M-16.

4.2.2 Bedrock Monitoring Well Construction Procedures

The bedrock groundwater monitoring wells that will be installed during this investigation will use the procedures described below.

Procedure:

1. Collect soil samples while advancing to the top of bedrock. Follow the procedures in Section 5.2 as applicable for field conditions.
2. Measure the depth to the top of bedrock from the ground surface using a weighted measuring tape.
3. Upon reaching the bedrock surface, the augers will be removed, and a temporary 6-inch diameter casing will be installed.
4. Bedrock will be cored using an NX core bit to approximately 3 feet into bedrock. The bedrock core will be examined by the AECOM geologist to confirm bedrock. After bedrock is confirmed, the drilling rig will be re-tooled to ream the core hole using a 5-7/8 – inch roller bit to construct a rock socket. A nominal 4-inch ID carbon steel casing will be installed to grade and grouted into the rock socket.

5. Bedrock will then be continuously cored at least 24-hours after the grout and steel permanent casing is installed using an NX core bit up to a target depth (i.e., approximately 10-15 feet into bedrock).
6. Insert a riser cap (J-plug) into the well riser. Install an 8-inch curb box around the well casing by cementing the protective curb box around the well casing. Install lock on J-plug and seal the curb box.
7. Document well construction details in the field notebook and transfer the data onto the Bedrock Monitoring Well Construction Detail form (**Appendix B**).

Reference: ASTM D5092/D5092M-16.

4.3 Well Development

Following completion of groundwater monitoring well installation, each newly installed monitoring well will be developed by pumping until the discharged water is relatively sediment free and the indicator parameters (pH, temperature, and specific conductivity) have reached steady state. Developing the monitoring well removes sediment and may improve the hydraulic properties of the formation.

The effectiveness of the development measures will be closely monitored in order to keep the volume of discharged water to the minimum necessary to obtain sediment-free samples. A portable turbidimeter will be used to monitor effectiveness of development. A turbidity reading of < 50 Nephelometric Turbidity Units (NTU) and steady-state pH, temperature, and specific conductivity readings will be used as a guide for discontinuing well development.

When sampling for PFAS, see **Appendix A** for special field procedures.

Procedure:

1. An appropriate monitoring well development method should be selected, depending on water level depth, well productivity, and sediment content of water. Monitoring well development options include: (a) manual pumping; and (b) powered suction-lift or hydrolift pumping.
2. Equipment should be assembled, decontaminated (if necessary), and installed in the well. Care should be taken not to introduce contaminants to the equipment during installation.
3. Monitoring well development should proceed by repeated removal of water from the well until the discharged water is relatively sediment-free. All development waters will be containerized. Effectiveness of development should be monitored at regular intervals using a portable turbidimeter and water quality meter. Volume of water removed, and turbidity, pH, temperature, and conductivity measurements will be recorded on a Well Development/Purging Log form (**Appendix B**).
4. Monitoring well development will be discontinued when the turbidity of the discharged water is below 50 NTU and the other indicator parameters have stabilized.

Reference: ASTM D5092/D5092M-16.

4.4 Groundwater Sampling from Monitoring Wells

Groundwater sampling will be performed to evaluate the extent of groundwater contamination. Select existing and newly installed monitoring wells will be sampled for chemical analysis. The analytical program is presented in the RIWP and QAPP.

The locations and well identifications are presented in the RIWP.

4.4.1 Low-Flow Sampling Technique

Groundwater sampling will be done in accordance with *Groundwater Sampling Guidelines for Superfund and RCRA Project Managers* (USEPA OSWER 542-S-02-001). The default groundwater sampling method will be in accordance with EPA's low stress (often referred to as low flow) sampling technique (EPA, 1998).

Monitoring well purging will be completed using the low-flow purging technique as follows:

1. The well cover will be unlocked and carefully removed to avoid having any foreign material enter the well. The interior of the riser pipe will be monitored for organic vapors using PID. If a reading of greater than 5 ppm is recorded, the well will be vented until levels are below 5 ppm before purging begins.
2. Using an electronic interface probe/water level detector, the water level below top of casing will be measured. The depth of the well will be measured to determine the volume of water in the well. The bottom of the well will also be checked for DNAPL using the interface probe/water level indicator. The end of the probe will be decontaminated between wells.
3. Calibrate field instruments (e.g., pH, specific conductance, PID, turbidity).
4. Purge the required water volume (i.e., until stabilization of pH, temperature, specific conductivity, and turbidity) using a low-flow pump (e.g., Solinst or Geopump) and dedicated HDPE tubing. New dedicated tubing will be used for each well.
5. Purge the well until the water quality parameters have stabilized. The stabilization criteria are: specific conductivity - 3% full-scale range; pH - 0.10 pH unit; dissolved oxygen - 10%, Turbidity - 10% and oxidation/reduction (redox) potential - +/- 10 units.
6. Purging of three well volumes is not necessary if the indicator parameters are stable. However, at least one (1) well volume must be purged before sampling can begin. During purging, it is permissible to by-pass the flow cell until the groundwater has cleared.
7. Indicator parameters of pH, conductivity, dissolved oxygen, oxidation/reduction (redox) potential, turbidity, and temperature must be measured continuously using the flow cell.
8. Well purging data are to be recorded in the field notebook and on the Low Flow Purge Log (**Appendix B**).

4.4.2 Sample Collection Procedures

Procedure:

1. After well purging is completed, a sample will be collected into the appropriate containers.
2. Direct water flow toward the inside wall of the sample container to minimize volatilization. Fill volatile sample containers so no headspace (air bubbles) is present. If containers are pre-preserved, do not overfill sample containers. Note if effervescence is observed.
3. All sample bottles will be labeled in the field using a waterproof permanent marker (Section 9.4).
4. Samples will be collected into sample bottles (containing required preservatives) and placed on ice in coolers for processing (preservation and packing) prior to shipment to the analytical laboratory. A chain-of-custody record will be initiated. The analytical laboratory will certify that the sample bottles are analyte-free prior to shipping.
5. Remove pump and disconnect valves and tubing, as necessary. If a submersible pump was used, it must be decontaminated prior to and between each use. Clean pump by flushing 10 gallons of potable water through the pump. Rinse with deionized water after flushing the pump.
6. Well sampling data are to be recorded in the field notebook and on the Well Purging Log (**Appendix B**).

4.5 Monitoring Well Decommissioning

If necessary, and after NYSDEC authorization, monitoring well decommissioning will be performed in accordance with NYSDEC Policy CP-43, using the following steps:

1. Each well will be tremie-grouted from the bottom of the well to within five feet of the ground surface to ensure a continuous grout column. Grout slurry composition should be the following:
 - a. 1.5 to 3.0 percent by weight - Bentonite (Quick Gel)
 - b. 40 to 60 percent by weight - Cement (Portland Type I)

- c. 40 to 60 percent by weight - Water
- 2. The well casing will be removed at a depth of five feet below grade (if possible) and the outer protective casing "stick-up" and/or flush-mount curb box will be removed only after the well has been properly filled with grout.
- 3. A metal marker (PK Survey Spike) will be embedded in the top of the grout to indicate the location of the former monitoring well.
- 4. The uppermost five feet of the borehole will be filled with approved/clean backfill or topsoil.
- 5. The surface of the borehole will be restored to the condition of the area surrounding the borehole (crushed stone, asphalt, etc.). If the surrounding surface is a concrete sidewalk flag, that flag will be replaced in accordance with applicable regulations/standards.
- 6. The solid waste should be handled in accordance with Section 7.2 of this plan.
- 7. Document well construction details in the field notebook and transfer the data onto the Well Decommissioning Record form (**Appendix B**).

Reference: ASTM D5299/D5299M-18; NYSDEC CP-43: Groundwater Monitoring Well Decommissioning Policy, November 3, 2009.

5.0 Soil Sampling Activities

Soil sampling will include near-surface and subsurface soil sampling. Procedures for these activities are described below.

5.1 Near-Surface Soil Sampling (by Hand Auger)

Near surface soil samples will be collected, as described in the site-specific RIWP.

Procedure:

1. Remove stones, vegetation, debris etc. from the ground surface in the sampling area.
2. Lay a section of plastic sheet adjacent to the soil sampling location.
3. Use a clean (decontaminated) bucket auger, required extension rods and "T" handle to collect a soil sample from the desired depth.
4. Monitor volatile organic compounds (VOCs) in the ambient air during soil collection.
5. Turn the auger in a clockwise direction with the "T" handle to remove soil until the desired soil sampling depth is reached. Place the excavated soil on the adjacent plastic. If possible, lay out the cuttings in stratigraphic order.
6. During auger advancement record observations made of the geologic features of the soil.
7. Stop advancing the auger when the top of the specified sampling depth has been reached. Decontaminate the auger.
8. Insert the auger into the borehole to the sample depth and collect the sample. Place sample on ice and ship overnight to the lab under COC custody.
9. Decontaminate the auger bucket and complete the preceding steps for sample collection from deeper depths.
10. When sampling is complete, place cuttings back in the borehole in the order in which they were removed if possible. Top off with hydrated bentonite pellets.

Reference: ASTM D6907-05(2016).

5.2 Subsurface Soil Sampling

Borings will be advanced at the locations specified in the site-specific RIWP. Borings will be advanced by direct push (geoprobe) methods and by HSA drilling. Soils will normally be logged during subsurface sampling, regardless of the method selected. Typical procedures for direct push sampling, sampling from HSA borings, and soil logging are presented below.

5.2.1 Subsurface Soil Sampling from Direct Push Borings

Soil samples will be collected at specific locations identified in the site-specific RIWP, or based on field observations (e.g., if contamination is observed or if elevated PID readings are recorded). The soil samples will be analyzed for parameters as indicated in the site-specific RIWP.

A standard method of subsurface boring using hydraulically powered (static force plus percussion) soil-probing equipment that enables the recovery of representative subsurface samples for identification and laboratory testing.

When sampling for PFAS, see **Appendix A** for special field procedures.

Procedure:

1. Inspect the sampling equipment to ensure proper working condition.
2. Insert dedicated disposable acetate liner into the sampler and select additional components for the sampler as required (i.e., leaf spring core retainer for clays, or a sand trap for non-cohesive sands).

3. Lower the sampler to the ground surface, or bottom of the hole previously made by the sampler and check the depth against length of the rods and the sampler.
4. Attach the drive head assembly to the sample rods.
5. Push the sampler in increments up to 5 feet into the subsurface up to the desired depth with a hydraulic press.
6. Rotate the sampling rods clockwise and remove the sampler.
7. Split the sample lengthwise and screen the soil with a PID for volatile organic vapors.
8. Document all properties and sample locations in the field notebook, and on the Direct-Push Log form (**Appendix B**).
9. Abandon the direct-push boring by backfilling with bentonite pellets and hydrate with potable water or use concrete patch in impervious areas.

Reference: ASTM D6282/D6282M-14.

5.2.1.1 Remote Direct-Push Soil Sampling

Standard equipment used for remote direct push sampling is the 420M Geoprobe® (or similar unit). This is a light weight and durable limited access machine designed to be deployed to hard-to-reach or limited access sampling locations. The machine is powered by a remote hydraulic source which is connected through auxiliary hydraulics.

When sampling for PFAS, see **Appendix A** for special field procedures.

Procedure:

1. Read and understand all safety, maintenance and operations instructions regarding this machine before beginning operations.
2. Maneuver the probe unit to place the probe foot near the desired probing location.
3. Position the power source near the unit leaving sufficient distance so as not to be in the way of probing activities.
4. The probe unit is intended for operations on level surfaces. Do not use on slopes greater than 2 degrees due to decreased stability.
5. Connect hydraulic hoses to probe unit and power source.
6. Start the engine of the hydraulic power source to allow engine and hydraulics to warm sufficiently and ensure there is adequate ventilation for exhaust fumes.
7. Make sure everyone is clear of any moving parts before engaging the hydraulics of the probe unit. Check the emergency stop button for proper operation. If the emergency stop button doesn't work, cease operations.
8. Anchor the probe derrick to floor or ground surface as needed based on conditions.
9. Insert dedicated disposable acetate liner into the sampler and select additional components for the sampler as required (i.e., leaf spring core retainer for clays, or a sand trap for non-cohesive sands).
10. Lower the sampler to the ground surface, or bottom of the hole previously made by the sampler and check the depth against length of the rods and the sampler.
11. Attach the drive head assembly to the sample rods.
12. Push the sampler in increments up to 5 feet into the subsurface up to the desired depth with a hydraulic press.
13. Rotate the sampling rods clockwise and remove the sampler. Split the sample lengthwise and screen the soil with a PID for volatile organic vapors.

14. Document all properties and sample locations in the field notebook, and on the Direct-Push Log form (**Appendix B**).
15. Abandon the direct-push boring by backfilling with bentonite pellets and hydrate with potable water or use concrete patch in impervious areas.

Reference: ASTM D6282/D6282M-14.

5.2.2 Split Spoon Sampling Procedures

Split-spoon samples will be collected during boring advancement at continuous 2-foot intervals. All soil samples will be visually described and classified, inspected for signs of contamination, and screened with a PID for the presence of organic vapors by the supervising AECOM geologist. Soil samples yielding the highest PID readings, or from directly above the water table will be collected and cooled on ice to be sent for laboratory analysis.

When sampling for PFAS, see **Appendix A** for special field procedures.

Procedure:

1. Measure the sampling equipment lengths to ensure that they conform to specifications. Confirm the weight of the hammer (140 pounds).
2. Clean out the HSAs to the bottom depth prior to sampling. Select additional components as required (i.e., leaf spring core retainer for clays or a sand trap for non-cohesive sands).
3. Lower the decontaminated 2-inch outside diameter (O.D.) split-spoon to the bottom of the HSAs and check the depth against length of the rods and the split-spoon.
4. Attach the drive head and hammer to the drill rods without the weight of the hammer resting on the rods.
5. Lower the weight and allow the split-spoon to settle up to 6 inches below the bottom of the HSAs. If it settles more, consider use of another type of sampler.
6. Mark four 6-inch intervals on the drill rods relative to a drive reference point on the rig. With the split-spoon resting on the bottom of the hole, drive the split-spoon with the 140-pound hammer falling freely over its 30-inch fall until 24 inches have been penetrated or 50 blows have been applied in any 6-inch interval.
7. Record the number of blows required to drive the split-spoon 6 inches into the overburden. Determine the "N" value by adding the blows for the 6-to 12-inch and 12-to 18-inch interval of each sample attempt.
8. After penetration is complete, remove the split-spoon sampler.
9. Open the split-spoon to determine the percent recovery and describe the soil.
10. Split the sample lengthwise and screen the soil with a PID for volatile organic vapors.
11. Document all properties and sample locations in the field notebook, and on the Boring Log form (**Appendix B**).

Reference: ASTM D1586/ D1586M-18.

5.2.3 Unified Soil Classification System

Soils will be classified according to the Unified Soil Classification System (USCS) adopted by the U.S. Army Corps of Engineers and U.S. Department of the Interior Bureau of Reclamation. Soil properties that form the basis for the USCS are:

- Percentage of gravel, sand, and fines;
- Shape of the grain-size distribution curve; and
- Plasticity and compressibility characteristics.

According to this system, all soils are divided into three major groups: coarse-grained, fine-grained, and highly-organic (peaty). The boundary between coarse-grained and fine-grained soils is taken to be the 200-mesh sieve (0.074 mm). In the field the distinction is based on whether the individual particles can be seen with the unaided eye. If more than 50% of the soil by weight is judged to consist of grains that can be distinguished separately, the soil is considered to be coarse-grained.

The coarse-grained soils are divided into gravelly (G) or sandy (S) soils, depending on whether more or less than 50% of the visible grains are larger than the No. 4 sieve (3/16 inch). They are each divided further into four groups:

- W: Well graded; fairly clean (<5% finer than 0.074 mm)
- P: Poorly graded (gap-graded); fairly clean (<5% finer than 0.074mm)
- C: Clayey (>12% finer than 0.074mm); plastic (clayey) fines. Fine fraction above the A- line with plasticity index above 7.
- M: Silty (>12% finer than 0.074 mm); non-plastic or silty fines. Fine fraction below the A- line and plasticity index below 4.

The soils are represented by symbols such as GW or SP. Borderline materials are represented by a double symbol, as GW-GC.

The fine-grained soils are divided into three groups: inorganic silts (M), inorganic clays (C), and organic silts and clays (O). The soils are further divided into those having liquid limits lower than 50% (L), or higher than 50% (H).

The distinction between the inorganic clays (C), the inorganic silts (M), and organic soils (O) is made on the basis of a modified plasticity chart. Soils CH and CL are represented by points above the A-line, whereas soils OH, OL, and MH correspond to positions below the A-line. Soils ML, except for a few clayey fine sands, are also represented by points below the A-line. The organic soils O are distinguished from the inorganic soils M and C by their characteristic odor and dark color.

Reference: ASTM D2487-17.

5.2.4 Visual Identification

Soil samples collected during boring advancement will be visually identified. Soil properties required to define the USCS classification of a soil and other observed characteristics normally identified in describing a soil are defined below:

- a. Color
- b. Moisture conditions
- c. Grain size
 - i. Estimated maximum grain size
 - ii. Estimated percent by weight of fines (material passing No. 200 sieve)
- d. Gradation
- e. Grain shape
- f. Plasticity
- g. Predominant soil type
- h. Secondary components of soil
- i. Classification symbol
- j. Other features such as:
 - i. organic, chemical, or metallic content;
 - ii. compactness;

- iii. consistency;
- iv. cohesiveness near plastic limit;
- v. dry strength; and
- vi. source - residual, or transported (aeolian, water borne, glacial deposit, etc.)

Reference: ASTM D2488-17.

6.0 Soil Vapor Intrusion Sampling

The RI will include collection of soil vapor samples at exterior locations using soil vapor implant probes. Details of the typical field activities associated with SVI studies are presented in this section.

The objective of the soil vapor sampling is to evaluate whether vapor intrusion of compounds related to the site or suspected source is occurring near structures within vicinity of the site, and whether vapor hazards as a result of the soil or groundwater contamination may exist for receptors associated the existing structures in the vicinity of the site. The soil vapor sampling results may be used to identify the structures within vicinity of the site that require further investigation or mitigation/remediation.

The following tasks will typically be performed:

- Location Mark-Out and Utility Clearance Activity
- Soil Vapor Implant Installation
- Sample Collection and Analysis
- Data Evaluation and Report Preparation

This section outlines the procedures that will be used in the collection of soil vapor samples.

6.1 Location Mark-Out and Utility Clearance Activity

Prior to commencement of the soil vapor probe/implant installation, LaBella will notify the UDig New York State One-Call Utility for utility clearance. In addition, Ravi will delineate potential subsurface utilities at the structures using electromagnetic utility locating instruments. Utility mark-outs by the local One-Call center and any information provided by the building occupants will be considered when locating the soil vapor locations in the field.

6.2 Soil Vapor Implant Installation

Four (4) exterior soil vapor implants will be installed within unconsolidated material for collection of soil vapor samples for laboratory testing. The soil vapor implants will be installed using the procedures described below.

Procedure:

1. Implants shall be 6 inches in length (e. g., Geoprobe® AT86 series) and are to be constructed of double woven stainless-steel wire screen. Implants shall have a pore diameter of 0.0057 inch, which is equivalent to a 0.007 slot well screen. The bottom of the implants must have a post run tubing (PRT) style thread; the same fitting style used with Geoprobe® PRT vapor sampling tools. The top connection with the Teflon or polyethylene tubing shall be stainless steel Swagelok® or clamp fitting to prevent leakage during sample collection. The connection to the sampling Summa® canister shall be made through the use of a 1/8th inch ID Teflon or polyethylene tubing.
2. Once the rods have been advanced to the desired depth, anticipated to be approximately 6 ft bgs, attach appropriate tubing to the implant to be installed. Allow at least 48 inches of tubing length longer than the required depth of the implant. Cover or plug the end of the tubing.
3. Remove the pull cap from the rods and lower the implant and tubing down inside the diameter of the rods until the implant hits the top of the Anchor/Drive Point. Note the length of the tubing to ensure proper depth has been reached.
4. Rotate tubing counterclockwise while exerting a gentle downward force to engage the PRT threads. Pull up on the tubing lightly to test the connection. DO NOT cut excess tubing.
5. Position a probe rod pull plate or manual probe rod jack on the top of the probe rod. Exert downward pressure on the tubing while pulling the probe rods up. Pull up about 12 inches.

6. Thread excess tubing through the bottom of a funnel and position funnel over top of probe rod. The funnel will be used to facilitate installation of sand into the borehole around the screened portion of the implant.
7. Pour sand into the funnel and down the inside diameter of the probe rods around the outside of the tubing and around the screen of the implant. Use tubing to “stir” sand into place. Sand should be used to create a 1 to 2 ft long sampling zone. [NOTE: sand and bentonite can only be installed in the vadose zone (unsaturated zone above the water table)].
8. Lift up an additional 18 to 24 inches and insert a bentonite slurry above sand. Soil vapor probes should be sealed above the sampling zone with a bentonite slurry for a minimum distance of 3 ft to prevent outdoor air infiltration and the remainder of the borehole backfilled with clean material.
9. Pull remaining rods out of the hole and complete with bentonite slurry.
10. Cut any excess tubing to allow approximately 8 to 12 inches to extend above the ground surface. Plug the tubing with a cap or plug.
11. Steps should be taken to minimize infiltration of water or outdoor air and to prevent accidental damage (e.g., setting a protective casing around the top of the probe tubing and grouting in place to the top of bentonite, sloping the ground surface to direct water away from the borehole like a groundwater monitoring well).
12. Install a protective casing (road box) over the tubing and set it into concrete.
13. Document well construction in the field notebook and on a Soil Vapor Implant Construction Detail diagram (**Appendix B**).

6.3 Soil Vapor Sample Collection and Analysis

Procedures for collection of soil vapor samples are provided below.

6.3.1 Soil Vapor Sampling

To obtain representative samples and to minimize possible discrepancies, soil vapor samples should be collected in the following manner at all locations:

1. At least 24 hours after the installation of permanent probes and shortly after the installation of temporary probes, one to three implant volumes (i.e., the volume of the sample probe and tube) should be purged prior to collecting the samples;
2. Flow rates for both purging and collecting should not exceed 200 mL/min to minimize outdoor air infiltration during sampling;
3. Samples should be collected, using conventional sampling methods, in an appropriate container, one which:
 - a. Meets the objectives of the sampling (e.g., investigation of areas where low or high concentrations of volatile chemicals are expected; to minimize losses of volatile chemicals that are susceptible to photodegradation);
 - b. Is consistent with the sampling and analytical methods (e.g., low flow rate; Summa® canisters if analyzing by using EPA Method TO-15); and
 - c. Is certified clean by the laboratory;
4. Sample size depends upon the volume of that will achieve minimum reporting limits; and
5. A tracer gas (e.g., helium) should be used when collecting soil vapor samples to verify that adequate sampling techniques are being implemented (i.e., to verify infiltration of outdoor air is not occurring).

In some cases, weather conditions may present certain limitations on soil vapor sampling. For example, condensation in the sample tubing may be encountered during winter sampling due to low outdoor air temperatures. Devices, such as tube warmers, may be used to address these conditions. AECOM will discuss anticipated limitations to the sampling with NYSDEC prior to the sampling event

so appropriate measures to address these difficulties are established in the site-specific FAP. When soil vapor samples are collected, the following actions should be taken to document local conditions during sampling that may influence interpretation of the results:

- If sampling near a commercial or industrial building, uses of volatile chemicals during normal operations of the facility should be identified;
- Outdoor plot sketches should be drawn that include the site, area streets, neighboring commercial or industrial facilities (with estimated distance to the site), outdoor air sampling locations (if applicable), and compass orientation (north);
- Weather conditions (e.g., precipitation and outdoor temperature) should be noted for the past 24 to 48 hours; and
- Any pertinent observations should be recorded, such as odors and readings from field instrumentation.

Additional information that could be gathered to assist in the interpretation of the results includes barometric pressure, wind speed and wind direction. The field sampling team should maintain a sample log sheet summarizing the following:

- sample identification,
- date and time of sample collection,
- sampling depth,
- identity of samplers,
- sampling methods and devices,
- purge volumes,
- volume of soil vapor extracted,
- if Summa® canisters are used, note the vacuum before and after samples were collected,
 - The February 2008 update to the 2005 NYSDEC ASP (NYSDEC, 2008) specifies allowable pressures (vacuum) for canisters. The initial canister vacuum must be 28 inches Hg $\pm$ 2-inch Hg. The final canister pressure vacuum should be 5 inches Hg $\pm$ 1-inch Hg. If final canister pressures are not within this range, contact the NYSDEC project manager before instructing the laboratory to analyze the canisters.
- apparent moisture content (dry, moist, saturated, etc.) of the sampling zone, and;
- Chain of custody protocols and records used to track samples from sampling point to analysis.

6.3.2 Soil Vapor Sample Analytical Requirements

AECOM will use a NYSDOH Environmental Laboratory Accreditation Program (ELAP) laboratory certified for the air and emissions category. The Summa® canisters will be certified clean (batch certification) by the laboratory. Air samples are typically analyzed for VOCs by USEPA Method TO-15. The laboratory-specific detection limits and quantitation limits for TO-15 analytes are included in the site-specific QAPP.

6.3.3 Decontamination Procedures

Only dedicated equipment (canisters, tubing, etc.) will be used during sampling. All non-dedicated equipment (i.e. flow meters, etc.) will be purged with air prior to sampling. As such, no field decontamination is necessary for vapor sampling. Summa canisters will be decontaminated by the analytical laboratory and certification of cleanliness will be included in the analytical data report.

7.0 Decontamination and Management of Investigation Derived Waste

7.1 Equipment Decontamination

To avoid cross contamination, sampling equipment (defined as any piece of equipment which may contact a sample) will be decontaminated according to the following procedures. Field equipment rinsate blanks are generated and analyzed to monitor the effective of field decontamination procedures.

Cross contamination is minimized by the use of vendor-decontaminated, dedicated, disposable equipment to the extent practical.

When sampling for PFAS, see **Appendix A** for special field procedures.

7.1.1 Decontamination Procedures

A decontamination pad will be constructed on the site by AECOM's drilling subcontractor, LaBella.

The pad will be sized to be large enough to handle the equipment used on site (e.g., drill rig). Additionally, the pad will be used for small equipment decontamination as well as personnel decontamination.

7.1.2 Small Equipment Decontamination

Small equipment decontamination for non-disposable equipment such as Geoprobe® HydroPunch® samplers, transducer probes and cables, will be accomplished using the following procedures:

- Alconox (or equivalent) and potable water wash;
- Potable water rinse;
- Distilled/deionized water rinse;

Solvents will not be used in the field decontamination of such equipment. Decontamination will include scrubbing/washing with a laboratory grade detergent (e.g. Alconox) to remove visible contamination, followed by potable (tap) water and analyte-free water rinses. Tap water may be used from any treated municipal water system; the use of an untreated potable water supply is not an acceptable substitute.

Equipment should be allowed to dry prior to use. Steam cleaning or high-pressure hot water cleaning may be used in the initial removal of gross, visible contamination.

Electric submersible pumps (such as a Grundfos Redi-Flow II) will be decontaminated using the above steps followed by running a large volume (several gallons) of potable water through the pump, followed by an analyte-free water rinse. Tubing will not be re-used (new tubing will be used for each well). Submersible pumps and supporting lines and cables will be placed in a plastic bucket filled with Liquinox and potable water and then run for several minutes (to decontaminate both exterior and interior parts). The process will be repeated with potable water. Submersible pumps will also be given a final analyte-free water rinse of both interior and exterior parts.

If bladder pumps are used, the pump will be disassembled and cleaned after each used. A new bladder will be used for each sample. Small parts, such as screens and gaskets will be replaced after each use. Dedicated airline tubing and Teflon sample tubing will be used at each monitoring well. The pump will be cleaned using the following steps:

- Alconox (or equivalent) and potable water wash;
- Potable water rinse;
- Distilled/deionized water rinse;
- Solvent (reagent or pesticide grade) rinse if samples are collected for organic analysis;

- Dilute (10%) nitric acid rinse if samples are collected for metals analysis; and
- Distilled/deionized rinse, air dry.

7.1.3 Heavy Equipment Decontamination

Drilling equipment will be decontaminated before the first use, between boreholes and prior to demobilization using high-pressure steam. Decontamination will be conducted at a dedicated decontamination pad constructed for the project or at an alternate location as indicated in the site-specific RIWP. Decontamination fluids will be containerized (drummed) for subsequent characterization or disposal, unless other arrangements are made on a project-specific basis and as indicated in the site-specific RIWP.

7.1.4 Personnel Decontamination

Wash buckets and potable water will be set up at the decontamination pad or alternate location as indicated in the site-specific RIWP. This includes washing hands and a boot wash. Details of the personnel decontamination procedures are provided in the HASP.

7.2 Management of Investigation Derived Waste

IDW management will be in accordance with section 3.3(3e) of DER-10 (NYSDEC, 2010). The sampling methods and equipment will be selected to limit both the need for decontamination and the volume of IDW.

IDW generated during field activities include, but is not limited to, the following:

- Purge water;
- Poly sheeting;
- Spent macrocore liners;
- PPE; and
- Drill cutting and soil boring spoils.

This IDW must be placed in 1A2 open head 55-gallon steel drums pending shipment off site for disposal.

Segregation

Drummed IDW is to be divided into the following categories:

- Drill cuttings and soil boring spoils (see Section 3.0);
- Purgewater from monitoring well development/sampling and DNAPL/LNAPL product; and,
- Solid waste other than drill cuttings and boring spoils (i.e., spent poly tubing, PPE, etc.).

Generator ID

Any IDW generated is assigned USEPA Generator ID Number NYD002207520.

Hazardous/Non-Hazardous Classification

AECOM will collect characterization samples to classify the IDW as either hazardous or non-hazardous.

Shipment/Disposal

Drummed IDW must be staged at its point of origin until it is shipped off site on the same day it's generated or staged in a designated and secured area until it can be shipped off site at a later date.

All IDW will be shipped off site by a permitted contractor, Miller Environmental Group Inc. (Miller), to a permitted facility and may be disposed of at a facility licensed to accept hazardous waste, if necessary.

Manifests

Waste manifests must accompany the IDW during shipment off site for disposal. For non-hazardous waste, a non-hazardous waste manifest must be completed. For hazardous waste, a Uniform Hazardous Waste Manifest (USEPA Form 8700-22) must be completed, along with a Land Disposal Restriction Notification Form 1. IDW manifests can be signed by AECOM personnel as agents for the generator (NYSDEC).

8.0 Community Air Monitoring Program

CAMP is used to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities.

The protocols cited below are based on the NYSDOH Generic CAMP (May, 2010; Appendix 1A to DER-10 [NYSDEC, 2010]) which is typically utilized by NYSDEC as guidance for work conducted under these contracts.

8.1 Monitoring

Real-time air monitoring for VOCs and/or particulate levels at the perimeter and surrounding community of the work area are necessary during intrusive drilling activities. Monitoring activities will consist of a combination of continuous and periodic monitoring, which will be performed dependent upon the type of activity being conducted at the site, as discussed below.

8.1.1 Continuous Air Monitoring

Continuous monitoring for VOCs and particulates are required for ground intrusive activities associated with the site, including, but not limited to, hand digs, the installation of soil borings and groundwater monitoring wells. A total of three (3) CAMP units will be present; one (1) in a down-wind location, one (1) in an up-wind location, and one (1) at the proximate school property.

VOC monitoring will be conducted continuously at each CAMP. VOC monitoring will be performed using a MiniRAE 2000 or equivalent, which is appropriate to detect a wide range of contaminants typically encountered. The MiniRAE 2000 will be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The MiniRAE 2000 is capable of calculating 15-minute running average concentrations, which will be compared to the action levels specified below.

Particulate concentrations will be monitored continuously at the upwind and downwind perimeters of the work area at temporary particulate monitoring stations. The particulate monitoring will be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) such as a Thermo MIE pDR-4000 DataRam or equivalent. The Thermo MIE pDR-4000 DataRam is a real-time monitoring equipment capable of measuring particulate matter less than 10 microns (μm) in size [PM-10] and capable of integrating over a period of 15 minutes for comparison to the airborne particulate action level. The Thermo MIE pDR is equipped with an audible alarm to indicate exceedance of the action level. In addition to using the Thermo MIE pDR-4000 DataRam, fugitive dust migration will be visually assessed during work activities. If particulate concentrations at the upwind station are higher or equivalent to concentrations at or downwind of work areas, then continuous air monitoring may be discontinued, as approved by NYSDEC.

8.1.2 Periodic (As-Needed) Air Monitoring

Periodic or as-needed air monitoring for VOCs may be required during non-intrusive activities associated with the site-specific Work Plan. Non-intrusive activities may include the collection of soil samples, the collection of groundwater samples from existing monitoring wells, and the collection of indoor air and soil vapor samples. Periodic air monitoring during sample collection will consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well bailing/purging, and taking a reading prior to leaving a sample location.

8.2 Action Levels and Response

This subsection identifies the action levels and corresponding responses for concentrations of VOCs and particulates detected during the field activities associated with a site.

8.2.1 Volatile Organic Compounds

If the ambient air concentration of total organic vapors at the downwind perimeter of the work area exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be

temporarily halted, and monitoring will continue. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.

If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be stopped, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 ft downwind of the work zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less (but in no case less than 20 ft), is below 5 ppm over background for the 15-minute average.

If the organic vapor level is above 25 ppm at the perimeter of the work area, field activities will be shut down.

All 15-minute readings will be recorded and be available for NYSDEC and NYSDOH personnel to review. Instantaneous readings (if any) used for decision purposes will also be recorded.

8.2.2 Particulates

If the downwind PM-10 particulate level is $100 \mu\text{g}/\text{m}^3$ greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques will be employed. Work will continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed $150 \mu\text{g}/\text{m}^3$ above the upwind level and provided that no visible dust is migrating from the work area.

If, after implementation of dust suppression techniques, the downwind PM-10 particulate levels are greater than $150 \mu\text{g}/\text{m}^3$ above the upwind level, work will be stopped, and a re-evaluation of activities initiated. Work will resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within $150 \mu\text{g}/\text{m}^3$ of the upwind level and in preventing visible dust migration.

Similar to the VOC readings, particulate readings will be recorded and be available for state (NYSDEC and NYSDOH) and county health personnel to review.

9.0 Field Records and Documentation

The objective of this subsection is to provide consistent procedures and formats by which field records will be kept and activities documented, and a methodology by which field records will be managed. Field records and documentation to be used during field activities include Field Log Books and Standard Forms. Standard Forms are provided in **Appendix B**.

9.1 Field Log Books

Field log books will be prepared and maintained throughout the course of the investigation. **With the exception of PFAS sampling events (Appendix A)**, only bound, weatherproof field log books will be used by personnel working on NYSDEC projects. The log books will be turned in for copying/filing/tracking when complete. **If performing PFAS sampling, then loose leaf notebook paper shall be used in lieu of a field log book.**

Each log book will be labeled on the front cover in indelible ink with the following designation: "Site Name/Project Type, NYSDEC Work Assignment D009803-62, AECOM Project Number 60781011."

Log book entries will be recorded in indelible, waterproof ink. If errors are made in any field log book, field record (form), Chain-of-Custody Record, or any other field record document, corrections will be made by crossing a single line through the error, entering the correct information, and initialing and dating the correction.

Standard Forms have been adopted in this FAP to facilitate the collection of consistent data (see **Appendix B**). This will preclude detailed documentation of, for example, lithologic descriptions in the field log book. A reference, however, to use of each specific form must be made in the log book.

The date will be placed at the top of every page in the left-hand corner of the right page. The time of entry recordings will be in columnar form down the left-hand side of the right page. If an entry is made in a non-dedicated log book, then the date, project name, and project number will be entered left to right, respectively, along the top of the right page. Entries should be dated, and time of entry recorded. At the beginning of each day, the first two entries will be "Personnel/Contractors On Site" and "Weather." At the end of each day's entry or particular event, if appropriate, the person entering the field notes should draw a diagonal line originating from the bottom left corner of the page to the conclusion of the entry and sign along the line indicating the conclusion of the entry or the day's activity.

Entries in field log books will be legible (printing is preferable) and will contain accurate and inclusive documentation of project activities (investigation, monitoring remediation, closure, maintenance, etc.). Information pertaining to health and safety aspects, personnel on site, visitor's names, association, and time of arrival/departure, etc., should also be recorded. Language should be objective, factual, and free of personal feelings or other terminology that might prove inappropriate, since field records are the basis for later written reports. Once completed, these field log books become accountable documents and must be maintained as part of the project files.

Sample collection and handling activities, as well as visual observations, will be documented in the field log books. The sample collection equipment (where appropriate), field analytical equipment, and equipment used to make physical measurements will be identified in the field log books. Calculations, results, and calibration data for field sampling, field analytical, and field physical measurement equipment will also be recorded in the field log books, except where these are referenced as being recorded on approved field forms. Field analyses and measurements must be traceable to the specific piece of field equipment utilized and to the field investigator collecting the sample, making the measurement, or conducting analyses. Log books will be updated as field work progresses.

On a periodic basis (i.e., daily, weekly, etc.), or at the end of each field event, the pages of the field log book that were filled out during that time will be scanned into PDF format. The resulting PDF files will then be uploaded to the project folder located on the office server.

When an individual log book is full, the log book will be submitted to the AECOM project manager for final cataloging and filing. The log books will be stored in the Project File. Copies of specific sections will be made available to personnel upon request.

9.2 Standard Forms

All non-bound field records (e.g., drilling logs, well construction forms, sampling logs, etc.) will be completed the day the associated activity occurs. Field data collected using electronic data loggers or computer entry forms, will be downloaded as soon as practical onto CDs and/or uploaded to office servers. If possible, the person collecting the data will download electronic data on a daily basis. This person will be responsible for verifying that the data collected are adequately represented in electronic media and in the file. Examples of forms typically used are provided in **Appendix B** of this FAP.

On a periodic basis (i.e., daily, weekly, etc.), or at the end of each field event, the field forms that were completed during that time will be scanned into PDF format. The resulting PDF files will then be uploaded to the project folder located on the office server.

9.3 Sample Identification

During this project, a unique sample identifier will designate each sample collected. The following system may be used to assign unique sample identification numbers; however, modifications should be made as needed to clearly and appropriately identify samples for each site or project. Each sample will be identified by an alphanumeric character identifier, as described below.

The following codes will be used for identifying other sample types:

CODE	Sample Type
MW	Monitoring well
SB	Soil boring
SW	Surface water
SD	Sediment
IA	Indoor air
OA (or AA)	Outdoor (or ambient) air
SV	Soil vapor
FB	Field (Rinsate) Blank
N + 50	Field Duplicate (e.g., field duplicate of MW-3S will be MW-53S)
TB	Trip Blank
MS/MSD	Matrix Spike/ Matrix Spike Duplicate

Field blanks and trip blanks will be labeled for the day of collection. For MS/MSD samples, the MS/MSD will be added to the sample ID and included on the COC as a note.

An example of the sample numbering system is provided below.

Sample Identifier	Description
MW-1S	Shallow well MW-1S
MW-101D	Deep monitoring well MW-101D
SB-02-0406	Soil sample from 4 to 6 ft interval from boring SB-02.
SS-01	Surface soil sample from location SS-01.
FBW110502	Field blank associated with water samples collected on 5/2/11
TB110503	Trip blank associated with samples shipped 5/3/11.

9.4 Sample Labeling

A non-removable label will be affixed to each sample container. Labels will be marked with permanent marker pens. The following information will be contained on each label:

- Project name;
- Sample identifier;
- Company (AECOM);
- Sample date and time;
- Sampler's initials;
- Sample preservation; and
- Analysis required.

9.5 Sample Shipping

Proper documentation of sample collection and the methods used to control these documents are referred to as chain-of-custody procedures. Chain-of-custody procedures are essential for presentation of sample analytical chemistry results as evidence in litigation or at administrative hearings held by regulatory agencies. Chain-of-custody procedures also serve to minimize loss or misidentification of samples and to ensure that unauthorized persons do not tamper with collected samples.

The procedures should follow the chain-of-custody guidelines outlined in NEIC Policies and Procedures, prepared by the National Enforcement Investigations Center (NEIC) of the U.S. Environmental Protection Agency Office of Enforcement.

Procedure:

1. The chain-of-custody (COC) record (provided by the analytical laboratory) should be completely filled out, with all relevant information.
2. The original COC goes with the samples. It should be placed in a Ziploc bag and taped inside the sample cooler. The sampler should retain a copy of the COC.
3. Place inert cushioning material such as vermiculite or bubble-wrap in the bottom of the cooler.
4. Place the bottles in the cooler in such a way that they do not touch (use cardboard dividers or bubble-wrap).
5. Wrap VOA vials securely in bubble-wrap and tape. Place them in the center of the cooler.
6. With the exception of Summa® canisters, pack the cooler with ice in doubled Ziploc plastic bags.
7. Pack the cooler with cushioning material.
8. Tape the drain shut.
9. Wrap the cooler completely with strapping tape at two locations securing the lid. Do not cover any labels.
10. Place the lab address on top of cooler. For out-of-town laboratory, add the following: Put "This side up" labels on all four sides and "Fragile" labels on at least two sides. Affix numbered custody seals on front right and left of cooler. Cover seals with wide, clear tape.
11. Summa® canisters are shipped in the same boxes the laboratory used for shipping.
12. Ship samples via overnight carrier the same day that they are collected. Samples (except Summa® canisters) must be maintained at 4 degrees Celsius (C) $\pm$ 2°C throughout the shipping duration.

10.0 References

- American Society for Testing and Materials (ASTM) D1452/D1452M-16, Standard Practice for Soil Exploration and Sampling by Auger Borings
- ASTM D1586/ D1586M-18. Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils.
- ASTM D1587/D1587M-15. Standard Practice for Thin-Walled Tube Sampling of Fine-Grained Soils for Geotechnical Purposes.
- ASTM D2113-14. Standard Practice for Rock Core Drilling and Sampling of Rock for Site Exploration.
- ASTM D2487-17. Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
- ASTM D2488-17. Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).
- ASTM D4750-87(2001). Standard Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitoring Well (Observation Well).
- ASTM D5092/D5092M-16. Standard Practice for Design and Installation of Groundwater Monitoring Wells.
- ASTM D5299/D5299M-18. Standard Guide for Decommissioning of Groundwater Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities.
- ASTM D5782-95. Standard Guide for Use of Direct Air-Rotary Drilling for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices.
- ASTM D5783-18. Standard Guide for Use of Direct Rotary Drilling with Water-Based Drilling Fluid for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices.
- ASTM D6001-05(2012). Standard Guide for Direct-Push Groundwater Sampling for Environmental Site Characterization.
- ASTM D6282/D6282M-14. Standard Guide for Direct Push Soil Sampling for Environmental Site Characterizations.
- ASTM D6907-05(2016). Standard Practice for Sampling Soils and Contaminated Media with Hand-Operated Bucket Augers.
- ASTM D6914/D6914M-16. Standard Practice for Sonic Drilling for Site Characterization and the Installation of Subsurface Monitoring Devices.
- ASTM D7663-12(2018). Standard Practice for Active Soil Gas Sampling in the Vadose Zone for Vapor Intrusion Evaluations.
- New York State Department of Environmental Conservation (NYSDEC), 2008. NYSDEC Modifications to EPA Region 9 TO-15 QA/QC Criteria. February 2008.
- NYSDEC, 2009. CP-43 Groundwater Monitoring Well Decommissioning Policy. November 3, 2009.
- NYSDEC, 2010. DER-10 Technical Guidance for Site Investigation and Remediation. May 3, 2010.
- New York State Department of Health (NYSDOH), 2006. Guidance for Evaluating Soil Vapor Intrusion in the State of New York. Final. October 2006.
- United States Environmental Protection Agency (USEPA), 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final. USEPA Office of Emergency and Remedial Response. EPA/540/G-89/004. October.
- USEPA, 1998. Region II Sampling SOP - Ground Water Sampling Procedure Low Stress (Low Flow) Purging and Sampling. March 16, 1998.

USEPA, 2002. Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers.
OSWER. Douglas Yeskis and Bernard Zavala. EPA 542-S-02-001. May 2002.

Appendix A – NYSDEC PFAS Sampling and Analysis Guidance



NEW YORK
STATE OF
OPPORTUNITY.

**Department of
Environmental
Conservation**

GUIDELINES FOR SAMPLING AND ANALYSIS OF PFAS

Under NYSDEC's Part 375 Remedial Programs

January 2020



Contents

Objective	1
Applicability	1
Field Sampling Procedures	1
Data Assessment and Application to Site Cleanup	2
Testing for Imported Soil	2
Analysis and Reporting	2
Appendix A: Quality Assurance Project Plan (QAPP) Guidelines for PFAS	4
Appendix B: Sampling Protocols for PFAS in Soils, Sediments and Solids	5
Appendix C: Sampling Protocols for PFAS in Monitoring Wells	7
Appendix D: Sampling Protocols for PFAS in Surface Water	9
Appendix E: Sampling Protocols for PFAS in Private Water Supply Wells	11
Appendix F: General Fish Handling Procedures for Contaminant Analysis.....	13
Appendix G: PFAS Analyte List	21
Appendix H: Laboratory Guidelines for Analysis of PFAS in Non-Potable Water and Solids	22
Appendix I: Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids	24

ERRATA SHEET for

Guidelines for Sampling and Analysis of PFAS Under NYSDEC's Part 375 Program

Issued January 17, 2020

Citation and Page Number	Current Text	Corrected Text	Date

Guidelines for Sampling and Analysis of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs

Objective

New York State Department of Environmental Conservation's Division of Environmental Remediation (DER) performs or oversees sampling of environmental media and subsequent analysis of PFAS as part of remedial programs implemented under 6 NYCRR Part 375. To ensure consistency in sampling, analysis and reporting of PFAS, DER has developed this document to summarize procedures and update previous DER technical guidance pertaining to PFAS.

Applicability

Sampling for PFAS has already been initiated at numerous sites under DER-approved work plans, in accordance with specified procedures. All future work plans should include PFAS sampling and analysis procedures that conform to the guidelines provided herein.

As part of a site investigation or remedial action compliance program, whenever samples of potentially affected media are collected and analyzed for the standard Target Analyte List/Target Compound List (TAL/TCL), PFAS analysis should also be performed. Potentially affected media can include soil, groundwater, surface water, and sediment. Based upon the potential for biota to be affected, biota sampling and analysis for PFAS may also be warranted as determined pursuant to a Fish and Wildlife Impact Analysis. Soil vapor sampling for PFAS is not required.

Field Sampling Procedures

DER-10 specifies technical guidance applicable to DER's remedial programs. Given the prevalence and use of PFAS, DER has developed "best management practices" specific to sampling for PFAS. As specified in DER-10 Chapter 2, quality assurance procedures are to be submitted with investigation work plans. Typically, these procedures are incorporated into a work plan, or submitted as a stand-alone document (e.g., a Quality Assurance Project Plan). Quality assurance guidelines for PFAS are listed in Appendix A - Quality Assurance Project Plan (QAPP) Guidelines for PFAS.

Field sampling for PFAS performed under DER remedial programs should follow the appropriate procedures outlined for soils, sediments or other solids (Appendix B), non-potable groundwater (Appendix C), surface water (Appendix D), public or private water supply wells (Appendix E), and fish tissue (Appendix F).

QA/QC samples (e.g. duplicates, MS/MSD) should be collected as specified in DER-10, Section 2.3(c). For sampling equipment coming in contact with aqueous samples only, rinsate or equipment blanks should be collected. Equipment blanks should be collected at a minimum frequency of one per day or one per twenty samples, whichever is more frequent.

Data Assessment and Application to Site Cleanup

Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFAS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10.

Water Sample Results

PFAS should be further assessed and considered as a potential contaminant of concern in groundwater or surface water if PFOA or PFOS is detected in any water sample at or above 10 ng/L (ppt). In addition, further assessment of water may be warranted if either of the following screening levels are met:

- a. any other individual PFAS (not PFOA or PFOS) is detected in water at or above 100 ng/L; or
- b. total concentration of PFAS (including PFOA and PFOS) is detected in water at or above 500 ng/L

If PFAS are identified as a contaminant of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.

Soil Sample Results

The extent of soil contamination for purposes of delineation and remedy selection should be determined by having certain soil samples tested by Synthetic Precipitation Leaching Procedure (SPLP) and the leachate analyzed for PFAS. Soil exhibiting SPLP results above 70 ppt for either PFOA or PFOS (individually or combined) are to be evaluated during the cleanup phase.

Sites in the site management phase should evaluate for PFAS to determine if modification to any components of the SMP is necessary (e.g., monitoring for PFAS, upgrading treatment facilities, or performing an RSO).

Testing for Imported Soil

Soil imported to a site for use in a soil cap, soil cover, or as backfill is to be tested for PFAS in general conformance with DER-10, Section 5.4(e) for the *PFAS Analyte List* (Appendix F) using the analytical procedures discussed below and the criteria in DER-10 associated with SVOCs.

If PFOA or PFOS is detected in any sample at or above 1 µg/kg, then soil should be tested by SPLP and the leachate analyzed for PFAS. If the SPLP results exceed 10 ppt for either PFOA or PFOS (individually) then the source of backfill should be rejected, unless a site-specific exemption is provided by DER. SPLP leachate criteria is based on the Maximum Contaminant Levels proposed for drinking water by New York State's Department of Health, this value may be updated based on future Federal or State promulgated regulatory standards. Remedial parties have the option of analyzing samples concurrently for both PFAS in soil and in the SPLP leachate to minimize project delays. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.

Analysis and Reporting

As of January 2020, the United States Environmental Protection Agency (EPA) does not have a validated method for analysis of PFAS for media commonly analyzed under DER remedial programs (non-potable waters, solids). DER has developed the following guidelines to ensure consistency in analysis and reporting of PFAS.

The investigation work plan should describe analysis and reporting procedures, including laboratory analytical procedures for the methods discussed below. As specified in DER-10 Section 2.2, laboratories should provide a full Category B deliverable. In addition, a Data Usability Summary Report (DUSR) should be prepared by an independent, third party data validator. Electronic data submissions should meet the requirements provided at: <https://www.dec.ny.gov/chemical/62440.html>.

DER has developed a *PFAS Analyte List* (Appendix F) for remedial programs to understand the nature of contamination at sites. It is expected that reported results for PFAS will include, at a minimum, all the compounds listed. If lab and/or matrix specific issues are encountered for any analytes, the DER project manager, in consultation with the DER chemist, will make case-by-case decisions as to whether certain analytes may be temporarily or permanently discontinued from analysis at each site. As with other contaminants that are analyzed for at a site, the *PFAS Analyte List* may be refined for future sampling events based on investigative findings.

Routine Analysis

Currently, New York State Department of Health's Environmental Laboratory Approval Program (ELAP) does not offer certification for PFAS in matrices other than finished drinking water. However, laboratories analyzing environmental samples for PFAS (e.g., soil, sediments, and groundwater) under DER's Part 375 remedial programs need to hold ELAP certification for PFOA and PFOS in drinking water by EPA Method 537.1 or ISO 25101. Laboratories should adhere to the guidelines and criteria set forth in the DER's laboratory guidelines for PFAS in non-potable water and solids (Appendix H - Laboratory Guidelines for Analysis of PFAS in Non-Potable Water and Solids). Data review guidelines were developed by DER to ensure data comparability and usability (Appendix H - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids).

LC-MS/MS analysis for PFAS using methodologies based on EPA Method 537.1 is the procedure to use for environmental samples. Isotope dilution techniques should be utilized for the analysis of PFAS in all media. Reporting limits for PFOA and PFOS in aqueous samples should not exceed 2 ng/L. Reporting limits for PFOA and PFOS in solid samples should not exceed 0.5 µg/kg. Reporting limits for all other PFAS in aqueous and solid media should be as close to these limits as possible. If laboratories indicate that they are not able to achieve these reporting limits for the entire *PFAS Analyte List*, site-specific decisions regarding acceptance of elevated reporting limits for specific PFAS can be made by the DER project manager in consultation with the DER chemist.

Additional Analysis

Additional laboratory methods for analysis of PFAS may be warranted at a site, such as the Synthetic Precipitation Leaching Procedure (SPLP) and Total Oxidizable Precursor Assay (TOP Assay). Commercially methods are also available for biota and air samples.

SPLP is a technique used to determine the mobility of chemicals in liquids, soils and wastes, and may be useful in determining the need for addressing PFAS-containing material as part of the remedy. SPLP by EPA Method 1312 should be used unless otherwise specified by the DER project manager in consultation with the DER chemist.

Impacted materials can be made up of PFAS that are not analyzable by routine analytical methodology. A TOP Assay can be utilized to conceptualize the amount and type of oxidizable PFAS which could be liberated in the environment, which approximates the maximum concentration of perfluoroalkyl substances that could be generated if all polyfluoroalkyl substances were oxidized. For example, some polyfluoroalkyl substances may degrade or transform to form perfluoroalkyl substances (such as PFOA or PFOS), resulting in an increase in perfluoroalkyl substance concentrations as contaminated groundwater moves away from a source. The TOP Assay converts, through oxidation, polyfluoroalkyl substances (precursors) into perfluoroalkyl substances that can be detected by routine analytical methodology.

Please note that TOP Assay analysis of highly-contaminated samples, such as those from an AFFF (aqueous film-forming foam) site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances.

Commercial laboratories have adopted methods which allow for the quantification of targeted PFAS in air and biota. The EPA's Office of Research and Development (ORD) is currently developing methods which allow for air emissions characterization of PFAS, including both targeted and non-targeted analysis of PFAS. Consult with the DER project manager and the DER chemist for assistance on analyzing biota/tissue and air samples.

Appendix A - Quality Assurance Project Plan (QAPP) Guidelines for PFAS

The following guidelines (general and PFAS-specific) can be used to assist with the development of a QAPP for projects within DER involving sampling and analysis of PFAS.

General Guidelines in Accordance with DER-10

- Document/work plan section title – Quality Assurance Project Plan
- Summarize project scope, goals, and objectives
- Provide project organization including names and resumes of the project manager, Quality Assurance Officer (QAO), field staff, and Data Validator
 - The QAO should not have another position on the project, such as project or task manager, that involves project productivity or profitability as a job performance criterion
- List the ELAP-approved lab(s) to be used for analysis of samples
- Include a site map showing sample locations
- Provide detailed sampling procedures for each matrix
- Include Data Quality Usability Objectives
- List equipment decontamination procedures
- Include an “Analytical Methods/Quality Assurance Summary Table” specifying:
 - Matrix type
 - Number or frequency of samples to be collected per matrix
 - Number of field and trip blanks per matrix
 - Analytical parameters to be measured per matrix
 - Analytical methods to be used per matrix with minimum reporting limits
 - Number and type of matrix spike and matrix spike duplicate samples to be collected
 - Number and type of duplicate samples to be collected
 - Sample preservation to be used per analytical method and sample matrix
 - Sample container volume and type to be used per analytical method and sample matrix
 - Sample holding time to be used per analytical method and sample matrix
- Specify Category B laboratory data deliverables and preparation of a DUSR

Specific Guidelines for PFAS

- Include in the text that sampling for PFAS will take place
- Include in the text that PFAS will be analyzed by LC-MS/MS for PFAS using methodologies based on EPA Method 537.1
- Include the list of PFAS compounds to be analyzed (*PFAS Analyte List*)
- Include the laboratory SOP for PFAS analysis
- List the minimum method-achievable Reporting Limits for PFAS
 - Reporting Limits should be less than or equal to:
 - Aqueous – 2 ng/L (ppt)
 - Solids – 0.5 µg/kg (ppb)
- Include the laboratory Method Detection Limits for the PFAS compounds to be analyzed
- Laboratory should have ELAP certification for PFOA and PFOS in drinking water by EPA Method 537.1, EPA Method 533, or ISO 25101
- Include detailed sampling procedures
 - Precautions to be taken
 - Pump and equipment types
 - Decontamination procedures
 - Approved materials only to be used
- Specify that regular ice only will be used for sample shipment
- Specify that equipment blanks should be collected at a minimum frequency of 1 per day per matrix

Appendix B - Sampling Protocols for PFAS in Soils, Sediments and Solids

General

The objective of this protocol is to give general guidelines for the collection of soil, sediment and other solid samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Containers

Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in to contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel spoon
- stainless steel bowl
- steel hand auger or shovel without any coatings

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification. Previous results of “non-detect” for PFAS from the UCMR3 water supply testing program are acceptable as verification.

Sampling Techniques

Sampling is often conducted in areas where a vegetative turf has been established. In these cases, a pre-cleaned trowel or shovel should be used to carefully remove the turf so that it may be replaced at the conclusion of sampling. Surface soil samples (e.g. 0 to 6 inches below surface) should then be collected using a pre-cleaned, stainless steel spoon. Shallow subsurface soil samples (e.g. 6 to ~36 inches below surface) may be collected by digging a hole using a pre-cleaned hand auger or shovel. When the desired subsurface depth is reached, a pre-cleaned hand auger or spoon shall be used to obtain the sample.

When the sample is obtained, it should be deposited into a stainless steel bowl for mixing prior to filling the sample containers. The soil should be placed directly into the bowl and mixed thoroughly by rolling the material into the middle until the material is homogenized. At this point the material within the bowl can be placed into the laboratory provided container.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at $4 \pm 2^{\circ}$ Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A soil log or sample log shall document the location of the sample/borehole, depth of the sample, sampling equipment, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix C - Sampling Protocols for PFAS in Monitoring Wells

General

The objective of this protocol is to give general guidelines for the collection of groundwater samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including plumbers tape and sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel inertia pump with HDPE tubing
- peristaltic pump equipped with HDPE tubing and silicone tubing
- stainless steel bailer with stainless steel ball
- bladder pump (identified as PFAS-free) with HDPE tubing

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Monitoring wells should be purged in accordance with the sampling procedure (standard/volume purge or low flow purge) identified in the site work plan, which will determine the appropriate time to collect the sample. If sampling using standard purge techniques, additional purging may be needed to reduce turbidity levels, so samples contain a limited amount of sediment within the sample containers. Sample containers that contain sediment may cause issues at the laboratory, which may result in elevated reporting limits and other issues during the sample preparation that can compromise data usability. Sampling personnel should don new nitrile gloves prior to sample collection due to the potential to contact PFAS containing items (not related to the sampling equipment) during the purging activities.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at $4 \pm 2^\circ$ Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank every day that sampling is conducted and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Additional equipment blank samples may be collected to assess other equipment that is utilized at the monitoring well
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A purge log shall document the location of the sample, sampling equipment, groundwater parameters, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix D - Sampling Protocols for PFAS in Surface Water

General

The objective of this protocol is to give general guidelines for the collection of surface water samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel cup

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Where conditions permit, (e.g. creek or pond) sampling devices (e.g. stainless steel cup) should be rinsed with site medium to be sampled prior to collection of the sample. At this point the sample can be collected and poured into the sample container.

If site conditions permit, samples can be collected directly into the laboratory container.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at $4 \pm 2^{\circ}$ Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank every day that sampling is conducted and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A sample log shall document the location of the sample, sampling equipment, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix E - Sampling Protocols for PFAS in Private Water Supply Wells

General

The objective of this protocol is to give general guidelines for the collection of water samples from private water supply wells (with a functioning pump) for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Drinking water samples collected using this protocol are intended to be analyzed for PFAS by ISO Method 25101. The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials (e.g. plumbers tape), including sample bottle cap liners with a PTFE layer.

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Locate and assess the pressure tank and determine if any filter units are present within the building. Establish the sample location as close to the well pump as possible, which is typically the spigot at the pressure tank. Ensure sampling equipment is kept clean during sampling as access to the pressure tank spigot, which is likely located close to the ground, may be obstructed and may hinder sample collection.

Prior to sampling, a faucet downstream of the pressure tank (e.g., wash room sink) should be run until the well pump comes on and a decrease in water temperature is noted which indicates that the water is coming from the well. If the homeowner is amenable, staff should run the water longer to purge the well (15+ minutes) to provide a sample representative of the water in the formation rather than standing water in the well and piping system including the pressure tank. At this point a new pair of nitrile gloves should be donned and the sample can be collected from the sample point at the pressure tank.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at $4 \pm 2^{\circ}$ Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- If equipment was used, collect one equipment blank every day that sampling is conducted and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A sample log shall document the location of the private well, sample point location, owner contact information, sampling equipment, purge duration, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate and available (e.g. well construction, pump type and location, yield, installation date). Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appendix F - Sampling Protocols for PFAS in Fish

This appendix contains a copy of the latest guidelines developed by the Division of Fish and Wildlife (DFW) entitled “General Fish Handling Procedures for Contaminant Analysis” (Ver. 8).

Procedure Name: General Fish Handling Procedures for Contaminant Analysis

Number: FW-005

Purpose: This procedure describes data collection, fish processing and delivery of fish collected for contaminant monitoring. It contains the chain of custody and collection record forms that should be used for the collections.

Organization: Environmental Monitoring Section
Bureau of Ecosystem Health
Division of Fish and Wildlife (DFW)
New York State Department of Environmental Conservation (NYSDEC)
625 Broadway
Albany, New York 12233-4756

Version: 8

Previous Version Date: 21 March 2018

Summary of Changes to this Version: Updated bureau name to Bureau of Ecosystem Health. Added direction to list the names of all field crew on the collection record. Minor formatting changes on chain of custody and collection records.

Originator or Revised by: Wayne Richter, Jesse Becker

Date: 26 April 2019

Quality Assurance Officer and Approval Date: Jesse Becker, 26 April 2019

**NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION**

GENERAL FISH HANDLING PROCEDURES FOR CONTAMINANT ANALYSES

- A. Original copies of all continuity of evidence (i.e., Chain of Custody) and collection record forms must accompany delivery of fish to the lab. A copy shall be directed to the Project Leader or as appropriate, Wayne Richter. All necessary forms will be supplied by the Bureau of Ecosystem Health. Because some samples may be used in legal cases, it is critical that each section is filled out completely. Each Chain of Custody form has three main sections:
1. The top box is to be filled out **and signed** by the person responsible for the fish collection (e.g., crew leader, field biologist, researcher). This person is responsible for delivery of the samples to DEC facilities or personnel (e.g., regional office or biologist).
 2. The second section is to be filled out **and signed** by the person responsible for the collections while being stored at DEC, before delivery to the analytical lab. This may be the same person as in (1), but it is still required that they complete the section. Also important is the **range of identification numbers** (i.e., tag numbers) included in the sample batch.
 3. Finally, the bottom box is to record any transfers between DEC personnel and facilities. Each subsequent transfer should be **identified, signed, and dated**, until laboratory personnel take possession of the fish.
- B. The following data are required on each **Fish Collection Record** form:
1. Project and Site Name.
 2. DEC Region.
 3. All personnel (and affiliation) involved in the collection.
 4. Method of collection (gill net, hook and line, etc.)
 5. Preservation Method.
- C. The following data are to be taken on each fish collected and recorded on the **Fish Collection Record** form:
1. Tag number - Each specimen is to be individually jaw tagged at time of collection with a unique number. Make sure the tag is turned out so that the number can be read without opening the bag. Use tags in sequential order. For small fish or composite samples place the tag inside the bag with the samples. The Bureau of Ecosystem Health can supply the tags.
 2. Species identification (please be explicit enough to enable assigning genus and species). Group fish by species when processing.
 3. Date collected.
 4. Sample location (waterway and nearest prominent identifiable landmark).
 5. Total length (nearest mm or smallest sub-unit on measuring instrument) and weight (nearest g or

smallest sub-unit of weight on weighing instrument). Take all measures as soon as possible with calibrated, protected instruments (e.g. from wind and upsets) and prior to freezing.

6. Sex - fish may be cut enough to allow sexing or other internal investigation, but do not eviscerate. Make any incision on the right side of the belly flap or exactly down the midline so that a left-side fillet can be removed.

D. General data collection recommendations:

1. It is helpful to use an ID or tag number that will be unique. It is best to use metal striped bass or other uniquely numbered metal tags. If uniquely numbered tags are unavailable, values based on the region, water body and year are likely to be unique: for example, R7CAY11001 for Region 7, Cayuga Lake, 2011, fish 1. If the fish are just numbered 1 through 20, we have to give them new numbers for our database, making it more difficult to trace your fish to their analytical results and creating an additional possibility for errors.
 2. Process and record fish of the same species sequentially. Recording mistakes are less likely when all fish from a species are processed together. Starting with the bigger fish species helps avoid missing an individual.
 3. If using Bureau of Ecosystem Health supplied tags or other numbered tags, use tags in sequence so that fish are recorded with sequential Tag Numbers. This makes data entry and login at the lab and use of the data in the future easier and reduces keypunch errors.
 4. Record length and weight as soon as possible after collection and before freezing. Other data are recorded in the field upon collection. An age determination of each fish is optional, but if done, it is recorded in the appropriate "Age" column.
 5. For composite samples of small fish, record the number of fish in the composite in the Remarks column. Record the length and weight of each individual in a composite. All fish in a composite sample should be of the same species and members of a composite should be visually matched for size.
 6. Please submit photocopies of topographic maps or good quality navigation charts indicating sampling locations. GPS coordinates can be entered in the Location column of the collection record form in addition to or instead for providing a map. These records are of immense help to us (and hopefully you) in providing documented location records which are not dependent on memory and/or the same collection crew. In addition, they may be helpful for contaminant source trackdown and remediation/control efforts of the Department.
 7. When recording data on fish measurements, it will help to ensure correct data recording for the data recorder to call back the numbers to the person making the measurements.
- E. Each fish is to be placed in its own individual plastic bag. For small fish to be analyzed as a composite, put all of the fish for one composite in the same bag but use a separate bag for each composite. It is important to individually bag the fish to avoid difficulties or cross contamination when processing the fish for chemical analysis. Be sure to include the fish's tag number inside the bag, preferably attached to the fish with the tag number turned out so it can be read. Tie or otherwise secure the bag closed. **The Bureau of Ecosystem Health will supply the bags.** If necessary, food grade bags may be procured from a suitable vendor (e.g., grocery store). It is preferable to redundantly label each bag with a manila tag tied between the knot and the body of the bag. This tag should be labeled with the project name, collection location, tag number, collection date, and fish species. If scales are collected, the scale envelope should be labeled with

the same information.

- F. Groups of fish, by species, are to be placed in one large plastic bag per sampling location. **The Bureau of Ecosystem Health will supply the larger bags.** Tie or otherwise secure the bag closed. Label the site bag with a manila tag tied between the knot and the body of the bag. The tag should contain: project, collection location, collection date, species and **tag number ranges**. Having this information on the manila tag enables lab staff to know what is in the bag without opening it.
- G. Do not eviscerate, fillet or otherwise dissect the fish unless specifically asked to. If evisceration or dissection is specified, the fish must be cut along the exact midline or on the right side so that the left side fillet can be removed intact at the laboratory. If filleting is specified, the procedure for taking a standard fillet (SOP PREPLAB 4) must be followed, including removing scales.
- H. Special procedures for PFAS: Unlike legacy contaminants such as PCBs, which are rarely found in day to day life, PFAS are widely used and frequently encountered. Practices that avoid sample contamination are therefore necessary. While no standard practices have been established for fish, procedures for water quality sampling can provide guidance. The following practices should be used for collections when fish are to be analyzed for PFAS:
 - No materials containing Teflon.
 - No Post-it notes.
 - No ice packs; only water ice or dry ice.
 - Any gloves worn must be powder free nitrile.
 - No Gore-Tex or similar materials (Gore-Tex is a PFC with PFOA used in its manufacture).
 - No stain repellent or waterproof treated clothing; these are likely to contain PFCs.
 - Avoid plastic materials, other than HDPE, including clipboards and waterproof notebooks.
 - Wash hands after handling any food containers or packages as these may contain PFCs.
 - Keep pre-wrapped food containers and wrappers isolated from fish handling.
 - Wear clothing washed at least six times since purchase.
 - Wear clothing washed without fabric softener.
 - Staff should avoid cosmetics, moisturizers, hand creams and similar products on the day of sampling as many of these products contain PFCs (Fujii et al. 2013). Sunscreen or insect repellent should not contain ingredients with “fluor” in their name. Apply any sunscreen or insect repellent well downwind from all materials. Hands must be washed after touching any of these products.
- I. All fish must be kept at a temperature <45° F (<8° C) immediately following data processing. As soon as possible, freeze at -20° C ± 5° C. Due to occasional freezer failures, daily freezer temperature logs are required. The freezer should be locked or otherwise secured to maintain chain of custody.
- J. In most cases, samples should be delivered to the Analytical Services Unit at the Hale Creek field station. Coordinate delivery with field station staff and send copies of the collection records, continuity of evidence forms and freezer temperature logs to the field station. For samples to be analyzed elsewhere, non-routine collections or other questions, contact Wayne Richter, Bureau of Ecosystem Health, NYSDEC, 625 Broadway, Albany, New York 12233-4756, 518-402-8974, or the project leader about sample transfer. Samples will then be directed to the analytical facility and personnel noted on specific project descriptions.
- K. A recommended equipment list is at the end of this document.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF FISH AND WILDLIFE
FISH COLLECTION RECORD

page _____ of _____

Project and Site Name _____ DEC Region _____

Collections made by (include all crew) _____

Sampling Method: ☐ Electrofishing ☐ Gill netting ☐ Trap netting ☐ Trawling ☐ Seining ☐ Angling ☐ Other _____

Preservation Method: ☐ Freezing ☐ Other _____ Notes (SWFDB survey number): _____

FOR LAB USE ONLY- LAB ENTRY NO.	COLLECTION OR TAG NO.	SPECIES	DATE TAKEN	LOCATION	AGE	SEX &/OR REPROD. CONDIT	LENGTH ()	WEIGHT ()	REMARKS

richter: revised 2011, 5/7/15, 10/4/16, 3/20/17; becker: 3/23/17, 4/26/19

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION CHAIN OF CUSTODY

I, _____, of _____ collected the
(Print Name) (Print Business Address)
 following on _____, 20____ from _____
(Date) (Water Body)
 in the vicinity of _____
(Landmark, Village, Road, etc.)
 Town of _____, in _____ County.
 Item(s) _____

Said sample(s) were in my possession and handled according to standard procedures provided to me prior to collection. The sample(s) were placed in the custody of a representative of the New York State Department of Environmental Conservation on _____, 20____.

Signature Date

I, _____, received the above mentioned sample(s) on the date specified and assigned identification number(s) _____ to the sample(s). I have recorded pertinent data for the sample(s) on the attached collection records. The sample(s) remained in my custody until subsequently transferred, prepared or shipped at times and on dates as attested to below.

Signature Date

SECOND RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
THIRD RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
FOURTH RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
RECEIVED IN LABORATORY BY (Print Name)	TIME & DATE	REMARKS
SIGNATURE	UNIT	
LOGGED IN BY (Print Name)	TIME & DATE	ACCESSION NUMBERS
SIGNATURE	UNIT	

NOTICE OF WARRANTY

By signature to the chain of custody (reverse), the signatory warrants that the information provided is truthful and accurate to the best of his/her ability. The signatory affirms that he/she is willing to testify to those facts provided and the circumstances surrounding the same. Nothing in this warranty or chain of custody negates responsibility nor liability of the signatories for the truthfulness and accuracy of the statements provided.

HANDLING INSTRUCTIONS

On day of collection, collector(s) name(s), address(es), date, geographic location of capture (attach a copy of topographic map or navigation chart), species, number kept of each species, and description of capture vicinity (proper noun, if possible) along with name of Town and County must be indicated on reverse.

Retain organisms in manila tagged plastic bags to avoid mixing capture locations. Note appropriate information on each bag tag.

Keep samples as cool as possible. Put on ice if fish cannot be frozen within 12 hours. If fish are held more than 24 hours without freezing, they will not be retained or analyzed.

Initial recipient (either DEC or designated agent) of samples from collector(s) is responsible for obtaining and recording information on the collection record forms which will accompany the chain of custody. This person will seal the container using packing tape and writing his signature, the time and the date across the tape onto the container with indelible marker. Any time a seal is broken, for whatever purpose, the incident must be recorded on the Chain of Custody (reason, time, and date) in the purpose of transfer block. Container then is resealed using new tape and rewriting signature, with time and date.

EQUIPMENT LIST

Scale or balance of appropriate capacity for the fish to be collected.

Fish measuring board.

Plastic bags of an appropriate size for the fish to be collected and for site bags.

Individually numbered metal tags for fish.

Manila tags to label bags.

Small envelopes, approximately 2" x 3.5", if fish scales are to be collected.

Knife for removing scales.

Chain of custody and fish collection forms.

Clipboard.

Pens or markers.

Paper towels.

Dish soap and brush.

Bucket.

Cooler.

Ice.

Duct tape.

Appendix G – PFAS Analyte List

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonates	Perfluorobutanesulfonic acid	PFBS	375-73-5
	Perfluorohexanesulfonic acid	PFHxS	355-46-4
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanesulfonic acid	PFOS	1763-23-1
	Perfluorodecanesulfonic acid	PFDS	335-77-3
Perfluoroalkyl carboxylates	Perfluorobutanoic acid	PFBA	375-22-4
	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	PFHpA	375-85-9
	Perfluorooctanoic acid	PFOA	335-67-1
	Perfluorononanoic acid	PFNA	375-95-1
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUA/PFUdA	2058-94-8
	Perfluorododecanoic acid	PFDaA	307-55-1
	Perfluorotridecanoic acid	PFTriA/PFTTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTA/PFTeDA	376-06-7
Fluorinated Telomer Sulfonates	6:2 Fluorotelomer sulfonate	6:2 FTS	27619-97-2
	8:2 Fluorotelomer sulfonate	8:2 FTS	39108-34-4
Perfluorooctane-sulfonamides	Perfluorooctanesulfonamide	FOSA	754-91-6
Perfluorooctane-sulfonamidoacetic acids	N-methyl perfluorooctanesulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethyl perfluorooctanesulfonamidoacetic acid	N-EtFOSAA	2991-50-6

Appendix H - Laboratory Guidelines for Analysis of PFAS in Non-Potable Water and Solids

General

New York State Department of Environmental Conservation's Division of Environmental Remediation (DER) developed the following guidelines for laboratories analyzing environmental samples for PFAS under DER programs. If laboratories cannot adhere to the following guidelines, they should contact DER's Quality Assurance Officer, Dana Maikels, at dana.maikels@dec.ny.gov prior to analysis of samples.

Isotope Dilution

Isotope dilution techniques should be utilized for the analysis of PFAS in all media.

Extraction

For water samples, the entire sample bottle should be extracted, and the sample bottle rinsed with appropriate solvent to remove any residual PFAS.

For samples with high particulates, the samples should be handled in one of the following ways:

1. Spike the entire sample bottle with isotope dilution analytes (IDAs) prior to any sample manipulation. The sample can be passed through the SPE and if it clogs, record the volume that passed through.
2. If the sample contains too much sediment to attempt passing it through the SPE cartridge, the sample should be spiked with isotope dilution analytes, centrifuged and decanted.
3. If higher reporting limits are acceptable for the project, the sample can be diluted by taking a representative aliquot of the sample. If isotope dilution analytes will be diluted out of the sample, they can be added after the dilution. The sample should be homogenized prior to taking an aliquot.

If alternate sample extraction procedures are used, please contact the DER remedial program chemist prior to employing. Any deviations in sample preparation procedures should be clearly noted in the case narrative.

Signal to Noise Ratio

For all target analyte ions used for quantification, signal to noise ratio should be 3:1 or greater.

Blanks

There should be no detections in the method blanks above the reporting limits.

Ion Transitions

The ion transitions listed below should be used for the following PFAS:

PFOA	413 > 369
PFOS	499 > 80
PFHxS	399 > 80
PFBS	299 > 80
6:2 FTS	427 > 407
8:2 FTS	527 > 507
N-EtFOSAA	584 > 419
N-MeFOSAA	570 > 419

Branched and Linear Isomers

Standards containing both branched and linear isomers should be used when standards are commercially available. Currently, quantitative standards are available for PFHxS, PFOS, NMeFOSAA, and NEtFOSAA. As more standards become available, they should be incorporated in to the method. All isomer peaks present in the standard should be integrated and the areas summed. Samples should be integrated in the same manner as the standards.

Since a quantitative standard does not exist for branched isomers of PFOA, the instrument should be calibrated using just the linear isomer and a technical (qualitative) PFOA standard should be used to identify the retention time of the branched PFOA isomers in the sample. The total response of PFOA branched and linear isomers should be integrated in the samples and quantitated using the calibration curve of the linear standard.

Secondary Ion Transition Monitoring

Quantifier and qualifier ions should be monitored for all target analytes (PFBA and PFPeA are exceptions). The ratio of quantifier ion response to qualifier ion response should be calculated for each target analyte and the ratio compared to standards. Lab derived criteria should be used to determine if the ratios are acceptable.

Reporting

Detections below the reporting limit should be reported and qualified with a J qualifier.

The acid form of PFAS analytes should be reported. If the salt form of the PFAS was used as a stock standard, the measured mass should be corrected to report the acid form of the analyte.

Appendix H - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids

General

These guidelines are intended to be used for the validation of PFAS analytical results for projects within the Division of Environmental Remediation (DER) as well as aid in the preparation of a data usability summary report. Data reviewers should understand the methodology and techniques utilized in the analysis. Consultation with the end user of the data may be necessary to assist in determining data usability based on the data quality objectives in the Quality Assurance Project Plan. A familiarity with the laboratory's Standard Operating Procedure may also be needed to fully evaluate the data. If you have any questions, please contact DER's Quality Assurance Officer, Dana Maikels, at dana.maikels@dec.ny.gov.

Preservation and Holding Time

Samples should be preserved with ice to a temperature of less than 6°C upon arrival at the lab. The holding time is 14 days to extraction for aqueous and solid samples. The time from extraction to analysis for aqueous samples is 28 days and 40 days for solids.

Temperature greatly exceeds 6°C upon arrival at the lab*	Use professional judgement to qualify detects and non-detects as estimated or rejected
Holding time exceeding 28 days to extraction	Use professional judgement to qualify detects and non-detects as estimated or rejected if holding time is grossly exceeded

*Samples that are delivered to the lab immediately after sampling may not meet the thermal preservation guidelines. Samples are considered acceptable if they arrive on ice or an attempt to chill the samples is observed.

Initial Calibration

The initial calibration should contain a minimum of five standards for linear fit and six standards for a quadratic fit. The relative standard deviation (RSD) for a quadratic fit calibration should be less than 20%. Linear fit calibration curves should have an R^2 value greater than 0.990.

The low-level calibration standard should be within 50% - 150% of the true value, and the mid-level calibration standard within 70% - 130% of the true value.

%RSD >20%	J flag detects and UJ non detects
$R^2 > 0.990$	J flag detects and UJ non detects
Low-level calibration check <50% or >150%	J flag detects and UJ non detects
Mid-level calibration check <70% or >130%	J flag detects and UJ non detects

Initial Calibration Verification

An initial calibration verification (ICV) standard should be from a second source (if available). The ICV should be at the same concentration as the mid-level standard of the calibration curve.

ICV recovery <70% or >130%	J flag detects and non-detects

Continuing Calibration Verification

Continuing calibration verification (CCV) checks should be analyzed at a frequency of one per ten field samples. If CCV recovery is very low, where detection of the analyte could be in question, ensure a low level CCV was analyzed and use to determine data quality.

CCV recovery <70 or >130%	J flag results

Blanks

There should be no detections in the method blanks above the reporting limits. Equipment blanks, field blanks, rinse blanks etc. should be evaluated in the same manner as method blanks. Use the most contaminated blank to evaluate the sample results.

Blank Result	Sample Result	Qualification
Any detection	<Reporting limit	Qualify as ND at reporting limit
Any detection	>Reporting Limit and >10x the blank result	No qualification
>Reporting limit	>Reporting limit and <10x blank result	J+ biased high

Field Duplicates

A blind field duplicate should be collected at rate of one per twenty samples. The relative percent difference (RPD) should be less than 30% for analyte concentrations greater than two times the reporting limit. Use the higher result for final reporting.

RPD >30%	Apply J qualifier to parent sample

Lab Control Spike

Lab control spikes should be analyzed with each extraction batch or one for every twenty samples. In the absence of lab derived criteria, use 70% - 130% recovery criteria to evaluate the data.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects

Matrix Spike/Matrix Spike Duplicate

One matrix spike and matrix spike duplicate should be collected at a rate of one per twenty samples. Use professional judgement to reject results based on out of control MS/MSD recoveries.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only
RPD >30%	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only

Extracted Internal Standards (Isotope Dilution Analytes)

Problematic analytes (e.g. PFBA, PFPeA, fluorotelomer sulfonates) can have wider recoveries without qualification. Qualify corresponding native compounds with a J flag if outside of the range.

Recovery <50% or >150%	Apply J qualifier
Recovery <25% or >150% for poor responding analytes	Apply J qualifier
Isotope Dilution Analyte (IDA) Recovery <10%	Reject results

Secondary Ion Transition Monitoring

Quantifier and qualifier ions should be monitored for all target analytes (PFBA and PFPeA are exceptions). The ratio of quantifier ion response to qualifier ion response should be calculated from the standards for each target analyte. Lab derived criteria should be used to determine if the ratios are acceptable. If the ratios fall outside of the laboratory criteria, qualify results as an estimated maximum concentration.

Signal to Noise Ratio

The signal to noise ratio for the quantifier ion should be at least 3:1. If the ratio is less than 3:1, the peak is discernable from the baseline noise and symmetrical, the result can be reported. If the peak appears to be baseline noise and/or the shape is irregular, qualify the result as tentatively identified.

Branched and Linear Isomers

Observed branched isomers in the sample that do not have a qualitative or quantitative standard should be noted and the analyte should be qualified as biased low in the final data review summary report. Note: The branched isomer peak should also be present in the secondary ion transition.

Reporting Limits

If project-specific reporting limits were not met, please indicate that in the report along with the reason (e.g. over dilution, dilution for non-target analytes, high sediment in aqueous samples).

Peak Integrations

Target analyte peaks should be integrated properly and consistently when compared to standards. Ensure branched isomer peaks are included for PFAS where standards are available. Inconsistencies should be brought to the attention of the laboratory or identified in the data review summary report.

Appendix B – Field Activity Forms

DAILY DRILLING RECORD



PROJECT TITLE: _____ DATE: _____

CLIENT: _____ CONTRACTOR: _____

FROM	TO	PRODUCTIVE HOURS	ACTIVITIES/COMMENTS
TOTAL PRODUCTIVE HOURS			LEVEL B / LEVEL C / LEVEL D (CIRCLE ONE SELECTION)

LABOR:		MATERIALS / SUPPLIES:	
UNITS		UNITS	

WEATHER: _____

_____ AECOM ONSITE COORDINATOR

_____ CONTRACTOR REPRESENTATIVE

TEST BORING LOG

PROJECT:										BORING NO:			
CLIENT:										SHEET: 1 of 1			
BORING CONTRACTOR:										JOB NO.:			
GROUNDWATER:										BORING LOCATION:			
					CAS.	SAMPLER	CORE	TUBE	GROUND ELEVATION:				
DATE	TIME	LEVEL	TYPE	TYPE		Macrocore			DATE STARTED:				
				DIA.		2"			DATE FINISHED:				
				WT.		--			DRILLER:				
				FALL		--			GEOLOGIST:				
* POCKET PENETROMETER READING										REVIEWED BY:			
DEPTH FEET	SAMPLE					DESCRIPTION					REMARKS		
	STRATA	NO.	TYPE	BLOWS PER 6"	REC% ROD%	COLOR	CONSIST HARD	MATERIAL DESCRIPTION	USCS	PID	Moist		
5													
10													
15													
20													
25													
30													
COMMENTS:									PROJECT NO.				
									BORING NO.				

TEST BORING LOG

										BORING NO:	
PROJECT:										SHEET: 1 of 1	
CLIENT:										JOB NO.:	
BORING CONTRACTOR:										BORING LOCATION:	
GROUNDWATER:						CAS.	SAMPLER	CORE	TUBE	GROUND ELEVATION:	
DATE	TIME	LEVEL	TYPE	TYPE						DATE STARTED:	
				DIA.						DATE FINISHED:	
				WT.						DRILLER:	
				FALL						GEOLOGIST:	
										* POCKET PENETROMETER READING	
										REVIEWED BY:	
DEPTH FEET	SAMPLE					DESCRIPTION				REMARKS	
	TIME	NO.	TYPE	BLOWS PER 6"	ROD%	COLOR	CONSISTENCY HARDNESS	MATERIAL DESCRIPTION			
5											
10											
15											
20											
25											
30											
COMMENTS:										PROJECT NO. BORING NO.	

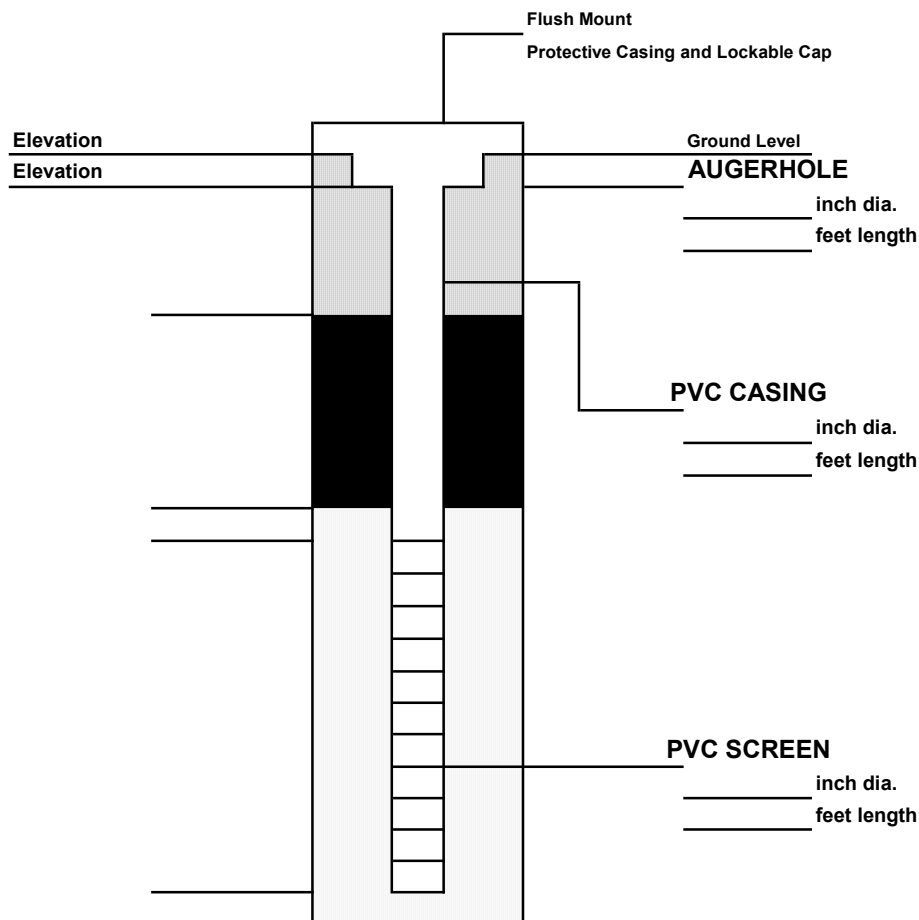
WELL ID:

DATE: _____

Date:

Description

DEPTH



WELL DESIGN

CASING MATERIAL

Surface: Steel grade box

Monitor: 4" PVC

SCREEN MATERIAL

Type: 4" PVC

Slot Size: .020"

FILTER MATERIAL

Type:	#2 Sand	Setting:

SEAL MATERIAL

Type: Bentonite **Setting:**

COMMENTS:

LEGEND

 Cement/Bentonite Grout
 Bentonite Seal
 Silica Sandpack

BEDROCK MONITORING WELL CONSTRUCTION DETAILS

PROJECT: _____ WELL ID: _____

CLIENT: _____ DATE: _____

DRILLING SUMMARY

Geologist: _____

Drilling Company: _____

Driller: _____

Rig Make/Model: _____

Date: _____

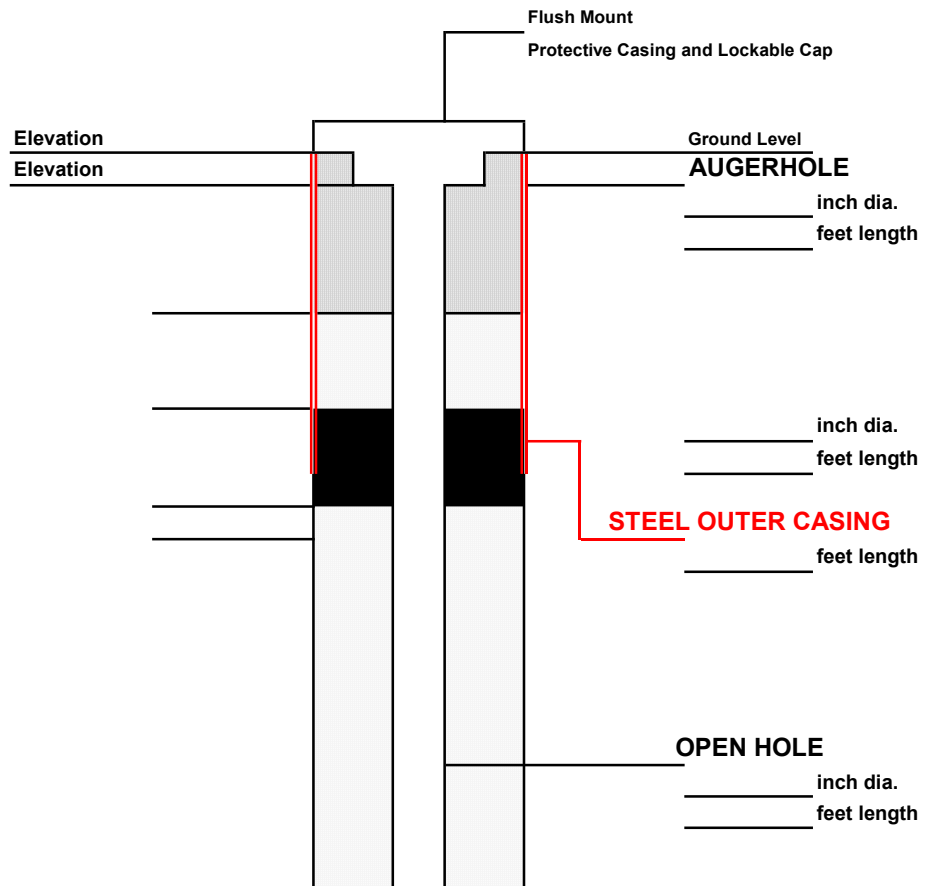
GEOLOGIC LOG

Depth(ft.)

Description

See boring log for lithologic description.

D
E
P
T
H



WELL DESIGN

CASING MATERIAL

SCREEN MATERIAL

FILTER MATERIAL

Surface: _____

Type: _____

Type: _____ Setting: _____

Monitor: _____

Slot Size: _____

SEAL MATERIAL

Type: _____ Setting: _____

COMMENTS: _____

LEGEND

- Cement/Bentonite Grout
- Bentonite Seal
- Silica Sandpack

WELL DEVELOPMENT LOG

PROJECT TITLE: _____ WELL NO.: _____

PROJECT NO.: _____

STAFF: _____

DATE(S): _____

			WELL ID.	VOL. (GAL/FT)
1. TOTAL CASING AND SCREEN LENGTH (FT.)	=	_____	1"	0.04
2. WATER LEVEL BELOW TOP OF CASING (FT.)	=	_____	2"	0.17
3. NUMBER OF FEET STANDING WATER (#1 - #2)	=	0.0	3"	0.38
4. VOLUME OF WATER/FOOT OF CASING (GAL.)	=	0.02	4"	0.66
5. VOLUME OF WATER IN CASING (GAL.)(#3 x #4)	=	0.0	5"	1.04
6. VOLUME OF WATER TO REMOVE (GAL.)(#5 x ____)	=	0	6"	1.50
7. VOLUME OF WATER ACTUALLY REMOVED (GAL.)	=	_____	0.75"	0.02
OR V=0.0408 x (CASING DIAMETER) ²				

PARAMETERS	ACCUMULATED VOLUME PURGED (GALLONS)										
pH											
SPEC. COND. (umhos)											
APPEARANCE											
TEMPERATURE (°C)											

COMMENTS:

LOW FLOW GROUNDWATER PURGING/SAMPLING LOG

PROJECT TITLE: _____		WELL ID: _____	
CLIENT: _____		SAMPLING PERSONNEL: _____	
DATE: _____			
Purging/ Sampling Device: _____	Tubing Type: _____	Pump/Tubing Inlet Location: _____	
Measuring Point: _____	Initial Depth to Water: _____	Depth to Well Bottom: _____	Well Diameter: _____
			Screen Length: _____
Casing Type: _____	PVC _____	Volume in 1 Well Casing (liters): _____	Estimated Purge Volume (liters): _____
Sample ID: _____	Sample Time: _____	QA/QC: _____	--
Sample Parameters: _____			

PURGE PARAMETERS

[illegible]

Remarks:

WELL DECOMMISSIONING RECORD

Site Name:	Well I.D.:
Site Location:	Driller:
Drilling Co.:	Inspector:
	Date:

DECOMMISSIONING DATA (Fill in all that apply)		WELL SCHEMATIC*	
<u>OVERDRILLING</u>		Depth (feet)	
Interval Drilled			
Drilling Method(s)			
Borehole Dia. (in.)			
Temporary Casing Installed? (y/n)			
Depth temporary casing installed			
Casing type/dia. (in.)			
Method of installing			
<u>CASING PULLING</u>			
Method employed			
Casing retrieved (feet)			
Casing type/dia. (in)			
<u>CASING PERFORATING</u>			
Equipment used			
Number of perforations/foot			
Size of perforations			
Interval perforated			
<u>GROUTING</u>			
Interval grouted (FBLS)			
# of batches prepared			
<u>For each batch record:</u>			
Quantity of water used (gal.)			
Quantity of cement used (lbs.)			
Cement type			
Quantity of bentonite used (lbs.)			
Quantity of calcium chloride used (lbs.)			
Volume of grout prepared (gal.)			
Volume of grout used (gal.)			
<u>COMMENTS:</u>		* Sketch in all relevant decommissioning data, including: interval overdrilled, interval grouted, casing left in hole, well stickup, etc.	

Drilling Contractor

Department Representative

SOIL VAPOR IMPLANT CONSTRUCTION DETAILS



PROJECT: _____

VAPOR IMPLANT ID: _____

CLIENT: _____

DATE: _____

DRILLING SUMMARY		Flush Mount _____ Protective Casing _____ Ground Level _____ Top of Seal _____ (ft bgs) Top of Sand _____ (ft. bgs) Top of Implant Screen _____ (ft bgs) _____ (ft bgs) Total Depth _____ DIRECT PUSH BOREHOLE _____ inch diameter _____ feet length IMPLANT _____ inch internal diameter _____ feet length NOT TO SCALE	
Geologist: _____			
Drilling Company: _____			
Driller: _____			
Rig Make/Model: _____			
Date: _____			
GEOLOGIC LOG			
Depth(ft.)	Description	DEPTH (FT)	
WELL DESIGN			
CASING MATERIAL		SCREEN MATERIAL	
Surface: _____		Type: _____	Type: _____
Riser: _____		Pore Diameter: _____	Type: _____
COMMENTS: _____		LEGEND Cement/Bentonite Grout Bentonite Seal Silica Sandpack	

SUMMA CANISTER SAMPLING FIELD SHEET

PROJECT: _____

DATE: _____

CLIENT: _____

Sample #					
Location					
Summa Canister ID					
Flow Controller ID					
Additional Tubing Added					
Purge Time (Start)					
Purge Time (Stop)					
Total Purge Time (min)					
Purge Volume (L)					
PID Test of Purge Air (ppm)					
Initial Tracer Gas Results (ppm)					
Pressure Gauge - before sampling					
Sample Time (Start)					
Sample Time (Stop)					
Total Sample Time (min)					
Pressure Gauge - after sampling					
Sample Volume (L)					
Canister Pressure Went To Ambient Pressure?					
Associated Ambient Air Sample Number					

General Comments:

Appendix D – Quality Assurance Project Plan (QAPP)

Quality Assurance Project Plan (QAPP)

Remedial Investigation
Genesee Valley Metal Finishing (Site No.
828228)
Work Assignment D009803.62

April 2026

Prepared for:

New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233

Prepared by:

AECOM USA, Inc.
40 British American Boulevard
Latham, New York 12110

Quality information

Prepared by	Reviewed by	Verified by	Approved by
			
Peter Fairbanks Senior Chemist	Edyta Chorostkowska Senior Scientist	Robert Montione Quality Assurance Officer	Mike Gutmann Project Manager

Table of Contents

1.0 INTRODUCTION.....	1-1
1.1 PURPOSE AND OBJECTIVE.....	1-1
1.2 PROJECT MANAGEMENT AND ORGANIZATION	1-1
1.2.1 Personnel	1-1
1.2.2 Specific Tasks and Services	1-2
1.3 SITE DESCRIPTION AND LOCATION	1-2
2.0 SITE INVESTIGATION.....	2-1
2.1 FIELD SAMPLING PROCEDURES.....	2-1
2.2 EQUIPMENT DECONTAMINATION	2-1
2.2.1 Decontamination Procedures	2-1
2.2.2 Small Equipment Decontamination	2-1
2.2.3 Heavy Equipment Decontamination.....	2-2
2.2.4 Personnel Decontamination	2-2
3.0 SAMPLE HANDLING.....	3-1
3.1 SAMPLE IDENTIFICATION AND LABELING	3-1
3.2 SAMPLE BOTTLES, PRESERVATION, AND HOLDING TIME.....	3-2
3.2.1 Sample Containers	3-2
3.2.2 Sample Preservation	3-2
3.2.3 Holding Times	3-2
3.2.4 Sample Custody.....	3-3
3.3 LABORATORY SAMPLE RECEIPT	3-4
3.3.1 Laboratory Sample Custody.....	3-4
3.3.2 Sample Storage, Security, and Disposal	3-4
4.0 DATA QUALITY REQUIREMENTS.....	4-1
4.1 ANALYTICAL METHODS	4-1
4.2 QUALITY ASSURANCE OBJECTIVES	4-1
4.2.1 Sensitivity	4-2
4.2.2 Precision.....	4-2
4.2.3 Accuracy.....	4-3
4.2.4 Representativeness	4-3
4.2.5 Comparability	4-4
4.2.6 Completeness	4-4
4.3 FIELD QUALITY ASSURANCE	4-4
4.3.1 Field Equipment (Rinsate) Blanks	4-5
4.3.2 Field Duplicate Samples	4-5
4.3.3 Split Samples	4-6
4.3.4 Trip Blanks	4-6
4.3.5 Temperature Blanks	4-6
4.4 FIELD TESTING QC.....	4-6
4.4.1 pH Meter.....	4-6
4.4.2 Specific Conductivity.....	4-6
4.4.3 Turbidity.....	4-7
4.4.4 Temperature.....	4-7
4.5 LABORATORY QUALITY ASSURANCE	4-7
4.5.1 Method Blanks	4-7
4.5.2 Laboratory Duplicates.....	4-7
4.5.3 Spiked Samples	4-7
4.5.4 Laboratory Control Sample.....	4-7
5.0 FIELD DATA DOCUMENTATION	5-1
6.0 EQUIPMENT CALIBRATION AND MAINTENANCE.....	6-1
6.1 STANDARD WATER AND AIR QUALITY FIELD EQUIPMENT	6-1
6.2 LABORATORY EQUIPMENT CALIBRATION	6-1
6.2.1 Analytical Support Areas	6-1
6.2.2 Calibration Procedure	6-2
6.2.3 Calibration Frequency.....	6-2

6.2.4	Calibration Reference Standards	6-2
6.2.5	Calibration Failure	6-2
6.2.6	Calibration Records	6-2
6.3	OPERATIONAL CALIBRATION	6-2
7.0	DATA REDUCTION, VALIDATION, AND REPORTING.....	7-1
7.1	LABORATORY DATA REPORTING AND REDUCTION	7-1
7.2	DATA VALIDATION	7-1
7.3	DATA USABILITY	7-2
7.4	FIELD DATA VERIFICATION	7-2
8.0	PERFORMANCE AND SYSTEM AUDITS	8-1
8.1	RESPONSIBILITY, AUTHORITY, AND TIMING.....	8-1
8.2	FIELD AUDITS.....	8-1
8.3	LABORATORY PERFORMANCE AND SYSTEM AUDITS	8-2
8.4	AUDIT PROCEDURES	8-2
8.5	AUDIT DOCUMENTATION.....	8-2
9.0	CORRECTIVE ACTIONS.....	9-1
9.1	RATIONALE.....	9-1
9.2	CORRECTIVE ACTION METHODS.....	9-1
9.2.1	Immediate Corrective Actions	9-1
9.2.2	Long-Term Corrective Actions.....	9-1
9.2.3	Corrective Action Steps	9-1
9.2.4	Audit-Based Non-Conformances	9-2
9.3	CORRECTIVE ACTION REPORT REVIEW AND FILING	9-2
10.0	QUALITY ASSURANCE REPORTS TO MANAGEMENT	10-1
11.0	REFERENCES	11-1

List of Tables

Table 1 Sample Bottle, Volume, Preservation, and Holding Time Summary

Table 2 Reporting Limits and QA/QC Sample Quantity Summary

Acronyms and Abbreviations

ASP	Analytical Services Protocol
°C	degrees Celsius
CLP	Contract Laboratory Program
COC	chain of custody
DUSR	Data Usability Summary Report
ELAP	Environmental Laboratory Approval Program
FAP	Field Activities Plan
FD	field duplicate
IDL	instrument detection limit
ITR	independent technical review
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
MD	matrix duplicate
MDL	method detection limit
mg/L	milligrams per liter
mg/kg	milligrams per kilograms
MS	matrix spike
MSB	matrix spike blank
MSD	matrix spike duplicate
NEIC	National Enforcement Investigations Center
ng/L	nanograms per liter
ng/g	nanograms per gram
NIST	National Institute of Standards and Technology
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PARCCS	precision, accuracy, representativeness, comparability, completeness, and sensitivity
PCB	polychlorinated biphenyl
PFAS	Per- and polyfluoroalkyl substances (PFAS)
PMWP	Project Management Work Plan
ppbv	parts per billion by volume
PQO	Project Quality Objective
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RIWP	Remedial Investigation Work Plan
RPD	relative percent difference
TCLP	toxicity characteristic leaching procedure
µg/kg	micrograms per kilograms
µg/L	micrograms per liter
µg/m ³	micrograms per cubic meter
USEPA	United States Environmental Protection Agency
VTSR	validated time of sample receipt

1.0 INTRODUCTION

1.1 PURPOSE AND OBJECTIVE

The purpose of this Quality Assurance Project Plan (QAPP) is to document planned investigative activities and establish the criteria for performing these activities at a predetermined quality for the work conducted by AECOM USA, Inc. (AECOM) under NYSDEC Standby Engineering Contract D009803.

Project work will be conducted in general accordance with the NYSDEC DER-10, Technical Guidance for Site Investigation and Remediation (NYSDEC, 2010a), DER's Spill Response Guidance Manual, as applicable, technical requirements in Contract D009803 between NYSDEC and AECOM (NYSDEC and AECOM, 2019), and United States Environmental Protection Agency (USEPA) Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (USEPA, 1988).

The QAPP is intended to be a companion document to the site-specific Work Plan prepared for each work assignment. This QAPP Addendum was prepared as an Appendix to the site-specific Work Plan for Work Assignment #62 to address site-specific conditions and project-specific requirements.

1.2 PROJECT MANAGEMENT AND ORGANIZATION

1.2.1 Personnel

The general responsibilities of key project personnel are listed below.

Program Manager – Michael L. Spera, PE will have responsibility for overall program management and coordination of AECOM personnel and subcontractors to complete the work.

Project Manager – Michael Gutmann will have responsibility for overall project management and coordination with NYSDEC, and will coordinate the initiation and implementation of the work assignment activities. The AECOM Project Manager will serve as the initial and primary contact with NYSDEC throughout the project, and will be responsible for successful implementation of the project's QA/QC activities. The AECOM Project Manager may delegate a portion of the tasks required for successful implementation of the project to a qualified individual, the Site Manager, who will be on site during field activities (i.e., investigations, remedial action, operation and maintenance activities, etc.). The Site Manager will work under the direction of the AECOM Project Manager, and will be responsible for implementing applicable QC procedures in the field and verifying that all other AECOM field personnel adhere to these procedures and perform all activities as described in the project work plans.

Task Leaders/Field Team Leaders – Edyta Chorostkowska will share the responsibility of implementing and coordinating the field and office project activities.

Program QA Officer – Robert Montione will serve as the Program Quality Assurance Officer (QAO) for work assignments issued under this contract. The QAO will be responsible for oversight of the data validation and laboratory subcontractors, as well as data usability reports. The QAO will work with the AECOM database manager to assure that electronic deliverables provided by the laboratory are accurate and are formatted and consistent with AECOM and NYSDEC requirements. The Program QAO may designate another qualified individual to serve as project QA officer to oversee the data-to-day quality assurance aspects of specific work assignments.

Project Chemist – Peter Fairbanks will be responsible for verifying that the analytical laboratories adhere to the QA/QC requirements specified in this QAPP. The AECOM Project Chemist will be the point of contact for the Laboratory's Project Manager and will personally communicate with the Laboratory's Project Manager to verify that all sample analyses are being performed such that the resulting data will be of sufficient quality for its intended purpose.

H & S Officer – Caroline Lee is responsible for oversight and preparation of the project health and safety plan, approving it, and tracking its implementation.

Database Manager – Max Reis, or an assigned qualified individual, will serve as database manager. The database manager is responsible for verifying that laboratory deliverables meet AECOM and NYSDEC electronic deliverable specifications, and for preparing the final EQUIS deliverable for submission to NYSDEC.

Resumes for AECOM personnel have previously been submitted to the Bureau of Program Management.

1.2.2 Specific Tasks and Services

AECOM has obtained the following subcontractor specialists for services relating to laboratory/analytical services and data validation services.

Laboratory Analysis – A laboratory will be assigned for the project, selected from laboratories subcontracted by NYSDEC based on the Call-out Subcontract. The laboratory, Pace Labs, is certified for aqueous and non-aqueous matrices. The laboratory will also be certified for air sample analysis.

All laboratories to be used for the work assignment shall hold applicable New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certifications for the analyses to be performed. Copies of the applicable ELAP certifications for each laboratory to be used during the work assignment are held at the NYSDEC. Each laboratory maintains its own QA/QC program and employs the required staff to implement this program. The QA Officer for each laboratory is responsible for verifying that all sample analyses are performed in accordance the analytical methods, laboratory QA/QC procedures, and this QAPP.

Data Validation – An AECOM data validator will be assigned for data quality review and Data Usability Summary Report (DUSR) preparation as needed for this project. Data validation is performed to establish the data quality for all data which are to be considered when making project decisions.

Field surveying and mapping – Mike Rozeski, L.S., a certified New York State land surveyor, will complete the field surveying.

Geophysical/utility locating will be provided by Ravi Engineering & Land Surveying, P.C. (MBE).

Drilling and monitoring well installation will be provided by LaBella Associates.

Investigation derived waste (IDW) disposal will be provided by Miller Environmental Group Inc.

1.3 SITE DESCRIPTION AND LOCATION

Background data on the site, including the site description and location, site history, previous investigations, and current conditions, are summarized in the site-specific Remedial Investigation Work Plan (RIWP) or Field Activities Plan (FAP). A site map showing proposed sampling locations is included in the site-specific RIWP.

2.0 SITE INVESTIGATION

Site investigation procedures are provided below.

2.1 FIELD SAMPLING PROCEDURES

Field activities are detailed in the RIWP or FAP and are not repeated in this QAPP. Per- and polyfluoroalkyl substances (PFAS) sampling will follow the NYSDEC Part 375 guidance (April 2023) included in the FAP. Proposed sampling procedures to be utilized will be identified in the site-specific FAP.

2.2 EQUIPMENT DECONTAMINATION

To avoid cross contamination, sampling equipment (defined as any piece of equipment which may contact a sample) will be decontaminated according to the procedures specified in the RIWP or FAP.

The procedures discussed here are general and will be superseded by project-specific requirements (as documented in the RIWP or FAP). However, these procedures are provided for guidance in developing those plans.

Field equipment rinsate blanks (see Section 4.3.1) are generated and analyzed to monitor the effectiveness of field decontamination procedures.

Cross contamination is minimized by the use of vendor-decontaminated, dedicated, or disposable equipment to the extent practicable.

2.2.1 Decontamination Procedures

As indicated in the RIWP or FAP, a decontamination pad may be constructed on the site. The pad will be appropriately sized and large enough to handle the equipment used on site (e.g., drill rig). The pad will also be used for small equipment decontamination as well as personnel decontamination.

2.2.2 Small Equipment Decontamination

Small equipment decontamination for non-disposable equipment such as Geoprobe Hydropunch samplers, transducer probes and cables, etc., will be accomplished using the following procedures:

- Alconox (or equivalent) and potable water wash;
- Potable water rinse; and
- Distilled/deionized water rinse.

Solvents will not be used in the field decontamination of such equipment. Decontamination will include scrubbing/washing with a laboratory grade detergent (e.g., Alconox) to remove visible contamination, followed by potable (tap) water and analyte-free water rinses. Tap water may be used from any treated municipal water system; the use of an untreated potable water supply is not an acceptable substitute. For PFAS sampling, all sources of water used for equipment decontamination will be verified in advance to be PFAS-free through laboratory analysis or certification.

Equipment should be allowed to dry prior to use. Steam cleaning or high-pressure hot water cleaning may be used in the initial removal of gross, visible contamination.

Electric submersible pumps (such as a Grundfos Redi-Flow II) will be decontaminated using the above steps followed by running a large volume (several gallons) of potable water through the pump, followed by an analyte-free water rinse. Tubing will not be re-used (new tubing will be used for each well). Submersible pumps and supporting lines and cables will be placed in a large clean plastic garbage can filled with potable water and then run for several minutes (to decontaminate both exterior and interior parts); submersible pumps will also be given a final analyte-free water rinse of both interior and exterior parts.

If bladder pumps are used, the pump will be disassembled and cleaned after each use. A new bladder will be used for each sample. Small parts, such as screens and gaskets will be replaced after each use. Dedicated air line tubing and sample tubing will be used at each monitoring well. The pump will be cleaned using the following steps:

- Alconox (or equivalent) and potable water wash;
- Potable water rinse;
- Distilled/deionized water rinse;
- Solvent (reagent or pesticide grade) rinse if samples are collected for organic analysis;
- Dilute (10%) nitric acid rinse if samples are collected for metals analysis; and
- Distilled/deionized rinse, air dry.

2.2.3 Heavy Equipment Decontamination

Drilling equipment will be decontaminated before the first use during this project, between boreholes and prior to demobilization using high-pressure steam. Decontamination will be conducted at a dedicated decontamination pad constructed for the project or at an alternate location as indicated in the RIWP or FAP. Decontamination fluids will be containerized (drummed) for subsequent characterization or disposal, unless other arrangements are made on a project-specific basis and as indicated in the RIWP.

2.2.4 Personnel Decontamination

Wash buckets and potable water will be set up at the decontamination pad or alternate location as indicated in the work plan, FAP, or Health and Safety Plan (HASP). This includes washing hands and a boot wash. Details of the personnel decontamination procedures will be provided in the HASP.

3.0 SAMPLE HANDLING

3.1 SAMPLE IDENTIFICATION AND LABELING

Samples will be assigned a unique identification using the sample location or other sample-specific identifier. Sample identification and labeling requirements are presented in FAP Section 10 and are not repeated here.

The procedures discussed here are general and will be superseded by project-specific requirements (as documented in the RIWP or FAP). However, these procedures are provided for guidance in developing those plans. Sample identification may be limited to a specific number of alphanumeric characters to be consistent with the limitations of the laboratory tracking/reporting software. The general sample identification format follows (other designations may be used to accommodate the requirements of specific projects). It should be noted that the field sample IDs shown below are not those required for the EQulS deliverable; AECOM will coordinate with the analytical laboratory so that the sample types and codes are entered properly for each field and QC sample, and that the codes are consistent with the most recent NYSDEC Valid Values.

MW = Monitoring Well

SB = Soil boring

SW = Surface Water

SD = Sediment

IA = Indoor Air

OA (or AA) = Outdoor (or ambient) air

SV = Soil Vapor

FB = Field (Equipment Rinsate) Blank

TB = Trip Blank

XX = Numerical sample identifier (up to five characters). This will ordinarily be the number of the monitoring well or soil boring location from which the sample was obtained.

As part of the unique identifier, the sample date will be included following any location that may have more than one sample collected. The format will be MMDDYY. For example, MW-01S that is sampled on May 24, 2011 will be MW-01S_052411.

QC field duplicate samples will be submitted blind to the laboratory; a fictitious sample ID will be created using the same system as the original by adding 50 to the original well ID (e.g., MW-51S_052411 would be a field duplicate of MW-01S_052411). The sample identifications (of the original sample and its field duplicate) will be marked in the field book and on the copy of the chain-of-custody kept by the sampler and copied to the project manager. As the field duplicates are blind to the laboratory, the NYSDEC Valid Value for a field duplicate (FD) along with the identification of the parent sample will be done by AECOM after the EQulS deliverable is received from the laboratory.

Affixed to each sampling container will be a non-removable label on which the following information will be recorded with permanent water-proof ink:

- Site name, location, and job number;
- Sample name;
- Date and time;
- Sampler's name;
- Preservative;

- Type of sample (e.g., water, soil, sludge, sediment, air); and
- Requested analyses.

3.2 SAMPLE BOTTLES, PRESERVATION, AND HOLDING TIME

Table 1 identifies the sample preparation and analytical method, matrix, holding time, containers, and preservatives for the typical analyses to be performed under this contract. Sample bottle requirements, preservation, and holding times are discussed further below.

3.2.1 Sample Containers

The selection of sample containers used to collect samples is based on the criteria of sample matrix, analytical method, potential contaminants of concern, reactivity of container material with the sample, QA/QC requirements and any regulatory protocol requirements.

Sample bottles will be provided by the analytical laboratory and will conform to the requirements of the USEPA Specifications and Guidance for Contaminant-Free Sample Containers. Aqueous samples for volatile organic compound (VOC) analysis will be collected in 40-mL vials with Teflon septa. Summa canisters for air samples will be batch certified by the laboratory.

3.2.2 Sample Preservation

Samples will be preserved as indicated below and summarized on **Table 1**.

Aqueous Samples:

Volatile organics – cooled to 4° C; HCl added to pH ≤ 2.

Metals – cooled to 4° C; HNO₃ added to pH ≤ 2.

Other organic fractions (semivolatiles, 1,4-dioxane, pesticides, PCBs, PFAS) – no chemical preservation.

Chemical preservatives will be added to the sample bottles (prior to sample collection) by the analytical laboratory. The pH of samples will be spot-checked in the field and additional preservative will be added as needed. Sample preservation is checked upon sample receipt by the laboratory; this information is reported to the AECOM Quality Assurance Officer (QAO). If it appears that the level of chemical preservation added is not adequate, laboratory preservative preparation and addition will be modified, or additional preservative will be added in the field by the sampling team.

Non-Aqueous (e.g., soil and sediment) Samples:

No chemical preservatives are added to non-aqueous samples

Air Samples (Summa Canisters):

No chemical preservatives are used for air samples.

3.2.3 Holding Times

Holding times (see **Table 1**) are calculated from the time of sample collection; samples will be shipped from the field to arrive at the lab no later than 48 hours from the time of sample collection except for instances with shorter holding time parameters. Holding time requirements will be those specified in the analytical methods.

Although trip blanks are prepared in the analytical laboratory and shipped to the site prior to the collection of environmental samples, for the purposes of determining holding time conformance, trip blanks will be considered to have been generated on the same day as the environmental samples with which they are shipped and delivered. Procurement of bottles and blanks will be scheduled to prevent trip blanks from being stored for excessive periods prior to their return to the laboratory; the goal is that trip blanks should be held for no longer than one week prior to use.

3.2.4 Sample Custody

Proper documentation of sample collection and the methods used to control these documents are referred to as chain-of-custody (COC) procedures. Chain-of-custody procedures are essential for presenting sample analytical results as evidence in litigation or at administrative hearings held by regulatory agencies. Chain-of-custody procedures also serve to minimize loss or misidentification of samples and to ensure that unauthorized persons do not tamper with collected samples.

The procedures used in this work assignment will follow the COC guidelines of National Enforcement Investigations Center (NEIC) Policies and Procedures, prepared by the NEIC of the USEPA Office of Enforcement.

3.2.4.1 Custody Definitions

Chain-of-Custody Officer - The employee responsible for oversight of all COC activities is the Project Manager (or his/her designee).

Under Custody - A sample is "Under Custody" if:

- It is in one's possession, or
- It is in one's view, after being in one's possession, or
- It was in one's possession and one placed it under lock, or
- It is in a designated secure area.

3.2.4.2 Responsibilities

The Project Manager will be responsible for monitoring all COC activities and for collecting legally admissible COC documentation for the permanent project file, and will perform the following tasks:

- Review sample labels or tags, closure tapes, and COC records.
- Train all field sampling personnel in the methodologies for carrying out COC activities and the proper use of all COC and record documents.
- Monitor the implementation of COC procedures.
- Submit copies of the completed COC records to the Project Chemist.

A COC form will trace the path of sample containers from the project site to the laboratory. Chain-of-custody forms are typically provided by the analytical laboratory.

Sample bottle tracking sheets or the chain-of-custody will be used to track the containers from the laboratory to the containers' destination. The Project Manager will notify the laboratory of upcoming field sampling events and the subsequent transfer of samples. This notification will include information concerning the number and type of samples, and the anticipated date of arrival. Insulated sample shipping containers (typically coolers) will be provided by the laboratory for shipping samples. Sample bottles within each shipping container will be individually labeled with an adhesive identification label provided by the laboratory. Project personnel receiving the sample containers from the laboratory will check each cooler for the condition and integrity of the bottles prior to field work.

Once the sample containers are filled, they will be immediately placed in the cooler with ice (in Ziploc plastic bags to prevent leaking) or synthetic ice packs to maintain the samples at 4° C. Synthetic (blue) ice packs shall not be used when sampling for PFAS. The field sampler will indicate the sample designation/location number in the space provided on the COC form for each sample. The COC forms will be signed and placed in a sealed plastic Ziploc bag in the cooler. The completed shipping container will be closed for transport with nylon strapping, or a similar shipping tape, and two paper seals will be affixed to the lid. The seals must be broken to open the cooler and will indicate tampering if the seals are broken before receipt at the laboratory. A label may be affixed identifying the cooler as containing "Environmental Samples" and the cooler will be shipped by an overnight delivery service to

the laboratory. When the laboratory receives the coolers, the custody seals will be checked and lab personnel will sign the COC form.

3.3 LABORATORY SAMPLE RECEIPT

Upon receipt at the laboratory, a laboratory representative inspects the samples for integrity and checks the shipment against the COC/analytical task order form. Discrepancies are addressed at this point and documented on the COC form and the cooler checklist (an example will be provided in each of the project-specific Field Sampling and Analysis Plans). Discrepancies are reported to the Laboratory Project Manager who contacts the AECOM Project Manager or QAO for resolution.

When the shipment and the COC are in agreement, the custodian enters the samples into the Laboratory Information Management System and assigns each sample a unique laboratory number. This number is affixed to each sample bottle. The custodian then enters the sample and analysis information into the laboratory computer system.

3.3.1 Laboratory Sample Custody

The laboratory must satisfy the sample chain-of-custody requirements by implementing the following procedures for laboratory/sample security:

- Samples are stored in a secure area
- Access to the laboratory is through a monitored area
- Visitors sign a visitor's log and are escorted while in the laboratory
- Only the designated sample custodians have keys to sample storage area(s)
- Transfers of samples in and out of storage are documented.

3.3.2 Sample Storage, Security, and Disposal

While in the laboratory, the samples and aliquots that require storage at $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$ are maintained in a locked refrigerator unless they are being used for analysis. The laboratory is responsible for sample storage and security so that:

- Samples and extracts are stored for 60 days after the final analytical data report has been submitted to AECOM. The samples, extracts, and digestates are then disposed by the laboratory in accordance with laboratory SOPs and applicable regulations.
- Samples are not stored with standards or sample extracts.

4.0 DATA QUALITY REQUIREMENTS

4.1 ANALYTICAL METHODS

Soil and water sample analyses for this contract will typically utilize USEPA SW-846 methods as listed below.

Analytical and extraction/sample preparation methods typically used are shown on **Table 1** and summarized below.

- Volatile Organics - SW-846 Method 8260D
- Semi volatile Organics – SW-846 Method 8270E
- Pesticides – SW-846 Method 8081B
- PCBs – SW 846 Method 8082A
- 1,4 Dioxane - SW-846 Method 8270E SIM
- PFAS – EPA 1633A
- Mercury – SW-846 Methods 7470A (water) and 7471B (soil)
- Other target analyte list metals – SW-846 Method 6010D.

Air samples (soil vapor, sub-slab vapor samples, indoor air samples, ambient air samples) will typically be collected in Summa® canisters and analyzed by USEPA method TO-15.

Solid waste characteristic samples will be extracted/prepared and analyzed by the methods shown on **Table 1** (i.e., Full TCLP, RCRA Characteristics, and PCBs).

NYSDEC Analytical Services Protocol (ASP) full Category B deliverables will be required unless specified otherwise in specific work assignments or work plans.

NYSDEC has yet to assign a laboratory to this project under their call-out subcontract. The to-be-determined (TBD) laboratory will be certified by the NYSDOH Environmental Laboratory Approved Program (see Section 1.2). The laboratory, Pace Labs, is in good standing for the applicable parameter groups.

4.2 QUALITY ASSURANCE OBJECTIVES

Data quality objectives (DQOs) for measurement data in terms of sensitivity and the PARCC parameters (precision, accuracy, representativeness, comparability, and completeness) are established so that the data collected are sufficient and of adequate quality for their intended uses. Data collected and analyzed in conformance with the DQO process described in this QAPP will be used in assessing the uncertainty associated with decisions related to this site.

Project quality objectives (PQOs), such as those described in the *Uniform Federal Policy for Quality Assurance Project Plans* (USEPA, 2005), define the type, quantity, and quality of data that are needed to answer specific environmental questions and support proper environmental decisions.

More specifically, the PQOs:

- Define the environmental problem;
- Identify target analytes/contaminants of concern and concentration levels;
- Establish the analytical techniques to be used (field-screening, on-site, and/or off-site);
- Establish the appropriate sampling techniques to be used;
- Establish project sampling/analytical measurement performance criteria (where applicable) for precision, accuracy/bias, representativeness, comparability, completeness, and sensitivity; and

- Determine the number of samples needed for each analytical group/matrix/concentration level.

PQOs are provided in the site-specific RIWP and in the project FAP.

4.2.1 Sensitivity

The sensitivity or detection limit desired for each analysis or compound is based on the DQOs established for the project. The method detection limit is determined in accordance with the procedure in ASP Exhibit A, Section 4.9.2.12, which is consistent with the procedure in 40 CFR Part 136 Appendix B.

The reporting limit (RL) for non-detected analytes will be the lowest calibration standard associated with the analysis. Reporting limits will be equal to or lower than those presented in the applicable methods. Analytes detected at concentrations below the RL but above the MDL will be flagged "J" (estimated) by the laboratory. Typical RLs are summarized on **Table 2**.

The RLs and MDLs of the assigned laboratory will be reviewed by AECOM's QAO for each project to verify that the laboratory sensitivity is sufficient to meet the project objectives. These will typically include meeting the applicable standards, criteria, and guidance (SCGs) including soil cleanup objectives (6 NYCRR 375-6.8), supplemental soil cleanup objectives (NYSDEC, 2010b), groundwater and surface water criteria (compiled in TOGS 1.1.1), and soil and water guidance for PFAS (NYSDEC 2023).

For VOCs in groundwater, a RL goal range of 0.5 to 1.0 µg/L has been established for the contaminants of concern, identified as those VOCs which were reported to have exceeded criteria in the scope of work; specifically, trichloroethene (TCE), tetrachloroethene (PCE), cis-1,2-dichloroethene, and vinyl chloride. The RL goal range for SVOCs in groundwater is 10 to 20 µg/L for most target compounds.

For soil, the RL goal is 5 µg/kg for most VOCs (before adjustment for reporting on a dry-weight basis) and 330 µg/kg for most SVOCs.

Reporting limit goals for soil vapor samples are below 1 µg/m³ for all compounds. Note, soil vapor samples are expected to contain high levels of VOCs, thus, RL goals may not be met at the non-detect level.

Reporting limits for most PFAS should be less than or equal to 1 nanograms per liter (ng/L) for aqueous samples and 0.16 ng/g (ppb) for solid samples.

4.2.2 Precision

The laboratory objective for precision is to equal or exceed the precision demonstrated for the applied analytical methods on similar samples. Precision is evaluated by the analyses of laboratory and field duplicates. Matrix spike duplicate analyses will be performed once for every 20 samples for VOCs.

Relative Percent Difference (RPD) criteria determined from laboratory performance data are used to evaluate precision between duplicates. A matrix spike duplicate will be performed once for every twenty samples for volatile organics.

Precision measures the reproducibility of measurements under a given set of conditions. Specifically, it is a quantitative measure of the variability of a group of measurements compared to their average value. Precision is usually stated in terms of standard deviation but other estimates such as the coefficient of variation, relative standard deviation, range (maximum value minus minimum value), and relative range are common, and may be used pending review of the data.

The overall precision of measurement data is a mixture of sampling and analytical factors. Analytical precision is easier to control and quantify than sampling precision; there are more historical data related to individual method performance and the "universe" is not limited to the samples received in the laboratory. In contrast, sampling precision is unique to each site or project.

Overall system (sampling plus analytical) precision will be determined by analysis of field duplicate samples. Analytical results from laboratory duplicate samples will provide data on measurement (analytical) precision.

Precision will be determined from field duplicates, as well as laboratory matrix duplicate samples for metals analyses, and matrix spikes and matrix spike duplicates for organic analyses; it will be expressed as the RPD:

$$RPD = 100 \times 2(|X_1 - X_2|) / (X_1 + X_2)$$

where:

X_1 and X_2 are reported concentrations for each duplicate sample and subtracted differences represent absolute values.

Criteria for evaluation of laboratory duplicates are specified in the applicable methods. The objective for field duplicate precision is $\leq 50\%$ RPD for all matrices for analytes detected at concentrations at least 2 times the RL. Where one or both analytes are detected at less than 2 times the RL, the criterion is the absolute difference "D" ($X_1 - X_2$), and D should be less than the RL for the analyte.

4.2.3 Accuracy

The laboratory objective for accuracy is to equal or exceed the accuracy demonstrated for the applied analytical method on similar samples. Percent method recovery criteria and those determined from laboratory performance data, are used to evaluate accuracy in matrix (sample) spike and blank spike quality control samples. A matrix spike and blank spike or laboratory control will be performed once for every analytical batch or as specified in the methods. Other method-specific laboratory QC samples (such as continuing calibration standards) may also be used in the assessment of analytical accuracy. Sample (matrix) spike recovery is calculated as:

$$\% \text{ Recovery} = 100 \times (SSR - SR) / SA$$

Where:

SSR = Spiked sample Result

SR = Sample Result, and

SA = Spike Added

Accuracy measures the bias in a measurement system. It is difficult to measure accuracy for the entire data collection activity. Accuracy will be assessed through use of known QC samples. Accuracy values can be presented in a variety of ways. For projects under this NYSDEC contract, accuracy will be normally presented as percent recovery.

Routine organic analytical protocol requires a surrogate spike in each sample. Surrogate recovery will be defined as:

$$\% \text{ Recovery} = (R/S) \times 100$$

Where:

S = surrogate spike concentration

R = reported surrogate compound concentration

Recovery criteria for laboratory spikes and other laboratory QC samples through which accuracy may be evaluated are established in the applicable analytical method.

4.2.4 Representativeness

The representativeness of data is only as good as the representativeness of the samples collected. Sampling and handling procedures, and laboratory practices are designed to provide a standard set of performance-driven criteria to provide data of the same quality as other analyses of similar matrices using the same methods under similar conditions. Representativeness will be determined by a

comparison of the quality controls for these samples against data from similar samples analyzed at the same time.

4.2.5 Comparability

Comparability of analytical data among laboratories becomes more accurate and reliable when all labs follow the same procedure and share information for program enhancement. Some of these procedures include:

- Instrument standards traceable to National Institute of Standards and Technology (NIST), the US Environmental Protection Agency (USEPA), or the New York State Departments of Health or Environmental Conservation;
- Using standard methodologies;
- Reporting results for similar matrices in consistent units;
- Applying appropriate levels of quality control within the context of the laboratory quality assurance program; and,
- Participation in inter-laboratory studies to document laboratory performance.

By using traceable standards and standard methods, the analytical results can be compared to other labs operating similarly. The QA Program documents internal performance. Periodic laboratory proficiency studies are instituted as a means of monitoring intra-laboratory performance.

Comparability within any specific project is also assessed by comparison of the project data to data generated previously; and, if available, comparison of the data for multiple sampling events conducted for the project. Comparability (consistency) of sampling techniques is also assessed, to some extent, by analysis of field duplicates; although it should be noted that large differences between field duplicates may result from a wide variety of causes, not just inconsistent sampling.

4.2.6 Completeness

The goal of completeness is to generate the maximum amount possible of valid data for all planned samples. Completeness of 100 percent indicates that all planned samples were collected; and the resultant data were fully valid and acceptable. As completeness is a function of both field activities and laboratory activities, separate completeness goals are established for each.

The default goal for sampling completeness is 95 percent, as is calculated as

$$\text{Sampling Completeness (\%)} = (\text{Sc/Sp}) \times 100$$

Where:

Sc = Samples collected (submitted) for analysis (documented from field records or COC)

Sp = Samples planned (as documented in the FAP or QAPP)

The default goal for analytical completeness is also set at 95 percent. Analytical completeness may be less than 100 percent either due to systemic failures that result in the rejection or loss of data for an entire sample; or compound-specific rejection (e.g., 2-hexanone) within an otherwise valid analysis.

For typical work assignments, the default overall completeness goal is 90 percent usable data. The impact of rejected or unusable data will be made on a case-by-case basis. If the goals of the project can be achieved without the missing datum or data, or if data from a different sampling event can be used to fill the data gap, no further action would be necessary. However, loss of critical data may require resampling or reanalysis.

4.3 FIELD QUALITY ASSURANCE

Blank water generated for use during this project must be “demonstrated analyte-free.” The criteria for analyte-free water are based on the USEPA-assigned values for the Contract Required Quantitation Limits (CRQLs) for CLP analyses, or the RL for SW-846 or other EPA methods.

However, specifically for the common laboratory contaminants (acetone and 2-butanone), the allowable limits are five times the CRQL (or RL). For methylene chloride, the limit is 2.5 times the CRQL. For common SVOC contaminants (phthalate esters such as bis(2-ethylhexyl) phthalate), the limit is 5 times the CRQL.

The analytical testing required for the water to be demonstrated as analyte-free must be performed prior to the start of sample collection; thus, blank water will be supplied by the laboratory.

Table 2 of this QAPP shows typical QA/QC samples and RLs. QA/QC samples are discussed below.

4.3.1 Field Equipment (Rinsate) Blanks

Equipment blanks consist of demonstrated, analyte-free water that show if sampling equipment has the potential for contaminant carryover to give a false impression of contamination in an environmental sample. When blank water is used to rinse a piece of sampling equipment (before it is used to sample), the rinsate is collected and analyzed to see if sampling could be biased by contamination from the equipment.

Rinsate blanks are not required when samples are collected directly into laboratory-provided sample containers (e.g., if specified as such in the FAP for matrices such as surface water or leachate seeps).

Field Equipment (Rinsate) blanks for bailers: For initial sampling, as well as at subsequent rounds of sampling when bailers are reused, at least one of the bailers used per decontamination batch, will be used to generate equipment (rinsate) blanks during groundwater sampling. Disposable bailers will be obtained from a single vendor for this project. One rinsate blank will be collected for each groundwater sampling event to verify that the vendor decontamination was adequate, and that contamination has not occurred during shipment and storage.

Typically, one rinsate blank will be collected for every 20 field samples collected or one per week, whichever is more frequent, for each type of sampling equipment. The rinsate blanks will be collected from the soil and groundwater sampling equipment. For PFAS sampling, equipment coming in contact with aqueous samples only, rinsate or equipment blanks should be collected at a minimum frequency of one per day or one per twenty samples, whichever is more frequent (see **Table 2** for frequency of equipment rinsate blanks).

Equipment blanks are not collected or submitted in association with air/soil vapor (Summa canister) samples.

4.3.2 Field Duplicate Samples

Field duplicate samples are used to assess the variability of a matrix at a specific sampling point and to assess the reproducibility of the sampling method.

Aqueous field duplicate samples are second samples collected from the same location, at the same time, in the same manner as the first, and placed into a separate container (technically, these are co-located samples). Each duplicate sample will be analyzed for the same parameters as the original sample collected that day.

Soil duplicate samples are collected from a single location and device (e.g., split spoon sampler). Soil duplicates for VOC analysis are collected first, without homogenization. If other parameters are analyzed, the remaining soil is homogenized (e.g., by mixing in a clean stainless-steel bowl) and prior to generating the sample and duplicate.

Air/soil vapor field duplicates are typically collected by utilizing a "T" fitting on the sample line and splitting the air between two Summa canisters of the same size and set to the same flow rate.

The default field duplicate precision (RPD) objective is $\leq 50\%$ percent RPD for all matrices where the sample concentration is at least two times the RL. Where the analyte is detected in both samples, but the concentration is less than 2 times the RL, precision is assessed by the absolute difference, which should be less than the RL. The RPD is not calculable when the analyte is not detected in one or both analyses. A more detailed discussion of the calculation is provided in Section 4.2.2 (Precision), above.

Field duplicates will be collected at a frequency of one per 20 environmental samples for aqueous and non-aqueous sample. The default field duplicate frequency for air/soil vapor samples is 10 percent (one per 10 environmental samples).

4.3.3 Split Samples

Split samples are used for performance audits or inter-laboratory comparability of data. Split samples may also be generated if a site owner or PRP requests them. A split sample will be defined as at least two separate sub-samples taken from a single original sample which has been thoroughly mixed or homogenized prior to the formation of the split samples. The exception to this is samples for volatile organics analysis which will not be homogenized. Collection of split samples may be conducted only when specifically requested by NYSDEC.

4.3.4 Trip Blanks

The purpose of a VOC trip blank (using demonstrated analyte-free water) is to place a mechanism of control on sample bottle preparation and blank water quality, and sample handling. The trip blank travels from the lab to the site with the empty sample bottles and back from the site with the collected samples. There will be a minimum of one trip blank per shipment containing aqueous samples for VOC analysis.

Trip blanks will be collected only when aqueous volatile organics are being sampled and shipped; except that a trip blank is not required when the only aqueous samples in a shipment are QC samples (rinse blanks).

4.3.5 Temperature Blanks

The laboratory will use either an infrared instrument to measure the temperature of liquid samples, or a temperature blank will be used to measure the temperature of liquid samples. If used, temperature blanks will be supplied by the analytical laboratory. If multiple coolers are necessary to store and transport aqueous samples, then each cooler will contain an individual temperature blank (if used).

4.4 FIELD TESTING QC

Field testing of groundwater will be performed during purging of wells prior to sampling for laboratory samples. Field QC checks of control limits for pH, specific conductance (conductivity) and turbidity are detailed below. The calibration frequencies discussed below are the minimum. Field personnel can and should check calibration more frequently in adverse conditions, if anomalous readings are obtained, or subjective observations of instrument performance suggest the possibility of erroneous readings. Calibration logs for the instruments discussed below will be provided in the work plan or FAP.

4.4.1 pH Meter

The pH meter is calibrated daily, using two standards bracketing the range of interest (generally 4.0 and 7.0). If the pH QC control sample (a pH buffer, which may be the same or different than those used to initially calibrate the instrument) exceeds 0.1 pH units from the true value, the source of the error will be determined and the instrument recalibrated. If a continuing calibration check with pH 7.0 buffer is off by more than 0.1 pH units, the instrument will be recalibrated. Expired buffer solutions will not be used.

Note that gel-type probes take longer to equilibrate (up to 15 minutes at near-freezing temperatures); this must be taken into account in calibrating the instrument and reading samples and standards.

4.4.2 Specific Conductivity

A vendor-provided conductivity standard will be used to check the calibration of the conductivity meter daily. Specific conductance QC samples will be on the order of 0.01 or 0.1 molar potassium chloride (KCl) solutions in accordance with manufacturer's recommendations.

4.4.3 Turbidity

The turbidity meter should be calibrated using a standard as close as possible to 50 NTU (the critical value for determining effectiveness of well development and evacuation). The turbidimeter will be checked daily. The turbidity QC sample will be a commercially prepared polymer standard (Advanced Polymer System, Inc., or similar).

4.4.4 Temperature

Temperature probes associated with instruments (such as the YSI SCT-33 conductivity and temperature meter) are not subject to field calibration, but the calibration should be checked to monitor instrument performance. It is recommended that the instrument temperature reading be checked against a NIST-traceable thermometer concurrently with checking the conductivity calibration. The instrument manual will be referenced for corrective actions if accurate readings cannot be obtained.

4.5 LABORATORY QUALITY ASSURANCE

4.5.1 Method Blanks

A method blank is laboratory water on which every step of the method is performed and analyzed along with the samples. Method blanks are used to assess the background variability of the method and to assess the introduction of contamination to the samples by the method, technique, or instruments as the sample is prepared and analyzed in the laboratory. Method blanks will be analyzed at a frequency of one for every twenty samples analyzed or as otherwise specified in the analytical protocol.

4.5.2 Laboratory Duplicates

Laboratory duplicates are sub-samples taken from a single aliquot of sample after the sample has been thoroughly mixed or homogenized (except for volatile organics), to assess the precision or reproducibility of the analytical method on a sample of a particular matrix. Laboratory duplicates will be performed on spiked samples as a matrix spike and a matrix spike duplicate (MS/MSD) for volatile organics.

4.5.3 Spiked Samples

Two types of spiked samples will be prepared and analyzed as quality controls: matrix spikes and matrix spike duplicates (MS/MSD), which are analyzed to evaluate instrument and method performance and performance on samples of similar matrix. MS/MSD samples will be analyzed at a frequency of one (pair) for every 20 samples. In addition, matrix spike blanks (MSBs) may also be prepared and analyzed by the laboratory as required by NYSDEC ASP.

4.5.4 Laboratory Control Sample

A fortified clean matrix (laboratory control sample, or LCS) is analyzed with each analysis. In some cases, a "Laboratory-Fortified Blank" (LFB) may serve as the LCS. These samples generally consist of a standard aqueous or solid matrix fortified with the analytes of interest for single-analyte methods and selected analytes for multi-analyte methods according to the appropriate analytical method. The LCS may be analyzed in duplicate for some methods (LCSD). The analyte recovery from each analysis (LCS and LCSD) is used to monitor analytical accuracy; analytical precision can be assessed from evaluation of the LCS/LCSD in the same manner as the MS/MSD.

5.0 FIELD DATA DOCUMENTATION

Field reporting documentation, including field logbooks and field data reporting forms, is discussed in FAP Section 10; therefore, it is not repeated here.

6.0 EQUIPMENT CALIBRATION AND MAINTENANCE

Quality assurance for instrumentation and equipment used for a project is controlled by a formal calibration program, which verifies that equipment is of the proper type, range, accuracy, and precision to provide data compatible with specified requirements. Instruments and equipment that measure a quantity, or whose performance is expected at a stated level, are subject to calibration. Calibration is performed using reference standards or externally by calibration agencies or equipment manufacturers.

6.1 STANDARD WATER AND AIR QUALITY FIELD EQUIPMENT

Field equipment used during the collection of environmental samples typically includes a turbidimeter (turbidity per EPA Method 180.1), pH meter (pH per EPA Method 150.1), conductivity meter (specific conductance per EPA Method 120.1), thermometer, and photoionization detector. See also Section 4.4 of this QAPP for additional discussion.

The organic vapor analyzer (MultiRAE, or equivalent organic vapor analyzer) used for soil screening and health and safety air monitoring will be calibrated following the manufacturer's instructions, at the beginning of the day, whenever the instrument is shut off for more than two hours, and at the field technician's discretion.

6.2 LABORATORY EQUIPMENT CALIBRATION

Laboratory equipment will be calibrated according to the method-specific requirements, and maintained following professional judgment and the manufacturer's specifications, and additional requirements as specified in the ELAP certification manual.

6.2.1 Analytical Support Areas

Prior to generating quality data, several analytical support areas must be considered:

Standard/Reagent Preparation - Primary reference standards and secondary standard solutions shall be obtained from sources traceable to National Institute of Standards and Technology, or other reliable commercial sources to ensure the highest purity possible. The preparation and maintenance of standards and reagents will be accomplished as per the referenced methods. All standards and standard solutions are to be formally documented (i.e., in a bound logbook) and should identify the supplier, lot number, purity/concentration, receipt/preparation date, preparer's name, method of preparation, expiration date, and any other pertinent information. All standard solutions shall be validated prior to use. Care shall be exercised in the proper storage and handling of standard solutions (e.g., separating volatile standards from nonvolatile standards). The laboratory shall continually monitor the quality of the standards and reagents through well-documented procedures.

Balances - The analytical balances shall be calibrated and maintained in accordance with manufacture specifications. Calibration is conducted with two American Society of Testing Materials Class 1 weights that bracket the expected balance use range. The laboratory shall check the accuracy of the balances daily and properly document results in permanently bound logbooks.

Refrigerators/Freezers - The temperature of the refrigerators and freezers within the laboratory shall be monitored and recorded daily. This will verify that the quality of the standards and reagents is not compromised and the integrity of the analytical samples is upheld. Appropriate acceptance ranges (e.g., $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for refrigerators) shall be clearly posted on each unit in service.

Water Supply System - Laboratories performing water/solid/waste sample analyses must maintain a sufficient supply of analyte-free water for all project needs. The grade of the water must be of the highest quality in order to eliminate false-positives from the analytical results. Ultraviolet cartridges or carbon absorption treatments are recommended for organic analyses, and ion-exchange treatment is recommended for inorganic tests. Appropriate documentation of the quality of the water supply system(s) will be performed on a regular basis by the laboratory.

Air Supply System – Laboratories performing air/soil vapor sample analyses must maintain a sufficient supply of analyte-free air for all project needs. The grade of air must be of the highest quality in order to eliminate false-positives from the analytical results. Appropriate documentation of the quality of the air supply system(s) will be performed on a regular basis by the laboratory.

6.2.2 Calibration Procedure

Written procedures are used for all instruments and equipment subject to calibration. For chemical analyses typically performed for these contracts, the calibration procedures are specified in the methods as compiled in the ASP. If established procedures are not available, a procedure is developed considering the type of equipment, stability characteristics of the equipment, required accuracy, and the effect of operational error on the quantities measured.

6.2.3 Calibration Frequency

Calibration frequency is based on the type of equipment, inherent stability, manufacturer's recommendations, values provided in recognized standards, intended data use, specified analytical methods, effect of error upon the measurement process, and prior experience.

6.2.4 Calibration Reference Standards

Two types of reference standards will be used by the standby laboratories for calibration:

Physical standards, such as weights for calibrating balances and certified thermometers for calibrating working thermometers, refrigerators and ovens, are generally used for periodic calibration.

Chemical standards, such as Standard Reference Materials (SRMs) provided by the National Institute of Standards and Technology (NIST) or USEPA, may also include vendor-certified materials traceable to NIST or USEPA SRMs. These are primarily used for operational calibration.

6.2.5 Calibration Failure

Equipment that cannot be calibrated or becomes inoperable is removed from service. Such equipment must be repaired and satisfactorily recalibrated before re-use. For laboratory equipment that fails calibration, analysis cannot proceed until appropriate corrective action is taken and the analyst achieves an acceptable calibration.

Laboratory managers are responsible for development and implementation of a contingency plan for major equipment failure. The plan includes guidelines on waiting for repairs, use of other instrumentation, subcontracting analyses, and evaluating scheduled priorities.

6.2.6 Calibration Records

Records are prepared and maintained for each piece of equipment subject to calibration. Records demonstrating accuracy of preparation, stability, and proof of continuity of reference standards are also maintained. Copies of the raw calibration data are kept with the analytical sample data.

6.3 OPERATIONAL CALIBRATION

Operational calibration is generally performed as part of the analytical procedure and refers to those operations in which instrument response (in its broadest interpretation) is related to analyte concentration. Included are the preparation of a standard response (calibration) curve and often the analysis of blanks.

Preparation of a standard calibration curve is accomplished by the analysis of calibration standards, which are prepared by adding the analyte(s) of interest to the solvent that is introduced into the instrument. The concentrations of the calibration standards are chosen to cover the working range of the instrument or method. For most methods, five calibration standards are used, with the concentration of the lowest calibration standard being the reporting or quantitation limit for that analysis. Sample measurements are made and reported within this working range; apparent concentrations which exceed the high end of the calibrated range ("E"-flagged data for organic analyses) are diluted (or a smaller sample is used) and re-analyzed. The calibration curve is prepared

by plotting or performing a linear regression of the instrument responses against the analyte concentration.

7.0 DATA REDUCTION, VALIDATION, AND REPORTING

The guidance followed to perform quality data validation, and the methods and procedures outlined herein and elsewhere in the RIWP, pertain to initiating and performing data validation, as well as reviewing data validation performed by others (if applicable). An outline of the data validation process is presented here, followed by a description of data validation review summaries.

7.1 LABORATORY DATA REPORTING AND REDUCTION

Data reduction is the process by which raw analytical data generated from laboratory instrument systems is converted into usable concentrations. The raw data, which may take the form of area counts, instrument responses, or observations, are processed by the laboratory and converted into concentrations expressed in the parts per million (milligrams per kilogram [mg/kg] or milligrams per liter [mg/L]), parts per billion (micrograms per kilogram [µg/kg], micrograms per liter [µg/L], or nanograms per gram [ng/g]), or parts per trillion (ng/L) range. Raw data from these systems include compound identifications, concentrations, retention times, and data system print-outs. Raw data are usually reported in graphic form, bar graph form, or tabular form. The laboratory will follow standard operating procedures consistent with the data handling requirements of the applicable methods.

The laboratory will meet the applicable documentation, data reduction, and reporting protocols as specified in the 2005 revision of the NYSDEC ASP. ASP Deliverables are either Category B (full deliverables; similar to USEPA CLP requirements) or Category A (a reduced deliverable level). For this contract, Category B deliverables are the default and will be provided for all deliverables generated under the contract unless explicitly indicated otherwise on a site-specific basis. Laboratory data reports will conform to NYSDEC Category B deliverable requirements, as specified in Exhibit B, Part II.E, Sections 2 and 3, respectively. Laboratory data reports for waste characterization samples will conform to Category A requirements.

Copies of the laboratory's generic Quality Assurance Management Plan (QAMP, as defined in ASP 2005 Exhibit E, Part I) will be maintained at NYSDEC's principal contact office (Albany, NY). The laboratory's QAMP will indicate the standard methods and practices for obtaining and assessing data, and how data are reduced from the analytical instruments to a finished report, indicating levels of review along the way.

To meet NYSDEC electronic data deliverable (EDD) requirements, laboratories subcontracted by NYSDEC for this work will be required to submit electronic deliverables in an EQulS 4-file format consistent with NYSDEC standards. AECOM's database manager will be responsible verifying that the file submitted meets these specifications including verifying that current NYSDEC Valid Values were used for sample coding; providing an Excel (or Access) file to the data validator; uploading the validated data into the database; overseeing the uploading of any other data (field data, boring log information, etc.), and submitting a final EQulS deliverable to NYSDEC that meets NYSDEC EDD requirements.

In addition to the hard copy of the data report, the laboratory will be asked to provide the sample data in spreadsheet form (submitted electronically). The data spreadsheet will be generated to the extent possible directly from the laboratory's electronic files or information management system to minimize possible transcription errors resulting from the manual transcription of data.

7.2 DATA VALIDATION

Data generated for this work assignment will be validated by AECOM. The AECOM validator will follow guidelines established in the USEPA Region 2 SOPs applicable to the analytical method(s) being reviewed. These SOPs are checklists which are designed to formally and rigorously assess the quality and completeness of SW-846 and soil vapor sample TO-15 analysis data packages. The use of these USEPA SOPs will be adapted to conform to the specific requirements of the analytical methods (e.g., holding times; matrix spike blank requirements). Where necessary and appropriate, supplemental validation criteria may be derived from the EPA Functional Guidelines (USEPA National Functional Guidelines for Inorganic Superfund Methods Data Review, EPA-542-R-20-006, November

2020, and the National Functional Guidelines for Organic Superfund Methods Data Review, EPA-540-R-20-005, November 2020). For PFAS samples, Appendix H - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids (NYSDEC 2023) shall be followed.

As discussed in the Standby Contract (D009803 – Attachment 1, Work Element V), a DUSR provides a thorough evaluation of analytical data without the costly and time-consuming process of third-party validation. The primary objective of a DUSR is to determine whether the data, as presented, meet the site-specific criteria for data quality and data use. Appendix 2B of NYSDEC's DER-10 provides guidance on data deliverables and development of a DUSR.

Validation reports and DUSRs will consist of text results of the review and marked up copies of Form I (results with qualifiers applied by the validator). Validation will consist of target and non-target compounds with corresponding method blank data, spike and surrogate recoveries, sample data, and a final note of validation decision or qualification, along with any pertinent footnote references. Qualifiers applied to the data will be documented in the report text. Where QC failures caused the laboratory to perform a re-analysis, the data validator will make a recommendation as to which of the two analyses should be used. Data review will also include an assessment of sensitivity (i.e., are RLs appropriate to determine if contaminants are present at or above action levels or other applicable threshold values).

There may be some analyses for which there are no established USEPA or NYSDEC data validation protocol. In such cases, validation will be based on the Region 2 SOPs and EPA Functional Guidelines as much as possible, as well as the laboratory's adherence to the technical requirements of the method, and the professional judgment of the validator. The degree of rigor in such validation will correspond to the nature of the data and the significance of the data and its intended use.

7.3 DATA USABILITY

Subsequent to review of the items evaluated in the AECOM data validator reports (DUSRs) and accompanying tables, AECOM's QA staff then prepares a brief data usability summary. The data usability summary, which will be provided as part of the project report, encompasses both quantitative and qualitative aspects, although the qualitative element is the most significant.

The quantitative aspect is a summary of the data quality as expressed by qualifiers applied to the data; the percent rejected, qualified (i.e., estimated), missing, and fully acceptable data are reported. As appropriate, this quantitative summary is broken down by matrix, laboratory, or analytical fraction or method.

The qualitative element of the data usability summary is the QA Chemists translation and summary of the validation reports into a discussion useful to data users. The qualitative aspect will discuss the significance of the qualifications applied to the data, especially in terms of those most relevant to the intended use of the data. The usability report will also indicate whether there is a suspected bias (high or low) in qualified data and will also provide a subjective overall assessment of the data quality.

If similar analyses are performed by more than one method, a discussion of the extent of agreement among the various methods will be included, as well as discussion of any discrepancies among the data sets.

The QA Chemist will also indicate if there is a technical basis for selecting one data type over another for multiple measurements which are not in agreement.

Data which has not been validated (i.e., solid waste characterization) and field data used for the project will be discussed in the data usability summary, including any limitations on the use of such data.

7.4 FIELD DATA VERIFICATION

Field personnel will record all field data in bound field logbooks and on standard forms. After checking the validity of the data in the field notes, the Project Manager or his/her designee will reduce the data to tabular form, when possible, by entering the data into data files. Where appropriate, the data files

will be set up for direct input into the project database. Subjective data will be filed as hard copies for later review by the Project Manager and incorporation into technical reports, as appropriate.

Verification of field data will be performed at two different levels. The first level of data verification will be performed at the time of collection by following standard procedures and QC checks. The second level of review consists of the Project Manager, Task Manager, or other competent personnel, reviewing the data to confirm that the correct codes and units have been included. After data reduction into tables and arrays is complete, the Site Manager will review data sets for anomalous values. The Project Manager, who will review field reports for reasonableness and completeness, will validate subjective field and technical data.

8.0 PERFORMANCE AND SYSTEM AUDITS

Audits are systematic checks to determine the quality of operation of some activity or function in the field or laboratory. Field audits are conducted to verify adherence to proper field and sampling procedures. Audits are of two types, as described below.

- Performance audits are independent safety and health, procedure, and/or sample checks made by a supervisor or auditor to arrive at a quantitative measure of the quality of the data produced by one section or the entire measurement process.
- System audits are onsite qualitative inspections and reviews of the QA system used by some part of or the entire measurement system. The audits are performed against the QAPP. A checklist is typically generated from the requirements and becomes the basis for the audit. The results of any deficiencies noted during the audit are summarized in an audit report.

Laboratory performance and system audits are performed by the laboratory's QA staff to assess the effectiveness of the quality system. These internal audits are performed on a routine basis. Audits are also performed by certifying agencies. Audit reports and corrective actions are available to NYSDEC for review.

8.1 RESPONSIBILITY, AUTHORITY, AND TIMING

QA audits to be conducted for the project may include system, performance, and data audits. The Project QA Officer will keep a tentative schedule on record that details the number and types of audits.

8.2 FIELD AUDITS

The need for field audits will be determined on a project-specific basis as required by the WA or in the approved work plans for the project. Not all the aspects listed below will be necessary or appropriate for projects for which field audits are specified.

Field performance audits, if specified, will be conducted during the project as field data are generated, reduced, and analyzed. Numerical manipulations, including manual calculations, will be documented. Records of numerical analyses will be legible, of reproduction quality, and sufficiently complete to permit logical reconstruction by a qualified individual other than the originator.

Indicators of the level of field performance include the analytical results of the blank and replicate samples. Each blank analysis will be considered an indirect audit of the effectiveness of measures taken in the field to maintain sample integrity (e.g., field decontamination procedures).

The results of the field replicate analyses are an indirect audit of the ability of each field team to collect representative sample portions of each matrix type.

System audits of site activities will be accomplished by an inspection of all field site activities. During this audit, the auditor(s) will compare current field practices with standard procedures. The following elements will be evaluated during a field system audit:

- Field activities conducted in substantial compliance with the RIWP and FAP
- Procedures and analyses conducted according to procedures outlined in the QAPP
- Sample documentation
- Working order of instruments and equipment
- Level of QA conducted by field personnel
- Contingency plans in case of equipment failure or other event preventing the planned activity from proceeding
- Decontamination procedures

- Level of efficiency with which each team conducts planned activities at one site and proceeds to the next
- Sample packaging and shipment.

After completion of the audit, any deficiencies will be discussed with the field staff and corrections identified. If any of these deficiencies could affect the integrity of the samples being collected, the auditor(s) will inform the field staff and corrections will be implemented immediately. The audit will be performed by the Project QA/QC Coordinator or the Site Manager.

8.3 LABORATORY PERFORMANCE AND SYSTEM AUDITS

As part of the laboratory subcontractor procurement process under the AECOM/NYSDEC Standby Engineering Contract, the laboratory assigned to this project, Pace Labs, is certified by the NYSDOH Environmental Laboratory Approval Program for the matrices and analytical protocols to be used. Therefore, no project-specific audit of the laboratory(s) will be performed unless warranted by a problem(s) that cannot be resolved by any other means, or at the discretion of AECOM and NYSDEC.

8.4 AUDIT PROCEDURES

Prior to an audit, the designated lead auditor prepares an audit checklist. During an audit and upon its completion, the auditor(s) will discuss the findings with the individuals audited and discuss and agree on corrective actions to be initiated. The auditor will then prepare and submit an audit report to the manager of the audited group and the project manager.

The manager of the audited group will then prepare and submit, to the Project QA Officer and the Project Manager, a plan for implementing the corrective action to be taken on non-conformances indicated in the audit report, the date by which such corrective action will be completed, and actions taken to prevent reoccurrence. If the corrective action has been completed, supporting documentation should be attached to the reply. The auditor will ascertain (by re-audit or other means) if appropriate and timely corrective action has been implemented.

Records of audits will be maintained in the project files.

8.5 AUDIT DOCUMENTATION

A checklist will be completed during each audit so that the previously defined scope of the individual audits is accomplished and that the audits follow established procedures. The checklist will detail the activities to be executed as part of the auditing plan. Audit checklists will be prepared in advance and will be available for review. Following each system, performance, and data audit, the auditor or QAO will prepare a report to document the findings of the specific audit.

9.0 CORRECTIVE ACTIONS

If instrument performance or data fall outside acceptable limits, then corrective actions will be taken. These actions may include recalibration or standardization of instruments, acquiring new standards, replacing equipment, repairing equipment, and reanalyzing samples or redoing sections of work.

Subcontractors providing analytical services should perform their own internal laboratory audits and calibration procedures with data review conducted at a frequency so that errors and problems are detected early, thus avoiding the prospect of redoing large segments of work.

Situations related to this project requiring corrective action will be documented and made part of the project file. For each measurement system identified requiring corrective action, the responsible individual for initiating the corrective action and the individual responsible for approving the corrective action, if necessary, will be identified.

As part of its quality management system (QMS) program, AECOM provides relevant excerpts and conclusions from data validation reports to the analytical laboratories. The laboratories are therefore made aware of non-critical items and areas where improvement may be made in subsequent NYSDEC ASP work.

The objectives of the corrective action procedures presented below are to ensure that recognized errors in performance of sample and data acquisition lead to effective remedial measures and that those steps are documented to provide assurance that any data quality deficiencies are recognized in later interpretation and are not recurrent.

9.1 RATIONALE

Many times, corrective measures are undertaken in a timely and effective fashion but go undocumented. In other cases, corrective actions are of a complex nature and may require scheduled interactions between departmental groups. In either case, documentation in a formal or informal sense can reinforce the effectiveness and duration of the corrective measures taken.

9.2 CORRECTIVE ACTION METHODS

9.2.1 Immediate Corrective Actions

Immediate corrective actions are of a minor or routine nature such as correcting malfunctioning equipment, correction of data transcription errors, and other such activities routinely made in the field, laboratory, or office by technicians, analysts, and other project staff.

9.2.2 Long-Term Corrective Actions

Long-term corrective action will be used to identify and eliminate causes of non-conformances which are of a complex nature and that are formally reported between management groups.

9.2.3 Corrective Action Steps

For long-term corrective actions, steps comprising closed-loop corrective action system are as follows:

- Define the problem
- Assign responsibility for investigating the problem
- Investigate and determine the cause of the problem
- Determine a corrective action to eliminate the problem
- Assign and accept responsibility for implementing the corrective action

Verify that the corrective action has eliminated the problem.

Non-conformance events associated with analytical work are documented by the laboratories' Non-Conformance Records, which are reviewed and approved by the laboratory's Quality Assurance Manager.

9.2.4 Audit-Based Non-Conformances

Following audits, corrective action is initiated by documenting the audit finding and recommended corrective action on an Audit Finding Report.

9.3 CORRECTIVE ACTION REPORT REVIEW AND FILING

Immediate and long-term corrective actions require review to assure that, during the time of non-conformance, erroneous data were not generated or that, if possible, correct data were acquired instead. Such confirmation and review are the responsibility of the supervisor of the staff implementing the corrective action. Confirmation will be acknowledged by notation and dated signature on the affected data record or appropriate form or by memorandum to the AECOM QAO and Project Manager.

10.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

Fundamental to the success of this QA/QC is the active participation of the Project Manager and the Project QA Officer. The Program QA Officer will be advised of project activities and will participate in development, review, and operation of the project. Project management will be informed of QA activities through the receipt, review, and/or approval of:

- Project-specific QA project plans
- Corporate and project-specific QA/QC plans and procedures
- Corrective action notices
- Non-conformance records.

Periodic assessment of field and laboratory QA/QC activities and data accuracy, precision, and completeness will be conducted and reported by the laboratory. Items to be included in the QA reports are the summary of results for the performance or the system audit and, where applicable:

- Assessment of adherence to work scope and schedule for the audited task
- Assessment of the precision, accuracy, and completeness of sample batches and subsequent status of data processing and analyses
- Significant QC problems and the status of any ongoing corrective actions
- Changes to the site-specific Work Plan
- Status of implementation of the site-specific Work Plan.

Monthly project status reporting to the NYSDEC will include aspects of quality control that were pertinent during the month's activities. Problems revealed during review of the month's activities will be documented and addressed. These reports will include a description of completed and on-going activities, and an indication how each task is progressing relative to the project schedule.

The Project Manager will be responsible for verifying that records and files related to the work assignment are stored appropriately and are retrievable.

The laboratory will submit any memoranda or correspondence related to quality control of this project's samples as part of its deliverables package.

11.0 REFERENCES

- New York State Department of Environmental Conservation (NYSDEC), 2005. *Analytical Services Protocol (ASP) Manual*. July.
- NYSDEC, 2008. *NYSDEC Modifications to EPA Region 9 TO-15 QA/QC Criteria provided in July 2005 ASP*. February 2008.
- NYSDEC, 2010a. *Technical Guidance for Site Investigation and Remediation. DER-10*. Division of Environmental Remediation. May.
- NYSDEC, 2010b. *CP-51 / Soil Cleanup Guidance*. October.
- NYSDEC, 2023. *Guidelines for Sampling and Analysis of PFAS, Under NYS DEC's Part 375 Remedial Programs*. January.
- NYSDEC and AECOM USA Inc. (AECOM), 2019. Standby Contract No. D009803 between the State of New York Department of Environmental Conservation and AECOM for Engineering Services. October.
- New York State Department of Health (NYSDOH) Wadsworth Laboratory Environmental Laboratory Approval Program Certification Manual. Accessed online at <http://www.wadsworth.org/labcert/elapcert/index.html>. Revisions through April, 2011; accessed May, 2011.
- NYSDOH ELAP Web site. <http://www.wadsworth.org/labcert/elap/>
- NYSDOH Center for Environmental Health Bureau of Environmental Exposure Investigation, 2006. *Guidance for Evaluating Soil Vapor Intrusion in the State of New York*. Final. October.
- NYSDOH, 2007. Letter from Gary Litwin (Director) to Dale Desnoyers (NYSDEC DER) re: Soil Vapor/Indoor Air Matrices. (Adds additional chlorinated VOCs to the original matrices in the 2006 SVI guidance). June 25.
- USEPA Region 2, Standard Operating Procedures for Data Review. Available at <http://www.epa.gov/region02/ga/documents.htm#sop>. Accessed November 2025.
- USEPA Region 2, 1998. *Ground Water Sampling Procedure – Low Stress (Low Flow) Purging and Sampling*. Final. March 16.
- USEPA, 2020. *National Functional Guidelines for Superfund Inorganic Methods Data Review*, EPA 542/R-20-006. November.
- USEPA, 2020. *National Functional Guidelines for Organic Superfund Methods Data Review*, EPA/540/R-20-005. November.
- USEPA, 1999. *Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air – Second Edition*. USEPA Center for Environmental Research Information. EPA/625/R-96/010b. January.
- USEPA, 1986. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, Third edition. EPA SW-846. With revisions and updates through May, 2020. Accessed online (at “SW-846 On-Line”) May 2011 at <http://www.epa.gov/epaoswer/hazwaste/test/main.htm>
- USEPA, 2024. *Method 1633, Revision A, Analysis of Per- and Polyfluoroalkyl Substances (PFAS) in Aqueous, Solids, Biosolids, and Tissue Samples by LC-MS/MS*. December.
- USEPA, 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*. USEPA Office of Emergency and Remedial Response. OSWER Directive No. 355.3-01. October.

Tables

Table 1
Sample Bottle, Volume, Preservation, and Holding Time Summary
Quality Assurance Project Plan
Genesee Valley Metal Finishing (Site No. 828288)

Matrix / Analysis	Sample Prep Method ⁽¹⁾	Analytical Method ⁽²⁾	Sample Bottles ⁽³⁾				Minimum Vol Rqd	Preservation ⁽⁴⁾	Holding Time ^(4,5)		Comment
			Mat'l	Size	Qty	Source			Extraction	Analysis	
Aqueous Samples											
Volatile Organics	SW 846 5030B	SW 846 8260D	G	40 mL	2 or 3	Lab	40 mL	HCl to pH ≤ 2	NA	14 days	7 days if not preserved to pH <2.
Semivolatile Organics	SW 846 3510C/3511/3520C/3535A	SW 846 8270E	AG	1L	2	Lab	250 mL	None	7 days	40 days	
Pesticides	SW 846 3510C/3511/3520C/3535A	SW 846 8081B	AG	1L	1	Lab	250 mL	None	7 days	40 days	
PCBs	SW 846 3510C/3511/3520C/3535A	SW 846 8082A	AG	1L	1	Lab	250 mL	None	7 days	40 days	
PFAS	per Analytical Method	EPA 1633A	HDPE	250 mL	2	Lab	250 ml	None	28 days	90 days	
1,4-Dioxane	SW 846 3510C	SW 846 8270D SIM	AG	1 L	2	Lab	1 L	None	7 days	40 days	
Total Metals (except Mercury)	SW 846 3005A/3010A/3015A	SW 846 6010D	P	500 mL	1	Lab	100 mL	HNO ₃ to pH≤ 2	NA	180 days	180 days for metals except mercury.
Total Mercury	per Analytical Method	SW 846 7470A	"	"	"	"	100 mL	"	NA	28 days	
Dissolved Metals (except Mercury)	SW 846 3005A/3010A/3015A	SW 846 6010D	P	500 mL	1	Lab	100 mL	Field filtered, then HNO ₃ to pH≤ 2	NA	180 days	180 days for metals except mercury.
Dissolved Mercury	per Analytical Method	SW 846 7470A	"	"	"	"	100 mL	"	NA	28 days	
Soil Samples											
Volatile Organics	SW 846 5035	SW 846 8260D	Encore ⁷	5 or 25 g	3 or 1	Vendor ⁷	5 g	DI water or Methanol	NA	48 hours ⁸	
Semivolatile Organics	SW 846 3540C/3541/3545A/3546/3550C	SW 846 8270E	AG	8 oz ⁽⁶⁾	1	Lab	30 g	None	14 days	40 days	
Pesticides	SW 846 3540C/3541/3545A/3546/3550C	SW 846 8081B	AG	"	"	Lab	30 g	None	14 days	40 days	
PCBs	SW 846 3540C/3541/3545A/3546/3550C	SW 846 8082A	AG	"	"	Lab	30 g	None	14 days	40 days	
PFAS	per Analytical Method	EPA 1633A	HDPE	8 oz	1	Lab	5 g	None	14 days	40 days	
1,4-Dioxane	SW 846 3540C/3541/3545A/3546/3550C	SW 846 8270E	AG	8 oz ⁽⁶⁾	1	Lab	30 g	None	14 days	40 days	
Metals (except Mercury)	SW 846 3050B/3051A/3052	SW 846 6010D	G	"	"	Lab	10 g	None	NA	180 days	180 days for metals except mercury.
Mercury	per Analytical Method	SW 846 7471B	"	"	"	"	2 g	"	NA	28 days	
Soil Vapor Samples											
Volatile Organics	NA	EPA TO-15	SS	6 L ⁽⁹⁾	1	Lab	400 mL	None	NA	14 days	Summa canister; certified clean by laboratory.
Solid Waste Charaterization Samples											
TCLP Volatile Organics	SW 846 1311/5030B	SW 846 8260D	G	100 g	1	Lab	100 g	None	14 days (TCLP)	14 days	
TCLP Semivolatile Organics (SVOCs, Pesticides)	SW 846 1311/3510C/3511/3520C/3535A	SW 846 8270E/8081B/8151A	AG	8 oz ⁽⁶⁾	1	Lab	100 g	None	14 days (TCLP), 7 days (Method)	40 days	
TCLP Metals (except mercury)	SW 846 1311/3005A/3010A/3015A	SW 846 6010D	G	"	"	Lab	100 g	None	180 days (TCLP)	180 days	
TCLP Mercury	SW 846 1311/per Analytical Method	SW 846 7470A	"	"	"	"	100 g	"	28 days (TCLP)	28 days	
PCBs	SW 846 3510C/3511/3520C/3535A	SW 846 8082A	AG	8 oz ⁽⁶⁾	1	Lab	30 g	None	14 days	40 days	
Corrosivity (as pH)	per Analytical Method	SW 846 9045D	G	4 oz	1	Lab	10 g	None	NA	ASAP	
Reactive Cyanide	SW 846 Chp. 7.3	SW 846 9014	G	4 oz	1	Lab	50 g	None	NA	ASAP	
Reactive Sulfide	SW 846 Chp. 7.3	SW 846 9034	G	4 oz	1	Lab	50 g	None	NA	ASAP	
Ignitability	per Analytical Method	SW 846 1030	G	4 oz	1	Lab	50 g	None	NA	ASAP	

Notes:

- (1) Laboratory may propose alternate extraction/preparation methods, subject to NYSDOH ELAP certification and AECOM approval.
- (2) More recent versions of analytical methods may be used subject to NYSDOH ELAP certification and AECOM approval.
- (3) Bottles typical. EnCore or similar samplers for VOCs in soil will be provided by laboratory or AECOM on a case-by-case basis. 250 mL bottles may be used for extractable organics if NYSDOH ELAP certified.
- (4) All samples for chemical analysis should be held at 4 ± 2 degrees C in addition to any chemical preservation required.
- (5) Holding time calculated from day of collection, unless noted as being from time of extraction.
- (6) A single 8-oz sample may be sufficient for SVOCs, pesticides, PCBs, herbicides, and metals; 3 x 1 L for TCLP SVOCs, pesticides, herbicides, and metals.
- (7) Other collection methods consistent with SW 846 5035 may be used. Encore or similar samplers (e.g. Terra Core) are typically purchased from an outside supplier by AECOM but may also be requested (for a fee) from the analytical laboratory.
- (8) Encore or similar samplers must be prepared/preserved in the laboratory within 48 hours of collection. Soil samples in glass bottles and preserved Encores (or similar) have a 14 day (total) holding time.
- (9) Smaller canisters (e.g., 1 L "mini-cans") may be substituted provided laboratory can meet reporting limits.

AG = Amber Glass

G = Glass

P = Plastic

SS = Stainless Steel

SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. USEPA SW-846. Complete through Update VII, May 2020.

Table 2
Reporting Limits and QA/QC Sample Quantity Summary
Quality Assurance Project Plan
Genesee Valley Metal Finishing (Site No. 828288)



Matrix / Analysis	Analytical Method	Laboratory	Reporting Limit - Typical (units as specified)	Field Sample Quantity ⁽¹⁾	Matrix Spike (MS)	MS Duplicate or Matrix Duplicate	Field Duplicate	Equipment Blank ⁽³⁾	Trip or Field Blank	Total Billable Analyses
Aqueous Samples										
Volatile organics	SW 846 8260D	TBD	0.5 - 1.0 µg/L (typical)	20	1	1	1	1	4	28
Semivolatile organics	SW 846 8270E	TBD	10 - 20 µg/L (typical)	5	1	1	1	1	0	9
Pesticides	SW 846 8081B	TBD	0.05 - 0.5 µg/L (typical)	5	1	1	1	1	0	9
PCBs	SW 846 8082A	TBD	33 µg/L	5	1	1	1	1	0	9
PFAS	EPA 1633A	TBD	1 - 100 ng/L	5	1	1	1	1	1	10
1,4-Dioxane	SW 846 8270E SIM	TBD	0.1 ug/L	5	1	1	1	1	0	9
Total Metals (TAL except Mercury)	SW 846 6010D	TBD	Analyte-specific	20	1	1	1	1	0	24
Total Mercury	SW 846 7470A	TBD	0.2 µg/L	20	1	1	1	1	0	24
Dissolved Metals (TAL except Hg)	SW 846 6010C	TBD	Analyte-specific	20	1	1	1	1	0	24
Dissolved Mercury	SW 846 7470A	TBD	0.2 µg/L	20	1	1	1	1	0	24
Soil Samples										
Volatile organics	SW 846 8260D	TBD	5 µg/kg (typical) ⁽²⁾	20	1	1	1	1	0	24
Semivolatile organics	SW 846 8270E	TBD	330 µg/kg (typical) ⁽²⁾	20	1	1	1	1	0	24
Pesticides	SW 846 8081B	TBD	1.7 - 3.3 µg/kg (typical) ⁽²⁾	20	1	1	1	1	0	24
PCBs	SW 846 8082A	TBD	57 - 70 µg/kg ⁽²⁾	20	1	1	1	1	0	24
PFAS	EPA 1633A	TBD	0.16 - 10 ng/g ⁽²⁾	20	1	1	1	1	1	25
1,4-Dioxane	SW 846 8270E	TBD	0.1 mg/kg ⁽²⁾	20	1	1	1	1	0	24
Metals (TAL except Hg)	SW 846 6010D	TBD	Analyte-specific ⁽²⁾	20	1	1	1	1	0	24
Mercury	SW 846 7471B	TBD	0.2 µg/kg ⁽²⁾	20	1	1	1	1	0	24
Soil Vapor Samples										
Volatile organics	TO-15	TBD	1 µg/m ³	4	NA ⁽⁴⁾	NA ⁽⁴⁾	1	NA	NA	5
Solid Waste Characterization Samples										
Full TCLP/RCRA Characteristics	SW 846 1311/8260D/8270E/ 8081B/8151A/6010D/7470A/ 9014/9034/9045D/1030	TBD	Analyte-specific	2	0	0	0	0	0	2
PCBs	SW 846 8082A	TBD	57 - 70 µg/kg ⁽²⁾	2	0	0	0	0	0	2

Notes:

TAL = Target Analyte List (23 Metals)

TBD = To be determined. Laboratory services to be determined by NYSDEC Call-out subcontract.

(1) Estimated number of samples. QC quantities shown are typical requirements for each group of 20 or fewer field samples.

(2) Reporting limits for soils, when adjusted for dry weight, will be higher. Detections above the MDL but less than reporting limits will be reported and flagged estimated (J).

(3) Field equipment rinsate blank quantity will vary depending on sample collection rate and types of sampling equipment used; quantity may be greater or less than that shown. See RIWP or FAP.

(4) Matrix spikes and duplicates are not explicitly required by method TO-15, but may be included as part the laboratory's analytical QA program.

Appendix E – Green Remediation Best Management Practices: Site Investigation

Sustainable Remediation BMP	Core Elements	Is Implemented?	Comments
Investigation and Sampling Analysis			
Contract with a laboratory that uses green practices (EPA, 2022a).	Air; Energy; Land & Ecosystems; Materials & Waste; Water	Yes	NYSDEC standby laboratory follows GSR practices.
Use drilling methods which minimized the generation and disposal of cuttings; specifically, direct-push technology – rather than a rotary auger or Rotasonic drill rig – was used to significantly reduce drilling time, avoid generating drilling fluids, and eliminate/reduce drill-cutting that would require characterization and disposal (EPA, 2022a).	Materials & Waste; Energy; Air	Yes	Direct push technology will be implemented for shallow soil borings / overburden wells.
Use on-site mobile lab or other field analysis (for example, portable gas chromatography/mass spectrometry for fuel-related compounds and VOCs) to minimize the need for off-site laboratory analysis and associated sample packing and shipping (EPA, 2016b).	Materials & Waste; Energy; Air	Yes	Field screening equipment (PID) will be used for screening soil sampling.
OnSite			
Choose the nearest offsite site laboratories, material vendors and waste facilities, to reduce shipping distances and limit the number and size of shipments (EPA, 2023a).	Energy; Air; Materials & Waste	Yes	Laboratory, equipment supplier and IDW contractor are located near site.
Procurement			
Use phosphate-free detergents instead of organic solvents or acids to decontaminate equipment not used directly for sample collection (EPA, 2016a; EPA, 2019a).	Materials & Waste	Yes	Using Alconox cleaner for decontamination.
Choose suppliers that will take back scraps or unused materials (EPA, 2013a).	Materials & Waste	Yes	Suppliers will take back scraps and unused materials.
Use local staff (including subcontractors) when possible to minimize transportation impacts (EPA, 2022a).	Energy; Air; Social	Yes	Geophysical surveyor, drillers, and IDW contractors are located near site.
Consolidate shipping and delivery of incoming materials to minimize the number of truck trips and associated fuel consumption and offsite air emissions. For example, a single shipment could supply the volume of wood chips to be placed in a biobarrier as well as the amount needed for site restoration (EPA, 2021a) .	Air; Land & Ecosystems; Materials & Waste; Water	Yes	IDW pick up will be conducted on one event.
Project Management			
Identify opportunities for resource sharing within a portfolio or with other parties located nearby (EPA, 2016a; CL:AIRE, 2020).	Materials & Waste; Energy; Land & Ecosystems	Yes	Local Buffalo Office staff will perform field work.
Include milestones to complete remedial site optimization process in site schedules (EPA, 2013b).	Air; Energy; Land & Ecosystems; Materials & Waste; Water	Yes	Milestones will be tracked throughout the project lifecycle.
Establish sustainability indicators for the site including reporting requirements and implement a plan to periodically evaluate sustainable indicators. Include discussions of sustainability metrics, activities, evaluations, and plans in site deliverables (EPA, 2016a; ISO, 2017; CL:AIRE, 2020).	Air; Energy; Land & Ecosystems; Materials & Waste; Water	Yes	BMP Checklist will be followed throughout the project lifecycle.
Establish key roles within the project which have sustainability responsibilities clearly outlined (Holland et.al, 2011).	Air; Energy; Land & Ecosystems; Materials & Waste; Water	Yes	PM and DPM will outline sustainability objectives for the project team as part of Work Plan.
Implement a plan to keep workforce informed of sustainability goals and provide structured training in implementing sustainable initiatives for the project (Rostone Operations, nd).	Air; Energy; Land & Ecosystems; Materials & Waste; Water	Yes	PM and DPM will prepare sustainability goals for the project team as part of Work Plan.
Implement a plan to provide continued professional and/or personal training to workforce (Rostone Operations, nd).	Air; Energy; Land & Ecosystems; Materials & Waste; Water; Social	Yes	AECOM standard practice is to keep up with regular training for workforce.
Project and stakeholder policies support a healthy work-life balance and healthy behavior in the workforce such as daily exercise, stress management, and a balanced diet (National Research Council, 2011; ISO, 2017).	Air; Energy; Land & Ecosystems; Materials & Waste; Water; Social	Yes	AECOM and this project support a healthy work-life balance.
Implement a plan to communicate project milestones with external stakeholders (National Research Council, 2011; CL:AIRE, 2020).	Air; Energy; Land & Ecosystems; Materials & Waste; Water; Social	Yes	PM and DPM will communicate project milestones to external stakeholders during regularly scheduled monthly progress update meetings.
Implement a plan to include external stakeholders in decision-making (ISO, 2017; CL:AIRE, 2020).	Air; Energy; Land & Ecosystems; Materials & Waste; Water; Social	Yes	PM and DPM will discuss approach and decisions with external stakeholders during regularly scheduled monthly progress update meetings.
Waste			
Identify equipment reuse or recycling options when evaluating remediation activities (EPA, 2013a; EPA, 2019b).	Air; Energy; Materials & Waste	Yes	Any materials that can be reused or recycled will be.
Use existing buildings to store materials and equipment or conduct activities requiring tight controls, in lieu of building new structures (EPA, 2021a).	Energy; Materials & Waste; Air; Land & Ecosystems	Yes	If needed, materials and equipment will be stored in the on-site building.

References

CL:AIRE. 2020. Supplementary Report 2 of the SuRF-UK Framework: Selection of Indicators/Criteria for Use in Sustainability Assessment for Achieving Sustainable Remediation. [Online]. Available: <https://claire.co.uk/component/phocadownload/category/16-surf-uk-bulletins?download=720.sr2-selection-of-indicators-criteria> (Date accessed: 2025).

Holland, Lewis, Tipton, Karnis, Dona, Petrovskis, Bull, Taege, and Hook, 2011. Framework for Integrating Sustainability into Remediation Projects. Remediation Journal, 21(3), pp.7-38. [Online]. Available: https://www.cresp.org/wordpress/wp-content/uploads/2012/02/Framework-20288_ftp.pdf (Date accessed: 2025).

International Standards Organization (ISO), 2017. ISO 18504: 2017 Soil Quality - Sustainable Remediation. [Online]. Available: <https://compass.astm.org/document/?contentCode=ISO%7CISO%2018504%3A2017%7Cen-US> (Date accessed: 2025).

National Research Council, 2011. Sustainability and the U.S. EPA. Washington, DC. The National Academies Press. [Online]. Available: <https://nap.nationalacademies.org/catalog/13152/sustainability-and-the-us-epa?s=z1120> (Date accessed: 2025).

Rostone Operations, nd. Sustaining Success: A Roadmap Through the 5 Essential Stages of a Sustainability Action Plan. [Online]. Available: <https://www.rostoneopex.com/resources/sustaining-success-a-roadmap-through-the-5-essential-stages-of-a-sustainability-action-plan> (Date accessed: 2025).

U.S. Environmental Protection Agency (EPA), 2013a. Green Remediation Best Management Practices: Materials and Waste Management. Office of Solid Waste and Emergency Response, EPA 542-F-13-003. [Online]. Available: https://clu-in.org/greenremediation/docs/GR%20BMP%20fact%20sheet_materials&waste.pdf (Date accessed: 2025).

U.S. Environmental Protection Agency (EPA), 2013b. Remediation Optimization: Definition, Scope and Approach. Office of Solid Waste and Emergency Response, 542-R-13-008. [Online]. Available: https://clu-in.org/optimization/pdfs/optimizationprimer_final_june2013.pdf (Date accessed: 2025).

U.S. Environmental Protection Agency (EPA), 2016a. Green Remediation Best Management Practices: Site Investigation and Environmental Monitoring. Office of Land and Emergency Management, EPA 542-F-16-002. [Online]. Available: https://www.clu-in.org/greenremediation/docs/GR_Fact_Sheet_SI&EM.pdf (Date accessed: 2025).

U.S. Environmental Protection Agency (EPA), 2016b. Field Methods For The Analysis Of Petroleum Hydrocarbons, in Expedited Site Assessment Tools for Underground Storage Tank Sites: A Guide for Regulators. Land and Emergency Management,

EPA 510-B-16-004. [Online]. Available: <https://www.epa.gov/sites/default/files/2014-03/documents/esa-ch6.pdf> (Date accessed: 2025).

U.S. Environmental Protection Agency (EPA), 2019a. Green Remediation Best Management Practices: Excavation and Surface Restoration. Office of Land and Emergency Management, EPA 542-F-19-002. [Online]. Available: https://clu-in.org/greenremediation/docs/GR_Quick_Ref_FS_exc_rest.pdf (Date accessed: 2025).

U.S. Environmental Protection Agency (EPA), 2019b. Green Remediation Best Management Practices: Sites with Leaking Underground Storage Tanks. Office of Land and Emergency Management, EPA 542-F-19-001. [Online]. Available: https://clu-in.org/greenremediation/docs/UST_GR_fact_sheet.pdf (Date accessed: 2025).

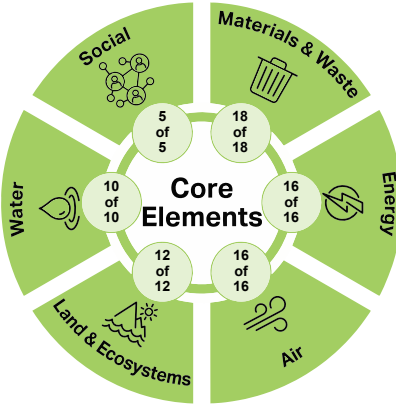
U.S. Environmental Protection Agency (EPA), 2021a. Green Remediation Best Management Practices: Bioremediation. Office of Land and Emergency Management, EPA 542-F-21-028. [Online]. Available: https://clu-in.org/greenremediation/docs/GR_factsheet_biorem_32410.pdf (Date accessed: 2025).

U.S. Environmental Protection Agency (EPA), 2021a. Green Remediation Best Management Practices: Bioremediation. Office of Solid Waste and Emergency Response, EPA 542-F-21-028. [Online]. Available: https://clu-in.org/greenremediation/docs/GR_factsheet_biorem_32410.pdf (Date accessed: 2025).

U.S. Environmental Protection Agency (EPA), 2022a. Greener Cleanups Best Management Practices: PCB Cleanups, EPA 530-F-22-005. [Online]. Available: <https://www.epa.gov/system/files/documents/2023-01/pcb-greener-cleanups-factsheet.pdf> (Date accessed: 2025).

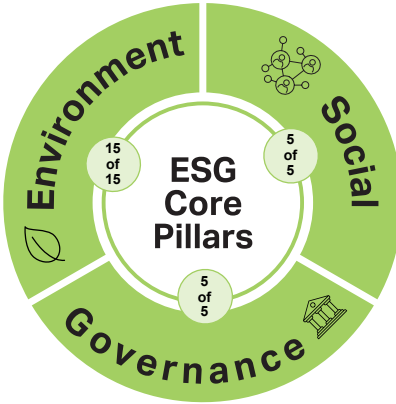
U.S. Environmental Protection Agency (EPA), 2023a. Green Remediation Best Management Practices: Cleaner Fuels and Air Emissions for Site Cleanups, EPA 542-F-23-001. [Online]. Available: https://clu-in.org/greenremediation/docs/GR_BMP_fact_sheet_cleaner_fuels_emissions.pdf (Date accessed: 2025).

Sustainable Remediation Best Management Practices
by Core Elements



Numbers indicate (BMPs Implemented) of (BMPs Applicable)

Sustainable Remediation Best Management Practices
by ESG Pillars



Numbers indicate (BMPs Implemented) of (BMPs Applicable)



Form A Summary of Green Remediation Metrics

Site Name: _____ Site Code: _____ Operable Unit: _____
Address: _____ City: _____
State: _____ Zip: _____ County: _____

Reporting Period

Contract Period From: _____ To: _____
Reporting Period From: _____ To: _____ Is this a Final Report? Yes ☐ No ☐

Contact Information

Preparer's Name: _____ Phone No.: _____
Preparer's Affiliation: _____ Company Code: _____
Contract No. _____

Materials & Waste Generation: Quantify the materials used or consumed and the management of waste generated on-site.

	Current Reporting Period (Include Units)	Total to Date (Include Units)
Materials Brought to the Site		
• Topsoil		
• Fill		
• Silt Fence		
• Silt Logs		
• Aggregate Base Course		
• Geotextile		
• Solidification Additives		
• Activated carbon		
• Other:		
• Other:		
• Other:		
• Other:		
• Other:		
• Other:		
• Other:		
Total Wastes Generated On-Site		
• Remedy Generated Waste		
• Contractor Generated Waste		
• Other:		
• Other:		
• Other:		
• Other:		
• Other:		
• Other:		
• Other:		

Provide a description of any implemented waste reduction programs appropriate for this project in the space provided on the certification page.

Recycled and Bio-Based Content in Imported Products and Materials: Quantify all materials and products imported to the site, including cost of materials/dollar values. Provide total percentages of recycled and bio-based of products and materials.

List Products and Materials Below	Total \$ Value Provided	Total Percent of Recycled Content	Total Percent of Bio-based Content

Provide additional descriptions, as necessary, in the space provided on certification page.

Solid Waste Disposal and Diversion: Quantify all solid wastes generated, and indicate whether material was disposed or diverted for recycling or reuse.

Solid Waste Material	Date	Disposed or Diverted	Volume (Ton or CY)	Disposal/Recycling Facility Name	Comments (if not diverted, state why)
TSCA Contaminated Sediment					
Non-TSCA Contaminated Sediment					
Cleared Vegetation					
Spent Granular Activated Carbon					
Monitoring Well Removal Debris					
Other:					
Other:					
Other:					
Other:					
Other:					
Other:					

Provide descriptions in the space provided on the certification page of all wastes that were redirected for recycling or reuse. Indicate full names and addresses of facilities.

Energy Usage: Quantify the amount of energy used on-site and portion of that voluntarily derived from renewable energy sources.

	Current Reporting Period (KWh)	Total to Date (KWh)
Total electricity usage		
Of that total amount, provide quantity:		
• Derived from renewable source (i.e., solar, wind)		
• Other:		

Provide descriptions in the space provided on the certification page of all reported energy use reduction programs appropriate to this project, including use of electricity derived from renewable sources.

Water Usage: Quantify the volume of water used on-site from difference sources.

	Current Reporting Period (Gallons)	Total to Date (Gallons)
Total quantity of water used on-site		
Of that total amount, provide the quantity obtained from:		
• Public potable water supply		
• Surface water		
• On-site treated groundwater		
• Reclaimed treated water		
• Collected or diverted storm water		
• Re-Injected groundwater		
• Other:		
• Other:		

Provide descriptions in the space provided on the certification page of any reported water use reduction programs applied. Please note if reused/injected groundwater is pre-treated.

Emissions: Quantify the distance traveled for delivery of supplies and removal of waste.

	Current Reporting Period (Miles)	Total to Date (Miles)
Off-site mobile fuel combustion		
Other:		

Provide descriptions in the space provided on the certification page of practices such as use of local vendors within 150 miles of the site and on-site stationary fuel use reduction programs.

Quantify the number of hours that diesel and other equipment with the potential to emit hazardous air pollutants (HAPs) or greenhouse gas (GHG) emissions was operated on-site.

	Current Reporting Period (Hours)	Total to Date (Hours)
On-site diesel excavation/construction equipment usage		
Other on-site processes generating emissions		
Other:		

Quantify the VOC emissions from active remediation systems on-site.

	Current Reporting Period (lbs VOCs emitted)	Total to Date (lbs VOCs emitted)
Operating soil remediation equipment		
Operating groundwater remediation equipment		
Other:		

Provide descriptions in the space provided on the certification page of the type of equipment used, rating, emission control devices used and other means to reduce emissions.

Land and Ecosystem: Quantify the amount of land and/or ecosystems disturbed by construction and the area of land and/or ecosystems restored to a natural condition.

	Current Reporting Period (Acres)	Total to Date (Acres)
Total land area disturbed		
Total land area restored		
Increase in area for storm water infiltration (vs pre-disturbed conditions)		
Increase in area of native species plantings (vs pre-disturbed conditions)		
Other:		

Quantify the amount of land and/or ecosystems remediated.

	Current Reporting Period (Acres)	Total to Date (Acres)
Total area of land impacted by contamination		
Total area of land remediated to unrestricted use		
Total area of land remediated to other future site use		

Additional Comments on Green Remediation Programs Implemented: *Provide descriptions in the space provided of other green remediation practices performed during the project.*

Descriptions of green remediation programs reported above (Attach additional sheet if needed)
Materials and Products Imported:
Waste Generation:

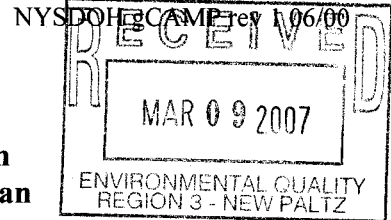
Descriptions of green remediation programs reported above (Attach additional sheet if needed)**Recycled and Bio-Based Content in Imported Products and Materials:****Solid Waste Disposal and Diversion:****Energy Use:****Water Use:****Emissions:****Land and Ecosystem:****Other:****CERTIFICATION BY CONTRACTOR**

I, _____ (**Name**) do hereby certify that I am _____ (**Title**) of the Company/Corporation herein referenced and contractor for the work described in the foregoing application for payment. According to my knowledge and belief, all items and amounts shown on the face of this application for payment are correct, all work has been performed and/or materials supplied, the foregoing is a true and correct statement of the contract account up to and including the last day of the period covered by this application.

Date_____
Contractor

THIS PAGE WAS LEFT INTENTIONALLY BLANK

Appendix F – NYSDOH Generic Community Air Monitoring Plan



New York State Department of Health Generic Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical-specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a **continuous** basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored **continuously** at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed $150 \text{ mcg}/\text{m}^3$ above the upwind level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than $150 \text{ mcg}/\text{m}^3$ above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within $150 \text{ mcg}/\text{m}^3$ of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

June 20, 2000

P:\Bureau\Common\CommunityAirMonitoringPlan (CAMP)\GCAMPRI.DOC

Appendix G – Access Agreements (Pending)