

Accident Prevention Plan

Phase I Remedial Investigation of PFAS

New Boston Space Force Station
Hillsborough County, New Hampshire

April 2023

Prepared for:



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Attachment 9 – MEC Procedures

Acronyms and Abbreviations

°C	Degrees Celsius
°F	Degrees Fahrenheit
ACGIH	American Conference of Governmental Industrial Hygienists
AECOM	AECOM Technical Services, Inc.
AED	Automatic External Defibrillator
AFCEC	Air Force Civil Engineering Center
AHA	Activity Hazard Analysis
ANSI	American National Standards Institute
APP	Accident Prevention Plan
CDC	Center for Disease Control and Prevention
CENAE	USACE, New England District
CEO	Chief Executive Officer
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
COR	Contracting Officer Representative
CPR	Cardiopulmonary Resuscitation
CRZ	Contaminant Reduction Zone
CSP	Certified Safety Professional
dBA	Decibel A-weighted
DoD	Department of Defense
DOT	Department of Transportation
ECP	Exposure Control Plan
EM	Engineer Manual
ERP	Emergency Response Plans
ERT	Emergency Response Team
EZ	Exclusion Zone
ft amsl	feet, above mean sea level
GAC	Granulated Activated Carbon
GDA	Government Designed Authority
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSE	Health, Safety, and Environment
HSI	Hazardous Substance Inventory
lb	Pound
MassDEP	Massachusetts Department of Environmental Protection
MassPort	Massachusetts Port Authority
MCL	Maximum Contaminant Level
NBSFS	New Boston Space Force Station
NIOSH	National Institute for Occupational Safety and Health
NTCRA	Non-Time Critical Removal Action
OSHA	Occupational Safety and Health Administration

OU	Operable Unit
PFAS	Per- and Polyfluoroalkyl Substances
PM	Project Manager
PPE	Personal Protective Equipment
QAPP	Quality Assurance Project Plan
QR	Quick Response
RAC	Risk Assessment Code
RCRA	Resource Conservation and Recovery Act
RSHEM	Regional Safety, Health, and Environment Manager
SDS	Safety Data Sheet
SEA	Safety Equipment Association
SH&E	Safety, Health & Environment
SHEM	Safety, Health, and Environment Manager
SHM	Safety and Health Manager
SOP	Standard Operating Procedure
SSE	Short Service Employees
SSHO	Site Safety and Health Officer
SSHP	Site-specific Safety and Health Plan
SULU	Speak Up/Listen Up
THA	Task Hazard Assessment
TLV	Threshold Limit Value
TOM	Task Order Manager
UFP	Uniform Federal Policy
U.S.	United States
USEPA	United States Environmental Protection Agency
USACE	United States Army Corps of Engineers
VOC	Volatile Organic Compound
WBGT	Wet Bulb Globe Temperature

Preface

This Accident Prevention Plan (APP) presents health and safety requirements and guidelines for field activities to be performed as part of Phase I Remedial Investigation of PFAS, being performed at New Boston Space Force Station (NBSFS) in New Boston, New Hampshire.

Under the current Scope of Work for this project, AECOM's field activities supporting these investigations at NBSFS is to:

- (1) Conduct field activities to refine the nature and extent of AFFF derived PFAS in site-media and to identify potential chemical behaviors and transport mechanisms.

This APP establishes procedures to protect site personnel from potential health and safety hazards that may occur during the site field activities. All AECOM safety, health and environmental (SH&E) standard operating procedures (SOPs) referenced in this APP are contained in the Site Safety and Health Plan (SSHP) located in **Attachment 1** of this APP.

This APP has been prepared for exclusive use for this program by employees of AECOM. AECOM will not use this plan for work other than that described in this APP, nor will AECOM modify it or use it after the expiration date without written approval by the Project Manager (PM); Safety, Health, and Environment Manager (SHEM); and Regional Safety, Health, and Environment Director (RSHEM). This plan is not valid unless it is signed and dated by the PM and authorized Health, Safety, and Environment (HSE) staff.

This APP shall not be used by firms or persons not under contract to AECOM without written approval by AECOM's Chief Executive Officer (CEO). Any use of this APP by other parties, including, without limitation, third party contractors on 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 shall have no responsibility. The existence and use of this APP 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. If this plan is to be used or modified by the United States Army Corps of Engineers (USACE) or their authorized representatives, the Project Identification page must be replaced by USACE or its authorized representatives, and neither AECOM nor its staff (past or present) will have any responsibility for the content or applicability of this document.

This APP shall be maintained on site at all times for reference by all personnel. This document includes plans required by USACE Engineer Manual (EM) 385-1-1.

1. Signature Sheet

a. Plan Preparer:

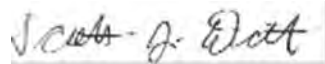


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16 January 2023

Date

b. Plan Reviewer (Company/corporate officer authorized to obligate the company):

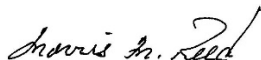


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16 January 2023

Date

c. Plan Approval:



Morris Reed, CSM, STS
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16 January 2023

Date

d. Plan Approval:



On behalf of Joshua Millard, PG, CPG
AECOM Task Order Manager
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April 6, 2023

Date

2. Background Information

2.1 Contractor

AECOM is the prime contractor. AECOM will have site safety and health oversight and coordination responsibilities for AECOM workers, including AECOM contractors and their subcontractors. Each contractor and subcontractor will be held accountable for the safe and healthful performance of work by each of their workers and subcontractors. AECOM will strictly adhere to the provisions of this APP, along with the applicable regulations issued by governmental entities.

- All workers and visitors on site are responsible for following the safety procedures regardless of their employer
- AECOM will have site safety and health oversight and coordination responsibilities for workers

2.2 Contract Number

This project is being executed by AECOM Technical Services, Inc. (AECOM) under Contract W912WJ-19-D-0003; Delivery Order W912WJ22F0102 issued by the USACE New England District (CENAE) on behalf of the US Air Force Civil Engineer Center (AFCEC) and NBSFS.

2.3 Project Name

Phase I Remedial Investigation of PFAS

2.4 Project Description

The PFAS Phase I RI includes investigation at three (3) sites at NBSFS where historic activities involving the use or storage of Aqueous Film Forming Foam (AFFF) has been confirmed and AFFF derived PFAS has been detected in soil, groundwater, surface water and/or sediment. The three sites include FT006P-SUB (Site 8 Former Fire Training Area), OW013P (Site 13 Building 103, Former Oil-Water Separator [OWS], Former Outfall), and SS018P-SUB (Site 18 Former Wastewater Treatment Plant [WWTP], Buildings 130 and 121). NBSFS environmental investigation history includes numerous investigations under both the Installation Restoration Program (IRP) and the Military Munitions Response Program (MMRP). To complete the PFAS Phase I RI, sufficient site-specific data is necessary to refine the nature and extent of AFFF derived PFAS in site-media and identify potential chemical behaviors and transport mechanisms. Human health and ecological risk assessments will not be conducted in association with the PFAS Phase I RI. Additionally, sufficient site-specific data will be collected that will also support future human health and ecological risk assessments, if warranted. A background and history of these three separate sites are presented below.

2.4.1 Site Background/History

This section presents AECOM's understanding of the elements of the Installation history that are relevant to the PFAS Phase I RI sampling design. NBSFS was formerly known as the New Boston Bombing and Gunnery Range and was used as an active bombing range in support of Grenier Field in nearby Manchester, NH from fall of 1941 until 1956. In addition to bombing activities, training and maneuver activities were performed on the property from 1956 until 2002, when the range officially closed. Until July 2021, the NBSFS was named the New Boston Air Force Station (NBAFS). The location of the three AFFF Release Areas, FT006P-SUB, OW013P, and SS018P-SUB are provided on Figure 1. FT006P-SUB and SS018P-SUB are all within munitions response

sites (MRS) and contain potential munitions of explosive concern (MEC). No munitions constituents (MC) analyses are proposed as part of this RI, which focuses on PFAS only. However, UXO clearance will occur on all three AFFF Release Areas during RI activities. A brief history of each site follows.

2.4.1.1 Site 8 Fire Training Area

FT006P-SUB is located at Site 8 and is the location of a former fire training area (FTA). The area was used for former fire training exercises consisting of ignition of small amounts of petroleum, oil and lubricants, and gasoline in 55-gallon drums from 1974 to 1985. Fire suppressants were also used during activities in the area. Historically, the boundaries of FT006P-SUB are a portion of a parking lot elevated above a former baseball field to the south and beneath a hillside to the north. However, the 2021 Site Inspection (Ayuda, 2021) indicates that the FTA may be larger than the depicted FT006P-SUB boundary (Figure 1) based on review of historical documents. Deer Pond is located to the east and drains to Joe English Pond via a small stream, while Ballfield Pond is located to the southwest and drains to Joe English Pond. In addition, around the current baseball field, historically there was a pistol/rifle range which was operated from 1962 through the early 1970s. Presently, the potential for MC (e.g., lead) at the pistol/rifle range is being investigated under the MMRP; therefore, MC are not covered by this investigation (URS, 2022). Water supply well PW-3 was installed to provide water to the NBSFS Community Center and is present to the east of that Center (Figure 2). Information regarding the amount of water used by the Community Center was not available. The combined perfluorooctane sulfonate (PFOS)/perfluorooctanoate (PFOA) concentration at PW-3 in an August 2016 sample was reported as 78 nanograms per liter (ng/L). PW-3 was resampled in November 2016, and the combined PFOS/PFOA concentration was 80 ng/L. These results were greater than the applicable Health Advisory (HA) at the time (70 ng/L), and a PFAS treatment system, based on granulated activated carbon (GAC), was installed at the PW-3 wellhead in 2017. The SI recommended FT006P-SUB proceed to an RI because PFAS concentrations exceeded screening levels (SLs) and there is a potentially complete groundwater pathway for future human receptors (Ayuda, 2021).

2.4.1.2 Site 13 Firehouse

OW013P is located at Site 13 and is the location of a firehouse (Building 103), former oil-water separator (OWS) and former National Pollutant Discharge Elimination System (NPDES) outfall. From 1976 to 1994 (prior to the installation of the OWS in 1994), vehicle wash water was discharged to the NPDES outfall (i.e., the storm water ditch across Galaxy Way to the north of Building 103). The 350-gallon OWS, operating from 1994 to 2001, received vehicle wash water through former floor drains in the vehicle bay of Building 103. The OWS system included a 1,000-gallon holding tank. All discharge from the former OWS was trucked to the former NBSFS WWTP at SS018P-SUB at Site 18 during system operation (Ayuda, 2021). Surface water drainage at OW013P is to the Bog Brook watershed to the north. There is no documented AFFF release at OW013P, however, the SI recommended OW013P proceed to an RI because PFAS concentrations exceeded SLs and there is a potentially complete groundwater pathway for future human receptors (Ayuda, 2021).

2.4.1.3 Site 18 Former WWTP

SS018P-SUB is located at Site 18 and is the location of the former WWTP. Discharge from the former OWS at OW013P was trucked to SS018P-SUB during system operation and may have been released via the former NPDES outfall associated with the WWTP (Ayuda, 2021). Surface drainage flows down a steep embankment to SATCOM Pond (also known as Beaver Pond No. 1). Surface water flows from the pond via an unnamed stream to Deer Pond east of SS018P-SUB. Effluent from the former NPDES outfall would have flowed the same as surface drainage. IRP investigations of Site 18 have identified areas where polycyclic aromatic hydrocarbons

(PAHs) and copper are identified as constituents of potential ecological concern in soil downgradient of the former WWTP NPDES outfall. The SI recommended SS018P-SUB proceed to an RI because PFAS concentrations exceeded SLs and there is a potentially complete groundwater pathway for future human receptors (Ayuda, 2021). SS018P-SUB within the PFAS Phase I RI also includes the location of IRP Site 5 (Landfill No. 3 [LF003]) and IRP Site 7 (Battery Acid Disposal and OWS Site [SD005]). Landfill No.3 (LF003) is an inactive construction debris area (ESE,1985). Portions of Site 7 overlap Site 5. This portion of SS018P-SUB is currently occupied by asphalt-paved parking areas and Building 141. Landfill No. 3 is estimated to have been utilized between 1960 and 1974 (Peer, 1989). Historical records indicate that the landfill contains construction debris and rock rubble from road construction and maintenance. At the former Motor Pool (Building 141) maintenance was performed on approximately 30 installation vehicles from 1974 until approximately 2002. Activities ranged from minor tune-ups to engine or transmission repair. Former floor drains and floor gutters within Building 141 were connected to the former OWS that was removed in 2002 (Shaw, 2011). The former Motor Pool area included four underground storage tanks (USTs), two Above Ground Storage Tanks (ASTs), and a fuel dispenser. All these features have been removed. In addition, former IRP Site 1 Chemical Spill/Drum Storage Site was located to the east of this area and IRP Site 12 Fuel Spill Site overlies this area. Both sites were closed as “No Further Action” based on site history and sampling results. Currently, metals and PAH human health risks have been identified in soil and groundwater at IRP Site 7. NBSFS water supply wells PW-1 and PW-2 are in proximity to SS018P-SUB. PW-1 is located east of IRP Site 5, while PW-2 is located south of Site 5 (Figure 3). The NBSFS water system distributes potable water and provides fire protection for the majority of NBSFS facilities. The system serves approximately 100 people at a reported average daily demand between 7,000-8,000 gallons per day (gpd) with a maximum daily demand of approximately 10,000 gpd (URS, 2021). PFAS have been detected in both water supply wells, and PFAS were detected at overburden and bedrock wells at SS018P-SUB in the Preliminary Assessment (ECC, 2017) and the Site Inspection (Ayuda, 2021).

2.4.2 Previous Site Investigations

A complete description of previous studies and findings related to the work covered under this APP are presented in the project Uniform Federal Polity (UFP) Quality Assurance Project Plans (QAPPs):

- AFCEC, April 2017. Final Preliminary Assessment Report for Perfluorinated Compounds at New Boston Air Force Station, New Boston, New Hampshire.
- ECC, September 2017. Final Preliminary PFC Investigation Completion Report For Site-Wide Groundwater, New Boston Air Force Station, New Boston, New Hampshire.
- Ayuda, September 2021. Final Site Inspection Report of Aqueous Film-Forming Foam Areas at New Boston Space Force Station, New Boston, New Hampshire
- Air Force Civil Engineer Center (AFCEC), September 2021. Addendum to the Site Inspection Report of Fire Fighting Foam Usage at New Boston Space Force Station, New Boston, New Hampshire
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- Shaw. 2009. New Boston Air Force Station, Site Inspection, Final, Installation Restoration Program. Shaw Environmental, Inc.
- Shaw, 2011. New Boston Air Force Station, Remedial Investigation/Feasibility Study, Final Report, IRP Program, New Boston, New Hampshire
- Shaw, 2013. New Boston Air Force Station, Remedial Investigation, Data Gap Addendum, Draft Final Report, Installation Restoration Program.
- URS, 2022. New Boston Space Force Station, Draft Supplemental Remedial Investigation, Installation Restoration Program, New Boston, New Hampshire

2.4.3 Work to Be Performed

As described above, the main purposes of these field activities are to: refine the nature and extent of AFFF derived PFAS in site-media and to identify potential chemical behaviors and transport mechanisms

All field activities will be conducted implementing MEC and Anomaly avoidance procedures in accordance with EM 385-1-97. AECOM will follow MEC safety procedures (included in Attachment 9), as appropriate, during all field activities. MEC safety procedures will be conducted in accordance with the United States Army Corps of Engineers (USACE) Explosive Safety and Health Requirements Engineer Manual (EM) 385-1-97 (USACE 2013), Safety and Health Requirements EM 385-1-1 (USACE 2014), Defense Explosives Safety Regulation 6055.09, Ammunition and Explosives Safety Standards 6055.09 (DoD 2019).

In order to achieve these goals, the following field activities may be performed:

- Mobilization/ demobilization
- Brush clearing
- Utility clearance and surveying
- Soil Borings
- Borehole geophysical work
- Groundwater monitoring well installation and development
- Soil sampling for various chemical analysis
- Groundwater sampling for various chemical analysis
- Staff gauge installation
- Synoptic water levels
- Surface water and sediment sampling for PFAS analysis
- Surveying
- IDW management

The sampling locations are shown on **Figure 2** (FT006P-SUB) and **Figure 3** (OW013P and SIS018P-SUB).

2.4.4 Site Location

NBSFS is in south-central NH, approximately 12 miles west of the city of Manchester. NBSFS consists of 2,826 acres of land and is located within the towns of New Boston, Amherst, and Mont Vernon. The Operations Area of NBSFS encompasses approximately 40 acres in the northeast portion of the property, including Site 13 and Site 18, while the remainder of the installation consists of forests, hills, and ponds that are used for camping and recreation.

2.4.5 Equipment to be Used

The field activities related to this project will require the use of equipment, as shown below. Some of this equipment (in particular, the heavy equipment) will be operated by subcontractors.

- Sonic Drill Rig
- Geoprobe
- Skid Steer
- Site Vehicles (Pickup trucks, sport utility vehicles, and privately owned vehicles)
- Monitoring Instruments
- Hand Tools

2.4.6 Anticipated High Risk Activities

The following tasks/hazards are considered high risk by AECOM. All that are applicable to the present project are checked. Controls will be instituted as needed to reduce risk and protect site workers.

- | | |
|--|--|
| <input type="checkbox"/> Asbestos Survey / Contact | <input type="checkbox"/> Ordinance, Munitions, Explosives Use |
| <input type="checkbox"/> ATV Use | <input type="checkbox"/> Pile Driving |
| <input type="checkbox"/> Bridge / Dam Inspections/ Snooper Truck Use | <input type="checkbox"/> Radiation or Radioactive Instrument Use |
| <input type="checkbox"/> Confined Space | <input checked="" type="checkbox"/> Remote Location or Lone Worker |
| <input type="checkbox"/> Cranes and Rigging Use | <input type="checkbox"/> Respirator Use (does not include dust mask) |
| <input type="checkbox"/> Demolition | <input type="checkbox"/> Scaffolding Use |
| <input type="checkbox"/> Diving – Scientific or Commercial | <input type="checkbox"/> Use or Exposure to Toxic Chemicals |
| <input checked="" type="checkbox"/> Drilling | <input type="checkbox"/> Trenching / Excavation |
| <input type="checkbox"/> High Speed Traffic Exposure | <input type="checkbox"/> Tunnel / Underground Work |
| <input type="checkbox"/> Hot Work | <input type="checkbox"/> UXO / MMR |
| <input type="checkbox"/> Conditions Immediately Dangerous to Life or Health (IDLH) | <input type="checkbox"/> Work at Heights >4 ft. |
| <input type="checkbox"/> Laboratory Operations | <input type="checkbox"/> Work at Angle >30 deg. |
| <input type="checkbox"/> LOTO or Live Energy Source Work | <input checked="" type="checkbox"/> Work On / Over Water |
| <input type="checkbox"/> On-rail / Near Rail Work | |
| <input type="checkbox"/> Operations on Active Airfield | |

2.5 Major Phases of Work

The following work activities have been identified for this project:

- Site and Utility Surveying (oversight)
- Brush clearing (oversight)
- Mobilization

- Soil Boring (oversight)
- Monitoring Well Installation and Development (oversight)
- Groundwater Sampling
- Synoptic Water Levels
- Surface Water and Sediment Sampling
- Demobilization
- Working near Water

Activity Hazard Analyses (AHAs) for work that will be conducted as part of the field activities have been prepared in accordance with EM 385-1-1, Section 01.A.14, and are included in **Attachment 2** of this plan. AHAs will remain accessible on the project site for review and use by all site personnel. Additional AHAs may be identified and added to this APP during the period of performance.

3. Statement of Safety, Health and Environment Policy

3.1 AECOM Policy

Safety, Health & Environment

Purpose

This policy establishes the framework to safeguard AECOM's employees and stakeholders through effective management of risk and commitment to a Culture of Caring.

Commitment

In recognition of the right to a safe and healthy working environment, AECOM is committed to maintaining the physical, psychological, and social well-being, of our employees, stakeholders, and global communities through appropriate risk management strategies.

To advance our Safety, Health & Environment (SH&E) program, we are committed to:

- Our goal of zero work-related injuries to AECOM employees and stakeholders, incident prevention and protection of the environment while executing our work.
- Providing a highly effective SH&E management system based on our Life-Preserving Principles that empowers employees and drives continuous review and improvement opportunities.
- Effectively managing critical SH&E risk throughout the project lifecycle, through identification and development of suitable actions using the hierarchy of controls.
- Appropriately meeting client requirements and properly incorporating all applicable SH&E legal requirements and local, state, provincial and national regulations.
- Fostering an exceptional safety culture based on equity, diversity, and inclusion, where communication, collaboration, and consultation enable ownership for the well-being of self and others.
- Advancing our goals of pollution prevention, resource conservation and environmental sustainability as set out in the Sustainable Legacies strategy.
- Setting aggressive SH&E performance goals and Core Value Metrics; working with employees and business partners to meet targets and promote continuous improvement opportunities.
- Establishing AECOM as the global provider of choice through safe execution of professional services throughout the project lifecycle.

Participation

Individual ownership of our Safety for Life program is required through participation of all parties in our Culture of Caring.

To that end, we expect our leaders, managers, supervisors, employees, and subcontractors to:

- Commit to the well-being of themselves and of all other stakeholders both on and off the job.
- Demonstrate this commitment through compliance with applicable rules and properly identifying, managing, and eliminating hazards and reducing risk in the workplace.
- Engage in planning and training to enable competency and the proper and appropriately maintained equipment, materials, and personal protective equipment required to work safely and respond as necessary to emergencies.
- Take action to stop work if the work cannot be executed safely or if conditions or behaviors on the work activity are unsafe or unhealthy.
- Immediately report SH&E incidents, near-misses, unsafe conditions, and at-risk behaviors; participate in investigations and review findings with appropriate stakeholders to enable implementation of corrective and preventative actions.

Accountability

We expect continuous improvement in our journey toward a "zero" incident culture, where everyone participates and is committed to SH&E excellence.

To that end our leaders, managers, supervisors, employees, and subcontractors will be held accountable to their commitment and participation through:

- Recognition and reward of those who positively contribute to excellent SH&E performance.
- Inspections, investigations and reporting to assess SH&E management system application; elevation of high potential findings to senior and executive leadership to enable appropriate action.
- Appropriate action such as coaching or disciplinary measures when expectations are not met.

Review and Communication

This Policy and associated SH&E management system will be reviewed annually and will be made available to all persons under the control of the company.



Troy Rudd
Chief Executive Officer

September 16, 2022

Date

3.2 Safety for Life

“Safety for Life” is a comprehensive integrated AECOM Safety Management System that drives our nearly 100,000 employees toward AECOM’s commitment to achieving zero work-related injuries and/or illnesses; preventing damage to property and the environment; and maintaining an environmentally friendly and sustainable workplace. Our Safety for Life program is supported by nine Life Preserving Principles that apply to all AECOM activities.

3.3 Life Preserving Principles

Demonstrated Management Commitment

Our Executive, senior and project managers will lead the SH&E improvement process and continuously demonstrate support and commitment.

Employee Participation

Our employees will be encouraged and empowered to become actively engaged in our safety processes through their active participation in safety committees, training, audits, observations and inspections. Employees will be encouraged to participate in health initiatives and adopt a healthy lifestyle.

Budgeting and Staffing for Safety

Our safety staff will be competent, fully trained and qualified to provide technical resources to our internal and external clients. A budget to support safety activities will be included in project proposals.

Pre-Planning

Our design, engineering, project and construction management staff will deploy effective risk mitigation efforts to design, plan and build safety into every project. Pre-Project and Pre-Task planning will be an effective tool in protecting our employees and the environment.

Contractor Management

Our project staff will work closely with our sub-consultants, subcontractors, contractors and Joint Venture Partners to provide a safe work environment for employees and members of the public. Our goal of SH&E performance excellence will be equally shared by all project participants.

Recognition and Rewards

Our employees will be recognized for their efforts in working safely and their support of our safety efforts.

Safety Orientation and Training

Our employees will be provided with effective safety training in order to identify and mitigate hazards in the workplace to prevent injuries to themselves and others who may be affected by their actions.

Incident Investigation

Our managers and safety professionals will investigate all recordable incidents and serious near misses to identify contributing factors and root causes in order to prevent a reoccurrence. Lessons learned shall be identified, communicated and implemented.

Fit for Duty

Our employees are responsible to report to work each day fit for duty and not to pose a health and safety hazard to themselves or others.

3.4 Driving and Vehicle Safety

The proper operation of vehicles is critical to protecting the safety of AECOM employees and subcontractors. Drivers face numerous hazards while operating vehicles. Some of the hazards include collision with another vehicle, collision with a fixed object, vehicle break down or failure, or falling asleep or becoming otherwise incapacitated while driving. All employees will adhere to Driving procedure S3AM-005-PR, which includes the following key practices:

1. Authorized Drivers

Managers must authorize drivers 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 in the course of conducting AECOM business.

2. Electronic Devices Prohibited

AECOM prohibits use of all portable electronic devices while operating a motor vehicle/ equipment which includes being stopped at a traffic light or stop sign. This includes cell phones, two-way radios and other items whether hand-held or hands-free. Electronic devices include, but are not limited to, all mobile phones, pagers, iPods, MP3s, GPS, DVD players, tablets laptops and other portable electronic devices that can cause driver distraction. Hands-free device use is not allowed.

GPS units and devices 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. Electronic devices shall be setup for operation prior to commencing driving activities and shall not be changed by the driver while driving.

3. Vehicle Inspections

The driver shall conduct pre-trip vehicle inspections prior to each trip. A vehicle inspection checklist, S3AM-005-FM2, can be used to guide and document the inspection process (**Attachment 3**). Vehicle inspection is to include a 360-degree walk around and visual inspection under the vehicle for leaks and obstructions prior to moving the vehicle.

4. Training

All drivers shall complete defensive driver training. Additional training (i.e., hands-on defensive driver training) may apply for medium and high-risk drivers; see Driving procedure S3AM-005-PR and SH&E training procedure S3AM-003-PR for more details.

5. Journey Management Plan

Drivers who undertake trips in excess of 250 miles (400 kilometers) one way, drive in remote or hazardous areas, or when otherwise deemed necessary, shall develop and document a Journey Management Plan using S3AM-005-FM1 or equivalent.

6. Secure Loads

Cargo is only to be carried within the passenger compartment of a vehicle when segregated and restrained to prevent objects from becoming distractions, obstructions or projectiles to occupants should emergency vehicle maneuvers be required (e.g., harsh braking or crash). All goods transported on flatbed trucks or in pickup beds must be securely fastened to prevent them from becoming hazards. All applicable laws and regulations regarding securing of loads must be met. It is prudent to check the load after a few miles to ensure that load has not shifted or loosened prior to completing the remainder of the trip.

7. Backing Up

Reversing the vehicle is to be avoided if at all possible. If backing up is necessary, use the following guidelines:

- Pre-plan all vehicle movements.
- If the pull-through method of parking is not possible, drivers will scan parking spot/area for hazards and back in; thereby, facilitating departure where the first move is forward.
- A light tap of the horn should be used to alert others of your intention to back up.
- Avoid tight spaces.
- Vehicles over 10,000 pounds gross vehicular weight are required to have a competent spotter in place when backing. A competent spotter is one that has received spotter training.
- All vehicles shall have a competent spotter in place when backing in an active work zone. Parking and public access areas are recommended but not required to have a spotter.

3.5 Fitness for Duty

One of AECOM's nine Life Preserving Principles is Fitness for Duty. Fitness for Duty means that individuals are in a state (physical, mental, and emotional) that enables them to perform assignments competently and in a manner that does not threaten the health and safety of themselves or others. Employees should report to work fit for duty and unimpaired by substances or fatigue. Supervisors must observe their employees and work with the employee, SH&E staff, and Human Resources to address deficiencies. AECOM will not tolerate retaliation against any employee for filing a complaint or concern regarding their fitness for duty or participating in any way in an investigation.

3.5.1 Medical Surveillance

AECOM's Medical Screening and Surveillance policy details the requirements for employee participation in a medical monitoring program. Medical Surveillance provides a streamlined process to determine if employees meet the physical requirements to perform assigned duties as defined by applicable regulations. It is also designed to provide a means to collect data relevant to exposure to chemical and physical agents for the protection of the workers and to confirm the effectiveness of health and safety programs. See Section 5 of the SSHP (**Attachment 1**) for site-specific medical surveillance requirements.

3.5.2 Proactive Health

AECOM is committed to promoting proactive health activities in addition to the planning for prevention of safety and environmental incidents. Proactive health activities will be completed on an on-going basis at AECOM on a corporate-wide basis (i.e., Wellness program associated with employee benefits), at offices, and at this project site. Management will be actively involved in providing and encouraging opportunities for health and wellness education and improvement. Health initiatives and education will be discussed periodically during office-based meetings as the safety moment or during the daily tailgate meeting as a toolbox talk. Topics may be related to, but are not limited to:

- Heart health
- Smoking cessation
- Diet
- Stress management
- Diabetes prevention
- Exercise benefits

Topics and educational materials can be located on the AECOM Wellness page, National Institutes of Health website, Centers for Disease Control and Prevention website and other reputable sources online.

In addition, the field team will be encouraged to participate in a daily stretch and flex routine (a standardized way to avoid soft tissue damage from work activities) to the best of their abilities, given their own personal limits. It is particularly beneficial to warm and loosen muscles before repetitive work, manual handling of loads, and when working in cold temperatures or with static postures.

3.5.3 Fatigue

One aspect of fit for duty is fatigue management. AECOM has developed procedures (that limit work periods or requires additional rest under certain circumstances, including during long-distance travel or when working at high altitudes. These procedures also set limits on extended work periods of 14 hours per day or 60 hours per week. A fatigue management plan can be found in Section 10.1.

3.5.4 Substance Abuse

Drug and alcohol abuse pose a serious threat to the health and safety of employees, clients, and the general public as well as the security of our job sites, equipment and facilities. AECOM is committed to the elimination of illegal drug use and alcohol abuse in its workplace and regards any misuse of drugs or alcohol by employees to be unacceptable. AECOM Substance Abuse Prevention Procedure (S3AM-019-PR) prohibits the use, possession, presence in the body, manufacture, concealment, transportation, promotion or sale of the following items or substances on company premises. Company premises refer to all property, offices, facilities, land, buildings, structures, fixtures, installations, aircraft, automobiles, vessels, trucks and all other vehicles and equipment - whether owned, leased, or used.

- 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;
- Controlled substances that are not used in accordance with physician instructions or non-prescribed controlled substances; and
- Alcoholic beverages while at work or while on any customer- or AECOM-controlled property.

This policy does not prohibit lawful use and possession of current medication prescribed in the employee's name or over-the-counter medications. Employees must consult with their health care provider about any prescribed medication's effect on their ability to perform work safely and disclose any restrictions to their supervisor.

Although some states may pass laws legalizing medical or recreational marijuana use, the use, sale, distribution, and possession of marijuana are violations of federal law and AECOM policy, and will subject an employee to disciplinary action up to and including termination in accordance with controlling law.

3.5.5 COVID19 Awareness and Self-Assessment

To reduce or eliminate potential impacts due to illness (including coronavirus), all AECOM staff will perform a COVID19 Fitness for Duty check prior to work. This check will include the following self-assessment:

- I have had close contact with a confirmed case or a symptomatic person under investigation for coronavirus in the last 14 days.
- A doctor requested me to be tested for coronavirus or instructed me to self-quarantine?
- A member of my household or someone I was in close contact within the last 14 days experienced some of the following symptoms: fever, cough, shortness of breath, fatigue, sore throat, chills, gastro-intestinal disease or diarrhea, loss of taste/smell.
- I have or previously had some of the following symptoms in the last 7 days: fever, cough, shortness of breath, fatigue, sore throat, chills, gastro-intestinal disease or diarrhea, loss of taste/smell.
- Where required, my temperature check today shows a fever, without the use of fever reducing medications in the last 24 hours? (100.4 degrees Fahrenheit [°F] or 37.8 degrees Celsius [°C] or above or exceeding criteria required by local order or client requirements).

If response is a YES to any of these questions, then do not access the workplace. If AECOM employee, contact your Supervisor and the AECOM Nurse at 512-419-5016 for advice.

If response is a NO or Yes, but released by AECOM nurse, you can proceed to work. You may be asked to check your temperature again when you arrive to your workplace.

The Site Supervisor or Site Safety Officer shall similarly verify that subcontractors and visitors are not impacted prior to entering AECOM office or field facilities.

3.6 Contractor Safety Commitment and Accident Experience

AECOM is committed to the goal of zero safety related incidents and will continue to foster our belief that all injuries are preventable. Our core values and business principles will guide our efforts to provide the systems, tools, and processes that inspire our workers and subcontractors to embrace our aspirations, understand their personal responsibilities in achieving our goals, and exhibit the individual behaviors that are fundamental to our success.

AECOM serves a diverse client base and performs a wide range of services that inherently involve variable and unique risks and hazards. Key SH&E metrics are part of business plans and are monitored and discussed among the management team on a monthly basis.

3.7 Project Safety Goals and Behavior Based Safety

The goal of the AECOM SH&E Program is zero accidents; therefore, accident prevention continues to be of paramount importance to the firm. To this end, safety takes precedence over expediency. AECOM's goal for this project is that the project will be completed without a loss-day injury. AECOM is committed to compliance with all client health, safety, and environmental requirements as well as to applicable regulations.

Most accidents are due to unsafe behavior, and behavior changes may be made that significantly reduce accident risk. Contractor and subcontractor employees are expected to value safety and be responsible for their safety as well as the safety of others. The NBSFS Site Safety and Health Officer (SSHO) is expected to provide clear safety expectations and provide positive and negative feedback for safe and unsafe behavior. Peers are expected to intervene upon observation of an unsafe behavior and provide positive feedback for safe behavior.

As part of the AECOM Behavior-Based Safety program, the SSHO will maintain Form S3AM-007-FM1 - Behavior Based Safety Checklist (**Attachment 3**) Safety observations will be performed by employees and subcontractor at the rate of one per 200 hours worked and a minimum of one per week of field work conducted. Each employee working on the project will complete a minimum of one safety observation.

3.8 Rewards and Recognition

One of AECOM's Life Preserving Principles is Recognition and Rewards for proactive safety, health and environmentally focused behaviors. All projects are expected to participate in the rewards and recognition programs available on the Corporate and DCS Americas SH&E ecosystem pages. Large, long-term projects are encouraged to establish a project specific rewards and recognition program which incorporates project specific goals and activities.

There are several possible appropriate methods of rewarding and recognizing employees and contractors:

1. **Informal** – Recognition via verbal acknowledgment, email, spot awards, luncheons, etc.
2. **Formal** – Safety Star Award nomination
3. **Formal** – SH&E Challenge Coins

3.9 Hazardous Material Handling and Waste Management

If hazardous, solid, and/or municipal wastes are generated during any phase of the project, the waste shall be accumulated, labeled, and disposed of in accordance with USFOR-A Environmental Standard Operating Procedure, February 2015 and AECOM SH&E Procedures. A site-specific Entity Letter may be required for the site/client; if so, only persons named on the entity letter are allowed to sign waste shipping papers “on behalf of USACE”. Any individual signing shipping papers must have valid Department of Transportation (DOT) and Resource Conservation and Recovery Act (RCRA) training for waste shipment. Employees will consult the SH&E Manager as needed for further guidance on AECOM and regulatory procedures and training requirements.

3.10 Housekeeping and Personal Hygiene

Basic housekeeping requirements for offices and work sites, as well as personal hygiene and sanitation standards, are described below. Inspections will be performed at the regular intervals using *S3AM-013-FM1 - Housekeeping Inspection*, included in **Attachment 3**. Additional information regarding housekeeping and sanitation is included in Section 10.4.

Site-specific Housekeeping and Personal Hygiene requirements include:

Housekeeping:	<i>Inspection Frequency:</i> Throughout the work shift	<i>Inspector:</i> SS/ SSO or designee
Eating, Drinking, Smoking:	Eating and drinking are permitted only in designated area(s) located outside the work area. Smoking and the use of smokeless tobacco is prohibited.	
Handwashing:	<p>Site staff will wash hands and face after completing work activities and prior to breaks or meals. Water, soap and paper towels or equivalent supplies may be available in the contractor field office/trailer. Otherwise, facilities are available at nearby restaurants and convenience stores.</p> <p>Due to Covid-19 wash hands more frequently:</p> <ul style="list-style-type: none"> • Wash hands with soap and water for 20 seconds. • Wash hands after sneezing, coughing, blowing your nose, or being in a public place. • Use hand sanitizer that contains at least 60% or up to 95% of alcohol • See Handwashing Illustration (end of this section) • Avoid touching face, mouth, nose, and eyes 	
Toilets:	<p>Toilets may be available in the contractor field office/trailer. Otherwise, facilities are available at nearby restaurants and convenience stores.</p> <p><i>NOTE: A minimum of one toilet must be provided for every 20 personnel on site. For mobile crews where work activities and locations permit transportation to nearby toilet facilities on-site facilities are not required.</i></p>	

Water:	<p>Potable and non-potable water may be available at the NBSFS. AECOM staff are encouraged to bring their own.</p> <p>A water supply meeting the following requirements will be utilized:</p> <p><i>Potable Water:</i> Potable water can be provided in the form of water bottles, canteens, water coolers, or drinking fountains. Disposable drinking cups for single use and a waste receptacle will be provided as needed. Water containers will be refilled daily and disinfected regularly. Potable water containers will be properly identified in order to distinguish them from non-potable water sources.</p> <p><i>Non-Potable Water:</i> Non-potable water may be used for hand washing and cleaning activities. Non-potable water will not be used for drinking purposes.</p>
Illumination:	<p>Oversight activities will be conducted during normal work hours. If natural light or installed lighting fixtures is not sufficient in the work area, work will be re-scheduled.</p>
"Touch Points" and Shared Equipment	<p>Common touch points and shared equipment may include but are not limited to:</p> <ul style="list-style-type: none"> Arms on chairs, tabletops, doorknobs and handles, countertops, elevator buttons, faucets, light switches Coffee Pots, Refrigerator/microwave/dishwasher/toaster handles, Water Dispensers Cabinet and file drawer knobs/handles, shared office supplies, phone receivers, keypads, copier/printer buttons Sampling/field equipment, coolers, hand tools <p>Use disinfectant to wipe down all "touch point" surfaces at least daily. Do not touch face. Wash hands before and after equipment use. Have soap, antibacterial hand wipes or spray, or 60% + alcohol hand sanitizer accessible at all times and use on high-touch surfaces after encounters with the public</p> <p>If any staff are showing any possible symptoms of or have been in recent direct contact with others showing symptoms of CORONAVIRUS, STOP WORK. Notify the site supervisor and the project manager and go home and/or stay home.</p>

3.11 Lone Worker

AECOM discourages employees from working alone (i.e., where AECOM personnel are out of visual and audio range of others) when performing field tasks (see Working Alone SHE Procedure [S3AM-314-PR](#)). If lone work is to be performed, a communications/check-in plan must be developed and implemented prior to commencing.

3.12 Newly Hired or Transferred Employees

All newly hired or transferred employees with fewer than 6 months experience working on field projects or an employee who has not completed the required training or received required certifications are considered "Short Service Employees", or "SSEs" (see the Newly Hired or Transferred Employees procedure, [S3AM-015-PR](#)). The Project Manager will identify all SSEs working on the project, and each SSEs will be assigned to an experienced team member so all activities may be monitored. All SSEs working or visiting a field environment are required to wear a green hard hat for safety and identification purposes. In the event a client has an existing SSEs program, AECOM will defer to the identification system required by the client. Any new employee shall wear the designated SSE identifier until the Project Manager determines the employee has the knowledge, skills, and ability related to the specific hazard on the project.

The project scope of work does not currently involve SSEs. If it becomes necessary to use one or more SSEs to complete the project scope of work, they will be evaluated in advance by the AECOM Project Manager, approved by both the AECOM and Project Managers prior to mobilizing to site, and listed in this APP.

3.13 Safety Observations

Safety observations are observations made by employees or subcontractors of a condition or behavior which could contribute to an incident, prior to the incident occurring. Observations can also identify positive behaviors or interventions which contribute to the prevention of incidents. Large, long-term projects may benefit from the use of LifeGuard to track and trend observations on a site level. All other projects should log their observations using IndustrySafe. Both reporting systems can be accessed on any safety page of ecosystem. Or the quick response (QR) codes below can be used while off the AECOM network from a smartphone/ device.



LifeGuard



IndustrySafe
Safety Management Software

3.14 Stop Work Authority

AECOM empowers and expects all employees to exercise their Stop Work Authority if an incident appears imminent, or when hazardous behaviors or conditions are observed. A stop work request can be informal if the situation can be easily corrected or may require shutting down operations if revised procedures are necessary to mitigate the hazard. If an AECOM employee observes an imminently hazardous situation on a site controlled by others (i.e., a client-managed contractor), the employee can stop work for themselves by removing themselves from the situation. Employees also may attempt to stop work by immediately notifying the contractor foreman or site engineer, or if necessary, the client or party managing the contractor.



No employee should object to the issuance of a stop-work request, nor can any disciplinary action be levied against the employee. All employees must agree that the situation has been mitigated before resuming work. No employee will be disciplined for refusing to work if they feel it is unsafe.

HANDWASHING ILLUSTRATION



4. Responsibilities and Lines of Authority

4.1 Statement of Responsibility

AECOM has the ultimate responsibility for the successful implementation and management of AECOM's activities, to include subcontractors and all other on the worksites in correlation to this APP.

4.2 Personnel Responsible for Safety

All personnel are responsible for continuous adherence to the safety and health procedures presented in this APP and the forthcoming SSHPs during the performance of work. No person may work in a manner that conflicts with the intent of, or the inherent safety and environmental precautions expressed in these procedures. After due warnings, the company will dismiss from the site any person who violates safety procedures.

The AECOM organization chart for the management of safety at both the corporate and project level for this project is presented as **Figure 4**. The positions/responsibilities presented in the organization chart are discussed below.

Program Manager [Mark Kauffman]

The AECOM Program Manager is responsible for supporting the establishment and oversight of the overall health and safety program presented in the APP.

Safety, Health & Environment (SH&E) Manager, Federal Programs [Scott Dietz]

The SH&E Manager is responsible for developing, maintaining, and overseeing the implementation of the APP and SSHP. The SH&E Manager will approve the APP and SSHP prior to final submittal. Specific responsibilities of the SH&E Manager includes the following:

- Approve the appointment of the Site Safety and Health Officer (SSHO) and ensure that he/she has the appropriate training and competencies to perform the duties;
- Participate in quality control planning such as development of Quality Control Plans, safety and health checklists, and perform design and system safety analyses as appropriate;
- Visits the project as needed to audit the effectiveness of the safety and health program;
- Provide safety and health expectations and flow down requirements for subcontractor statements of work;
- Be available on a 24-hour basis for consultation with SSHO during onsite emergencies or as needed;
- Coordinate any modifications to the safety plans with the SSHO and Task Order Manager (TOM), as required;
- Evaluate occupational exposure monitoring/air sampling data and adjust APP/SSHPs requirements, as necessary;
- Provide continued support for upgrading and/or downgrading the level of personal protective equipment (PPE);
- Participate in the investigation of unplanned events, high loss potential mishaps; and
- Assist in development of onsite training, which will be provided by the SSHO.

Task Order Manager [Josh Millard]

The AECOM TOM represents the company in all aspects of the project work and is responsible for the following:

- Providing leadership by, among other things, setting an example for all site personnel through actions and words regarding the importance of proper health and safety practices and holding project staff accountable for safety performance;
- Coordinating all work performed by AECOM personnel and subcontractors for the project;
- Ensuring the APP/SSHPs is approved prior to commencing field operations;
- Ensuring all required PPE, other types of equipment and instruments, safety incentives, and other safety-related items are budgeted and provided;
- Ensuring that subcontractor "Statements of Work" include appropriate safety provisions and expectations;
- Ensuring that safety and health requirements are covered during kickoff meetings;
- Participating in the investigation of, and ensuring that unplanned events, high loss potential mishaps are properly reported to CENAE and NBSFS;
- Notifying the SH&E Manager of any changes in the scope of work or site conditions, and ensuring that the APP/SSHPs is updated to address new hazards;
- Immediately stopping operations in the event of an emergency or serious hazard, in order to protect personnel and the environment; and
- Preparing and submitting required work progress reports.

Site Safety and Health Officer [Richard Purdy]

The AECOM Site Safety and Health Officer will be Richard Purdy. Mr. Purdy has over 30 years of experience in the environmental, health, and safety fields.

The SSHO will be a competent person that can identify existing and predictable hazards in the working environment or working conditions that are dangerous to personnel, and who has authorization to take prompt corrective measures to eliminate them. The SSHO will have the authority and is responsible for the following actions:

- Be present during investigation operations to implement the APP/SSHP;
- Inspect site activities to identify safety and occupational health deficiencies and correct them;
- Coordinate changes/modifications to the APP/SSHPs with the SH&E Manager, TOM, and Site Supervisor;
- Ensure all field personnel, including any subcontractor personnel, assigned to the project have satisfied requirements for training and medical surveillance as specified by 29 Code of Federal Regulations (CFR) 1910.120, and that records of training and medical approval are available and maintained for each person;
- Oversee compliance with the APP/SSHPs procedures and Occupational Safety and Health Administration (OSHA) regulations through daily inspections;
- Serve as a member of the quality control staff on matters relating to safety and health;
- Stop work if unacceptable safety and health conditions exist, and take necessary action to re-establish and maintain safe working conditions;

- Operate and maintain air monitoring equipment required at a site for airborne contaminants and prepare air monitoring reports; and
- Maintain all required safety and health records (e.g., OSHA 300 Logs, mishap reports, training certificates and qualifications, equipment checklists, safety plans, air monitoring data and reports, etc.) throughout the life of the project.

Site Supervisor

The Site Supervisor will manage the onsite investigation operations in accordance with the approved Work Plan and APP/SSHP. The Site Supervisor will coordinate all onsite personnel and equipment conducting investigation operations in a safe manner. The Site Supervisor will coordinate all work with the SSHO to ensure that all safety concerns are adequately addressed and controlled. The SSHO may also serve in a dual role as SSHO and Site Supervisor. The Site Supervisor will immediately stop work in the event of an emergency or serious hazard in order to protect personnel and the environment. The Site Supervisor will work with the SH&E Manager, TOM, and SSHO in coordinating changes/modifications to the APP/SSHP, as needed.

UXO Qualified Person (UXOQP) [Shannon Linnane]

The UXOQP will provide the appropriate level of onsite support in accordance with USACE EM 385-1- 97 to include the following:

- Provide the expertise to identify and avoid possible MEC-related hazards.
- Conduct MEC safety training and briefings for all site personnel and visitors.
- Initiate MEC reporting procedures.

Please refer to Appendix C of **Attachment 9** for the UXO escort certifications.

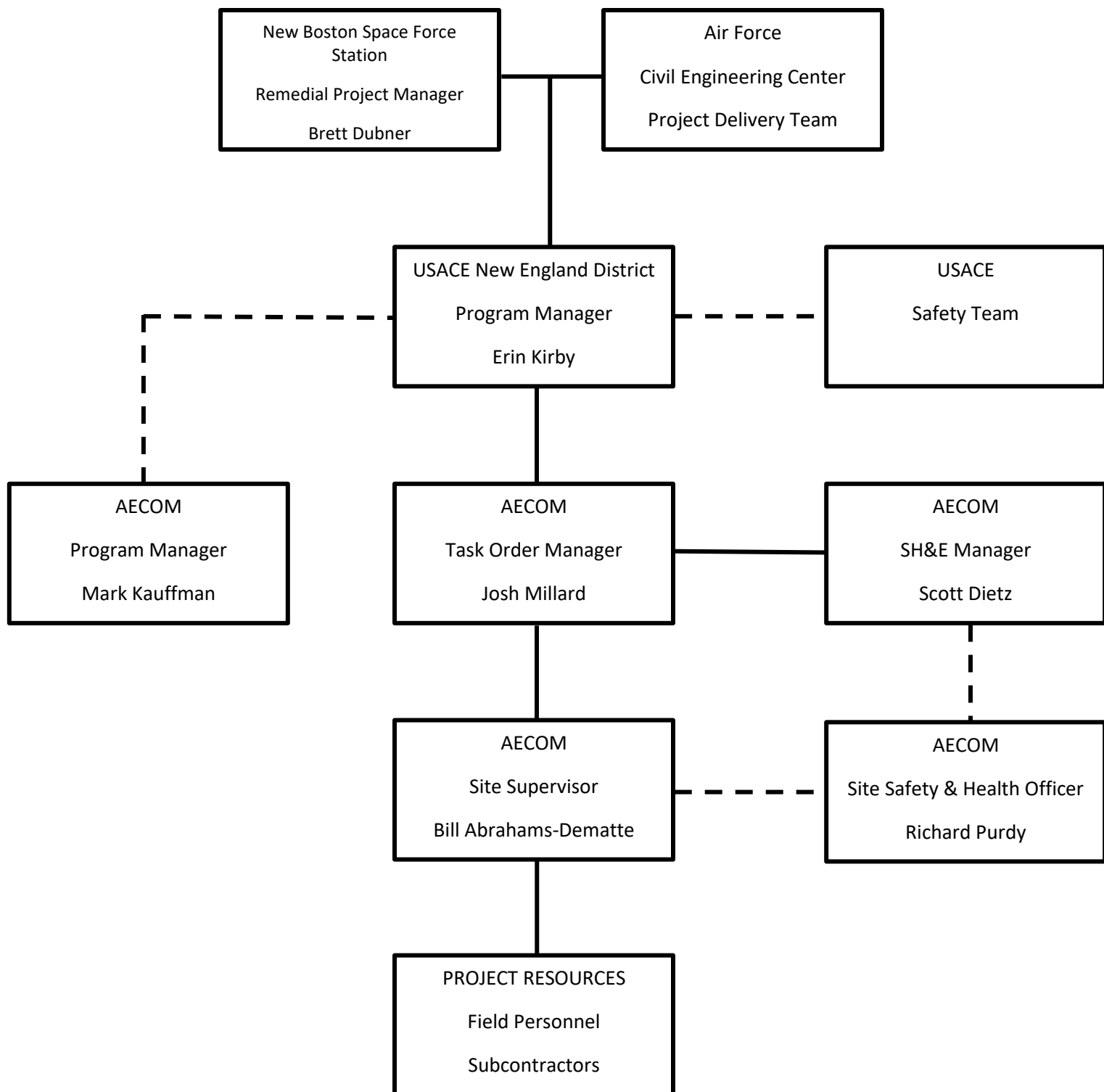
Field Personnel

Field Personnel will review and acknowledge understanding and compliance with the APP/SSHPs and performing their work in a safe and responsible manner. Specific responsibilities will include the following:

- Act in a responsible manner at all times in order to prevent mishaps, injury, and/or exposure to themselves and their co-workers, this includes exercising Stop Work Authority if needed;
- Report any and all mishaps, including near misses, to the Site Supervisor or SSHO;
- Attend and participate in all daily health and safety tailgate meetings;
- Participate in the development of AHAs as required, and follow the provisions as outlined in the final AHAs;
- Follow instructions and directions of the Site Supervisor and SSHO;
- Utilize the prescribed PPE provided for each task;
- Following all field safety procedures for safe work practices (e.g., the buddy system, communication, site control, decontamination, evacuations, and related emergency procedures);
- Perform only those tasks they have been instructed to perform if they are trained, qualified, and capable of performing safely at the time of assignment;
- Report any personal condition that could affect their safety and/or the safety of co-workers (e.g., fatigue, drowsiness, severe illness, impairment by prescription medications, influence by drugs and alcohol, emotional stress, or other condition); and

- Ensure that no work tasks are performed in deviation from the APP/SSHPs and/or the initial instructions of the Site Supervisor and SSHO.

New Boston Space Force Station
Phase I Remedial Investigation of PFAS
SH&E Organization Chart



4.3 Names of Competent and Qualified Personnel

Competent persons are qualified individuals that can identify existing and predictable hazards in the working environment or working conditions that are dangerous to personnel and have authorization to take prompt corrective measures to eliminate them.

AECOM's *S3AM-202 Competent Person Designation* explains the roles, responsibilities and procedures of naming a competent person. A *S3AM-202-FM1 - Competent Person Designation Form* will be completed for each AECOM competent person (subcontractors to use an equivalent process).

No currently scoped work requiring a Competent Person will be performed by AECOM.

4.4 Risk Management Process

For each definable feature of work, an AHA with a Risk Assessment Code (RAC) for the work activity will be prepared and discussed with personnel engaged in the activity in a job pre-brief presented by the SSHO. The AHA will define the activities being performed, identify the work sequences, specific hazards anticipated, site conditions, equipment, materials, and the control measures that will be implemented to eliminate or reduce each hazard to an acceptable level of risk. See Section 10 of this APP for further information about the risk management process.

4.4.1 Pre-Task Safety and Health Analysis Requirements

AHAs are used to identify hazards and hazard controls associated with a specific job function. AHAs focus on the relationship between the workers, the task, the resources required to complete the task, and the work environment. These variables must be evaluated to identify the potential hazards associated with the task. Once identified, steps can be taken to eliminate, reduce, or control the hazards to an acceptable risk level. Guidelines for developing AHAs are located in SH&E SOP S3AM-209-PR1-Risk Assessment and Management.

4.4.2 Stop Work Authority

All employees have the right and duty to stop work when conditions are unsafe, and to assist in correcting these conditions as outlined in SH&E SOP S3AM-002-PR1-Stop Work Authority. Whenever the SSHO determines that workplace conditions present an uncontrolled risk of injury or illness to employees, immediate resolution with the appropriate supervisor shall be sought. Should the Site Supervisor be unable or unwilling to correct the unsafe conditions, the SSHO is authorized and required to stop work, which shall be immediately binding on all affected AECOM employees and subcontractors. Upon issuing the stop work order, the SSHO shall implement corrective actions so that operations may be safely resumed. Resumption of safe operations is the primary objective; however, operations shall not resume until the SH&E Manager and TOM have concurred that workplace conditions meet acceptable safety standards. Reviewing and updating the appropriate AHA and other documentation may be necessary to document the change.

All stop work actions must be documented in the field notes and immediate contact made with the AECOM TOM.

4.5 Policy for Noncompliance with Safety Requirements

Employee non-compliance with safety requirements is taken very seriously by AECOM management. Personnel not following procedures are warned and counseled on the proper safety procedures and if the problem persists, they are again counseled with notations made in their permanent record. Continued non-compliance can lead to termination of employment.

AECOM has developed the following progressive discipline policy for the violation of safety requirements. Extremely careless or reckless violations may result in immediate termination. All instances of progressive disciplinary action will be handled in conjunction with the AECOM HR Department.

First Violation: An oral warning will be given for the first violation of a SH&E requirement depending on the severity of the violation. The employee will be informed by his or her supervisor of the violation and of the correct safe practice or procedure. The supervisor will review with the employee all applicable safety and health workplace requirements and guidelines. The employee must sign a statement indicating understanding of those requirements and guidelines. The supervisor should inform the employee that future violations will result in higher levels of discipline and may lead to dismissal.

Second Violation: The employee may be given a written warning for the second documented safety and health requirement violation. This warning will specifically identify the violation. The warning will also refer the employee to applicable safety and health requirements and guidelines for review, and show the date the employee previously read and signed the statement of understanding of safety and health requirements and guidelines. The employee, the employee's supervisor, the department head, Human Resources, and the employee's personnel file receive copies of the warning.

Third Violation: The employee may be given a final warning for the third documented violation of safety and health requirements or guidelines. This warning will specifically identify the violation. It will also state that any further violation of safety and health requirements and guidelines will result in dismissal. All persons who receive a copy of the previously written warning will receive a copy of the final warning.

Any Subsequent Violation: The employee may be dismissed for a subsequent violation. If dismissed, the employee will receive a letter specifically identifying the violation of the safety and health requirement or guideline, as well as rights of appeal through the grievance process.

Immediate Termination: On occasion, an employee can commit a violation of a safety and health requirement or guideline that is so careless and reckless, or that so endangers life or property, that it can be considered imminently dangerous. When this occurs, an employee can be dismissed immediately, without benefit of any warnings. An employee dismissed in this fashion will receive a letter specifically identifying the violation and setting out his/her right of appeal within the grievance process.

Discipline for Subcontractor Personnel: If noncompliance actions are committed by subcontractor personnel, AECOM will recommend that the employer discipline the employee. If the action continues, AECOM will have the employer remove the employee from the site. If the employer refuses to adhere to our requirements, they may be dismissed from the project.

Documentation: Employee warnings and disciplinary actions will be documented using AECOM's Corporate Memorandum format in a manner consistent with the requirements of this policy and the AECOM Human Resource Department.

4.6 Lines of Authority

Figure 4 is a graphic presentation of the project organizational chart. The lines of authority for the AECOM team are represented in **Table 1**. The lines of authority for this project include:

- The field personnel are responsible for immediately reporting unsafe or potentially hazardous conditions, mishaps, and near misses to the SSHO.
- The SSHO will report the issue to the Safety and Health Manager (SHM) and PM.
- The PM will report the issue, depending on severity, to the SH&E Manager and the USACE Contracting Officer Representative (COR).

4.7 Management Accountability for Safety

The AECOM PM, with the assistance of the SSHO, is responsible for managing, communicating, implementing and enforcing compliance with this APP. Safety audits and inspections are performed, and the results become a part of the PM's record. Safety and health constitute one of the key performance indicators by which project managers are judged. PMs who fail to demonstrate a commitment to compliance with AECOM and client safety and health policies and procedures will be relieved of their responsibilities as a PM.

Table 1: Project Team Members

Organization	Name and Project Role	Telephone Number	E-mail Address
AFCEC	Brett Dubner, Project Manager	508-968-4670, x3001	brett.dubner.1@us.af.mil
USACE New England	Erin Kirby, Project Manager	978-318-8147	Erin.Kirby@usace.army.mil
AECOM	Josh Millard, Task Order Manager	978-424-8199	Joshua.Millard@aecom.com
AECOM	Bill Abrahams-Dematte, Site Supervisor	603-801-6583	bill.abrahams-dematte@aecom.com
AECOM	Richard Purdy, STS, Site Safety and Health Officer	781-883-6425	richard.purdy@aecom.com
AECOM	Scott Dietz, CSP, STSC, Federal SH&E Manager	240-344-5892	Scott.dietz@aecom.com
AECOM	Shannon Linnane, Senior UXO QP	414-248-7263	Shannon.linnane@aecom.com

5. Subcontractors and Suppliers

5.1 Subcontractor and Supplier Identification

The following types of subcontractors and suppliers will be utilized for field activities:

- Private utility locator
- Environmental drilling company
- Investigative Derived Waste management company

These subcontractors will be identified and SH&E documentation approved prior to their work on-site. Safety Documentations (SSHPs, AHAs, etc.) for the subcontractors is presented in **Attachment 6**.

5.2 Subcontractor and Supplier Safety Responsibilities

Subcontractors

Each subcontractor will be held accountable for the safe and healthful performance of work by their workers. Each AECOM subcontractor is responsible for assigning specific work tasks to their employees. Each subcontractor's management will provide qualified employees and allocate sufficient time, materials, and equipment to safely complete assigned tasks. In particular, each subcontractor is responsible for equipping its personnel with any required PPE and all required training.

AECOM considers each subcontractor to be an expert in all aspects of the work operations for which they are tasked to provide, and each subcontractor is responsible for compliance with the regulatory requirements that pertain to those services as well as all other requirements applicable to their work. Each subcontractor is expected to perform its operations in accordance with its own safety policies and procedures, in order to ensure that hazards associated with the performance of the work activities are properly controlled. Copies of any required safety documentation for a subcontractor's work activities will be provided to AECOM for review prior to the start of on-site activities.

AECOM will provide a copy of the APP to each subcontractor in order to fulfill its obligation under 29 CFR 1910.1200 to inform subcontractors of site hazards. Subcontractors are required to read this APP, sign the Personnel Acknowledgement before work activities begin, and abide by the provisions in the APP.

Hazards not listed in this APP but known to any subcontractor, or known to be associated with a subcontractor's services, must be identified and addressed to the AECOM PM prior to beginning work operations. The PM or authorized representative has the authority to halt any subcontractor operations, and to remove any subcontractor or subcontractor employee from the site for failure to comply with established health and safety procedures or for operating in an unsafe manner.

Specific responsibilities of subcontractor employees include:

- Compliance with the requirements of their Scope of Work;
- Participate in development of a SSHPs with AHAs for their work activities;
- Maintain a safe and healthy work environment;
- Compliance with the APP, contract requirements, laws, regulations, and EM 385-1-1;
- Review the APP to ensure that the health and safety requirements of their specific tasks are satisfied;

- Provide trained and experienced workers for the specific work activities;
- Participate in the Daily Safety Tailgate Meetings;
- Identify additional training needs for unique tasks;
- Enforce company- and project-specific rules and procedures during work activities;
- Report all mishaps and participate in the investigations; and
- Ensure all equipment brought to the site is in proper working order, is routinely inspected and maintained in safe working order.

5.3 Suppliers

All suppliers of safety-related items are required to provide approved and/or appropriate materials for the project, and meet applicable specifications, testing criteria or third-party certifications. These items will be inspected upon receipt by the SSHO.

Each hazardous material supplied for site use will be accompanied by a Safety Data Sheet (SDS) and will be added to the site list of hazardous materials. These materials must be pre-approved for use by the TOM and SSHO prior to being brought onto the jobsite. SDSs and the list will be maintained by the SSHO.

5.4 Visitors

Authorized visitors (e.g., client representatives, regulators, AECOM management staff) requiring entry to any work location on the site will be briefed by the PM, Site Supervisor, or SSHO on the hazards present at that location. Visitors will be escorted at all times at the work location and will be responsible for compliance with their employer's health and safety policies. In addition, this APP specifies the minimum acceptable qualifications, training, and PPE that are required for entry to any controlled work area; visitors must comply with these requirements at all times.

If the site visitor requires entry to any exclusion zone (EZ) and does not comply with the above requirements, all work activities within the EZ must be suspended.

Unauthorized visitors, and visitors not meeting the specified qualifications, will not be permitted within established controlled work areas.

6. Training

6.1 New Hire Safety Orientation Training

Employees will be provided with a safety and health orientation prior to the start of work. All orientation training will be documented in writing by date, name, content, and trainer. The training, at a minimum, will include:

- Requirements and responsibilities for accident prevention and the maintenance of safe and healthful work environments;
- General safety and health policies and procedures and pertinent provisions of EM 385-1-1;
- Employee and supervisor responsibilities for reporting all accidents;
- Provisions for medical facilities and emergency response and procedures for obtaining medical treatment or emergency assistance;
- Procedures for reporting and correcting unsafe conditions or practices; and
- Job hazards and the means to control/eliminate those hazards, including applicable AHAs.

6.2 Requirements for Safety and Occupational Health Orientation

Prior to the start of on-site operations, the SSHO will conduct a site safety orientation for field personnel. This meeting will involve representatives from all organizations with a direct contractual relationship with AECOM on the job site. This meeting will cover the following topics:

- Contents of this APP
- Types of hazards at the site, health effects, and means for minimizing exposure to them
- The type of monitoring that will be performed
- PPE that will be used
- Action levels for upgrade and downgrade of PPE
- Site-specific respiratory protection requirements
- Decontamination protocol
- Site control measures, including safe operating practices and communication
- Location and use of emergency equipment
- Spill response
- Evacuation signals and procedures
- Emergency contacts
- Procedures for obtaining medical treatment

This orientation will allow field personnel to clarify any issues they do not understand and will reinforce individual responsibilities regarding safety and health during site work. At the conclusion of this meeting, field personnel will sign a copy of the Personnel Acknowledgement Form. The SSHO will maintain these agreements at the site and place them in the project file at the conclusion of the operation.

6.3 CoVid-19 Level 1 Awareness Training

All employees will receive COVID-19 Level 1 Awareness Training.

6.4 MEC and Anomaly Awareness Training

Prior to field activities, the senior UXOQP will conduct project-specific training for all on-site personnel assigned to projects where MEC and anomaly avoidance activities will be implemented.

The senior UXOQP will conduct training on applicable MEC and anomaly avoidance protocols. All site personnel must receive this training prior to conducting field operations. The SSHO, and/or applicable project personnel (if appropriate for the task being performed) may conduct additional training as appropriate. At a minimum, site specific training will include the following topics:

- Field equipment operation, including safety precautions and safety equipment
- Procedures, guidelines, and requirements in relevant sections of the Site Safety and Health
- Plan (SSHP) as they relate to the task being performed (if applicable)
- • Site- and task-specific hazards, including physical, biological, and chemical hazards
- • Emergency procedures and contact information
- • Incremental monitoring procedures

6.5 Other Site-Specific Training

Specific training requirements for site activities will be identified in the AHAs. The SSHO is responsible to ensure that field personnel have the required training.

6.6 Visitors Orientation

Visitors are required to complete an orientation appropriate to the site that will be visited, and subsequently abide by AECOM SH&E policies and procedures when visiting the site.

Visitors to AECOM premises or sites will be escorted by an AECOM employee who will confirm that local security arrangements are applied and the visitor is aware of SH&E management requirements, including those for emergency response and incident reporting.

6.7 Mandatory Training and Certifications

Personnel who participate in field activities associated with this project must be qualified Hazardous Waste Operations and Emergency Response (HAZWOPER) workers (unless otherwise noted in specific AHA or by the SSHO) and must meet the training and medical monitoring requirements. Personnel must have successfully completed training, meeting the provisions established in 29 CFR 1910.120 for 40-hour training and 8-hour annual refresher training. Additionally, onsite management and supervisors directly responsible for, or who supervise employees engaged in, hazardous waste operations shall receive at least eight additional hours of specialized hazardous waste operations management training. Training and certifications for key personnel are listed in the **Table 2** below. Training certificates and documentation are included in **Attachment 4**.

Medical Monitoring

AECOM personnel performing onsite work that may result in exposure to contaminant-related health and safety hazards are enrolled in the medical surveillance program that complies with OSHA standard 29 CFR 1910.120 (f)/29 CFR 1926.62 (f).

They will have successfully completed a pre-placement occupational physical examination and annually thereafter. The medical surveillance program meets the following requirements:

- The physician's opinion concerning the employees' abilities to perform the assigned work shall be provided to the SH&E Manager or designated company HR representative;
- The required written physician's opinion shall be made available upon request;
- All medical records are maintained in accordance with 29 CFR 1910.1020;
- Examinations are given at least once every 12 months unless the attending physician believes a longer interval (not greater than biennially) is appropriate; and
- Examinations are administered by a licensed physician who is certified by the American Board of Preventive Medicine.

Medical examinations must meet the requirements specified by the licensed physician. The physician takes into account site-specific contaminant issues during the examinations. This examination has been designed to meet the requirements of 29 CFR 1910.120 (f) requirements for hazardous waste site operations. The employee will be informed of any medical conditions that would result in work restriction or that would prevent them from working at hazardous waste sites.

AECOM will certify that all employees have successfully completed a physical examination by a qualified occupational health physician and will supply certification of medical clearance for each onsite employee. The certifications include employee name, date of last examination, and name of examining physician.

6.8 Procedures for Periodic Safety and Health Training

The SSHO will maintain training/certification records onsite for all personnel as well as track training expiration dates. Prior to expiration, the SSHO will coordinate training of all site personnel with the TOM to maintain valid training/certification requirements.

The SSHO will conduct daily site safety briefings (i.e., tailgate meetings) prior to the start of field activities. Briefings will also be conducted whenever new personnel report to the site. Attendance at the daily tailgate meeting is mandatory for all employees and subcontractors at the site contracted to AECOM. Simultaneous operations are encouraged to attend each other's tailgate meetings or at the very least the supervisors shall discuss the coordination of activities and associated hazards of each other's tasks.

The purpose of the safety briefings is to assist personnel in safely conducting the scheduled work activities. The briefings will include weather-related information, instructions for new operations to be conducted, and/or safe work practices. The briefings will also provide an opportunity to identify safety-related performance deficiencies noted during routine activities or during a safety audit. Any unsafe conditions or activities observed during the previous day will be discussed at the daily briefings.

A THA will be completed as part of the safety briefing. Field personnel are required to attend the briefings and sign the *S3AM-209-FM5 - Daily Tailgate Meeting* and the *S3AM-209-FM6 - Task Hazard Assessment* forms (**Attachment 3**). Truck drivers will attend an initial site briefing and will be notified of changes that could affect the execution of their duties, such as changes in the haul route, or slippery road conditions, and will be encouraged to report any unsafe conditions or activities to the SSHO at any time.

6.9 Worker Training and Qualifications

All personnel at this site must be qualified and experienced to perform their assigned tasks.

Required training is summarized on the table below. Training records of employees and subcontractors will be verified prior to working on site. Required certifications will be maintained on site by the SSHO.

Table 2: Site-Specific Training Requirements

Training	Applies to
<input checked="" type="checkbox"/> APP and Site Orientation	All Employees and Subcontractors
<input checked="" type="checkbox"/> HAZWOPER 40 –HR	On HAZWOPER sites, in Exclusion Zone (EZ), exposed to hazardous contamination
<input checked="" type="checkbox"/> HAZWOPER Supervisor	Employees managing others in HAZWOPER activities
<input type="checkbox"/> Fit Test/ Respiratory Protection	Employees needing to wear respirators
<input checked="" type="checkbox"/> CPR/First Aid	A minimum of two onsite AECOM or subcontractor employees
<input checked="" type="checkbox"/> Hazardous Materials Shipping	Employee responsible for shipping hazardous materials/hazardous waste/dangerous goods (HZM/HZW/DG) and/or signing manifests
<input checked="" type="checkbox"/> Annual Medical Surveillance/ Clearance	Employees working in an EZ and the regulatory required exposure limit is exceeded for 30 or more days a year
<input checked="" type="checkbox"/> Biennial Medical Surveillance/ Clearance	Working in an EZ more than 30 days a year and the regulatory required exposure limit is not exceeded
<input checked="" type="checkbox"/> OSHA 10 hr. Construction	Employees working near heavy equipment
<input checked="" type="checkbox"/> OSHA 30 hr. Construction	Supervisor/SSHO overseeing work with heavy equipment
<input checked="" type="checkbox"/> CoVid-19 Level 1 – General Awareness Training	All AECOM personnel working on the site

6.10 Emergency Response Training

AECOM will provide training in the handling of emergency situations that may arise from project activities or equipment operation. Prior to commencement of project activities, all site personnel will be trained on the posted emergency telephone numbers, location and use of spill kit materials, directions to the hospital, location and use of fire extinguishers, location of first aid kits, and the persons who are certified in first aid and cardiopulmonary resuscitation (CPR). Additional details on applicable emergency response training and procedures are provided in Section 9.2, Emergency Response Plans (ERPs).

7. Hazard Assessment and Control

AECOM has adopted an approach to hazard assessment and control that incorporates both qualitative and quantitative methods to identify hazards and the degree to which these hazards may impact employees and AECOM operations. See S3AM-209-PR1 *Risk Assessment & Management*, for details regarding AECOM's process. This approach involves the following:

7.1 SH&E Procedures

All AECOM SH&E procedures, in their controlled copy version, are available on the internal SH&E Policy and Procedures ecosystem page. Programmatic procedures referenced in this document (for example SH&E Training) do not need to be printed for inclusion in this APP. Only procedures that are needed for field activity reference and application **MUST** be printed in full and included in this APP. The applicable field procedures checklist is in the Physical Hazards section (Section 7.6) below and procedures.

7.2 Task Hazard Assessment¹

A Task Hazard Assessment (the equivalent to an Activity Hazard Analysis for EM-385) is to be developed for each discrete task planned as part of the project. This assessment lays out the steps of the job, potential hazards, and mitigation measures. Form S3AM-209-FM6A *Task Hazard Assessment* or a client required equivalent may be used. Task Hazard Assessments are included in **Attachment 2** of this APP.

As a result of unanticipated work activities or changing conditions, additional Task Hazard Assessments may be required. A blank S3AM-209-FM6 Task Hazard Assessment form is included in **Attachment 3** of this APP.

The THA is based on understanding the work to be performed and hazard recognition. This is founded in AECOM's 4 Sight process and requires critical thought of job steps before starting work activities. Not all risks can be anticipated in this APP or the activity hazard assessment process; therefore, the THA is used to assess, mitigate, and document the site-specific conditions and changes to the hazard profile prior to and throughout the work task. Proper implementation of the THA program protects worker health and safety. A blank *S3AM-209-FM6 Task Hazard Assessment* form is included in **Attachment 3**. The THA must be signed by all employees and subcontractors each day and initialed whenever a changed condition provokes a change in hazard controls.

Prior to initiating work each day, the personnel conducting the task will review the THA as part of the Daily Site Safety Briefing. The current conditions will be evaluated compared to conditions anticipated and hazards found in the applicable THA for the activity (i.e., job or task) to be performed that day. If the current THA does not adequately address unanticipated hazards, the THA must be updated.

7.2.1 Development

THAs will be completed by AECOM and any Subcontractor field crews/workers performing the work. The team (or person) responsible for the THA will be competent in a formal process of hazard recognition.

¹ EM-385 references the term Activity Hazard Analysis (AHA). Task Hazard Assessment (THA), Activity Hazard Analysis, Job Safety Analysis (JSA), and similar are equivalent terms used to describe the process of assess and documenting potential hazards and mitigations for site-specific activities on a job site.

7.2.2 Risk Ranking

The THA defines the initial Risk Rating for each step.

- For each task, a Risk Rating will be determined and discussed with personnel engaged in the activity during the Daily THA development meeting.
- The final risk is that which remains after controls have been applied.

7.2.3 Timing

No work will begin on a task until the THA has been accepted by the USACE contact addressing the project-specific hazards and the AECOM SHEM; and reviewed on-site by all workers engaged in the activity.

The information from the THA will be communicated to all staff on-site during safety briefings. Workers will have in their possession the current THA that reflects current site conditions, personnel, equipment, and control measures, while the work is being performed.

If the person responsible for implementing control measures is not available to implement those measures, work must stop and the THA must be revised.

7.2.4 Management of Change

THAs are living documents and are intended to be created in the field and updated (by the workers) as needed. The THA will be regularly reviewed and modified as necessary to address:

Changing site conditions and/or operations. If the initial Risk Rating increases due to a change made to the THA by the workers, the THA will be resubmitted for acceptance prior to work proceeding. Changes to or updates of a THA that do not increase the Risk Rating are not required to be resubmitted for acceptance.

Change of the competent person. If a new Competent Person (not on the original list) is added, the list will be updated (an administrative action not requiring an updated THA). The new person will acknowledge in writing that he/she has reviewed the THA and is familiar with current site safety issues.

Any proposed changes will be reviewed and approved by the SSHO and SHEM, or designated representative, prior to their implementation per *S3AM-215-PR1 Management of Change*. The SSHO as delegated by the SHEM will record changes on *S3AM-215-FM1 - Management of Change Authorization* form (**Attachment 3**).

7.2.5 Recordkeeping

Once the activity/task has been completed, the THA will be available and kept on file on site for the length of the contract. THAs will then be maintained in the project files for 50 years.

7.3 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. Using these questions during each task, especially those without formal THA, will help workers identify hazards and condition changes so that they can control them or stop work to seek assistance.

- 1) **What am I about to do?**
- 2) **What could go wrong?**
- 3) **What could be done to make it safer?**
- 4) **What have I done to communicate the hazards?**



7.4 Speak Up / Listen Up

All AECOM employees have a responsibility to help create the environment where the expectation is Safety For Life. Speak Up/Listen Up (SULU) is a technique to steward jobsite safety by utilizing 4-Sight as a basis for safety feedback conversations. SULU has two main parts:

- Speak Up where employees use three simple steps when providing feedback to others about unsafe acts:
 1. Ask to discuss their hazard assessment or 4-Sight for the task
 2. Get a commitment from the employee to apply the hazard controls and perform the task according to the accepted procedures
 3. Follow up to ensure the employee is working safely
- Listen Up where employees use two simple steps when responding to safety feedback:
 1. Listen – Focus on the message, not the messenger
 2. Commit to performing the task the safer way

SULU conversations should happen consistently throughout the workday to create clear expectations of how work should be performed. All employees should recognize safe work behaviors in order to reinforce them and keep them going. An occasional correction is much more effective when employees are frequently encouraged and positively recognized for their safe actions. Managers and supervisors should be having SULU conversations during site visits and ensure peer to peer and site supervisor to crew SULU conversations are being held.

7.5 Hazard Categories

THAs should include consideration of the following hazard categories when identifying hazards and task specific controls:

- Biological
- Chemical
- Electrical
- Gravity
- Mechanical
- Motion
- Pressure
- Noise
- Radiation
- Thermal



7.6 Physical Hazards

A physical hazard is a hazard that threatens the physical safety of an individual; contact with the hazard typically results in an injury. The following table summarizes the physical hazards or activities containing physical hazards present at the site and the associated procedures that address protection and prevention of harm.

All checked procedures **MUST** be included in Appendix B for implementation and reference.

	Hazard/ Activity <i>(note: text in this column links to procedure)</i>	Site Specific Description <i>[where, what phase of work, frequency]</i>	Applicable Procedure
<input type="checkbox"/>	Abrasive Blasting		S3AM-335
<input type="checkbox"/>	Aerial Work Platforms		S3AM-323
<input type="checkbox"/>	All-Terrain Vehicles		S3AM-319
<input type="checkbox"/>	Blasting and Explosives		S3AM-336
<input type="checkbox"/>	Bloodborne Pathogens		S3AM-111
<input type="checkbox"/>	Cofferdams		S3AM-344
<input checked="" type="checkbox"/>	Cold Stress	Site-wide, potentially all phases of work	S3AM-112
<input type="checkbox"/>	Compressed Air Systems and Testing		S3AM-337
<input type="checkbox"/>	Compressed Gases		S3AM-114
<input type="checkbox"/>	Concrete Work		S3AM-338
<input type="checkbox"/>	Confined Spaces		S3AM-301
<input type="checkbox"/>	Corrosive Reactive Materials		S3AM-125
<input type="checkbox"/>	Cranes and Lifting Devices		S3AM-310
<input type="checkbox"/>	Demolition		S3AM-339
<input type="checkbox"/>	Diving (scientific and commercial)		S3AM-334
<input checked="" type="checkbox"/>	Drilling, Boring & Direct Push Probing	Site-wide, during drilling and well installation	S3AM-321
<input type="checkbox"/>	Electrical Safety		S3AM-302
<input type="checkbox"/>	Excavation		S3AM-303

	Hazard/ Activity <i>(note: text in this column links to procedure)</i>	Site Specific Description <i>[where, what phase of work, frequency]</i>	Applicable Procedure
<input type="checkbox"/>	Fall Protection		S3AM-304
<input type="checkbox"/>	Flammable and Combustible Liquids		S3AM-126
<input type="checkbox"/>	Gauge Source Radiation		S3AM-122
<input checked="" type="checkbox"/>	Hand and Power Tools	Site-wide, potentially all phases of work	S3AM-305
<input type="checkbox"/>	Hazardous Waste Operations		S3AM-117
<input checked="" type="checkbox"/>	Heat Stress	Site-wide, potentially all phases of work	S3AM-113
<input checked="" type="checkbox"/>	Heavy Equipment	Site-wide, during drilling and well installation	S3AM-309
<input type="checkbox"/>	High Altitude		S3AM-124
<input type="checkbox"/>	Highway and Road Work		S3AM-306
<input type="checkbox"/>	Hoists Elevators and Conveyors		S3AM-343
<input type="checkbox"/>	Hot Work		S3AM-332
<input type="checkbox"/>	Ladders		S3AM-312
<input type="checkbox"/>	Lockout Tagout		S3AM-325
<input type="checkbox"/>	Machine Guarding Safe Work Practice		S3AM-326
<input type="checkbox"/>	Marine Safety and Vessel Operations		S3AM-333
<input type="checkbox"/>	Material Storage		S3AM-316
<input type="checkbox"/>	Mine Site Activities		S3AM-341
<input type="checkbox"/>	Mining Operations		S3AM-345
<input type="checkbox"/>	Non Ionizing Radiation		S3AM-121
<input type="checkbox"/>	Overhead Lines		S3AM-322
<input type="checkbox"/>	Powder-Actuated Tools		S3AM-327
<input type="checkbox"/>	Powered Industrial Trucks		S3AM-324
<input type="checkbox"/>	Radiation		S3AM-120
<input type="checkbox"/>	Railroad Safety		S3AM-329
<input type="checkbox"/>	Respiratory Protection		S3AM-123
<input type="checkbox"/>	Scaffolding		S3AM-311
<input type="checkbox"/>	Steel Erection		S3AM-340
<input type="checkbox"/>	Temp. Floors, Stairs, Railings, Toe-boards		S3AM-342
<input checked="" type="checkbox"/>	Underground Utilities	Site-wide, during drilling and well installation	S3AM-331
<input type="checkbox"/>	Underground Work		S3AM-330
<input checked="" type="checkbox"/>	Wildlife, Plants and Insects	Site-wide, potentially all phases of work	S3AM-313
<input type="checkbox"/>	Working Alone		S3AM-314
<input checked="" type="checkbox"/>	Working On and Near Water	Site-wide, Surface water collection and site survey	S3AM-315

In addition to potential on-site hazards, AECOM workers should be aware of the potential for hunters on and around the NBSFS property. AECOM workers should wear safety orange vests and hats and, where practical, limit on-site work during hunting seasons (especially in the fall) and low-light conditions. See Section 7.10.3 and the site-specific THAs (AHAs) for more information.

7.7 Decontamination

All possible and necessary steps will be taken to reduce or minimize contact with chemicals and contaminated/impacted materials while performing field activities. Decontamination steps are outlined in S3AM-117-PR1 Hazardous Waste Operations procedure. Some key elements are as follows:

- All persons and equipment entering the EZ will be considered contaminated, and thus, must be properly decontaminated prior to exiting to clean areas of the site.
- Non-essential and personal vehicles will remain outside the Contaminant Reduction Zone (CRZ).
- Avoid reactions between the solutions and contaminated materials. Review the applicable SDS.
- All contaminated PPE and decontamination materials will be contained, stored and disposed of in accordance with site-specific requirements determined by site management.
- Use caution while working around decontamination stations, including the decontamination pad, which may be a slip or trip hazard.
- Use disposable equipment when possible and practical.
- All employees performing equipment decontamination will wear the appropriate PPE to protect against exposure to contaminated materials. The level of PPE may be equivalent to the level of PPE required in the EZ. Other PPE may include splash protection, such as face-shields and splash suits, and knee protectors.
- All decontaminated equipment will be visually inspected for contamination prior to leaving the CRZ.

Decontamination Procedures & Equipment		
Procedure		Equipment Needed
As described in S3AM-117-PR. In brief:		
Remove loose debris		Brush
Spray with decontamination solution		Spray bottle, decontamination solution
Wipe clean		Paper towels
Dry		Air dry or use paper towels
Equipment Decontamination Procedures		
Type Equipment	Decontamination Solution	Procedure
As described in S3AM-117-PR. In brief:		
Drilling rods and equipment	Alconox and Water	Brush loose debris from equipment. Spray with decontamination solution. Wipe clean and allow to air dry. Additional details described in Subcontractor's SOP,
Pumps, YSIs	Alconox and Water	Brush loose debris from equipment. Spray with decontamination solution. Wipe clean and dry with paper towel.
IP/Water Level Meter	Alconox and Water	Brush loose debris from equipment. Spray with decontamination solution. Wipe clean and dry with paper towel.
Waste Handling for Decontamination		
Waste Streams/Products		Disposal Procedures
As described in S3AM-117-PR. In brief:		
Paper towels		Discard in trash bag.
Nitrile gloves		Discard in trash bag.
Small tools, plastic sheeting, and decontamination water		Collect in appropriate container for transport for disposal.

The specific decontamination areas will be designated by the SSHO and Field Team Leader with consideration given to access and suitability of available locations.

7.8 Environmental Impact Prevention

AECOM strives to avoid or control environmental impacts from our operations through planning and implementation of best practices as well as preparing responses to react to environmental incidents. *S3AM-204-PR1 Environmental Compliance* procedure provides details on permitting and planning requirements.

	Potential Environmental Impact	Description of Hazard and Permit or Control Being Implemented
<input type="checkbox"/>	Air Emissions	Not applicable
<input type="checkbox"/>	Hazardous Waste Management	Not applicable
<input type="checkbox"/>	Storm Water Pollution	Not applicable
<input type="checkbox"/>	Wetlands	Not applicable
<input type="checkbox"/>	Critical Habitat	Not applicable
<input type="checkbox"/>	Other	

7.9 Site Control

The purpose of site control is to protect the public from inadvertently coming into contact with site hazards and to protect AECOM employees being impacted by hazards. This section details the equipment and actions needed to promote optimal site control.

7.9.1 Site Work Zones

Site layout and site control need to be coordinated achieve a productive work environment and efficient work process while minimizing exposure of employees and the public to hazards associated with the work. Consider the following items when planning the site layout and controls:

- “Line of Fire” hazards- overhead utilities, falling/ tipping equipment, release of energy/ pressure, flying debris,
- Noise, dust, odor suppression
- Contamination containment and decontamination area layout
- Traffic control for site vehicles/ equipment (public traffic control requires Traffic control Plan)
- Restricted access for areas requiring special training, skills, or certifications
- Restriction of work near railroads
- Presence or creation of excavations
- Loading/unloading areas
- Portable restrooms
- Dumpsters and bins
- Equipment lay down
- Heavy equipment parking

- Overnight safety and security needs

Check the description of the site controls already in place:

- ☒ Work area is within a facility/ property with secure and restricted access provided by client or third party
- ☐ Work area is enclosed within facility/ property; however, access is not restricted via locks, guards, or gates
- ☐ Work area is on a property that is open and access by the public is likely
- ☐ Work area is on a property that is open; however, access by the public is unlikely
- ☐ Work area is in a roadway or right of way of a roadway (Traffic Control Plan required S3AM-306-PR1 Highway and Road Work
- ☐ Work area is on or near railroad (including right of way, active lines, and crossings)
- ☐ Other: *(describe)*

Check and describe the site controls that need to be added to protect the public and the AECOM work team.

	Control Item	Description of Type and Application
<input type="checkbox"/>	Fence	
<input type="checkbox"/>	Locks	
<input type="checkbox"/>	Barricades	
<input type="checkbox"/>	Cones	
<input type="checkbox"/>	Tape	
<input type="checkbox"/>	Hole Covers	
<input checked="" type="checkbox"/>	Other	Event specific controls will be utilized where needed. For instance, cones and tape barriers for well drilling where public access is not controlled by fencing.

7.9.2 Site Control Map/ Diagram

Work area is within a facility/property with secure and restricted access provided by client or third party. Potential hazards presented by simultaneous and neighboring operations will be mitigated by coordination and communication with NBSFS point of contact. No hazards are anticipated.

A description of the Work Zones and general diagram are provided in the SSHP.

7.9.3 Simultaneous and Neighboring Operations

Simultaneous and neighboring operations present a need for added coordination and communication to address hazards that are presented by multiple operations.

	Activity/ Company	Hazard	Controls/Mitigations and Communication Methods
Simultaneous Operation <i>(within the site)</i>	None anticipated		
Neighboring Operation	Hunting	Shooting / Live fire	Wear blaze or hunter orange hi-visibility vest or outer clothing; wear orange hat; wear safety

(outside/ bordering the site)			glasses; avoid site work at dusk and low-light conditions; limit site work during hunting seasons (fall and early winter).

7.9.4 Site Security

All projects should be reviewed for the potential for personal security issues (e.g., assault, robbery, threat). Check all of the following that apply:

- ☐ Project site located in a higher crime area or has a history of security incidents
- ☐ Working outside of regular cellular telephone service
- ☐ Idle property with potential for trespasser(s) to shelter in buildings/structures and assault personnel
- ☐ Working at night

Detail the security measures to address the above risks: **Not applicable**

8. Safety and Health Inspections

8.1 Daily Job Site Safety and Health Inspection

The SSHO will conduct daily jobsite health and safety inspections/audits to identify new or previously unidentified hazards, verify the effectiveness of hazard control measures, observe workers performing tasks, and provide feedback to workers. Deficiencies that pose a significant safety hazard will be corrected immediately, or work will be stopped in the affected area until the deficiency is corrected. The daily jobsite health and safety inspection will be documented in the SSHO logbook.

Safety and health issues and deficiencies identified during the “weekly” level inspections, and the actions, timetable, and responsibility for correcting the deficiencies, will be recorded on an inspection form. Follow-up inspections to ensure correction of any identified deficiencies will also be conducted and documented on an inspection form.

AECOM will establish a safety and occupational health deficiency tracking log that lists and monitors the status of safety and health deficiencies. The log will be available, be updated daily, and will provide the following information:

- Data of deficiency;
- Description of deficiency;
- Name of person responsible for correcting deficiency;
- Projected resolution date; and
- Date actually resolved.

Table 3 lists the safety and health inspection requirements for field operations.

Table 3: Safety and Health Inspection Requirements

What	Who	When	Documentation
General Site Conditions	SSHO	Daily	Logbook
	SSHO	Weekly	Safety Inspection Form S3AM-013-FM1 - Housekeeping Inspection
	Task Order Manager or designee	Monthly (for field tasks longer than one month)	Safety Inspection Form S3AM-013-FM1 - Housekeeping Inspection
	SH&E Manager	When needed, in coordination with the SSHO	Safety Inspection Form S3AM-013-FM1 - Housekeeping Inspection
Tools and Equipment	Users	Daily	Tag and Remove Defective Items from Service S3AM-208-FM2 - Personal Protective Equipment Inspection
Personal Protective Equipment	Users	Upon issue and daily thereafter	Reported to SSHO for logbook entry

What	Who	When	Documentation
First aid kit and emergency equipment	SSHO or designee	Weekly	S3AM-012-FM1- First Aid Kit/AED Inventory and Inspection
PPE and monitoring equipment	SSHO/Users	Daily	S3AM-208-FM2 - Personal Protective Equipment Inspection
Vehicles	Users	Prior to driving	S3AM-005-FM2 - Vehicle Inspection Checklist
Heavy Equipment (drill rigs, skid steer, etc.)	Qualified/Competent Person (subcontractor)	Prior to use on-site	S3AM-309-FM2, Heavy Equipment Pre-Operation Checklist ¹ S3AM-312-FM1, Daily Drilling, Boring, and Direct-Push Equipment ¹ Form 16-1 (if applicable)
		Daily	S3AM-309-FM2, Heavy Equipment Pre-Operation Checklist ¹ S3AM-312-FM1, Daily Drilling, Boring, and Direct-Push Equipment ¹

¹ Subcontractor's equivalent form may be used.

8.2 Inspection Deficiency Tracking and Follow-up

Corrective action will be immediately initiated by the AECOM SSHO. These corrective actions will be documented in writing and maintained on site for the duration of the project. Findings that represent deficiencies in the implementation of the APP, EM 385-1-1, or the subcontractor's accepted safety documentation, and which cannot be corrected immediately, will be added to the Tracking Log which will be posted in the field office and updated on a daily basis.

In most cases, deficiencies will be corrected immediately when found. If the deficiency is not immediately correctable, the task will be shut down until the deficiency is corrected. Deficiencies will be discussed with subcontractors, and the subcontractor will be responsible for prompt repair, replacement or correction of any deficiencies that are not correctable immediately.

8.3 External Inspections and Certifications

External inspections are not expected for this project. In the event of an OSHA or other regulatory agency inspection, AECOM will immediately notify and provide government designated authority (GDA)/NBSFS the opportunity to accompany AECOM on the inspection. AECOM will provide GDA/NBSFS a copy of any citations or reports issued by the inspector and any corrective action responses to the citation(s) or report(s).

9. Mishaps Reporting and Investigation

9.1 Exposure Data

AECOM will maintain records of all exposure and mishap experience incidental to the project work including AECOM personnel and subcontractors. These records will include exposure work hours and a log of occupational injuries and illnesses (OSHA Form 300 or equivalent). Monthly exposure data, summarizing the total number of field hours executed by both AECOM and subcontractor personnel, will be reported electronically to USACE by the 10th day of the month.

9.2 Mishap Investigations, Reports, and Logs

Mishaps include accidents, incidents, and near misses. All mishaps that occur on-site during any field activity will be called into the AECOM Incident Reporting Hotline (800) 348-5046 immediately and promptly reported to the SSHO and the immediate supervisor. No supervisor may decline to accept a report of a mishap from a subordinate.

All recordable mishaps will be reported by the PM to the GDA within 24 hours after notification by the affected employee.

In addition to the above, AECOM will report:

- Property damage (damage exceeding \$5,000 is recordable)
- Days away injuries
- Days away illnesses
- Restricted/transfer injuries

If any AECOM employee is injured and requires medical treatment, the SSHO will contact the AECOM SH&E Manager and the PM immediately. All major incidents and emergencies, including all injury/medical incidents (to include first aid treatments) will be reported to the PM, the AECOM Incident Reporting Hotline and the Area SH&E Manager, and entered into IndustrySafe within 4 hours, as required by AECOM policies. Reports of non-medical incidents, property damage less than \$2,500, and environmental releases less than the reportable quantity will be entered into IndustrySafe within 24 hours.

If any employee of a subcontractor is injured, documentation of the incident will be accomplished in accordance with the subcontractor's procedures; however, copies of all documentation (which at a minimum must include the OSHA Form 301 or equivalent) must be provided to the SSHO within 24 hours after the mishap has occurred.

Should a mishap occur, AECOM will obtain medical and emergency assistance and will notify fire, law enforcement, and regulatory agencies, as necessary. Corrective actions will be implemented as soon as reasonably possible; however, except for rescue and emergency measures, the accident scene shall not be disturbed until it has been released by the investigating official. All recordable mishaps will be investigated by the SH&E Manager or their designee in accordance with AECOM policies using Form *S3AM-004-FM3-Incident Investigation Report* and USACE requirements, using ENG Form 3394. Current paper copies of these forms are included in **Attachment 3**.

All personnel at the work site shall use the buddy system, staying within sight of their partner. If a partner becomes incapacitated or severely ill, an ambulance shall be called. In the event that a cessation of work is ordered, all personnel should:

- Assist the SSHO and, if required, in decontaminating the victim and/or administering first aid;

- Leave the contaminated area and undergo decontamination prior to entering the worker rest area; and
- Assist emergency response personnel when requested.

All workers receiving medical treatment by a physician will obtain a release from the physician on the date of treatment stating one of the following: (1) the employee is not fit for duty, (2) the employee is fit for restricted duty, or (3) the employee is fit for duty.

9.3 Mishap Notification

Mishaps as described in the previous section will be reported by the PM to the GDA as soon as reasonably possible, but no later than 24 hours. Notification will be made in accordance with applicable USACE requirements. The SH&E Manager will review all documentation associated with the mishap and will assist in the performance of any necessary mishap investigation or other follow-up. The PM will ensure that the recommendations resulting from any investigation are implemented without delay.

Daily records of all first aid treatments not otherwise reportable will be recorded on a first aid treatment form by the SSHO and furnished to the GDA upon request.

9.4 Immediate Mishap Notification

Any mishap that has, or appears to have, any of the consequences listed below will be immediately reported by AECOM to GDA/NBSFS. The following mishaps will be investigated in depth to identify all causes and to recommend hazard control measures:

- A fatal injury/illness;
- A permanent totally disabling injury/illness;
- A permanent partial disabling injury/illness;
 - One or more persons hospitalized as inpatients as a result of a single occurrence;
 - \$500,000 or greater accidental property damage; or
 - Three or more individuals become ill or have a medical condition that is suspected to be related to a site condition, or a hazardous or toxic agent on the site

AECOM will also notify OSHA of any worker fatality within 8 hours and any amputation, loss of an eye, or hospitalization of a worker within 24 hours.

In addition to the above, mishaps related to high hazard activities will be immediately reported to the GDA and investigated in depth to identify all causes and recommend hazard control measures.

These high hazard mishaps may be a result of the following:

- Electrical (e.g., arc flash, electrical shock)
- Uncontrolled Release of Hazardous Energy (electrical and non-electrical)
- Load Handling equipment (LHE) or Rigging
- Fall from height (any level other than same surface)
- Underwater diving

The GDA will immediately notify the local SSHO when any of these occurs and subsequently follow up with reports as prescribed by regulation. USACE must also be notified within 24 hours and investigative findings provided within 10 days of occurrence. AECOM SH&E staff will fully cooperate with investigations and documentation.

10. Plans (Programs, Procedures) Required by the Safety Manual

Based on the scope of the NBSFS investigation activities, all applicable safety plans, programs, and procedures to address risk and compliance requirements were identified and are described below.

10.1 Fatigue Management Plan

Fatigue is a mental or physical exhaustion that stops a person from being able to function normally. Work related stress may be related to items such as pace of work schedule, location, environmental conditions (e.g., noise, lighting, tasks), and degree and duration of concentration required to perform a task. Long distance travel causes fatigue primarily by disruption of natural biological rhythms through both external factors and internal factors.

Workers are expected to carry out their work activities in a manner that does not risk the safety and health of themselves, their fellow employees, or any other personnel on the site (e.g., contractors, clients, the public). If an employee feels unable to perform work activities safely due to the effects of fatigue, that employee is required to stop work immediately and notify the supervisor. If this occurs while an employee is driving a vehicle, the employee is required to stop driving and find a suitable location to rest. Similarly, if an employee suspects a co-worker (including subcontractors or clients working with the employee) of suffering from the effects of fatigue, they are required to intervene on behalf of the affected person, stop work and notify the supervisor.

Fatigue management will be the responsibility of the SSHO and field team members. Signs of fatigue include long eye blinks, repeated yawning, frequent blinking, bloodshot eyes, poor reaction time, slow speech, loss of energy, and an inability to concentrate. Fatigue can result in a lack of attention, difficulty following instructions, reduced ability to think clearly, and slower response to changing circumstances. Fatigue contributes to accidents by impairing performance and in extreme cases causing people to fall asleep. Fatigue related “micro sleeps” are very hard to predict or prevent and can place the individual and others safety at risk.

The risk of fatigue can be significantly reduced by effective planning and resourcing of work shifts, work cycles and rotations. Schedules, work cycles or job roles will be assessed by the SSHO for fatigue risks. The following items must be assessed:

- Are complex tasks planned on the first or final shift of a nightshift work cycle?
- Are standby and on-call duties limited where possible?
- Does day shift start before 6am?
- Do extended shifts (> 12 hours) occur more than three times in a work cycle?
- Do shifts rotate backwards (day to night to afternoon)?
- Do core hours regularly exceed 80 hours in a two-week period?

Risk controls for mitigating fatigue must be applied using the hierarchy of controls. The number of employees at risk and the level of risk must be considered when implementing controls. Rest is the most important control measure for managing fatigue. Time spent away from the immediate work environment allows workers to recover from fatigue, thereby improving work performance, vigilance, safety and efficiency. To provide adequate rest the SSHO will consider the following:

- Is a 10-hour or longer break between work shifts provided?

- Does the break between work shifts provide a sleep opportunity of 7 or more hours of continuous sleep?
- Is a minimum of one break provided between each 4 hours of work with one break of sufficient length to have a meal (i.e., 30 minutes)?
- Are more frequent short breaks allowed during strenuous activities?
- Is ready access to drinking water provided?

The SSHO will also assess if workers:

- Present fit for work at the commencement of and during the work period. If not fit for work then notify their supervisor to ensure that an appropriate risk mitigation process is implemented
- Comply with this fatigue management procedure
- Monitor for the signs of fatigue with their coworkers
- Communicate and report personnel fatigue issues

The SSHO will conduct a review of any fatigue-related incidents and the effectiveness of existing control measures as required. Fatigue related incidents will be reported as incidents or near misses depending on the overall situations. Fatigue will be considered during incident investigations.

10.2 Emergency Response Plans

In the event of an emergency, the safety of people should always be the first priority. All personnel on site will be alerted to emergencies by verbal command and directed to a muster or assembly point.

The AECOM site team will hold an emergency response plan meeting during mobilization and prior to fieldwork to discuss and define the following:

- Personnel roles and line of authority;
- Safe distances from emergency location;
- Evacuation/Hospital route, procedures, and pre-determined meeting place;
- Medical emergency and communication procedures;
- Emergency alert and response procedures; and
- Emergency equipment and location on-site.

The Emergency Response Plan (ERP) will be discussed during initial site training and discussed regularly during the Daily Tailgate Safety Meetings. Annually, or as needed, the SSHO and the TOM will review the ERP and make any changes necessary to keep the ERP current with new or changing site conditions and information. The SSHO will conduct drills monthly or more frequently if conditions change to evaluate the response and testing the effectiveness of the ERP. Conditions that may lead to an emergency situation during field activities will be addressed in specific AHAs as tasks are identified. These conditions include:

- Fire;
- Vehicle collisions or rollovers;
- Environmental release;
- Severe weather; and

- Medical emergency due to heat/cold stress, physical/physiological mishap, allergic reactions.

10.2.1 Procedures and Tests

In accordance with the above, a test drill will be conducted on an as needed basis to evaluate the effectiveness of the ERP and to ensure all employees onsite are adequately accounted for. The drills will consist of mock simulations of differing events requiring emergency response and will be applicable to the type of work being conducted on the site.

Drills will consist of responding to a medical emergency, striking utility lines, environmental releases (i.e., spills), fires, and other typical onsite emergencies as determined applicable to the SSHO. Using the protocols outlined in the subsections below, personnel will be required to perform emergency shutdown operations of equipment/tasks, follow proper evacuation and emergency procedures, and assemble at the pre-determined safe places of refuge where the SSHO will take head-counts of onsite personnel using the Site Control log for the project site. Based on the parameters established for the drill (e.g., medical emergency versus spill response), the list of contact numbers for the appropriate local and company specific emergency notifications will be reviewed with all site personnel as a part of the drill.

A post-drill analysis will be performed by the SSHO to analyze the response actions of site personnel and determine their effectiveness (evacuation times, routes, muster points, accountability, contacts, etc.). If any deficiencies are noted, adjustments to the ERP will be made by the SSHO and site personnel re-trained on the appropriate course of action for the type of emergency.

The SSHO will be responsible for the overall direction and implementation of the ERP, and for overall coordination of any emergency response actions. Specific ERP responsibilities of the SSHO include, but are not limited to, the following:

- Notifying facility police, fire department, and other offsite emergency units, as required;
- Notifying the TOM and providing updates as conditions change;
- Directing offsite emergency response personnel to the scene and providing assistance;
- Site control;
- Completing any follow-up reports;
- Rescuing personnel;
- Accounting for all site personnel and visitors;
- Providing emergency first aid;
- Preventing further injury of personnel;
- Providing current status of the mishap to the SH&E Manager;
- Ensuring that onsite emergency response personnel don the proper PPE if needed;
- Assisting onsite emergency response personnel with treatment and transport of sick/injured;
- Providing medical background information of the sick/injured and applicable site health and safety information to the offsite emergency medical responders;
- Accompanying sick/injured personnel to hospital; and
- Accounting for all site personnel using the Site Control Log (Sign-in Log).

AECOM personnel, subcontractors, and visitors will be responsible for:

- Reporting any site emergencies to the SSHO or Site Supervisor;
- Knowing the exit location and evacuation route(s) within the exclusion zone;
- Knowing the pre-planned evacuation assembly point and going there in the event of an emergency; and
- Assisting emergency response personnel as requested.

Emergency Recognition and Prevention

An emergency is an unplanned event that threatens the safety of site personnel. Compliance with this APP can assist in the prevention of anticipated site emergencies. These emergency situations can easily be recognized by visual observations, worker complaints, safety audits, and/or monitoring instruments.

Safe Distances and Places of Refuge

The SSHO will determine safe distances and places of refuge. Prior to the start of each workday, the SSHO will hold a safety meeting with all personnel and discuss the following, as applicable:

- Evacuation routes from work areas;
- The assembly point (both primary and secondary) to be used in the event of an emergency;
- Locations of the nearest fire extinguishers and spill containment equipment; and
- Discussion on specific safety and health concerns of personnel.

10.2.2 Emergency Evacuation Procedures

In the event of a site emergency requiring evacuation, the SSHO will ensure that the entire field team evacuate as a group to a pre-designated area. During severe weather including lightning, heavy rain, or hail, buildings or vehicles will be used as the primary place of refuge. The SSHO (in cooperation with a base representative) will designate a primary place of refuge for other emergencies, including tornados, prior to the start of work each day. The daily pre-designated assembly area may have to be re-designated by the SSHO in the event of an emergency where the area of influence affects the primary assembly area.

During any site evacuation, employees will be instructed to observe wind direction indicators and to travel upwind or crosswind of the area of influence. The SSHO will provide specific evacuation instructions, via the site emergency radio if necessary, to site personnel regarding the actual site conditions.

Once assembled, the SSHO will take a head count. The SSHO will evaluate the assembly area to determine if the area is outside the influence of the situation; if not, the SSHO will redirect the group to an alternate assembly area where a second head count will be taken.

10.2.3 Contingency Plan - Severe Weather

Daily weather conditions will be a part of the daily briefing. In the event of severe weather, personnel will shut down field operations and take shelter in an appropriate location (e.g., building or vehicle). The SSHO will provide specific instructions, via the site radios if necessary. Upon notification of an evacuation, AECOM, subcontractor, and visitors will immediately proceed to their designated assembly location. In the event of lightning, outdoor work will cease, and personnel will move into or stay inside a vehicle or a work site structure.

The individual is ultimately responsible for his/her personal safety and has the right to take appropriate action when threatened by severe weather.

Safe Locations during Severe Weather and Locations to Avoid

No place is absolutely safe from severe weather; however, some places are safer than others:

- Large, enclosed structures (substantially constructed buildings) tend to be much safer than smaller or open structures;
- The risk for lightning injury depends on whether the structure incorporates lightning protection, construction materials used, and the size of the structure; and
- In general, fully enclosed metal vehicles such as cars, trucks, buses, vans, etc. with the windows rolled up provide good shelter from many weather conditions.

AVOID being in or near: High places and open fields, isolated trees, rain or picnic shelters, communications towers, flagpoles, light poles, bleachers (metal or wood), metal fences, water (lakes, streams, rivers, etc.).

When inside a building AVOID: Use of the telephone, washing your hands, or any contact with conductive surfaces with exposure to the outside such as metal door or window frames, electrical wiring, telephone wiring, cable TV wiring, plumbing, etc., if lightning is a factor. Generally speaking, identify and seek shelter that is appropriate for the type of severe weather you are encountering. Proper shelter will always include sound structure and remove you from the elements. When available, pay attention to weather warning devices such as National Oceanic and Atmospheric Administration weather radio and/or credible weather detection systems, however, do not let this information override good common sense.

Weather-related hazards will directly correlate to the type of weather involved. Hot, dry weather may cause greater dust emissions, particularly during intrusive activities. Rain may increase slip/trip hazards, particularly for ground workers. Additionally, lightning strikes during electrical storms could also be a potential hazard. The following procedures will be implemented once thunder is heard or lightning spotted:

- If thunder is heard, all site personnel are to be alert of any visible lightning flashes. The SSHO will observe the storm front and track the direction it is moving. The SSHO will continue to observe the storm front until it passes or until the prevailing direction is determined to be away from the site.
- If lightning is observed, the SSHO are to be notified. When the next lightning flash is observed, a “second” count shall be initiated from the time the lightning is observed until the thunder from the strike is heard.
- The following action guidelines shall be implemented once the “second” count is ≤ 30 seconds:
 - “second” count > 30 , the Site Supervisor or SSHO will continually observe the storm front. If the front is moving away, work will continue. If the front is moving towards the site, the Site Supervisor will initially place workers on alert for potential evacuation.
 - “second” count ≤ 30 , the Site Supervisor will issue the evacuation command and all workers are to report to the break/lunch trailer. Work can be re-initiated once the front has passed by and thunder has not been heard for 30 minutes.
- If lightning is observed and the storm front is moving away from or around the site and is > 20 miles away, work will be permitted to continue. The location of the storm can be confirmed via internet access to a local weather website that has a Doppler radar tracking system.

10.2.4 Alerting and Communications

An employee alarm system will consist of the use of air horns or verbal instructions, either directly or via radio. Air horn signals, (and hand signals if necessary) will be established and employees will be trained in the signals and appropriate response. Telephones will be used to contact offsite emergency responders. Contact lists included in the SSHP will be provided for field personnel, a copy will be kept in site vehicles. The following information will be communicated:

- Name of the person reporting the emergency;
- Telephone number at the location of the person making the call;
- Name of the injured person, if known;
- Description of the emergency;
- Exact location of the emergency;
- Actions already taken; and
- Assistance required.

10.2.4.1 Coordination with Local Emergency Agencies

Local, base, or New Boston Field authorities and emergency services will be contacted prior to initiation of work. The work objectives and onsite capabilities will be explained, as well as the most likely emergencies.

Preferred contact procedures will be established and the response capabilities of local or base responders will be determined. AECOM will ensure there is good coordination between our emergency plan and base requirements. Contact agencies, points of contact, and phone numbers will be provided in the SSHP.

10.2.4.2 Emergency Response Team

During emergency response operations, safety and health requirements put in place to protect site workers must be maintained. The SSHO will be alerted of the mishap that happened, which requires the Emergency Response Team (ERT) response and/or recovery operations.

Response to hazardous substances release will be limited to immediate action available due to equipment and training, (i.e., oil or fuel spills of small quantities). Responding facility emergency response personnel have authority for the site upon arrival. Project ERT personnel will assist local facility emergency response personnel, as needed.

The project ERT will notify base emergency response personnel, project personnel, and GDA/NBSFS in the event of a hazardous substance release. Team response is limited to the confining or recovery of small spills using a spill containment kit, shovel, and approved container with lid. Training of personnel is in accordance with 29 CFR 1910.120(q)(6)(ii).

A first aid kit must be maintained on site and checked weekly (EM 385-1-1 section 03.B.02). A log of items used will be maintained.

Project personnel will rely on base emergency response personnel through the use of the 911 emergency notification system and/or base emergency notification system while on NBSFS property.

If an injury or illness requires more than first aid, but is not an emergency, the employee will be taken to a pre-determined clinic for examination or observation. If the injury or illness is considered an emergency, emergency services will be contacted to transport the victim to the local hospital or emergency care facility.

10.2.5 Spill Plans

If hazardous or unknown potentially hazardous materials are unexpectedly spilled during project work activities, evacuate and secure the area. Small spills will be immediately reported to the SSHO and dealt with according to the chemical manufacturer's recommended procedures found on the SDS. Steps will be taken to contain and/or collect small spills for approved containment and disposal.

Spills or releases of hazardous materials that result in human exposure or off-site environmental contamination will be promptly reported by the SSHO to the proper authorities and the appropriate measures will be taken to contain and/or collect the material for approved storage and disposal.

Work activities may involve the use of hazardous materials (i.e. fuels, solvents) or work involving drums or other containers. When these activities exist the procedures outlined below will be used to prevent or contain spills:

- All hazardous material will be stored in appropriate containers and labelled.
- Tops/lids will be placed back on containers after use.
- Containers of hazardous materials will be stored appropriately away from moving equipment.
- Containers shall only be lifted using equipment specifically manufactured for that purpose.
- Drums/containers will be secured and handled in a manner which minimizes spillage and reduces the risk of musculoskeletal injuries.
- Equipment will be inspected daily for signs of leaks, wear, or strain on parts that, if ruptured or broken, would result in a spill.

AECOM employees are not expected to take action or to participate in rescues or responses to chemical releases (including of petroleum products) beyond the initial discovery of the release and immediate mitigation actions such as closing a valve, placing absorbents, and notifying the Fire Department (911), unless there is a contractual provision for this response and specially trained employees.

10.2.5.1 Spill Evaluation and Response

The SSHO is responsible for evaluating spills and determining the appropriate response. When this evaluation is being made, the spill area is isolated and demarcated to the extent possible. When an incidental release occurs, clean-up personnel receive instructions in a pre-clean-up meeting as to spill conditions, PPE, response activities, decontamination, and waste handling.

The procedures of the Emergency Response section of this APP are immediately implemented when the spill is determined to require emergency precautions and action. If necessary to protect those outside the clean-up area, notification of the appropriate authorities is made.

The following are general measures that response/clean-up personnel take when responding to a spill:

- To minimize the potential for a hazardous spill, hazardous substances, control/absorbent media, drums and containers, and other contaminated materials are properly stored and labeled;
- When a spill occurs, only those persons involved in overseeing or performing spill containment operations will be allowed within the designated hazard areas. Always follow the spill clean-up procedures in the corresponding SDS sheet. If necessary, the area will be roped or otherwise blocked off. Unauthorized personnel are kept clear of the spill area;

- Appropriate PPE is donned before entering the spill area;
- Appropriate spill control measures are applied during spill response;
- Whenever possible without endangerment of personnel, the spill is stopped at the source or as close to the source as possible;
- Ignition points are removed if fire or explosion hazards exist;
- Surrounding reactive materials are removed;
- Drains or drainage in the spill area are blocked or surrounded by berms to exclude the spilled waste and any materials applied to it;
- Provisions are made to contain and recover a neutralizing solution, if used;
- Small spills or leaks from a drum, tank, or pipe will require evacuation of at least Enter Distance feet in all directions to allow clean-up and to prevent employee exposure. For small spills, sorbent materials such as sand, sawdust, or commercial sorbents are placed directly on the spill to prevent further spreading and aid in recovery;
- Spill area is sprayed with appropriate foam where the possibility of volatile emissions exists;
- If the spill results in the formation of a toxic vapor cloud, from vaporization, reaction with surrounding materials, or the outbreak of fire, further evacuation may be required;
- To dispose of spill waste, all contaminated sorbents, liquid waste, or other spill clean-up will be placed in small quantities Enter QTY pounds) in approved drums for proper storage or disposal as hazardous waste.

10.2.5.2 Notification of Spills and Discharges

All environmental spills or releases of hazardous materials (e.g., fuels, etc.), whether in excess of the Reportable Quantity or not, will be reported according to the sequence identified for the site.

AECOM will notify NBSFS immediately of any spill or discharge. AECOM will make all regulatory notifications for AECOM generated spills, if deemed necessary.

In determining whether a spill or release must be reported to a regulatory agency, the Site Supervisor will assess the quantity of the spill or release and evaluate the reporting criteria against the state-specific reporting requirements, the applicable regulatory permit, and/or client-specific reporting procedures.

10.2.6 Fire Fighting Plan

AECOM employees are not expected to attempt to put out fires. Stop work; notify all AECOM personnel, move upwind and contact the base Fire Department. If employees have been properly trained in the operation of a fire extinguisher, they may attempt to put out a small fire, provided that the following conditions are met:

- The fire must be small (i.e., smaller than a trash can) and in its early stages
- The employee must have an escape route
- The employee must be trained and know they have the right type of extinguisher
- The employee must be safe from toxic gases
- There must be no hazardous conditions that could quickly accelerate the fire (i.e., presence of chemicals, especially dry grass, etc.)
- Above all, if in doubt, the employee must not attempt to fight the fire

- Vehicles will be equipped with at least one fire extinguisher

In any fire situation, it is important to act quickly and decisively in order to contain the spread of the fire. Regardless of the size and nature of the fire, and AECOM's ability to respond, all fires will be reported immediately to the base fire department and local fire department as appropriate. The SSHO will:

- Sound the fire alarm (local or auxiliary);
- Determine the extent of the fire;
- Notify Fire Department — 911
 - Name of Facility
 - Address, including nearest cross street(s)
 - Exact location of the fire within the site
 - Provide name and phone number
- Coordinate and manage fire suppression efforts until the additional personnel arrive;
- Coordinate the evacuation of injured or non-essential personnel from the site upwind following the evacuation procedure;
- Check attendance;
- Provide emergency first aid as required;
- If the SSHO has determined that it is safe to do so, site personnel may use available onsite fire extinguishers on incipient stage fires only;
- Remove or isolate flammable or other hazardous materials, which may contribute to the fire; and
- Clear access routes for emergency vehicles.

Fire Department officials will determine when it is safe for re-entry.

10.2.6.1 Fire Extinguishers

Full 10 pound (lb) ABC fire extinguishers will be available on site to contain and extinguish small fires. All fire extinguishers will be available for response and will be positioned to be within 10 seconds of a potential fire event. A minimum of two fire extinguishers will be kept on site at all times. All vehicles will be equipped with at least one fire extinguisher.

10.2.6.2 Hot Work

Before any flame-producing devices, (e.g., cutting torches, welding irons) are used in the exclusion zone, the SSHO must be contacted.

A detailed inspection of the work area will be conducted to determine if potential fire sources exist. The fire sources must be removed to at least 35 feet away before work can commence.

When welding or cutting takes place, a flash shield is required. No slag or sparks will be allowed to fall onto other workers or visitors.

Two 20 lb, 4A:20, portable fire extinguishers will be readily available for all hot/flame producing work

"Fire watch" person will watch out for flying sparks or slag during the welding operation or torch cutting operation. Upon completion of the cutting/welding activities the area will be inspected for hot metal, and slag. The "fire watch" person will stay at least one hour after all welding or cutting has finished for the day to document no fire is present.

10.2.6.3 Heavy Equipment

Each piece of heavy equipment (e.g., forklift, bulldozer, backhoe/loader, dump truck) and all vehicles will be equipped with at least a 10-B: C portable fire extinguisher. During refueling of these machines, the engine will be turned off.

10.2.6.4 Storage

Combustible or flammable materials will be stored in proper containers. Gasoline or diesel fuels will be stored in metal safety cans in quantities of five gallons or less. No plastic gas cans or 5-gallon jerry cans are allowed on the project unless specifically authorized by camp command.

10.2.7 Muster Location

A primary muster location will be identified each day during the safety briefing and communicated to all site personnel. If site conditions indicate a change in this location, procedures as discussed below will be used to inform site personnel of the new location.

10.2.8 CPR / First Aid Trained Personnel

At all times, at least two of the AECOM field workers on-site will have current first aid and CPR certification.

10.2.9 Posting of Emergency Telephone Numbers

Emergency phone numbers, call signs, and detailed instructions for obtaining emergency response and medical assistance will be posted in the SSHP (**Attachment 1**). This includes a detailed hospital route map and approximate times and distances. All personnel will be trained on the emergency alert systems in place at the work site. Emergency phone numbers for the ERT are provided in **Table 4** below.

Table 4: Emergency Response Team

Name	Name and Project Role	Telephone Number	E-mail Address
AECOM Contacts			
AECOM	Josh Millard, TOM	978-424-8199	Joshua.Millard@aecom.com
AECOM	Richard Purdy, STS, SSHO	781-883-6425	richard.purdy@aecom.com
AECOM	William Abrahams-Dematte	603-801-6583	bill.abrahams-dematte@aecom.com
AECOM	Scott Dietz, CSP, STSC Area SH&E	240-344-5892	Scott.dietz@aecom.com
Client Contacts			
AFCEC PM	Brett Dubner	508-968-4670, x3001	brett.dubner.1@us.af.mil
USACE PM	Erin Kirby	978-318-8147	erin.kirby@usace.army.mil
Organization/Agency			
Police Department			911
Fire			911
Ambulance			911
Hospital Catholic Medical Center 100 McGregor St, Manchester, NH 03102			603-668-3545
Poison Control Center DE			800-222-1222
Pollution Emergency			800-662-8802
INFOTRAC (AECOM's account number 74984)			800-535-5053
AECOM Hazardous Material Shipping Help Line			800-381-0664

Safety and Health Information

The field effort will be relatively short term and/or completed in phases of limited duration, therefore AECOM will not maintain a field office for this project on NBSFS. The AECOM SSHO will ensure the appropriate safety and health information is available for field personnel. This will likely include maintaining copies of the information in field vehicles used by company personnel. The information will be maintained current, readily available to affected workers, and protected against the elements and unauthorized removal.

Required project specific and general safety awareness reminder information will be used to communicate information to site participants. The information will include copies of the current:

- APP;
- Facility-Specific SSHP;
- AHAs;
- OSHA Form 300 (if injury has occurred);
- Safety and Health promotional posters (staff office);
- Date of last lost workday injury (if injury has occurred);
- OSHA Safety and Health Poster (staff office);
- A highly visible map showing the route to the nearest emergency room; and
- Emergency contact numbers.

Each office/project site where AECOM has established a presence will have the appropriate labor posters. Ensure local and state posting are included. At a minimum, ensure OSHA's Occupational Safety Health and Act Poster (OSHA 3165) is available at staff personnel offices and communicated to all affected employees. It is anticipated that all postings will be maintained in the site vehicle in the absence of a dedicated site office.

10.2.10 Man Overboard/Abandon Ship

This section is not applicable.

10.2.11 Medical Support

At least two field team members on each site will have current first-aid and CPR training from the American Red Cross, the American Heart Association, an organization whose training adheres to the standards of the International Liaison Committee on Resuscitation (as stated in writing), or from a licensed physician. Classes will contain a hands-on component. The certificate(s) will state the date of issue and length of validity. The following table indicates the personnel and their locations that are trained.

A list of individuals and dates of First Aid and CPR training is depicted in the table below and copies of the certifications provided in the forthcoming SSHPs. Onsite first aid kits will meet the requirements of EM 385-1-1. First aid kits are Type III, 16-unit kits, including one pocket mouthpiece or CPR barrier. Kits will be checked prior to use, and at least weekly when work is in progress to ensure that contents are replaced as used. If a unit is available, personnel will be trained in the use of the Automated External Defibrillator. A list of First Aid and CPR trained employees is provided in **Table 5** below.

Table 5: First Aid and CPR Certified Employees

Name
Bill Abrahams-Dematte
Richard Purdy

Emergency medical support contact information will be contained in the SSHP. Employees can contact emergency personnel by dialing 911 the appropriate base emergency services contact number. The dispatcher will contact, fire, and/or helicopter evacuation services. Emergency phone numbers will be found in the SSHP.

10.2.12 Plan for Prevention of Alcohol and Drug Abuse

Illegal use, sale, manufacture, distribution, dispensation, possession (without a physician's prescription) or being under the influence of any controlled substance is absolutely prohibited. Employees are expected and required to report to work on time and in appropriate mental and physical condition for work. AECOM provides a drug-free, healthful, safe and secure work environment.

Drug and alcohol abuse pose a serious threat to the health and safety of employees, clients, and the general public as well as the security of our job sites, equipment and facilities. AECOM is committed to the elimination of illegal drug use and alcohol abuse in its workplace and regards any misuse of drugs or alcohol by employees to be unacceptable. AECOM prohibits the use, possession, presence in the body, manufacture, concealment, transportation, promotion or sale of the following items or substances on company premises. Company premises refer to all property, offices, facilities, land, buildings, structures, fixtures, installations, aircraft, automobiles, vessels, trucks and all other vehicles and equipment - whether owned, leased, or used.

- 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;
- Controlled substances that are not used in accordance with physician instructions or non-prescribed controlled substances; and
- Alcoholic beverages while at work or while on any customer- or AECOM-controlled property.

This policy does not prohibit lawful use and possession of current medication prescribed in the employee's name or over-the-counter medications. Employees must consult with their health care provider about any prescribed medication's effect on their ability to perform work safely and disclose any restrictions to their supervisor.

The use, sale, distribution and possession of marijuana are violations of AECOM policy, and will subject an employee to disciplinary action up to and including termination in accordance with controlling law.

10.3 Site Sanitation/ Housekeeping Plan

10.3.1 Smoking, Eating, and Drinking

Eating and drinking will be permitted only in designated areas at AECOM project sites. Smoking will be permitted only in areas designated by SSHO and situated in locations that are not in the immediate vicinity of activities associated with work site activities. Additionally, the SSHO will designate each smoking area giving primary consideration to those personnel who do not smoke.

Personnel actively involved in the performance of certain activities will not be permitted to smoke, eat, drink, or use smokeless tobacco, except during breaks (e.g., HAZWOPER Controlled work areas).

10.3.2 Water Supply

Water supplies will be available for use onsite and will comply with the following requirements.

An adequate supply of potable cool water will be supplied and will be kept in water coolers in the support zone onsite. The water cooler will be kept closed and appropriately sealed to protect the drinking water integrity. Personnel will be instructed to wash their face and hands prior to drinking.

Potable water can be provided in the form of approved well or city water, bottled, or drinking fountains. Where drinking fountains are not available, individual use cups will be provided as well as adequate disposal containers. Potable water containers will be properly identified in order to distinguish them from non-potable water sources.

Non-potable water maintained at the project site and all outlets dispensing non-potable water should have posted the following: "CAUTION – WATER UNSAFE FOR DRINKING, WASHING, OR COOKING." Non-potable water may be used for hand washing and cleaning activities. Non-potable water will not be used for drinking purposes. All containers/supplies of non-potable water used will be properly identified/labeled as such.

10.3.3 Toilet Facilities

Chemical toilet(s) will be available for site personnel and visitors. A minimum of one toilet will be provided for every 20-site personnel, with separate toilets maintained for each sex, except where there are less than five total personnel onsite. The toilet will be equipped with toilet paper, toilet paper holder, hand sanitizer, locking door, and adequate ventilation.

For mobile crews where work activities and locations permit transportation to nearby toilet facilities (e.g., gas station, or rest stop), onsite facilities are not required.

10.3.4 Washing Facilities

Site personnel will wash hands and face after completing work activities and prior to breaks, lunch, or completion of workday.

Cleaning supplies at project sites will consist of soap, water, and disposable paper towels or items of equal use/application (e.g., anti-bacterial gels, wipes, etc.). For mobile crews where work activities and locations permit transportation to nearby wash facilities (e.g., gas station, or rest stop), onsite facilities are not required.

10.3.5 Clothing and PPE

All PPE will be kept clean at all times and maintained in accordance with the manufacturer's requirements.

10.3.6 Housekeeping

10.3.6.1 General Work Areas

At all times, work areas will be kept free of dirt and debris that may impact the safety of site personnel and visitors. All trash receptacles will be regularly emptied.

10.3.6.2 Break Areas and Lunchrooms

Site personnel will observe the following requirements when using break areas and lunchrooms at project sites:

- All food and drink items will be properly stored when not in use;
- Food items will not be stored in personal lockers for extended periods in order to prevent the potential for vermin infestation;
- Perishable foods will be refrigerated whenever possible;
- All waste food containers will be discarded in trash receptacles;
- All tables, chairs, counters, sinks, and similar surfaces will be kept clean and free of dirt, waste food, and food containers at all times;
- Refrigerators used to store food items will be maintained at 45°F and emptied of all unclaimed food items weekly; and
- Routine cleaning of refrigerators will also be performed on a regular basis.

10.3.6.3 Work Sites

- All work areas shall be kept clean to the extent that the nature of the work allows;
- Every work area shall be maintained, so far as practicable, in a dry condition; where wet processes are used, drainage shall be maintained and platforms, mats, or other dry standing places shall be provided, where practicable, or appropriate waterproof footwear shall be provided;
- Protruding objects or placement of materials on paths or foot traffic areas present a problem with regard to slips, trips, falls, and puncture wounds. Personnel will use a reasonable amount of effort to keep slip, trip, and fall hazards to a minimum;

- Excess debris and trash will be collected and stored in an appropriate container (e.g., plastic trash bags, garbage can, roll-off bin) prior to disposal; and
- At no time will debris or trash be intermingled with waste PPE or contaminated materials.

10.4 Medical Support Agreement

AECOM works with Workcare an occupational healthcare company that has a network of providers. The medical providers that are listed in the plan are part of the Workcare network and don't require a separate agreement.

10.4.1 Medical Emergency

If emergency services are required, call 911, stabilize the employee and wait for medical staff to arrive. While awaiting the ambulance, stabilize the injured, and decontaminate the injured person, if necessary. Workers with suspected back or neck injuries are not to be moved until professional emergency assistance arrives. Extricate only if the environment is dangerous or unsafe and only if the rescuers are appropriately protected for potential hazards they may encounter during the rescue. If the rescuers cannot safely enter the work zone to transport the victim, extricate the victim to a safe area for the rescuers. This may require use of medical equipment (back boards, collars, wraps) provided by the rescue personnel. When emergency services personnel arrive, communicate all first aid activities that have occurred. Transfer responsibility for care of the injured/ill to the emergency services personnel.

10.4.2 Non-Critical Injury/Illness

For a non-critical injury/illness, provide first aid treatment and evaluate the need for further treatment. If further treatment is necessary, transport the injured employee to the nearest clinic or arrange for transport by ambulance.

Attend to any injured personnel in so far as is required to prevent further injury and provided no other person is put at risk in the process. In the event of any illness or injury, the following steps will be taken:

- Evaluate the extent of injuries or seriousness of illness; and check the victim for consciousness.
- The victim may need to be moved to a safe location. If not, do not move the victim and assess the cause of the injury where the victim is located.
- When workers require urgent medical attention, transport to the clinic or call for emergency assistance. First aid will be administered while awaiting an ambulance or paramedics. All emergency medical treatment, other than first aid, will be administered by the local paramedics. In all cases, critical injuries must be immediately referred for professional medical attention.
- All first aid will be administered by on-site personnel trained and certified in CPR and first aid. All vehicles used to transport injured persons to the off-site medical facility will be provided with directions and a map to the medical facility (facility locations are presented in subsequent bullets). Medical and allergy information voluntarily provided by personnel will be referenced in an emergency to assist with the treatment of the victim.
- Workers will immediately notify the SSHO who will notify the PM, the SH&E Manager, and the AECOM Incident Reporting Line as soon as possible of any injury requiring medical care or first aid response that could be followed by medical care. Notification will occur for all persons requiring treatment whether an AECOM employee or an AECOM subcontractor.

- **Hospital Location**
Catholic Medical Center
100 McGregor St.
Manchester, NH 03102
603-668-3545

10.4.3 Personnel - First Aid/CPR Responders

Project emergency contact information is presented in **Table 4**.

10.5 Bloodborne Pathogen Program

During site activities, workers can potentially be exposed to bloodborne pathogens when rendering FA or CPR. Avoiding contact with biological agents is the best way to prevent adverse health effects caused by them. Recognition of potential hazards is essential. As a rule, employees will not come into contact with any item that may appear to result from medical waste disposal. When avoidance is impractical or impossible, such as when administering first aid, PPE and personal hygiene will be used to prevent adverse effects. Employees designated to perform tasks involving occupational exposure including designated first-aid providers, shall receive bloodborne pathogens training at the time of initial assignment to the job.

AECOM employees are at risk of contracting infectious diseases each time they are exposed to bloodborne pathogens. Any exposure incident may result in infection and subsequent illness. Since it is possible to become infected from a single exposure incident, it is the practice of AECOM to prevent exposure incidents whenever possible.

To ensure employees are effectively informed concerning potential workplace health hazards, and in accordance with the requirements set forth in 29 CFR 1910.1030 and EM 385-1-1 Section 3, AECOM has established an Exposure Control Plan (ECP) for bloodborne pathogens. The purpose of this plan is to identify those tasks and procedures for which occupational exposure to bloodborne pathogens may occur, to identify the positions whose duties include those tasks, and to implement controls that will significantly reduce the risk of infection by bloodborne pathogens. The plan also includes provisions for affected employees to receive Hepatitis B vaccinations, training, and, if necessary, confidential medical evaluations and follow up.

10.6 Exposure Control Plan

The site-specific ECP includes:

- **Hepatitis B vaccination:** Employees whose assigned duties present a potential exposure to BBP will be offered the Hepatitis B vaccination if their immunization is not current. If the employee declines the vaccination; a signed waiver will be required.
- **Work practice controls:** Provide adequate supplies for providing First Aid/CPR and treating all contact with human blood and bodily fluids as potentially infectious. Hand washing facilities/supplies shall be readily accessible for all employees.
- **PPE:** Provide PPE at no cost to the employee. Typical equipment includes, but is not limited to, gloves, facemasks, eye protection, and CPR shield. PPE will be 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 will be used. PPE must be readily accessible and will be removed prior to leaving the work area.

- Housekeeping: Use universal precautions when cleaning or decontaminating any surface or equipment that may be contaminated. Appropriate PPE will be used for protection during decontamination.
- Post-Exposure Activities:
 - Report all occupational bloodborne pathogen exposures to the SSHO immediately after initial decontamination and first aid is accomplished. Following the report of an exposure incident, a confidential medical evaluation with an occupational physician will be arranged as soon as possible, ideally no later than 1-2 hours after the incident has occurred.
 - Report the incident as soon as possible to the AECOM Reporting Hotline and the Area SH&E Manager. The Area SH&E Manager will review the circumstances of each exposure incident to determine if the appropriate work procedures were being followed at the time of the incident, and to assess and implement any necessary corrective actions, including changes required in the ECP.
 - Post-exposure medical treatment will be offered in accordance with the current recommendations of the U.S. Public Health Service. This may include, but is not limited to:
 - A series of HIV post-exposure blood tests
 - Hepatitis vaccination and/or Hepatitis B immune globulin
 - HIV post-exposure prophylactic medication
 - Evaluation of acute febrile illnesses
 - Employee counseling

10.7 Automatic External Defibrillator (AED) Program

This section is not applicable.

10.8 Site Layout Plan

This section is not applicable.

10.9 Access and Haul Road Plan

This section is not applicable.

10.10 Hearing Conservation Program

Hearing protection will be worn, as appropriate, whenever sound-pressure levels exceed 85-decibel A-weighted sound level (dBA) steady-state expressed as a time-weighted average or 140 dBA impulse, or as desired by individual workers when working around noise-producing equipment. Hearing protection worn by personnel will comply with the requirements of 29 CFR Part 1910.95(j), and will provide a minimum noise reduction rating of at least 21.

Hearing protection will be worn at all times when normal conversation becomes difficult at distances of 3 feet or less, such as during the operation of heavy equipment. The use of hearing protection and its necessity will be detailed in the applicable AHAs for the individual tasks.

Heavy equipment (e.g., scrapers, dozers, excavators, drilling equipment) may produce continuous and impact noise at or above the action level of 85 decibels. Personnel within 20 feet of operating equipment, or near an operation that creates noise levels high enough to impair

conversation, will wear hearing protective devices (either muffs or plugs). AECOM personnel who are in the Medical Surveillance Program are automatically enrolled in the AECOM Hearing Conservation Program and have had baseline and, where appropriate, annual audiograms. Personnel will wash their hands with soap and water prior to inserting earplugs to avoid initiating ear infections due to soiled earplug insertion into the ear canal. Additional information regarding the AECOM Hearing Conservation Program is located in S3AM-118 Hearing Conservation (**Attachment 5**). In addition, the following forms will be used if noise is quantified:

- S3AM-118-FM2 - Sound Level Survey
- S3AM-118-FM3 - Noise Dosimetry Record

10.11 Respiratory Protection Program

If any conditions that require potential upgrade in PPE, to include the use of Level C PPE, are noted during the course of site activities, all work operations will cease at the location and the PM and SH&E Manager will be notified immediately. A modification to AECOM's APP and SSHP will be required prior to conducting work in Level C PPE or higher.

10.12 Health Hazard Control Program

All operations, materials, and equipment associated with this project will be evaluated/assessed to determine the presence of hazardous environments or if hazardous or toxic agents could be released into the work environment. Additional hazard assessment will be conducted if a change in conditions occurs. The work to be conducted under this APP is related to investigation of PFAS at NBSFS. As such, additional precautions must be taken to ensure no cross contamination occurs. Please see of the project-specific QAPPs listed in Section 2.4.2 of this APP for details regarding materials suitable for PFAS sampling.

The AHA procedures will be used to identify all substances, agents, and environments that present a hazard and recommend hazard control measures. Engineering and administrative controls will be used to control hazard and in cases where engineering or administrative controls are not feasible, PPE use will be mandated. The AHAs are included in **Attachment 2** for the main tasks covered under this project. Any additional tasks identified outside of those included in **Attachment 2** will be included in the SSHP.

The analyses will identify the workplace and activity evaluated; the name of the person certifying that the evaluation has been performed; and the date of the evaluation.

Operations, materials, and equipment involving potential exposure to hazardous or toxic agents or environments shall be evaluated by an AECOM certified industrial hygienist (CIH), Certified Safety Professional (CSP), or other competent person. Exposure, through inhalation, ingestion, skin absorption, or physical contact, to any chemical, biological, or physical agent in excess of the acceptable limits specified in the most recently published American Conference of Governmental Industrial Hygienists (ACGIH) guideline, "Threshold Limit Values and Biological Exposure Indices," or by OSHA, whichever is more stringent, shall be prohibited.

10.12.1 Identification of Principal Hazards

The following are the principal hazards that can be anticipated while conducting field investigations:

- Chemical hazards;
- Biological hazards; and
- Physical hazards,

10.12.2 Hazard/Risk Management

AECOM has adopted and implemented the composite risk management process, which includes the following steps:

- Identification of the hazard;
- Assessment of the hazard;
- Development of controls and risk decision;
- Implementation of controls; and
- Supervision and evaluation during task performance.

10.12.3 Hazard Identification

A concise statement is prepared identifying the conditions that reflect actual or potential conditions that can cause injury, illness, or death of personnel, damage to the environment, damage or loss of equipment, or degradation of the production goals.

10.12.4 Exposure Control

The following methods will be utilized for the control of exposure to hazardous or toxic agents and environments:

- Substitution, if the substitute process or product is determined to provide the same outcome and to be less of a hazard;
- Engineering controls (such as local/general ventilation), to limit exposure to hazardous or toxic agents and environments within acceptable limits;
- Work practice controls, when engineering controls are not feasible or are not sufficient to limit exposure to hazardous or toxic agents and environments within acceptable limits; and
- Appropriate PPE (i.e., respirators, gloves, etc.) and associated programs shall be instituted when engineering, work practice controls or material substitution are not feasible or are not sufficient to limit exposure to hazardous or toxic agents.

10.12.5 Personal Protective Equipment

The purpose of PPE and clothing is to protect individuals from chemical and physical hazards. Specific work tasks with unique hazards and/or PPE requirements will be evaluated or reevaluated prior to beginning work. This task review will be led by the SSHO and will include knowledgeable individuals such as the worker(s) and the supervisor. PPE requirements, based on this assessment will be found in the SSHP and in the AHA for the specific task. All workers must be trained in the requirements of the APP, SSHP, and the applicable AHAs prior to beginning work.

Requirements for task and activity-specific levels of protective clothing are presented on the AHAs. Personnel performing site tasks shall use the appropriate level and type of PPE specified in this APP for each individual task. This APP makes provisions for use of the following levels of PPE, in accordance with the hazards and contamination level anticipated for each task or operation.

10.12.5.1 Level D Protection

Level D protection is the minimum protection required for project personnel and visitors at the site. Level D protection may be sufficient when no contaminants are present or work operations preclude splashes, immersion, or the potential for unexpected inhalation or contact with hazardous levels of chemicals.

The following equipment will be used for Level D protection:

- Coveralls or other suitable fieldwork clothing;
- Persons exposed to vehicular or equipment traffic, including signalpersons, spotters, or inspectors, shall wear high visibility apparel meeting American National Standards Institute/Safety Equipment Association (ANSI/SEA) 107 Class 3 requirements;
- Work boots with either steel or composite safety toe meeting the ASTM F2413 standard;
- Safety glasses (ANSI Z87.1) or goggles as needed;
- Hardhat if overhead hazard or heavy equipment is encountered or operated;
- Leather work gloves;
- Hearing protection, earplugs, and/or earmuffs as needed; and
- Raingear and Rubber Boots (if required).

Should personnel encounter an unusual odor, discolored soil, or an unknown item, they will immediately notify their supervisor and will evacuate the site upwind of the suspected item. The SSHO will notify the TOM of the actions taken.

Modified Level D protection will incorporate all of the above with the addition of chemical protective gloves (nitrile), chemical resistant coveralls, and rubber over booties for biological hazard avoidance if necessary.

10.12.5.2 Level C Protection

Level C protection is the next higher level of PPE that encompasses Level D and incorporates additional safety equipment. Level C will be upgraded to if the need for respiratory protection is found by the SSHO. The main components of Level C are as follows:

- Full-face or half-face, air purifying respirators (National Institute for Occupational Safety and Health (NIOSH) approved);
- Hooded chemical-resistant clothing (coveralls; two-piece chemical-splash suit; disposable chemical-resistant coveralls);
- Gloves, outer, chemical-resistant; and
- Gloves, inner, chemical-resistant.

10.12.5.3 Proper PPE Selection

The selection of the PPE will be done after a thorough evaluation of the hazards involved at the site during each phase of the operation. All persons entering the site area will put on the required PPE according to established procedures in this APP.

Hazard and risk assessment is a continuing process to be conducted by the SSHO, throughout the duration of the project. Changes in specific PPE or levels of PPE may be required in accordance with information obtained from implementation of site activities and data derived from the other sources. As a general rule, levels of PPE will need to be reassessed if any of the following occur:

- Appearance of previously unidentified or anticipated chemicals, conditions, or task hazards;
- Airborne concentrations of known chemicals exceed action levels;
- Ambient weather conditions changes impacting the use of assigned PPE; and
- A new task is introduced or a previously assigned and evaluated task is expanded in scope.

Specific levels of protection will be modified when onsite conditions warrant and based upon the revisions presented in the forthcoming SSHPs for a specific location. The decision to change levels of protection will be made by the SSHO with concurrence from the TOM and the SH&E Manager. Levels of protection will not be downgraded without prior approval from the SH&E Manager.

10.12.5.4 Head Protection

AECOM employees and visitors will wear hard hats that meet the requirements of ANSI Z89.1 (as indicated by the manufacturer's label) if there is a potential of exposure to flying/falling objects or overhead hazards. Hard hats can be removed in break areas or where their use presents potential safety hazards. Ear protection and face shields may be attached to hard hats. The following criteria will be followed:

- No modification to the shell or suspension is allowed except when such changes are approved by the manufacturer.
- Hard hats shall be worn with the bill facing forward unless the SSHO has determined exceptions for certain trades in order to accommodate appropriate mission accomplishments.
- No ball caps, knit caps, or other headdress shall be worn under the hard hat that could interfere with the fit or stability of the hard hat.
- Protective headgear and components shall be visually inspected on a daily basis for signs of damage (dents, cracks, etc.) that might reduce the degree of safety integrity originally provided.
- Headgear will be periodically inspected for ultraviolet degradation as evidenced by cracking or flaking of the helmet.
- Drilling holes or in any way changing the integrity of the hard hat is prohibited. Alterations that will reduce the dielectric or impact strength will not be made.
- Chin straps will be worn when wearers are subject to high wind conditions and/or working on elevated structures.

10.12.5.5 Eye Protection

Eye and face protection equipment shall meet the requirements of ANSI Z87.1 and bear a legible and permanent "Z87" logo to indicate compliance with the standard providing side protection. When required to wear eye protection, persons whose vision requires the use of corrective lenses in eyeglasses shall be protected by one of the following:

- Prescription safety glasses providing optical correction and equivalent protection;
- Protective glasses with side shields designed to fit over corrective lenses without disturbing the adjustment of the glasses; and
- Goggles that can be worn over corrective lenses without disturbing the adjustment of the glasses or goggles that incorporate corrective lenses mounted behind the protective lenses.

The SSHO will ensure that suitable eye protection is available and provided to all onsite personnel.

The use of eye protection by all personnel will meet the requirements of the following minimum requirements:

- Provide adequate protection against the particular hazards for which they are designed;
- Be reasonably comfortable when worn under the designated conditions;
- Fit snugly and not unduly interfere with the wearer's movements;
- Be durable; and
- Be easily cleaned and sanitized.

Contact lenses do not provide adequate eye protection. Contact lens wearers must use the same additional eye protection as non-lens wearers. Persons whose vision requires correction and who are required to wear eye protection may wear goggles or spectacles of one of the following types:

- Spectacles whose protective lenses provide optical correction (prescription);
- Goggles that can be worn over corrective (prescription) spectacles without disturbing the adjustment of the spectacles; and
- Goggles that incorporate corrective (prescription) lenses mounted behind the protective lenses.

10.12.5.6 Hand Protection

Employees will use appropriate hand protection when exposed to hazards that could cause injury to the hands. Gloves must resist puncturing and tearing, as well as provide any necessary chemical resistance. Generally, leather or Kevlar gloves will be worn during material and equipment handling activities and Nitrile gloves will be used for chemical protection as indicated in the AHA developed for the specific task and during biological hazard avoidance.

10.12.5.7 Foot Protection

All workers entering designated fieldwork areas will wear sturdy leather or leather/synthetic combination work boots with safety toes that provides adequate ankle support and provide adequate protection for the task being performed. Sandals and other open-top footwear are not acceptable in designated fieldwork areas.

10.12.5.8 Traffic Safety Vests

When working on or near public roads and when working around moving vehicles at designated field work areas, all personnel will wear high visibility retroreflective traffic safety vests, shirts, or similar colored garment so as to provide high visibility to drivers/operators (e.g., Class II or III as required).

10.12.5.9 PPE Use

All site personnel will be given initial PPE-specific training. This training will be given by the SSHO prior to personnel participating in site operations where PPE is required. All personnel receiving PPE training will be required to demonstrate an understanding of the training topics and the ability to correctly use the PPE. This will be accomplished through the SSHO supervising and visually inspecting each individual's ability to properly don and use the PPE during its initial use. Upon completion of the training and after each employee has successfully demonstrated the requisite understanding, the SSHO will complete any applicable training completion form.

10.12.5.10 PPE Program Effectiveness

The jobsite shall be evaluated to determine if the incorporated PPE levels are adequate based upon the site conditions and contaminants detected. If additional work tasks, are added to the Statement of Work, after approval of this APP, the TOM and SSHO shall identify and assess the task hazards, and relay that information to the SH&E Manager. The SSHO, in conjunction with the SH&E Manager, will prepare an amendment to the APP/ and submit the amendment for approval to NBSFS. The amendment will be added to the APP/SSHPs upon approval.

The SSHO will ensure PPE use complies with all applicable OSHA, NBSFS, and AECOM requirements.

10.12.5.11 PPE Inspection and Care

Maintenance of PPE can vary greatly, based upon the complexity of the PPE and the intricacy of the repair involved. The SSHO will become familiar with the manufacturer's recommended maintenance, and when possible, repair defective PPE. If unable or unauthorized to conduct the repair, the SSHO will return the item to the manufacturer for repair, or to procure a replacement.

The SSHO will be responsible for ensuring that PPE is in good, clean, working order prior to the initial issuing of the PPE. Once issued, site personnel will ensure that re-usable articles of PPE are maintained in a clean, sanitary fashion. During the work task, co-workers should periodically inspect each other for the proper use of PPE. For items used inside an exclusion zone, site personnel will follow the requirements of the Site-Specific Decontamination Plan, and ensure that the PPE is properly decontaminated in the Contaminate Reduction Zone before removing the item from the exclusion zone.

10.12.6 Biological Hazards

The SSHO will identify all personnel with known insect or arachnid allergies or sensitivities before fieldwork begins. Personnel with known allergies should carry appropriate medication and should notify the SSHO of this medication's location.

10.12.6.1 Ticks

Ticks have the potential to carry serious diseases such as Relapsing Fever, Encephalitis and Lyme disease. Periodically during the workday and at the end of the day, employees should inspect themselves for the presence of ticks. If tick infestation is present, clothing will be turned inside out and shaken at the end of day. The same clothes will not be worn two days in a row. To remove ticks that are embedded in skin, a tick key will be used. If a tick key is not available, tweezers or fingers will be used to carefully grasp the tick as close to the skin as possible and pull slowly upward, avoiding twisting or crushing the tick. The bite area will be cleansed with soap and water, alcohol, or household antiseptic. Note the date and location of the bite and save the tick in a secure container (e.g., empty pill vial, film canister). Use a bit of moistened paper towel placed inside the container will keep ticks from drying out. Report the tick bite to the SSHO within 4 hours.

10.12.6.2 Mosquitoes

Mosquitoes occur anywhere there is standing water and may transmit the malaria pathogen, and other serious diseases. Malaria is transmitted through the bite of infected *Anopheles* mosquitoes. Human malaria can result from four distinct species of the parasite of the genus *Plasmodium*.

Malaria symptoms may include: fever, chills, sweats, headache, body aches, nausea, vomiting, and fatigue. Symptoms will normally occur seven to nine days after being bitten by an infected mosquito. Malaria may cause anemia and jaundice. Malaria infections with *P. falciparum*, if not promptly treated, may cause kidney failure, coma, and death. Travelers can develop malaria up to a year after returning from a malarious area.

Filariasis is a parasitic disease transmitted by thread-like nematodes that are carried from host to host by mosquitoes. Filariasis symptoms include swelling from fluid build-up (lymphedema) and engorgement, thickened skin, and disfigurement (elephantiasis). Avoid standing water, use mosquito repellent and netting when possible.

10.12.6.3 Spiders

Spider bites can be extremely serious. Venom affects the nervous system; symptoms can include local reaction, muscle cramps, belly pain, weakness, tremor, nausea and vomiting, faintness, dizziness, chest pain, and trouble breathing. Other spider bites (e.g., black widow and brown recluse) are unpleasant or uncomfortable, resulting in rashes, itching, and possible infection. The possibility of allergies greatly increases the danger since people are not usually aware of such allergies until they have been bitten. Therefore, spiders should be regarded as a serious potential hazard.

10.12.6.4 Bees

If field personnel have been stung by a bee, the stinger needs to be removed immediately. Use something to scrape across the affected area (e.g., credit card) to remove the stinger. Once the stinger is removed, wash area with soap and water and apply ice. Monitor affected area for allergic reaction. If field personnel are allergic to bee stings or if an allergic reaction is noticed after a sting, administer doctor prescribed epinephrine (commonly found in an Epi-pen) shot after sting occurs and seek medical attention immediately. The epinephrine can only be administered to the field personnel in a manner prescribed by a doctor.

10.12.6.5 Poisonous Snakes

The project is located in a region of the United States (U.S.) that may contain only two venomous snakes: the Northern Copperhead and the Timber Rattlesnake.

The copperhead snake prefers rocky regions; it is inoffensive and not aggressive unless disturbed. Copperheads use rocks and timber piles for shelter and hibernate in burrows vacated by other animals. Its bite, while painful and capable of producing severe illness, rarely results in death. Site personnel should avoid rocks, timber piles, and animal burrows.

Rattlesnakes usually attack only when they are surrounded or surprised, so site personnel should proceed slowly or avoid dense patches of underbrush. If a rattlesnake is encountered, back away slowly. Rattlesnake habitats include stump holes, animal burrows, and dense patches of underbrush.

The possibility of poisonous snakes will be communicated to site personnel during the initial site-specific safety training. Site personnel will be warned to avoid snakes and will be required to wear sturdy steel-toe/steel-shank work boots. If there is a snakebite emergency, the victim will be transported to the hospital for emergency treatment.

First aid for snake bites:

1. Immobilize the bitten arm or leg and have the victim stay as quiet as possible to keep the poison from spreading through the body
2. Remove jewelry before swelling starts
3. Position the person so that the bite is at or below the level of the heart
4. Cleanse the wound and cover with a clean, dry dressing
5. Apply a splint to reduce movement of the affected area, but do not restrict blood flow
6. Do not use a tourniquet or apply ice
7. Do not cut the wound or attempt to remove the venom
8. Do not let the victim drink caffeine or alcohol

Do not try to capture the snake, but try to remember its color and shape

10.12.6.6 Poisonous Plants

Poison ivy, oak, and sumac may be present on site. Poison ivy can be found as vines on tree trunks or as upright bushes. Poison oak is another name for the bush form of poison ivy. Poison ivy consists of three leaflets with notched edges—two leaflets form a pair on opposite sides of a stalk, and the third leaflet stands by itself at the tip. Poison ivy is red in the early spring and turns shiny green later in the spring. Poison sumac can be present in the form of a flat-topped shrub or tree. It has fern-like leaves, velvety dark green on top and pale underneath. The branches of immature sumac have a velvety “down.” Poison sumac also has “hairy” berry clusters.

Contact with poison ivy, oak, or sumac may lead to a skin rash, characterized by reddened, itchy, blistering skin that needs first aid treatment. If you believe you have contacted one of these plants, immediately wash your skin thoroughly with soap and water, taking care not to touch your face or other parts of your body prior to washing. In addition, wash contaminated clothing in strong soap and water because the plant oils can remain active for a period of months.

First aid/response to poison plant exposure: Call 911 if the person has trouble swallowing or breathing; or swelling, especially near the eyes or on the face

1. Immediately wash skin thoroughly with soap and water or a product such as Technu®, taking care not to touch the face or other parts of the body prior to washing
2. Wash tools and contaminated clothing in strong soap and water because the plant oils can remain active for months
3. Apply cool compresses for 15 to 30 minutes at a time
4. Oatmeal baths or the application of calamine lotion will ease itching discomfort
5. Oral antihistamine may also help, but avoid topical antihistamines, which may make skin more sensitive

Seek medical attention for severe cases, if the rash covers a large part of the body, or if the person has blisters or can't sleep. Steroids may be prescribed by a physician to help stop the spread of the rash in severe cases

10.12.6.7 Indigenous Animals

To avoid animal bites and diseases, including rabies and plague, do not handle or pet animals, especially dogs and cats. Any animal encountered has likely not been inoculated and should be considered a wild animal. No pets are allowed on the U.S. military bases and only working dogs are authorized to be kept on the bases. Wild animals, however, sometimes find their way onto the bases through the perimeter and may be encountered. If an employee is bitten or scratched, wash the wound immediately with soap and water and seek medical attention to determine if medication or anti-rabies vaccine is needed.

10.12.7 Pandemic Virus – COVID-19

COVID-19 is the result of the virus identified as SARS-CoV-2. Coronaviruses are a large family of viruses found in both animals and humans. Some infect people and are known to cause illness ranging from the common cold to more severe diseases with symptoms, such as fever, cough, and shortness of breath. A human vaccine is currently being distributed for this virus. Additional COVID-19 information can be found on **Attachment 7**.

On February 4, 2021, the Secretary of Defense issued a memorandum regarding the use of masks and other public health measures to Senior Pentagon Leadership. In accordance with this

memorandum, all AECOM employees and AECOM subcontractors working on behalf of the Department of Defense (DoD) on military installations or any location other than the individual's home, including indoor and outdoor shared spaces, will wear masks in accordance with the most current Center for Disease Control and Prevention (CDC) guidelines. Individuals will wear masks continuously except:

- 1.) when an individual is alone in an office with floor-to-ceiling walls and a closed door.
- 2.) for brief period of time when eating and drinking while maintaining distancing in accordance with CDC guidelines and instructions from commanders (when on a military installation) and supervisors.
- 3.) when the mask is required to be lowered briefly for identification or security purposes.
- 4.) when necessary to reasonably accommodate an individual with a disability.

The memorandum is included in **Attachment 8**.

10.12.7.1 Inhalation Potential for COVID-19

COVID-19 may also be a potential inhalation hazard if working near (within 6 feet) of other workers or clients that may be infected with COVID-19. Symptoms of COVID-19 include:

- Fever
- Cough
- Shortness of Breath
- Bluish Lips of Face
- New Confusion or Inability to Arouse
- Persistent Pain or Pressure in the Chest

Individuals that have symptoms must discontinue work activities and seek medical attention immediately.

Air monitoring instrumentation is not available that can detect COVID-19. Protection can only be obtained by maintaining social distancing, and the use of personal protective equipment.

10.12.7.2 Skin Contact and Virus Including COVID-19

- Viruses including COVID-19 can live up to 6 days on non-porous surfaces
- High risk infectious objects tend to be frequently touched, including phones, toilet handles, handrails, and doorknobs
- Frequently touched surfaces and shared items should be cleaned twice daily and when visibly soiled

10.12.7.3 Requirements during COVID-19 Pandemic

Protect Yourself and Others

- Stay home if sick except to get medical help
- Wear N95 respirators if you will be around others (See the memorandum in Attachment 6 for DoD requirements).
- Cover coughs and sneezes with a tissue
- Toss tissue in toilet (preferred) or trash, preferable covered foot operated trash can
- Wash hands with soap and water
- Clean and disinfect frequently touched surfaces daily
- Proper disposal of tissues used to wipe noses

Social Distancing

Social distancing – six feet from clients and other workers whose health history you do not know; further away from strangers.

Prevention Cleaning

- Clean high touch surfaces often. When using wet wipes allow additional contact time. Preferably use accelerated hydrogen peroxide.
- Use Oxiclean or similar product when washing clothes
- Put chlorine tablets in toilets as directed by manufacturer

Clean and Disinfect Surfaces

- If surfaces are dirty, use a detergent or soap and water before disinfection
- For disinfection, the following are effective agents against germs:
 - Accelerated hydrogen peroxide
 - Quaternary ammonia
 - Diluted household bleach solutions
 - Alcohol solutions with at least 70% alcohol

For soft, remove visible contamination if present and clean with appropriate cleaners.

10.13 Hazard Communication Program

AECOM will implement a hazard communication program on field projects managed by the SSHO responsible for maintaining a list of hazardous materials used on the site, as well as SDS's for each hazardous material. Details of the program are contained in SH&E SOP S3AM-115-PR1-Hazardous Materials Communication, which includes the development of a site-specific Hazard Communication Plan, complete with inventory log, which will be developed for the project site.

The program establishes procedures for AECOM employees and subcontractors who handle and store chemical products at project sites. It ensures that hazards of all chemicals purchased are evaluated and the information concerning their hazards is transmitted to employees. The delivery of information is to be accomplished by employee training, container labeling, and other forms of warning and SDSs. All SDSs are requested from the suppliers at the time of order. If not available, then a recent SDS will be downloaded off the Internet.

The requirements defined in this program apply to all AECOM facilities, projects, employees, and subcontractors, which receive, use, handle, store, transport, or distribute hazardous substances.

All hazardous substances found in a particular workplace shall be listed on a Hazardous Substance Inventory (HSI). The HSI will be reviewed at least annually. New hazardous substances entering a workplace (e.g., project-specific materials) shall be added to the HSI upon receiving and reviewing the SDS. The HSI includes the following information:

- Product name;
- Chemical name (if different from product name);
- Manufacturer's name;
- Approximate typical quantity;
- Location of substance (i.e., work area); and
- Description of use.

A copy of the most current HSI, along with the corresponding SDS and a copy of this program (or site-specific program), will be available onsite for review by all employees. The name of the

material (product or chemical) on the HSI must be consistent with the SDS for that material. A site map will be attached to the inventory showing where inventoried substances are stored. The inventory and site map will be updated as frequently as necessary to ensure accuracy.

10.13.1 Safety Data Sheets

AECOM does not manufacture, package, or distribute hazardous commodities. However, as an end user, AECOM must maintain hazard documentation for each hazardous substance used on each job site. This documentation will take the form of a listing of all onsite hazardous substances, and copies of manufacturer developed SDSs for each listed item.

A SDS shall be available for every hazardous substance used or stored on each job site. Copies of all SDS's will be maintained onsite as an Appendix to the forthcoming site-specific SSHP. All site personnel will be briefed as to the location of the SDS's, and will have immediate access to examine any SDS at any time during their work shift.

SDSs received for consumer products, articles and other materials not covered by this procedure will be maintained and made available to employees.

For on-going projects, each SDS associated with a material no longer in use will be marked as obsolete and the date it was obsolete. At the completion of any project, the accumulated SDSs will be maintained as part of the project records. NO SDS ASSOCIATED WITH ANY PROJECT WILL BE DESTROYED.

Employees are required to report any hazardous substance found at the project site that is not on the list of hazardous substances. The report is to be made to the TOM and Site Supervisor. If no SDS accompanies a hazardous substance, the manufacturer, distributor, or importer will be immediately notified and requested to provide one as soon as possible. The request will be documented in a letter or telephone log. If this request is not honored, the SH&E Department will be notified.

When purchasing hazardous substances, the verbal or written purchase order will request a SDS be sent with the shipment. For each facility and/or project, the SDS will be kept along with the HSI in a location that is readily accessible to all employees at all times during their work periods. Additionally, the SDSs and HSI will be available to employees for review in such a way so that the assistance of a supervisor is not necessary.

10.13.2 Labels

All hazardous substances received from outside suppliers will conform to legal requirements and display on each container, as a minimum, the following:

- Product name and identifier;
- Hazard pictogram;
- Signal word;
- Physical, health, environmental statements;
- Supplemental information;
- Precautionary measures and pictograms;
- First aid statements;
- Name and address of company; and
- Telephone number.

Any failure to have a label on the container at the time of receipt will be cause to refuse delivery of the product in addition to the following guidance:

- Stationary process containers may have signs, placards, process sheets, batch tickets, operating procedures, or other written material in lieu of fixed labels on the containers, as long as the alternative method conveys hazard information. The written materials will be readily accessible to the employees in the work area.
- Although the practice is not recommended, if an employee will use the hazardous substance in a portable container immediately, the portable container need not be labeled when the substance is transferred from the labeled container. The term “immediate use” is intended to mean that the hazardous chemical will be exclusively under the control of and used by the person performing the transfer at all times and work will be completed within the current work shift.
- Containers of hazardous substances transferred from labeled containers and not intended for the immediate use of the employee performing the transfer must be labeled in accordance with a hazardous materials identification system or an equivalent commercial system.
- Labels on incoming containers will not be removed or defaced.
- Labels or other forms of warning will be legible, in English, and prominently displayed on the containers, or readily available throughout each work shift.
- Container size is not the determining factor in deciding if a label is required; ALL containers of hazardous chemicals must be labeled.

10.13.3 Hazard Communication Training

Due to the nature of our business, the information and training provided to AECOM employees with regard to hazard communication will take two forms: general and specific. General training and information will include the following:

- The elements and requirements of the OSHA Hazard Communication standard (29 CFR 1910.1200) and applicable state regulation;
- Tasks and operations where hazardous substances are present;
- The location and availability of the written Hazard Communication Program, including the list(s) of hazardous substances and SDS’s and how employees can obtain and use hazard information;
- The methods and observations that may be used to detect the presence or release of a hazardous substance, such as personal and area monitoring, continuous monitoring devices, visual appearance or odor of hazardous substances when being released, etc.;
- The physical and health hazards of the substances in the work area;
- The measures they can take to protect themselves from these hazards, including specific procedures implemented for the project or shop to protect employees from exposure to hazardous substances, such as appropriate work practices, emergency procedures, and PPE to be used;
- The project- or shop-specific details of the Hazard Communication Program, including an explanation of the labeling system and the SDS’s, and how employees can obtain and use the appropriate hazard information;
- Information for their physician to receive, regarding hazardous substances to which the employee may be exposed according to provisions of this section; and

- Freedom from discharge or other discrimination due to the employee's exercise of the rights afforded pursuant to the provisions of the Hazardous Substances Information and Training Act.

Site-Specific Hazard Communication Training regarding safe handling and use of hazardous materials found on the HSI will be presented during site-specific training programs. This training may be for specific hazardous materials or for groups of hazardous substances, including flammable/combustible liquids, compressed gases, organic solvents, corrosives, and toxic metals. Additional specific training will be provided to the affected employees any time a new hazardous substance is introduced into the workplace (e.g., project specific substances) and/or when an employee is reassigned. All training conducted will be documented and copies of the documentation included in the permanent project files.

The SSHO must ensure that project personnel can immediately obtain the required information about chemicals of concern during an emergency.

10.13.4 Handling Controls and PPE

When engineering and work practice controls or substitution are either infeasible or insufficient, appropriate PPE and chemical hygiene facilities will be provided and used for the transportation, use, and storage of hazardous or toxic agents.

When irritants or hazardous substances may contact skin or clothing, chemical hygiene facilities and PPE will be provided. PPE may include suitable gloves, face/eye protection, and chemical protective suits. Required task-specific PPE are identified in the AHAs.

The CIH, CSP, or other competent personnel will determine the scope and type of protective equipment.

Special attention shall be given to selecting proper chemical protection when working with materials designated with a "skin" notation by Occupational Exposure Limits. Such materials may produce systemic toxic effects through absorption through broken or unbroken skin.

When eyes or body of any person may be exposed to hazardous or toxic agents, suitable facilities for quick drenching or flushing of the eyes and body will be provided in the work area for immediate emergency use and shall be no more than 10 seconds from the hazardous material.

Emergency eyewash equipment must be provided where there is the potential for an employee's eyes to be exposed to corrosives, strong irritants, or toxic chemicals. The emergency eyewash equipment must irrigate and flush both eyes simultaneously while the operator holds the eyes open.

Storage prior to transportation of hazardous chemicals, materials, substances, and wastes will be under the supervision of a qualified person. Transportation, use, and storage of hazardous or toxic agents will be planned and controlled to prevent contamination of people, animals, food, water, equipment, materials, and environment.

All storage of hazardous or toxic agents shall be in accordance with the recommendations of the manufacturer, OSHA, and National Fire Protection Association requirements and accessible only to authorized personnel.

Disposal of surplus or excess hazardous or toxic agents will occur in a manner that will not contaminate or pollute any water supply, ground water, or streams; and will comply with federal, state, and local regulations and guidelines.

Containers used to hold hazardous or toxic agents should not be used to hold other materials unless they have been managed or cleaned under hazardous waste and Department of Transportation (DOT) regulatory requirements. Every hazardous or toxic agent being transported for disposal shall be transported with a copy of the substance's SDS whenever applicable.

Persons who prepare shipments of hazardous chemicals, materials, substances, and/or wastes that are defined as hazardous material under DOT regulations, are required to be DOT trained, certified, and issued an appointment letter in accordance with Defense Transportation Regulation 4500.9-R, Chapter 204.

10.14 Process Safety Management Plan

This section is not applicable.

10.15 Lead Compliance Plan

This section is not applicable.

10.16 Asbestos Abatement Plan

This section is not applicable.

10.17 Radiation Safety Program

This section is not applicable.

10.18 Abrasive Blasting

This section is not applicable.

10.19 Heat Stress Monitoring Plan

Heat stress is one of the most common (and potentially serious) illnesses that affect site workers. When site personnel are engaged in operations involving hot environments, a number of physiological responses can occur, which may seriously affect the health and safety of the workers. These effects can be eliminated or controlled through the use of a comprehensive heat stress prevention and monitoring program.

It is the responsibility of the SSHO and each employee to ensure that temperature stress controls are adequate for the site conditions and tasks. All employees, and specifically the SSHO, are empowered and expected to stop or modify work and take any precautionary measures to prevent temperature related illnesses.

Individuals vary in their susceptibility and degree of response to stress induced by increased body heat. Heat stress can result in health effects ranging from transient heat fatigue to serious illness or death. Heat stress is caused by a number of interacting factors including environmental condition, clothing, workload, and the individual characteristics of the worker. Because heat stress is probably one of the most common (and potentially serious) illnesses at work sites, regular physiological or area monitoring (as appropriate) and other preventive precautions are vital. Factors that may predispose a worker to heat stress include:

- Lack of physical fitness;
- Lack of acclimatization to hot environments;
- Degree of hydration;
- Level of obesity;
- Current health (i.e., having an infection, chronic disease, diarrhea, etc.);
- Alcohol or drug use;

- The worker's age and sex; and
- Prior history of heat stress.

10.19.1 Effects of PPE

The amount, and type of PPE worn, directly influences reduced work tolerance and the increased risk of excessive heat stress. PPE adds weight and bulk, severely reduces the body's access to normal heat exchange mechanisms (evaporation, convection, and radiation), and increases energy expenditure. Therefore, when selecting PPE, each item's benefit should be carefully evaluated in relation to its potential for increasing the risk of heat stress. Once PPE is selected, the safe duration of work/rest periods should be determined based on the following criteria and that of the recommendations of the ACGIH Threshold Limit Value (TLV) handbook:

- Anticipated work rate;
- Ambient temperature and other environmental factors;
- Type of protective ensemble; and
- Individual worker characteristics and fitness.

Sweating does not cool the body unless moisture is removed from the body. The use of PPE reduces the body's ability to eliminate large quantities of heat because the evaporation of sweat is decreased. The body's effort to maintain an acceptable temperature may become impaired and this may cause heat stress. Increased body temperature and physical discomfort also promote irritability and a decreased attention to the performance of hazardous tasks.

10.19.2 Early Symptoms of Heat Related Illness

The following are the early symptoms of heat related problems that may be experienced by the field teams:

- Decline in task performance;
- Lack of co-ordination;
- Decline in alertness;
- Unsteady walk;
- Excessive fatigue;
- Muscle cramps; and
- Dizziness.

10.19.3 Heat Stress Disorders

This section outlines the major heat related illness that may result from exposure to high heat environments, which include heat rash, fainting, heat cramps, heat exhaustion, and heat stroke. For the purpose of this program, reference to "liquids" will indicate the use of water or an electrolyte replacement solution, and not tea or coffee (unless it is decaffeinated) or carbonated soft drinks.

10.19.3.1 Heat Rash

Heat rash is caused by continuous exposure to heat and humid air and is aggravated by wet chafing clothing. This condition can decrease a worker's ability to tolerate hot environments.

- **Symptoms:** Mild red rash, especially in areas of the body that sweat heavily.

- **Treatment:** Decrease amount of time in protective gear and provide powder such as cornstarch or baby powder to help absorb moisture and decrease chafing. Maintain good personal hygiene standards and change into dry clothes if needed.

10.19.3.2 Heat Cramps

Heat cramps are caused by a profuse rate of perspiration that is not balanced by adequate fluid and electrolyte intake. The occurrence of heat related cramps are often an indication that excessive water and electrolyte loss has occurred, which can further develop into heat exhaustion or heat stroke.

- **Symptoms:** Acute, painful spasms of voluntary muscles such as the back, abdomen, and extremities.
- **Treatment:** Remove victim to a cool area and loosen restrictive clothing. Stretch and massage affected muscles to increase blood flow to the area. Have patient drink one to two cups of liquids immediately, and every twenty minutes thereafter. Consult with physician if condition does not improve. If available, an electrolyte replacement solution should be taken along with liquids.

10.19.3.3 Heat Exhaustion

Heat exhaustion occurs due to the large fluid and salt loss from profuse sweating. It is a state of very definite weakness or exhaustion caused by increased stress on various organs to meet increased demands to cool the body due to excessive loss of fluids from the body. This condition leads to inadequate blood supply and cardiac insufficiency. Heat exhaustion is less dangerous than heat stroke, but nonetheless must be treated. If allowed to go untreated, heat exhaustion can quickly develop into heat stroke.

- **Symptoms:** Pale or flushed, clammy, moist skin, profuse perspiration, and extreme weakness. Body temperature is basically normal or slightly elevated, the pulse is weak and rapid, and breathing is shallow. The individual may have a headache, be dizzy or nauseated.
- **Treatment:** Remove the individual to a cool, air-conditioned place, loosen clothing, elevate feet, and allow individual to rest. Consult physician, especially in severe cases. Have patient drink one to two cups of liquids slowly and immediately, and every twenty minutes thereafter. Total liquid consumption should be about one to two gallons per day. If the signs and symptoms of heat exhaustion do not subside, or become more severe, immediate medical attention will be required.

10.19.3.4 Heat Stroke

Heat stroke is an acute and dangerous reaction to heat stress caused by failure of the heat regulating mechanisms of the body. Heat stroke occurs when the body's system of temperature regulation fails, and the body temperature rises to critical levels. When this occurs, the body core temperature rises very rapidly to a point (>105.8°F) where brain damage and death may result if the person is not cooled quickly.

- **Symptoms:** The victim's skin is hot, and may or may not be red, dry, and/or spotted, due to the fact that the individual may still be wet from having sweat while wearing protective clothing earlier; nausea; dizziness; confusion; extremely high body temperature; rapid respiratory and pulse rate; delirium; convulsions; unconsciousness or coma.
- **Treatment:** Cool the victim immediately. If the body temperature is not brought down quickly, permanent brain damage or death may result. The victim should be moved to a shady area; he should lie down and keep feet elevated. Cool the victim by either sponging or immersing the victim in very cool (not cold) water to reduce the core

temperature to a safe level (<102°F). If conscious, give the victim cool liquids to drink. Observe the victim and obtain immediate medical help. Do not give the victim energy, caffeinated or alcoholic beverages. Heat stroke is considered a medical emergency. Medical help should be summoned immediately. EARLY RECOGNITION AND TREATMENT OF HEAT STROKE ARE THE ONLY MEANS OF PREVENTING BRAIN DAMAGE OR DEATH.

10.19.4 Preventive Measures

Proper training and preventive measures will help avert serious illness and loss of work productivity. Preventing heat stress is particularly important because once someone suffers from heat exhaustion, that person may become predisposed to additional heat injuries. In order to avoid heat related illnesses, proper preventive measures will be implemented whenever environmental conditions dictate the need, normally whenever the temperature reaches at least 70°F. These preventive measures represent the minimal steps to be taken and will include the following procedures.

The SSHO or other authorized person will observe each site worker prior to the start of daily operations, and periodically throughout the day, to determine the individuals susceptible to heat induced stress. Evidence of extreme dehydration, illness, or drug or alcohol use may require the SSHO to restrict the worker's activities until such time as the worker is fit for duty. Personnel identified as being at high risk for heat stress who are allowed to participate in site operations will be monitored frequently by the SSHO.

Site workers will be trained to recognize and treat heat-related illnesses. This training will include the signs, symptoms, and treatment of heat stress disorders. In order to maintain workers' body fluids at normal levels, workers will be encouraged to drink, as a minimum, approximately sixteen ounces of liquids prior to start of work in the morning, after lunch, and prior to leaving the site at the conclusion of the day's activities. Disposable four to twelve ounce cups and liquids will be provided onsite. Liquids to be provided will be water. Liquids containing caffeine should be avoided.

When ambient conditions and site workload requirements dictate, as determined by the SSHO, workers will be required to drink a minimum of 16 to 32 ounces of liquids during each rest cycle. The normal thirst mechanism is not sensitive enough to ensure that enough water will be consumed to replace lost sweat. When heavy sweating occurs, workers shall be encouraged to drink even though they may not be thirsty. A shelter or shaded area may be provided where workers can be protected from direct sunlight during rest periods.

Monitoring of ambient or physiological heat stress indices will be conducted to allow prevention and/or early detection of heat-induced stress. Monitoring will be conducted in accordance with applicable paragraphs of this APP.

Site workers will be given time to acclimatize to site work conditions, temperature, protective equipment, and workload. Acclimatization is the adaptive process that usually takes two to six days of continued work in hot environments, resulting in a decrease of the physiological strain and allowing the worker's body to become adjusted to the level and type of work required by the application of a constant environmental stress. This process involves a gradual increase in the individual's workload over the required period, the length of which depends upon the nature of the work performed, ambient temperatures, and the individual's susceptibility to heat stress.

- Work schedules will be adjusted as follows:
- Modify work/rest schedules according to monitoring requirements;
- Mandate work slowdowns as needed;

- Rotate personnel: alternate job functions to minimize over-stress or overexertion at one task;
- Add additional personnel to work teams; and
- Perform work during cooler hours of the day if possible.

Workers will be encouraged to achieve and maintain an optimum level of physical fitness. Increased physical fitness will allow workers to better tolerate and respond to hot environments and heavy workloads. In comparison to an unfit person, a fit person will have less physiological strain, a lower heart rate and body temperature, and a more efficient sweating mechanism.

Alcohol should not be consumed in a hot environment because the loss of body fluids increases the risk of heat stress.

10.19.5 Heat Stress Monitoring

Because the incidence of heat stress depends on a variety of factors, all workers shall be monitored. Initially, the frequency of physiological monitoring depends on the air temperature adjusted for solar radiation and the level of physical work. The length of the work cycle will be governed by the frequency of the required physiological monitoring.

Monitoring of personnel wearing PPE should begin when the ambient temperature is 72°F or above. **Table 6** below presents the suggested frequency for such monitoring. Monitoring frequency should increase as the ambient temperature increases or as slow recovery rates are observed.

A person with a current first aid certification who is trained to recognize heat stress symptoms should perform heat stress monitoring. Other methods for determining heat stress monitoring, such as the wet bulb globe temperature (WBGT) index from ACGIH TLV booklet or portable heat stress monitoring instrumentation can be used.

Table 6: Suggested Frequency of Physiological Monitoring for Fit and Acclimatized Workers

Adjusted Temperature ^(1,2)	Normal Work Ensemble ³	Impermeable Ensemble
90°F (32.2°C) or above	After each 45 min. of work	After each 15 min. of work
87.5°-90°F(30.8°-32.2°C)	After each 60 min. of work	After each 30 min. of work
82.5°-87.5°F (28.1°-28.1°C)	After each 90 min. of work	After each 60 min. of work
77.5°-82.5°F (25.3°-28.1°C)	After each 120 min. of work	After each 90 min. of work
72.5°-77.5°F (22.5°-25.3°C)	After each 150 min. of work	After each 120 min. of work

Notes:

- 1 For work levels of 250 kilocalories/hour
- 2 Calculate the adjusted air temperature (ta adj) by using this equation: $ta\ adj\ ^\circ F = ta\ ^\circ F + (13 \times \% \text{ sunshine})$. Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows.)
- 3 A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

When workers are wearing permeable clothing (i.e., standard cotton work clothes), follow recommendations for monitoring requirements and suggested work/rest schedules in the current ACGIH TLVs for Heat Stress.

When monitoring the worker physically, measure:

- Heart rate:
 - Count the radial pulse during a 30-second period as early as possible in the rest period;

- If the working heart rate (while in PPE and performing tasks) exceeds 180 beats per minute minus the workers age, the work cycle should be discontinued and an appropriate rest/recovery period should begin;
- If the heart rate exceeds 110 beats per minute at the beginning of the rest period (after 1 minute of rest), shorten the next work cycle by one-third and keep the rest period the same; and
- If the heart rate still exceeds 110 beats per minute at the next rest period, shorten the following work cycle by one-third.
- Oral temperature:
 - Use a clinical thermometer (three minutes under the tongue) or similar device to measure the oral temperature at the end of the work period (before drinking);
 - If oral temperature exceeds 99.6°F (37.6°C), shorten the next work cycle by one-third without changing the rest period;
 - If oral temperature still exceeds 99.6°F (37.6°C) at the beginning of the next rest period, shorten the following cycle by one-third; and
 - Do not permit a worker to wear a semi-impermeable or impermeable garment when oral temperature exceeds 100.6°F (38.1°C).

For site conditions where personnel are working in Level D PPE, and the ambient temperature is greater than 72°F, the SSHO may conduct WBGT monitoring to assist in controlling the potential for site workers experiencing heat related adverse health effects. The SSHO may take readings on a WBGT monitor throughout the day to determine the work/rest schedule to be implemented (see **Table 7**).

Table 7: Permissible WBGT Heat Exposure Threshold Limit Values

Work — Rest Regimen	Work Load		
	Light	Moderate	Heavy
Continuous work	86 (30.0)	80 (26.7)	77 (25.0)
75% Work — 25% Rest, each hour	87 (30.6)	82 (28.0)	78 (25.9)
50% Work — 50% Rest, each hour	89 (31.4)	85 (29.4)	82 (27.9)
25% Work — 75% Rest, each hour	90 (32.2)	88 (31.1)	86 (30.0)

Note:

* Consult the ACGIH TLV booklet for definitions of Light, Moderate, and Heavy workloads. Values are given in F and (C) WBGT, and are intended for workers wearing single layer summer type clothing. Use of semi or totally impermeable clothing requires monitoring in accordance with the Heat Stress Prevention Program. As workload increases, the heat stress impact on a non-acclimated worker is exacerbated. For non-acclimated workers performing a moderate level of work, the permissible heat exposure TLV should be reduced by approximately 2.5°C.

Table 8: Approximate Wet-bulb Globe Temperature Chart

Approximate Wet-Bulb Globe Temperature (WBGT) Chart

Relative Humidity (%)	Degrees F																			
	68	70	72	73	75	77	79	81	82	84	86	88	90	91	93	95	97	99	100	102
0	59	61	61	63	64	64	66	66	68	68	70	72	72	73	73	75	75	77	77	79
5	61	61	63	64	63	66	66	68	70	70	72	72	73	75	75	77	79	79	81	81
10	61	63	63	64	66	66	68	70	70	72	73	73	75	77	77	79	81	81	82	84
15	63	63	64	66	66	68	70	70	72	73	73	75	77	79	79	81	82	84	84	86
20	63	64	64	66	68	70	70	72	73	75	75	77	79	81	81	82	84	86	88	90
25	64	64	66	68	68	70	72	73	75	75	77	79	81	82	82	84	86	88	90	91
30	64	66	68	68	70	72	73	73	75	77	79	81	82	84	84	86	88	90	91	93
35	64	66	68	70	72	72	73	75	77	79	81	82	84	86	88	90	91	93	95	97
40	66	68	70	70	72	73	75	77	79	81	82	84	86	88	90	91	93	95	97	99
45	66	68	70	72	73	75	77	79	81	81	82	84	86	90	91	93	95	97	99	100
50	68	70	72	73	73	75	77	79	81	82	84	86	88	91	93	95	97	99	100	102
55	68	70	72	73	75	77	79	81	82	84	86	88	90	93	95	97	99	100		
60	70	72	73	75	77	79	81	82	84	86	88	90	91	95	97	99	100			
65	70	72	73	75	77	79	81	82	84	88	90	91	93	97	99	100				
70	72	73	75	77	79	81	82	84	86	88	91	93	95	97	100	102				
75	72	73	75	77	79	81	84	86	88	90	91	95	97	99	102					
80	73	75	77	79	81	82	84	86	90	91	93	97	99	100						
85	73	75	77	79	82	84	86	88	90	93	95	99	100	102						
90	75	77	79	81	82	84	88	90	91	95	97	99	102							
95	75	77	79	81	84	86	88	91	93	95	99	100								
100	75	79	81	82	84	88	90	91	95	100	100	102								

Chart assumes full sunshine and light wind. Using this chart on a cloudy or windy day will result in an overestimation of heat stress

The values outlined in **Tables 7 and 8** are designed such that nearly all acclimatized, fully clothed workers with adequate water and electrolyte replacement liquids intake will be able to function without the body temperature exceeding 100.4°F (38°C).

10.19.6 Heat Stress Documentation

The SSHO will be responsible for recording all heat stress related information. This will include training sessions and monitoring data. Training sessions will be documented on the Safety Meeting and Training Form, and WBGT data and other information will be recorded on a heat stress monitor log.

10.20 Cold Stress Monitoring Plan

If work is conducted in the winter months, thermal injury due to cold exposure can become a problem for field personnel. Work will cease under unusually hazardous conditions (e.g., wind-chill less than 0°F, or wind-chill less than 10°F with precipitation). Systemic cold exposure is referred to as hypothermia. Localized cold exposure is generally labeled frostbite. Recognition of the symptoms of cold related illness will be discussed during the health and safety briefing conducted prior to the onset of site activities. Refer to the 2003 ACGIH TLV for Chemical Substances and Physical Agents for additional information on cold stress prevention, monitoring, and work-warming regimens.

10.20.1 Hypothermia

Hypothermia is a life-threatening condition in which the core body temperature falls below 95°F. Hypothermia can occur at temperatures above freezing particularly, when the skin or clothing becomes wet. During exposure to cold, maximum shivering occurs when the core temperature falls to 95°F. As hypothermia progresses, depression of the central nervous system becomes increasingly more severe. This accounts for the progressive signs and symptoms ranging from sluggishness and slurred speech to disorientation and eventually unconsciousness (see **Table 9**).

Table 9: Progressive Clinical Symptoms of Hypothermia

Core Temperature (°F)	Clinical Signs
95°	Maximum shivering
87° - 89°	Consciousness clouded; blood pressure becomes difficult to obtain; pupils dilated
84° - 86°	Progressive loss of consciousness; muscular rigidity; respiratory rate decreases
79°	Victim rarely conscious
70° - 72°	Maximum risk of ventricular fibrillation

The ability to sustain metabolic rate and to reduce skin blood flow is diminished by fatigue. Thus, fatigue increases the risk of severe hypothermia by decreasing metabolic heat. Additionally, because blood flow through the skin is reduced to conserve heat, the skin and underlying tissues become more susceptible to frostbite.

10.20.2 Frostbite

Frostbite is both the general and medical term given to areas of cold injury. Unlike hypothermia, frostbite rarely occurs unless environmental temperatures are less than freezing and usually less than 20°F. Frostbite injuries occur most commonly on the distal parts of the body (nose, earlobes, hands, and feet) that are subject to intense vasoconstriction. The three general categories of frostbite are:

- **Frostnip** — A whitened area of the skin, which is slightly burning or painful
- **Superficial frostbite** — Waxy, white skin with a firm sensation but with some resiliency. Symptomatically feels “warm” to the victim with a notable cessation of pain
- **Deep frostbite** — Tissue damage deeper than the skin, at times, down to the bone. The skin is cold, numb, and hard

10.20.3 Prevention of Cold Related Illness

The following are precautions that will be taken to prevent illness relating to cold stress:

- Educate worker to recognize the symptoms of frostbite and hypothermia.
- Ensure the availability of an enclosed, heated environment within the vehicles. The nearest heated environment will be the interior of the vehicles at the site.
- Ensure the availability of dry changes of clothes.
- Record temperature readings.
- Ensure the availability of warm beverages, preferably non-caffeinated.

10.20.4 Monitoring for Cold Exposure

Cold stress monitoring will be conducted in accordance with the ACGIH cold stress TLV. The TLV objective is to prevent the deep body core temperature from falling below 96.8°F and to prevent cold injury to body extremities. Temperature monitoring and recording will be initiated in the following situations:

- At the SSHO discretion when suspicion is based on changes in worker's performance or mental status;

- At worker's request;
- As a screening measure whenever a worker on the site develops hypothermia; and
- Any person developing moderate hypothermia (a core temperature of 92°F) cannot return to work for 48 hours.

10.21 Indoor Air Quality Management Plan

This section is not applicable.

10.22 Mold Remediation Plan

This section is not applicable.

10.23 Chromium (VI) Exposure Evaluation

This section is not applicable.

10.24 Crystalline Silica Monitoring Plan

No cutting or breaking of concrete, cement, or asphalt is planned for this project. Sand, Portland cement, and bentonite used in monitoring well construction will be handled using manual methods to control dust generation.

10.25 Lighting Plan for Night Operations

This section is not applicable.

10.26 Traffic Control Plan

This section is not expected to be applicable. If a specific worksite location will require a TCP, one will be developed and incorporated into the SSHP.

10.27 Fire Prevention Plan

10.27.1 Fire Protection

All project personnel will be responsible for observing and reporting fires and conditions that could lead to fires. During all onsite activities, the following practices will be used for fire prevention and protection:

- Smoking onsite is prohibited in designated work areas, contamination reduction zones, and other areas where smoking may create a fire hazard (e.g., dry fields or forested areas);
- A designated smoking area will be established (if allowed by base regulations) as necessary by the SSHO or Site Supervisors when operations on site begin;
- Accumulations of combustible scrap and debris onsite will be promptly removed and properly disposed;
- Care will be taken with all equipment to reduce the possibility of sparks or open flames;
- Inspect all electrical cords and plugs prior to use; keep cords away from water and moisture;

- Fire extinguishers (minimum 2 A:B:C, 10-lb) will be available at the work area and support area; and
- A fire extinguisher will be available on all pieces of heavy equipment.

Requirements for storage of flammable and combustible liquids will include:

- A suitable portable fire extinguisher will be available at the location where flammable or combustible liquids are stored.
- “No Smoking” signs will be posted in the storage area.
- Flammable liquids will be stored in closed containers. Type I or Type II metal safety cans (not greater than 5 gallons capacity) will be used for small quantities. Plastic storage containers are not allowed.
- Not more than 60 gallons of Class I or Class II liquids, nor more than 120 gallons of Class III liquids may be stored in a storage cabinet.
- Containers of flammable and combustible liquids shall be stored properly when not in use.
- The grounds around the storage area will be kept free of weeds, trash, and other unnecessary combustible materials.
- Spills will be cleaned up promptly.
- Proper bonding and grounding principles will be observed when transferring flammable liquids from one container to another.

10.27.2 Fire Extinguishers

Fire extinguishers are divided into categories, based on different types of fires. Each fire extinguisher also has a numerical rating that serves as a guide for the size of fire the extinguisher can handle. The higher the number rating, the more firefighting power of the extinguisher. The following is a quick guide to project management to help choose the right type of extinguisher:

- Class A extinguishers are for ordinary combustible materials such as paper, wood, cardboard, and most plastics. The numerical rating on these types of extinguishers indicates the amount of water it holds and the amount of fire it can extinguish.
- Class B fires involve flammable or combustible liquids such as gasoline, kerosene, grease and oil. The numerical rating for class B extinguishers indicates the approximate number of square feet of fire it can extinguish.
- Class C fires involve electrical equipment, such as appliances, wiring, circuit breakers, and outlets. Never use water to extinguish class C fires – the risk of electrical shock is far too great! Class C extinguishers do not have a numerical rating. The C classification means the extinguishing agent is non-conductive.

10.28 Wild Land Fire Management Plan

This section is not applicable.

10.29 Arc Flash Hazard Analysis

This section is not applicable.

10.30 Assured Equipment Grounding Control Program

This section is not applicable.

10.31 Hazardous Energy Control Plan

This section is not applicable to this project.

10.32 Underground and Aboveground Utilities

Underground and Above Ground Utilities Clearance will be performed in accordance with AECOM Safety Procedures *S3AM-331-PR1 Underground Utilities-Americas* and Procedure *S3AM-322-PR1 Overhead Lines and Obstructions-Americas*, and the requirements of NBSFS. Before any intrusive drilling can be performed, AECOM will pre-mark the drilling locations and call in a New Hampshire DigSafe Request. This DigSafe ticket will be provided to NBSFS, and fill out the Base Civil Engineering Work Clearance Request. Proposed drilling locations will be visually inspected along with availability utility drawings. Each well locations will be dug by soft digging technics (post hole diggers and/or air knife with soil vacuum extraction) to a depth of 5 feet to visually confirm the absence of utilities.

AECOM is responsible for providing all appropriate locations requiring intrusive activities to the subcontractor requesting the utility locate. The SSHO is responsible for making sure all locates have been completed and the sites requiring intrusive activities are cleared for work. Resources include site plans, DPW, utility locating services. The proper personnel will certify in writing to the SSHO the deactivation or location of underground utilities, and the certification retained in the project files.

Excavation and drilling or similar operations adjacent to overhead lines will not be initiated until operations are coordinated with the utility officials. Operations adjacent to overhead lines are prohibited unless one of the following conditions is satisfied:

Power has been shut off and positive means (e.g., lockout/tagout) have been taken to prevent lines from being energized. Wherever possible, the AECOM SSHO will observe power shutoff and place a lock and tag on the switch. In all cases DPW personnel will certify in writing to the SSHO the deactivation of overhead utilities, and the certification retained in the project files. The SSHO must also attempt to verify power shut off by checking that power is no longer available to the affected building or equipment.

Equipment, or any part of the equipment, cannot come within the following minimum clearance from energized overhead lines (see **Table 10**).

Table 10: Minimum Clearance from Energized Overhead Lines

Voltage (Nominal, kilovolts. Alternating current)	Minimum Clearance Distance (feet)
Up to 50	10
51 – 200	15
201 – 350	20
351 – 500	25
501 – 750	35
751 – 1000	45
Over 1000	As established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electric power

Voltage (Nominal, kilovolts. Alternating current)	Minimum Clearance Distance (feet)
	transmission and distribution

Note: All dimensions are distances from live part to equipment and components at any potential reach

10.33 Standard Pre-Lift Plan

This section is not applicable

10.34 Critical Lift Plan

This section is not applicable.

10.35 Naval Architectural Analysis

This section is not applicable.

10.36 Floating Plant Inspection and Certification

This section is not applicable.

10.37 Severe Weather for Marine Activities

This section is not applicable.

10.38 Emergency Plan for Marine Activities

This section is not applicable

10.39 Man Overboard/ Abandon Ship

This section is not applicable.

10.40 Float Plan for Launches, Motorboats and Skiffs

This section is not applicable.

10.41 Fall Protection & Prevention Plan

This section is not applicable.

10.42 Demolition/ Renovation Plan

This section is not applicable.

10.43 Rope Access Work Plan

This section is not applicable.

10.44 Excavation/Trenching Plan

This section is not applicable.

10.45 Fire Prevention and Protection Plan for Underground Construction

This section is not applicable.

10.46 Compressed Air Work Plan for Underground Construction

This section is not applicable.

10.47 Erection and Removal Plan for Formwork and Shoring

This section is not applicable.

10.48 Precast Concrete Plan

This section is not applicable.

10.49 Lift-slab Plans

This section is not applicable.

10.50 Masonry Bracing Plan

This section is not applicable.

10.51 Steel Erection Plan

This section is not applicable.

10.52 Explosives Safety Site Plan

This section is not applicable.

10.53 Blasting Plan

This section is not applicable.

10.54 Dive Operations Plan

This section is not applicable.

10.55 Safe Practices Manual for Diving Activities

This section is not applicable.

10.56 Emergency Management Plan for Diving

This section is not applicable.

10.57 Tree Felling/ Maintenance Program

This section is not applicable.

10.58 Aircraft/ Airfield Construction Safety & Phasing Plan

This section is not applicable.

10.59 Aircraft/ Airfield Safety Plan & Phasing Plan

This section is not applicable.

10.60 Site Safety and Health Plan for Hazardous Toxic Radiological Waste Work

The Site Safety and Health Plan is included as **Attachment 1** to this APP.

10.61 Confined Space Entry Procedures

This section is not applicable.

10.62 Confined Space Program

This section is not applicable.

10.63 Explosive Ordnance

All field activities will be conducted implementing MEC and Anomaly avoidance procedures in accordance with EM 385-1-97. AECOM will follow MEC safety procedures (included in Attachment 9), as appropriate, during all field activities. MEC safety procedures will be conducted in accordance with the United States Army Corps of Engineers (USACE) Explosive Safety and Health Requirements Engineer Manual (EM) 385-1-97 (USACE 2013), Safety and Health Requirements EM 385-1-1 (USACE 2014), Defense Explosives Safety Regulation 6055.09, Ammunition and Explosives Safety Standards 6055.09 (DoD 2019).

11. Risk Management Process

11.1 Risk Management Process

11.1.1 Pre-Job Activity Hazard Analysis

All executed work scope tasks will have an AHA, prepared in accordance with the requirements of USACE EM 385-1-1. The intent of the AHA is for task clarification and hazard awareness, as an incident investigation tool, and for informing employees of specific task hazards and protective measures. AHAs must be performed and documented before the given task begins. The team (or person) responsible for the AHA will be competent in a formal process of hazard recognition. The information from the AHA will be communicated to all staff on-site.

Site-specific AHAs are presented in **Attachment 2**. Detailed project-specific hazards and controls will be provided by AHAs for each activity.

1. The AHA defines the work sequence, anticipated hazards, conditions, equipment, materials, personnel and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level of risk, and the Risk Rating for each step.
2. Acceptance of risk. The residual risk is that which remains after controls have been applied. This residual risk must be communicated to the proper authority for acceptance in order to proceed with the activity.
3. Before beginning each work activity, AECOM will prepare the initial AHA, which will include a Risk Rating for that activity. That AHA will define the activities being performed, identify the work sequences, specific hazards anticipated, site conditions, equipment, materials, and the control measures that will be implemented to eliminate or reduce each hazard to an acceptable level of risk. Detailed site-specific hazards and control templates will be provided by an AHA for each major task.
4. No work will begin on an activity until the initial AHA has been accepted by the GDA addressing the project-specific hazards.
5. AHAs will be created by AECOM and any subcontractor field crews/workers performing the work. AHAs are living documents and are intended to be created in the field and updated (by the workers) as needed.
6. The AHA will be reviewed and modified as necessary to address changing site conditions, operations, or change of competent persons.
 - a. If a new competent person (not on the original list) is added, the list will be updated (an administrative action not requiring an updated AHA). The new person will acknowledge in writing that he or she has reviewed the AHA and is familiar with current site safety issues.
 - b. If the initial Risk Rating increases due to a change made to the AHA by the workers, the AHA will be resubmitted to USACE for acceptance prior to work proceeding.
 - c. Changes to or updates of an AHA that do not increase the Risk Rating are not required to be resubmitted for acceptance by the USACE.



Last Minute Risk Assessment

7. Workers/crews will have in their possession the current AHA that reflects current site conditions, personnel, equipment, and control measures, while the work is being performed.
8. The AHA will be used by AECOM and USACE to assure work is being performed in accordance with the APP. In the event that the work is not being conducted in a safe manner, AECOM and/or USACE will stop the unsafe work being conducted until work is in compliance with EM 385-1-1 and this APP.
9. Once the activity has been completed, the AHA will be available and kept on file for the length of the contract.

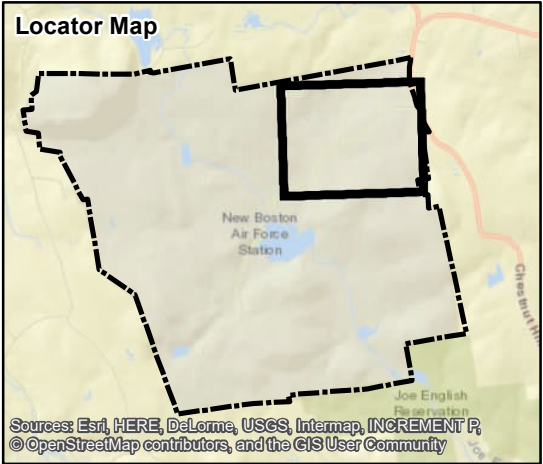
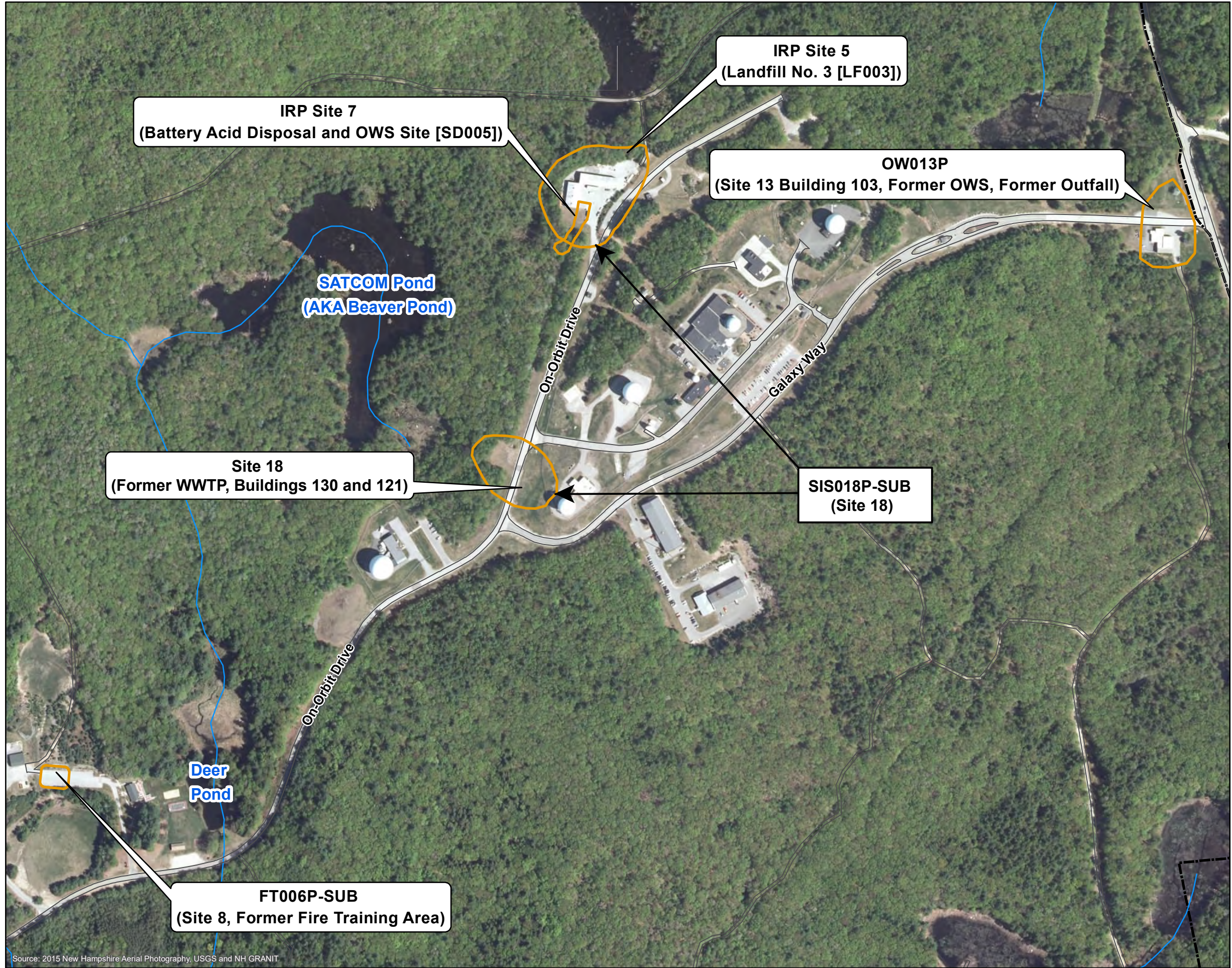
11.1.2 Task Hazard Assessment (THA)

The THA is based on understanding the work to be performed and hazard recognition. This is founded in AECOM's 4 Sight process and requires critical thought of job steps before starting work activities. Not all risks can be anticipated in this APP or the activity hazard assessment process; therefore, the THA is used to assess, mitigate, and document the site-specific conditions and changes to the hazard profile prior to and throughout the work task. Not all risks can be anticipated in this HASP or the AHA/ pre-job hazard assessment process; therefore, the THA is used to assess, mitigate, and document the site-specific conditions and changes to the hazard profile prior to and throughout the work task. Proper implementation of the THA program protects worker health and safety. A blank THA form is included in **Attachment 3**. The THA must be signed by all employees each day and initialed whenever a changed condition provokes a change in hazard controls.

11.2 Management of Change

The project-specific AHAs (**Attachment 2**) will be regularly reviewed and modified as necessary to address changing site conditions, operations, or change of the competent person. Any proposed changes will be reviewed and approved as discussed above. The SSHO as delegated by the SHM will record changes on *S3AM-215-FM1 - Management of Change Authorization* form (**Attachment 3**). No modifications to this plan will conflict with governmental regulations.

Figures



Legend

- Installation Boundary
- AFFF Sites
- Road Area
- Stream

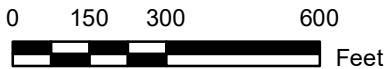


Figure 1

PFAS Phase I RI – Site Overview
FT006P-SUB, OW013P, and SIS18P-SUB
New Boston Space Force Station
New Boston, New Hampshire

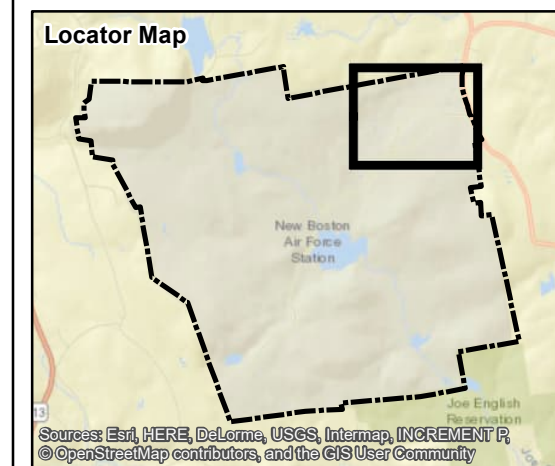
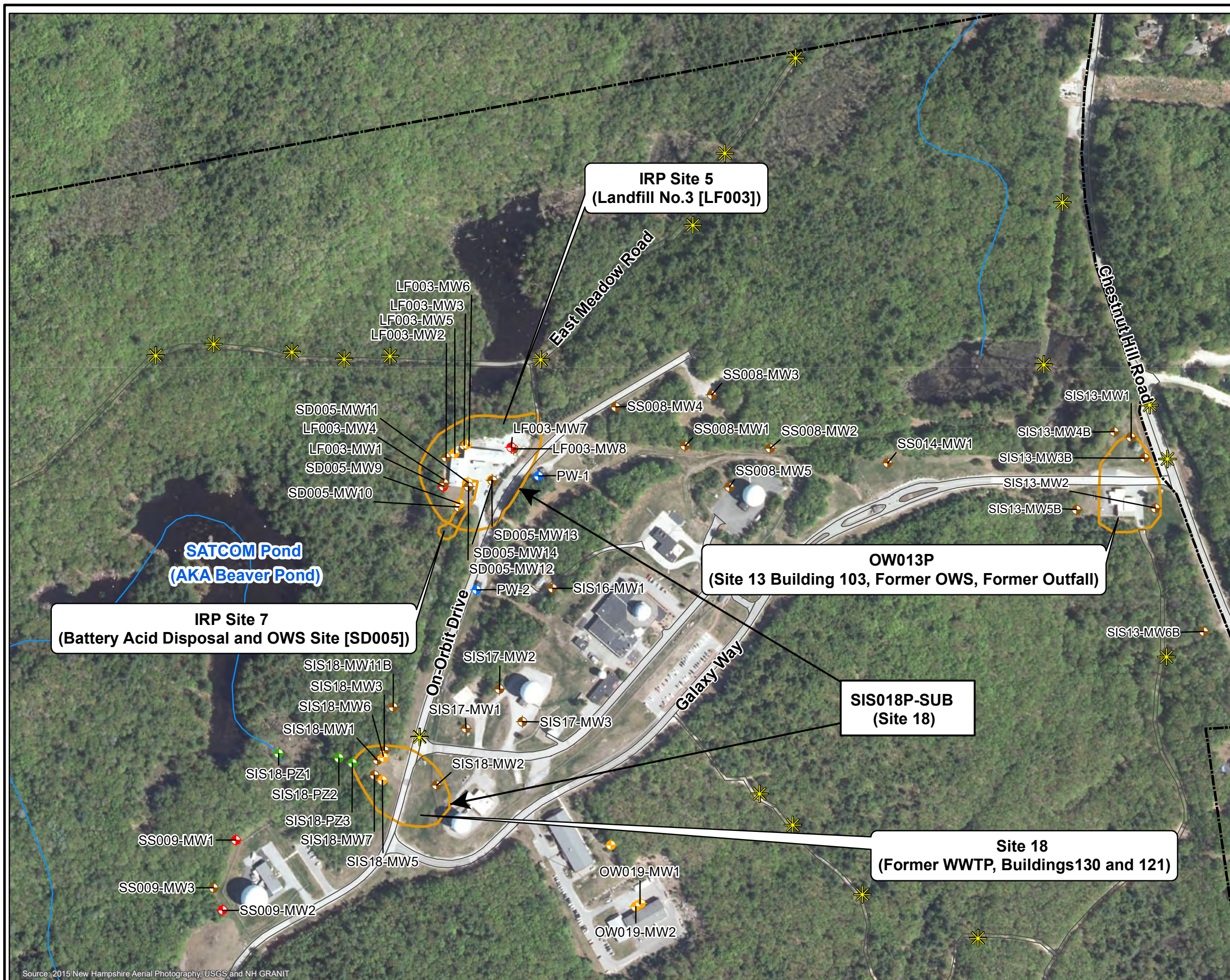
Remedial Investigation for PFAS

AECOM

Project Number:
60692069

Drawn By:
NM





- Legend**
- Installation Boundary
 - AFFF Sites
 - Road Area
 - Stream
 - Culvert
 - OB/BR interface MW
 - Bedrock Monitoring Well
 - Overburden Monitoring Well
 - Piezometer
 - Water Supply Well

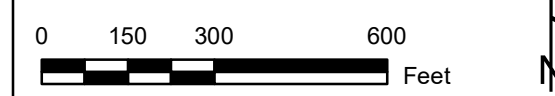


Figure 3

Site Map
OW013P and SIS018P-SUB
New Boston Space Force Station
New Boston, New Hampshire

Remedial Investigation for PFAS

AECOM	Project Number: 60692069	Drawn By: NM
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Attachment 1 – Site-specific Safety and Health Plan

New Boston Space Force Station

Phase I Remedial Investigation of PFAS

Site Safety and Health Plan

Contract No: W912WJ19D0003
Project number: 60690269

April 2023

Prepared by:

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Figure 1-1	Site Map
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Attachments

- Attachment 1 Hospital Route Map
- Attachment 2 Personnel Acknowledgement
- Attachment 3 Safety Data Sheets

Acronyms and Abbreviations

AL	action level
AHA	activity hazard analysis
APP	Accident Prevention Plan
CFR	Code of Federal Regulations
CPR	cardiopulmonary resuscitation
CRZ	contaminated reduction zone
DNREC	Delaware Department of Natural Resources and Environmental Control
EM	engineer manual
ETL	Engineering Technical Lead
EZ	exclusion zone
HAZWOPER	Hazardous Waste Operations and Emergency Response
LNAPL	light no-aqueous phase liquid
MEC	Munitions and Explosives of Concern
MERS	Middle East Respiratory Syndrome
NBSFS	New Boston Space Force Station
OSHA	Occupational Safety and Health Administration
PFAS	per- and polyfluoralkyl substance
PEL	permissible exposure limit
PID	photoionization detector
PM	project manager
POL	petroleum, oil, and lubricants
PPE	personal protective equipment
ppm	parts per million
SARS	Severe Acute Respiratory Syndrome
SDS	safety data sheet
SHE	AECOM Safety, Health and Environment
SHM	Safety and Health Manager
SOP	standard operating procedure
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
STEL	short-term exposure limit
SZ	support zone
TWA	time weighted average
UFP-QAPP	Uniform Federal Policy- Quality Assurance Project Plan

USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance
UXOQP	Unexploded Ordnance Qualified Person
VOC	volatile organic compound
WP	work plan

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Site Safety and Health Plan (SSHP) Contact List

THIS EMERGENCY CONTACT LIST IS PROVIDED AS A QUICK-REFERENCE/OVERVIEW ONLY. THE REMAINDER OF THIS SITE-SPECIFIC SSHP IS INTEGRAL TO THE SAFE CONDUCT OF SITE OPERATIONS AND MUST BE APPLIED IN ITS ENTIRETY

Emergency Information

Ambulance:		911
Fire:		911
Police:		911
Hospital (Main Office):	Catholic Medical Center	(603) 668-3545
Hospital (Emergency Department):	Catholic Medical Center	(603) 663-6478
AFCEC Project Manager:	Brett Dubner	(508) 968-4670, x3001
USACE Project Manager:	Erin Kirby	(978) 318-8147
SH&E Incident Reporting:	IndustrySafe	(800) 348-5046
AECOM Project Manager:	Josh Millard	(978) 424-8199
AECOM Field Technical Lead:	Bill Abrahams-Dematte	(603) 801-6583
AECOM Safety Manager:	Scott Dietz, CSP, STSC	(240) 344-5832
AECOM MRSPM	Mac Reed, CSM, CSA	(615) 618-5272
Senior UXO QP	Shannon Linnane	414-248-7263
AECOM Site Safety Officer	Richard Purdy, STS	(781) 883-6425

Directions to Catholic Medical Center:

1. Take unnamed road to Chestnut Hill Rd and head North (0.4 miles).
2. Keep right as the road curves to the East to New Boston Rd (6.6 miles).
3. Go straight at Route 114 intersection and continue on Donald Street, and take the first right off the roundabout to continue on Donald Street (1.4 miles).
4. Donald St turns right and becomes Milford Street. Stay on Milford Street (0.4 miles).
5. Turn left on S Main Street (0.9 miles).
6. Turn left at Foundry Street and the Catholic Medical Center is on your left.

Emergency entrance is in the northeast corner of the building.

1. Introduction

This Site Safety and Health Plan (SSHP) has been prepared in accordance with U.S. Army Corps of Engineers (USACE) Engineering Manual (EM) 385-1-1; the AECOM Safety, Health and Environment (SHE) Program; and Occupational Safety and Health Administration (OSHA) regulations (29 Code of Federal Regulations [CFR] 1910 and 1926), as well as policies established by New Boston Space Force Station (NBSFS). The SSHP addresses field activities to include Hazardous Waste Operations and Emergency Response (HAZWOPER) in accordance with Section 33 of EM 385-1-1 and 29 CFR 1910.120 and 1926.65.

The general information, which includes site background, responsibilities and lines of authority, general site control, and general site safety procedures, is presented in **Section 2** and **Section 4** of the Accident Prevention Plan (APP).

AECOM will have site safety and health oversight and coordination responsibilities for all project personnel. Work will be conducted by AECOM or an AECOM directed subcontractor.

Changing and/or unanticipated site conditions may require modification of this SSHP in order to maintain a safe and healthful work environment. Any proposed changes to this plan will be reviewed and approved by the AECOM Project Manager (PM), Safety and Health Manager (SHM), and Area Safety, Health, and Environment (SHE) Manager. SSHP revisions will be submitted to the USACE Authorized Representative for approval prior to implementation.

The work will be performed on NBSFS property. The property boundaries are shown on Figure 1-1, and the locations of the investigation locations (including existing monitoring wells) are shown on Figures. While working on NBSFS, all activities must be coordinated through the AFCEC Project Manager [Brett Dubner (508) 968-4670, x3001. While working at NBSFS, 911 should be used in the event of an emergency.

2. Hazard/Risk Analysis

2.1 Activity Hazard Analysis

Project hazards include biological, chemical and physical. An Activity Hazard Analysis (AHA) has been developed for each identified task. If additional tasks are identified during the period of performance, additional AHAs will be completed. The AHAs define the activity being performed, the sequence of work, specific safety and health hazards anticipated, control measures, equipment, inspection requirements, training requirements, and the competent person in charge of that phase of work. AHAs for the identified tasks can be found in **Attachment 2 of the APP**. Additional information regarding the scope of the field activities is presented in **Section 2** of the APP.

2.2 Biological Hazards

Biological hazard and mitigations are discussed in Section 9.12.4 of the APP.

Coronavirus (COVID-19) is the result of a virus identified as SARS-CoV-2. Coronaviruses are large family of viruses found in both animals and humans. Some infect people and are known to cause illness ranging from the common cold to more severe diseases such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) with symptoms such as fever, cough and shortness of breath. There currently is no human vaccine available for this virus.

Refer to the latest – Interim Guidance for Coronaviruses: [AECOM Guidance for Coronavirus](#) and the AECOM Pandemic Procedure: SR1-003-PR2:

	Hazard/ Activity	Project Specific Description	Applicable Procedure
<input checked="" type="checkbox"/>	Pandemic Virus / All Activities	All activities (Include Project Specific Description)	SR1-003-PR2

Any employee experiencing any Symptoms of CoVid-19 must not work at the office or at any client location and must seek medical attention immediately. Covid-19 symptoms include:

- Fever
- Cough
- Shortness of breath
- Bluish lips or face
- New confusion or inability to arouse
- Persistent pain or pressure in the chest

2.3 Physical Hazards

Physical hazards and mitigations are discussed in Section 9.12.5 of the APP

2.4 Chemical Hazards

Chemicals may be present on site as site media constituents or may be brought on site for use.

2.4.1 Site Contaminants

Chemicals may be present on site as site constituents or may be brought on site for use. Chemicals potentially present onsite that may be encountered during project activities include volatile organic compounds (VOCs), per- and polyfluoralkyl substance (PFAS), and copper

Occupational exposure to chemical hazards may occur by two primary routes (inhalation and skin contact/absorption) and one indirect route (incidental ingestion).

Constituents that potentially pose an occupational concern to employees by the inhalation route are VOCs. During activities where these contaminants may be present monitoring of airborne concentrations will be conducted. Response actions, which may consist of engineering controls or an upgrade of PPE (including the use of respiratory protection), will be instituted as indicated on **Section 7, Table 7-2**.

Personnel collecting samples, handling residuals, or waste and associated equipment may be exposed to chemical hazards by skin contact or absorption. The use of appropriate PPE (e.g., work gloves, protective clothing, and face shield) and good hygiene practices will minimize these exposures.

Personnel collecting samples, handling residuals, or waste and associated equipment, including project hazardous materials, may also be exposed by incidental ingestion (i.e., PFAS, and VOCs). The use of appropriate PPE, proper decontamination procedures, and good hygiene practices will minimize these exposures.

Exposure to chemical hazards can present a risk of serious injury. This SSHP provides the basics to avoiding occupational exposure to chemical hazards through the use of personal protective equipment (PPE). From an occupational health standpoint, potential exposure to site personnel will be only for a short period of time (intermittent for several days). However, new investigations have the potential for exposure to elevated levels of unknown contaminants.

Skin contact with potentially contaminated materials will be minimized by the use of administrative practices and PPE. Inhalation of vapors or particulates during the site activities will be minimized by use of engineering controls and monitoring. Respiratory protection will be used if site action levels are exceeded. Air monitoring with a photoionization detector (PID) will be completed in the field to determine levels of respiratory protection required. Ingestion of contaminated materials will be minimized by the use of appropriate personal hygiene procedures during well installation, sampling, and decontamination (i.e., thoroughly washing face and hands with soap and water after leaving the work area and prior to eating or drinking).

Please refer to Table 2-1 for summary of the maximum detected concentration of chemicals of concern detected at NBSFS.

Table 2-1: Summary of Maximum Detected Concentrations

Description	Fraction	Maximum Detected Concentration			
		Sediment (ug/Kg)	Soil (ug/Kg)	Groundwater (ug/L)	Surface Water (ug/L)
6:2 Fluorotelomer sulfonic acid (FTS)	TOTAL	NA	NA	0.26	NA
2-Amino-4,6-Dinitrotoluene	Not Applicable	NA	2670	NA	0.306
4-Amino-2,6-Dinitrotoluene	Not Applicable	NA	1640	NA	NA
Acetone	Not Applicable	NA	1080	NA	NA
Acetone	TOTAL	NA	NA	95	NA
Acenaphthene	Not Applicable	NA	6700	NA	NA
Acenaphthene	TOTAL	NA	NA	4.14	NA
Acenaphthylene	Not Applicable	NA	410	NA	NA
Acenaphthylene	TOTAL	NA	NA	0.042	NA
Silver	DISS	NA	NA	NA	1.1

		Maximum Detected Concentration			
Description	Fraction	Sediment (ug/Kg)	Soil (ug/Kg)	Groundwater (ug/L)	Surface Water (ug/L)
Silver	TOTAL	NA	194000	0.84	9.4
Aluminum	DISS	NA	NA	3210	480
Aluminum	TOTAL	15000000	48100000	4600	6490
Alkalinity, Total (As Caco3)	Not Applicable	NA	NA	NA	9800
Alkalinity, Total (As Caco3)	TOTAL	NA	NA	53300	NA
Anthracene	Not Applicable	NA	11000	NA	NA
Anthracene	TOTAL	NA	NA	0.204	NA
Arsenic	DISS	NA	NA	12.2	NA
Arsenic	TOTAL	NA	242000	64.7	3
Barium	DISS	NA	NA	110	37.4
Barium	TOTAL	NA	431000	121	77.3
Benzyl Butyl Phthalate	Not Applicable	37	130	NA	1.1
Benzyl Butyl Phthalate	TOTAL	NA	NA	0.294	NA
Bromodichloromethane	TOTAL	NA	NA	0.952	NA
Beryllium	DISS	NA	NA	0.44	0.93
Beryllium	TOTAL	NA	6200	2.4	NA
bis(2-Ethylhexyl) Phthalate	Not Applicable	17.6	5950	NA	2.8
Tert-Butyl Alcohol	TOTAL	NA	NA	6.7	NA
n-Butylbenzene	Not Applicable	NA	40.5	NA	NA
n-Butylbenzene	TOTAL	NA	NA	49	NA
sec-Butylbenzene	Not Applicable	NA	39	NA	NA
sec-Butylbenzene	TOTAL	NA	NA	11	NA
t-Butylbenzene	TOTAL	NA	NA	0.52	NA
Benzene	Not Applicable	NA	0.605	NA	NA
Benzene	TOTAL	NA	NA	0.428	NA
Benzo(a)anthracene	Not Applicable	NA	34800	NA	NA
Benzo(a)anthracene	TOTAL	NA	NA	0.72	NA
Benz[a]anthracene, 1-Me	Not Applicable	NA	4250	NA	NA
Benzoic Acid	Not Applicable	NA	8910	NA	NA
Benzo(a)pyrene	Not Applicable	NA	48700	NA	NA
Benzo(a)pyrene	TOTAL	NA	NA	0.49	NA
Benzo(b)fluoranthene	Not Applicable	NA	31900	NA	NA
Benzo(b)fluoranthene	TOTAL	NA	NA	0.58	NA
Benzo(g,h,i)perylene	Not Applicable	NA	21900	NA	NA
Benzo(g,h,i)perylene	TOTAL	NA	NA	0.64	NA
Benzo(k)fluoranthene	Not Applicable	NA	39500	NA	NA

Description	Fraction	Maximum Detected Concentration			
		Sediment (ug/Kg)	Soil (ug/Kg)	Groundwater (ug/L)	Surface Water (ug/L)
Benzo(k)fluoranthene	TOTAL	NA	NA	0.67	NA
Benzyl Alcohol	Not Applicable	NA	182	NA	NA
Toluene	Not Applicable	NA	506	NA	0.48
Toluene	TOTAL	NA	NA	2.1	NA
4-Chloro-3-Methylphenol	Not Applicable	35.1	NA	NA	NA
Calcium	DISS	NA	NA	26600	5990
Calcium	TOTAL	18100000	26000000	56300	38200
Carbazole	Not Applicable	NA	220	NA	NA
Cadmium	DISS	NA	NA	0.31	NA
Cadmium	TOTAL	720	82900	0.8	1.7
Chrysene	Not Applicable	NA	47300	NA	NA
Chrysene	TOTAL	NA	NA	0.99	NA
Chloride (As Cl)	Not Applicable	NA	785000	NA	255000
Chloride (As Cl)	TOTAL	NA	NA	317000	NA
4-Chloroaniline	Not Applicable	NA	839	NA	NA
4-Chloroaniline	TOTAL	NA	NA	0.594	NA
2-Chlorotoluene	TOTAL	NA	NA	2.1	NA
Chloromethane	TOTAL	NA	NA	0.92	NA
Cobalt	DISS	NA	NA	8.52	4.1
Cobalt	TOTAL	NA	91900	7.6	6.6
Chromium, Total	DISS	NA	NA	6.77	1.4
Chromium, Total	TOTAL	14700	78400	9.35	54.2
Copper	DISS	NA	NA	2.86	17.3
Copper	TOTAL	794000	2810000	118	562
p-Cymene (p-Isopropyltoluene)	Not Applicable	NA	47.5	NA	NA
p-Cymene (p-Isopropyltoluene)	TOTAL	NA	NA	3.9	NA
Dibenz(a,h)anthracene	Not Applicable	NA	5070	NA	NA
Dibenz(a,h)anthracene	TOTAL	NA	NA	0.584	NA
Dibromochloromethane	TOTAL	NA	NA	0.46	NA
Dibenzofuran	Not Applicable	NA	602	NA	NA
1,2-Dichloroethane	Not Applicable	NA	3.45	NA	NA
1,2-Dichlorobenzene	Not Applicable	NA	10.1	NA	NA
1,3-Dichlorobenzene	Not Applicable	NA	19.9	NA	NA
1,4-Dichlorobenzene	Not Applicable	NA	143	NA	NA
1,1-Dichloroethene	Not Applicable	NA	3.4	NA	NA
1,1-Dichloroethene	TOTAL	NA	NA	0.66	NA

Description	Fraction	Maximum Detected Concentration			
		Sediment (ug/Kg)	Soil (ug/Kg)	Groundwater (ug/L)	Surface Water (ug/L)
cis-1,2-Dichloroethylene	TOTAL	NA	NA	1.53	NA
trans-1,2-Dichloroethene	TOTAL	NA	NA	0.819	NA
Diethyl Phthalate	TOTAL	NA	NA	2.32	NA
Dissolved Inorganic Carbon	Not Applicable	NA	NA	NA	9700
1,4-Dioxane (P-Dioxane)	Not Applicable	NA	2.2	NA	NA
1,4-Dioxane (P-Dioxane)	TOTAL	NA	NA	23.4	NA
Dimethyl Phthalate	Not Applicable	NA	75	NA	NA
3,5-Dinitroaniline	Not Applicable	NA	167	NA	0.0951
1,3-Dinitrobenzene	Not Applicable	NA	767	NA	0.315
Di-n-Butyl Phthalate	Not Applicable	NA	160	NA	0.69
Di-n-Octylphthalate	Not Applicable	NA	47	NA	NA
2,4-Dinitrotoluene	Not Applicable	NA	182	NA	1.86
2,6-Dinitrotoluene	Not Applicable	NA	117	NA	0.32
3,4-Dinitrotoluene	TOTAL	NA	NA	2960	NA
Dissolved Oxygen	Not Applicable	NA	NA	NA	12850
Dissolved Organic Carbon	Not Applicable	NA	NA	NA	22700
Ethylbenzene	Not Applicable	NA	1.51	NA	NA
Ethylbenzene	TOTAL	NA	NA	1.9	NA
1,2-Dibromoethane	TOTAL	NA	NA	0.019	NA
2-Ethyl-1-Hexanol	Not Applicable	NA	91.8	NA	NA
2-Ethyl-1-Hexanol	TOTAL	NA	NA	83.7	NA
Trichlorofluoromethane	TOTAL	NA	NA	4.3	NA
Dichlorodifluoromethane	TOTAL	NA	NA	0.659	NA
Iron	DISS	NA	NA	6020	2050
Iron	TOTAL	17300000	50900000	20800	8890
Fluorene	Not Applicable	NA	4640	NA	NA
Fluorene	TOTAL	NA	NA	2.76	NA
Fluoranthene	Not Applicable	NA	38300	NA	NA
Fluoranthene	TOTAL	NA	NA	0.879	NA
Hardness (As CaCO ₃)	Not Applicable	NA	NA	NA	115000
1-Hexanol	Not Applicable	NA	91.8	NA	NA
1-Hexanol	TOTAL	NA	NA	83.7	NA
Mercury	DISS	NA	NA	0.16	0.14
Mercury	TOTAL	720	4160	NA	0.66
Octahydro-1,3,5,7-Tetranitro-1,3,5,7-Tetrazocine	Not Applicable	NA	540	NA	1.96

Description	Fraction	Maximum Detected Concentration			
		Sediment (ug/Kg)	Soil (ug/Kg)	Groundwater (ug/L)	Surface Water (ug/L)
Octahydro-1,3,5,7-Tetranitro-1,3,5,7-Tetrazocine	TOTAL	NA	NA	0.39	NA
Heptachlorinated Dibenzo-P-Dioxins, (Total)	Not Applicable	NA	0.0327	NA	NA
1,2,3,4,6,7,8-Heptachlorodibenzo-P-Dioxin	Not Applicable	NA	0.00901	NA	NA
Heptachlorinated Dibenzofurans, (Total)	Not Applicable	NA	0.0057	NA	NA
1,2,3,4,6,7,8-Heptachlorodibenzofuran	Not Applicable	NA	0.00427	NA	NA
Hexachlorinated Dibenzo-P-Dioxins, (Total)	Not Applicable	NA	0.0045	NA	NA
1,2,3,6,7,8-Hexachlorodibenzo-P-Dioxin	Not Applicable	NA	0.000525	NA	NA
1,2,3,7,8,9-Hexachlorodibenzo-P-Dioxin	Not Applicable	NA	0.000432	NA	NA
Hexachlorinated Dibenzofurans, (Total)	Not Applicable	NA	0.00328	NA	NA
1,2,3,4,7,8-Hexachlorodibenzofuran	Not Applicable	NA	0.000874	NA	NA
1,2,3,6,7,8-Hexachlorodibenzofuran	Not Applicable	NA	0.000555	NA	NA
2-Hexanone	TOTAL	NA	NA	360	NA
Indeno(1,2,3-c,d)pyrene	Not Applicable	NA	17900	NA	NA
Indeno(1,2,3-c,d)pyrene	TOTAL	NA	NA	0.78	NA
Isopropylbenzene (Cumene)	TOTAL	NA	NA	11	NA
Isophorone	Not Applicable	NA	80.6	NA	NA
Potassium	DISS	NA	NA	7170	1080
Potassium	TOTAL	NA	11500000	8520	7790
Methyl Ethyl Ketone	Not Applicable	NA	461	NA	NA
3&4-Methyl Phenol	Not Applicable	NA	543	NA	2.2
3&4-Methyl Phenol	TOTAL	NA	NA	14	NA
Magnesium	DISS	NA	NA	4130	1880
Magnesium	TOTAL	3910000	11200000	11500	4650
Methyl Isobutyl Ketone	TOTAL	NA	NA	300	NA
Manganese	DISS	NA	NA	1360	434
Manganese	TOTAL	361000	7450000	2180	8180
Methylene Chloride	Not Applicable	NA	3040	NA	NA
Methylene Chloride	TOTAL	NA	NA	15	NA
1-Methylnaphthalene	Not Applicable	NA	6750	NA	NA
1-Methylnaphthalene	TOTAL	NA	NA	5.9	NA
2-Methylnaphthalene	Not Applicable	NA	12200	NA	NA
2-Methylnaphthalene	TOTAL	NA	NA	5.5	NA
Sodium	DISS	NA	NA	149000	48500
Sodium	TOTAL	NA	1450000	212000	140000

Description	Fraction	Maximum Detected Concentration			
		Sediment (ug/Kg)	Soil (ug/Kg)	Groundwater (ug/L)	Surface Water (ug/L)
Naphthalene	Not Applicable	NA	11700	NA	NA
Naphthalene	TOTAL	NA	NA	186	NA
2-Nitrotoluene	Not Applicable	NA	92.3	NA	0.636
3-Nitrotoluene	Not Applicable	NA	853	NA	0.425
4-Nitrotoluene	Not Applicable	NA	134	NA	0.359
Nitrogen, Ammonia (As N)	Not Applicable	NA	647000	NA	380
Nickel	DISS	NA	NA	9.62	4.2
Nickel	TOTAL	NA	61300	11	7.4
n-Nitrosodiphenylamine	Not Applicable	NA	224	NA	NA
Nitrobenzene	Not Applicable	NA	201	NA	1.52
Nitrocellulose	Not Applicable	3610	189000	NA	3680
Nitrocellulose	TOTAL	NA	NA	97.2	NA
Nitroglycerin	Not Applicable	NA	435	NA	0.232
Nitroglycerin	TOTAL	NA	NA	1.71	NA
Octachlorodibenzo-P-Dioxin	Not Applicable	NA	0.0797	NA	NA
Octachlorodibenzofuran	Not Applicable	NA	0.00494	NA	NA
Lead	DISS	NA	NA	2.42	4
Lead	TOTAL	79200	205000000	9.4	71.7
n-Propylbenzene	Not Applicable	NA	23.1	NA	NA
n-Propylbenzene	TOTAL	NA	NA	44	NA
Perchlorate	Not Applicable	NA	5.76	NA	0.042
Perchlorate	TOTAL	NA	NA	0.184	NA
PCB-1242 (Arochlor 1242)	Not Applicable	NA	3330	NA	NA
PCB-1254 (Arochlor 1254)	Not Applicable	NA	1030	NA	NA
PCB-1260 (Arochlor 1260)	Not Applicable	NA	714	NA	NA
Tetrachloroethylene (PCE)	Not Applicable	NA	27.6	NA	NA
Tetrachloroethylene (PCE)	TOTAL	NA	NA	0.639	NA
Pentachlorinated Dibenzo-P-Dioxins, (Total)	Not Applicable	NA	0.00152	NA	NA
Pentachlorinated Dibenzofurans, (Total)	Not Applicable	NA	0.00357	NA	NA
1,2,3,7,8-Pentachlorodibenzofuran	Not Applicable	NA	0.000491	NA	NA
2,3,4,7,8-Pentachlorodibenzofuran	Not Applicable	NA	0.000575	NA	NA
Pentaerythritol Tetranitrate	Not Applicable	NA	628	NA	0.921
Perfluorobutanoic acid (PFBA)	TOTAL	NA	NA	0.21	NA

Description	Fraction	Maximum Detected Concentration			
		Sediment (ug/Kg)	Soil (ug/Kg)	Groundwater (ug/L)	Surface Water (ug/L)
Perfluorobutanesulfonic acid (PFBS)	TOTAL	NA	NA	0.01	NA
Perfluoroheptanoic acid (PFHpA)	TOTAL	NA	NA	0.32	NA
Perfluoroheptanesulfonic acid (PFHpS)	TOTAL	NA	NA	0.0092	NA
Perfluorohexanoic acid (PFHxA)	TOTAL	NA	NA	0.67	NA
Perfluorohexanesulfonic acid (PFHxS)	TOTAL	NA	NA	0.11	NA
Perfluorononanoic acid (PFNA)	TOTAL	NA	NA	0.01	NA
PERFLUOROOCTANOIC ACID-AMMONIUM SALT	TOTAL	NA	NA	0.15	NA
PERFLUOROOCTANE SULFONATE-POTASSIUM SALT	TOTAL	NA	NA	0.26	NA
Perfluoropentanoic acid (PFPeA)	TOTAL	NA	NA	0.8	NA
Phenanthrene	Not Applicable	NA	37500	NA	NA
Phenanthrene	TOTAL	NA	NA	1.81	NA
Petroleum Hydrocarbons Above C-10	Not Applicable	NA	1160000	NA	NA
Petroleum Hydrocarbons C10-C28	Not Applicable	NA	67700	NA	NA
1,2-Benzenedicarboxylic Acid	Not Applicable	NA	3410	NA	NA
Pyrene	Not Applicable	NA	41400	NA	NA
Pyrene	TOTAL	NA	NA	0.731	NA
Hexahydro-1,3,5-Trinitro-1,3,5-Triazine	Not Applicable	NA	422	NA	3.96
Hexahydro-1,3,5-Trinitro-1,3,5-Triazine	TOTAL	NA	NA	0.539	NA
Antimony	DISS	NA	NA	2.89	NA
Antimony	TOTAL	NA	23300	0.72	NA
Selenium	DISS	NA	NA	0.32	NA
Selenium	TOTAL	NA	15000	3.5	NA
Tin	DISS	NA	NA	1.31	NA
Tin	TOTAL	NA	256000	NA	NA
Sulfate (As SO4)	Not Applicable	NA	NA	NA	69200
Sulfate (As SO4)	TOTAL	NA	NA	59700	NA
Styrene	Not Applicable	NA	0.753	NA	NA
Tert-Butyl Methyl Ether	TOTAL	NA	NA	15	NA
Tetrachlorinated Dibenzo-P-Dioxins, (Total)	Not Applicable	NA	0.00206	NA	NA
Tetrachlorinated Dibenzofurans, (Total)	Not Applicable	NA	0.00399	NA	NA
2,3,7,8-Tetrachlorodibenzofuran	Not Applicable	NA	0.000754	NA	NA
Trichloroethylene (TCE)	Not Applicable	NA	2.7	NA	NA
Trichloroethylene (TCE)	TOTAL	NA	NA	2.35	NA
Chloroform	Not Applicable	NA	0.665	NA	NA

Description	Fraction	Maximum Detected Concentration			
		Sediment (ug/Kg)	Soil (ug/Kg)	Groundwater (ug/L)	Surface Water (ug/L)
Chloroform	TOTAL	NA	NA	1.76	NA
Tetryl	Not Applicable	NA	245	NA	NA
Thallium	TOTAL	NA	1050	NA	NA
1,2,4-Trimethylbenzene	Not Applicable	NA	54.9	NA	NA
1,2,4-Trimethylbenzene	TOTAL	NA	NA	200	NA
1,3,5-Trimethylbenzene	TOTAL	NA	NA	74	NA
1,3,5-Trinitrobenzene	Not Applicable	NA	182	NA	0.26
2,4,6-Trinitrotoluene	Not Applicable	NA	383	NA	NA
Total Organic Carbon	Not Applicable	260000000	78000000	NA	NA
Total Organic Carbon	TOTAL	NA	NA	2760	NA
Total Solids	Not Applicable	50.8	NA	NA	NA
Vanadium	DISS	NA	NA	9.08	NA
Vanadium	TOTAL	NA	114000	4.09	3.6
Total Xylenes	TOTAL	NA	NA	15	NA
m,p-Xylene	Not Applicable	NA	131	NA	NA
m,p-Xylene	TOTAL	NA	NA	0.577	NA
o-Xylene	Not Applicable	NA	44	NA	NA
o-Xylene	TOTAL	NA	NA	13	NA
Zinc	DISS	NA	NA	37.3	23.6
Zinc	TOTAL	59500	3670000	182	134

Notes:

ug/l=micrograms per liter

DISS = Dissolved Fraction

TOTAL=Total Fraction

ug/kg = micrograms per kilogram

NA = The result was either not detected or not reported for the analyte matrix combination

2.4.2 Chemicals Brought Onsite

Chemicals used or brought on site include fuels, hydraulic oil, and drilling materials (powdered bentonite, Portland cement, concrete mix). Chemicals brought on site will be managed in accordance with the Hazard Communication Program included in **Section 9.13** of the APP.

A chemical inventory will be developed (including information on the approximate quantities and storage locations – for emergency response purposes). All chemical products brought on-site will be properly labeled and a copy for each Safety Data Sheet (SDS) will be kept in Attachment 3 of this SSHP.

2.4.3 Good Work Practices

The following general housekeeping techniques will be used to minimize exposure to chemicals via all pathways:

- Where possible, personnel will remain upwind of contaminated areas.

- Contaminated materials will be stored in a designated area and will be placed in bags or drums as soon as possible.
- If needed, samples will be collected in suitable containers in a controlled manner.
- Handling of potentially contaminated materials will be kept to a minimum.

If handling of potentially contaminated soil and/or water is necessary to complete work, the exposure to this contamination will be controlled by the correct use of appropriate PPE and by strict personal hygiene.

The correct use of PPE is essential, for further information See **Section 5**.

3. Project Personnel

See **Section 4** of the APP for project personnel requirements and responsibilities. Safety personnel responsibilities are also discussed in **Section 4** of the APP.

4. Training

Training requirements are addressed in **Section 6** of the APP. Training Documentation is addressed in **Section 17.4** of this SSHP. Site-specific training is discussed below.

4.1 HAZWOPER Training

All AECOM and subcontractor personnel working within the exclusion zone (EZ) of site intrusive activities will have met the requirements of 29 CFR 1910.120(e), including:

- Forty-hour initial OSHA HAZWOPER training
- Eight-hour annual OSHA refresher training (current within past year)
- Eight-hour OSHA supervisor training for personnel serving as Site Safety and Health Officer (SSHO) or supervising or managing on-site work activities
- Three days of work activity under the supervision of a trained and experienced HAZWOPER site supervisor. This work activity must be documented for all HAZWOPER site supervisors.

At all times, at least two of the fieldworkers will have current first aid and cardiopulmonary resuscitation (CPR) certification. First aid and CFR training certifications are provided in **Attachment 4** of the APP.

4.2 CoVid-19 Awareness Training

All AECOM employees will receive CoVid-19 Level 1 Awareness Training.

4.3 On-Site MEC Training

Prior to field activities, the senior UXOQP will conduct project-specific training for all on-site personnel assigned to field task where MEC and anomaly avoidance activities will be implemented. At a minimum, site specific training will include the following topics:

- Field equipment operation, including safety precautions and safety equipment
- Procedures, guidelines, and requirements in relevant sections of the Site Safety and Health Plan (SSHP) as they relate to the task being performed (if applicable)
- Site- and task-specific hazards, including physical, biological, and chemical hazards
- Emergency procedures and contact information
- Incremental monitoring procedures

5. Personal Protective Equipment

Procedures for use and selection of PPE are addressed in **Section 9.12** of the APP. The level of protection worn by site personnel will be enforced by the SSHO.

The level of PPE and upgrade requirements are provided in **Table 5-1**. Initial minimum PPE requirements for each task are outlined in the AHAs presented in **Appendix D** of the APP. Downgrade of PPE will be at the discretion of the SSHO, and will be based on the task being performed, air monitoring results, and applicable regulations.

5.1 Level D PPE

Level D protection is the minimum level of PPE that will be worn by field personnel. Level D offers no protection against the inhalation hazards of airborne contaminants. Level D ensembles are not airtight; therefore, dermal exposure to vapors and liquids is possible. This level is not authorized when an airborne contaminant is present above site action levels. Level D PPE will be worn for activities as specified in **Table 5-1**, and at a minimum will consist of the following:

- Work clothes
- Safety-toe work boots
- Safety glasses (ANSI Z87.1)
- Goggles (when required or desired)
- Safety Vest (Class II or III as required)
- Hard hat
- Leather work gloves
- Hearing protection (if required)

5.2 Modified Level D

Modified Level D PPE offers protection from casual contact with contaminated soils and materials, but will not be worn when there is potential for airborne exposure to hazardous substances. Modified Level D PPE will be worn for activities specified in **Table 5-1**, and at a minimum will consist of the following:

- Work clothes
- Safety-toe work boots
- Chemical-resistant boot covers (as required)
- Safety glasses with side shields
- Goggles (as required)
- Hard hat
- Leather work gloves
- Nitrile gloves (when sampling)
- Hearing protection (as required)
- Respiratory protection. If used, the level of protection will change to Level C.
- Tychem® or Tyvek F suit (PFAS sampling limitations)

5.3 Level C PPE

If real-time air monitoring detects VOC concentrations in excess of 5 parts-per-million (ppm) above background, intrusive site activities will stop and the USACE Engineering Technical Lead (ETL) will be notified immediately.

Level C PPE offers protection against the inhalation hazards of airborne contaminants by the use of either air filtration or chemical cartridges or combinations of both. Level C ensembles are not airtight; therefore, dermal exposure to vapors and liquids is possible. Level C protection can be used when the chemical hazards do not pose acute toxic hazards via dermal contact or when no possibility of dermal contact exists and when contaminants that can be sensed (either by smell or breathing resistance when filters alone are used) are present below permissible exposure limits. Level C PPE will be worn for activities as specified in **Table 5-1**, and at a minimum will consist of the following:

- NIOSH approved respirator for particulate and chemical
- Tychem® F or Tyvek F suit (with hood), all borders double taped (PFAS sampling limitations)
- Inner gloves: Nitrile gloves or surgical gloves
- Outer gloves: Non-standard chemical protective butyl rubber gloves,
- Leather work gloves (as required)
- Approved chemical-resistant rubber safety boots (safety toe)
- Chemical-resistant boot covers
- Hard hat
- Hearing protection (as required)

Table 5-1: Levels of Personal Protective Equipment (PPE)

Level of Protection	Criteria for Use	Upgrade Criteria
Level D	Required for all work outside of EZs.	If unanticipated chemical hazards are encountered
Modified Level D	Initial level of protection for all work in EZ with suspected hazardous contamination	Presence of strange odor or Discovery of discolored soils; If VOC concentrations are detected in excess of 5 ppm above background, intrusive site activities will stop and the NAE ETL will be immediately notified

Notes:

EZ = Exclusion Zone

N/A = Not Applicable

6. Medical Surveillance

Site personnel conducting intrusive activities are required to participate in medical surveillance programs that meet the requirements of 29 CFR 1910.120(f) and 1926.65. Also refer to AECOM SH&E SOP S3AM-128-PR1, Medical Screening and Surveillance. A current medical clearance will be maintained at the local AECOM office. The medical examinations are provided annually or biennially as required based on worker activities.

7. Exposure Monitoring

7.1 Heat and Cold Stress, Noise, and Chemical Exposure

Exposure to heat and cold stress conditions, noise, and chemicals, may be encountered during the project. Heat and cold stress are addressed in **Section 9.19** of the APP. Noise levels will not be monitored during field activities unless the activity warrants. AECOM personnel will use hearing protection when appropriate (e.g., drill rig operation). Monitoring and air sampling will be conducted for chemical contaminants to continuously evaluate employee exposures and the level of PPE required for field activities.

7.2 Chemical Exposure Monitoring

Chemical hazards may be associated with field activities anticipated during this project. General guidelines for air monitoring are provided in the following sections. If additional monitoring for airborne contaminants and/or chemicals is determined to be necessary based on site-specific information, the SSHP will be revised and submitted for USACE approval. The monitoring equipment specified in this section will be used on a regular basis to evaluate the potential for exposure to airborne chemicals of concern. Monitoring for total VOC concentrations will be performed using a PID with an appropriate detection device. Monitoring will be conducted in the immediate vicinity of the contaminant source point or work area and in the breathing zone of potentially exposed workers.

Area monitoring will be conducted every 15 minutes and is considered predictive of potential contaminant dispersion of maximum VOC levels toward the breathing zone. The PID probe (whether for VOCs or benzene specific) will be held within the breathing zone area for one minute.

In petroleum vapor dispersion, the assumption is that as much as 20% of the total VOCs could be benzene (denoted as the 20% assumption). Consequently, if VOCs equal or exceed 5 ppm, as much as 1 ppm of the total VOCs could be benzene. The OSHA Permissible Exposure Limit (PEL) for benzene is 1 ppm as an eight-hour time weighted average (TWA). The short term exposure limit (STEL), averaged over a 15 minute time period, is 5 ppm. If benzene monitoring (either with a handheld PID designed to measure benzene or with colorimetric tubes) indicates that benzene does not exceed the TWA or STEL; respirators are not required. However, if benzene monitoring is not available, then the 20% of total assumption is used.

If breathing zone monitoring readings equal or exceed five ppm total VOCs above background for 5 minutes, intrusive site activities will stop and the USACE ETL will be immediately notified.

7.3 Site Dust Monitoring Strategy and Approach

Based on the field activities anticipated to be completed as part of this project (monitoring well installation, groundwater sampling, soil sampling, sediment sampling, surface water sampling, and drinking water well sampling), monitoring and control of dust generated will not be initially required. Drilling materials (cement, bentonite) will be handled to minimize generation of airborne dust. If monitoring and control is determined to be necessary based on new information, an addenda to this SSHP will be written to address the hazard and any required dust suppression and monitoring thereof, including exposure monitoring.

7.4 Combustible Gas Monitoring

Combustible gas monitoring is typically completed as part of a confined space entry program. It is not anticipated that Confined Space Entry will be required during field activities. If Confined Space Entry is required by AECOM, a site-specific addendum will be prepared as described in **Section 15** of this SSHP.

7.5 Radiation Monitoring

It is not anticipated that radiation monitoring will be needed during field activities based on historical knowledge and contractual requirements.

7.6 Air Monitoring

Air monitoring will be performed within the employee breathing zone to assess the need to implement appropriate control measures or stop work. In addition, air monitoring will be performed at the source, as needed, to assess potential exposure hazards.

Monitoring shall be performed within the work area on site in order to detect the presence and relative levels of toxic substances. The data collected throughout monitoring shall be used to determine the appropriate levels of PPE. Monitoring shall be in accordance with the requirements specified in the following sections and/or AHAs for the tasks. Key elements of the procedure include:

7.6.1 Real-Time Exposure Measurement/Equipment

Monitoring equipment will be used, as described below, to document contaminant levels. All instrumentation need to be rated intrinsically safe to prevent fire or explosion. Calibration of monitoring equipment and/or daily bump tests will be conducted to verify calibrations and confirm alarm function.

Table 7-1: Monitoring Equipment

Instrument	Manufacturer/Model	Substances Detected
<input checked="" type="checkbox"/> Photo Ionization Detector (PID)	RAE Systems mini-RAE Photovac Microtip HNu Model Hnu (min. 10.6 eV bulb) Or equivalent	<ul style="list-style-type: none">• Volatile organic compounds (VOCs)• Petroleum hydrocarbons• Light non-aqueous phase liquids (LNAPL)

7.6.2 Health and Safety Action Levels

The concentration level (above background level) and the ability of the PPE to protect against that specific contaminant determine each action level (AL). The ALs are based on concentrations in the breathing zone.

If ambient levels are measured which exceed the ALs in areas accessible to unprotected personnel, necessary control measures (barricades, warning signs, and mitigation actions to limit, etc.) must be implemented prior to commencing activities at the specific work area.

Personnel should also be able to upgrade or downgrade their level of protection with the concurrence of the PM and the SSHO.

Reasons to Upgrade:	<ul style="list-style-type: none">• Known or suspected presence of dermal hazards;• Occurrence or likely occurrence of gas, vapor, or dust emission; or• Change in work task that will increase the exposure or potential exposure to hazardous materials.
Reasons to Downgrade:	<ul style="list-style-type: none">• New information indicating that the situation is less hazardous than was originally suspected;• Change in site conditions that decrease the potential hazard; or• Change in work task that will reduce exposure to hazardous materials.

7.6.3 Monitoring Procedures

The monitoring procedures shown below are general guidelines for sampling activities. The SSHO, in conjunction with the SHM, and SH&E Manager, may modify any or all of these for

site-specific application. A reading in excess of ALs outlined below will require additional ventilation for 30 minutes, followed by re-monitoring.

Table 7-2: Monitoring Procedures and ALs

Parameter	Zone Location and Monitoring Interval	Response 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 ppm (sustained for 5 minutes)	STOP WORK and notify PM and the USACE ETL. 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 ppm above background.
		> 25 ppm (sustained for 5 minutes)	Cease work, exit the area, and contact the SSHO and PM.
Benzene (by PID with benzene-specific separation tube)	Breathing zone, continuously where indicated by VOC readings	> 0.25 ppm	Cease work, exit the area, and contact the SSHO and PM.

8. Heat and Cold Stress

Heat and cold stress are discussed in **Section 9.19 and 9.20, respectively** of the APP.

9. SOP/Engineering Controls/Work Practices

Standard Operation Procedures (SOPs) for field activities can be found in the task specific Expanded Site Investigation Uniform Federal Policy- Quality Assurance Project Plan (UFP-QAPP).

9.1 Site Rules/Prohibitions

Site rules/prohibitions are covered in **Section 4 and 9** of the APP and **Section 10** of this SSHP.

9.2 Work Permit Requirements

Refer to the project Work Plan for details.

9.3 Material Handling Procedures

AECOM will handle hazardous materials in accordance with the work plan (WP), APP, and this SSHP.

9.4 Drum/Container Handling

If investigation derived waste are required to be containerized, AECOM will procure 55-gallon drums to store and transport the materials. The soil, sediment, and/or water will be shipped in accordance with applicable regulations and AECOM SOPs. Required shipping / manifests will be prepared by an appropriately trained and certified shipping agent or specialist.

10. Site Control Measures

10.1 Site Control

The purpose of site control is to protect the public from inadvertently coming into contact with site hazards and to protect AECOM employees being impacted by hazards. This section details the equipment and actions needed to promote optimal site control. Site control will be accomplished through the daily safety brief. All site personnel will be informed of each day's activities and associated site control requirements.

The following items will be considered when planning the site layout and controls:

- "Line of Fire" hazards- overhead utilities, falling/ tipping equipment, release of energy/ pressure, flying debris,
- Noise, dust, odor suppression
- Contamination containment and decontamination area layout
- Traffic control for site vehicles/ equipment (public traffic control requires Traffic control Plan)
- Restricted access for areas requiring special training, skills, or certifications
- Restriction of work near railroads
- Presence or creation of excavations
- Loading/unloading areas
- Portable restrooms
- Dumpsters and bins
- Equipment lay down
- Heavy equipment parking
- Overnight safety and security needs

The SSHO will verify that all site visitors sign the visitors' log, receive a safety briefing, and will designate an escort to and from the site.

10.1.1 Site Work Zones

Site layout and site control will be coordinated to achieve a productive work environment and efficient work process while minimizing exposure of employees and base occupants to hazards associated with the work. All well installation work areas are within the NBSFS facilities/properties with secure and restricted access. At NBSFS, an exclusion zone (EZ) will be maintained with stakes and barrier tape and only authorized site workers will be allowed within 20 feet of intrusive activities (note: barricade tape or barricades shall be used to delineate a work zone for safety purposes in public/high traffic areas). The support zone (SZ) will be located outside the 20 foot perimeter around the intrusive activity. The contamination reduction zone (CRZ) will be the between the support zone (SZ) and the intrusive activity.

11. Personal Hygiene and Decontamination

11.1 Contamination Prevention

During all field activities contamination prevention protocols will be implemented. Procedures for contamination prevention for personnel include:

- Do not carry or use gum, chewing tobacco, or cosmetics in the CRZ or SZ.
- Do not smoke or use tobacco products onsite
- Stay upwind of the contaminated area.
- Do not handle or touch contaminated materials directly.
- Make sure that all PPE is free of cuts or tears prior to donning.
- Fasten all closures on suits, covering with tape if necessary.
- Take special care to protect any skin injuries. If open wounds exist on hands or forearms, handling chemicals or contaminated materials should be restricted or eliminated.

Procedures / protocols for prevention of cross contamination during PFAS sampling and material handling will be employed. Refer to the UFP-QAPP for sampling protocols / SOPs.

11.2 Decontamination of CoVid-19

Viruses including CoVid-19 can survive on hard non-porous surfaces for days, therefore, every hard, non-porous surface can potentially be contaminated and harbor viruses. The most frequently touched objects are at a higher risk of being contaminated with CoVid-19 and other viruses. Frequently touched surfaces and commonly shared items should be cleaned at least twice daily and when visibly soiled using an EPA-registered cleaning agent with label claims that the product is effective in use against viruses. The US Environmental Protection Agency (USEPA) registers pesticide and germicide products.

11.2.1 Light Touch Versus Heavy Hand Touch Surfaces

In making decisions related to biocide usage and other cleaning protocols one of the criteria is the type and amount of hand contact. Light touch surfaces are those that are seldom touched and include most vertical wall surfaces potentially available to be touched. The exceptions are vertical surfaces associated with toilet stalls in restrooms. Due to the usual distance between the incoming door and the toilet; often touching the vertical walls of the stall must occur upon entry and exit. In addition, vertical surfaces in close proximity to toilets are often touched; especially if someone is ill. These surfaces then become 'heavy hand touch surfaces'. The usual categories of 'heavy hand touch surfaces' are items that require hand operation to use. These surfaces require more frequent cleaning.

11.2.2 Recommended Biocides

Sterilization attempts to kill all biological contaminants while disinfection attempts to kill sufficient numbers in order to lessen the infective potential of contaminants. Decontamination and dilution within interior environments seek to lessen the numbers of biological contaminants to some defined limit. Consequently, the industrial hygiene goals should concentrate on disinfection and decontamination.

The following categories of decontamination solutions (chemicals that when applied assist in the removal of contaminants from surfaces) should be considered.

- Surfactant - such as soap that aids in washing the surfaces clean by increasing potential for material to 'slide' off these surfaces. All consumer products labeled as soap are in fact this type of surfactant decontamination solution. The differences in the soap products are primarily associated with added fragrance or color. Soaps have limited biocide properties and mainly function to remove biological contamination from surfaces. Some liquid soaps have added chemicals to enhance their bacterial biocide effect. Bar soaps should not be used on decontamination sites as without sufficient drying, the bar and surrounding liquids may harbor biological contaminants.
- Detergent - such as TriSodium Phosphate (TSP) that chemically bond contaminants and, thus, facilitate contaminant removal from surfaces.
- Desiccant (Alcohol) Decontamination Solution - contains alcohol that destroys bacteria and other types of cells by 'drying them out'. These solutions evaporate quickly and have little residual property. The higher the percentage of alcohol in the solution, the greater the flammability risk during use. Common hand sanitizers, such as Purell, are an example of desiccant solutions.
- Biocide Decontamination Solution – includes a chemical that reduces the development of bacteria, other biologicals cells, and viruses.
 - Oxivir Tb is a biocide decontamination solution with accelerated hydrogen peroxide as the active ingredient (disinfecting agent). Hydrogen peroxide is an oxidizer and the biocide activity is based on the use of this oxidizing property – to deliver oxygen as a metabolic poison and to disrupt the outer protein sheaths of viruses.
 - Virex II 256 is a quaternary ammonium product that is used to provide a biocide decontamination solution. Quaternary ammonia effectively removes bulk contamination from surfaces. Solutions provide detergent properties and the ammonium chloride present acts as the disinfecting agent.
 - Residual Biocide Decontamination Solution - have biocide properties and also leave a film of residual chemical on surfaces to kill newly developing bacteria and biological colonies.

11.3 Decontamination Procedures

Personnel decontamination will be required for personnel conducting environmental activities. Personnel will avoid contact with potentially contaminated soil/sediment/water and will take precautions to prevent being splashed with liquid chemical products or potentially contaminated water. During monitoring well installation and development and soil/sediment/water sampling activities, personnel will also avoid contact with potentially contaminated equipment, media, chemical vapors, dusts, fumes, and mists. PPE, including gloves, boots, and clothing; will be used to limit exposure to contamination.

All possible and necessary steps shall be taken to reduce or minimize contact with chemicals and contaminated/impacted materials while performing field activities. Key elements include:

- Avoid reactions between the solutions and contaminated materials. Review the applicable SDS.
- All contaminated PPE and decontamination materials shall be contained, stored and disposed of in accordance with site-specific requirements determined by site management.
- Use caution while working around decontamination stations, which may be a slip or trip hazard.
- Use disposable equipment when possible and practical.

- All employees performing equipment decontamination shall wear the appropriate PPE to protect against exposure to contaminated materials. The level of PPE will be equivalent to the level of PPE required in the EZ. Other PPE may include splash protection, such as face-shields and splash suits, and knee protectors.
- All decontaminated equipment shall be visually inspected for contamination prior to leaving the CRZ.

11.4 Respirator Use

It is not expected that any filed activities will require the use of a respirator. If any conditions that require potential upgrade in PPE, to include the use of Level C PPE, are noted during the course of site activities, all work operations will cease at the location and the PM and SH&E Manager will be notified immediately. A modification to AECOM's APP and SSHP will be required prior to conducting work in Level C PPE or higher.

11.5 Decontamination – Medical Emergencies

The planned field activities present very limited chemical exposure potential. Materials expected to be brought onsite are diesel fuel, gasoline, and drilling materials (bentonite, cement and concrete). Exposure to these or any unknown chemicals may require that decontamination occur both as an initial first aid protocol (to limit chemical effects) and also to allow transport to medical facilities off-site.

11.6 Sanitation

Sanitation is discussed in **Section 9.3** of the APP.

12. Equipment Decontamination

12.1 Equipment Decontamination

When all work activities have been completed, contaminated tools used by site personnel will be either appropriately decontaminated or properly disposed. All tools will be constructed of non-porous, non-absorbent materials.

Tools and equipment will be decontaminated using water and phosphate-free detergent (Alconox or equivalent) while using a scrub brush to remove contamination. The tools will be rinsed with disinfected, non-potable water and dried by air or with paper towels. Tools will be stored in clean plastic bags or in storage areas approved by NBSFS. Refer to the UFP-QAPP for detail on PFAS equipment use and decontamination.

Drill rig casing and rods will be pressure washed in a temporary decontamination pad. Decon water will be pumped from the pad into a 55-gallon drum.

12.2 Decontamination Procedures in the Exclusion Zone

Decontamination water may be containerized during environmental activities. If necessary, decontamination water will be sealed in Department of Transportation approved containers at the work sites and later transferred to a designated temporary storage area designated by NBSFS's Representative. AECOM will transfer the storage containers between the work site and the designated temporary storage area.

Each container will be labeled as follows:

- Installation identification
- Site name and number
- Classification of waste
- Type of waste
- Source of waste
- Date(s) of accumulation
- Name and phone number of site contact.

AECOM will dispose of decontamination water in accordance with the UFP-QAPP

13. Emergency Equipment and First Aid

A supply of emergency PPE and first aid equipment will be maintained in sufficient quantities to ensure an adequate supply. The following emergency supplies will be available and maintained in a vehicle used by each field team:

- Industrial first-aid kit (one 16-unit kit that complies with American National Standards Institute Z308A for every 25 persons or less) with alcohol swabs removed
- Bloodborne pathogen precaution kit with CPR mouth shield
- Instant cold packs
- Portable emergency eye wash and drenching station
- Fire extinguishers
- Face shields
- Nitrile gloves
- Spill control/absorption supplies
- Soap or waterless hand cleaner and towels;
- American Red Cross First Aid and CPR instruction manuals
- Multiple sizes of bandages

14. Emergency Response Plan

Emergency procedures are discussed in **Section 9.2** of the APP. See **Table 14-1** for a list of project contacts.

In the event of an emergency, the safety of people should always be the first priority. All personnel on site will be alerted to emergencies by verbal command and directed to a muster or assembly point. While all site personnel will have current HAZWOPER training, the emphasis for site personnel is hazardous waste operations and not emergency response. It is AECOM policy to maintain an awareness level response, act defensively, evacuate personnel from areas involved in hazardous material emergencies, and to summon outside assistance from agencies with personnel trained to respond to the specific emergency. In the event of a fire or medical emergency, the emergency numbers identified in the SSHP Contact List (page v) can be called for assistance. The number to dial for emergencies while working at NBSFS will be 911.

This section outlines the procedures to be followed by AECOM personnel in the event of a site emergency. The AECOM site team will hold emergency response plan (ERP) meetings with facility representatives (NBSFS) and prior to fieldwork and during mobilization to discuss and define the following:

- Personnel roles and line of authority;
- Communication procedures between facility operations and AECOM personnel;
- Safe distances from emergency location;
- Evacuation/Hospital route, procedures, and pre-determined meeting place;
- Medical emergency and communication procedures with emergency services (fire, police, ambulance), AECOM management, USACE, and NBSFS personnel (see SSHP Contact List on page v);
- Emergency alert and response procedures; and
- Emergency equipment and location on-site.

These procedures are to be attached to this SSHP. The ERP will be discussed during initial site training and discussed regularly during the Daily Tailgate Safety Meetings. The SSHO will conduct drills monthly or more frequently if conditions change to evaluate the response and testing the effectiveness of the ERP.

The AECOM emergency response team will consist of employees who assume the following roles:

1. Emergency Care Provider(s)

Example Provide first aid and/or CPR as needed.

2. Communicator

Example The role of the communicator is to maintain contact with appropriate emergency services, providing as much information as possible, such as the number injured, the type and extent of injuries, and the exact location of the accident scene. The communicator should be located as close to the scene as possible in order to transmit to the emergency care providers any additional instructions that may be given by emergency services personnel in route.

3. Site Supervisor

Example The site supervisor (usually the SSHO) should survey and assess existing and potential hazards, evacuate personnel as needed, and contain the hazard. Follow up responsibilities include replacing or repairing damaged equipment, documenting the

incident, and notifying appropriate personnel/agencies described under incident reporting. Follow up also includes reviewing and revising site safety and contingency plans as necessary with the SHM's assistance and approval.

An employee alarm system will consist of the use of air horns or verbal instructions, either directly or via radio. Air horn signals, (and hand signals if necessary) will be established and employees will be trained in the signals and appropriate response. Telephones will be used to contact offsite emergency responders. Contact lists included in the SSHP will be provided for field personnel, a copy will be kept in site vehicles. The following information will be communicated:

- Name of the person reporting the emergency;
- Telephone number at the location of the person making the call;
- Name of the injured person, if known;
- Description of the emergency;
- Exact location of the emergency;
- Actions already taken; and
- Assistance required.

Table 14-1: Project Team Members

Organization	Name and Project Role	Telephone Number	E-mail Address
AFCEC	Brett Dubner, Project Manager	508 968-4670, x3001	brett.dubner.1@us.af.mil
USACE New England	Erin Kirby, Project Manager	978-318-8147	Erin.Kirby@usace.army.mil
AECOM	Josh Millard, Task Order Manager	978 424-8199	Joshua.Millard@aecom.com
AECOM	Bill Abrahams-Dematte, Site Supervisor	603-801-6583	bill.abrahams-dematte@aecom.com
AECOM	Richard Purdy, STS, Site Safety and Health Officer	781-883-6425	richard.purdy@aecom.com
AECOM	Shannon Linnane, Senior UXOQP	414-248-7263	Shannon.linnane@aecom.com
AECOM	Scott Dietz, CSP, STSC, Federal SH&E Manager	240-344-5892	Scott.dietz@aecom.com

15. Confined Space Entry

Permit required confined space entry is not anticipated, however if confined space entry is required during field activities, AECOM will submit a site specific addendum for Confined Space Entry approved by the AECOM PM, SHM, and Area SHE Manager for review and approval by the USACE Authorized Representative.

16. Munitions and Explosives of concern and Anomaly Avoidance Plan

All field activities conducted in areas potentially impacted by MEC will be performed implementing MEC and anomaly avoidance processes in accordance with USACE EM 385-1-97. These processes will be implemented by a UXOQP meeting the requirements of DDESB TP-18.

17. Logs, Reports, and Recordkeeping

17.1 Required Documentation

The SSHO are responsible for site recordkeeping. All AECOM personnel and AECOM subcontractors will review the SSHP and sign the Personnel Acknowledgement form, daily site safety briefings, and any “toolbox” training topics. Copies of these forms will be maintained in the on-site project file.

All instrument readings and calibrations, PPE use and changes, health and safety-related issues, and deviations from or problems with this SSHP will be recorded in the Field Logbook.

Maintain an Inventory of Hazardous Materials and SDSs for all hazardous materials present on-site, including materials brought on-site by subcontractors.

In addition the following safety records will be maintained in the on-site project files. These records must be available in the event of an internal or external compliance audit.

- Fit Test Records, as appropriate
- HAZWOPER and Safety Training Records
- Medical Clearance Record
- S3AM-012-FM1 – First Aid Kit AED Inventory and Inspection– monthly inspection documentation
- Site Visitors Log
- Medical Emergency Contact Sheet
- OSHA Form 300A, Summary of Work Related Injuries and Illnesses
- USACE Form 3394 Version 2
- S3AM-209-FM6 – Task Hazard Assessment
- Any other site-specific permits, training records, or documentation

17.2 Behavior-Based Safety

Most accidents are due to unsafe behavior, and behavior changes can be made that significantly reduce accident risk. All field personnel and subcontractors are expected to value safety and be responsible for their safety as well as the safety of others. The SSHO is expected to provide clear safety expectations and positive and negative feedback for safe and unsafe behavior. Peers are expected to intervene upon an unsafe behavior and provide positive feedback for safe behavior.

17.3 Site Surveillance

Workers will continuously monitor site conditions and their work efforts; and will notify the SSHO if any unforeseen hazard becomes evident during field activities. The Project Manager or SSHO will communicate with on-site government representatives and determine if field activities can be continued in a safe manner.

17.4 Training Logs

Training logs will include initial site-specific safety training, daily safety briefings, weekly “toolbox” topic training, and visitor training. A record of the training will be documented on a training log, which will include the following information:

- The date
- Employee's name (attendance check)
- Time allocation in training session
- Training topic(s)
- Trainer(s) signature

17.5 Field Logbook

The SSHO will maintain a Field Logbook on-site in accordance with standard AECOM procedures. Complete and detailed documentation of site activities will be very important. The following information will be recorded on a daily basis:

- Site conditions (e.g., weather)
- Activities being performed
- Log of photographs taken
- Personnel on-site
- Site visitors
- Incidents, accident, and near misses

17.6 Mishap Reports

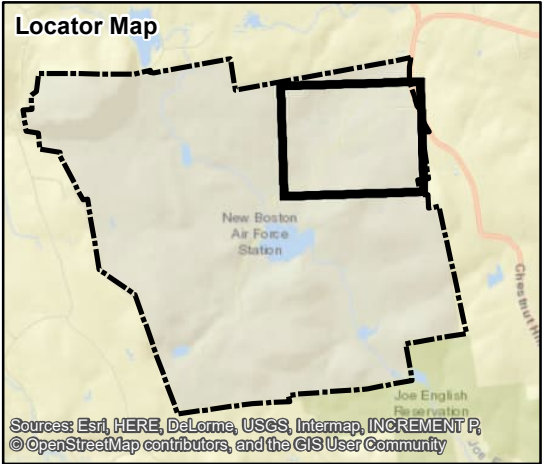
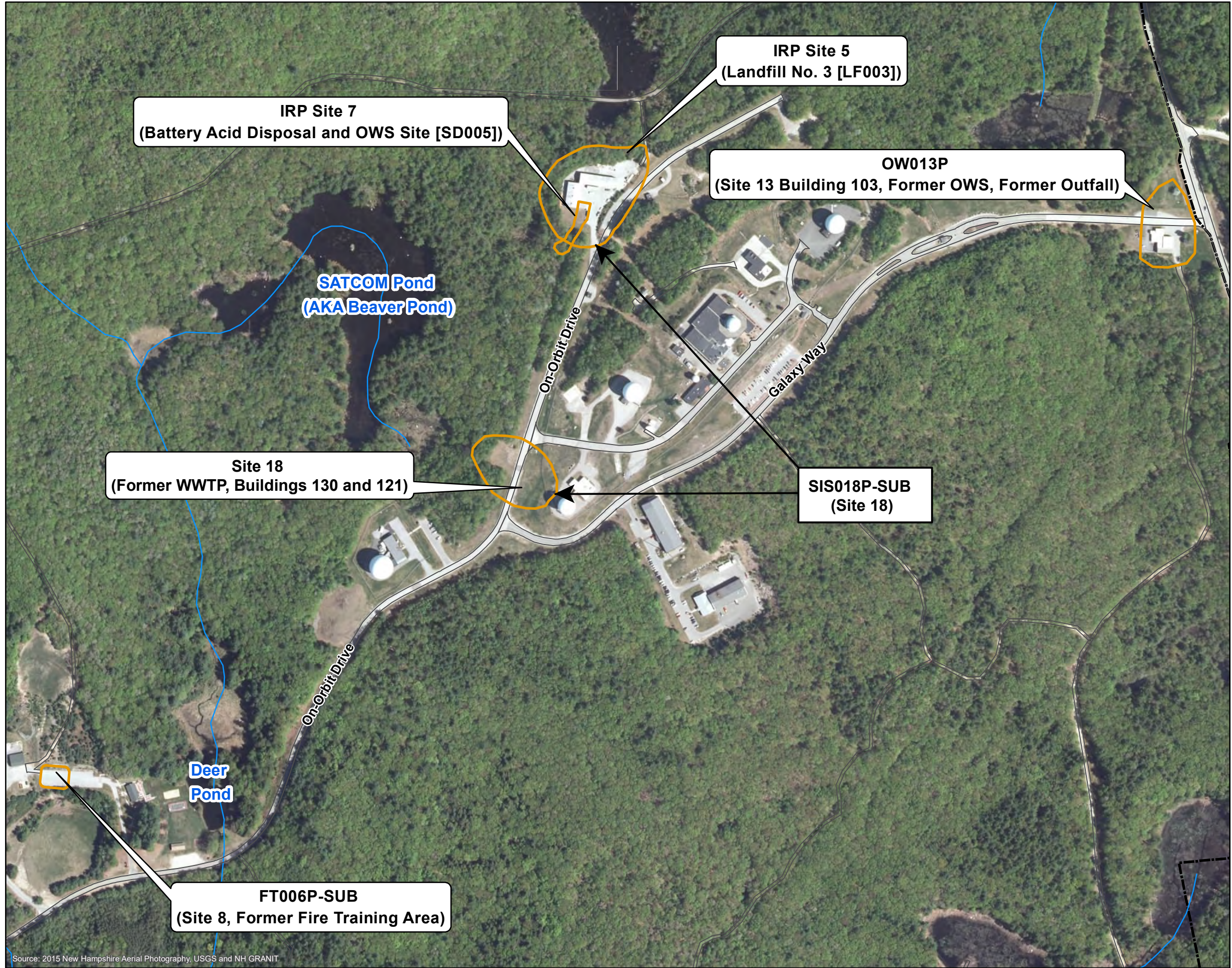
Mishap reporting procedures are presented in **Section 8** of the APP.

18. References

Code of Federal Regulations, Hazardous Waste Operations and Emergency Response, Title 29, Sec. 1910.120 and Sec. 1926.65

USACE. 2014. Safety and Health Requirements Manual, EM 385-1-1. 30 November.

Figures



Legend

- Installation Boundary
- AFFF Sites
- Road Area
- Stream

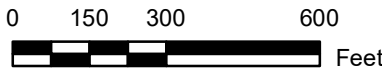


Figure 1

PFAS Phase I RI – Site Overview
FT006P-SUB, OW013P, and SIS18P-SUB
New Boston Space Force Station
New Boston, New Hampshire

Remedial Investigation for PFAS

AECOM

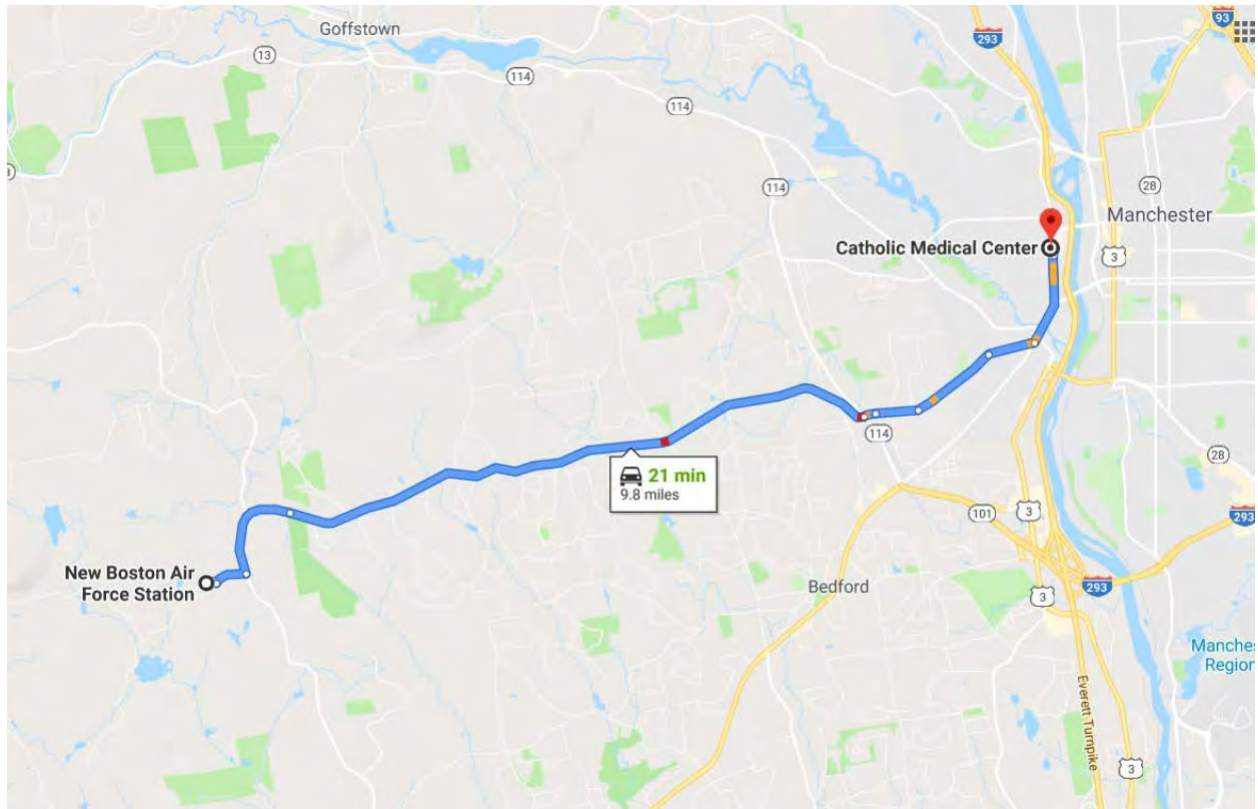
Project Number:
60692069

Drawn By:
NM

Attachment 1: Hospital Route Map

Hospital Route

NBSFS to Catholic Medical Center, Manchester, NH



1. Take unnamed road to Chestnut Hill Rd and head North (0.4 miles).
2. Keep right as the road curves to the East to New Boston Rd (6.6 miles).
3. Go straight at Route 114 intersection and continue on Donald Street, and take the first right off the roundabout to continue on Donald Street (1.4 miles).
4. Donald St turns right and becomes Milford Street. Stay on Milford Street (0.4 miles).
5. Turn left on S Main Street (0.9 miles).
6. Turn left at Foundry Street and the Catholic Medical Center is on your left.
8. Emergency entrance is in the northeast corner of the building.

Attachment 2: Personnel Acknowledgement

By signing below, the undersigned acknowledges that he/she has read and reviewed the Site Specific Health Plan for the PFAS RI at NBSFS. The undersigned also acknowledges that he/she has been instructed in the contents of this document and understands the information pertaining to the specified work, and will comply with the provisions contained therein.

[illegible]

Attachment 3: Safety Data Sheets

Material Safety Data Sheet

Methanol

ACC# 14280

Section 1 - Chemical Product and Company Identification

MSDS Name: Methanol

Catalog Numbers: AC167830000, AC167830025, AC167835000, AC176840000, AC176840010, AC176840025, AC176840250, AC176845000, AC177150000, AC177150050, AC177150051, AC177150250, AC177150251, AC268280000, AC268280010, AC325740000, AC325740010, AC325740025, AC326630000, AC326630010, AC326630025, AC326950000, AC326950010, AC326951000, AC326952500, AC327900000, AC327900010, AC364390000, AC364390010, AC364391000, AC364395000, AC413770000, AC413770040, AC423950000, AC610200040, AC61040019, AC61040050, AC61040050, AC61040115, AC61040115, AC61040200, AC611070040, AC615130025, 17715-0010, 17715-0025, 19123467, 26828-0025, 41377-5000, 42395-0010, 42395-0040, 42395-0200, 42395-5000, 61009-0040, 61040-0010, 61040-1000, 61098-1000, A408-1, A408-4, A408-4LC, A408SK-4, A411-20, A411-4, A412-1, A412-20, A412-200, A412-200LC, A412-4, A412-4LC, A412-500, A412200-001, A412CU-1300, A412FB-200, A412FB115, A412FB19, A412FB50, A412P-4, A412POP19, A412POPB-200, A412RB-200, A412RB-50, A412RB115, A412RS-200, A412RS115, A412RS19, A412RS28, A412RS50, A412SK-4, A412SS-115, A413-20, A413-200, A413-4, A413-500, A433P-4, A433S-20, A433S-200, A433S-4, A434-20, A450-4, A452-1, A452-4, A452-4LC, A452N1-19, A452N2-19, A452POP-200, A452POP50, A452RS-115, A452RS-19, A452RS-200, A452RS-28, A452RS-50, A452SK-1, A452SK-4, A452SS-19, A452SS-200, A452SS-28, A452SS-50, A453-1, A453-1LC, A453-500, A454-1, A454-4, A454-4LC, A454RS-115, A454RS-200, A454RS-28, A454SK-4, A454SS-200, A454SS-28, A455-1, A456-1, A456-4, A457-4, A4574LC, A935-4, A935RB-200, A947-4, A947-4LC, A947POP-200, A947RS-115, A947RS-200, A947RS-28, A947SS-115, A947SS-200, A947SS-28, A947SS-50, BP1105-1, BP1105-4, BP1105SS19, BP1105SS28, HC4001GAL, NC9173853, NC9386568, NC9433033, NC9433739, NC9514454, NC9516446, NC9535777, NC9541632, NC9598497, NC9620421, NC9942270, S75965HPLC, SC95-1, SW2-1, TIA947-4, TIA947P-200L

Synonyms: Carbinol; Methyl alcohol; Methyl hydroxide; Monohydroxymethane; Wood alcohol; Wood naptha; Wood spirits; Columbian spirits; Methanol.

Company Identification:

Fisher Scientific

1 Reagent Lane

Fair Lawn, NJ 07410

For information, call: 201-796-7100

Emergency Number: 201-796-7100

For CHEMTREC assistance, call: 800-424-9300

For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
67-56-1	Methanol	> 99	200-659-6

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: APHA: 10 max clear liquid. Flash Point: 12 deg C.

Danger! Poison! May be fatal or cause blindness if swallowed. Vapor harmful. **Flammable liquid and vapor.** Harmful if swallowed, inhaled, or absorbed through the skin. Causes eye, skin, and respiratory tract irritation. May cause central nervous system depression. Cannot be made non-poisonous.

Target Organs: Eyes, nervous system, optic nerve.

Potential Health Effects

Eye: May cause painful sensitization to light. Methanol is a mild to moderate eye irritant. Inhalation, ingestion or skin absorption of methanol can cause significant disturbances in vision, including blindness.

Skin: Causes moderate skin irritation. May be absorbed through the skin in harmful amounts.

Prolonged and/or repeated contact may cause defatting of the skin and dermatitis. Methanol can be absorbed through the skin, producing systemic effects that include visual disturbances.

Ingestion: May be fatal or cause blindness if swallowed. Aspiration hazard. Cannot be made non-poisonous. May cause gastrointestinal irritation with nausea, vomiting and diarrhea. May cause systemic toxicity with acidosis. May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. May cause cardiopulmonary system effects.

Inhalation: Methanol is toxic and can very readily form extremely high vapor concentrations at room temperature. Inhalation is the most common route of occupational exposure. At first, methanol causes CNS depression with nausea, headache, vomiting, dizziness and incoordination. A time period with no obvious symptoms follows (typically 8-24 hrs). This latent period is followed by metabolic acidosis and severe visual effects which may include reduced reactivity and/or increased sensitivity to light, blurred, double and/or snowy vision, and blindness. Depending on the severity of exposure and the promptness of treatment, survivors may recover completely or may have permanent blindness, vision disturbances and/or nervous system effects.

Chronic: Prolonged or repeated skin contact may cause dermatitis. Chronic exposure may cause effects similar to those of acute exposure. Methanol is only very slowly eliminated from the body. Because of this slow elimination, methanol should be regarded as a cumulative poison. Though a single exposure may cause no effect, daily exposures may result in the accumulation of a harmful amount. Methanol has produced fetotoxicity in rats and teratogenicity in mice exposed by inhalation to high concentrations that did not produce significant maternal toxicity.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid.

Skin: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid immediately. Wash clothing before reuse.

Ingestion: Potential for aspiration if swallowed. Get medical aid immediately. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.

Inhalation: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid.

Notes to Physician: Effects may be delayed.

Antidote: Ethanol may inhibit methanol metabolism.

Section 5 - Fire Fighting Measures

General Information: Ethanol may inhibit methanol metabolism. As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. Water may be ineffective. Material is lighter than water and a fire may be spread by the use of water. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.

Extinguishing Media: For small fires, use dry chemical, carbon dioxide, water spray or alcohol-resistant foam. Water may be ineffective. For large fires, use water spray, fog or alcohol-resistant foam. Do NOT use straight streams of water.

Flash Point: 12 deg C (53.60 deg F)

Autoignition Temperature: 455 deg C (851.00 deg F)

Explosion Limits, Lower: 6.0 vol %

Upper: 31.00 vol %

NFPA Rating: (estimated) Health: 1; **Flammability:** 3; **Instability:** 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/ Leaks: Use water spray to disperse the gas/vapor. Remove all sources of ignition. Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite. Do not use combustible materials such as sawdust. Use a spark-proof tool. Provide ventilation. A vapor suppressing foam may be used to reduce vapors. Water spray may reduce vapor but may not prevent ignition in closed spaces.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Do not ingest or inhale. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames. Use only with adequate ventilation. Keep away from heat, sparks and flame. Avoid use in confined spaces.

Storage: Keep away from heat, sparks, and flame. Keep away from sources of ignition. Store in a cool, dry, well-ventilated area away from incompatible substances. Flammables-area. Keep containers tightly closed.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Methanol	200 ppm TWA; 250 ppm STEL; Skin - potential significant contribution to overall exposure by the cutaneous route	200 ppm TWA; 260 mg/m ³ TWA 6000 ppm IDLH	200 ppm TWA; 260 mg/m ³ TWA

OSHA Vacated PELs: Methanol: 200 ppm TWA; 260 mg/m³ TWA

Personal Protective Equipment

Eyes: Wear chemical splash goggles.

Skin: Wear butyl rubber gloves, apron, and/or clothing.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: 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.

Section 9 - Physical and Chemical Properties

Physical State: Clear liquid

Appearance: clear, colorless - APHA: 10 max

Odor: alcohol-like - weak odor

pH: Not available.

Vapor Pressure: 128 mm Hg @ 20 deg C

Vapor Density: 1.11 (Air=1)

Evaporation Rate: 5.2 (Ether=1)

Viscosity: 0.55 cP 20 deg C

Boiling Point: 64.7 deg C @ 760 mmHg

Freezing/ Melting Point: -98 deg C

Decomposition Temperature: Not available.

Solubility: miscible

Specific Gravity/ Density: .7910 g/cm³ @ 20°C

Molecular Formula: CH₄O

Molecular Weight: 32.04

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: High temperatures, ignition sources, confined spaces.

Incompatibilities with Other Materials: Oxidizing agents, reducing agents, acids, alkali metals, potassium, sodium, metals as powders (e.g. hafnium, raney nickel), acid anhydrides, acid chlorides, powdered aluminum, powdered magnesium.

Hazardous Decomposition Products: Carbon monoxide, carbon dioxide, formaldehyde.

Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:

CAS# 67-56-1: PC1400000

LD50/ LC50:

CAS# 67-56-1:

Draize test, rabbit, eye: 40 mg Moderate;

Draize test, rabbit, eye: 100 mg/24H Moderate;

Draize test, rabbit, skin: 20 mg/24H Moderate;

Inhalation, rabbit: LC50 = 81000 mg/m³/14H;

Inhalation, rat: LC50 = 64000 ppm/4H;

Oral, mouse: LD50 = 7300 mg/kg;

Oral, rabbit: LD50 = 14200 mg/kg;
 Oral, rat: LD50 = 5600 mg/kg;
 Skin, rabbit: LD50 = 15800 mg/kg;

Human LDLo Oral: 143 mg/kg; Human LDLo Oral: 428 mg/kg; Human TCLo Inhalation; 300 ppm caused visual field changes & headache; Monkey LDLo Skin: 393 mg/kg. Methanol is significantly less toxic to most experimental animals than humans, because most animal species metabolize methanol differently. Non-primate species do not ordinarily show symptoms of metabolic acidosis or the visual effects which have been observed in primates and humans.

Carcinogenicity:

CAS# 67-56-1: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found

Teratogenicity: There is no human information available. Methanol is considered to be a potential developmental hazard based on animal data. In animal experiments, methanol has caused fetotoxic or teratogenic effects without maternal toxicity.

Reproductive Effects: See actual entry in RTECS for complete information.

Mutagenicity: See actual entry in RTECS for complete information.

Neurotoxicity: ACGIH cites neuropathy, vision and CNS under TLV basis.

Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Fathead Minnow: 29.4 g/L; 96 Hr; LC50 (unspecified) Fish: Goldfish: 250 ppm; 11 Hr; resulted in death Fish: Rainbow trout: 8000 mg/L; 48 Hr; LC50 (unspecified) Fish: Rainbow trout: LC50 = 13-68 mg/L; 96 Hr.; 12 degrees C Fish: Fathead Minnow: LC50 = 29400 mg/L; 96 Hr.; 25 degrees C, pH 7.63 Fish: Rainbow trout: LC50 = 8000 mg/L; 48 Hr.; Unspecified Bacteria: Phytobacterium phosphoreum: EC50 = 51,000-320,000 mg/L; 30 minutes; Microtox test No data available.

Environmental: Dangerous to aquatic life in high concentrations. Aquatic toxicity rating: TLM 96>1000 ppm. May be dangerous if it enters water intakes. Methyl alcohol is expected to biodegrade in soil and water very rapidly. This product will show high soil mobility and will be degraded from the ambient atmosphere by the reaction with photochemically produced hydroxyl radicals with an estimated half-life of 17.8 days. Bioconcentration factor for fish (golden ide) < 10. Based on a log Kow of -0.77, the BCF value for methanol can be estimated to be 0.2.

Physical: No information available.

Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3.

Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series:

CAS# 67-56-1: waste number U154 (Ignitable waste).

Section 14 - Transport Information

	US DOT	Canada TDG
	METHANOL	METHANOL

Shipping Name:		
Hazard Class:	3	3
UN Number:	UN1230	UN1230
Packing Group:	II	II
Additional Info:		FLASHPOINT 11 C

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 67-56-1 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 67-56-1: 5000 lb final RQ; 2270 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 67-56-1: immediate, fire.

Section 313

This material contains Methanol (CAS# 67-56-1, > 99%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 67-56-1 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 67-56-1 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

T F

Risk Phrases:

R 11 Highly flammable.

R 23/24/25 Toxic by inhalation, in contact with skin and if swallowed.

R 39/23/24/25 Toxic : danger of very serious irreversible effects through inhalation, in contact with skin and if swallowed.

Safety Phrases:

S 16 Keep away from sources of ignition - No smoking.

S 36/37 Wear suitable protective clothing and gloves.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

S 7 Keep container tightly closed.

WGK (Water Danger/ Protection)

CAS# 67-56-1: 1

Canada - DSL/ NDSL

CAS# 67-56-1 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of B2, D1B, D2B.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 67-56-1 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 7/21/1999

Revision #17 Date: 2/11/2008

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

Material Safety Data Sheet

Hydrochloric acid 32-38% solution

ACC# 11155

Section 1 - Chemical Product and Company Identification

MSDS Name: Hydrochloric acid 32-38% solution

Catalog Numbers: A142-212, A142P-19, A142P-20, A144-212, A144-212LC, A144-500, A144-500LB, A144-500LC, A144-612GAL, A144C-212, A144C-212EA, A144P-19, A144P-20, A144S-212, A144S-212EA, A144S-500, A144SI-212, A466-1, A466-2, A466-250, A466-2LC, A466-500, A481-212, A481-212LC, A508-212, A508-212LC, A508-4, A508-500, A508SK-212, AS481-212LC, NC9373124, S71942SC, S71942SCND, S71943, S71943ND, S80038, SA49

Synonyms: Muriatic acid; Chlorohydric acid; Hydrogen chloride in aqueous solution.

Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100

Emergency Number: 201-796-7100

For CHEMTREC assistance, call: 800-424-9300

For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7732-18-5	Water	62-68	231-791-2
7647-01-0	Hydrogen chloride	32-38	231-595-7

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear, colorless to pale yellow liquid.

Danger! Causes eye and skin burns. Causes digestive and respiratory tract burns. May be fatal if inhaled or swallowed. Repeated or prolonged exposure may cause erosion of exposed teeth.

Corrosive to metal.

Target Organs: Respiratory system, gastrointestinal system, teeth, eyes, skin.

Potential Health Effects

Eye: May cause irreversible eye injury. Vapor or mist may cause irritation and severe burns.

Contact with liquid is corrosive to the eyes and causes severe burns.

Skin: Contact with liquid is corrosive and causes severe burns and ulceration. The severity of injury depends on the concentration of the solution and the duration of exposure.

Ingestion: Causes severe digestive tract burns with abdominal pain, vomiting, and possible death. May cause corrosion and permanent tissue destruction of the esophagus and digestive tract.

Inhalation: May be fatal if inhaled. May cause severe irritation of the respiratory tract with sore throat, coughing, shortness of breath and delayed lung edema. Causes chemical burns to the

respiratory tract. Causes corrosive action on the mucous membranes.

Chronic: Prolonged or repeated skin contact may cause dermatitis. Repeated exposure may cause erosion of teeth. Repeated exposure to low concentrations of HCl vapor or mist may cause bleeding of nose and gums. Chronic bronchitis and gastritis have also been reported.

Section 4 - First Aid Measures

Eyes: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical aid immediately.

Skin: In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid immediately. Wash clothing before reuse.

Ingestion: If swallowed, do NOT induce vomiting. Get medical aid immediately. If victim is fully conscious, give a cupful of water. Never give anything by mouth to an unconscious person.

Inhalation: POISON material. If inhaled, get medical aid immediately. Remove victim to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

Notes to Physician: Do NOT use sodium bicarbonate in an attempt to neutralize the acid.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Water runoff can cause environmental damage. Dike and collect water used to fight fire. Not flammable, but reacts with most metals to form flammable hydrogen gas. Use water spray to keep fire-exposed containers cool. Vapors may be heavier than air. They can spread along the ground and collect in low or confined areas. Containers may explode when heated.

Extinguishing Media: Substance is noncombustible; use agent most appropriate to extinguish surrounding fire.

Flash Point: Not applicable.

Autoignition Temperature: Not applicable.

Explosion Limits, Lower: Not available.

Upper: Not available.

NFPA Rating: (estimated) Health: 3; Flammability: 0; Instability: 1

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Isolate area and deny entry. Provide ventilation. Spill may be carefully neutralized with lime (calcium oxide, CaO). A vapor suppressing foam may be used to reduce vapors. Approach spill from upwind.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse.

Contents may develop pressure upon prolonged storage. Do not get in eyes, on skin, or on clothing. Keep container tightly closed. Discard contaminated shoes. Keep away from strong bases and metals. Use caution when opening. Do not use with metal spatula or other metal items. Do not breathe vapor or mist. Use only with adequate ventilation or respiratory protection. Storage: Store in a cool, dry, well-ventilated area away from incompatible substances. Corrosives area. Do not store in metal containers. Store away from alkalis. Separate from oxidizing materials.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits. Use a corrosion-resistant ventilation system.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Water	none listed	none listed	none listed
Hydrogen chloride	2 ppm Ceiling	50 ppm IDLH	5 ppm Ceiling; 7 mg/m ³ Ceiling

OSHA Vacated PELs: Water: No OSHA Vacated PELs are listed for this chemical. Hydrogen chloride: No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes: Wear chemical splash goggles and face shield.

Skin: Wear appropriate gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: 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.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Appearance: clear, colorless to pale yellow

Odor: strong, pungent

pH: 0.01

Vapor Pressure: 84 mm Hg @ 20 deg C

Vapor Density: 1.27 (air=1)

Evaporation Rate: > 1.00 (N-butyl acetate)

Viscosity: Not available.

Boiling Point: 83 deg C @ 760 mmHg

Freezing/Melting Point: -66 deg C

Decomposition Temperature: Not available.

Solubility: Soluble.

Specific Gravity/Density: 1.19 (38%)

Molecular Formula: HCl.H₂O

Molecular Weight: 36.46

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Excess heat.

Incompatibilities with Other Materials: Metals, strong oxidizing agents, strong reducing agents, bases, acetic anhydride, alcohols, amines, sulfuric acid, vinyl acetate, epoxides (e.g. butyl glycidyl ether), chlorosulfonic acid, carbides, beta-propiolactone, ethyleneimine, propylene oxide, lithium silicides, 2-aminoethanol, 1,1-difluoroethylene, magnesium boride, mercuric sulfate, aldehydes, cyanides, sulfides, phosphides.

Hazardous Decomposition Products: Hydrogen chloride, chlorine, hydrogen gas.

Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:

CAS# 7732-18-5: ZC0110000

CAS# 7647-01-0: MW4025000; MW4031000

LD50/LC50:

CAS# 7732-18-5:

Oral, rat: LD50 = >90 mL/kg;

.

CAS# 7647-01-0:

Inhalation, mouse: LC50 = 1108 ppm/1H;

Inhalation, mouse: LC50 = 20487 mg/m³/5M;

Inhalation, mouse: LC50 = 3940 mg/m³/30M;

Inhalation, mouse: LC50 = 8300 mg/m³/30M;

Inhalation, rat: LC50 = 3124 ppm/1H;

Inhalation, rat: LC50 = 60938 mg/m³/5M;

Inhalation, rat: LC50 = 7004 mg/m³/30M;

Inhalation, rat: LC50 = 45000 mg/m³/5M;

Inhalation, rat: LC50 = 8300 mg/m³/30M;

Oral, rabbit: LD50 = 900 mg/kg;

.

Inhalation LC50 (aerosol) rat: 8300mg/m³/30M; Oral LDLo Man: 2857 ug/kg; Oral LDLo Woman: 420 uL/kg; Inhalation LCLo Human: 1300 ppm/30M.

Carcinogenicity:

CAS# 7732-18-5: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

CAS# 7647-01-0: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.

Teratogenicity: Female rats were exposed to 450 mg/m³ of HCl for 1 hour either prior to mating or on day 9 of pregnancy. Developmental effects were observed in the offspring. However, this exposure caused toxic effects, including mortality, in the mothers.

Reproductive Effects: No information available.

Mutagenicity: See actual entry in RTECS for complete information.

Neurotoxicity: No information available.

Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Bluegill/Sunfish: 3.6 mg/L; 48Hr; Lethal (unspecified) Fish: Bluegill/Sunfish: LC50; 96 Hr; pH 3.0-3.5 No data available.

Environmental: Will exhibit extensive evaporation from soil surfaces. Upon transport through the soil, hydrochloric acid will dissolve some of the soil materials (especially those with carbonate bases) and the acid will neutralize to some degree.

Physical: No information available.

Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	HYDROCHLORIC ACID	HYDROCHLORIC ACID
Hazard Class:	8	8
UN Number:	UN1789	UN1789
Packing Group:	II	II

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 7732-18-5 is listed on the TSCA inventory.

CAS# 7647-01-0 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 7647-01-0: 5000 lb final RQ; 2270 kg final RQ

SARA Section 302 Extremely Hazardous Substances

CAS# 7647-01-0: 500 lb TPQ (gas only)

SARA Codes

CAS # 7647-01-0: immediate.

Section 313

This material contains Hydrogen chloride (CAS# 7647-01-0, 32-38%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 7647-01-0 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 7647-01-0 is listed as a Hazardous Substance under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

CAS# 7647-01-0 is considered highly hazardous by OSHA.

STATE

CAS# 7732-18-5 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

CAS# 7647-01-0 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

C

Risk Phrases:

R 34 Causes burns.

R 37 Irritating to respiratory system.

Safety Phrases:

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/Protection)

CAS# 7732-18-5: No information available.

CAS# 7647-01-0: 1

Canada - DSL/NDSL

CAS# 7732-18-5 is listed on Canada's DSL List.

CAS# 7647-01-0 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of E, D1A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 7647-01-0 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 7/06/1999

Revision #20 Date: 4/01/2008

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any

special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

Material Safety Data Sheet

Nitric acid, 20-70%

ACC# 16550

Section 1 - Chemical Product and Company Identification

MSDS Name: Nitric acid, 20-70%

Catalog Numbers: AC124660000, AC124660010, AC124660011, AC124660025, AC124660026, AC124665000, AC124665001, AC133620000, AC133620010, AC133620011, AC133620025, AC133620026, AC424000000, AC424000025, AC424000026, AC424000250, AC424005000, AC424005001, AC613205000, A198C-212, A198C4X-212, A200-212, A200-500, A200-500LC, A200-612GAL, A200212LC, A200C-212, A200C212EA, A200C212LC, A200C4X-212, A200C4X212L, A200S-212, A200S-500, A200S212LC, A200SI-212, A206C-212, A206C4X-212, A467-1, A467-2, A467-250, A467-500, A483-212, A509-212, A509-212LC, A509-500, A509SK-212, A509SK-212LC, MCC-030822, NC9596579, S719721, S71972SC

Synonyms: Azotic acid; Engraver's acid; Aqua fortis.

Company Identification:

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100

Emergency Number: 201-796-7100

For CHEMTREC assistance, call: 800-424-9300

For International CHEMTREC assistance, call: 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
7732-18-5	Water	30-80	231-791-2
7697-37-2	Nitric acid	20-70	231-714-2

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear to yellow liquid.

Danger! May be fatal if inhaled. Causes severe eye and skin burns. Causes severe respiratory and digestive tract burns. Strong oxidizer. Contact with other material may cause a fire. Acute pulmonary edema or chronic obstructive lung disease may occur from inhalation of the vapors of nitric acid. Corrosive to metal.

Target Organs: Lungs, eyes, skin, mucous membranes.

Potential Health Effects

Eye: Causes severe eye burns. Direct contact with liquid may cause blindness or permanent eye damage.

Skin: Causes skin burns. May cause deep, penetrating ulcers of the skin. Concentrated nitric acid dyes human skin yellow on contact.

Ingestion: May cause severe and permanent damage to the digestive tract. Causes gastrointestinal tract burns. May cause perforation of the digestive tract. May cause systemic effects.

Inhalation: Effects may be delayed. Causes chemical burns to the respiratory tract. Inhalation may be fatal as a result of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema. Aspiration may lead to pulmonary edema. May cause systemic effects. May cause acute pulmonary edema, asphyxia, chemical pneumonitis, and upper airway obstruction caused by edema. Depending on the conditions, the vapor or fumes of nitric acid may actually be a mixture of nitric acid and various oxides of nitrogen. The composition may vary with temperature, humidity, and contact with other organic materials.

Chronic: Exposure to high concentrations of nitric acid vapor may cause pneumonitis and pulmonary edema which may be fatal. Symptoms may or may not be delayed. Continued exposure to the vapor & mist of nitric acid may result in a chronic bronchitis, & more severe exposure results in a chemical pneumonitis. The vapor & mists of nitric acid may erode the teeth, particularly affecting the canines & incisors.

Section 4 - First Aid Measures

Eyes: Get medical aid immediately. Do NOT allow victim to rub eyes or keep eyes closed. Extensive irrigation with water is required (at least 30 minutes).

Skin: Get medical aid immediately. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Destroy contaminated shoes.

Ingestion: Do not induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately.

Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Do NOT use mouth-to-mouth resuscitation. If breathing has ceased apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.

Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Strong oxidizer. Contact with other material may cause fire. During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion. Use water spray to keep fire-exposed containers cool. May react with metal surfaces to form flammable and explosive hydrogen gas.

Approach fire from upwind to avoid hazardous vapors and toxic decomposition products.

Extinguishing Media: Use extinguishing media most appropriate for the surrounding fire.

Flash Point: Not applicable.

Autoignition Temperature: Not available.

Explosion Limits, Lower: Not available.

Upper: Not available.

NFPA Rating: (estimated) Health: 4; Flammability: 0; Instability: 0; Special Hazard: OX

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Avoid runoff into storm sewers and ditches which lead to waterways. Clean up spills immediately, observing precautions in the Protective Equipment section. Absorb spill using an absorbent, non-combustible material such as earth, sand, or vermiculite. Do not use combustible materials such as sawdust. Provide ventilation. Evacuate unnecessary personnel. Approach spill from upwind. Use water spray to cool and disperse vapors and protect personnel.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Do not breathe dust, mist, or vapor. Do not get in eyes, on skin, or on clothing. Keep container tightly closed. Avoid contact with clothing and other combustible materials. Discard contaminated shoes. Do not use with metal spatula or other metal items. Use only with adequate ventilation or respiratory protection.

Storage: Do not store near combustible materials. Do not store in direct sunlight. Keep container closed when not in use. Store in a cool, dry, well-ventilated area away from incompatible substances. Keep away from metals. Store away from alkalies. Separate from organic materials. Inspect periodically for damage or evidence of leaks or corrosion.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits. Use a corrosion-resistant ventilation system.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Water	none listed	none listed	none listed
Nitric acid	2 ppm TWA; 4 ppm STEL	2 ppm TWA; 5 mg/m ³ TWA 25 ppm IDLH	2 ppm TWA; 5 mg/m ³ TWA

OSHA Vacated PELs: Water: No OSHA Vacated PELs are listed for this chemical. Nitric acid: 2 ppm TWA; 5 mg/m³ TWA

Personal Protective Equipment

Eyes: Wear chemical splash goggles and face shield.

Skin: Wear butyl rubber gloves, apron, and/or clothing.

Clothing: Wear appropriate clothing to prevent skin exposure.

Respirators: 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.

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Appearance: clear to yellow

Odor: strong odor - acrid odor - suffocating odor

pH: 1.0 (0.1M soln)

Vapor Pressure: 51 mm Hg @ 25 deg C
Vapor Density: 2.17 (air=1)
Evaporation Rate: Not available.
Viscosity: 0.761 cps @ 25 deg C
Boiling Point: 86 deg C
Freezing/Melting Point: -42 deg C
Decomposition Temperature: Not available.
Solubility: Soluble in water.
Specific Gravity/Density: 1.4
Molecular Formula: HNO₃
Molecular Weight: 63.01

Section 10 - Stability and Reactivity

Chemical Stability: Stable. Decomposes when in contact with air, light, or organic matter. The yellow color is due to release of nitrogen dioxide on exposure to light.
Conditions to Avoid: High temperatures, light, confined spaces.
Incompatibilities with Other Materials: Metals, reducing agents, strong bases, acetic acid, alcohols, acetone, aniline, hydrogen sulfide, metal powders, carbides, aldehydes, organic solvents, combustible materials, chromic acid, flammable liquids, cyanides, sulfides, Incompatible with many substances.
Hazardous Decomposition Products: Nitrogen oxides.
Hazardous Polymerization: Has not been reported.

Section 11 - Toxicological Information

RTECS#:
CAS# 7732-18-5: ZC0110000
CAS# 7697-37-2: QU5775000; QU5900000
LD50/LC50:
CAS# 7732-18-5:
Oral, rat: LD50 = >90 mL/kg;
.

CAS# 7697-37-2:
Inhalation, rat: LC50 = 260 mg/m³/30M;
Inhalation, rat: LC50 = 130 mg/m³/4H;
Inhalation, rat: LC50 = 67 ppm(NO₂)/4H;
.

Carcinogenicity:
CAS# 7732-18-5: Not listed by ACGIH, IARC, NTP, or CA Prop 65.
CAS# 7697-37-2: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No information found
Teratogenicity: No information found
Reproductive Effects: No information found
Mutagenicity: No information found
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: No data available. No information available.

Environmental: Terrestrial: During transport through the soil, nitric acid will dissolve some of the soil material, in particular, the carbonate based materials. The acid will be neutralized to some degree with adsorption of the proton also occurring on clay materials. However, significant amounts of acid are expected to remain for transport down toward the ground water table. Upon reaching the ground water table, the acid will continue to move, now in the direction of the ground water flow.

Physical: No information available.

Other: No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	NITRIC ACID	NITRIC ACID
Hazard Class:	8	8
UN Number:	UN2031	UN2031
Packing Group:	II	II

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 7732-18-5 is listed on the TSCA inventory.

CAS# 7697-37-2 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 7697-37-2: 1000 lb final RQ; 454 kg final RQ

SARA Section 302 Extremely Hazardous Substances

CAS# 7697-37-2: 1000 lb TPQ

SARA Codes

CAS # 7697-37-2: immediate, delayed, fire.

Section 313

This material contains Nitric acid (CAS# 7697-37-2, 20-70%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

This material does not contain any hazardous air pollutants.

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

CAS# 7697-37-2 is listed as a Hazardous Substance under the CWA.

None of the chemicals in this product are listed as Priority Pollutants under the CWA.

None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

CAS# 7697-37-2 is considered highly hazardous by OSHA.

STATE

CAS# 7732-18-5 is not present on state lists from CA, PA, MN, MA, FL, or NJ.

CAS# 7697-37-2 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

C

Risk Phrases:

R 35 Causes severe burns.

Safety Phrases:

S 23 Do not inhale gas/fumes/vapour/spray.

S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S 36 Wear suitable protective clothing.

S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

WGK (Water Danger/Protection)

CAS# 7732-18-5: No information available.

CAS# 7697-37-2: 1

Canada - DSL/NDSL

CAS# 7732-18-5 is listed on Canada's DSL List.

CAS# 7697-37-2 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of E, C, D1A.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 7697-37-2 is listed on the Canadian Ingredient Disclosure List.

Section 16 - Additional Information

MSDS Creation Date: 9/30/1998

Revision #16 Date: 2/11/2008

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

Safety Data Sheet

according to 1907/2006/EC (REACH),
1272/2008/EC (CLP), and GHS

Printing date 25.05.2012

Revision: 24.05.2012

1 Identification of the Substance/mixture and of the Company/Undertaking

1.1 Product identifierTrade name: **LIQUINOX**

Application of the substance / the preparation: Hand detergent

1.3 Details of the supplier of the Safety Data Sheet**Manufacturer/Supplier:**

Alconox, Inc.

30 Glenn St., Suite 309

White Plains, NY 10603

Phone: 914-948-4040

Further information obtainable from: Product Safety Department

**1.4 Emergency telephone number:**

ChemTel Inc.

(800)255-3924, +1 (813)248-0585

2 Hazards Identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008



GHS07

Skin Irrit. 2: H315: Causes skin irritation.

Eye Irrit. 2: H319: Causes serious eye irritation.

Classification according to Directive 67/548/EEC or Directive 1999/45/EC



Xi; Irritant

R36/38: Irritating to eyes and skin.

Information concerning particular hazards for human and environment:

The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.

Classification system:

The classification is according to the latest editions of the EU-lists, and extended by company and literature data

2.2 Label elements**Labelling according to Regulation (EC) No 1272/2008**

The product is classified and labelled according to the CLP regulation.

Hazard pictograms

GHS07

Signal word: Warning

Hazard-determining components of labelling:

Benzenesulfonic Acid, Sodium Salts

Hazard statements:

H315 Causes skin irritation.

H319 Causes serious eye irritation.

(Contd. on page 2)

Safety Data Sheet

according to 1907/2006/EC (REACH),
1272/2008/EC (CLP), and GHS

Printing date 25.05.2012

Revision: 23.05.2012

Trade name: LIQUINOX

(Contd. of page 1)

Precautionary statements:

- P280 Wear protective gloves/protective clothing/eye protection/face protection.
 P264 Wash thoroughly after handling.
 P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 P321 Specific treatment (see on this label).
 P362 Take off contaminated clothing and wash before reuse.
 P332+P313 If skin irritation occurs: Get medical advice/attention.
 P337+P313 If eye irritation persists: Get medical advice/attention.
 P302+P352 IF ON SKIN: Wash with plenty of soap and water.

Hazard description:**WHMIS-symbols:**

D2B - Toxic material causing other toxic effects

**NFPA ratings (scale 0 - 4)****HMIS-ratings (scale 0 - 4)**

HEALTH	1	Health = 1
FIRE	0	Fire = 0
REACTIVITY	0	Reactivity = 0

2.3 Other hazards**Results of PBT and vPvB assessment**

PBT: Not applicable.

vPvB: Not applicable.

3 Composition/Information on Ingredients

3.2 Mixtures**Description:** Mixture of substances listed below with nonhazardous additions.**Dangerous components:**

CAS: 68081-81-2	Benzenesulfonic Acid, Sodium Salts ■ Xi R38-41	10-25%
	⚠ Eye Dam. 1, H318	
	⚠ Skin Irrit. 2, H315	
CAS: 1300-72-7 EINECS: 215-090-9	Sodium xylenesulphonate ■ Xi R36/37/38	2.5-10%
	⚠ Skin Irrit. 2, H315; Eye Irrit. 2, H319; STOT SE 3, H335	
CAS: 84133-50-6	Alcohol Ethoxylate ■ Xi R36/38	2.5-10%
	⚠ Skin Irrit. 2, H315	

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CAS: 68603-42-9 EINECS: 271-657-0	Coconut diethanolamide Xi R36/38	2.5-10%
CAS: 17572-97-3 EINECS: 241-543-5	Ethylenediaminetetraacetic acid, tripotassium salt Xi R36/37/38	2.5-10%

Additional information: For the wording of the listed risk phrases refer to section 16.

4 First Aid Measures

4.1 Description of first aid measures

General information:

Take affected persons out into the fresh air.

After inhalation:

Supply fresh air; consult doctor in case of complaints.

After skin contact:

Immediately wash with water and soap and rinse thoroughly.

If skin irritation continues, consult a doctor.

After eye contact:

Remove contact lenses if worn.

Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.

After swallowing:

Do not induce vomiting; call for medical help immediately.

Rinse out mouth and then drink plenty of water.

A person vomiting while laying on their back should be turned onto their side.

4.2 Most important symptoms and effects, both acute and delayed:

No further relevant information available.

4.3 Indication of any immediate medical attention and special treatment needed:

No further relevant information available.

5 Firefighting Measures

5.1 Extinguishing media:

Suitable extinguishing agents:

CO₂, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

5.2 Special hazards arising from the substance or mixture:

No further relevant information available.

5.3 Advice for firefighters:

Protective equipment:

Wear self-contained respiratory protective device.

Wear fully protective suit.

6 Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures:

Ensure adequate ventilation

Particular danger of slipping on leaked/spilled product.

6.2 Environmental precautions:

Dilute with plenty of water.

Do not allow to enter sewers/ surface or ground water.

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Trade name: LIQUINOX

(Contd. of page 3)

6.3 Methods and material for containment and cleaning up:

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust). Clean the affected area carefully; suitable cleaners are:

Warm water

6.4 Reference to other sections:

See Section 7 for information on safe handling.

See Section 8 for information on personal protection equipment.

See Section 13 for disposal information

7 Handling and Storage

7.1 Precautions for safe handling:

No special measures required.

Information about fire - and explosion protection:

No special measures required.

7.2 Conditions for safe storage, including any incompatibilities:**Storage:**

Requirements to be met by storerooms and receptacles: No special requirements.

Information about storage in one common storage facility: Not required.

Further information about storage conditions: None

7.3 Specific end use(s): No further relevant information available.

8 Exposure Controls/Personal Protection

Additional information about design of technical facilities: No further data; see item 7.

8.1 Control parameters**Ingredients with limit values that require monitoring at the workplace:**

The product does not contain any relevant quantities of materials with critical values that have to be monitored at the workplace.

Additional information: The lists valid during the making were used as basis.

8.2 Exposure controls:**Personal protective equipment:****General protective and hygienic measures:**

Keep away from foodstuffs, beverages and feed.

Immediately remove all soiled and contaminated clothing.

Wash hands before breaks and at the end of work.

Avoid contact with the eyes and skin.

Respiratory protection:

Not required.

Protection of hands:

Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.

Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.

Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation

(Contd. on page 5)

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(Contd. of page 4)

Material of gloves:

Natural rubber, NR

Nitrile rubber, NBR

Neoprene gloves

The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material cannot be calculated in advance and has therefore to be checked prior to the application.

Penetration time of glove material:

The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

Eye protection:

Safety glasses

Goggles recommended during refilling

9 Physical and Chemical Properties

9.1 Information on basic physical and chemical properties:**General Information:****Appearance:****Form:**

Liquid

Colour:

Light yellow

Odour:

Odourless

Odour threshold:

Not determined.

pH-value at 20°C:

8.5

Change in condition:**Melting point/Melting range:**

Undetermined.

Boiling point/Boiling range:

100°C

Flash point:

Not applicable.

Flammability (solid, gaseous):

Not applicable.

Ignition temperature:**Decomposition temperature:**

Not determined.

Self-igniting:

Product is not selfigniting.

Danger of explosion:

Product does not present an explosion hazard.

Explosion limits:**Lower:**

Not determined.

Upper:

Not determined.

Vapour pressure at 20°C:

23 hPa

Density at 20°C:1.08 g/cm³**Relative density:**

Not determined.

Vapour density:

Not determined.

Evaporation rate:

Not determined.

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1272/2008/EC (CLP), and GHS

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Trade name: LIQUINOX

(Contd. of page 5)

Solubility in / Miscibility with water:	Fully miscible.
Segregation coefficient (n-octanol/water):	Not determined.
Viscosity:	
Dynamic:	Not determined.
Kinematic:	Not determined.
9.2 Other information:	No further relevant information available

10 Stability and Reactivity

10.1 Reactivity:

10.2 Chemical stability:

Thermal decomposition / conditions to be avoided:

No decomposition if used according to specifications.

10.3 Possibility of hazardous reactions:

Reacts with strong oxidizing agents.

Reacts with strong acids.

10.4 Conditions to avoid:

No further relevant information available.

10.5 Incompatible materials:

No further relevant information available.

10.6 Hazardous decomposition products:

Carbon monoxide and carbon dioxide

Sulphur oxides (SO_x)

Nitrogen oxides

11 Toxicological Information

11.1 Information on toxicological effects:

Acute toxicity:**Primary irritant effect:****On the skin:** Irritant to skin and mucous membranes.**On the eye:** Strong irritant with the danger of severe eye injury.**Sensitization:** No sensitizing effects known.**Additional toxicological information:**

The product shows the following dangers according to the calculation method of the General EU Classification Guidelines for Preparations as issued in the latest version:

Irritant

12 Ecological Information

12.1 Toxicity:

Aquatic toxicity: No further relevant information available.**12.2 Persistence and degradability:** No further relevant information available.**12.3 Bioaccumulative potential:** No further relevant information available.**12.4 Mobility in soil:** No further relevant information available.**Additional ecological information:****General notes:**

Water hazard class 1 (German Regulation) (Self-assessment): slightly hazardous for water.

Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.

Must not reach sewage water or drainage ditch undiluted or unneutralized.

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Trade name: LIQUINOX

(Contd. of page 6)

12.5 Results of PBT and vPvB assessment:

PBT: Not applicable.

vPvB: Not applicable.

12.6 Other adverse effects: No further relevant information available.**13 Disposal Considerations****13.1 Waste treatment methods:****Recommendation:**

Smaller quantities can be disposed of with household waste.

Small amounts may be diluted with plenty of water and washed away. Dispose of bigger amounts in accordance with Local Authority requirements.

The surfactant used in this product complies with the biodegradability criteria as laid down in Regulation (EC) No. 648/2004 on detergents. Data to support this assertion are held at the disposal of the competent authorities of the Member States and will be made available to them, at their direct request or at the request of a detergent manufacturer.

Uncleaned packaging:**Recommendation:** Disposal must be made according to official regulations.**Recommended cleansing agents:** Water, if necessary together with cleansing agents.**14 Transport Information****14.1 UN-Number:**

DOT, ADR, ADN, IMDG, IATA, ICAO: Not Regulated

14.2 UN proper shipping name:

DOT, ADR, ADN, IMDG, IATA, ICAO: Not Regulated

14.3 Transport hazard class(es):

DOT, ADR, ADN, IMDG, IATA, ICAO: Not Regulated

14.4 Packing group:

DOT, ADR, AND, IMDG, IATA, ICAO: Not Regulated

14.5 Environmental hazards:**Marine pollutant:** No**14.6 Special precautions for user:** Not applicable.**14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code:** Not applicable.**UN "Model Regulation":** Not Regulated**15 Regulatory Information****15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture:****United States (USA):****SARA:****Section 355 (extremely hazardous substances):**

None of the ingredients is listed.

Section 313 (Specific toxic chemical listings):

None of the ingredients is listed.

TSCA (Toxic Substances Control Act):

All ingredients are listed.

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Proposition 65 (California):**Chemicals known to cause cancer:**

None of the ingredients is listed.

Chemicals known to cause reproductive toxicity for females:

None of the ingredients is listed.

Chemicals known to cause reproductive toxicity for males:

None of the ingredients is listed.

Chemicals known to cause developmental toxicity:

None of the ingredients is listed.

Carcinogenic Categories:**EPA (Environmental Protection Agency):**

None of the ingredients is listed.

TLV (Threshold Limit Value established by ACGIH):

None of the ingredients is listed.

NIOSH-Ca (National Institute for Occupational Safety and Health):

None of the ingredients is listed.

OSHA-Ca (Occupational Safety & Health Administration):

None of the ingredients is listed.

Canadá:**Canadian Domestic Substances List (DSL):**

All ingredients are listed.

Canadian Ingredient Disclosure list (limit 0.1%):

None of the ingredients is listed.

Canadian Ingredient Disclosure list (limit 1%):

None of the ingredients is listed.

15.2 Chemical safety assessment: A Chemical Safety Assessment has not been carried out.**16 Other Information**

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

Relevant phrases:

H315 Causes skin irritation.

H318 Causes serious eye damage.

H319 Causes serious eye irritation.

H335 May cause respiratory irritation.

R36/37/38 Irritating to eyes, respiratory system and skin.

R36/38 Irritating to eyes and skin.

R38 Irritating to skin.

R41 Risk of serious damage to eyes.

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Safety Data Sheet
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1272/2008/EC (CLP), and GHS

Printing date 25.05.2012

Revision: 23.05.2012

Trade name: LIQUINOX

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Abbreviations and Acronyms

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
ACGIH: American Conference of Governmental Industrial Hygienists
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
VOC: Volatile Organic Compounds (USA, EU)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent

Attachment 2 – Activity Hazard Analyses

ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task: COVID 19 Exposure Control	Overall Risk Assessment Code (RAC)				4																																					
Project & Location: Phase I Remedial Investigation of PFAS, NBSFS, New Boston, NH	<table border="1"> <tr> <th colspan="2" rowspan="2">Risk Assessment Code (RAC) Matrix</th> <th colspan="4">Mishap Probability Subcategory</th> </tr> <tr> <th>A. Likely to occur immediately or within a short period of time.</th> <th>B. Probably will occur in time.</th> <th>C. May occur in time.</th> <th>D. Unlikely to occur.</th> </tr> <tr> <td rowspan="4">Hazard Severity Category</td> <td>I. May cause death, permanent total disability, or loss of a facility/asset.</td> <td>1</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>II. May cause permanent partial disability, temporary total disability in excess of 90 days, or major property damage.</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>III. May cause minor injury, occupational illness, or property damage.</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> <tr> <td>IV. Presents minimal threat to personnel safety or health, or property, but is still in violation of a standard.</td> <td>3</td> <td>4</td> <td>5</td> <td>5</td> </tr> <tr> <td colspan="5"> Step 1: Identify each Job Step required for the Task that presents a hazard to those performing it Step 2: Identify the Hazards associated with each Job Step Step 3: Determine the unmitigated (uncontrolled) RAC based on the matrix above for each Job Step Step 4: Identify the Controls that will be implemented to mitigate the Hazards associated with each Job Step Step 5: Determine the mitigated RAC for each Controlled Hazard on the matrix above Step 6: Identify the Overall RAC for the Task based upon the highest mitigated RAC. </td> <td> RAC Definitions 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible </td> </tr> </table>					Risk Assessment Code (RAC) Matrix		Mishap Probability Subcategory				A. Likely to occur immediately or within a short period of time.	B. Probably will occur in time.	C. May occur in time.	D. Unlikely to occur.	Hazard Severity Category	I. May cause death, permanent total disability, or loss of a facility/asset.	1	1	2	3	II. May cause permanent partial disability, temporary total disability in excess of 90 days, or major property damage.	1	2	3	4	III. May cause minor injury, occupational illness, or property damage.	2	3	4	5	IV. Presents minimal threat to personnel safety or health, or property, but is still in violation of a standard.	3	4	5	5	Step 1: Identify each Job Step required for the Task that presents a hazard to those performing it Step 2: Identify the Hazards associated with each Job Step Step 3: Determine the unmitigated (uncontrolled) RAC based on the matrix above for each Job Step Step 4: Identify the Controls that will be implemented to mitigate the Hazards associated with each Job Step Step 5: Determine the mitigated RAC for each Controlled Hazard on the matrix above Step 6: Identify the Overall RAC for the Task based upon the highest mitigated RAC.					RAC Definitions 1-Critical 2-Serious 3-Moderate 4-Minor 5-Negligible
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Contract Number: W912WJ-19-D-0003 Delivery Order: W912WJ22F0102																																										
Date Prepared: 01/13/23																																										
Prepared by (Name/Title): Richard Purdy/SH&E Specialist																																										
Reviewed by (Name/Title):																																										
Notes: (Field Notes, Review Comments, etc.)																																										
1. All field tasks will be proceeded with a daily tailgate meeting where the following will be discussed: <ul style="list-style-type: none"> Site Safety and Health Officer (SSHO) will ensure that all field personnel have donned the appropriate PPE (items 2 and 3, below), including sunscreen (minimum SPF of 30) and insect repellent as necessary. Discussed tasks to be performed, including review of all pertinent AHAs covering potential hazards and control measures. Make modifications to AHAs, as necessary. Review pertinent SDSs (item 4, below). All field workers will be informed of emergency contact information and hospital routes. Upon completion of the tailgate, all personnel will sign form, acknowledging attendance of tailgate meeting and presence onsite. 2. Required Supplies: <ul style="list-style-type: none"> Potable water and soap (preferable) or hand sanitizer w/ 70% alcohol Face Coverings Paper towels Disinfectant wipes Tissues Nitrile gloves Safety glasses or goggles Disinfectant spray 																																										

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
1. Fitness for Duty check (performed at home prior to work)	<ul style="list-style-type: none"> Being unfit for duty – impacted by illness including coronavirus 	4	<p>1a. Ensure you are fit for duty</p> <p>Are you or have you been in any of these situations?</p> <ul style="list-style-type: none"> I am unvaccinated and have had close contact with a confirmed case or a symptomatic person under investigation for coronavirus in the last 14 days. A doctor requested me to be tested for coronavirus or instructed me to self-quarantine? A member of my household or someone I was in close contact within the last 14 days experienced some of the following symptoms: fever, cough, shortness of breath, fatigue, sore throat, chills, gastro-intestinal disease or diarrhea, loss of taste/smell. I have or previously had some of the following symptoms in the last 7 days: fever or chills, cough, shortness of breath or difficulty breathing, fatigue, muscle or body ache, headache, new loss of taste/smell, sore throat, congestion or runny nose, nausea or vomiting, or diarrhea.. Where required, my temperature check today shows a fever, without the use of fever reducing medications in the last 24 hours? (100.4 F [37.8C] or above or exceeding criteria required by local order or client requirements). <p>If response is a YES, then do not access the workplace. If AECOM employee, contact your Supervisor and the AECOM Nurse at 512-419-5016 for advice.</p> <p>If response is a NO or Yes, but released by AECOM nurse, you can proceed to work. You may be asked to check your temperature again when you arrive to your workplace.</p>	5
2. Planning the trip	<ul style="list-style-type: none"> Potential exposure to Coronavirus 	4	<p>2a. Map route in advance to minimize the potential for exposure and utilize the least populated route of travel where feasible. Avoid entering public places whenever possible. Review vaccination, mask mandate requirements, etc, at destination and for any likely stops along the way and plan to adhere to these requirements. If traveling to an AECOM office, complete Voluntary Vaccine Declaration Form (if you are vaccinated) to be permitted in offices without face coverings where legally permitted.</p>	5
3. Hazards from travel (via vehicle, air travel, public transit, etc)	<ul style="list-style-type: none"> Possible exposure from vehicle passengers. Possible exposure from airline/transit agency travel 	2	<p>a. Carpooling is permitted if users voluntarily share that they are both vaccinated; if not, limit to one person per vehicle whenever possible. If an unvaccinated passenger must ride with you, limit to one passenger and have them sit in the rear passenger side seat. Unvaccinated individuals must wear face coverings. Crack and/or open windows and use fan to recirculate air.</p> <p>3b. Review airline or transit agency guidelines for additional safety precautions that may be applicable. When possible, consider traveling during non-peak hours when there are likely to be fewer people. Follow social distancing guidelines by staying at least 6 feet (2 meters) from people who are not from your household. In enclosed spaces with other passengers, unvaccinated individuals must wear a face covering and others should consider wearing one as well.</p>	4
4. Stopping for restroom breaks and food, fueling, supplies, etc	<ul style="list-style-type: none"> Possible exposure due to contact with members of the general public at gas stations, convenience stores, restrooms, etc. 	2	<p>4a. Plan trip to reduce the need to stop for food or restroom breaks. Bring your own food/water/snacks if possible. If you must stop, try avoid entering public places (use drive through services if possible). If you must enter public places, practice social distancing and wear a face covering if unvaccinated. Wash hands with soap and water for at least 20 seconds or use a hand sanitizer before and after entering public places and restrooms. Have soap and water, antibacterial hand wipes or spray, 70% + alcohol hand sanitizer available.</p>	4

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
5. Field Work	<ul style="list-style-type: none"> Working around Others 	2	<p>5a. Unvaccinated personnel must maintain at least 6-foot distance from others to the extent possible and wear face coverings. All employees should practice social distancing at tailgate meetings, in break rooms and job trailers. Limit the number of people in job trailers and other confined areas at any one time so that this distance can be maintained. If possible, hold meetings outside. If indoors, open window(s) for circulation.</p> <p>Clean all surfaces of your hands often with soap and water for at least 20 seconds. Where available, also use a hand sanitizer that contains at least 60% alcohol. When using hand sanitizer, be sure your hands are completely dry prior to touching any objects or surfaces.</p> <p>Wear safety glasses or goggles and avoid contact/touching of face, eyes, nose, and mouth. Cover your mouth and nose with a tissue when you cough or sneeze or use the inside of your elbow. Throw used tissues in the trash. Immediately wash or sanitize your hands.</p> <p>If the need arises to enter a personal residence, prepare a separate task specific THA for this task</p>	4
6. Office Work	<ul style="list-style-type: none"> Working around others 	2	<p>6a. AECOM recommends all employees obtain a Coronavirus vaccine. To work in AECOM offices after being fully vaccinated without the requirement to wear a mask or socially distance, please complete the AECOM voluntary vaccination self-attestation form on Workday. For a step-by-step guide to using the Voluntary Vaccination Declaration tool in Workday, click here. Unvaccinated personnel must maintain at least 6-foot distance from others to the extent possible and wear face coverings when not at your personal, socially-distanced work station.</p> <p>Adhere to office-specific Workplace Readiness Plans where available (or the AECOM US Offices Workplace Readiness Plan where site-specific plans are no longer required). This plan may be reviewed at the following link: US DCS Office Workplace Readiness Plan</p>	4
<p>Additional job steps/hazards identified by the Subcontractor or others in the field:</p> <p>Note: If any additional job tasks or hazards identified results in a revised overall RAC that is greater than that listed, stop work and submit the revised AHA to the SHM and PM for review.</p>				
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Equipment to be Used	Competent/Qualified Personnel name(s)	Training Requirements	Inspection Requirements
<ul style="list-style-type: none"> Wipes Hand sanitizer Face Covering Gloves 	SSHO: Richard Purdy FM: Ray Warren First Aid/CPR:	<ul style="list-style-type: none"> 40-Hr HAZWOPER: All field personnel 8-Hr HAZWOPER refresher: All field personnel 	<ul style="list-style-type: none"> Inspection of all equipment prior to use to ensure they are in good working condition. Pre- and post-operational checks performed daily.

Pertinent SOPs:		
AECOM Americas SOPs:		
S3AM-001-PR1	<i>Safe Work Standards and Rules</i>	S3AM-013-PR1 <i>Housekeeping</i>
S3AM-002-PR1	<i>Stop Work Authority</i>	S3AM-016-PR1 <i>Ergonomics</i>
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ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task: Brush Clearing & Landscaping Oversight	Overall Risk Assessment Code (RAC)				5																																					
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Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
1. Mobilize equipment and personnel to site.	<ul style="list-style-type: none"> Driving hazards Distracted driving Parking hazards 	4	<ul style="list-style-type: none"> Inspect vehicles for defects and complete inspection form. Implement safe driving practices to prevent transportation incidents. Secure all loads, including equipment within the cab. Do not operate vehicles in unsafe conditions (e.g., on steep slopes, in deep mud). Use of handheld devices while driving is prohibited. Use devices when vehicle is parked. When reversing, use caution and a spotter, if available. Use care when parking off pavement; do not park over tall grass as the grass may catch on fire from the hot vehicle exhaust. 	5
2. Evaluate area for hazards (this should be performed regularly throughout the duration of the task).	<ul style="list-style-type: none"> Slips, trips and falls Heat stress Biological hazards UV exposure Severe weather Suspect surface MEC or MPPEH 	4	<ul style="list-style-type: none"> Personnel should take identify and take measurable cautionary steps to observe areas for hazards. Ensure that pathways are clear and free of obstruction prior to initiating work. Adhere to proper housekeeping practices. The buddy system is a requirement and must always be used during every job step throughout the duration of the subsurface utility clearance process. Use appropriate PPE (see Notes, item 2). Assess ambient temperature and begin heat stress monitoring if necessary. Avoid contact with insects. Tape clothing at openings to prevent insects from crawling onto skin. Conduct frequent checks for bites and other signs of insect or plant exposures. Change field clothing immediately at the end of the workday, or as soon as possible after. Segregate clothing that may contain insects or plant residue that could transfer to personal effects. Shower and launder clothing immediately. Reapply sunscreen as necessary. Know where the closest location of shade is and seek vehicle air conditioning to cool if an employee begins to get lightheaded. Ensure there is an adequate supply of cold water for all employees to drink on hand. When there are warnings or indications of severe weather conditions should be monitored and precautions taken to protect personnel. Inspect fire extinguishers monthly. Personnel will follow the NBSFS UXO Safety Brief and practice the 3 Rs (Recognize, Retreat, Report). 	5
3. Mark locations of utilities and other locations, as necessary.	<ul style="list-style-type: none"> Slips, trips and falls Ergonomics/muscle strain/soreness Heat stress Hand tools (see equipment list below) Biological hazards UV exposure Chemical exposure UXO Hazards 	4	<ul style="list-style-type: none"> Make sure you have good, solid footing and that walking/working surfaces are as clean and dry as possible. Wear sturdy work boots with traction sole and safety toe. Keep work areas free of debris. Be cautious in wet and muddy conditions. Take the time to find a safe route. Stay well hydrated, taking water breaks as necessary. Work/rest regimens shall be adjusted during hot weather. Inspect equipment prior to use. Use tools for their intended use only. Use repellents and proper clothing for protection against insects including mosquitoes and ticks. Avoid walking through dense foliage. Position body upwind when applying spray marking paint. Use biodegradable, non-hazardous spray marking paint. Personnel will follow the NBSFS UXO Brief and will not dig or install stakes into the ground. Only pin-flags or non-intrusive means will be used to mark areas for clearing. 	5

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
4. Oversight of Subcontracted Brush/ Tree Clearing at the Site	<ul style="list-style-type: none"> Proximity to Power Tools Cold/Heat Stress Biological Hazards Slips, Trips, Falls Walking Noise Hazard Eye Injury 	2	<ul style="list-style-type: none"> AECOM will not operate power tools during the clearing effort. All communication will be done with subcontractors when power tools/equipment are not running; if AECOM needs to provide direction to the subcontractor, the subcontractor must power down the power tool/equipment in use before the AECOM employee approaches the subcontractor. The subcontractor must not power up the power tool/equipment until the AECOM employee has finished communicating with the subcontractor and walked a safe distance behind the subcontractor. Stand at a safe distance while power tools are in use. Wear proper PPE (Hard Hat, Steel-Toed Boots, and Safety Glasses) for protection against possible flying debris and appropriate hearing protection for harmful noise levels while power tools are in use. Always walk behind the contractor as they are clearing a path. Keep clear of area when large trees are being felled. Provide drinking water and first aid kit. Wear appropriate clothing for work and weather conditions (e.g., not loose, no jewelry). Take breaks and stay hydrated. Assess work area for poisonous plants and animals and communicate observations to avoid them. If hazardous plants such as poison ivy or poison oaks are identified or suspected in a work area, controls including, gloves (with taped cuffs), and barrier creams, should be implemented. If hazardous insects such as ticks or wasps are identified or suspected in a work area, controls including, insect repellent (23.8% DEET or similar), light colored clothing, barrier creams, frequent tick checks should be implemented. Provide wasp spray if nests are encountered during clearing process. Additionally, all field clothing and equipment should be thoroughly cleaned, removed and/or segregated from clean clothing, equipment and supplies to avoid transfer of hazardous plants/insects. All employees should bath immediately following fieldwork and use soaps/cleansers designed to remove oils associated with poison oak, and conduct a full body tick check using a mirror. Wear appropriate foot protection to prevent slips and trips and use caution when working on uneven and wet ground surfaces. Take inventory of your surroundings noting any conditions which may pose a slip, trip or fall hazard. Clear and walk your pathway prior to work beginning. Make any corrective actions to eliminate hazards, erect barricades or place warning signs and cones to raise awareness to hazards that can't be engineered out. Maintain strong housekeeping habits. Keep worksites clean and free from debris, spills or other slip/trip hazards. Do not carry items that impede visibility. Use hand signals, keep clear of moving equipment, and ensure eye contact with operator prior to approaching. 	3
<p>Additional job steps/hazards identified by the Subcontractor or others in the field:</p> <p>Note: If any additional job tasks or hazards identified results in a revised overall RAC that is greater than that listed, stop work and submit the revised AHA to the SHM and PM for review.</p>				
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Equipment to be Used	Competent/Qualified Personnel name(s)	Training Requirements	Inspection Requirements
<ul style="list-style-type: none"> Hand saws Chainsaws Loppers/pruners Weed whacker 	Landscaping Subcontractor: SSHO: Richard Purdy FM: First Aid/CPR:	<ul style="list-style-type: none"> Utility Clearing will be completed by trained subcontractor 30-Hr OSHA Construction (or equivalent): SSHO 40-Hr HAZWOPER: All field personnel 8-Hr HAZWOPER refresher: All field personnel 	<ul style="list-style-type: none"> Calibrate instruments daily as recommended by the manufacturers. Pre- and post-operational checks performed daily. Inspection of all tools and equipment prior to use to ensure they are in good working condition.

Pertinent SOPs:			
AECOM Americas SOPs:		S3AM-111-PR1	<i>Bloodborne Pathogens</i>
S3AM-001-PR1	<i>Safe Work Standards and Rules</i>	S3AM-113-PR1	<i>Heat Stress</i>
S3AM-002-PR1	<i>Stop Work Authority</i>	S3AM-115-PR1	<i>Hazardous Materials Communication</i>
S3AM-003-PR1	<i>Safety, Health, and Environment Training</i>	S3AM-117-PR1	<i>Hazardous Waste Operations</i>
S3AM-004-PR1	<i>Incident Reporting, Notifications, & Investigation</i>	S3AM-121-PR1	<i>Non-Ionizing Radiation</i>
S3AM-005-PR1	<i>Driving</i>	S3AM-127-PR1	<i>Exposure Monitoring</i>
S3AM-007-PR1	<i>Behavior Based Safety</i>	S3AM-128-PR1	<i>Medical Screening & Surveillance</i>
S3AM-008-PR1	<i>Fitness for Duty</i>	S3AM-204-PR1	<i>Environmental Compliance</i>
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S3AM-013-PR1	<i>Housekeeping</i>	S3AM-216-PR1	<i>Compliance Assurance</i>
S3AM-014-PR1	<i>Manual Lifting</i>	S3AM-305-PR1	<i>Hand & Power Tools</i>
S3AM-016-PR1	<i>Ergonomics</i>	S3AM-313-PR1	<i>Wildlife, Plants & Insect</i>
S3AM-017-PR1	<i>Injury & Illness Recordkeeping</i>	S3AM-317-PR1	<i>Hand Safety</i>
S3AM-018-PR1	<i>Injury & Claims Management</i>	S3AM-331-PR1	<i>Underground Utilities</i>
S3AM-019-PR1	<i>Substance Abuse Prevention</i>	S3AM-331-ATT2	<i>Underground Utilities Flowchart</i>
S3AM-020-PR1	<i>Recognition & Rewards</i>		

ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task: Utility Clearance Oversight		Overall Risk Assessment Code (RAC)				5																																					
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1. Mobilize equipment and personnel to site.	<ul style="list-style-type: none"> Driving hazards Distracted driving Parking hazards 	4	<ul style="list-style-type: none"> Inspect vehicles for defects and complete inspection form. Implement safe driving practices to prevent transportation incidents. Secure all loads, including equipment within the cab. Do not operate vehicles in unsafe conditions (e.g., on steep slopes, in deep mud). Use of handheld devices while driving is prohibited. Use devices when vehicle is parked. When reversing, use caution and a spotter, if available. Use care when parking off pavement; do not park over tall grass as the grass may catch on fire from the hot vehicle exhaust. 	5
2. Evaluate area for hazards (this should be performed regularly throughout the duration of the task).	<ul style="list-style-type: none"> Slips, trips and falls Heat stress Biological hazards UV exposure Severe weather Suspect surface MEC or MPPEH 	4	<ul style="list-style-type: none"> Personnel should take identify and take measurable cautionary steps to observe areas for hazards. Ensure that pathways are clear and free of obstruction prior to initiating work. Adhere to proper housekeeping practices. The buddy system is a requirement and must always be used during every job step throughout the duration of the subsurface utility clearance process. Use appropriate PPE (see Notes, item 2). Assess ambient temperature and begin heat stress monitoring if necessary. Avoid contact with insects. Tape clothing at openings to prevent insects from crawling onto skin. Conduct frequent checks for bites and other signs of insect or plant exposures. Change field clothing immediately at the end of the workday, or as soon as possible after. Segregate clothing that may contain insects or plant residue that could transfer to personal effects. Shower and launder clothing immediately. Reapply sunscreen as necessary. Know where the closest location of shade is and seek vehicle air conditioning to cool if an employee begins to get lightheaded. Ensure there is an adequate supply of cold water for all employees to drink on hand. When there are warnings or indications of severe weather conditions should be monitored and precautions taken to protect personnel. Inspect fire extinguishers monthly. Mark-outs for surveyed areas will follow the UXO Safety Brief and will be conducted with non-intrusive means or pin flags. 	5
3. Mark locations of utilities and other locations, as necessary.	<ul style="list-style-type: none"> Slips, trips and falls Ergonomics/muscle strain/soreness Heat stress Biological hazards UV exposure Chemical exposure Lifting and handling utility locating tools (metal detector, GPR) 	4	<ul style="list-style-type: none"> Make sure you have good, solid footing and that walking/working surfaces are as clean and dry as possible. Wear sturdy work boots with traction sole and safety toe. Keep work areas free of debris. Be cautious in wet and muddy conditions. Take the time to find a safe route. When possible, alternate hands to avoid repetitive use. Do not strain when collecting point measurements. Use arms and shoulders; do not twist your back. Stay well hydrated, taking water breaks as necessary. Work/rest regimens shall be adjusted during hot weather. Inspect equipment prior to use. Use tools for their intended use only. Use repellents and proper clothing for protection against insects including mosquitoes and ticks. Use appropriate lifting techniques when handling heavy tools or instruments. Avoid walking through dense foliage. Position body upwind when applying spray marking paint. Use biodegradable, non-hazardous spray marking paint. 	5
<p>Additional job steps/hazards identified by the Subcontractor or others in the field:</p> <p>Note: If any additional job tasks or hazards identified results in a revised overall RAC that is greater than that listed, stop work and submit the revised AHA to the SHM and PM for review.</p>				

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
4.	•		•	

Equipment to be Used	Competent/Qualified Personnel name(s)	Training Requirements	Inspection Requirements
<ul style="list-style-type: none"> Utility Clearing equipment (GPR, Metal Detector) 	Utility Clearing Subcontractor: SSHO: Richard Purdy FM: First Aid/CPR:	<ul style="list-style-type: none"> Utility Clearing will be completed by trained subcontractor 30-Hr OSHA Construction (or equivalent): SSHO 40-Hr HAZWOPER: All field personnel 8-Hr HAZWOPER refresher: All field personnel 	<ul style="list-style-type: none"> Calibrate instruments daily as recommended by the manufacturers. Pre- and post-operational checks performed daily. Inspection of all tools and equipment prior to use to ensure they are in good working condition.

Pertinent SOPs:			
AECOM Americas SOPs:		S3AM-111-PR1	<i>Bloodborne Pathogens</i>
S3AM-001-PR1	<i>Safe Work Standards and Rules</i>	S3AM-113-PR1	<i>Heat Stress</i>
S3AM-002-PR1	<i>Stop Work Authority</i>	S3AM-115-PR1	<i>Hazardous Materials Communication</i>
S3AM-003-PR1	<i>Safety, Health, and Environment Training</i>	S3AM-117-PR1	<i>Hazardous Waste Operations</i>
S3AM-004-PR1	<i>Incident Reporting, Notifications, & Investigation</i>	S3AM-121-PR1	<i>Non-Ionizing Radiation</i>
S3AM-005-PR1	<i>Driving</i>	S3AM-127-PR1	<i>Exposure Monitoring</i>
S3AM-007-PR1	<i>Behavior Based Safety</i>	S3AM-128-PR1	<i>Medical Screening & Surveillance</i>
S3AM-008-PR1	<i>Fitness for Duty</i>	S3AM-204-PR1	<i>Environmental Compliance</i>
S3AM-009-PR1	<i>Fatigue Management</i>	S3AM-208-PR1	<i>Personal Protective Equipment</i>
S3AM-010-PR1	<i>Emergency Response Planning</i>	S3AM-209-PR1	<i>Risk Assessment & Management</i>
S3AM-011-PR1	<i>Fire Protection</i>	S3AM-211-PR1	<i>Regulatory Inspections</i>
S3AM-012-PR1	<i>First Aid</i>	S3AM-213-PR1	<i>Subcontractor Management</i>
S3AM-013-PR1	<i>Housekeeping</i>	S3AM-216-PR1	<i>Compliance Assurance</i>
S3AM-014-PR1	<i>Manual Lifting</i>	S3AM-305-PR1	<i>Hand & Power Tools</i>
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S3AM-017-PR1	<i>Injury & Illness Recordkeeping</i>	S3AM-317-PR1	<i>Hand Safety</i>
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S3AM-019-PR1	<i>Substance Abuse Prevention</i>	S3AM-331-ATT2	<i>Underground Utilities Flowchart</i>
S3AM-020-PR1	<i>Recognition & Rewards</i>		

ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task: Land Surveying		Overall Risk Assessment Code (RAC)				5																																			
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Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
1. Mobilize equipment and personnel to site.	<ul style="list-style-type: none"> Driving hazards Distracted driving Parking hazards 	4	<ul style="list-style-type: none"> Inspect vehicles for defects and complete inspection form. Implement safe driving practices to prevent transportation incidents. Secure all loads, including equipment within the cab. Do not operate vehicles in unsafe conditions (e.g., on steep slopes, in deep mud). Use of handheld devices while driving is prohibited. Use devices when vehicle is parked. When reversing, use caution and a spotter, if available. Use care when parking off pavement; do not park over tall grass as the grass may catch on fire from the hot vehicle exhaust. 	5
2. Evaluate area for hazards (this should be performed regularly throughout the duration of the task).	<ul style="list-style-type: none"> Slips, trips and falls Heat stress Biological hazards UV exposure Severe weather Fire Suspect surface MEC or MPPEH 	4	<ul style="list-style-type: none"> Personnel should take identify and take measurable cautionary steps to observe areas for hazards. Ensure that pathways are clear and free of obstruction prior to initiating work. Adhere to proper housekeeping practices. The buddy system is a requirement and must always be used during every job step throughout the duration land surveying operations. Assess ambient temperature and begin heat stress monitoring if necessary. Avoid contact with insects. Tape clothing at openings to prevent insects from crawling onto skin. Conduct frequent checks for bites and other signs of insect or plant exposures. Change field clothing immediately at the end of the workday, or as soon as possible after. Segregate clothing that may contain insects or plant residue that could transfer to personal effects. Shower and launder clothing immediately. Reapply sunscreen as necessary. Know where the closest location of shade is and seek vehicle air conditioning to cool if an employee begins to get lightheaded. Ensure there is an adequate supply of cold water for all employees to drink on hand. When there are warnings or indications of severe weather conditions should be monitored and precautions taken to protect personnel. During thunderstorms, all personnel must evacuate. Provide portable fire extinguishers in all vehicles. Inspect fire extinguishers monthly. Mark-outs for surveyed areas will follow the UXO Safety Brief and will be conducted with non-intrusive means or pin flags. 	5
3. Mark locations of site boundaries, sampling locations, and other locations, as necessary.	<ul style="list-style-type: none"> Slips, trips and falls Ergonomics/muscle strain/soreness Heat stress Biological hazards UV exposure 	4	<ul style="list-style-type: none"> Make sure you have good, solid footing and that walking/working surfaces are as clean and dry as possible. Wear sturdy work boots with traction sole and safety toe. Keep work areas free of debris. Be cautious in wet and muddy conditions. Take the time to find a safe route. When possible, alternate hands to avoid repetitive use. Do not strain when collecting point measurements. Use arms and shoulders; do not twist your back. Stay well hydrated, taking water breaks as necessary. Work/rest regimens shall be adjusted during hot weather. Inspect tools prior to use. Use tools for their intended use only. Do not use damaged tools. Use repellents and proper clothing for protection against insects including mosquitoes. Protective clothing includes long sleeve shirt, long pants, and sturdy hiking boots. Use appropriate lifting techniques when handling heavy tools or instruments. Avoid walking through dense foliage. Reapply sunscreen as necessary. Wear PPE (See Note 2,3). Be cognizant of surroundings and look out for people/vehicles. 	5

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
Additional job steps/hazards identified by the Subcontractor or others in the field: Note: If any additional job tasks or hazards identified results in a revised overall RAC that is greater than that listed, stop work and submit the revised AHA to the SHM and PM for review.				
4.	•		•	

Equipment to be Used	Competent/Qualified Personnel name(s)	Training Requirements	Inspection Requirements
<ul style="list-style-type: none"> Survey equipment 	Land Surveying Subcontractor: SSHO: Richard Purdy FM: First Aid/CPR:	<ul style="list-style-type: none"> Surveying will be completed by a licensed Surveyor 30-Hr OSHA Construction (or equivalent): SSHO 40-Hr HAZWOPER: All field personnel 8-Hr HAZWOPER refresher: All field personnel 	<ul style="list-style-type: none"> Inspection of all tools and equipment prior to use to ensure they are in good working condition. Pre- and post-operational checks performed daily. Calibrate instruments daily as recommended by the manufacturers.

Pertinent SOPs:		
AECOM Americas SOPs: S3AM-001-PR1 <i>Safe Work Standards and Rules</i> S3AM-002-PR1 <i>Stop Work Authority</i> S3AM-003-PR1 <i>Safety, Health, and Environment Training</i> S3AM-004-PR1 <i>Incident Reporting, Notifications, & Investigation</i> S3AM-005-PR1 <i>Driving</i> S3AM-007-PR1 <i>Behavior Based Safety</i> S3AM-008-PR1 <i>Fitness for Duty</i> S3AM-009-PR1 <i>Fatigue Management</i> S3AM-010-PR1 <i>Emergency Response Planning</i> S3AM-011-PR1 <i>Fire Protection</i> S3AM-012-PR1 <i>First Aid</i> S3AM-013-PR1 <i>Housekeeping</i> S3AM-014-PR1 <i>Manual Lifting</i> S3AM-016-PR1 <i>Ergonomics</i> S3AM-017-PR1 <i>Injury & Illness Recordkeeping</i> S3AM-018-PR1 <i>Injury & Claims Management</i> S3AM-019-PR1 <i>Substance Abuse Prevention</i>	S3AM-020-PR1 <i>Recognition & Rewards</i> S3AM-111-PR1 <i>Bloodborne Pathogens</i> S3AM-113-PR1 <i>Heat Stress</i> S3AM-115-PR1 <i>Hazardous Materials Communication</i> S3AM-117-PR1 <i>Hazardous Waste Operations</i> S3AM-121-PR1 <i>Non-Ionizing Radiation</i> S3AM-127-PR1 <i>Exposure Monitoring</i> S3AM-128-PR1 <i>Medical Screening & Surveillance</i> S3AM-204-PR1 <i>Environmental Compliance</i> S3AM-208-PR1 <i>Personal Protective Equipment</i> S3AM-209-PR1 <i>Risk Assessment & Management</i> S3AM-211-PR1 <i>Regulatory Inspections</i> S3AM-213-PR1 <i>Subcontractor Management</i> S3AM-216-PR1 <i>Compliance Assurance</i> S3AM-305-PR1 <i>Hand & Power Tools</i> S3AM-313-PR1 <i>Wildlife, Plants & Insect</i> S3AM-317-PR1 <i>Hand Safety</i>	

ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task: Sonic Drilling Oversight	Overall Risk Assessment Code (RAC)	3																																					
Project & Location: Phase I Remedial Investigation of PFAS, NBSFS, New Boston, NH	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" rowspan="2">Risk Assessment Code (RAC) Matrix</th> <th colspan="4">Mishap Probability Subcategory</th> </tr> <tr> <th>A. Likely to occur immediately or within a short period of time.</th> <th>B. Probably will occur in time.</th> <th>C. May occur in time.</th> <th>D. Unlikely to occur.</th> </tr> <tr> <td rowspan="4" style="text-align: center; vertical-align: middle;">Hazard Severity Category</td> <td>I. May cause death, permanent total disability, or loss of a facility/asset.</td> <td style="background-color: red; text-align: center;">1</td> <td style="background-color: red; text-align: center;">1</td> <td style="background-color: orange; text-align: center;">2</td> <td style="background-color: yellow; text-align: center;">3</td> </tr> <tr> <td>II. May cause permanent partial disability, temporary total disability in excess of 90 days, or major property damage.</td> <td style="background-color: red; text-align: center;">1</td> <td style="background-color: orange; text-align: center;">2</td> <td style="background-color: yellow; text-align: center;">3</td> <td style="background-color: lightgreen; text-align: center;">4</td> </tr> <tr> <td>III. May cause minor injury, occupational illness, or property damage.</td> <td style="background-color: orange; text-align: center;">2</td> <td style="background-color: yellow; text-align: center;">3</td> <td style="background-color: lightgreen; text-align: center;">4</td> <td style="background-color: blue; text-align: center;">5</td> </tr> <tr> <td>IV. Presents minimal threat to personnel safety or health, or property, but is still in violation of a standard.</td> <td style="background-color: yellow; text-align: center;">3</td> <td style="background-color: lightgreen; text-align: center;">4</td> <td style="background-color: blue; text-align: center;">5</td> <td style="background-color: blue; text-align: center;">5</td> </tr> <tr> <td colspan="5"> Step 1: Identify each Job Step required for the Task that presents a hazard to those performing it Step 2: Identify the Hazards associated with each Job Step Step 3: Determine the unmitigated (uncontrolled) RAC based on the matrix above for each Job Step Step 4: Identify the Controls that will be implemented to mitigate the Hazards associated with each Job Step Step 5: Determine the mitigated RAC for each Controlled Hazard on the matrix above Step 6: Identify the Overall RAC for the Task based upon the highest mitigated RAC. </td> <td> RAC Definitions <div style="background-color: red; text-align: center; padding: 2px;">1- Critical</div> <div style="background-color: orange; text-align: center; padding: 2px;">2-Serious</div> <div style="background-color: yellow; text-align: center; padding: 2px;">3-Moderate</div> <div style="background-color: lightgreen; text-align: center; padding: 2px;">4-Minor</div> <div style="background-color: blue; text-align: center; padding: 2px;">5-Negligible</div> </td> </tr> </table>		Risk Assessment Code (RAC) Matrix		Mishap Probability Subcategory				A. Likely to occur immediately or within a short period of time.	B. Probably will occur in time.	C. May occur in time.	D. Unlikely to occur.	Hazard Severity Category	I. May cause death, permanent total disability, or loss of a facility/asset.	1	1	2	3	II. May cause permanent partial disability, temporary total disability in excess of 90 days, or major property damage.	1	2	3	4	III. May cause minor injury, occupational illness, or property damage.	2	3	4	5	IV. Presents minimal threat to personnel safety or health, or property, but is still in violation of a standard.	3	4	5	5	Step 1: Identify each Job Step required for the Task that presents a hazard to those performing it Step 2: Identify the Hazards associated with each Job Step Step 3: Determine the unmitigated (uncontrolled) RAC based on the matrix above for each Job Step Step 4: Identify the Controls that will be implemented to mitigate the Hazards associated with each Job Step Step 5: Determine the mitigated RAC for each Controlled Hazard on the matrix above Step 6: Identify the Overall RAC for the Task based upon the highest mitigated RAC.					RAC Definitions <div style="background-color: red; text-align: center; padding: 2px;">1- Critical</div> <div style="background-color: orange; text-align: center; padding: 2px;">2-Serious</div> <div style="background-color: yellow; text-align: center; padding: 2px;">3-Moderate</div> <div style="background-color: lightgreen; text-align: center; padding: 2px;">4-Minor</div> <div style="background-color: blue; text-align: center; padding: 2px;">5-Negligible</div>
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Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
	<ul style="list-style-type: none"> Inoperable rig 		<ul style="list-style-type: none"> When reversing, use caution and a spotter, if available. Use care when parking off pavement; do not park over tall grass as the grass may catch on fire from the hot vehicle exhaust. Perform inspection of rig before placement at site and complete Mechanized Equipment Inspection form. 	
2. Evaluate area for hazards (this should be performed regularly throughout the duration of the task).	<ul style="list-style-type: none"> Utilities Overhead hazards Slips, trips and falls Heat stress Biological hazards UV exposure Severe weather Fire Suspect surface MEC or MPPEH 	2	<ul style="list-style-type: none"> Utilities in the work area should be cleared by completing the appropriate survey prior to drilling operations. The buddy system is a requirement and must always be used during every job step throughout the duration of drilling and subsurface soil sampling operations. Check the area for potential overhead utility/power lines and obstructions such as trees. Before moving a rig on location, confirm the height of the equipment with the driller/Competent Person. Ensure the equipment is a minimum safe approach distance from power lines as outlined in AECOM's SH&E SOP S3AM-322-PR1, <i>Overhead Lines</i>. Use caution and wear high-visibility reflective safety vest when working near active roads or around heavy equipment. Personnel should take identify and take measurable cautionary steps to observe areas for hazards. Ensure that pathways are clear and free of obstruction prior to initiating work. Adhere to proper housekeeping practices. Use appropriate PPE (see Notes, items 2 and 3). Assess ambient temperature and begin heat stress monitoring if necessary. Avoid contact with insects. Tape clothing at openings to prevent insects from crawling onto skin. Conduct frequent checks for bites and other signs of insect or plant exposures. Change field clothing immediately at the end of the workday, or as soon as possible after. Segregate clothing that may contain insects or plant residue that could transfer to personal effects. Shower and launder clothing immediately. Reapply sunscreen as necessary. When there are warnings or indications of severe weather conditions should be monitored and precautions taken to protect personnel. During thunderstorms, all personnel must evacuate. Matches, lighters and similar spark producing devices are not permitted. Provide portable fire extinguishers in all equipment. Inspect fire extinguishers monthly. UXOQP will provide escort. 	4
3. Calibrate PID & noise monitor	<ul style="list-style-type: none"> Chemical exposure 	4	<ul style="list-style-type: none"> Perform the calibration procedure in a well-ventilated area. Maintain a clean and uncluttered workspace. 	5
4. Rig placement and set-up	<ul style="list-style-type: none"> Unstable ground surface Overhead obstructions MEC 	2	<ul style="list-style-type: none"> Place and set rig using procedures listed in AECOM's SH&E SOP S3AM-309-PR1, <i>Heavy Equipment</i> and EM 385-1-1 manual. Evaluate ground conditions, concurrent operations and obstructions to identify approved routes of travel and work areas. Check that there is sufficient swing room and that the outriggers are adequately supported on solid and stable ground. Before raising the mast (derrick) look up and survey the area for overhead obstructions (i.e., trees) and place rig at an adequate distance away. Watch for low hanging branches. Never travel with any part of the drilling equipment in a raised or partially raised position. UXOQP will conduct a survey of the proposed boring location using a hand-held detector. If suspect surface MEC, MPPEH, or an anomaly is detected, the location will be marked for avoidance and a new location will be selected. UXOQP must also complete a survey of the area around the proposed investigation site that is large enough to support all planned operations. The size of the surveyed area will be project-specific and will consider, for example, maneuverability of required equipment, and parking of support vehicles. At a minimum, the surveyed area should have a dimension in all directions equal to twice the length of the longest vehicle or piece of equipment to be brought on-site. 	3

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
5. Advancement of borehole	<ul style="list-style-type: none"> Underground utilities Drill operation Heat stress Noise Muscle strain, pulls, twists, and repetitive use injuries Struck by/striking hazard Hand and power tools Leaks from hydraulic lines Cables/lines under tension Contaminant exposure Airborne contaminants UV exposure Entanglement MEC 	2	<ul style="list-style-type: none"> Prior to any advancement, utility clearance will be performed to ensure the location is cleared of utilities. Verify that the qualified person for the rig is working in a safe manner Ensure that all site personnel are wearing the appropriate PPE. Rig operators should utilize cut-resistant work gloves. Complete forms S3AM-309-FM2, <i>Heavy Equipment Pre-Operation Checklist</i> and S3AM-321-FM1, <i>Daily Drilling, Boring, and Direct-Push Equipment Inspection</i>. Ensure that all field personnel are familiar with the location of the emergency shut-off switches on the rig prior to operation. Ensure that personnel not essential to the safe operation of the rig maintain a safe distance from the rig. Stay well hydrated, taking water breaks as necessary. Work/rest regimens shall be adjusted during hot weather. Monitor noise levels. Wear hearing protection. Practice proper lifting and manual handling of materials and equipment. Lift with the knees, seek assistance when necessary, or employ additional handling equipment as needed. Operators need to find the safest, most effective position for themselves and the machine. Move materials so that drills can be operated from such a position to allow the driller to maintain good footing and posture. Check hydraulic lines during daily safety inspection. If leakage or spillage occurs, stop work and begin clean up procedures immediately. If necessary, the waste material will be transferred to another container to minimize leakage and appropriate measures taken to prevent reoccurrence. Always inspect wire rope for wear, damage, or abuse before use. Never use wire rope that is wore, damaged, or abused. Never overload a wire rope. Implement air monitoring as directed by the APP/SSHP using calibrated equipment. A certification of calibration should be maintained on file. Reapply sunscreen as necessary. All personnel should stay clear of the drill rods or augers while in motion and should not grab or attempt to attach a tool to the drill rods or augers until they have completely stopped rotating. Rod wipers, rather than gloves or bare hands, should be used to remove mud or other material from drill stem as it is withdrawn from the borehole. Do not lean against the rig or place hands on or near moving parts at the rear of the rig while it is operating. Work clothes will be firm fitting, but comfortable and free of straps, loose ends, strings etc., that might catch on some moving part of the rig. Rings, watches, or other jewelry will not be worn while working around the rig. Drilling will be conducted implementing incremental anomaly avoidance procedures in 12-inch intervals by a UXOQP until the maximum depth of drilling reached, bedrock is encountered, or 12 feet below ground surface is reached, whichever occurs first. During the detector subsurface anomaly checks at 12-inch intervals, all metallic equipment will be moved far enough away from the detection location or area, so they don't interfere with the detector or mask any metallic subsurface anomalies. If an anomaly is detected, the borehole will be backfilled in accordance with project-specific procedures, and the field team will select a new location. 	3
6. Equipment decontamination.	<ul style="list-style-type: none"> Slips, trips and falls Contaminant exposure Muscle strain Pressurized equipment and hoses Exhaust fumes Chemical splash/flying debris 	3	<ul style="list-style-type: none"> Wear PPE (minimum Level D with nitrile gloves, safety glasses with side shields) to prevent contaminant exposure from splashing. Arrange decontamination area in an organized fashion with enough room to efficient perform decontamination procedures. Ensure that plastic sheeting is free of bulges that may create a trip or fall hazard. Spray alcohol and Alconox away from the body in a downwind direction. Absorb any overspray or spilt alcohol, Alconox or deionized water on plastic sheeting to prevent slips or falls. When decontaminating drilling equipment, use a portable high-pressure steam cleaner with a pressure hose and fittings. Ensure that heavy equipment is placed on a plastic sheet and bermed to collect contaminated material. Collect spent decontamination liquid in appropriate containers or drums. Ask for assistance when working with drums or drum lids. Inspect hoses, valves, and pump prior to use. Decontaminate in a well-ventilated area. Establish a 10-foot radius exclusion zone around the decontamination area. 	4

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
Additional job steps/hazards identified by the Subcontractor or others in the field: Note: If any additional job tasks or hazards identified results in a revised overall RAC that is greater than that listed, stop work and submit the revised AHA to the SHM and PM for review.				
7.	•		•	

Equipment to be Used	Competent/Qualified Personnel name(s)	Training Requirements	Inspection Requirements
<ul style="list-style-type: none"> • Sonic drill rig • PID (Honeywell MiniRAE 3000+ or equivalent) • Sound level meter • Soil sampling tools (i.e., split spoon) • Hand tools (trowels, shovels, hammer, wrenches) • Handheld magnetometer • Borehole gradiometer 	Rig operator: Cascade Drilling SSHO: Richard Purdy FM: First Aid/CPR: UXOQP: Shannon Linnane	<ul style="list-style-type: none"> • 30-Hr OSHA Construction: SSHO • 40-Hr HAZWOPER: All field personnel • 8-Hr HAZWOPER refresher: All field personnel • DDESB TP 18 UXO qualified Technician 	<ul style="list-style-type: none"> • Daily inspection before use and complete S3AM-309-FM2, <i>Heavy Equipment Pre-Operation Checklist</i> and S3AM-321-FM1, <i>Daily Drilling, Boring, and Direct-Push Equipment Inspection</i>. • Inspection of all tools and equipment prior to use to ensure they are in good working condition. • Calibrate instruments daily as recommended by the manufacturers. • UXOQP will be responsible for performing tests on their instruments to verify that their detectors are in proper working condition each morning and also throughout the day to verify instrument functionality.

Pertinent SOPs:		
AECOM Americas SOPs:		
S3AM-001-PR1	<i>Safe Work Standards and Rules</i>	S3AM-118-PR1 <i>Hearing Conservation</i>
S3AM-002-PR1	<i>Stop Work Authority</i>	S3AM-121-PR1 <i>Non-Ionizing Radiation</i>
S3AM-003-PR1	<i>Safety, Health, and Environment Training</i>	S3AM-123-PR1 <i>Respiratory Protection</i>
S3AM-004-PR1	<i>Incident Reporting, Notifications, & Investigation</i>	S3AM-127-PR1 <i>Exposure Monitoring</i>
S3AM-005-PR1	<i>Driving</i>	S3AM-128-PR1 <i>Medical Screening & Surveillance</i>
S3AM-007-PR1	<i>Behavior Based Safety</i>	S3AM-129-PR1 <i>Respirable Crystalline Silica</i>
S3AM-008-PR1	<i>Fitness for Duty</i>	S3AM-204-PR1 <i>Environmental Compliance</i>
S3AM-009-PR1	<i>Fatigue Management</i>	S3AM-208-PR1 <i>Personal Protective Equipment</i>
S3AM-010-PR1	<i>Emergency Response Planning</i>	S3AM-209-PR1 <i>Risk Assessment & Management</i>
S3AM-011-PR1	<i>Fire Protection</i>	S3AM-211-PR1 <i>Regulatory Inspections</i>
S3AM-012-PR1	<i>First Aid</i>	S3AM-216-PR1 <i>Compliance Assurance</i>
S3AM-013-PR1	<i>Housekeeping</i>	S3AM-305-PR1 <i>Hand & Power Tools</i>
S3AM-014-PR1	<i>Manual Lifting</i>	S3AM-309-PR1 <i>Heavy Equipment</i>
S3AM-016-PR1	<i>Ergonomics</i>	S3AM-313-PR1 <i>Wildlife, Plants & Insect</i>
S3AM-017-PR1	<i>Injury & Illness Recordkeeping</i>	S3AM-317-PR1 <i>Hand Safety</i>
S3AM-018-PR1	<i>Injury & Claims Management</i>	S3AM-321-PR1 <i>Drilling, Boring, Direct Push</i>
S3AM-019-PR1	<i>Substance Abuse Prevention</i>	S3AM-321-ATT1 <i>Core Drilling Machine</i>
S3AM-020-PR1	<i>Recognition & Rewards</i>	S3AM-322-PR1 <i>Overhead Lines</i>
S3AM-111-PR1	<i>Bloodborne Pathogens</i>	S3AM-326-PR1 <i>Machine Guarding</i>
S3AM-113-PR1	<i>Heat Stress</i>	S3AM-331-PR1 <i>Underground Utilities</i>
S3AM-115-PR1	<i>Hazardous Materials Communication</i>	S3AM-331-ATT2 <i>Utilities Flowchart</i>
S3AM-117-PR1	<i>Hazardous Waste Operations</i>	S3AM-346-PR1 <i>Signs, Signals & Barricades</i>

ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task: Well Development (using surge blocks)	Overall Risk Assessment Code (RAC)	4																																					
Project & Location: Phase I Remedial Investigation of PFAS, NBSFS, New Boston, NH	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" rowspan="2">Risk Assessment Code (RAC) Matrix</th> <th colspan="4">Mishap Probability Subcategory</th> </tr> <tr> <th>A. Likely to occur immediately or within a short period of time.</th> <th>B. Probably will occur in time.</th> <th>C. May occur in time.</th> <th>D. Unlikely to occur.</th> </tr> <tr> <td rowspan="4" style="writing-mode: vertical-rl; transform: rotate(180deg); text-align: center;">Hazard Severity Category</td> <td>I. May cause death, permanent total disability, or loss of a facility/asset.</td> <td style="background-color: red; color: white; text-align: center;">1</td> <td style="background-color: red; color: white; text-align: center;">1</td> <td style="background-color: orange; color: black; text-align: center;">2</td> <td style="background-color: yellow; color: black; text-align: center;">3</td> </tr> <tr> <td>II. May cause permanent partial disability, temporary total disability in excess of 90 days, or major property damage.</td> <td style="background-color: red; color: white; text-align: center;">1</td> <td style="background-color: orange; color: black; text-align: center;">2</td> <td style="background-color: yellow; color: black; text-align: center;">3</td> <td style="background-color: lightgreen; color: black; text-align: center;">4</td> </tr> <tr> <td>III. 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Presents minimal threat to personnel safety or health, or property, but is still in violation of a standard.</td> <td style="background-color: yellow; color: black; text-align: center;">3</td> <td style="background-color: lightgreen; color: black; text-align: center;">4</td> <td style="background-color: blue; color: white; text-align: center;">5</td> <td style="background-color: blue; color: white; text-align: center;">5</td> </tr> <tr> <td colspan="5"> Step 1: Identify each Job Step required for the Task that presents a hazard to those performing it Step 2: Identify the Hazards associated with each Job Step Step 3: Determine the unmitigated (uncontrolled) RAC based on the matrix above for each Job Step Step 4: Identify the Controls that will be implemented to mitigate the Hazards associated with each Job Step Step 5: Determine the mitigated RAC for each Controlled Hazard on the matrix above Step 6: Identify the Overall RAC for the Task based upon the highest mitigated RAC. </td> <td> RAC Definitions <div style="background-color: red; color: white; text-align: center; padding: 2px;">1- Critical</div> <div style="background-color: orange; color: black; text-align: center; padding: 2px;">2-Serious</div> <div style="background-color: yellow; color: black; text-align: center; padding: 2px;">3-Moderate</div> <div style="background-color: lightgreen; color: black; text-align: center; padding: 2px;">4-Minor</div> <div style="background-color: blue; color: white; text-align: center; padding: 2px;">5-Negligible</div> </td> </tr> </table>		Risk Assessment Code (RAC) Matrix		Mishap Probability Subcategory				A. 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Date Prepared: 01/12/2023																																							
Prepared by (Name/Title): Richard Purdy/SH&E Specialist																																							
Reviewed by (Name/Title):																																							
Notes: (Field Notes, Review Comments, etc.)																																							

1. All field tasks will be proceeded with a daily tailgate meeting where the following will be discussed:

- Site Safety and Health Officer (SSHO) will ensure that all field personnel have donned the appropriate PPE (items 2 and 3, below), including sunscreen (minimum SPF of 30) and insect repellent as necessary.
- Discussed tasks to be performed, including review of all pertinent AHAs covering potential hazards and control measures.
- Make modifications to AHAs, as necessary.
- Review pertinent SDSs
- All field workers will be informed of emergency contact information and hospital routes.
- Upon completion of the tailgate, all personnel will sign form, acknowledging attendance of tailgate meeting and presence onsite.

2. Required Level D Personal Protective Equipment (PPE):

- Steel-toed shoes or boots
- High-visibility reflective safety vest
- ANSI approved hardhat
- ANSI approved safety glasses with side shields
- Work gloves (millimeter nitrile)
- Sleeved work shirt

3. Additional PPE:

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Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
1. Mobilize equipment and personnel to site.	<ul style="list-style-type: none"> Driving hazards Distracted driving Parking hazards 	4	<ul style="list-style-type: none"> Inspect vehicles for defects. Implement safe driving practices to prevent transportation incidents. Secure all loads, including equipment within the cab. Do not operate vehicles in unsafe conditions (e.g., on steep slopes, in deep mud). Use of handheld devices while driving is prohibited. Use devices when vehicle is parked. When reversing, use caution and a spotter, if available. 	5

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
2. Evaluate area for hazards (this should be performed regularly throughout the duration of the task).	<ul style="list-style-type: none"> Utilities Overhead hazards Slips, trips and falls Heat stress Biological hazards UV exposure Severe weather Fire 	4	<ul style="list-style-type: none"> Check the area for potential overhead utility lines and obstructions such as trees. Personnel should take identify and take measurable cautionary steps to observe areas for hazards. Ensure that pathways are clear and free of obstruction prior to initiating work. Adhere to proper housekeeping practices. Use appropriate PPE (see Notes, items 2 and 3). Assess ambient temperature and begin heat stress monitoring if necessary. Avoid contact with insects. Tape clothing at openings to prevent insects from crawling onto skin. Conduct frequent checks for bites and other signs of insect or plant exposures. Change field clothing immediately at the end of the work day, or as soon as possible after. Segregate clothing that may contain insects or plant residue that could transfer to personal effects. Reapply sunscreen as necessary. When there are warnings or indications of severe weather, conditions should be monitored and precautions taken to protect personnel. During thunderstorms, all personnel must evacuate. Provide portable fire extinguishers in all equipment. Inspect fire extinguishers monthly. 	5
3. Set Up	<ul style="list-style-type: none"> Chemical exposure Muscle strain Hand tools (wrenches, ratchets, screwdriver) 	4	<ul style="list-style-type: none"> Use proper lifting and body posing Use appropriate PPE (see Notes, items 2 and 3). Inspect integrity of sample containers and sample collection train prior to use. 	4
4. Attach surge block to tubing and lower in well.	<ul style="list-style-type: none"> Pinch points Overhead hazards, back strain 	3	<ul style="list-style-type: none"> Note and avoid pinch points between block and well casing. Wear coated nitrile gloves, or leather gloves when handling tubing. Watch out for overhead hazards. If well is at deeper depth to be performed comfortably by one person it may be necessary to use two people to insert/handle tubing. 	4
5. Surge well.	<ul style="list-style-type: none"> Repetitive Motion injury from moving surging up and down 	3	<ul style="list-style-type: none"> Take frequent breaks as needed to prevent fatigue to shoulder/arm/back muscles caused by surging well. Be aware of the signs/symptoms of repetitive stress injuries (tingling, sharp pains, numbness) and report all symptoms immediately. 	5
6. Bail or pump water from well. Purge Water Handling	<ul style="list-style-type: none"> Repetitive motion bailing/pumping well. Exposure from splashes during bailing/pumping activities. Spill or release of impacted water. Slip, trip, fall. Back strain 	4	<ul style="list-style-type: none"> Take frequent breaks as needed to prevent fatigue to shoulder/arm/back muscles caused by surging well. Be aware of the signs/symptoms of repetitive stress injuries and report all symptoms immediately. Wear additional PPE (Tyvek) if deemed necessary, pace bailing actions. Wear eye protection, long pants, nitrile gloves, and steel-toed boots. Have spill pillows/socks available to contain any release or impacted water spill. Wear appropriate PPE (eye protection, long pants, leather gloves, long sleeves, steel-toed boots). Use proper lifting technique (lift with the knees) while handling purge water containers/buckets. Secure bucket lids to prevent splashes/spills. 	5
7. Remove tubing from well.	<ul style="list-style-type: none"> Exposure to contaminants. Overhead/Horiz ontal hazards. Back strain. 	4	<ul style="list-style-type: none"> When removing tubing use nitrile gloves and paper towels (if necessary to wipe down tubing) as removed. Wipe tubing in downward motion. Remove and coil tubing as removed or lay-out on ground surface. Ensure that tubing on ground surface does not hinder any nearby operations. 	5

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
8. Decontamination - Soak/spray durable equipment to prevent cross-contamination between multiple well locations; properly store disposable equipment	<ul style="list-style-type: none"> Exposure to decontamination chemicals 	3	<ul style="list-style-type: none"> Wear appropriate PPE (eye protection, long sleeves and pants, nitrile gloves, steel-toed boots). Avoid contact with all decontaminated chemicals (Liquinox, Alconox, Simple Green, methanol, and any other solvents used on development equipment). Store decontaminated equipment in clean dry area. 	5
Additional job steps/hazards identified by the Subcontractor or others in the field: Note: If any additional job tasks or hazards identified results in a revised overall RAC that is greater than that listed, stop work and submit the revised AHA to the SHM and PM for review.				
9.				

Dog o

Equipment to be Used	Competent/Qualified Personnel name(s)	Training Requirements	Inspection Requirements
<ul style="list-style-type: none"> PID (Honeywell MiniRAE 3000+ or equivalent) Monitoring equipment (YSI, turbidity meter) Hand tools (wrenches, ratchets, screwdriver) Bailer and twine Submersible Pump (Hurricane pump or similar) Hydrolift pump with Waterra check valve 	SSHO: Richard Purdy FM: First Aid/CPR:	<ul style="list-style-type: none"> 30-Hr OSHA Construction (or equivalent): SSHO 40-Hr HAZWOPER: All field personnel 8-Hr HAZWOPER refresher: All field personnel 	<ul style="list-style-type: none"> Inspection of all tools and equipment prior to use to ensure they are in good working condition. Calibrate instruments daily as recommended by the manufacturers.

Pertinent SOPs:		
AECOM Americas SOPs:		
S3AM-001-PR1	<i>Safe Work Standards and Rules</i>	S3AM-020-PR1 <i>Recognition & Rewards</i>
S3AM-002-PR1	<i>Stop Work Authority</i>	S3AM-111-PR1 <i>Bloodborne Pathogens</i>
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S3AM-019-PR1	<i>Substance Abuse Prevention</i>	S3AM-317-PR1 <i>Hand Safety</i>

ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task: Groundwater Monitoring Well Sampling	Overall Risk Assessment Code (RAC)	4																																					
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1. All field tasks will be proceeded with a daily tailgate meeting where the following will be discussed:

- Site Safety and Health Officer (SSHO) will ensure that all field personnel have donned the appropriate PPE (items 2 and 3, below), including sunscreen (minimum SPF of 30) and insect repellent as necessary.
- Discussed tasks to be performed, including review of all pertinent AHAs covering potential hazards and control measures.
- Make modifications to AHAs, as necessary.
- Review pertinent SDSs
- All field workers will be informed of emergency contact information and hospital routes.
- Upon completion of the tailgate, all personnel will sign form, acknowledging attendance of tailgate meeting and presence onsite.

2. Required Level D Personal Protective Equipment (PPE):

- Steel-toed shoes or boots
- High-visibility reflective safety vest
- ANSI approved hardhat
- ANSI approved safety glasses with side shields
- Work gloves (millimeter nitrile)
- Sleeved work shirt

3. Additional PPE:

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
1. Mobilize equipment and personnel to site.	<ul style="list-style-type: none"> Driving hazards Distracted driving Parking hazards 	4	<ul style="list-style-type: none"> Inspect vehicles for defects. Implement safe driving practices to prevent transportation incidents. Secure all loads, including equipment within the cab. Do not operate vehicles in unsafe conditions (e.g., on steep slopes, in deep mud). Use of handheld devices while driving is prohibited. Use devices when vehicle is parked. When reversing, use caution and a spotter, if available. 	5

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
2. Evaluate area for hazards (this should be performed regularly throughout the duration of the task).	<ul style="list-style-type: none"> Utilities Overhead hazards Slips, trips and falls Heat stress Biological hazards UV exposure Severe weather Fire 	4	<ul style="list-style-type: none"> Check the area for potential overhead utility lines and obstructions such as trees. Personnel should take identify and take measurable cautionary steps to observe areas for hazards. Ensure that pathways are clear and free of obstruction prior to initiating work. Adhere to proper housekeeping practices. Use appropriate PPE (see Notes, items 2 and 3). Assess ambient temperature and begin heat stress monitoring if necessary. Avoid contact with insects. Tape clothing at openings to prevent insects from crawling onto skin. Conduct frequent checks for bites and other signs of insect or plant exposures. Change field clothing immediately at the end of the work day, or as soon as possible after. Segregate clothing that may contain insects or plant residue that could transfer to personal effects. Reapply sunscreen as necessary. When there are warnings or indications of severe weather, conditions should be monitored and precautions taken to protect personnel. During thunderstorms, all personnel must evacuate. Provide portable fire extinguishers in all equipment. Inspect fire extinguishers monthly. 	5
3. Calibrate PID and YSI	<ul style="list-style-type: none"> Chemical exposure 	4	<ul style="list-style-type: none"> Perform the calibration procedure in a well-ventilated area. Maintain a clean and uncluttered workspace. Wear nitrile gloves and safety glasses while handling the YSI calibration solutions 	5
4. Sampling Set Up	<ul style="list-style-type: none"> Chemical exposure Muscle strain Hand tools (wrench, ratchet, screwdriver) Compressed Nitrogen tank 	4	<ul style="list-style-type: none"> Use proper lifting and body positing Use appropriate PPE (see Notes, items 2 and 3). Inspect integrity of sample containers and sample collection train prior to use. Implement air monitoring as directed by the APP/SHHP using calibrated equipment. A certification of calibration should be maintained on file. If using a bladder pump with Nitrogen, always store the tank upright in a secured position to prevent tipping and damaging of the valve or regulator Make sure the tank is closed prior to disconnecting the regulator to prevent a sudden release of compressed gas Never transport the tank with the regulator attached. 	4
5. Sample Collection	<ul style="list-style-type: none"> Chemical exposure Inadequate probe labeling Pressurized hoses 	3	<ul style="list-style-type: none"> Implement air monitoring as directed by the APP/SHHP using calibrated equipment. A certification of calibration should be maintained on file. Inspect integrity of sample containers and sample collection train during use. Fill sample containers to the instructed level. Do not overfill. Use appropriate PPE (see Notes, items 2 and 3). Ensure sample labels match sample location label 	4
6. Equipment Decontamination	<ul style="list-style-type: none"> Chemical exposure Muscle strain Pressurized hoses 	4	<ul style="list-style-type: none"> Use appropriate PPE (see Notes, items 2 and 3). Arrange decontamination area in an organized fashion with enough room to efficient perform decontamination procedures. Spray alcohol and Alconox away from the body in a downwind direction. Collect spent decontamination liquid in appropriate containers or drums Ask for assistance when working with drums or drum lids. Decontaminate in a well-ventilated area. 	5

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
Additional job steps/hazards identified by the Subcontractor or others in the field: Note: If any additional job tasks or hazards identified results in a revised overall RAC that is greater than that listed, stop work and submit the revised AHA to the SHM and PM for review.				
7.				

Equipment to be Used	Competent/Qualified Personnel name(s)	Training Requirements	Inspection Requirements
<ul style="list-style-type: none"> PID (Honeywell MiniRAE 3000+ or equivalent) GW Monitoring equipment (YSI, turbidity meter) Peristaltic pump Bladder pump Hand tools (wrench, ratchet, screwdriver) 	SSHO: Richard Purdy FM: First Aid/CPR:	<ul style="list-style-type: none"> 30-Hr OSHA Construction (or equivalent): SSHO 40-Hr HAZWOPER: All field personnel 8-Hr HAZWOPER refresher: All field personnel 	<ul style="list-style-type: none"> Inspection of all tools and equipment prior to use to ensure they are in good working condition. Calibrate instruments daily as recommended by the manufacturers.

Pertinent SOPs:		
AECOM Americas SOPs: S3AM-001-PR1 <i>Safe Work Standards and Rules</i> S3AM-002-PR1 <i>Stop Work Authority</i> S3AM-003-PR1 <i>Safety, Health, and Environment Training</i> S3AM-004-PR1 <i>Incident Reporting, Notifications, & Investigation</i> S3AM-005-PR1 <i>Driving</i> S3AM-007-PR1 <i>Behavior Based Safety</i> S3AM-008-PR1 <i>Fitness for Duty</i> S3AM-009-PR1 <i>Fatigue Management</i> S3AM-010-PR1 <i>Emergency Response Planning</i> S3AM-011-PR1 <i>Fire Protection</i> S3AM-012-PR1 <i>First Aid</i> S3AM-013-PR1 <i>Housekeeping</i> S3AM-014-PR1 <i>Manual Lifting</i> S3AM-016-PR1 <i>Ergonomics</i> S3AM-017-PR1 <i>Injury & Illness Recordkeeping</i> S3AM-018-PR1 <i>Injury & Claims Management</i> S3AM-019-PR1 <i>Substance Abuse Prevention</i>	S3AM-020-PR1 <i>Recognition & Rewards</i> S3AM-111-PR1 <i>Bloodborne Pathogens</i> S3AM-113-PR1 <i>Heat Stress</i> S3AM-115-PR1 <i>Hazardous Materials Communication</i> S3AM-117-PR1 <i>Hazardous Waste Operations</i> S3AM-121-PR1 <i>Non-Ionizing Radiation</i> S3AM-123-PR1 <i>Respiratory Protection</i> S3AM-127-PR1 <i>Exposure Monitoring</i> S3AM-128-PR1 <i>Medical Screening & Surveillance</i> S3AM-204-PR1 <i>Environmental Compliance</i> S3AM-208-PR1 <i>Personal Protective Equipment</i> S3AM-209-PR1 <i>Risk Assessment & Management</i> S3AM-211-PR1 <i>Regulatory Inspections</i> S3AM-216-PR1 <i>Compliance Assurance</i> S3AM-305-PR1 <i>Hand & Power Tools</i> S3AM-313-PR1 <i>Wildlife, Plants & Insect</i> S3AM-317-PR1 <i>Hand Safety</i>	

ACTIVITY HAZARD ANALYSIS (AHA)

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- Upon completion of the tailgate, all personnel will sign form, acknowledging attendance of tailgate meeting and presence onsite.

2. Required Level D Personal Protective Equipment (PPE):

- Steel-toed shoes or boots
- High-visibility reflective safety vest
- ANSI approved hardhat
- ANSI approved safety glasses with side shields
- Work gloves (millimeter nitrile)
- Sleeved work shirt

3. Additional PPE:

- USCG Type III or Type V personal flotation device
- Hip waders (if required)

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
1. Mobilize equipment and personnel to site.	<ul style="list-style-type: none"> Driving hazards Distracted driving 	4	<ul style="list-style-type: none"> Inspect vehicles for defects. Implement safe driving practices to prevent transportation incidents. Secure all loads, including equipment within the cab. Do not operate vehicles in unsafe conditions (e.g., on steep slopes, in deep mud). Use of handheld devices while driving is prohibited. Use devices when vehicle is parked. 	5

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
	<ul style="list-style-type: none"> Parking hazards 		<ul style="list-style-type: none"> When reversing, use caution and a spotter, if available. 	
2. Evaluate area for hazards (this should be performed regularly throughout the duration of the task).	<ul style="list-style-type: none"> Utilities Overhead hazards Slips, trips and falls Heat stress Biological hazards UV exposure Severe weather Fire Suspect surface MEC or MPPEH 	4	<ul style="list-style-type: none"> Check the area for potential overhead utility lines and obstructions such as trees. Personnel should take identify and take measurable cautionary steps to observe areas for hazards. Ensure that pathways are clear and free of obstruction prior to initiating work. Adhere to proper housekeeping practices. Use appropriate PPE (see Notes, items 2 and 3). Assess ambient temperature and begin heat stress monitoring if necessary. Avoid contact with insects. Tape clothing at openings to prevent insects from crawling onto skin. Conduct frequent checks for bites and other signs of insect or plant exposures. Change field clothing immediately at the end of the work day, or as soon as possible after. Segregate clothing that may contain insects or plant residue that could transfer to personal effects. Reapply sunscreen as necessary. When there are warnings or indications of severe weather, conditions should be monitored and precautions taken to protect personnel. During thunderstorms, all personnel must evacuate. Provide portable fire extinguishers in all equipment. Inspect fire extinguishers monthly. UXOQP will provide escort. 	5
3. Near-Shore Activities to include surface water and sediment sampling	<ul style="list-style-type: none"> Slips, trips, falls Biological hazards Adverse Weather 	3	<ul style="list-style-type: none"> Practice good housekeeping to keep the ground around the sampling location clear of obstructions, equipment and other tripping hazards. Wear appropriate foot protection to prevent slips and trips. Use caution when working on uneven and wet ground surfaces. If workers have the potential to get stuck in mud or fluidized sediment, air injection equipment designed to free workers feet/legs may need to be available onsite. At a minimum, a safety line should be available to be deployed from safe ground. If a worker does get stuck, they should not struggle as this causes further sinking. Use a pole to conduct sediment probing to assess water depths, the stability of shoreline terrain, and the bearing capacity of bottom sediments ahead of the chosen path. Take special care on slippery rocks along shorelines, lakeshores, riverbanks, and creeks. Always look ahead at the ground when walking around the water's edge and avoid stepping on stones that have algal growth. Waders may not be worn when working along, over, or in moving waters; or in waters influenced by tides or acted upon by waves when water depths exceed knee height unless specifically approved by the SH&E Manager. Waders may be worn in still waters in water depths up to the waist if bottom conditions are firm and well understood. Waders shall never be worn aboard a watercraft of any kind. Leather work gloves, or similar level of protection, shall be worn when walking in areas with a high potential for slip/trip (i.e. slippery rocks, riprap, etc.) to protect hands from coming in contact with sharp rocks and shells present along the shore. Assess work area for poisonous plants and animals and communicate observations to avoid them. If hazardous insects or plants such as ticks, poison oaks are identified or suspected in a work area, controls including the use of disposable (Tyvek) coveralls, insect repellent (23.8% DEET or similar), clothing treated with insecticide (Permethrin), light colored clothing, barrier creams, frequent tick checks should be implemented. Additionally, all field clothing and equipment should be thoroughly cleaned, removed and/or segregated from clean clothing, equipment and supplies to avoid transfer of hazardous plants/insects. All employees should bath immediately following fieldwork and use soaps/cleansers designed to remove oils associated with poison oak, and conduct a full body tick check using a mirror. Be aware of changing weather condition and provide appropriate weather gear; when work is halted due to inclement weather, personnel are to seek shelter in vehicles or building designated Shelter in Place (SIP) 	<p>4</p> <p>5</p> <p>4</p>

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Equipment to be Used	Competent/Qualified Personnel name(s)	Training Requirements	Inspection Requirements
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Pertinent SOPs:			
AECOM Americas SOPs:		S3AM-020-PR1	<i>Recognition & Rewards</i>
S3AM-001-PR1	<i>Safe Work Standards and Rules</i>	S3AM-111-PR1	<i>Bloodborne Pathogens</i>
S3AM-002-PR1	<i>Stop Work Authority</i>	S3AM-113-PR1	<i>Heat Stress</i>
S3AM-003-PR1	<i>Safety, Health, and Environment Training</i>	S3AM-115-PR1	<i>Hazardous Materials Communication</i>
S3AM-004-PR1	<i>Incident Reporting, Notifications, & Investigation</i>	S3AM-117-PR1	<i>Hazardous Waste Operations</i>
S3AM-005-PR1	<i>Driving</i>	S3AM-121-PR1	<i>Non-Ionizing Radiation</i>
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S3AM-012-PR1	<i>First Aid</i>	S3AM-209-PR1	<i>Risk Assessment & Management</i>
S3AM-013-PR1	<i>Housekeeping</i>	S3AM-211-PR1	<i>Regulatory Inspections</i>
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S3AM-016-PR1	<i>Ergonomics</i>	S3AM-305-PR1	<i>Hand & Power Tools</i>
S3AM-017-PR1	<i>Injury & Illness Recordkeeping</i>	S3AM-313-PR1	<i>Wildlife, Plants & Insect</i>
S3AM-018-PR1	<i>Injury & Claims Management</i>	S3AM-317-PR1	<i>Hand Safety</i>
S3AM-019-PR1	<i>Substance Abuse Prevention</i>		

ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task: Potable Water and Direct Sampling	Overall Risk Assessment Code (RAC)	4																																					
Project & Location: Phase I Remedial Investigation of PFAS, NBSFS, New Boston, NH	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" rowspan="2">Risk Assessment Code (RAC) Matrix</th> <th colspan="4">Mishap Probability Subcategory</th> </tr> <tr> <th>A. Likely to occur immediately or within a short period of time.</th> <th>B. Probably will occur in time.</th> <th>C. May occur in time.</th> <th>D. Unlikely to occur.</th> </tr> <tr> <td rowspan="4" style="writing-mode: vertical-rl; transform: rotate(180deg); text-align: center;">Hazard Severity Category</td> <td>I. May cause death, permanent total disability, or loss of a facility/asset.</td> <td style="background-color: red; text-align: center;">1</td> <td style="background-color: red; text-align: center;">1</td> <td style="background-color: orange; text-align: center;">2</td> <td style="background-color: yellow; text-align: center;">3</td> </tr> <tr> <td>II. May cause permanent partial disability, temporary total disability in excess of 90 days, or major property damage.</td> <td style="background-color: red; text-align: center;">1</td> <td style="background-color: orange; text-align: center;">2</td> <td style="background-color: yellow; text-align: center;">3</td> <td style="background-color: lightgreen; text-align: center;">4</td> </tr> <tr> <td>III. May cause minor injury, occupational illness, or property damage.</td> <td style="background-color: orange; text-align: center;">2</td> <td style="background-color: yellow; text-align: center;">3</td> <td style="background-color: lightgreen; text-align: center;">4</td> <td style="background-color: lightblue; text-align: center;">5</td> </tr> <tr> <td>IV. Presents minimal threat to personnel safety or health, or property, but is still in violation of a standard.</td> <td style="background-color: yellow; text-align: center;">3</td> <td style="background-color: lightgreen; text-align: center;">4</td> <td style="background-color: lightblue; text-align: center;">5</td> <td style="background-color: lightblue; text-align: center;">5</td> </tr> <tr> <td colspan="5"> Step 1: Identify each Job Step required for the Task that presents a hazard to those performing it Step 2: Identify the Hazards associated with each Job Step Step 3: Determine the unmitigated (uncontrolled) RAC based on the matrix above for each Job Step Step 4: Identify the Controls that will be implemented to mitigate the Hazards associated with each Job Step Step 5: Determine the mitigated RAC for each Controlled Hazard on the matrix above Step 6: Identify the Overall RAC for the Task based upon the highest mitigated RAC. </td> <td> RAC Definitions <div style="background-color: red; text-align: center; padding: 2px;">1- Critical</div> <div style="background-color: orange; text-align: center; padding: 2px;">2-Serious</div> <div style="background-color: yellow; text-align: center; padding: 2px;">3-Moderate</div> <div style="background-color: lightgreen; text-align: center; padding: 2px;">4-Minor</div> <div style="background-color: lightblue; text-align: center; padding: 2px;">5-Negligible</div> </td> </tr> </table>		Risk Assessment Code (RAC) Matrix		Mishap Probability Subcategory				A. Likely to occur immediately or within a short period of time.	B. Probably will occur in time.	C. May occur in time.	D. Unlikely to occur.	Hazard Severity Category	I. May cause death, permanent total disability, or loss of a facility/asset.	1	1	2	3	II. May cause permanent partial disability, temporary total disability in excess of 90 days, or major property damage.	1	2	3	4	III. May cause minor injury, occupational illness, or property damage.	2	3	4	5	IV. Presents minimal threat to personnel safety or health, or property, but is still in violation of a standard.	3	4	5	5	Step 1: Identify each Job Step required for the Task that presents a hazard to those performing it Step 2: Identify the Hazards associated with each Job Step Step 3: Determine the unmitigated (uncontrolled) RAC based on the matrix above for each Job Step Step 4: Identify the Controls that will be implemented to mitigate the Hazards associated with each Job Step Step 5: Determine the mitigated RAC for each Controlled Hazard on the matrix above Step 6: Identify the Overall RAC for the Task based upon the highest mitigated RAC.					RAC Definitions <div style="background-color: red; text-align: center; padding: 2px;">1- Critical</div> <div style="background-color: orange; text-align: center; padding: 2px;">2-Serious</div> <div style="background-color: yellow; text-align: center; padding: 2px;">3-Moderate</div> <div style="background-color: lightgreen; text-align: center; padding: 2px;">4-Minor</div> <div style="background-color: lightblue; text-align: center; padding: 2px;">5-Negligible</div>
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Contract Number: W912WJ-19-D-0003 Delivery Order: W912WJ22F0102																																							
Date Prepared: 01/12/2023																																							
Prepared by (Name/Title): Richard Purdy/SH&E Specialist																																							
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Notes: (Field Notes, Review Comments, etc.)																																							

1. All field tasks will be proceeded with a daily tailgate meeting where the following will be discussed:

- Site Safety and Health Officer (SSHO) will ensure that all field personnel have donned the appropriate PPE (items 2 and 3, below), including sunscreen (minimum SPF of 30) and insect repellent as necessary.
- Discussed tasks to be performed, including review of all pertinent AHAs covering potential hazards and control measures.
- Make modifications to AHAs, as necessary.
- Review pertinent SDSs
- All field workers will be informed of emergency contact information and hospital routes.
- Upon completion of the tailgate, all personnel will sign form, acknowledging attendance of tailgate meeting and presence onsite.

2. Required Level D Personal Protective Equipment (PPE):

- Steel-toed shoes or boots
- High-visibility reflective safety vest
- ANSI approved hardhat
- ANSI approved safety glasses with side shields
- Work gloves (millimeter nitrile)
- Sleeved work shirt

3. Additional PPE:

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
1. Mobilize equipment and personnel to site.	<ul style="list-style-type: none"> Driving hazards Distracted driving Parking hazards 	4	<ul style="list-style-type: none"> Inspect vehicles for defects. Implement safe driving practices to prevent transportation incidents. Secure all loads, including equipment within the cab. Do not operate vehicles in unsafe conditions (e.g., on steep slopes, in deep mud). Use of handheld devices while driving is prohibited. Use devices when vehicle is parked. When reversing, use caution and a spotter, if available. 	5

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
2. Evaluate area for hazards (this should be performed regularly throughout the duration of the task).	<ul style="list-style-type: none"> Utilities Overhead hazards Slips, trips and falls Heat stress Biological hazards UV exposure Severe weather Fire 	4	<ul style="list-style-type: none"> Check the area for potential overhead utility lines and obstructions such as trees. Personnel should take identify and take measurable cautionary steps to observe areas for hazards. Ensure that pathways are clear and free of obstruction prior to initiating work. Adhere to proper housekeeping practices. Use appropriate PPE (see Notes, items 2 and 3). Assess ambient temperature and begin heat stress monitoring if necessary. Avoid contact with insects. Tape clothing at openings to prevent insects from crawling onto skin. Conduct frequent checks for bites and other signs of insect or plant exposures. Change field clothing immediately at the end of the work day, or as soon as possible after. Segregate clothing that may contain insects or plant residue that could transfer to personal effects. Reapply sunscreen as necessary. When there are warnings or indications of severe weather, conditions should be monitored and precautions taken to protect personnel. During thunderstorms, all personnel must evacuate. Provide portable fire extinguishers in all equipment. Inspect fire extinguishers monthly. 	5
3. Sampling Set Up	<ul style="list-style-type: none"> Chemical exposure Muscle strain Hand tools (wrench) 	4	<ul style="list-style-type: none"> Use proper lifting and body posing Use appropriate PPE (see Notes, items 2 and 3). Inspect integrity of sample containers and sample collection train prior to use. 	4
4. Sample Collection (Exterior spigot or sample tap)	<ul style="list-style-type: none"> General Hazards Chemical exposure Inadequate probe labeling Pressurized hoses 	3	<ul style="list-style-type: none"> Obtain owner's or occupants' permission prior to sampling; use buddy system or stay in visual contact of AECOM personnel; notify FM or SSHO if indoor sampling is required; maintain awareness of biological and physical hazards. Inspect integrity of sample containers and sample collection train during use. Fill sample containers to the instructed level. Do not overfill. Use appropriate PPE (see Notes, items 2 and 3). Ensure sample labels match sample location label 	4
5. Equipment Decontamination	<ul style="list-style-type: none"> Chemical exposure Muscle strain Pressurized hoses 	4	<ul style="list-style-type: none"> Use appropriate PPE (see Notes, items 2 and 3). Arrange decontamination area in an organized fashion with enough room to efficient perform decontamination procedures. Spray alcohol and Alconox away from the body in a downwind direction. Collect spent decontamination liquid in appropriate containers or drums Ask for assistance when working with drums or drum lids. Decontaminate in a well-ventilated area. 	5

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
Additional job steps/hazards identified by the Subcontractor or others in the field: Note: If any additional job tasks or hazards identified results in a revised overall RAC that is greater than that listed, stop work and submit the revised AHA to the SHM and PM for review.				
6.				

Equipment to be Used	Competent/Qualified Personnel name(s)	Training Requirements	Inspection Requirements
<ul style="list-style-type: none"> PID (Honeywell MiniRAE 3000+ or equivalent) Monitoring equipment (YSI, turbidity meter) Hand tools (wrench) 	SSHO: Richard Purdy FM: First Aid/CPR:	<ul style="list-style-type: none"> 30-Hr OSHA Construction (or equivalent): SSHO 40-Hr HAZWOPER: All field personnel 8-Hr HAZWOPER refresher: All field personnel 	<ul style="list-style-type: none"> Inspection of all tools and equipment prior to use to ensure they are in good working condition. Calibrate instruments daily as recommended by the manufacturers.

Pertinent SOPs:			
AECOM Americas SOPs: S3AM-001-PR1 <i>Safe Work Standards and Rules</i> S3AM-002-PR1 <i>Stop Work Authority</i> S3AM-003-PR1 <i>Safety, Health, and Environment Training</i> S3AM-004-PR1 <i>Incident Reporting, Notifications, & Investigation</i> S3AM-005-PR1 <i>Driving</i> S3AM-007-PR1 <i>Behavior Based Safety</i> S3AM-008-PR1 <i>Fitness for Duty</i> S3AM-009-PR1 <i>Fatigue Management</i> S3AM-010-PR1 <i>Emergency Response Planning</i> S3AM-011-PR1 <i>Fire Protection</i> S3AM-012-PR1 <i>First Aid</i> S3AM-013-PR1 <i>Housekeeping</i> S3AM-014-PR1 <i>Manual Lifting</i> S3AM-016-PR1 <i>Ergonomics</i> S3AM-017-PR1 <i>Injury & Illness Recordkeeping</i> S3AM-018-PR1 <i>Injury & Claims Management</i> S3AM-019-PR1 <i>Substance Abuse Prevention</i>		S3AM-020-PR1 <i>Recognition & Rewards</i> S3AM-111-PR1 <i>Bloodborne Pathogens</i> S3AM-113-PR1 <i>Heat Stress</i> S3AM-115-PR1 <i>Hazardous Materials Communication</i> S3AM-117-PR1 <i>Hazardous Waste Operations</i> S3AM-121-PR1 <i>Non-Ionizing Radiation</i> S3AM-123-PR1 <i>Respiratory Protection</i> S3AM-127-PR1 <i>Exposure Monitoring</i> S3AM-128-PR1 <i>Medical Screening & Surveillance</i> S3AM-204-PR1 <i>Environmental Compliance</i> S3AM-208-PR1 <i>Personal Protective Equipment</i> S3AM-209-PR1 <i>Risk Assessment & Management</i> S3AM-211-PR1 <i>Regulatory Inspections</i> S3AM-216-PR1 <i>Compliance Assurance</i> S3AM-305-PR1 <i>Hand & Power Tools</i> S3AM-313-PR1 <i>Wildlife, Plants & Insect</i> S3AM-317-PR1 <i>Hand Safety</i>	

ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task: Soil Sampling with Hand Auger or Trowel	Overall Risk Assessment Code (RAC)	4																																					
Project & Location: Phase I Remedial Investigation of PFAS, NBSFS, New Boston, NH	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" rowspan="2" style="padding: 5px;">Risk Assessment Code (RAC) Matrix</th> <th colspan="4" style="padding: 5px;">Mishap Probability Subcategory</th> </tr> <tr> <th style="padding: 5px;">A. Likely to occur immediately or within a short period of time.</th> <th style="padding: 5px;">B. Probably will occur in time.</th> <th style="padding: 5px;">C. May occur in time.</th> <th style="padding: 5px;">D. Unlikely to occur.</th> </tr> <tr> <td rowspan="4" style="padding: 5px; text-align: center; vertical-align: middle;">Hazard Severity Category</td> <td style="padding: 5px;">I. May cause death, permanent total disability, or loss of a facility/asset.</td> <td style="padding: 5px; text-align: center;">1</td> <td style="padding: 5px; text-align: center;">1</td> <td style="padding: 5px; text-align: center;">2</td> <td style="padding: 5px; text-align: center;">3</td> </tr> <tr> <td style="padding: 5px;">II. May cause permanent partial disability, temporary total disability in excess of 90 days, or major property damage.</td> <td style="padding: 5px; text-align: center;">1</td> <td style="padding: 5px; text-align: center;">2</td> <td style="padding: 5px; text-align: center;">3</td> <td style="padding: 5px; text-align: center;">4</td> </tr> <tr> <td style="padding: 5px;">III. May cause minor injury, occupational illness, or property damage.</td> <td style="padding: 5px; text-align: center;">2</td> <td style="padding: 5px; text-align: center;">3</td> <td style="padding: 5px; text-align: center;">4</td> <td style="padding: 5px; text-align: center;">5</td> </tr> <tr> <td style="padding: 5px;">IV. Presents minimal threat to personnel safety or health, or property, but is still in violation of a standard.</td> <td style="padding: 5px; text-align: center;">3</td> <td style="padding: 5px; text-align: center;">4</td> <td style="padding: 5px; text-align: center;">5</td> <td style="padding: 5px; text-align: center;">5</td> </tr> <tr> <td colspan="5" style="padding: 5px;"> Step 1: Identify each Job Step required for the Task that presents a hazard to those performing it Step 2: Identify the Hazards associated with each Job Step Step 3: Determine the unmitigated (uncontrolled) RAC based on the matrix above for each Job Step Step 4: Identify the Controls that will be implemented to mitigate the Hazards associated with each Job Step Step 5: Determine the mitigated RAC for each Controlled Hazard on the matrix above Step 6: Identify the Overall RAC for the Task based upon the highest mitigated RAC. </td> <td style="padding: 5px; text-align: center;"> RAC Definitions 1- Critical 2-Serious 3-Moderate 4-Minor 5-Negligible </td> </tr> </table>		Risk Assessment Code (RAC) Matrix		Mishap Probability Subcategory				A. Likely to occur immediately or within a short period of time.	B. Probably will occur in time.	C. May occur in time.	D. Unlikely to occur.	Hazard Severity Category	I. May cause death, permanent total disability, or loss of a facility/asset.	1	1	2	3	II. May cause permanent partial disability, temporary total disability in excess of 90 days, or major property damage.	1	2	3	4	III. May cause minor injury, occupational illness, or property damage.	2	3	4	5	IV. Presents minimal threat to personnel safety or health, or property, but is still in violation of a standard.	3	4	5	5	Step 1: Identify each Job Step required for the Task that presents a hazard to those performing it Step 2: Identify the Hazards associated with each Job Step Step 3: Determine the unmitigated (uncontrolled) RAC based on the matrix above for each Job Step Step 4: Identify the Controls that will be implemented to mitigate the Hazards associated with each Job Step Step 5: Determine the mitigated RAC for each Controlled Hazard on the matrix above Step 6: Identify the Overall RAC for the Task based upon the highest mitigated RAC.					RAC Definitions 1- Critical 2-Serious 3-Moderate 4-Minor 5-Negligible
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Prepared by (Name/Title): Matt Heppleston/Geologist																																							
Reviewed by (Name/Title):																																							
Notes: (Field Notes, Review Comments, etc.)																																							

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- Discussed tasks to be performed, including review of all pertinent AHAs covering potential hazards and control measures.
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- Upon completion of the tailgate, all personnel will sign form, acknowledging attendance of tailgate meeting and presence onsite.

2. Required Level D Personal Protective Equipment (PPE):

- Steel-toed shoes or boots
- High-visibility reflective safety vest
- ANSI approved hardhat
- ANSI approved safety glasses with side shields
- Work gloves (millimeter nitrile)
- Sleeved work shirt

3. Additional PPE:

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
1. Mobilize equipment and personnel to site.	<ul style="list-style-type: none"> Driving hazards Distracted driving Parking hazards 	3	<ul style="list-style-type: none"> Inspect vehicles for defects. Implement safe driving practices to prevent transportation incidents. Secure all loads, including equipment within the cab. Do not operate vehicles in unsafe conditions (e.g., on steep slopes, in deep mud). Use of handheld devices while driving is prohibited. Use devices when vehicle is parked. When reversing, use caution and a spotter, if available. 	5

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
2. Evaluate area for hazards (this should be performed regularly throughout the duration of the task).	<ul style="list-style-type: none"> Utilities Overhead hazards Slips, trips and falls Heat stress Biological hazards UV exposure Severe weather Fire Suspect surface MEC or MPPEH 	3	<ul style="list-style-type: none"> Check the area for potential overhead utility lines and obstructions such as trees. Personnel should take identify and take measurable cautionary steps to observe areas for hazards. Ensure that pathways are clear and free of obstruction prior to initiating work. Adhere to proper housekeeping practices. Use appropriate PPE (see Notes, items 2 and 3). Assess ambient temperature and begin heat stress monitoring if necessary. Avoid contact with insects. Tape clothing at openings to prevent insects from crawling onto skin. Conduct frequent checks for bites and other signs of insect or plant exposures. Change field clothing immediately at the end of the work day, or as soon as possible after. Segregate clothing that may contain insects or plant residue that could transfer to personal effects. Reapply sunscreen as necessary. When there are warnings or indications of severe weather, conditions should be monitored and precautions taken to protect personnel. During thunderstorms, all personnel must evacuate. Provide portable fire extinguishers in all equipment. Inspect fire extinguishers monthly. Clear the work area of trip hazards. Walk around bore hole, never over it and cover hole with delineator when unattended Prior to soil sampling, UXOQP will visually inspect each proposed soil sample location and use a hand-held detector to detect subsurface anomalies. If an anomaly is detected, a new location will be selected. 	5
3. Advancing Hand Auger	<ul style="list-style-type: none"> Contacting utilities causing serious personal injury or death Back strain or pulled muscle from rotating hand auger Injury to eyes from flying debris. MEC 	2	<ul style="list-style-type: none"> 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 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. If it is windy, stand upwind and switch to goggles to prevent dirt entering eye. Prior to soil sampling, UXOQP will visually inspect each proposed soil sample location and use a hand-held detector to detect subsurface anomalies. If suspect surface MEC, MPPEH, or an anomaly is detected, a new location will be selected. Soil sample excavations will be incrementally monitored by the UXOQP every 12-inches. Soil sampling will be conducted implementing incremental anomaly avoidance procedures by a UXOQP in 12-inch intervals until the maximum depth of sampling is reached, bedrock is encountered, or 12 feet below ground surface is reached, whichever occurs first. During the detector subsurface anomaly checks at 12-inch intervals, all metallic equipment will be moved far enough away from the detection location or area so they don't interfere with the detector or mask any metallic subsurface anomalies. If an anomaly is detected, the excavation will be backfilled in accordance with project specific procedures and the field team will select a new location. 	5
4. Collecting soil samples	<ul style="list-style-type: none"> Contact with contaminated soil Cut from handling auger, sampling tools, jars Muscle strain in back or legs from bending over or squatting 	4	<ul style="list-style-type: none"> 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 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. Evaluate work surface height (see if chair/ table needed) and sample jar placement to eliminate ergonomic issues. Avoid squatting and bending Stretch and flex 	5

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
5. Adding extensions to auger	<ul style="list-style-type: none"> Cuts or hand injuries from pinch points Striking another person Contacting overhead structure 	2	<ul style="list-style-type: none"> Avoid placing hands near connection points of extensions and avoid the sharp edges of the auger cup. Wear cut resistant gloves at all times Check that the swing radius of the auger is clear before moving it 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 	5
6. Breakdown and decontaminate equipment	<ul style="list-style-type: none"> Chemical exposure Breaking a sample container resulting in cut, or contact with contents/preservatives Striking another person 	4	<ul style="list-style-type: none"> 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. 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. Before disassembling auger, verify that no one is in the swing radius. 	5
<p>Additional job steps/hazards identified by the Subcontractor or others in the field:</p> <p>Note: If any additional job tasks or hazards identified results in a revised overall RAC that is greater than that listed, stop work and submit the revised AHA to the SHM and PM for review.</p>				
7.				

Equipment to be Used	Competent/Qualified Personnel name(s)	Training Requirements	Inspection Requirements
<ul style="list-style-type: none"> PID (Honeywell MiniRAE 3000+ or equivalent) Soil Sampling Equipment (Hand auger, trowels) Hand tools (wrenches, hammer) Sampling tools (trowels, mixing bowl) Handheld magnetometer Borehole gradiometer 	SSHO: Richard Purdy FM: First Aid/CPR: UXOQP: Shannon Linnane	<ul style="list-style-type: none"> 30-Hr OSHA Construction (or equivalent): SSHO 40-Hr HAZWOPER: All field personnel 8-Hr HAZWOPER refresher: All field personnel DDESB TP 18 UXO qualified Technician 	<ul style="list-style-type: none"> Inspection of all tools and equipment prior to use to ensure they are in good working condition. Calibrate instruments daily as recommended by the manufacturers. UXOQP will be responsible for performing tests on their instruments to verify that their detectors are in proper working condition each morning and also throughout the day to verify instrument functionality.

Pertinent SOPs:		
AECOM Americas SOPs:		
S3AM-001-PR1	<i>Safe Work Standards and Rules</i>	S3AM-020-PR1 <i>Recognition & Rewards</i>
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ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task: Investigation Derived Waste Management	Overall Risk Assessment Code (RAC)				4																																					
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Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
1. Secure work area	<ul style="list-style-type: none"> Struck by traffic Hunting / Shooting Dog or Small Mammal Encounters 	3	<ul style="list-style-type: none"> Establish work area so that each site vehicle used for activity are in close proximity of each other; this would prevent unnecessary trips outside of work zone and into potential traffic area. Establish barricaded area using cones and barricade tape. Wear required highly visible clothing. Wear blaze or hunter orange hi-visibility vest or outer clothing; wear orange hat; wear safety glasses; avoid site work at dusk and low-light conditions; limit site work during hunting seasons (fall and early winter). Do not attempt to pet or engage animals; be conscious of behaviors that could indicate the animal feels anxious or threatened, such as flattened ears, tail held down low and close to the body, lips pulled back to expose teeth, growling, or other defensive or aggressive actions; should an animal approach and display negative or threatening behaviors, calmly get inside vehicles and/or leave the area – DO NOT RUN as this may cause the animal to give chase. 	5
2. Prepare work area	<ul style="list-style-type: none"> Trips & falls Tools and emergency equipment not present 	4	<ul style="list-style-type: none"> Clear any trip/fall hazards from work area. Scan ground prior to moving or walking Obtain tools and emergency equipment and stage adjacent to work area 	5
3. Remove drum lid	<ul style="list-style-type: none"> Pinch points at drum ring Sharp edges on drum ring or rim 	4	<ul style="list-style-type: none"> 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) Evaluate rim and ring for sharp edges, avoid handling as much as possible. Wear cut resistant gloves 	5
4. Load soil into drums	<ul style="list-style-type: none"> Exertion/sprains/strains Sharp edges on drum rim Exposure to contaminants Slips/trips/falls 	2	<ul style="list-style-type: none"> 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. Inspect rim for sharp and rough edges, avoid leaning into drum or placing hands onto rim edge; wear cut-resistant gloves 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. Be alert for uneven and slippery terrain. Keep tools and equipment away from walking paths. 	4
5. Replacing drum ring	<ul style="list-style-type: none"> Pinch points 	4	<ul style="list-style-type: none"> 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) 	5
6. Moving/relocating drums	<ul style="list-style-type: none"> Exertion Trips and Falls 	2	<ul style="list-style-type: none"> 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. 	4

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
Additional job steps/hazards identified by the Subcontractor or others in the field: Note: If any additional job tasks or hazards identified results in a revised overall RAC that is greater than that listed, stop work and submit the revised AHA to the SHM and PM for review.				
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Equipment to be Used	Competent/Qualified Personnel name(s)	Training Requirements	Inspection Requirements
<ul style="list-style-type: none"> PID (Honeywell MiniRAE 3000+ or equivalent) Hand tools (Ratchet/ wrench, bungle wrench) 	SSHO: Richard Purdy FM: First Aid/CPR:	<ul style="list-style-type: none"> 30-Hr OSHA Construction (or equivalent): SSHO 40-Hr HAZWOPER: All field personnel 8-Hr HAZWOPER refresher: All field personnel 	<ul style="list-style-type: none"> Inspection of all tools and equipment prior to use to ensure they are in good working condition. Calibrate instruments daily as recommended by the manufacturers.

Pertinent SOPs:			
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ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task: Gauging Groundwater Monitoring Wells	Overall Risk Assessment Code (RAC)				4																																					
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Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
1. Visually clear proposed gauging locations	<ul style="list-style-type: none"> Exposure to biologic hazards: insects, poisonous plants and animals. Injuries could include anaphylactic shock, allergic reaction, rabies Damage to equipment or vehicles due to surface / subsurface obstructions Slips / trips / falls due to uneven terrain resulting in broken bones or torn ligaments. 	4	<ul style="list-style-type: none"> 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 Investigate travel path. Look for surface obstructions such as rubble, debris, old foundations or rebar. Use spotter is available or park in such a manner as to not have to back-up Identify, mark and avoid slip, trip and fall hazards (holes, obstructions protruding from the ground, or debris). Contact PM immediately and do not proceed if any conditions are observed that cannot be controlled to make well gauging in the area safe. Visually inspect roadway for moving equipment if walking and set up vehicle as a barrier if driving. Set up exclusion zone around each well. Don reflective vest 	5
2. Opening well casings / flush-mount covers and well plug lock	<ul style="list-style-type: none"> Cuts/ lacerations / crushing, bruises Back strain Vapor exposure resulting in inhalation hazards or illness Biologic hazards: insects, poisonous plants, and animals 	4	<ul style="list-style-type: none"> 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, d on knee pads. Stretch before working. DO NOT use awkward positioning. Keep back straight. Take regular rest/stretch breaks. Change position regularly. 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. Slowly lift the well cover away from person and look for insects underneath the well. Use long handle tool to remove or kill any insects (i.e. screwdriver) 	5
3. Lowering fluid meter probe and measuring tape to detect fluid level and total depth	<ul style="list-style-type: none"> Cuts / lacerations / bruises to knees (flush mount) Aches and strains from repetitive motion Exposure to chemical hazards in 	4	<ul style="list-style-type: none"> Inspect ground before kneeling. Remove any objects. Don knee pads Do not use awkward positioning. Keep back straight, take regular rest/stretch breaks. Change position regularly. Use smooth movements to avoid splashes. Don nitrile gloves over cut resistant gloves and safety glasses with side shields. Check gloves for damages/ rips. 	5

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
	groundwater resulting in skin irritation or illness			
4. Removing fluid meter measuring tape and probe from well	<ul style="list-style-type: none"> Exposure to chemical hazards in groundwater resulting in inhalation hazard or illness Cross contamination of equipment Cuts / lacerations / bruises to knees (flush mount) Aches and strains from repetitive motion Trips / falls from entanglement in measuring tape 	4	<ul style="list-style-type: none"> Stay upwind to avoid vapor exposure. 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 Don knee pads and inspect ground before kneeling down and take frequent breaks to stand and stretch. Check for location of measuring tape before walking or moving around. 	5
5. Closing well casings/ flush-mount covers	<ul style="list-style-type: none"> Cuts / lacerations / crushing / bruises Back strain from heavy / awkward materials handling 	4	<ul style="list-style-type: none"> Avoid touching sharp materials/ edges. Keep face, hands, fingers, and feet clear when opening and closing well cover. Don knee pads and inspect ground before kneeling down Keep back straight. Take regular rest/stretch breaks. Change position regularly. Verify that well covers are secure upon departure. 	5
6. Gather gauging equipment and tools, place in work vehicle	<ul style="list-style-type: none"> Cuts / lacerations / crushing / bruises from gathering or dropping equipment Aches and strains from improper lifting 	4	<ul style="list-style-type: none"> Maintain a secure grip on equipment and only carry manageable amount of equipment when demobilizing. 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). Verify all tools and equipment are removed from the site. 	5

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
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Equipment to be Used	Competent/Qualified Personnel name(s)	Training Requirements	Inspection Requirements
<ul style="list-style-type: none"> PID (Honeywell MiniRAE 3000+ or equivalent) Fluid Meter Probe Hand tools (wrench) 	SSHO: Richard Purdy FM: First Aid/CPR:	<ul style="list-style-type: none"> 30-Hr OSHA Construction (or equivalent): SSHO 40-Hr HAZWOPER: All field personnel 8-Hr HAZWOPER refresher: All field personnel 	<ul style="list-style-type: none"> Inspection of all tools and equipment prior to use to ensure they are in good working condition. Calibrate instruments daily as recommended by the manufacturers.

Pertinent SOPs:			
AECOM Americas SOPs: S3AM-001-PR1 <i>Safe Work Standards and Rules</i> S3AM-002-PR1 <i>Stop Work Authority</i> S3AM-003-PR1 <i>Safety, Health, and Environment Training</i> S3AM-004-PR1 <i>Incident Reporting, Notifications, & Investigation</i> S3AM-005-PR1 <i>Driving</i> S3AM-007-PR1 <i>Behavior Based Safety</i> S3AM-008-PR1 <i>Fitness for Duty</i> S3AM-009-PR1 <i>Fatigue Management</i> S3AM-010-PR1 <i>Emergency Response Planning</i> S3AM-011-PR1 <i>Fire Protection</i> S3AM-012-PR1 <i>First Aid</i> S3AM-013-PR1 <i>Housekeeping</i> S3AM-014-PR1 <i>Manual Lifting</i> S3AM-016-PR1 <i>Ergonomics</i> S3AM-017-PR1 <i>Injury & Illness Recordkeeping</i> S3AM-018-PR1 <i>Injury & Claims Management</i> S3AM-019-PR1 <i>Substance Abuse Prevention</i>		S3AM-020-PR1 <i>Recognition & Rewards</i> S3AM-111-PR1 <i>Bloodborne Pathogens</i> S3AM-113-PR1 <i>Heat Stress</i> S3AM-115-PR1 <i>Hazardous Materials Communication</i> S3AM-117-PR1 <i>Hazardous Waste Operations</i> S3AM-121-PR1 <i>Non-Ionizing Radiation</i> S3AM-123-PR1 <i>Respiratory Protection</i> S3AM-127-PR1 <i>Exposure Monitoring</i> S3AM-128-PR1 <i>Medical Screening & Surveillance</i> S3AM-204-PR1 <i>Environmental Compliance</i> S3AM-208-PR1 <i>Personal Protective Equipment</i> S3AM-209-PR1 <i>Risk Assessment & Management</i> S3AM-211-PR1 <i>Regulatory Inspections</i> S3AM-216-PR1 <i>Compliance Assurance</i> S3AM-305-PR1 <i>Hand & Power Tools</i> S3AM-313-PR1 <i>Wildlife, Plants & Insect</i> S3AM-317-PR1 <i>Hand Safety</i>	

ACTIVITY HAZARD ANALYSIS (AHA)

Activity/Work Task: Surface Water and Sediment Sampling	Overall Risk Assessment Code (RAC)				3																																					
Project & Location: Phase I Remedial Investigation of PFAS, NBSFS, New Boston, NH	<table border="1"> <tr> <th colspan="2" rowspan="2">Risk Assessment Code (RAC) Matrix</th> <th colspan="4">Mishap Probability Subcategory</th> </tr> <tr> <th>A. Likely to occur immediately or within a short period of time.</th> <th>B. Probably will occur in time.</th> <th>C. May occur in time.</th> <th>D. Unlikely to occur.</th> </tr> <tr> <td rowspan="4">Hazard Severity Category</td> <td>I. May cause death, permanent total disability, or loss of a facility/asset.</td> <td>1</td> <td>1</td> <td>2</td> <td>3</td> </tr> <tr> <td>II. May cause permanent partial disability, temporary total disability in excess of 90 days, or major property damage.</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>III. May cause minor injury, occupational illness, or property damage.</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> </tr> <tr> <td>IV. Presents minimal threat to personnel safety or health, or property, but is still in violation of a standard.</td> <td>3</td> <td>4</td> <td>5</td> <td>5</td> </tr> <tr> <td colspan="5"> Step 1: Identify each Job Step required for the Task that presents a hazard to those performing it Step 2: Identify the Hazards associated with each Job Step Step 3: Determine the unmitigated (uncontrolled) RAC based on the matrix above for each Job Step Step 4: Identify the Controls that will be implemented to mitigate the Hazards associated with each Job Step Step 5: Determine the mitigated RAC for each Controlled Hazard on the matrix above Step 6: Identify the Overall RAC for the Task based upon the highest mitigated RAC. </td> <td> RAC Definitions 1- Critical 2-Serious 3-Moderate 4-Minor 5-Negligible </td> </tr> </table>					Risk Assessment Code (RAC) Matrix		Mishap Probability Subcategory				A. Likely to occur immediately or within a short period of time.	B. Probably will occur in time.	C. May occur in time.	D. Unlikely to occur.	Hazard Severity Category	I. May cause death, permanent total disability, or loss of a facility/asset.	1	1	2	3	II. May cause permanent partial disability, temporary total disability in excess of 90 days, or major property damage.	1	2	3	4	III. May cause minor injury, occupational illness, or property damage.	2	3	4	5	IV. Presents minimal threat to personnel safety or health, or property, but is still in violation of a standard.	3	4	5	5	Step 1: Identify each Job Step required for the Task that presents a hazard to those performing it Step 2: Identify the Hazards associated with each Job Step Step 3: Determine the unmitigated (uncontrolled) RAC based on the matrix above for each Job Step Step 4: Identify the Controls that will be implemented to mitigate the Hazards associated with each Job Step Step 5: Determine the mitigated RAC for each Controlled Hazard on the matrix above Step 6: Identify the Overall RAC for the Task based upon the highest mitigated RAC.					RAC Definitions 1- Critical 2-Serious 3-Moderate 4-Minor 5-Negligible
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Date Prepared: 01/16/2023																																										
Prepared by (Name/Title): Matt Heppleston/Geologist																																										
Reviewed by (Name/Title):																																										
Notes: (Field Notes, Review Comments, etc.)																																										
<p>1. All field tasks will be proceeded with a daily tailgate meeting where the following will be discussed:</p> <ul style="list-style-type: none"> Site Safety and Health Officer (SSHO) will ensure that all field personnel have donned the appropriate PPE (items 2 and 3, below), including sunscreen (minimum SPF of 30) and insect repellent as necessary. Discussed tasks to be performed, including review of all pertinent AHAs covering potential hazards and control measures. Make modifications to AHAs, as necessary. Review pertinent SDSs All field workers will be informed of emergency contact information and hospital routes. Upon completion of the tailgate, all personnel will sign form, acknowledging attendance of tailgate meeting and presence onsite. <p>2. Required Level D Personal Protective Equipment (PPE):</p> <ul style="list-style-type: none"> Steel-toed shoes or boots High-visibility reflective safety vest ANSI approved hardhat ANSI approved safety glasses with side shields Work gloves (millimeter nitrile) Sleeved work shirt <p>3. Additional PPE:PFD and waders.</p>																																										

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
1. Equipment setup	<ul style="list-style-type: none"> Cuts or hand injuries from pinch points Back strain/ overexertion when unloading equipment 	4	<ul style="list-style-type: none"> Inspect tools. If broken welds or cracks – STOP WORK. Wear cut resistant gloves when working with tools. Keep face, hands, fingers, and feet out of the line of fire of moving parts and tools 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. Stage sampling equipment on the shore of the water body where the sample will be collected (samples to be collected from shore) 	5
2. Sample collection	<ul style="list-style-type: none"> Slips, Trips, Falls Worker stuck/sinking in mud Contact with contaminated soil/water. Cut from handling auger, sampling tools, jars Muscle strain in back or legs from bending over or squatting MEC 	2	<ul style="list-style-type: none"> Use appropriate PPE (see Notes, items 2 and 3). Practice good housekeeping to keep the ground around the sampling location clear of obstructions, equipment and other tripping hazards Wear appropriate foot protection. Use caution when working on uneven ground surfaces. If workers have the potential to get stuck in mud or fluidized sediment, air injection equipment designed to free workers' feet/legs may need to be available onsite. At a minimum, a safety line should be available to be deployed from safe ground. If a worker does get stuck, they should not struggle as this causes further sinking. Use a pole to conduct sediment probing to assess water depths, the stability of shoreline terrain, and the bearing capacity of bottom sediments ahead of the chosen path. Have a buddy present when within 3 feet of water. Refer to 'Working Near Water' AHA for more information. 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 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. Evaluate work surface height (see if chair/ table needed) and sample jar placement to eliminate ergonomic issues. Avoid squatting and bending. Prior to the collection of sediment samples, UXOQP will visually inspect each proposed sediment sample location and use a hand-held detector to detect subsurface anomalies. If suspect surface MEC, MPPEH, or an anomaly is detected, a new location will be selected. 	5
3. Breakdown and decontamination	<ul style="list-style-type: none"> Contact with contaminants and cut hazards Breaking a sample container resulting in cut, or contact with contents/preservatives Striking another person 	4	<ul style="list-style-type: none"> Use appropriate PPE (see Notes, items 2 and 3). Arrange decontamination area in an organized fashion with enough room to efficient perform decontamination procedures. Decontaminate in a well-ventilated area. 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. 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. Spray alcohol and Alconox away from the body in a downwind direction. Collect spent decontamination liquid in appropriate containers or drums Ask for assistance when working with drums or drum lids. Before moving equipment, verify that no one is in the swing radius. 	5

Job Steps	Hazards	Unmitigated RAC	Controls	Mitigated RAC
Additional job steps/hazards identified by the Subcontractor or others in the field: Note: If any additional job tasks or hazards identified results in a revised overall RAC that is greater than that listed, stop work and submit the revised AHA to the SHM and PM for review.				
4.				

Equipment to be Used	Competent/Qualified Personnel name(s)	Training Requirements	Inspection Requirements
<ul style="list-style-type: none"> PID (Honeywell MiniRAE 3000+ or equivalent) GW Monitoring equipment (YSI, turbidity meter) Sampling Equipment (Hand augers, trowels) Handheld magnetometer 	SSHO: Richard Purdy FM: First Aid/CPR: UXOQP: Shannon Linnane	<ul style="list-style-type: none"> 30-Hr OSHA Construction (or equivalent): SSHO 40-Hr HAZWOPER: All field personnel 8-Hr HAZWOPER refresher: All field personnel DDESB TP 18 UXO qualified Technician 	<ul style="list-style-type: none"> Inspection of all tools and equipment prior to use to ensure they are in good working condition. Calibrate instruments daily as recommended by the manufacturers. UXOQP will be responsible for performing tests on their instruments to verify that their detectors are in proper working condition each morning and also throughout the day to verify instrument functionality.

Pertinent SOPs:		
AECOM Americas SOPs: S3AM-001-PR1 <i>Safe Work Standards and Rules</i> S3AM-002-PR1 <i>Stop Work Authority</i> S3AM-003-PR1 <i>Safety, Health, and Environment Training</i> S3AM-004-PR1 <i>Incident Reporting, Notifications, & Investigation</i> S3AM-005-PR1 <i>Driving</i> S3AM-007-PR1 <i>Behavior Based Safety</i> S3AM-008-PR1 <i>Fitness for Duty</i> S3AM-009-PR1 <i>Fatigue Management</i> S3AM-010-PR1 <i>Emergency Response Planning</i> S3AM-011-PR1 <i>Fire Protection</i> S3AM-012-PR1 <i>First Aid</i> S3AM-013-PR1 <i>Housekeeping</i> S3AM-014-PR1 <i>Manual Lifting</i> S3AM-016-PR1 <i>Ergonomics</i> S3AM-017-PR1 <i>Injury & Illness Recordkeeping</i> S3AM-018-PR1 <i>Injury & Claims Management</i> S3AM-019-PR1 <i>Substance Abuse Prevention</i>	S3AM-020-PR1 S3AM-111-PR1 S3AM-113-PR1 S3AM-115-PR1 S3AM-117-PR1 S3AM-121-PR1 S3AM-123-PR1 S3AM-127-PR1 S3AM-128-PR1 S3AM-204-PR1 S3AM-208-PR1 S3AM-209-PR1 S3AM-211-PR1 S3AM-216-PR1 S3AM-305-PR1 S3AM-313-PR1 S3AM-317-PR1	<i>Recognition & Rewards</i> <i>Bloodborne Pathogens</i> <i>Heat Stress</i> <i>Hazardous Materials Communication</i> <i>Hazardous Waste Operations</i> <i>Non-Ionizing Radiation</i> <i>Respiratory Protection</i> <i>Exposure Monitoring</i> <i>Medical Screening & Surveillance</i> <i>Environmental Compliance</i> <i>Personal Protective Equipment</i> <i>Risk Assessment & Management</i> <i>Regulatory Inspections</i> <i>Compliance Assurance</i> <i>Hand & Power Tools</i> <i>Wildlife, Plants & Insect</i> <i>Hand Safety</i>

Attachment 3 – Safety Forms

U.S. Army Corps of Engineers (USACE) MISHAP NOTIFICATION AND INVESTIGATION For use of this form, see instructions in the attachments and USACE ER 385-1-99; the proponent agency is CESO.		Requirement Control Symbol RCS-CESO-21-0001
DATA REQUIRED BY THE PRIVACY ACT OF 1974		
Authority	10 U.S.C. 7013, Secretary of the Army; 5 U.S.C. 7902, Safety Programs; Public Law 91-596, Occupational Safety and Health Act of 1970; DoD Instruction 6055.1, DoD Safety and Occupational Health Program; Army Regulations 385-10, Army Safety Program; DoD Instruction 6055 .07, Mishap Notification, Investigation, Reporting, and Record Keeping; and E.O. 9397 (SSN), as amended.	
Principal Purpose	Information collected is to provide the USACE leaders, soldiers, families and civilians in injury, illness, and loss data to effectively manage its safety and occupational health program.	
Routine Uses	In addition to those disclosures generally permitted under 5 U.S.C. 552a(b) of the Privacy Act of 1974, these records or information contained therein may specifically be disclosed outside the DoD as a routine use pursuant to 5 U.S.C. 552a(b) as follows: To the Department of Labor, the Federal Aviation Agency, the National Transportation Safety Board, and to Federal, State, and local agencies and applicable civilian organizations, such as the National Safety Council, for use in a combined effort of accident prevention. In some cases, data must also be disclosed to an employee's representative under the provisions of 29 CFR 1960.29. Records will be made available consistent with applicable laws and regulations. Information will be withheld from the public only if authorized by 5 U.S.C. Section 552 (Freedom of Information Act (FOIA), 5 U.S.C. 552a (Privacy Act)), or other statutory or regulatory authority.	
Disclosure	Failure to provide all the required information on the report may result in the rejection of report submission.	
1. WHO IS REPORTING MISHAP		
a. Name:		b. Phone number:
c. Email address:		d. Signature:
e. Report type:	<input type="checkbox"/> 1. Near Miss Report. <i>(No injury/illness, or property damage. Complete all fields with underlined text.)</i>	Date:
	<input type="checkbox"/> 2. Initial Accident Report. <i>(For accident notification within 24 hrs, Complete all fields with underlined text.)</i>	Date:
	<input type="checkbox"/> 3. Final Accident Report. <i>(For reporting findings from accident investigation, complete full form.)</i>	Date:
f. Mishap Type. <i>(Check all that apply)</i>		
<input type="checkbox"/> Fatality	<input type="checkbox"/> Injury/Illness	<input type="checkbox"/> Property Damage <input type="checkbox"/> Near Miss
g. Were any of the following items associated with the mishap ? <input type="checkbox"/> Yes <input type="checkbox"/> No <i>(If yes, check all that apply)</i>		
<input type="checkbox"/> Electrical and/or Hazardous Energy	<input type="checkbox"/> Working at Heights	<input type="checkbox"/> Diving <input type="checkbox"/> Load Handling Equipment or Rigging <input type="checkbox"/> Occupational Health Exposure
2. WHO WAS INVOLVED IN THIS MISHAP?		
a. Name:		
b. Personnel Classification:		c. Time employee began work:
d. Gender:	e. Date of birth <i>(for Government personnel only):</i>	f. Age:
g. Date hired:	h. Primary language:	
i. Is individual a supervisor? <input type="checkbox"/> Yes <input type="checkbox"/> No	j. Duty status at time of mishap:	k. Years experience in job:
l. What was individual doing when mishap occurred? <i>(Select activity from the drop downs below.)</i>		
1. General activities:		2. Vehicle/Equipment/Vessel:
3. Sports/Recreation:		4. Other not listed:
m. Did individual utilize all OSHA/EM 385-1-1 required Personal Protective Equipment (PPE) for activity? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		
If no, identify missing PPE:		
n. Was a Personal Flotation Device used? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A		o. Was a seat belt used? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

p. Government personnel only:			
1. Job series:		2. Rank:	3. Grade:
4. Center/Division/Lab:			5. District:
q. Contractor personnel only:			
1. Employer/Contractor name:			
2. Individual's occupation/trade:			Other not listed:
r. If mishap occurred on a contractor site, provide the following:			
1. Prime Contractor name:			
2. Contract number:		3. Contract type:	4. Funding type:
3. WHAT TYPE OF INJURY/ILLNESS OCCURRED?			
a. Severity of injury/illness?		b. Type of Injury/Illness:	
c. Identify body part(s) affected by injury/illness:			
Primary body part affected:		Secondary body part affected:	
d. Identify cause and source of injury/illness:			
Cause of injury/illness:		Source of injury/illness:	
e. Was employee treated by a physician or health care professional provider? <input type="checkbox"/> Yes <input type="checkbox"/> No			
If yes, provide name of physician or health care professional provider:			
f. Was treatment given away from work site? <input type="checkbox"/> Yes <input type="checkbox"/> No		g. Was employee treated in an emergency room ? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
h. If treatment was given away from the work-site, where was it given? (For Government Personnel Only)			
Treatment facility name:			
Address:			
City:	State:	Zip:	Country:
i. Was employee hospitalized as an in-patient? <input type="checkbox"/> Yes <input type="checkbox"/> No		If yes, how many nights?	Was OSHA notified? <input type="checkbox"/> Yes <input type="checkbox"/> No
Note: OSHA requires reporting all work-related fatalities within 8 hours and in-patient hospitalizations, amputations and loss of an eye within 24 hours to OSHA.			
j. Estimated days away from work:		k. Estimated days of restricted/transferred duty:	
4. WHAT HAPPENED?			
a. What was the primary activity occurring at the time of the mishap?			
Other, not listed:			
b. What happened? Provide a detailed description of the mishap. (Do not include any personally identifiable information (name, etc.).)			
Note: Provide supporting photos, charts, diagrams, etc. with this report.			
c. What other organizations or agencies have been notified about this mishap?			

5. WHAT TYPE OF PROPERTY/MATERIAL WAS INVOLVED?			
a. List all property/material involved in the mishap. (Include damaged and undamaged property.)			
	<i>Item A</i>	<i>Item B</i>	<i>Item C</i>
i. Type of item:			
Other not listed:			
ii. Name of item(s):			
iii. Collision type:			
Other not listed:			
iv. Ownership of item:			
v. Dollar cost of damage:			
6. WHEN DID THE MISHAP OCCUR?			
a. Date the mishap occurred:		b. Time mishap occurred:	
c. What day did mishap occur on?		d. What period of day did mishap occur?	
7. WHERE DID THE MISHAP OCCUR?			
a. Did the mishap occur on a military Base/Post? <input type="checkbox"/> Yes <input type="checkbox"/> No			
b. USACE Office/Program/Project name:			
c. Select the location type most closely associated with the mishap:			
d. Identify exact location where mishap occurred:			
Address:			
City:	State:	Zip:	Country:
e. Latitude:		f. Longitude:	
8. WHY DID THE MISHAP OCCUR? (Recommend completing this section for Near Misses.)			
A. Performance Causal Factors			
1. Did a problem with performance contribute to this mishap occurring? <input type="checkbox"/> Yes <input type="checkbox"/> No			
If yes, select the error that contributed most to the mishap:			
2. Describe action(s) taken, anticipated or recommended to eliminate cause(s):			
B. Support Causal Factors			
1. Did a problem with resources contribute to this mishap occurring? <input type="checkbox"/> Yes <input type="checkbox"/> No			
If yes, select the error that contributed most to the mishap:			
2. Describe action(s) taken, anticipated or recommended to eliminate cause(s):			
C. Standards/Policy/Planning Causal Factors			
1. Did an organizational standard/policy/or plan contribute to this mishap occurring? <input type="checkbox"/> Yes <input type="checkbox"/> No			
If yes, select the error that contributed most to the mishap:			
2. Was a written Activity Hazard Analysis (AHA) or equivalent completed and accepted by Government Designated Authority (GDA) for task(s) being performed at time of mishap? (If yes, attach a copy to this report) <input type="checkbox"/> Yes <input type="checkbox"/> No			
If yes, was the AHA available and used by worker? <input type="checkbox"/> Yes <input type="checkbox"/> No			
3. Was a written work plan (critical lift plan, fall protection plan, etc.) required, completed and accepted by the GDA for task(s) being performed at time of mishap? <input type="checkbox"/> Yes <input type="checkbox"/> No			
If yes, was the plan available and used by worker? <input type="checkbox"/> Yes <input type="checkbox"/> No			

4. Describe action(s) taken, anticipated or recommended to eliminate cause(s):

D. Training Causal Factors

1. Did a problem with training contribute to this mishap occurring? ☐ Yes ☐ No

If yes, select the error that contributed most to the mishap:

2. Was individual trained to perform the activity/task? ☐ Yes ☐ No

If yes, select type of training: ☐ Classroom ☐ Certification/License ☐ On the job

☐ Other, describe:

What was date of most recent training?

3. Describe action(s) taken, anticipated or recommended to eliminate cause(s):

E. Leader/Supervisor Causal Factors

1. Did any leader/supervisory mistake/task error contribute to this mishap occurring? ☐ Yes ☐ No

If yes, select the error that contributed most to the mishap:

2. Did the safety climate/culture contribute to the mishap? ☐ Yes ☐ No

3. Did challenges with teamwork contribute to the mishap? ☐ Yes ☐ No

4. Describe action(s) taken, anticipated or recommended to eliminate cause(s):

F. Individual Causal Factors

1. Did any individual mistakes/task errors contribute to this mishap occurring? ☐ Yes ☐ No

If yes, select the error that contributed most to the mishap:

2. Describe action(s) taken, anticipated or recommended to eliminate cause(s):

G. Physical Environment Causal Factors

1. Did any physical environment contribute to this mishap occurring? ☐ Yes ☐ No

If yes, select the error that contributed most to the mishap:

2. Describe action(s) taken, anticipated or recommended to eliminate cause(s):

H. Material Causal Factors

1. Did any material failure contribute to this mishap occurring? ☐ Yes ☐ No

If yes, select the error that contributed most to the mishap:

2. Which failure is most closely associated with the material failure/malfunction?

3. Describe action(s) taken, anticipated or recommended to eliminate cause(s):

I. Environmental Causal Factors

1. Did any environmental condition contribute to this mishap occurring? ☐ Yes ☐ No

If yes, select the factor that contributed most to the mishap:

2. Describe action(s) taken, anticipated or recommended to eliminate cause(s):

J. Facility/Building Design	
1. Did the design of the facility/building contribute to the mishap? <input type="checkbox"/> Yes <input type="checkbox"/> No	
If yes, describe:	
2. Describe action(s) taken, anticipated or recommended to eliminate hazard:	
K. Existing Hazard	
1. Did a hazard(s) contribute to the mishap? <input type="checkbox"/> Yes <input type="checkbox"/> No	
If yes, describe the hazard(s):	
2. Describe action(s) taken, anticipated or recommended to eliminate hazard(s):	
9. Corrective Action plan	
a. Have all corrective action(s) to prevent mishap recurrence been completed? <input type="checkbox"/> Yes <input type="checkbox"/> No	
b. Who is responsible for the corrective action plan?	
c. What date will/have all corrective action(s) be/been completed by:	
d. Additional information:	
10. Additional Information	
<div style="height: 400px; border: 1px solid black;"></div>	

<u>FORM 16-1</u> <u>Certificate of Compliance for LHE and Rigging</u>	
This certificate shall be signed by an official of the company that provides LHE/cranes and rigging gear for any application under this contract.	
Contracting Officer's Point of Contact: (Government Designated Representative)	Phone #:
Prime Contractor/Phone #:	Contract Number:
SSHO/QC:	Phone #:
LHE Manufacturer/Type/Capacity:	
LHE Operator(s) Name(s):	
I certify that: 1. The above noted LHE and all rigging gear conform to the EM 385-1-1, applicable OSHA regulations (host country regulations in foreign countries) and applicable ASME standards. 2. The operator(s) noted above has been trained, qualified and designated in accordance with the requirements in Section 16, EM 385-1-1 for the operation of the above noted LHE. 3. The operator(s) noted above has been trained not to bypass safety devices during LHE operations. 4. The operator(s), rigger(s) and company official (staff) are aware that immediate notification to the GDA of any incident or accident involving this equipment is required.	
Company Official Signature:	Date:
Company Official Name/Title:	
Post on Crane/LHE. (In Cab and Contractor's Office for each LHE onto USACE Project/Property)	

Americas

Underground Utilities & Subsurface Installation Clearance Checklist

S3AM-331-FM1

Location:	Project #:	Date & Time:
Manager:	Contractor (if applicable):	Weather:
Client:	Inspector:	
Notes:		

Part 1

<p><i>Part 1 and Part 2 shall be completed prior to any intrusive subsurface work. DO NOT DISTURB GROUND if a "No" or "N/A" answer to any of the Part 1 questions has not been initialed as authorized by the AECOM Manager.</i></p> <p><i>Any variance from these procedures requires approval of the Vice President of the applicable business group.</i></p>			
	Yes	No	N/A
I. Permits and Access Agreements			
1. Have all appropriate permits and agreements been identified and obtained (e.g. client, drilling, encroachment, working near railroads, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Have all client requirements been identified and obtained?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. If working off-site is (are) site access agreement(s) executed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
II. General Health and Safety			
1. Has a Health and Safety Plan (HASP) been prepared for AECOM employees?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Do on-site personnel have required-level PPE?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Do on-site personnel have required-level of training?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Is appropriate monitoring equipment as specified in HASP/THAs available at each clearance location?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Has the field screening equipment been calibrated as required by the HASP?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Are calibration gases available at the site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
III. Identification and Mapping of Utility and Subsurface Structures			
1. Is a Site Plan showing proposed subsurface locations and utility locations attached to this check list?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Have above/below ground utilities & subsurface installations been investigated (Part 2 of this form)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Have all Federal/State/Provincial/Territorial and other "One Call" providers marked their facilities or otherwise notified they do not have any facilities near the proposed subsurface/intrusive locations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Have Federal/State/Provincial/Territorial or other "One Call" providers identified what utilities and underground structures are <u>not</u> included in their provider system (e.g. underground structures)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. As noted in the exception at the bottom of Section VI of this checklist, has a utility locating contractor performed geophysical and/or other surveys of the proposed subsurface/intrusive locations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Part 1 and Part 2 shall be completed prior to any intrusive subsurface work. DO NOT DISTURB GROUND if a "No" or "N/A" answer to any of the Part 1 questions has not been initialed as authorized by the AECOM Manager.

Any variance from these procedures requires approval of the Vice President of the applicable business group.

	Yes	No	N/A
6. Visual verification that each of the proposed locations does not lie on a line connecting two similar manhole covers (e.g. sanitary sewer or storm drain)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Visual verification that the ground in the vicinity of each of the proposed subsurface locations has not subsided, been excavated and patched, give 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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IV. Site Walk			
1. Has a site walk been performed that includes the following:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
a. Reviewing all planned intrusive locations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Adjusting locations away from subsurface utilities and installations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Determining the appropriate utility clearance activities for each location?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Determining the presence and location of overhead utilities and obstructions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Walk around perimeter of the site to observe physical hazards?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Includes 50 feet (15.2 meters) from perimeter of the site to observe physical hazards and 50 feet (15.2 meters) radius from each proposed subsurface location?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
V. Proposed Subsurface Investigation Locations*			
1. Are all of the proposed subsurface locations at least 5 feet (1.5 meters) from any identified subsurface utility?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. 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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Are all of the proposed subsurface locations at least 5 feet (1.5 meters) from any subsurface utilities shown on the Public Right-of-Way street improvements?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>* These set back distances are a minimum; government regulations and utility requirements may dictate a greater set back distance.</i>			
VI. Utility Clearance Investigation Location Confirmation*			
1. 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.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
a. For soil borings/monitoring wells; excavated to a minimum of 5 feet (1.5 meters) below ground surface using non-mechanical methods?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. For soil gas sampling; excavated to 2 foot (0.6 meter) below grade or below the bottom of a concrete floor prior to the installation of soil gas sample probe points?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>* Exceptions to requirements of the utility clearance process, as permitted by the applicable jurisdiction, include the following:</i> <ul style="list-style-type: none"> <i>Sites where extensive utility mapping (e.g. geophysical survey) has been completed and/or where extensive activities have already been performed.</i> <i>Locations where facility layout is well documented and understood.</i> <i>Sites or portions of large sites where utilities are known not to exist currently or to not have ever existed throughout the life of the facility, property or site.</i> 			

Part 1 and Part 2 shall be completed prior to any intrusive subsurface work. DO NOT DISTURB GROUND if a "No" or "N/A" answer to any of the Part 1 questions has not been initialed as authorized by the AECOM Manager.

Any variance from these procedures requires approval of the Vice President of the applicable business group.

	Yes	No	N/A
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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 shall 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 (OneCall)			Prior Locate Ticket #	
Date Called:		Called By:		Valid Until:
Ticket Number:		Area Requested To Be Cleared:		
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:				
OneCall Utilities			Field Observation	
Utility	Notified by	Comments	Marked (mains & services)	
Electric (Red)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	
Gas/Petroleum Pipeline (Yellow)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Sewer/Drainage (Green)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Water (Blue)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Communications (Orange)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	
Other	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	
Were all circuits on during subsurface checks if the checks were for identifying energized lines (e.g., circuits on timers or light sensing switches)?			<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Utilities Not Identified By OneCall (Includes both Public and Private along with Regional and Site Utilities)			Field Observation	
Utility (Colors may vary)	Owner / Contact / Phone #	Notified	Marked	
Communications: (Orange) TV, computer, phone, cell towers, site communication, cameras, security, etc.		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	
Electricity: (Red) Mains / Supplies / Interior / Exterior (signs, fuel pumps, low voltage security perimeters, gates, property light posts, equipment, substations, etc.)		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	
Gas: (Yellow) Mains / Supplies / Equipment / Pipelines (Natural, Process, Oil, Crude, Refined (Gas, Diesel, Jet), etc.)		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	
Steam: (Yellow)		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	

Structures: Possible horizontally installed facilities, vaults, basements, tunnels, sub-grade structures, foundations, overhead obstructions, etc.		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above
UST Systems (Tanks / piping / electric)		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Sewer: (Green) Sanitary, storm, combined, septic, drainage (parking, buildings, fields), irrigation		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Water: (Blue) Process, Plant, potable, well, cooling, return/makeup, fire, sprinkler, landscape irrigation, reclaim (Purple) other		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above
Other: Abandoned lines, invisible dog fences, shopping cart perimeter monitoring, traffic lights		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above

Manager:

Print

Sign

Date

Americas

Vehicle Inspection Checklist

S3AM-005-FM2

Vehicle Tag No:	Mileage:	Date:	Time:	Driver Name:	Location:
Inspection Checklist: This Pre-Trip Vehicle Inspection Checklist is intended to be completed by the vehicle driver prior to departing on a trip. Checking boxes means that item is present and functioning. Deficiencies that affect or could potentially affect the safe operation of the vehicle shall be repaired or corrected prior to departure. This checklist should only be used in addition to an on-going vehicle maintenance program.					

Item	Yes	No	N/A
1. General			
1-1 Proof of insurance and registration available and current?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1-2 Is the date of the last regular maintenance known, or is the mileage/date of next scheduled maintenance known?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1-3 Is the overall condition of the vehicle good (no body damage, unusual sounds, leaks, odors, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Tires			
2-1 Do all tires have sufficient tread for driving conditions? Legal limit: 2/32" (for rain/snow: > 4/32")	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2-2 Are tires sufficiently inflated for driving conditions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2-3 Are the lug nuts and stem caps present and tight for each tire?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2-4 Is the spare tire and jack present and in good condition?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Vehicle Interior			
3-1 Are the brake and accelerator pedal pads in good condition?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-2 Are the floor mats in good condition and not interfering with the brake or accelerator pedals?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-3 Is the seat properly adjusted (including the headrest)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-4 Is the seatbelt in good condition?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-5 Are the mirrors in good condition (not broken, dirty)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-6 Are the dashboard/instrument lights working?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-7 Is the dashboard free of warning lights and do the gauges appear to work when the car is started?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-8 Does the horn work?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-9 Are distractions such as cell phones and GPS units secured so they do not encourage use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Lights and Signals			
4-1 Do the headlights and high beams work?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4-2 Do the tail lights function properly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4-3 Do the turn signals work (front and rear)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4-4 Do the brake lights work (including high light in the rear window if applicable)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4-5 Do the hazard lights (emergency flashers) work?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4-6 Do back up / reverse lights work?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4-7 If equipped with a back-up alarm can it be heard clearly?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Mechanical			
5-1 Do the brakes work and feel solid (not soft)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5-2 Does the parking/emergency brake work?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5-3 Is the steering in good working condition (not loose)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5-4 Is the engine oil level full or in the operating zone?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5-5 Excessive vehicle bounce going over bumps reported (possible sign of worn shock absorbers)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5-4 Is the fuel level full or at an adequate level for the proposed usage?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Item	Yes	No	N/A
6. Windows and Windshield			
6-1 Is the windshield clean and unbroken?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6-2 Are the wiper blades in good condition (front and rear)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6-3 Are all the windows clean and unbroken and windshield fluid available and operational?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Emergency Equipment (as needed per conditions/project requirements)			
7-1 Is there a "Safety Kit" (fire extinguisher, first aid, safety triangle and 2 reflective vests)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7-2 Is there a first aid kit, has it been inspected recently?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7-3 Is survival gear and equipment available (blanket, water, heat source, flashlight, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7-4 Is a means for emergency communication available?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Other Equipment (as needed per conditions/project requirements)			
8-1 Is there a means to secured loads (cargo next, container)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8-2 Are cones or other warning devices available?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8-3 Is weather specific equipment (snow chains, tired etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8-4 Does the vehicle have a snow brush/ice scraper?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8-5 Does the vehicle have a fire extinguisher?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Comments			
Inspector Name:	Signature:	Date:	

Americas

Behavior Based Safety Checklist

S3AM-007-FM1

Use comment column when unsafe behavior / conditions were observed. Describe what was observed and why this occurred.

Job Location: _____

Date: _____

Task/Work Observed: _____

Observer: _____

	<u>Safe</u>	<u>Unsafe</u>	<u>Comments</u>
Personal Protective Equipment			
Head	<input type="checkbox"/>	<input type="checkbox"/>	_____
Hand	<input type="checkbox"/>	<input type="checkbox"/>	_____
Feet	<input type="checkbox"/>	<input type="checkbox"/>	_____
Eyes/Face	<input type="checkbox"/>	<input type="checkbox"/>	_____
Skin	<input type="checkbox"/>	<input type="checkbox"/>	_____
Hearing	<input type="checkbox"/>	<input type="checkbox"/>	_____
Fall Protection	<input type="checkbox"/>	<input type="checkbox"/>	_____
Equipment / Tools			
Proper tool for the job	<input type="checkbox"/>	<input type="checkbox"/>	_____
Condition	<input type="checkbox"/>	<input type="checkbox"/>	_____
Proper Use	<input type="checkbox"/>	<input type="checkbox"/>	_____
Body Use / Position			
Lifting	<input type="checkbox"/>	<input type="checkbox"/>	_____
Pinch Point	<input type="checkbox"/>	<input type="checkbox"/>	_____
Ladder / stairs	<input type="checkbox"/>	<input type="checkbox"/>	_____
Hand placement	<input type="checkbox"/>	<input type="checkbox"/>	_____
Travel path / speed	<input type="checkbox"/>	<input type="checkbox"/>	_____
Body position	<input type="checkbox"/>	<input type="checkbox"/>	_____
Work Practices			
Follow Safety Plan / Procedures	<input type="checkbox"/>	<input type="checkbox"/>	_____
Housekeeping	<input type="checkbox"/>	<input type="checkbox"/>	_____
Other			
_____	<input type="checkbox"/>	<input type="checkbox"/>	_____
_____	<input type="checkbox"/>	<input type="checkbox"/>	_____
_____	<input type="checkbox"/>	<input type="checkbox"/>	_____
_____	<input type="checkbox"/>	<input type="checkbox"/>	_____
_____	<input type="checkbox"/>	<input type="checkbox"/>	_____

Americas

Housekeeping Inspection

S3AM-013-FM1

Building or Location: _____

Inspection Conducted by: _____ **Date:** _____

Check Yes, No, or NA for Not Applicable.

General Site Housekeeping

- | | | | | |
|----|--|------------------------------|-----------------------------|-----------------------------|
| 1. | Exits, emergency equipment, and electrical panels unblocked? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 2. | Equipment, materials, supplies properly stored and, as applicable, secured (e.g. chocked)? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 3. | Drawers closed when not in use? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 4. | Equipment, including desks and chairs, in good repair? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 5. | Storage areas free from the accumulation of materials that constitute trip hazards? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 6. | Recyclable material, debris and trash collected and stored in appropriate containers? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 7. | Scrap materials and other debris removed from work area? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 8. | Combustible scrap and debris removed by safe means at regular intervals? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 9. | Oily rags removed at the end of the day and stored in metal cans with tight fitting lids? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |

Visibility

- | | | | | |
|-----|--|------------------------------|-----------------------------|-----------------------------|
| 10. | Worksite and, as applicable, halls, stairways and walkways are well lit? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 11. | Well-designed light switches are present in areas where walkways are not always lighted? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 12. | Dust, smoke or steam does not create poor visibility? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 13. | Glare from floodlights or windows does not create poor visibility in work areas? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |

Stairs

- | | | | | |
|-----|---|------------------------------|-----------------------------|-----------------------------|
| 14. | Handrails are tight and at the proper level? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 15. | Handrails extend past the top and bottom step? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 16. | White or yellow strips are painted on the first and last step for better visibility? (recommendation only). | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 17. | Steps are not rough or defective? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 18. | Stair treads are wide enough and risers consistently spaced? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 19. | Stairs are free of obstructions? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |

Floor Conditions

- | | | | | |
|-----|---|------------------------------|-----------------------------|-----------------------------|
| 20. | Floors of every workroom are clean, and so far as possible, in a dry condition? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 21. | Floors are not oily, overly waxed, or polished. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 22. | Where wet floors or processes are present, proper drainage and false floors, mats, or other dry standing places are provided? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 23. | Floor surfaces finished with non-slip coatings where spills are likely? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 24. | Floors and passageways are free from protruding nails, splinters, holes, or loose boards? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 25. | Floors are free of holes and depressions? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 26. | Aisles or pathways are wide enough for easy passage and for carrying objects (48 inches is recommended)? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 27. | Ramps are covered with non-slip surfaces or matting? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |

28. Carpets or rugs free from loose or frayed edges that may catch boots or shoes? ☐ Yes ☐ No ☐ NA
29. Extension cords, air hoses and cables removed from walkways, or otherwise managed to prevent trip hazards? ☐ Yes ☐ No ☐ NA
30. Pathways free from boxes, containers, machine parts, or other tripping hazards? ☐ Yes ☐ No ☐ NA

Ground Conditions

31. Trip hazards are not present? ☐ Yes ☐ No ☐ NA
32. Fall hazards are not present? ☐ Yes ☐ No ☐ NA
33. Holes or changes in ground elevation are either filled or guarded? ☐ Yes ☐ No ☐ NA
34. Muddy or icy walkways are provided with traction material (e.g. sand, gravel) to reduce slipping? ☐ Yes ☐ No ☐ NA

Equipment

35. Vehicle steps are free from debris or obstructions and of adequate size, and surface placement for safe dismounting? ☐ Yes ☐ No ☐ NA
36. Hand grips or ladders are free from debris or obstructions and adequate for getting into and out of equipment? ☐ Yes ☐ No ☐ NA
37. Ladders have been checked for damage and removed from service if found unsafe? ☐ Yes ☐ No ☐ NA

Chemicals

38. Chemicals are properly stored to minimize a potential spill? ☐ Yes ☐ No ☐ NA
39. Spill cleanup materials are available and appropriate for the type of potential spill? ☐ Yes ☐ No ☐ NA

Smoking, Eating and Drinking

40. Smoking permitted in designated areas only? ☐ Yes ☐ No ☐ NA
41. Designated smoking area appropriately placed? ☐ Yes ☐ No ☐ NA
42. Appropriate and clean eating and drinking areas designated away from work areas? ☐ Yes ☐ No ☐ NA
43. Food and drink items properly stored? ☐ Yes ☐ No ☐ NA
44. Potable water identified and readily available? ☐ Yes ☐ No ☐ NA

Sanitation

45. Appropriate cleaning supplies available and properly stored? ☐ Yes ☐ No ☐ NA
46. Hand and face washing facilities available and maintained with adequate supplies? ☐ Yes ☐ No ☐ NA
47. Adequate toilet facilities available and maintained with sufficient supplies? ☐ Yes ☐ No ☐ NA

Identify areas that need attention and describe the corrective actions to be implemented:

I certify that the above inspection was performed to the best of my knowledge and ability, based on the conditions present.

Signature

Date

Americas

Daily Tailgate Meeting

S3AM-209-FM5

Instructions: Conduct meeting prior to sending crews to individual tasks. Require attendance of all AECOM employees and subcontractors. Invite personnel from simultaneous operations for coordination purposes. Review scope of work and briefly discuss required and applicable topics. **This meeting is a daily refresher, not a full orientation.** Task-specific discussions associated with Task Hazard Assessment (THA) follow this meeting at the task location immediately before individual task is started.

AECOM Supervisor Name:

Phone Number:

AECOM SH&E Rep. Name:

Phone Number:

Meeting Leader:

DCS Americas - This form may be replaced by the electronic Daily Tailgate Meeting Tool. Link - [Ecosystem Daily Tailgate Meeting App Site](#)

Date:	Project Name/Location:	Project Number:	
Today's Scope of Work:			
Muster Point Location:	First Aid Kit Location:	Fire Extinguisher Location:	Spill Kit Location:
1. Required Topics		2. Discuss if Applicable to Today's Work	
<p>Fitness for Duty requirements, all sign in / sign out</p> <p>Required training (incl. task specific) completed and current</p> <p>SH&E Plan onsite - understood, reviewed, signed by all (incl. scope, preplanning hazard assessments / risk registers, controls, procedures, requirements, etc.)</p> <p>Task Hazard Assessments (THAs) are to be reviewed and completed for each task immediately prior to conducting</p> <p>STOP WORK Right & Responsibility- all task changes/changed conditions re-assess with THA</p> <p>Requirement to report to supervisor any injury, illness, damage, near miss, unsafe act / condition</p> <p>Emergency Response Plan – including muster point, first aid kit, fire extinguisher, clinic/hospital location</p> <p>Personal Protective Equipment (PPE) - Required items per hazard assessments in good condition / in use by all</p> <p>Equipment/machinery inspected (documented as required) and in good condition - operators properly trained/certified</p> <p>Work area set up and demarcation/ barricades in place to protect workers, site staff, and the public</p> <p>Required checklists/records available, understood (describe):</p> <p>Lessons Learned / SH&E improvements (describe):</p>		<p>Check <input checked="" type="checkbox"/> as reviewed or mark <input type="checkbox"/> as not applicable</p> <p>Biological/ Chemical / Electrical Hazards</p> <p>Ergonomics - Lifting, Body Position</p> <p>Lock Out/ Tag Out</p> <p>Short Service Employees - visual identifier and mentor/ oversight assignment</p> <p>Simultaneous/ Neighbouring Operations</p> <p>Slip/ Trip/ Fall Hazards</p> <p>Specialized PPE Needs</p> <p>Traffic Control</p> <p>Waste Management/ Decontamination</p> <p>Weather Hazards / Heat Stress / Cold Stress</p> <p>Subcontractor Requirements (e.g., JHAs, THAs, procedures, reporting, etc.)</p> <p>Work Permits / Plans required (e.g., Fall Protection, Confined Space, Hot Work, Critical Lifts, etc.); in place, understood (identify/attach):</p> <p>Other Topics (describe/attach):</p> <p>Client specific requirements (describe):</p>	
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:	
<i>The site is being left in a safe condition and work crew checked out as fit unless otherwise specified as above.</i>			
Site Supervisor Name	Signature	Date Time (at end of day / shift)	

Worker Acknowledgement / Sign In Sign Out sheets applicable to this meeting are on reverse and, if applicable, attached.

Daily Tailgate Meeting (S3AM-209-FM5)

Revision 10 June 1, 2021

PRINTED COPIES ARE UNCONTROLLED. CONTROLLED COPY IS AVAILABLE ON COMPANY INTRANET.

All employees:

- **STOP WORK** if concerned / uncertain about safety / hazard or additional precaution is not recorded on the THA.
- **Be alert and communicate any changes in personnel or conditions at the worksite to the supervisor.**
- **Reassess task, hazards, & mitigations on an ongoing basis; amend the THA if needed.**

SITE WORKERS (including AECOM Contractors and Subcontractors): Your signature below means that you understand:

- * The requirement to participate in creating, reviewing, & updating hazard assessments (THA) applicable to your task(s).
- * The hazards & control measures associated with each task you are about to perform.
- * The permit to work requirements applicable to the work you are about to perform (if it includes permitted activities).
- * That no tasks or work is to be performed without a hazard assessment.
- * Your authority & obligation to "Stop Work" intervene, speak up/ listen up.

Your initials (right columns) certify that you arrived & departed fit for duty, & have reported all incidents/near misses; meaning:

- * You are physically and mentally fit for duty and have inspected your required PPE to ensure satisfactory condition.
- * You are not under the influence of any type of 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 / 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
		In & Fit	Out & Fit

(Attach additional Site Worker sign-in/out sheets if needed) Identify number of attached sheets: _____

SITE VISITOR / SITE REPRESENTATIVE

Name	Company Name	Arrival Time	Departure Time	Signature

S3AM-209-FM6

Date:	Project Name / Location:	
Permit / Job Number:	Project Number:	
Description of Task:		

Yes — review the steps, hazards, and precautions. Attach and reference JHA in the form below. Add any additional steps, hazards, and precautions to this form otherwise unidentified on JHA.

No – list all steps, hazards, and precautions associated with the task in the form below.

Basic Task Steps (explain in order how the task will be carried out)	Hazards (identify all hazards & potential hazards of each step)	Risk (before)	Control Measures / Precautions (describe how that hazard will be controlled)	Risk (after)	Revised? (yes – record time)
			Highest Risk Index		

Originator

Supervisor

Print Name

Signature

Print Name

Signature

Risk Matrix on Reverse

THIS FORM IS TO BE KEPT ON JOB SITE.

WORKER SIGN ON

NAME (Please Print) TIME SIGNATURE

I participated in the development and understand the content of this Task Hazard Assessment.

Task Hazard Assessment Follow-Up/Review

Initials/Time Initials/Time Initials/Time

Instructions:

Identify basic steps of the task and associated hazards. Calculate the initial risk rating. Identify control measure to eliminate or reduce the hazard's risk and calculate the residual risk rating. If the risk rating (after controls are implemented) cannot be reduced to 4 or lower, additional approvals are needed before the activity can begin.

Employees shall monitor the activities for compliance with this document. Workers should **STOP WORK** on a task if conditions change from the planned and agreed approach to the work.

This document should be updated to reflect new conditions or changes in task methods.

VISITOR SIGN ON

I have read and understand the content of this Task Hazard Assessment.

Emergency Meeting / Assembly Area

--

Emergency Contact

--

Method of Communication

--

Risk Rating 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

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 Operations Lead/Supervisor & SH&E Manager
10 to 25 (High)	Risk requires the approval of the Operations 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

Americas

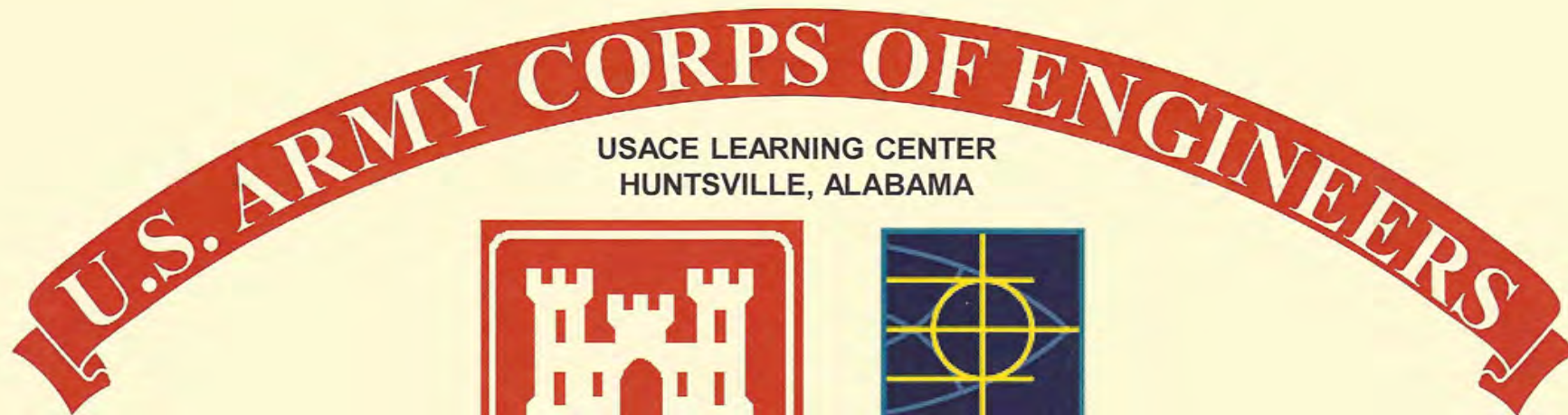
Management Of Change Authorization

S3AM-215-FM1

Description of the Change (include the scope of the change and affected employees):		
Risks Identified:		Mitigation Measures:
1.		1.
2.		2.
3.		3.
4.		4.
5.		5.
MOC Coordinator:		
Print Name	Signature	Date
Evaluation Team:		
Print Name	Signature	Date
Reviewers:		
Print Name	Signature	Date
Timeline for Implementation:		

Comments/Conditions:		
Authorizer Approvals:		
Print Name	Signature	Date

Attachment 4 – Staff Qualifications



USACE LEARNING CENTER
HUNTSVILLE, ALABAMA



CERTIFICATE

WILLIAM ABRAHAMS-DEMATTE

SE9-04-20-00-00252

has completed the Corps of Engineers and Naval Facility Engineering Command Training Course

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS - #784

NORTH CHARLESTON, SC
Location

2 MARCH 2020
Training Date(s)

NAVFAC SE
Instructional District/ NAVFAC

Benjamin D. Redmon
Tel (904) 232-1632

CQM-C Manager

John E Parker III, PMP
Facilitator/Instructor

Parkerjeusa@tds.net
Email

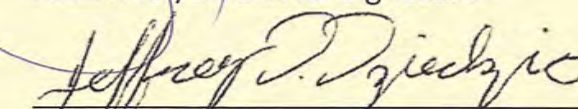
843-834-0173
Telephone


Facilitator/Instructor Signature

THIS CERTIFICATE EXPIRES FIVE YEARS FROM DATE OF ISSUE

CQM-C Recertification online course: <https://www.myuln.net>

Florida Construction Industry Licensing Board – 10 Continuing Education Hours
University of North Florida / NAVFAC SE - Provider # 0001345, Course # 0608220


Chief, USACE Learning Center
Jeffrey D. Dziedzic

AECOM University

Certificate of Completion



This is to certify that

William A Abrahams-Dematte

Has successfully completed the following course

40-HR Initial HAZWOPER Training - Vendor

on 28 October 1998



AECOM

University Certificate of Completion

Certificate of Completion 8 Hour HAZWOPER Refresher

This certifies that

William Abrahams-Dematte

Has completed Annual HAZWOPER 8-Hour Refresher Training,
required by 29 CFR 1910.120(e) and AECOM SH&E Tier III S3NA-117-PR1,
Hazardous Waste Operations

Completed on:
05/16/2022
MM/DD/YYYY

Sue Stephens
Specialist II, Safety, Health & Environment



certifies that

WILLIAM ABRAHAM-DEMATTE

has successfully completed ClickSafety's web-based training course:

Hazwoper Supervisor for Construction

In accordance with the requirements of 29 CFR 1910.120(e)

This course was developed and presented by ClickSafety.com, Inc.



29452984

SERIAL NUMBER

8/16/2019

COMPLETION DATE

8 HOURS

COURSE DURATION

I confirm that I personally took the
course listed above.

STUDENT SIGNATURE



Certificate of Professional Program Completion

This is to certify that

William A. Abrahams-Dematte

Has demonstrated academic excellence with distinction by completing all exams, academic requirements and a minimum of 40 hours of study on required subjects in the OSHAcademy Professional Development Certificate Program. This achievement demonstrates commitment and professionalism in Occupational Safety and Health.

40-hour EM 385-1-1 Construction Safety Hazard Awareness for Contractors

Steven J. Geigle, MA, CET, CSHM-E
Director, Instructor
OSHAcademy Safety and Health Training

This training complies with OSHA standards and conforms with ANSI Z490.1 and ISO 45001 guidelines for Safety, Health, and Environmental (SHE) Training. OSHAcademy training is widely recognized by government agencies, colleges, technical schools, and businesses. OSHAcademy training also qualifies for Continuance of Certification (COC) points toward professional recertification.



705699	01.29.2021	40
Student #	Issue Date	Hours

Printed original certificates must include the OSHAcademy hologram or embossed OSHAcademy seal. All certificates include a unique QR Code and can be validated through the OSHAcademy website.
www.oshatrain.org/verify

OSHAcademy is a division of
Geigle Safety Group, Inc.
15220 NW Greenbrier Pkwy, Ste 230
Beaverton, OR, USA, 97006
+1.971.217.8721
www.oshatrain.org





Certificate of Completion

Presented to

William Abrahams Dematte

for successful completion of

**OSHA 10: Construction Industry Outreach Training Course (IACET
CEU=1.0)**

Dated: 1/17/2019

A handwritten signature in black ink, appearing to read 'Forster', is written over a horizontal line.

As an OSHA Outreach Training Program trainer, I affirm that I have conducted this OSHA Outreach Training Program training class in accordance with OSHA Outreach Training Program requirements. I will document this class to my OSHA Authorizing Training Organization. Upon successful review of my documentation, I will provide each student their course completion card within 90 calendar days of the end of the class.



Certificate of Completion

Presented to

William Abrahams Dematte

for successful completion of

**OSHA 30: Construction Industry Outreach Training Course (IACET
CEU=3.0)**

Dated: 3/6/2019

A handwritten signature in black ink, appearing to read 'Forster', is written over a horizontal line.

As an OSHA Outreach Training Program trainer, I affirm that I have conducted this OSHA Outreach Training Program training class in accordance with OSHA Outreach Training Program requirements. I will document this class to my OSHA Authorizing Training Organization. Upon successful review of my documentation, I will provide each student their course completion card within 90 calendar days of the end of the class.

Certificate of Completion

This is to certify that

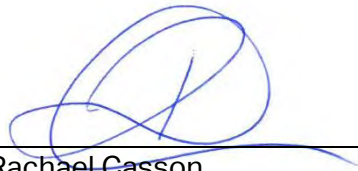
William Abrahams-Dematte

Has successfully completed the

AECOM Per- and Polyfluoroalkyl Substances (PFAS) Sampling Training

(MDEQ General PFAS Sampling Guidance: October 2018)

February 2021




Rachael Casson
Director of International PFAS Program
Environment




Katherine L. Davis, Ph.D.
North America PFAS Lead
Remediation Services – Environment

Certificate of Completion
Bill Abrahams-DeMatte
has completed the requirements for
Adult First Aid/CPR/AED
conducted by
American Red Cross
Date Completed: **05/24/2021**
Valid Period: **2 Years**
Certificate ID: **00L17RE**



**American
Red Cross**



Scan code or visit:
<https://www.redcross.org/take-a-class/qrcode?certnumber=00L17RE>

CERTIFICATE OF COMPLETION

This certificate awarded to

William Abrahams-Dematte

for satisfactory participation in

DOT Hazardous Materials Shipping for Environmental Professionals

49 CFR 172.704 - 3 Contact Hour(s)

Certificate 125754 awarded on March 16, 2022.



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Joni White

Eduwhere

Eduwhere • PO Box 4704 • Chapel Hill, NC 27515 • www.eduwhere.com • (919) 246-4847

CERTIFICATE OF COMPLETION

This certificate awarded to

William Abrahams-Dematte

for satisfactory participation in

IATA Dangerous Goods

IATA DGR Section 1.5 and 49 CFR 172.704 - 4 Contact Hour(s)

Certificate 125759 awarded on March 18, 2022.



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Your compliance connection.

Joni White

Eduwhere

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BILL ABRAHAMS-DEMATTE

has successfully completed

Level I Antiterrorism Awareness Training

04/07/2022


A handwritten signature in black ink, reading "H.W. Thorp, Jr.", written over a horizontal line.

H.W. Thorp, Jr., GS-15
Chief, Joint Knowledge Online Division
Deputy Director Joint Training
Joint Staff, J7

CERTIFICATE OF COMPLETION

OPSEC Awareness for Military
Members, DoD Employees and
Contractors

Bill Abrahams-Dematte


Heather Mardaga
Director, CDSE

April 06, 2022



The New England Consortium

(Partially supported by the National Institute of Environmental Health Sciences)

This is to certify that

Richard Purdy

Certificate #16520

has successfully completed the

40-Hour Hazardous Waste Site Personnel Basic Health and Safety Course

per requirements of 29 CFR 1910.120

January 9-13, 2006 at Lowell, MA

conducted in conjunction with

ConnectiCOSH

MassCOSH

New Hampshire COSH

RICOSH

Western MassCOSH

Work Environment Program at the University of Massachusetts Lowell

Signed: *Charles J. McNamee*

Continuing Education Units 4

Refresher Due - January 2007



AECOM

University Certificate of Completion

Certificate of Completion 8 Hour HAZWOPER Refresher

This certifies that

Richard Purdy

Has completed Annual HAZWOPER 8-Hour Refresher Training,
required by 29 CFR 1910.120(e) and AECOM SH&E Tier III S3NA-117-PR1,
Hazardous Waste Operations

Completed on:
03/07/2022
MM/DD/YYYY

Sue Stephens
Specialist II, Safety, Health & Environment

Certificate of Completion
8 Hour HAZWOPER Supervisor

This certifies that

Richard P Purdy

Has completed eight hours of annual refresher training for
hazardous waste/materials supervisors under OSHA 29 CFR 1910.120.

Completed on 7/30/2018

Learning Hours: 8

A handwritten signature in black ink, appearing to read 'Mike de Bettencourt', is written over a solid black horizontal line.

Mike de Bettencourt, Director
Safety, Health and Environment Training and Development



Certificate of Completion

Presented to

Richard Purdy

for successful completion of

**OSHA 30: Construction Industry Outreach Training Course (IACET
CEU=3.0)**

Dated: **12/19/2018**

A handwritten signature in black ink, appearing to read 'Forster', is written over a horizontal line.

As an OSHA Outreach Training Program trainer, I affirm that I have conducted this OSHA Outreach Training Program training class in accordance with OSHA Outreach Training Program requirements. I will document this class to my OSHA Authorizing Training Organization. Upon successful review of my documentation, I will provide each student their course completion card within 90 calendar days of the end of the class.

Board of Certified Safety Professionals

Upon the recommendation of the
Board of Certified Safety Professionals,
by virtue of the authority vested in it,
has conferred on

Richard Purdy

the credential of

Safety Trained Supervisor

and has granted the title as evidence of meeting the qualifications and passing
the required examination so long as this credential is not suspended or
revoked and is renewed annually and meets all recertification requirements.



October 2, 2017

DATE ISSUED

STS-16492

CERTIFICATION NUMBER

A handwritten signature in black ink, appearing to read 'C. H. H. H.', written over a horizontal line.

BOARD PRESIDENT SIGNATURE

A handwritten signature in black ink, appearing to read 'Debra M. Furber', written over a horizontal line.

BOARD SECRETARY SIGNATURE

WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: AECOM-Annual Hazmat Exam
EXAM CLASSIFICATION: Periodic Examination

EMPLOYEE: Purdy, Richard
ID: 632793
DATE OF EXAM: 11/22/2022
EXPIRATION DATE: 11/22/2023

COMPANY: AECOM
POSITION: Environmental Scientist
LOCATION: AECOM-Chelmsford - DCS
SITE: East

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120 (Hazardous)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Has the employee any contraindication for work in accordance with 29 CFR §1910.95(g)1926.52 (Hearing Conservation)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Has the employee any limitations in accordance with 29 CFR §1910.134 (Respirator)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

WORK STATUS

☒ **QUALIFIED**

The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.

☐ **QUALIFIED - WITH LIMITATIONS**

Pursuant to applicable OSHA regulations, the examination indicates that a medical condition currently exists which will require the following work assignment limitations:

☐ **NOT QUALIFIED**

☐ **DEFERRED**

The examination indicated that additional information is necessary. The employee has been given the following instructions.

Comments:

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Dr. Jeffrey Jacobs Date: 11/30/22

Signature: _____



American Red Cross
Training Services

Certificate of Completion

Richard Purdy

has successfully completed requirements for

Adult First Aid/CPR/AED

Date Completed: 5/24/2021

Validity Period: 2 - Years

Conducted by: American Red Cross



To verify certificate, scan code or visit redcross.org/digitalcertificate and enter ID.

Learn and be inspired at LifesavingAwards.org



00L171F

Certificate of Completion

This is to certify that

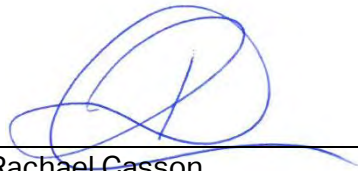
Richard Purdy

Has successfully completed the

AECOM Per- and Polyfluoroalkyl Substances (PFAS) Sampling Training

(MDEQ General PFAS Sampling Guidance: October 2018)

February 2021



Rachael Casson
Director of International PFAS Program
Environment



Katherine L. Davis, Ph.D.
North America PFAS Lead
Remediation Services – Environment

CERTIFICATE OF COMPLETION

This certificate awarded to

Richard Purdy

for satisfactory participation in

**Hazardous Waste Management and Shipping for Environmental
Professionals**

40 CFR 262.16(b)(9)(iii), 40 CFR 262.17(a)(7) and 49 CFR 172.704 - 8 Contact Hour(s)

Certificate 122898 awarded on December 7, 2021.



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Joni White

Eduwhere

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CERTIFICATE OF COMPLETION

This certificate awarded to

Richard Purdy

for satisfactory participation in

IATA Dangerous Goods

IATA DGR Section 1.5 and 49 CFR 172.704 - 4 Contact Hour(s)

Certificate 122899 awarded on December 7, 2021.



Eduwhere
Your compliance connection.

Joni White


Eduwhere

Eduwhere · PO Box 4704 · Chapel Hill, NC 27515 · www.eduwhere.com · (919) 246-4847

CERTIFICATE OF COMPLETION

OPSEC Awareness for Military
Members, DoD Employees and
Contractors

Richard Purdy


Heather Mardaga
Director, CDSE

April 07, 2022



**Attachment 5 – AECOM Safety, Health, and Environmental
Procedures**

1.0 Purpose and Scope

- 1.1 The purpose of this document is to establish policies and procedures for operation of AECOM-owned, rented, or leased vehicles, client or customer-owned vehicles, and personal vehicles used by AECOM employees.
- 1.2 This procedure applies to all AECOM Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content. Policies and procedures related to the operation of commercial motor vehicles are in addition to this procedure; refer to *S3AM-320-PR1 Commercial Motor Vehicles*.

2.0 Terms and Definitions

- 2.1 **AECOM Business** – Any activity that is performed in the name of AECOM. This includes, but is not limited to, vehicle travel between work locations, client sites, meeting locations as well as driving performed as a part of work-related travel (e.g., driving to and from airports, hotels, train stations). AECOM business does not include driving that is a part of a daily routine commute from home to an AECOM location.
- 2.2 **Authorized Driver** – AECOM employees who receive 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 in the course of conducting AECOM business. Authorized Drivers shall maintain a current driver's license with full privileges applicable to the vehicle to be operated. There are three categories of Authorized Drivers;
 - Professional (AECOM employee who operates a commercial motor vehicle. Please refer to *S3AM-320-PR1 Commercial Motor Vehicles*).
 - Hired (Employee's specific AECOM role is to drive employees in a normal street vehicle, which may or may not require commercial licensing by the applicable authorities. This category does not include busses or vans with a capacity of more than 12 people.).
 - General (Driving is required as a part of the employee's job duties. This includes driving AECOM-owned, leased, or rented vehicles, client or customer-owned vehicles, or personal vehicles on AECOM business).
- 2.3 **Collision** – Any incident in which a motor vehicle that (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.
- 2.4 **Commercial Motor Vehicle (CMV)** – 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:
 - Has a gross vehicle weight rating (GVWR) or gross combination weight rating equal to or greater than the weight specified by the applicable jurisdiction (e.g., U.S. ≥ 10,001 pounds [4,536 kilograms]); or
 - Is designed or used to transport more than the number of passengers specified by the applicable jurisdiction, including the driver, for compensation; or
 - 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
 - Is used in transporting hazardous material in quantities ≥ 1,001 pounds (454 kilograms) combined total weight at any time.
 - Refer to *S3AM-320-PR1 Commercial Motor Vehicles* for additional information.

- 2.5 **Distracted Driving** – An activity that takes the driver's attention away from the primary task of driving.
- 2.6 **Driving Under the Influence (DUI)/Driving While Intoxicated (DWI)** – The operation of a vehicle while under the influence of alcohol, drugs, medications, or other substances capable of inducing an altered mental state and/or impairing physical and mental judgments, such that the influence of the substances produces impairment in violation of the applicable governmental laws.
- 2.7 **Fatigue** – A general term used to describe the experience of being “sleepy”, “tired” or “exhausted”. The effect of fatigue is both physiological and psychological and can severely impair a driver's judgement. Fatigue can cause lapses in concentration which could prove fatal. Fatigue is not just a problem for drivers on long trips, as drivers can also suffer from fatigue on short trips.
- 2.8 **Incident** – For the purposes of this procedure, a vehicle collision or other event where personal injury or property damage occurs, or where a citation is issued while the employee is on AECOM business. This may also include acts of theft, vandalism, and criminal mischief.
- 2.9 **Journey Management** – A process for planning and executing necessary journeys safely.
- 2.10 **Local Laws** – Signs, postings, laws, regulations, ordinances and codes applicable for the jurisdiction in which the motor vehicle is being operated.
- 2.11 **Motor Vehicle Report (MVR) / Driver's Abstract** – A listing of the tickets (violations), incidents collision for an individual driver over a period of time (e.g., 3 years, 5 years) provided by a state or provincial authority such as the Department of Motor Vehicles.
- 2.12 **Personal Vehicle** – A motorized vehicle owned or leased by an employee.
- 2.13 **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 (MCD)
 - Mobile/Cellular phones
 - Two-way Radios
 - Personal Data Assistant (PDA)
 - iPads, iPods, or other tablet models
 - Computers
 - Global Positioning System (GPS) receivers
- 2.14 **Spotters** – Extra personnel that may provide guidance when maneuvering in close and/or complex situations in order to avoid the occurrence of an incident.
- 2.15 **Task Hazard Analysis (THA)** – A tool for evaluating work activities for the purpose of:
 - Identifying the SH&E hazards and risks associated with the activity being performed;
 - Identifying and implementing control measures to eliminate or reduce hazards and risks; and,
 - Evaluating the effectiveness of control measures and making modifications as needed.

3.0 References

- 3.1 AECOM Global Travel Policy
- 3.2 RS2-001-PR Firearms Standard
- 3.3 S3AM-003-PR1 SH&E Training
- 3.4 S3AM-004-PR1 Incident Reporting, Notifications & Investigation
- 3.5 S3AM-009-PR1 Fatigue Management
- 3.6 S3AM-010-PR1 Emergency Response Planning

- 3.7 S3AM-209-PR1 Risk Assessment & Management
- 3.8 S3AM-314-PR1 Working Alone
- 3.9 S3AM-319-PR1 All-Terrain Vehicles
- 3.10 S3AM-320-PR1 Commercial Motor Vehicles

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Manager / Supervisor

- Confirming employees are informed of the provisions of this procedure and related vehicle procedures.
- Providing a copy of this procedure to an employee who will be driving an AECOM-owned, leased or personal vehicle for AECOM business.
- Allowing employees to designate time to complete required driving safety training, vehicle inspections and related activities.
- Assigning driving tasks to authorized employees only.
- Selecting and providing vehicles for use by authorized employees that are appropriate for the planned working conditions and environment.
- Supporting employees in the reporting of vehicle incidents per *S3AM-004-PR1 Incident Reporting, Notifications & Investigations*, including the entry of the incident into the on-line incident management system (e.g., IndustrySafe).
- Confirm notification of AECOM Human Resources and Counsel upon receipt by an employee of a legal summons associated with a moving violation related to the use of a company vehicle.

4.1.2 Employee

- Follow this procedure and applicable laws while operating a vehicle.
- Complete assigned driver safety training based on the training matrix and any additional training assessments developed at the business group. Refer to *S3AM-003-PR1 SH&E Training, including S3AM-003-FM1 SH&E Training Matrix*.
- Report to the Manager / Supervisor if the vehicle selected is not appropriate for the working conditions and environment.
- Report to the Manager / Supervisor if the employee is inexperienced in operating the type of vehicle assigned.
- Report to the Manager / Supervisor if the employee is inexperienced in driving in the type of working conditions and environment assigned.
- Review the completed Task Hazard Assessment and complete journey management. If required, document the Journey Management Plan using *S3AM-005-FM1 Journey Management Plan* or equivalent.
- Immediately report vehicle incidents per *S3AM-004-PR1 Incident Reporting, Notifications & Investigations*, including the entry of the incident into the on-line incident management system (e.g., IndustrySafe).
- Notify the appropriate Manager / Supervisor and SH&E Manager upon receipt of a legal summons associated with a moving violation related to the use of a company vehicle.
- Immediately report a change or limitation(s) to his/her Driver's License to the appropriate AECOM Human Resources representative or his/her Manager / Supervisor.

- Conducting a pre-operational inspection of the vehicle for damage or deficiencies and reporting discovered deficiencies affecting the safe operation of the motor vehicle to the appropriate authority (e.g., supervisor, rental car agency, etc.).

4.1.3 SH&E Manager

- Maintaining and updating training resources for vehicle and driver safety.
- Providing guidance.
- Assisting operational leaders with determining the risk incurred by the use of motor vehicles.
- Assist in the incident investigation and review process.

4.2 General Procedures and Practices

- 4.2.1 Only Authorized Drivers are to operate a motor vehicle (rental, personal, client or customer-owned, or AECOM-owned/leased) while on AECOM business.
- 4.2.2 Drivers must comply with AECOM's *Global Travel Policy* and applicable laws, and employ safe driving practices. (NOTE: *Individual state, provincial, and local laws vary.*) Refer to S3AM-005-ATT1 *Authorized Driver Safety Practices*.
- 4.2.3 Authorized Drivers shall confirm their operating license is on their person, and valid registration and insurance is maintained with the respective vehicle prior to operation.
- 4.2.4 All local laws including, signs, postings, regulations, ordinances, and codes applicable for the jurisdiction in which the motor vehicle is being operated shall be adhered to.
- 4.2.5 At-risk driving behavior by AECOM employees shall be identified and managed accordingly.
- 4.2.6 Authorized Drivers must be at least 18 years of age (noncommercial license) or 21 years of age (commercial license) and have a current driver's license for the appropriate class of vehicle (unless more stringent requirements are established by the leasing/renting agency). Employees with conditional licenses are prohibited from operating vehicles on AECOM business.
- 4.2.7 If an Authorized Driver receives a citation resulting in their license being suspended, has his/her driver's license revoked, or is otherwise unauthorized to drive, he/she shall notify the appropriate AECOM Human Resources representative or his/her Manager prior to start of the following work day. Failure to do this may result in disciplinary action up to and including termination.
- 4.2.8 The office to which the vehicles are registered is liable for any damages to the vehicle being operated by an Authorized Driver.
- 4.2.9 Seat belts are to be worn by the occupants. The number of passengers shall not exceed the manufacturer's specifications for the vehicle.
- 4.2.10 The vehicle may not move until all passengers have fastened their restraints in the proper manner (e.g., lap belt secured and shoulder harness placed over the shoulder). Vehicles are not to be operated or used by AECOM employees if seatbelts are not included as part of the vehicle's safety equipment.
- 4.2.11 The vehicle's engine is to be turned off during refueling. Smoking or cellular phone use is not allowed while refueling.
- 4.2.12 Motorcycles may not be operated on AECOM business unless the following requirements are met:
 - Specific approval is provided by the Supervisor with concurrence from the SH&E Manager.
 - A hazard analysis is completed.
 - Required training and license is in place.
 - Headlights or daytime running lights will be used when the vehicle is in operation.
 - A Class 2 or 3 safety vest and appropriate helmet shall be worn while operating a motorcycle.

- 4.2.13 When practical, drivers should travel during daylight hours and avoid driving during adverse weather conditions. Drivers should also inform colleagues of their travel itinerary including destination and anticipated departure and arrival times.
- 4.2.14 Fire arms and weapons are not permitted in AECOM-owned, leased or rented vehicles insured by AECOM. Firearms and weapons in personal vehicles are subject to the laws and regulations of the respective local, provincial, state, territory, federal and region and/or country. Refer to the *RS2-001-PR1 Firearms Standard*.
 - Exceptions to this standard may exist where there is a credible and demonstrated risk to AECOM employees or assets, or when knives or weapons are required as part of the work activity. Under such circumstances, the exception must be approved by the Chief Resilience Officer, and must strictly adhere to the procedures set forth by the Global Resilience Group.
- 4.2.15 Vehicles are to be selected based on the nature of planned use. In some working conditions, specialized vehicles, such as four-wheel drive and higher clearance vehicle, may be required to confirm safe travel. These specialized vehicle requirements/specifications shall be identified in the project specific SH&E Plan and/or THA.
- 4.2.16 Vehicles are to be maintained according to manufacturer's specifications and the applicable environmental and operating factors (e.g. winterized with appropriate fluids, winter tires installed, appropriate coolant for hot climates, etc.).
- 4.2.17 Vehicles are to be outfitted with the appropriate support equipment based on the THA or client vehicle specifications. Support equipment may include, but is not limited to, cones, rotating warning lights, warning flags, vehicle identification (magnetic door signs or similar), wheel chocks, cargo nets, and rollover protection.
- 4.2.18 Drivers are to operate vehicles in a manner that avoids situations where backing is necessary. Whenever possible and as permitted, reverse parking of all vehicles while on business is required. A spotter shall be used when backing of trucks and heavy equipment presents a risk of collision.
- 4.2.19 Non-AECOM drivers (those other than AECOM employees [e.g., subcontractors, joint venture partners, clients, etc.]) are prohibited from operating an AECOM company owned, leased or rented vehicle unless the activity is specifically agreed to in the applicable contract and only if the use of the vehicle is consistent with the terms of the contract.
- 4.2.20 Authorized drivers required to operate vehicles with special hazards (e.g., trucks carrying fuel cells, vehicles used to tow trailers, vehicles with limited visibility, etc.) will be thoroughly briefed on the hazards and control measures necessary for safe operation of the vehicle. The local AECOM operation will maintain documentation of the briefing.
- 4.2.21 Define specific vehicle travel routes and parking areas at field sites through the use of fencing, cones, or other markings.
- 4.2.22 When a vehicle will be left unattended without an authorized driver in the driver's seat, the vehicle must be turned off, placed into park (or gear for manual transmissions), and the emergency brake set. When parked on a grade, the wheels or tracks of mobile equipment shall be either chocked or turned into a bank.
- 4.3 Distracted Driving
 - 4.3.1 Distractions while driving are a major cause of incidents. Distractions include the use of cellular phones (including texting), eating, drinking, smoking, and engaging in intense conversations. AECOM Authorized Drivers must exercise proper control of the vehicle at all times, including the management of possibly distracting actions and behaviors.
 - 4.3.2 The use of portable 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. Electronic devices include, but are not limited to, all mobile phones pagers, iPods, MP3s, GPS units, DVD players, tablets laptops and other portable electronic devices that can cause driver distraction.

- Employees shall not use a personal or company mobile communication devices (MCD) while driving any vehicle on AECOM business.
 - Employees shall not use a company MCD while driving a personal vehicle.
 - Driving includes the time spent in traffic or while stopped at red lights or stop signs.
- 4.3.3 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. Note: windshield mounting brackets are not permitted in many jurisdictions, with dashboard mounts being acceptable. Consult jurisdictional requirements.
- 4.3.4 Electronic devices shall be setup for operation prior to commencing driving activities and shall not be changed by the driver while driving.
- 4.4 Impairment
- 4.4.1 Impairment can take many forms ranging from fatigue, to the use of prescription medication or alcohol (even small amounts), to the abuse use of illegal and legal drugs and alcohol. AECOM employees shall not drive in an impaired condition.
- 4.4.2 AECOM employees are prohibited from being under the influence of alcohol or drugs or improperly using medication in a way that could diminish, or raise questions concerning, an employee's ability to perform at his or her best while performing services for or on behalf of AECOM. Operation of vehicles while under the influence may void insurance coverage.
- 4.4.3 Drivers/operators will not drive or operate vehicles while under the influence of medications when told by a physician, another healthcare provider, or the manufacturer (e.g., instructions on the label) the medication could render the activity unsafe.
- 4.4.4 AECOM employees are prohibited from operating a vehicle if they are experiencing signs and symptoms of fatigue. Employees should stop work and rest before driving. 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*.
- 4.5 Journey Management
- 4.5.1 When practical, alternatives to road travel should be evaluated including teleconferencing/video conferencing, the use of public transportation or carpooling.
- 4.5.2 Journey management is a process for planning and executing necessary journeys safely and may or may not be documented. Review the completed THA and complete the journey management process. If required, document a Journey Management Plan (JMP) using *S3AM-005-FM1 Journey Management Plan* or equivalent. The journey management process includes the following steps:
- Determining if the trip is necessary.
 - Evaluating alternative safer modes of transport.
 - Evaluating the potential to combine journeys with others.
 - Planning the trip.
 - Select the safest and most efficient route. Confirm compliance with any site specific specified routes, route rules, or restrictions.
 - Confirm route planning factors in fatigue management. Refer to *S3AM-009-PR1 Fatigue Management*.
 - Review road conditions and potential hazards associated with the route.
 - Review weather conditions and forecast.
 - If applicable, review *S3AM-314-PR1 Working Alone*.
 - Confirm Emergency Response Plan includes procedures to be taken in the event of a collision or vehicle incident.
 - Allow for adequate travel time.
 - Inform others of destination, estimated time of arrival and routing.

- 4.5.3 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 JMP. This plan typically includes the route, location of route hazards, timing, rest periods and locations, communications, emergency response and security arrangements.
- 4.5.4 Drivers are responsible for developing the JMP and coordinating with the applicable parties identified in the plan.

4.6 Driver Safety Training

Authorized drivers shall have a current driver's license for the appropriate class of vehicle (unless more stringent requirements are established by the leasing/renting agency).

Driver safety training is to be assigned based on the risks posed with the work environment, driver type and vehicle type, using the training matrix and any additional training assessments developed at the business group level. Refer to *S3AM-003-PR1 SH&E Training, including S3AM-003-FM1 SH&E Training Matrix*. A determination of training type is at the discretion of the Manager / Supervisor, with the following guidance applied.

- 4.6.1 All Authorized Drivers (Professional, Hired, and General Drivers) shall be trained in this procedure; *S3AM-005-PR1 Driving*.
- 4.6.2 All Authorized Professional Drivers shall be trained in *S3AM-320-PR1 Commercial Motor Vehicles*.
- 4.6.3 Vehicle / Driver Safety Training
 - Recommended for all employees who drive on behalf of AECOM (Professional, Hired and General Drivers).
 - This may be completed online (e.g., AECOM University – Driver Safety).
 - Recommended to be completed within 1 month of the Authorized Driver's hire date.
- 4.6.4 Defensive Driver (online) Training
 - Recommended for all Authorized Drivers (Professional, Hired, and General Drivers) who are assigned an AECOM company owned, leased or rented vehicle for a significant period of time with the expectation that the employee utilizes the vehicle on a regular basis for AECOM business.
 - It is recommended that authorized drivers who have completed web-based defensive driver training or equivalent also complete a refresher every three years.
 - Defensive Driver training is available online through AECOM University (e.g., Alert Driving Basic, Alert Driving Skills) or one of the following AECOM-approved training resources:
 - The National Safety Council
 - Alert Driving
- 4.6.5 Defensive Driver (hands-on) Training
 - Recommended for all Authorized Professional Drivers and Authorized Hired Drivers.
 - Recommended for Authorized General Drivers who drive in remote locations, hazardous environments (such as refineries, ports, terminals etc.), at-risk drivers, and when required by clients.
 - Defensive Driver hands-on training is provided through an AECOM-approved training resource, such as Smith Systems.
 - Hands on defensive driver training may be required as a result of an incident or negative Motor Vehicle Report.
- 4.6.6 Driver Retraining
 - Drivers involved in repeated motor vehicle incidents, incidents of sufficient severity or concern, or drivers identified as at-risk through review of their Motor Vehicle Report/Driver Abstract may

be retrained or, as applicable, subject to disciplinary action and refused the right to drive on behalf of AECOM.

- Retraining programs will be implemented at the discretion of the Supervisor and SH&E Manager.
- Employees eligible to continue driving shall be subject to a driver retraining program that may include any of the above programs or other training programs appropriate for the type of driving the employees performs.

4.6.7 Special Vehicles and Driving Conditions

- Vehicles such as All-Terrain Vehicles (ATVs), four wheel drive vehicles, motorized carts, snowmobiles, box vans and trailers (towing) require specialized training and supervision. For ATVs, Refer to *S3AM-319-PR1 All-Terrain Vehicles* for additional information.
- Use of these types of vehicles is limited to AECOM projects, therefore training and qualification programs for drivers will be project specific. The Manager / Supervisor shall work with the SH&E Manager to tailor training to the specific needs of the project.

4.7 Personal Vehicles (additional requirements)

- 4.7.1 The requirements of this procedure apply to the use of a personal vehicle for AECOM business. Additional requirements are set forth in the *AECOM Global Travel Policy*.
- 4.7.2 Personal vehicles driven by Authorized Drivers for business use must satisfy the jurisdiction's registration and inspection requirements and may not be modified beyond manufacturer's specifications.

4.8 Rental Vehicles (additional requirements)

- 4.8.1 The requirements of this procedure apply to the use of a rental vehicle for AECOM business. Additional requirements are set forth in the *AECOM Global Travel Policy*.

4.9 Requirements for Authorized Drivers

- 4.9.1 Review the *S3AM-005-ATT1 Authorized Driver Safety Practices* for specifics.
- 4.9.2 Drivers are not to permit unauthorized persons to operate an AECOM-owned/leased/rented vehicle.
- 4.9.3 All Authorized Drivers shall perform a walk-around inspection of the vehicle prior to operation.
- 4.9.4 Pre-operation vehicle inspections shall be performed and documented by all Authorized Professional Drivers and all Authorized Hired Drivers. A sample vehicle inspection checklist is provided in *S3AM-005-FM2 Vehicle Inspection Checklist*.
- 4.9.5 Vehicles with deficiencies that affect or could potentially affect the safe operation of the vehicle shall be removed from service and promptly repaired as necessary to permit safe vehicle operation.
- 4.9.6 As applicable, arrange for and/or coordinate with appropriate AECOM personnel to facilitate preventive maintenance services for the vehicle. Maintain it in sound mechanical condition, as per the manufacturer's recommendations provided in the owner's manual.
- 4.9.7 Do not operate the vehicle if unsafe maintenance conditions exist that would likely result in vehicle damage or personal injury. This applies to vehicles owned or leased by AECOM and to personally-owned vehicles used for AECOM business. Escalate other maintenance issues for correction to appropriate authority (e.g., manager, rental car agency, supervisor, etc.).
- 4.9.8 Transport only persons on AECOM related business or those persons receiving transportation as a prescribed service. Only drive vehicles in conditions for which the driver has the appropriate training and experience.
- 4.9.9 AECOM-owned, rented, or leased vehicles are for official business use only and are not to be used for personal activities. Exceptions to this requirement can be made only with the specific written approval of the Manager of the office or location the vehicle is registered to.

- 4.9.10 Smoking (including the use of e-cigarettes) and chewing tobacco is not permitted in AECOM-owned, leased or rented vehicles.
- 4.9.11 Drivers are responsible for damage caused by abuse of the vehicle.
- 4.9.12 Secure the vehicle when left unattended.
- 4.9.13 Securing loads in the inside and outside compartments of the vehicle.
 - Do not rely on weight/shape of load alone. Always use a cargo net, straps, containers or other mechanical device when necessary to confirm load is secure.
 - Mark loads that extend the beyond the end of truck, trailer or similar edge with a red warning flag of at least 16 square inches.
 - Red lights will be utilized at night to mark loads that extend the beyond the end of truck, trailer or similar edge.
- 4.9.14 Do not modify existing equipment (warning sounds, backing alarms etc.) or install aftermarket equipment including toolboxes, truck caps, specialty lights, or towing equipment) without approval from the Manager of the office or location the vehicle is registered to and AECOM Procurement Department.
- 4.10 Emergency Preparedness
 - 4.10.1 AECOM-owned or leased vehicles are to have a “Safety Kit” that contains a first-aid kit, portable fire extinguisher, safety triangle, and two reflective safety vests. If not available, contact the Manager / Supervisor or SH&E Manager to determine how to obtain a kit.
 - 4.10.2 The following suggested items should be kept in vehicles used for AECOM business in remote project locations:
 - First aid kit, appropriate to the work and crew size, or per regulations.
 - Fire extinguisher, safety triangle, and safety vest.
 - Emergency equipment (e.g., flares, flashlight, blanket, drinking water, etc.) based on conditions.
 - Means of communication (cell phone, radio or satellite phone), extra batteries or a charger.
 - 4.10.3 To the extent possible, employees should refrain from changing tires or making repairs to vehicles in the field.
 - A road side assistance service should be identified for vehicles used for AECOM business in advance travel.
 - If changing tires or making repairs to vehicles is necessary in the field, assessment of hazards shall be completed and all applicable safe procedures and manufacturer’s specifications shall be followed.
 - 4.10.4 Specific emergency procedures are to be identified in the applicable Emergency Response Plan, JMP or the THA. Refer to *S3AM-010-PR1 Emergency Response Planning*.
- 4.11 Vehicle Incidents
 - 4.11.1 Vehicle incidents are to be reported and managed in accordance with *S3AM-004-PR1 Incident Reporting, Notifications and Investigation* regardless of how minor the incident might be.
 - 4.11.2 The Employee(s) involved in a collision shall follow the below guidelines:
 - Assess the situation to confirm everyone is safe, and remove any vehicle occupants from harm’s way. Call, or have someone else call 911 immediately, if necessary.
 - As appropriate, remain at the scene of a collision to contact the police. Ask another motorist to call the police if necessary; never leave the scene of a collision.

- As applicable, provide (if requested) to police and the other driver(s) the liability insurance information. Obtain the officer's jurisdiction, name, and badge number and a copy of the police report.
 - As applicable, consider moving the vehicle out of the traffic flow if it is safe to do so, the vehicle is operational, and/or no further damage to the vehicle can occur.
 - Do not operate a damaged vehicle if its safety is questionable, its operating condition is illegal by applicable laws or its condition is such that further damage would likely result from its operation.
 - Turn on the vehicle's flashers to warn other motorists.
 - 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.
 - Cooperate with AECOM Counsel if the incident results in unresolved risks or third party claims, or if the employee receives a summons, complaint or other legal documents relating to a traffic incident.
 - **DO NOT ADMIT LIABILITY, AGREE TO PAY FOR DAMAGE OR SIGN A DOCUMENT RELATED TO AN INCIDENT EXCEPT AS REQUIRED BY LAW.**
 - Statements made in haste or anger may be legally damaging.
 - If contacted by a third party, do not answer any questions. Immediately report this contact to the Manager / Supervisor and/or Legal Counsel
 - Employees shall report the incident to AECOM's Global Travel Department. If the incident involved a third party, the driver is responsible for obtaining a copy of the police report and providing to global travel
- 4.11.3 Employees must cooperate with the incident investigation team during any investigation of an incident meeting the investigation protocol.
- 4.11.4 Vehicle repairs shall be conducted at the authorization of the Manager / Supervisor.
- 4.12 Drug and Alcohol Testing
- 4.12.1 Testing for Alcohol and/or Drugs procedures shall be administered in accordance with the applicable policy and procedures. Refer to *S3AM-019-PR1 Substance Abuse Prevention*.
- 4.12.2 In the event that a police/regulatory officer responding to a vehicle incident administers field and/or laboratory impairment testing AECOM reserves the right, as permitted, to obtain copies of such testing results for inclusion in the incident report and consideration in a subsequent incident investigation.
- 4.13 Driving Privileges, Citations and Violations
- 4.13.1 A violation of this vehicle safety standard is subject review by the appropriate AECOM Human Resources representative and may be subject to disciplinary action, up to and including termination. The applicable Manager / Supervisor will review all incidents involving AECOM-owned, rented, or leased vehicles.
- 4.13.2 Citations and violations which occur while driving for AECOM business are to be reported as a vehicle incident in accordance with *S3AM-004-PR1 Incident Reporting, Notification & Investigation* within 24-hours. Incidents will be investigated as appropriate.
- 4.13.3 The AECOM Manager responsible for the employee, in consultation with the appropriate AECOM Human Resources representative, may suspend the privilege to operate vehicles on AECOM business due to noncompliance with the AECOM Vehicle and Driver Safety Program, involvement

in a motor vehicle incident, or resulting citations or other legal actions associated with motor vehicle violations.

4.13.4 The employee's driving privileges will be suspended for any of the following:

- Accidents or legal action involving alcohol or drug use (e.g., driving under the influence).
- Driving without a license.
- Hit-and-run driving or leaving the scene of an accident.
- Unauthorized use of AECOM vehicles (e.g., using an AECOM vehicle for moving personal items, carrying passengers who are not associated with work activities, etc.).

4.13.5 The employee's driving privileges may be suspended for any of the following:

- Two or more at-fault accidents involving the same Authorized Driver within a 12-month period.
- Multiple complaints from other employees or members of the public about driving performance.
- Any accident caused by an AECOM Authorized Driver where damages exceed \$2,500.
- Failure to comply with the distracted driving requirements.
- Gross misconduct or violation of policy.

4.13.6 An Authorized Driver's driving privileges may be reinstated as follows:

- For any suspension resulting from law enforcement agency legal action involving drugs and alcohol on the part of the former Authorized Driver, driving privileges may be reinstated only by concurrent agreement of the Vice President of SH&E for the applicable Business Group and Human Resources Manager.
- For those Authorized Driver's privilege suspensions that are not related to driving under the influence of drugs or alcohol, privileges may be reinstated with concurrent agreement by the AECOM Manager, the SH&E Manager, and Human Resources Manager upon completion of required remedial training.

4.13.7 Disciplinary action may include the following:

- Loss of AECOM driving privileges.
- Disciplinary warning.
- Termination.

4.13.8 The employee is personally responsible for payment of fines for moving violations and parking citations incurred while driving a vehicle on AECOM business and for reporting such incidents to his/her Manager / Supervisor. The Manager is responsible for notifying Counsel.

4.13.9 If an Authorized Driver receives a citation resulting in the license being suspended from driving or has his/her driver's license revoked, he/she is required to notify his/her Manager / Supervisor prior to start of the following work day. Failure to do so may result in disciplinary action up to and including termination.

5.0 Records

5.1 Documentation of employee training completed shall be retained in accordance with *S3AM-003-PR1 SH&E Training*.

5.2 As applicable, completed *S3AM-005-FM2 Vehicle Inspection Checklists* and/or *S3AM-005-FM1 Journey Management Plans* shall be retained in project files.

6.0 Attachments

6.1 [S3AM-005-ATT1 Authorized Driver Safety](#)

6.2 [S3AM-005-FM1 Journey Management Plan](#)

6.3 [S3AM-005-FM2 Vehicle Inspection Checklist](#)

Authorized Driver Safety

S3AM-005-ATT1

1.0 Before Vehicle Operation

- 1.1 Learning and practicing good driving habits will help reduce the chance of a traffic collision. Learning to properly scan surroundings will improve hazard awareness and avoidance. With correct driving habits, errors can be significantly reduced and incident response time can be decreased.
- 1.2 All Authorized Drivers shall perform a walk-around inspection of the vehicle prior to operation.
 - 1.2.1 Authorized Drivers should use the "Get Out And Look" (GOAL) method before placing a vehicle in motion. Drivers are to make a 360-degree (360°) walk around of the vehicle immediately before placing vehicle into motion in order to determine whether there are hazards or possible obstructions in the proposed path of travel. Drivers are to clear the area of people and objects before placing the vehicle in motion. A check will also be performed to confirm overhead and side clearances are adequate. The following are recommended best practices:
 - Placement of cones on the right side of the front and rear of vehicle upon parking and retrieved during the 360° GOAL walk-around.
 - In lieu of cones, place GOAL magnets on the right side of the hood and truck/tailgate of the vehicle upon parking. The GOAL magnets should then be retrieved during the 360° GOAL walk around just prior to moving the vehicle again.
 - Place a GOAL sticker on the driver side door window as a reminder to get out and look.
 - 1.2.2 Pre-operation vehicle inspections shall be performed and documented by all Authorized Professional Drivers and all Authorized Hired Drivers. A sample vehicle inspection checklist is provided in *S3AM-005-FM2 Vehicle Inspection Checklist*.
- 1.3 Drivers shall be familiar with applicable client rules and regulations when on the client's sites. The employee may, for example, be required to leave their keys in the ignition with the vehicle turned off or to display a vehicle pass. When parking, it is recommended that employees back the vehicle into the parking space.
- 1.4 Drivers must be trained, competent and in possession of a current driver's license that is valid to the jurisdiction and the vehicle driven. Any additional certification required given the particular vehicle and equipment transported must also be current (e.g. air brake certificate).
- 1.5 Execute proper travel planning to avoid being in a rush, traveling during peak traffic hours, and traveling through high traffic volume areas. Utilize the *S3AM-005-FM1 Journey Management Plan* as appropriate.
- 1.6 All drivers must be involved in a task hazard assessment applicable to the task(s) undertaken (may exclusively be the driving task or may include the driving task).
- 1.7 Confirm current insurance and registration is maintained with the vehicle and any equipment being towed. License plates must be clean.
- 1.8 As applicable, check all safety equipment (e.g. First Aid Kit, Fire Extinguisher, Flares, Triangles, Reflective Vest, etc.).
- 1.9 As applicable, check for survival gear and equipment. Emergency kits should include blankets, food, water, flashlight, extra batteries, a method of communication and a heat source such as a candle.
- 1.10 When accessing any pickup truck box, staff will: step up into the box to avoid excess reaching and strain and; use three point contact getting in and out of the truck box (i.e., avoid jumping off the tailgate).
- 1.11 Confirm no items are hanging from the rear view mirror that could obstruct vision.
- 1.12 Adjust mirrors to confirm optimal visibility.

2.0 Vehicle Operation – General

- 2.1 Be vigilant of differences between trucks and small cars related to blind spots, turning radius, and required overhead and undercarriage clearances.
- 2.2 It is a personal responsibility of the driver to operate a vehicle safely and in compliance with regulations (e.g. Cargo Securement, Traffic, Dangerous Goods, etc.).
- 2.3 Confirm compliance with applicable traffic legislation, driver regulations, and rules (e.g. commercial driver hours of service, state / provincial highway acts, municipal bylaws, private road/property owner rules, site specific rules, etc.).
- 2.4 All vehicle occupants shall wear seatbelts at all times.
- 2.5 Keep reflectors, lights and windows (inside and out) clean.
- 2.6 Window cleaner should be on hand for cleaning the interior of the windows as well as headlights that have become obscured due to road spray or slush.
- 2.7 A shovel and a supply of sand or gravel can help to extract a stuck vehicle that does not have traction.
- 2.8 Maintain good housekeeping practices and confirm items and loaded materials are secured from movement on both the interior (e.g. cab, glove box, etc.) and exterior (e.g. box, flat deck, etc.) of the vehicle.
- 2.9 Conduct en-route inspections as required to check cargo securement.
- 2.10 Pulling Over
 - 2.10.1 Pull the vehicle off the road to a safe location as required by the applicable jurisdiction (e.g. rest stops, a side road, an unused approach):
 - If, in the ongoing assessment of road and weather conditions, it has been concluded that travel is no longer safe (i.e. heavy rain, sleet), and wait until conditions allow for safe travel.
 - To review or adjust navigation equipment and check cargo securement.
 - To check telephone messages, text messages or to take notes.
 - For interval breaks, to stretch and if fatigued (try to take a break every two hours).
 - To manage and eliminate driver distractions.
 - 2.10.2 If it is necessary to park a vehicle on the shoulder of an active roadway, park as far off the road as possible, and turn on the four-way indicators (hazard lights) prior to leaving the vehicle. Use cones or other warning devices, and wear a high visibility traffic vest.
 - 2.10.3 Observe extra caution in and around emergency and construction zones.
 - 2.10.4 Avoid unattended rest areas, when possible, and especially at night.
 - 2.10.5 If the vehicle breaks down, attempt to get to a secured location. Call police or roadside assistance as appropriate.
 - 2.10.6 Contact the police to help those with car trouble instead of stopping to assist.
 - 2.10.7 When possible, employees should have a car mechanic or roadside assistance change or repair a flat tire. If the Driver or passenger must change a tire, the Driver and passenger must adhere to the manufacturer's specifications and observe the proper lifting technique and safety procedures. Proper lifting is addressed in *S3AM-104-PR1 Manual Material Handling*.
 - 2.10.8 When parking or leaving a vehicle, the following procedures must be followed:
 - Engage the transmission in park (automatic transmission) or first gear (standard transmission).
 - Shut off the engine.

- Set the parking brake.
 - Remove the ignition keys, and lock the vehicle.
- 2.10.9 If work (e.g., surveying) is required alongside an active road, park the vehicle behind the area of work to provide a barrier against out-of-control vehicles.
- 2.11 Backing Up
 - 2.11.1 Keep reverse motion to a minimum as the most common incidents involve backing up.
 - 2.11.2 Whenever possible, vehicles should be parked in a manner that prevents the driver from backing (reversing) upon departure. For example, the vehicle should be backed into a parking spot or drivers should select a parking spot that allows them to “pull” through” so that the vehicle is facing the direction of departure.
 - 2.11.3 Confirm the area behind the vehicle is clear prior to and while reversing a vehicle.
 - 2.11.4 All vehicles with limited visibility operated around workers or on a construction site:
 - Should have an audible back-up alarm installed that functions automatically when the vehicle is put into rear motion; or
 - Shall be backed up only when a signaler communicates that it is safe to do so.
 - If a vehicle is not equipped with an audible back-up alarm, the operator shall sound the vehicle horn twice to indicate intention to back vehicle up.
 - 2.11.5 Confirm compliance with applicable traffic legislation regarding backing up (i.e. Texas – An operator may not back the vehicle on a shoulder or roadway of a limited-access or controlled-access highway; Ontario – No driver of a vehicle shall back the vehicle upon the roadway or shoulder of any highway divided by a median strip on which the speed limit is in excess of 80 km/h; etc.).
 - 2.11.6 Take the time to become acquainted with the area the vehicle is to be backed into.
 - 2.11.7 Inspect the area to be backed into (i.e. walk around it by foot, identify obstructions and possible hazards).
 - 2.11.8 Line up as straight as possible with intended final position prior to backing equipment or vehicle up.
 - 2.11.9 If the area is congested with people or equipment a signaler SHALL be used.
 - 2.11.10 Before putting the vehicle into motion, decide:
 - The method of communication (hand signals, two-way radios or other means).
 - If hand signals are going to be used, confirm both the driver and signaler agree on signals to be used.
 - If two-way radios are being used confirm there is continuous voice contact between the signaler and driver. If there is nothing being transmitted on the two-way radio the driver shall STOP the vehicle.
 - 2.11.11 While backing up:
 - Confirm there is constant visual contact with the signaler when the vehicle is in motion if using hand signals.
 - If driver loses eye contact with the signaler at ANY time, the driver shall STOP the vehicle until eye contact is regained. The exception is where the communication between the signaler and driver is conducted by two-way radio.
 - When possible, the signaler shall stand on the driver’s side of the vehicle during motion.

- The signaler must always keep a safe distance from the vehicle or equipment and never stand directly in the path of motion. Refer to Safe Work Practice – Red Zone.
- While backing up using a signaler, the driver must confirm that the vehicle radio (not to be confused with two-way radio) is off and the windows are down (if possible) to avoid distraction and to be able to hear outside of the vehicle.
- If the driver notices anything out of the ordinary (despite what the signaler is directing) the driver will STOP the vehicle or equipment and assess the situation.
- If at any time the safety of any person or property is at risk, including that of the signaler, the signaler shall signal the driver to STOP the vehicle IMMEDIATELY.
- Any person (other than the signaler) can direct the driver to STOP the vehicle or equipment and the driver must take that as a valid direction to STOP.

3.0 If Vehicle is to be Left Unattended

- 3.1 Turn the ignition off, remove the key and set the emergency brake (if parked on an incline).
- 3.2 Lock and secure the vehicle.
- 3.3 Secure equipment and property in a locked trunk or tool chest.
- 3.4 Do not leave keys in an unattended vehicle.

4.0 Defensive Driving

- 4.1 Demonstrate an effective and positive driving attitude.
- 4.2 Use road courtesy, expect the unexpected and be patient. Do not rush or drive aggressively.
- 4.3 Follow and obey regulations.
- 4.4 Do not make sudden lane changes and always use signal lights.
- 4.5 Be Visible – Be seen by all other drivers, pedestrians, cyclists and others using or crossing the road:
 - 4.5.1 Avoid driving in blind spots of other vehicles.
 - 4.5.2 Confirm vehicle lights are on, working and clean before and during travel.
 - 4.5.3 Confirm the vehicle's horn works and use it as necessary to warn others.
 - 4.5.4 Tapping the vehicle brakes may provide a visible alert for following vehicles.
 - 4.5.5 Confirm adequate distance to enable passing of other motorists safely.
- 4.6 If it is necessary to turn a vehicle around, confirm that the operation is conducted safely and according the applicable traffic legislation and rules.
- 4.7 Always operate a vehicle within operator driving limitations. Do not be enticed by others to exceed driving capability for any reason. When behind the wheel, drivers must be in control of all driving related situations.
- 4.8 Maintain awareness of all objects in the immediate circle of influence. Whenever possible, stay well clear of other vehicles, machinery, equipment and pedestrians.
- 4.9 Scan Ahead – Check the path of travel for obstacles and other vehicles:
 - 4.9.1 Utilize three driving monitoring zones (should not be confused with safe following distances):
 - Action Zone (approximately 4 to 6 seconds in front of the vehicle) – activity in this zone generally requires immediate reaction by the driver.

- Planning Zone (at least 15 seconds in front of the vehicle) – look ahead to visually identify if there is slowing traffic or another type of road hazard ahead or to the side. Do not drive behind vehicles that block visibility.
 - These zones may require enlarging based on speed and driving environment (e.g. traffic congestion, weather, etc.).
- 4.9.2 Get the big picture and look for hazards (other motorists, pedestrians, cyclists, road debris, etc.).
- 4.9.3 Moving eyes every 2 seconds can help to avoid fixating on any one object. Check rear view mirror every 5 to 8 seconds and any time braking.
- 4.9.4 Read and obey traffic signage and controls.
- 4.9.5 Use high beam head lights when possible.
 - Use low beam headlights when following closely behind other vehicles or when approaching and meeting oncoming traffic.
 - Use low beam headlights in fog or heavy snow.
- 4.9.6 Wear appropriately tinted sunglasses to improve visibility in sunny conditions. Do not wear sunglasses at night and, if wearing at dusk or dawn, confirm the tint is of the type that improves and does not hinder visibility.
- 4.10 Keep a Space Cushion:
 - 4.10.1 Maintain a space cushion around the vehicle to improve the potential of avoiding a collision. Create an out by monitoring the space in front, behind and to each side of the vehicle, leaving enough area as a cushion to enable evasive action if needed.
 - 4.10.2 Maintain a minimum of 2 seconds plus 1 second for every 10 feet (3m) of vehicle length between the vehicle driven and the vehicle ahead:
 - Pick a marker on the road ahead, such as a road sign or pole.
 - Count "one thousand one, one thousand two".
 - When the front of the driven vehicle reaches the marker, stop counting.
 - If the marker is reached before "one thousand two," increase the space cushion.
 - Add more time (space) in poor driving conditions.
 - Add more time (space) if the vehicle operated is heavily loaded.
 - Add more time (space) if the vehicle ahead is smaller and lighter and may stop more quickly than the vehicle operated.
 - 4.10.3 When stopped behind another vehicle leave 1 vehicle length between the vehicle driven and the vehicle ahead.
 - 4.10.4 Do not travel in a traffic cluster. Manage the space to the front, left and right of the vehicle driven.
 - 4.10.5 Fog, heavy rain, snow, slush or wind require speed and distance between vehicles to be adjusted accordingly.
- 4.11 Recognize and Anticipate Hazards:
 - 4.11.1 Exercise increased caution at night, dawn and dusk.
 - 4.11.2 When driving at night look to the right of the on-coming headlights and not directly head-on.
 - 4.11.3 Identify changing road hazards or conditions.
 - 4.11.4 Identify changing weather or driving conditions:

- 4.11.5 Light rain and heat can draw oil to the surface of asphalt creating slippery driving conditions.
- 4.11.6 Heavily rain soaked roads can result in a vehicle hydroplaning / aquaplaning.
- 4.11.7 Fluctuating cold temperatures may produce ice.
 - Open hilltops may become icy due to blowing snow accumulating and freezing on the road.
 - Shaded areas, such as overpasses and bridges, will freeze first and dry out last. These locations are prone to black ice.
 - Be aware that black ice may be very difficult to spot. Darker, glossy spots may indicate black ice.
- 4.11.8 At dawn or dusk, the low sun can create a significant visibility hazard.
- 4.11.9 Be aware of changing conditions (i.e. traffic patterns, accidents, traffic lights, other vehicles).
- 4.11.10 Watch for large loads or slow moving agricultural equipment:
 - Exercise extreme caution, provide extra room and pass only if it is safe to do so.
 - Be aware that large loads or heavy equipment cannot stop as quickly as smaller vehicles and require a longer stopping distance.
 - Never pull directly in front of these vehicles after passing or merging, but leave adequate space to confirm safe operation.
 - Signal well in advance of any intended maneuver to give large vehicles additional time to react.
- 4.11.11 Avoid travelling in the blind spots of other vehicles or mobile equipment.
- 4.11.12 Scan road and shoulders for wildlife and pedestrians:
 - Animals may travel in groups. Maintain heightened awareness when spotting one.
 - Leave plenty of room when driving around an animal on or near the road – a frightened animal may run in any direction.
 - Honk in a series of short bursts to make animals move out of the way.
 - Avoid *swerving* for wildlife as this could result in veering into oncoming traffic.
- 4.12 Reduce Speed:
 - 4.12.1 Adjust speed to accommodate traffic flow and patterns.
 - 4.12.2 Adjust speed to all weather pattern changes (Rain/Hydroplaning, Ice & Frost/Traction Loss, and Restricted Visibility).
 - 4.12.3 Adjust speed in response to inconsistent road surfaces.
 - 4.12.4 Reduce speed when required by law, in construction zones and school and playgrounds.
 - 4.12.5 Safely and appropriately reduce speed upon observing any hazard to increase reaction time.
 - 4.12.6 Always be prepared to brake at an intersection.
 - 4.12.7 Always come to a full stop at uncontrolled railway intersections and verify it is safe to proceed.
 - 4.12.8 Make eye contact with other motorists at intersections (particularly uncontrolled intersections) before proceeding.
 - 4.12.9 Never assume other motorists are following and obeying road rules.
 - 4.12.10 Keep to the right of the road or in the right-hand lane on multi-lane roads unless turning left or passing another vehicle.
 - 4.12.11 Confirm driving practice and vehicle position allow for a defensive or avoidance maneuver.

4.13 Eliminate Distractions

- 4.13.1 Confirm appropriate time is taken to become acquainted with an unfamiliar vehicle prior to driving.
- 4.13.2 Do not operate a vehicle if preoccupied, agitated or have existing health issues that could potentially pose a safety issue.
- 4.13.3 Do not operate a vehicle if under any form of impairment (i.e. fatigue, alcohol, drugs, etc.).
- 4.13.4 Remain engaged. Do not succumb to boredom, complacency, or allow the focus to drift from the driving task.
- 4.13.5 Remain focused on driving defensively and follow any given direction when passing an accident scene.
- 4.13.6 Avoid any activity that requires moving a hand from the steering wheel (e.g. changing radio stations, handing articles to passengers, etc.).
- 4.13.7 Do not engage in activities that may distract from the driving task (e.g. operating navigation systems, ridding the cab of an insect, etc.).
- 4.13.8 Do not engage in eating or drinking that may distract from the driving task.
- 4.13.9 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 (a simple text message sent while travelling at highway speed results in an operator's eyes being off the road for the length of a football field).

5.0 Road Rage

- 5.1 Road rage is a dangerous driving situation that can occur and should be avoided whenever possible, but NEVER instigated. Do not get drawn into a confrontation. Avoid any confrontational eye contact or gestures.
- 5.2 The driver should be aware of the vehicles around them, paying frequent attention to the vehicle's mirrors.
- 5.3 Get out of the way if safely possible, even if the other motorist is speeding. The other driver may be dealing with an emergency situation.
- 5.4 Unless it is necessary to use the horn as an alert, do so sparingly.
- 5.5 If followed after an on-the-road encounter, drive to a public place or to the nearest police station and seek assistance.
- 5.6 Attempt to note the offender's license plate number and write it down as soon as it is safe to do so and the vehicle is not in motion.
- 5.7 Report any aggressive driving to the police immediately. This action may aid in preventing further occurrences by the same driver.

6.0 Winter Driving

- 6.1 Clear snow from exterior vehicle surfaces.
- 6.2 Do not cruise control on icy roads.
- 6.3 Accelerate and brake gently to reduce skids or spinouts.
- 6.4 Wear winter clothing that does not restrict movement, vision or hearing.
- 6.5 Where required, have snow chains for the vehicle and be familiar with their installation.
- 6.6 Use extra caution while driving during hazardous winter conditions.
- 6.7 Avoid sudden changes of speed or direction to reduce possibility of skidding.

- 6.8 Drivers should leave extra distance between their vehicle and the vehicle ahead of them. Stopping on ice takes approximately eight times the distance that it takes on dry pavement.
- 6.9 Carry suitable warm clothing and emergency equipment during the winter months. Temperatures can plunge rapidly.
- 6.10 Be aware of icy patches on the road bridges and intersections that are especially prone to icing.
- 6.11 Be familiar with the skid control procedures for the type of vehicle being driven (e.g., front, rear or four-wheel drive).

7.0 Gravel Roads and Remote Locations

- 7.1 Prior to driving on a road with an assigned radio frequency, the passenger will test the two-way radio to confirm that the proper radio frequency is set, and that the transmission is being received clearly by other traffic. The passenger will operate the two-way radio.
- 7.2 Drivers will maintain appropriate speed for the road conditions.
- 7.3 Headlights will be used when operating the vehicle.
- 7.4 Drivers will respect the understood road protocol, drive defensively and respect intersections.
- 7.5 4WD options will be utilized at the discretion and comfort level of the driver. If road conditions are questionable even for 4WD use, the road will not be traveled and either another route found or the job postponed until road conditions improve.

8.0 Off-road

- 8.1 If inexperienced, seek supervisory advice and training.
- 8.2 Vehicles should only be driven off roads after other available options (e.g., use of ATV's, etc.) have been considered.
- 8.3 Prior to driving off-road, check to see that the vehicle is in good operating condition and tires are properly inflated.
- 8.4 Realize the limitations of the vehicle and do not become over confident.
- 8.5 Seat belts should be kept fastened and loose objects in the vehicle securely fastened to prevent them from becoming projectiles in the event of a sudden stop.
- 8.6 Drive according to the ground conditions.
- 8.7 Speed and power are normally not required in rough off-road driving.
- 8.8 Learn to read the surrounding terrain. Monitor the ground conditions ahead of the vehicle -- it is essential to know what to expect in light of the road conditions.
- 8.9 When slowly traversing difficult areas of soft ground, try to keep the vehicle in motion.
 - 8.9.1 Once stopped it is far more difficult to get the vehicle going again.
 - 8.9.2 If the vehicle becomes stuck, do not spin the wheels, as they will only dig in further or deeper until the vehicle chassis rests on the ground.
 - 8.9.3 Try to slowly back the vehicle in its own tracks, as these have been previously compressed by the vehicle. In most cases this will be successful. If not, place appropriate material (e.g., wooden planks, mats, branches, etc.) under the wheel to improve traction.
- 8.10 Before driving over rough terrain, the terrain should be inspected on foot first.
- 8.11 When climbing hills in the vehicle travel straight up or down.
 - 8.11.1 Be aware of what is on the other side of the hill prior to climbing.

- 8.11.2 At the base of the hill the driver should apply more power. Ease up on the power while approaching the top and before going over the crest.
- 8.11.3 If the vehicle stalls on the ascent, back straight down the hill in reverse.
- 8.11.4 For downhill travel in a vehicle with manual transmission, always use the lowest appropriate gear, and do not disengage the clutch to allow the vehicle to coast. If the vehicle is equipped with an automatic transmission, use low range and the lowest drive setting.
- 8.11.5 DO NOT drive a hill at an angle this increases the risk for a roll-over incident.
- 8.11.6 DO NOT attempt to climb a very steep hill if there is doubt the vehicle can successfully climb the hill.
- 8.12 When driving through water, consider the maximum wading depth of the vehicle.
 - 8.12.1 The air intake must always be kept clear of water.
 - 8.12.2 Driving through water should always be done slowly to keep the bow wave low.
 - 8.12.3 In addition, slow speed prevents a hot engine from suffering tension cracks by sudden contact with cold water.
 - 8.12.4 Check the brakes after leaving the water.
- 8.13 Prior to returning to the road, do a vehicle inspection to confirm the vehicle is road worthy.

9.0 Towing

- 9.1 Conduct a pre-start inspection of the equipment to be towed.
- 9.2 Only hook-up equipment, using a signaler to do so, that has been verified as safe for transport.
- 9.3 Confirm the hitching equipment of the vehicle and that of the equipment to be towed are compatible.
- 9.4 Always inspect the hitch for defects and to confirm it is securely closed (e.g. safety pin in place, safety chains hooked up using the "crossed" or "cradle" method, locking devices on hooks).
- 9.5 Confirm light cord is plugged in and any emergency braking devices are hooked up. Verify all lights are in working order.
- 9.6 Conduct a brake test prior to travelling.
- 9.7 Confirm speed of travel does not exceed the manufacturer's specification for the equipment towed.
- 9.8 Maintain awareness of total dimensions of the vehicle plus the equipment towed. Adjust driving accordingly (i.e. widen turning radius, increase distance between vehicles).

Americas

Journey Management Plan

S3AM-005-FM1

Project:		Journey Management Plan Identifier # (optional):	
Project Specific Requirements:			
Journey Management Plan – Minimum – required for trips > 250 miles / 400 kilometers (one way) and as identified in the project specific requirements.			
1. Driver and Passenger Information			
Driver Name:		Driver Training Completed:	
Passengers:			
2. Vehicle Information			
Company Owned <input type="checkbox"/>		Rental / Leased <input type="checkbox"/>	Personal <input type="checkbox"/>
Vehicle Type/Description/Registration No.:			
3. Trip Information			
What is the purpose of the trip?		Estimated distance:	
Single Trip: <input type="checkbox"/> Reoccurring Trip: <input type="checkbox"/> / / to / /			
<i>This Journey Management Plan is to be assessed and reviewed prior to each trip.</i>			
Have alternate modes of travel (telepresence, public transportation, air, train) been evaluated? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Has a Safe Work Plan or Task Hazard Assessment been completed and attached? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA			
Destination 1:			
Departure Date:	Time:	Arrival Date:	Time (ETA):
Destination 2:			
Departure Date:	Time:	Arrival Date:	Time (ETA):
Destination 3:			
Departure Date:	Time:	Arrival Date:	Time (ETA):
Destination 4:			
Departure Date:	Time:	Arrival Date:	Time (ETA):
4. Special Conditions / Hazards (Check all that may apply)			
<input type="checkbox"/> Night Driving <input type="checkbox"/> Weather <input type="checkbox"/> Road Conditions (e.g., construction, ice, snow) <input type="checkbox"/> Rush Hour/Heavy Traffic <input type="checkbox"/> Long Driving / Fatigue <input type="checkbox"/> Potential for distraction		<input type="checkbox"/> Rugged Terrain (4 x 4) <input type="checkbox"/> Large Vehicles <input type="checkbox"/> Animals <input type="checkbox"/> Towing (e.g., trailer) Other	
Additional Conditions / Hazards Details:			
Weather forecast:			
5. Contact Information			
Traveler No. 1 (Driver) - Name:		Phone No:	
Traveler No. 1 (Driver) - Personal Contact Name:		Phone No:	
Traveler No. 2 - Name:		Phone No:	
Traveler No. 2 - Personal Contact Name:		Phone No:	
Traveler No. 3 - Name:		Phone No:	

Traveler No. 3 - Personal Contact Name:		Phone No:
Manager - Name:		Phone No:
Check-In Contact - Name:		Phone No:
Alternate Check-In Contact - Name:		Phone No:
Destination Contact (if applicable) - Name:		Phone No:
Other (description)	Name:	Phone No:
Other (description)	Name:	Phone No:
6. Route of Travel		
Route of travel (insert map or give detailed route directions):		
Is the return route of travel the same? <input type="checkbox"/> Yes <input type="checkbox"/> No		
7. Check-In Procedure		
<ul style="list-style-type: none"> • 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. 		
7.A Missed Check-In Procedure for Manager		
<ul style="list-style-type: none"> • Attempt to call traveler(s) using contact number(s) listed above. • Contact traveler's personal 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. 		
8. Emergency Planning		
AECOM Supervisor	Name:	Phone Number:
AECOM Manager	Name:	Phone Number:
Roadside Service:		
Emergency: 911 or equivalent	Incident Reporting:	
9. Approvals: All Journey Management Plans shall be reviewed and acknowledged by the driver and the driver's manager / supervisor. Copies of the form shall remain with the driver and the manager / supervisor for the duration of the journey. (Electronic copies are acceptable).		
Driver's Signature:		
Manager or Supervisor	Name:	Signature:

Americas

Vehicle Inspection Checklist

S3AM-005-FM2

Vehicle Tag No:	Mileage:	Date:	Time:	Driver Name:	Location:		
Inspection Checklist: This Pre-Trip Vehicle Inspection Checklist is intended to be completed by the vehicle driver prior to departing on a trip. Checking boxes means that item is present and functioning. Deficiencies that affect or could potentially affect the safe operation of the vehicle shall be repaired or corrected prior to departure. This checklist should only be used in addition to an on-going vehicle maintenance program.							
Item					Yes	No	N/A
1. General							
1-1 Proof of insurance and registration available and current?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1-2 Is the date of the last regular maintenance known, or is the mileage/date of next scheduled maintenance known?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1-3 Is the overall condition of the vehicle good (no body damage, unusual sounds, leaks, odors, etc.)?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Tires							
2-1 Do all tires have sufficient tread for driving conditions? Legal limit: 2/32" (for rain/snow: > 4/32")					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2-2 Are tires sufficiently inflated for driving conditions?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2-3 Are the lug nuts and stem caps present and tight for each tire?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2-4 Is the spare tire and jack present and in good condition?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Vehicle Interior							
3-1 Are the brake and accelerator pedal pads in good condition?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-2 Are the floor mats in good condition and not interfering with the brake or accelerator pedals?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-3 Is the seat properly adjusted (including the headrest)?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-4 Is the seatbelt in good condition?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-5 Are the mirrors in good condition (not broken, dirty)?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-6 Are the dashboard/instrument lights working?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-7 Is the dashboard free of warning lights and do the gauges appear to work when the car is started?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-8 Does the horn work?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3-9 Are distractions such as cell phones and GPS units secured so they do not encourage use?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Lights and Signals							
4-1 Do the headlights and high beams work?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4-2 Do the tail lights function properly?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4-3 Do the turn signals work (front and rear)?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4-4 Do the brake lights work (including high light in the rear window if applicable)?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4-5 Do the hazard lights (emergency flashers) work?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4-6 Do back up / reverse lights work?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4-7 If equipped with a back-up alarm can it be heard clearly?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Mechanical							
5-1 Do the brakes work and feel solid (not soft)?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5-2 Does the parking/emergency brake work?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5-3 Is the steering in good working condition (not loose)?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5-4 Is the engine oil level full or in the operating zone?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5-5 Excessive vehicle bounce going over bumps reported (possible sign of worn shock absorbers)?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5-4 Is the fuel level full or at an adequate level for the proposed usage?					<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Item	Yes	No	N/A
6. Windows and Windshield			
6-1 Is the windshield clean and unbroken?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6-2 Are the wiper blades in good condition (front and rear)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6-3 Are all the windows clean and unbroken and windshield fluid available and operational?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Emergency Equipment (as needed per conditions/project requirements)			
7-1 Is there a "Safety Kit" (fire extinguisher, first aid, safety triangle and 2 reflective vests)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7-2 Is there a first aid kit, has it been inspected recently?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7-3 Is survival gear and equipment available (blanket, water, heat source, flashlight, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7-4 Is a means for emergency communication available?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Other Equipment (as needed per conditions/project requirements)			
8-1 Is there a means to secured loads (cargo next, container)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8-2 Are cones or other warning devices available?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8-3 Is weather specific equipment (snow chains, tired etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8-4 Does the vehicle have a snow brush/ice scraper?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8-5 Does the vehicle have a fire extinguisher?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Comments			
Inspector Name:	Signature:	Date:	

Housekeeping

S3AM-013-PR1

1.0 Purpose and Scope

- 1.1 This procedure provides AECOM's basic housekeeping requirements for offices and work sites, as well as establishes personal hygiene and sanitation standards for housekeeping.
- 1.2 This procedure applies to all AECOM Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.

2.0 Terms and Definitions

- 2.1 None

3.0 References

- 3.1 S3AM-208-PR1 Personal Protective Equipment

4.0 Procedure

- 4.1 Roles and Responsibilities

- 4.1.1 **Managers / Supervisors**

- Implementation of this procedure at all AECOM sites and offices.
 - Confirm inspections are performed at appropriate intervals.
 - Confirm the building Property Manager maintains leased facilities effectively.

- 4.1.2 **SH&E Managers**

- Monitor, assess, and report on housekeeping when visiting AECOM sites.

- 4.1.3 **Employees**

- Report any areas of concern to their Manager / Supervisor for prompt resolution.
 - Maintain office locations that are free from debris, clutter, and slipping or tripping hazards.

- 4.2 General Housekeeping

- 4.2.1 All aisles, emergency exits, fire extinguishers, etc., will be kept clear (a minimum of three feet / 0.9 meters of either side) of material storage (temporary and permanent) at all times.

- 4.2.2 Areas in front of electrical panels will be kept clear and free of debris and materials storage for a minimum distance of 36 inches, or approximately 0.9 meters.

- 4.2.3 All work areas shall be kept clean to the extent that the nature of the work allows.

- 4.2.4 Spills shall be promptly cleaned up and resulting waste will be disposed of properly.

- 4.2.5 Storage areas will be maintained in an orderly manner at all times. When supplies are received, the supplies will be stored properly.

- 4.2.6 At all times, work areas will be kept free of debris and unused materials, tools and equipment that may affect the safety of employees and visitors.

- 4.2.7 All sharps, and sharp objects, shall be stored and/or guarded in a manner that prevents injury.

- 4.2.8 Recyclable material, debris and trash will be collected and stored in appropriate containers (e.g., recycle bins, plastic trash bags, garbage cans, roll-off bins) prior to disposal or recycling.

- 4.2.9 Containers maintained outdoors shall be provided with lids that are kept closed. Contents shall be removed at appropriate intervals (e.g. garbage weekly, garbage daily in areas with wildlife, monthly recyclable cardboard, etc.).
- 4.2.10 Take positive control measures for protection against vermin, insects, and rodents.
- 4.3 Smoking, Eating, and Drinking
 - 4.3.1 Eating and drinking will be permitted in designated areas. These areas shall be located away from the work zone.
 - 4.3.2 Operate and maintain food dispensing facilities established by AECOM in compliance with applicable health and sanitation regulations.
 - 4.3.3 Buildings housing food dispensing facilities shall be floored completely, painted, well lighted, heated, ventilated, fly proof, and sanitary. Equip doors and windows with screens.
 - 4.3.4 Microwave ovens shall be used for food only.
 - 4.3.5 Use refrigerators designated for food storage for food only (i.e., no chemical or samples storage).
 - 4.3.6 Hand washing stations shall be available nearby for employees entering the eating and smoking areas.
 - 4.3.7 Smoking will be permitted only in areas:
 - Designated in compliance with applicable local laws, regulations, legislation and ordinances;
 - Not in the immediate vicinity of work-related activities or designated eating and drinking areas.
 - Free of fire hazard;
 - That will not contaminate indoor areas and HVAC systems. Specifically, there shall be no smoking within 5 metres (16 feet) around doorways, windows, air vents, and HVAC intakes and equipment; and
 - Supervisors will designate each smoking area giving primary consideration to those employees who do not smoke.
 - 4.3.8 Employees involved in the performance of certain activities will not be permitted to smoke, eat, drink, or use smokeless tobacco, except during breaks (e.g., HAZWOPER-controlled work areas).
 - 4.3.9 Site employees will first wash hands and face after completing work activities which involve potential exposure or contact with hazardous substances and prior to eating or drinking.
- 4.4 Water Supply
 - 4.4.1 Water will be available for use on all AECOM sites and will comply with the following requirements:
 - Potable Water:
 - An adequate supply of drinking water will be available for site staff consumption.
 - Potable water can be provided in the form of approved well or city water, bottled water, or drinking fountains.
 - Water coolers and water dispensers shall be maintained in a sanitary condition and filled only with potable water.
 - Where drinking fountains are not available, individual use cups will be provided as well as adequate disposal containers. Do not use common drinking cups.
 - Potable water containers will be properly identified in order to distinguish them from non-potable water sources.
 - Laboratory-test drinking water obtained from streams, wells, or other temporary sources in accordance with applicable regulations, or often enough to ensure it is suitable for consumption. Maintain records of testing reports and results.

- Non-potable Water:
 - Non-potable water will not be used for drinking purposes.
 - Non-potable water may not be used for hand washing or other personal hygiene activities but may be used for other types of cleaning activities.
 - All containers/supplies of non-potable water used will be properly identified and labelled as such.

4.5 Toilet Facilities

- 4.5.1 Clean and sanitary toilet facilities in good repair will be available for site and office staff and visitors. For locations without flush toilets readily available, one of the following shall be provided:
- Chemical toilets.
 - Combustion toilets.
 - Recirculation toilets.
- 4.5.2 A minimum of one toilet will be provided for every 20 site staff, with separate toilets maintained for each sex, except where there are less than five total staff on site or in an office.
- 4.5.3 Where toilet facilities will not be used by women, urinals may be provided instead of water closets in accordance with jurisdictional regulations.
- 4.5.4 Provisions for toilet facilities shall be considered as being met when mobile crews or employees working at normally unattended work locations have transportation immediately available (within 4 minutes travel time) to nearby toilet facilities.
- 4.5.5 Toilets shall be constructed so that the interior is lighted, by artificial or natural light, adequate ventilation is provided, and all windows and vents are screened.
- 4.5.6 A means for washing hands shall be provided next to or near toilet areas.
- 4.5.7 Release sanitary sewage into sanitary sewer lines or to other proper disposal channels.

4.6 Washing Facilities

- 4.6.1 Hand and Face: As applicable to the individual's potential exposure or contact with hazardous substances, site staff will wash hands and face after completing work activities and prior to breaks, lunch, or completion of workday.
- 4.6.2 Personal Cleaning Supplies: Cleaning supplies at all AECOM sites will consist of soap, water, and disposable paper towels or items of equal use/application (e.g., anti-bacterial gels, wipes, etc.).

4.7 Work Areas

- 4.7.1 Worksites which store chemical or environmental samples in refrigerators will clearly label the refrigerators that no food or beverages permitted and will locate refrigerators and sample coolers used for temporary sample storage, away from any food areas.
- 4.7.2 Every work area shall be maintained, so far as practicable, in a dry condition. Where wet processes are used, drainage shall be maintained and platforms, mats, or other dry standing places shall be provided, where practicable, or appropriate waterproof footwear shall be provided.
- 4.7.3 Protruding objects or placement of materials on paths or foot traffic areas creates the risk of slips, trips, falls, and puncture wounds. Employees shall eliminate slip, trip, and fall hazards where reasonably practicable.
- 4.7.4 At no time will debris or trash be intermingled with waste PPE or contaminated materials.

4.8 Break Areas and Lunchrooms

Site staff will observe the following requirements when using break areas and lunchrooms at AECOM sites:

- 4.8.1 All food and drink items will be properly stored when not in use.

- 4.8.2 Food items will not be stored in personal lockers for extended periods in order to prevent the potential for vermin infestation.
- 4.8.3 Perishable foods will be refrigerated whenever possible.
- 4.8.4 All waste food containers will be discarded in trash receptacles.
- 4.8.5 All tables, chairs, counters, sinks, and similar surfaces will be kept clean and free of dirt, waste food, and food containers at all times.
- 4.8.6 All ice dispensing machines for beverages shall be hands free/touchless design to prevent bacterial contamination (no ice scoops or ice bins permitted, closed beverage containers can be stored in portable ice coolers but the ice may not be used in the beverage).
- 4.8.7 Refrigerators used to store food items will be maintained at 40 degrees Fahrenheit (4 degrees Celsius) and emptied of all unclaimed food items weekly. Refrigerators used to store food will be labelled as such so that only food and drinks are stored within the refrigerator.
- 4.8.8 Routine cleaning of refrigerators will also be performed on a regular basis.
- 4.9 Change Rooms and Sleeping Facilities
 - 4.9.1 Heated and ventilated change rooms shall be provided for changing, hanging, and/or drying clothing for operations subjecting employees to prolonged wetting or contact with hazardous materials.
 - 4.9.2 Temporary sleeping quarters shall be heated, ventilated, lighted, and clean with all doors and windows screened.
 - 4.9.3 Keep clean and sanitary, and periodically disinfect bunkhouses, bedding, and furniture.
- 4.10 Office Areas

Office areas are to be kept neat and orderly. The following general rules apply to prevent injuries and to maintain a professional workplace appearance.

 - 4.10.1 All waste receptacles shall be lined with a plastic trash bag to avoid direct contact with waste during disposal. Employees shall use gloves when handling waste and may use a compaction bar to compress waste when necessary.
 - 4.10.2 Keep file and desk drawers closed when not in use to avoid injuries. Open only one file drawer at a time to prevent tipping of file cabinets. Nothing should be stored on top of high filing cabinets without adequate support.
 - 4.10.3 Telephone cords, electrical cords, wastebaskets, open file cabinets, and other ground-level hazards shall be managed in a manner that protects employees from tripping and obstruction hazards.
 - Electrical cords and computer/phone cables will be bundled and stored.
 - Cord covers should be used to protect temporary extension cords (used for presentations etc.) where they could be a tripping hazard.
 - Small electrical appliances shall not be plugged into portable extension cords.
 - Multiple appliances amperage should not exceed the circuit load limits.
 - 4.10.4 Electrical appliances shall not be used in wet areas unless the circuit is equipped with ground fault circuit interrupters (GFCI).
 - 4.10.5 File cabinets, desk drawers, safes, and other doors shall be fitted with handles or other hardware to protect employees from pinch points.
 - 4.10.6 All materials shall be stored in a manner that prevents tipping of storage furniture (e.g. book shelves, file cabinets) and inadvertent falling of overhead material.

- 4.10.7 Do not stack excessive amounts of papers or other material on shelves to reduce possibility of shelf overload or falling items.
- 4.10.8 Workstations should be tidied, as a minimum, at the end of each day.
- Paperwork that is not currently needed should be filed appropriately
 - Refrain from storing items on the floor as they may become falling or tripping hazards.
- 4.10.9 In public areas of the office:
- Maintain chairs in good repair.
 - Keep rugs clean, in good repair, and free of tripping hazards.
 - Clean up spills immediately.
 - Pick up objects that may have been left on the floor by others.
 - Report loose carpeting, damaged flooring, or other obstructions that are present in walkways.
- 4.10.10 Broken or damaged office furniture and equipment shall be removed from service. Office equipment shall be repaired and serviced by qualified personnel or contractors.

5.0 Records

- 5.1 None

6.0 Attachments

- 6.1 [S3AM-013-FM1](#) [Housekeeping Inspection](#)

Americas

Housekeeping Inspection

S3AM-013-FM1

Building or Location: _____

Inspection Conducted by: _____

Date: _____

Check Yes, No, or NA for Not Applicable.

General Site Housekeeping

- | | | | | |
|----|--|------------------------------|-----------------------------|-----------------------------|
| 1. | Exits, emergency equipment, and electrical panels unblocked? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 2. | Equipment, materials, supplies properly stored and, as applicable, secured (e.g. chocked)? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 3. | Drawers closed when not in use? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 4. | Equipment, including desks and chairs, in good repair? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 5. | Storage areas free from the accumulation of materials that constitute trip hazards? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 6. | Recyclable material, debris and trash collected and stored in appropriate containers? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 7. | Scrap materials and other debris removed from work area? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 8. | Combustible scrap and debris removed by safe means at regular intervals? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 9. | Oily rags removed at the end of the day and stored in metal cans with tight fitting lids? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |

Visibility

- | | | | | |
|-----|--|------------------------------|-----------------------------|-----------------------------|
| 10. | Worksite and, as applicable, halls, stairways and walkways are well lit? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 11. | Well-designed light switches are present in areas where walkways are not always lighted? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 12. | Dust, smoke or steam does not create poor visibility? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 13. | Glare from floodlights or windows does not create poor visibility in work areas? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |

Stairs

- | | | | | |
|-----|---|------------------------------|-----------------------------|-----------------------------|
| 14. | Handrails are tight and at the proper level? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 15. | Handrails extend past the top and bottom step? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 16. | White or yellow strips are painted on the first and last step for better visibility? (recommendation only). | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 17. | Steps are not rough or defective? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 18. | Stair treads are wide enough and risers consistently spaced? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 19. | Stairs are free of obstructions? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |

Floor Conditions

- | | | | | |
|-----|---|------------------------------|-----------------------------|-----------------------------|
| 20. | Floors of every workroom are clean, and so far as possible, in a dry condition? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 21. | Floors are not oily, overly waxed, or polished. | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 22. | Where wet floors or processes are present, proper drainage and false floors, mats, or other dry standing places are provided? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 23. | Floor surfaces finished with non-slip coatings where spills are likely? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 24. | Floors and passageways are free from protruding nails, splinters, holes, or loose boards? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 25. | Floors are free of holes and depressions? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 26. | Aisles or pathways are wide enough for easy passage and for carrying objects (48 inches is recommended)? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |
| 27. | Ramps are covered with non-slip surfaces or matting? | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> NA |

28. Carpets or rugs free from loose or frayed edges that may catch boots or shoes? ☐ Yes ☐ No ☐ NA
29. Extension cords, air hoses and cables removed from walkways, or otherwise managed to prevent trip hazards? ☐ Yes ☐ No ☐ NA
30. Pathways free from boxes, containers, machine parts, or other tripping hazards? ☐ Yes ☐ No ☐ NA

Ground Conditions

31. Trip hazards are not present? ☐ Yes ☐ No ☐ NA
32. Fall hazards are not present? ☐ Yes ☐ No ☐ NA
33. Holes or changes in ground elevation are either filled or guarded? ☐ Yes ☐ No ☐ NA
34. Muddy or icy walkways are provided with traction material (e.g. sand, gravel) to reduce slipping? ☐ Yes ☐ No ☐ NA

Equipment

35. Vehicle steps are free from debris or obstructions and of adequate size, and surface placement for safe dismounting? ☐ Yes ☐ No ☐ NA
36. Hand grips or ladders are free from debris or obstructions and adequate for getting into and out of equipment? ☐ Yes ☐ No ☐ NA
37. Ladders have been checked for damage and removed from service if found unsafe? ☐ Yes ☐ No ☐ NA

Chemicals

38. Chemicals are properly stored to minimize a potential spill? ☐ Yes ☐ No ☐ NA
39. Spill cleanup materials are available and appropriate for the type of potential spill? ☐ Yes ☐ No ☐ NA

Smoking, Eating and Drinking

40. Smoking permitted in designated areas only? ☐ Yes ☐ No ☐ NA
41. Designated smoking area appropriately placed? ☐ Yes ☐ No ☐ NA
42. Appropriate and clean eating and drinking areas designated away from work areas? ☐ Yes ☐ No ☐ NA
43. Food and drink items properly stored? ☐ Yes ☐ No ☐ NA
44. Potable water identified and readily available? ☐ Yes ☐ No ☐ NA

Sanitation

45. Appropriate cleaning supplies available and properly stored? ☐ Yes ☐ No ☐ NA
46. Hand and face washing facilities available and maintained with adequate supplies? ☐ Yes ☐ No ☐ NA
47. Adequate toilet facilities available and maintained with sufficient supplies? ☐ Yes ☐ No ☐ NA

Identify areas that need attention and describe the corrective actions to be implemented:

I certify that the above inspection was performed to the best of my knowledge and ability, based on the conditions present.

Signature

Date

Manual Lifting

S3AM-014-PR1

1.0 Purpose and Scope

- 1.1 This procedure provides the requirements for AECOM employees to use when performing manual materials handling activities (e.g., lifting/handling of items or materials).
- 1.2 This procedure applies to all staff for AECOM Americas-based operations and any other entity and its personnel contractually required to comply with this document's content.

2.0 Terms and Definitions

- 2.1 **Manual Materials Handling (MMH)** – Moving or handling things by lifting, lowering, pushing, pulling, carrying, holding, or restraining.
- 2.2 **Team Handling** – Team handling occurs when more than one person is involved during the lift.

3.0 References

- 3.1 None

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Manager

- Administer the procedure, provide resources as required and provide direction on proper lifting/handling techniques.
- Ensure material handling activities are monitored and facilities assessed to ensure compliance with the procedure and proactively identify and correct hazardous conditions.
- Ensure the proper reporting and investigations of any incidents, including those associated with manual material handling.
- Ensure this procedure and any associated or applicable documents are reviewed as part of an investigation and revised as required to prevent future incidents.

4.1.2 SH&E Manager

- Ensure material handling activities are monitored and facilities assessed to ensure compliance with the procedure and proactively identify and correct hazardous conditions.
- Assist in identifying activities with a high potential for lifting/handling strains and injuries as well as the associated mitigation strategies.
- Ensure employee training on proper lifting/manual materials handling techniques.
- Assist in any investigations of incidents, including those associated with manual material handling.

4.1.3 Employees

- Complete training appropriate to their anticipated manual material handling tasks.
- Review and follow any additional procedures or instructions applicable to the task at hand.

4.2 Mechanical / Engineered Controls

- 4.2.1 Whenever possible, new operations should be evaluated to engineer out hazards before work processes are implemented.

- 4.2.2 Mechanical equipment or assistance such as hand carts, dollies, carts, come-alongs, conveyors, rollers, or if appropriate, pallet jacks, skid steers, or telehandlers, are preferable to be used whenever possible rather than the employee physically moving materials.
 - 4.2.3 Mechanical assistance will be of proper size and height, have wheels sized for the terrain, and be designed to prevent pinching or undue stress on joints.
 - 4.2.4 Mechanical equipment or assistance shall be inspected and appropriately maintained. Defective equipment shall be tagged, removed from service, and repaired or replaced.
 - 4.2.5 Objects to be moved will be secured to prevent falling and properly balanced to prevent tipping.
 - 4.2.6 Material handling tasks should be designed to minimize the weight, range of motion, and frequency of the activity.
 - 4.2.7 Alter the task to eliminate the hazardous motion and/or change the position of the object in relation to the employee's body—such as adjusting the height of a pallet or shelf.
 - 4.2.8 Work methods and stations should be designed to minimize the distance between the person and the object being handled.
 - 4.2.9 Confirm well-lit and clear paths of travel.
 - 4.2.10 High-strength push-pull requirements are undesirable, but pushing is better than pulling. Material handling equipment should be easy to move, with handles that can be easily grasped in an upright posture.
 - 4.2.11 Workbench or workstation configurations can force people to bend over. Corrections should emphasize adjustments necessary for the employee to remain in a relaxed upright stance or fully supported seated posture. Bending the upper body and spine to reach into a bin or container is highly undesirable. The bins should be elevated, tilted, or equipped with collapsible sides to improve access.
 - 4.2.12 Repetitive or sustained twisting, stretching, or leaning to one side are undesirable. Corrections could include repositioning bins and moving employees closer to parts and conveyors
- 4.3 Administrative Controls
- 4.3.1 Task hazard assessment (THA) must include manual material handling, its associated hazards and the appropriate actions to take to eliminate or reduce the identified risks.
 - 4.3.2 Stage materials close to the applicable work area to minimize carrying distances.
 - 4.3.3 When significant, sustained lifting work is required, it is desirable to rotate employees to spread the work load among several people and thereby avoid fatigue.
 - 4.3.4 Rotation is not simply performing a different job, but is performing a job that utilizes a completely different muscle group from the ones that have been overexerted.
 - 4.3.5 All employees exposed to manual handling hazards shall be trained by competent persons on the hazards associated with manual material handling, and the safe lifting and handling of loads applicable to their anticipated manual handling tasks.
 - 4.3.6 Employees shall not manually handle materials in excess of their personal lifting limit, with no personal lifting limit exceeding 50 pounds (22.7kg).
 - Manual handling weight limits may decrease from 50 pounds (22.7kg) depending upon several variables. Refer to *S3AM-014-ATT1 Recommended Weight Limit Calculations*.
 - This restriction should also be applied to a team handling or a buddy lift (item lifted by the team should be no more than 50 pounds [22.7kg]). Should one lifter fail, the remaining worker would bear 100% of the load weight.

4.4 Training

4.4.1 Employees who may have MMH as part of their duties are required to receive training that includes the following topics:

- Methods to avoid unnecessary physical stress and strain during MMH operations.
- Signs and symptoms of musculoskeletal injuries and reporting requirements.
- Methods to maintain personal awareness of what the individual can comfortably handle without undue strain.
- Instruction on the proper use of lifting equipment.
- Recognition of potential hazards and how to prevent or correct them.

4.4.2 This training must be completed prior to an employee being assigned to a task that involves MMH activities.

4.4.3 Assistance with training or training materials is available through the Safety, Health and Environment staff.

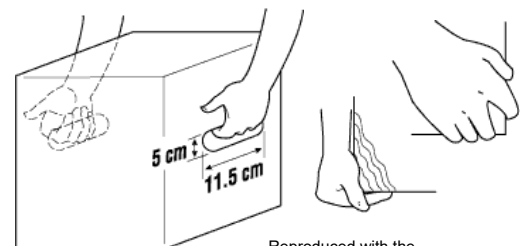
4.5 General Handling

4.5.1 Before Performing a Lift:

- Check to see if mechanical aids such as hoists, lift trucks/dollies, or wheelbarrows are available.
- Confirm that, based on personal physical capabilities and medical limitations, that the load can be lifted without overexertion. Get help with heavy or awkward loads.
- Confirm that the load is “free” to move.
- Do not lift loads if personal health issues or doctors recommendations prevent it.
- Manual handling weight limits may decrease depending upon several variables. Refer to *S3AM-014-ATT1 Recommended Weight Limit Calculations*.
- Do not manually handle loads if unsure of personal limitations on what load can be handled safely.
- Check that the planned destination and travel path of the load is free of obstacles, personnel and debris.
- Confirm that the travel path and the planned destination of the load are clear of obstacles and debris. Grease, oil, water, litter, and debris can cause slips and falls.
- Particular handling and lifting techniques are needed for different kinds of loads or materials being handled (for example, compact loads, small bags, large sacks, drums, barrels, cylinders, and sheet materials like metal or glass). See additional guidance in this procedure.

4.5.2 Gripping the Load

- Whenever possible, utilize hand holds or other lifting attachments on objects being handled.
- Use the “hook grip” on loads with cut-out handholds.
- Curl fingers around the edge.
- Do not hold the load with fingertips. The palm grip is much more secure; grip the load with the palm of the hand and fingers.
- Use containers with handles located more than halfway up the side of the container.
- Use the “ledge grip” to handle regularly shaped objects without handles.



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- Use vacuum lifters to handle sheet materials or plates.
- Hold the object with hands placed diagonally.

4.5.3 General Lifting Guidelines

- Prepare for the lift by warming up muscles. Frequently re-energize muscles throughout the course of the work.
- Avoid lifting immediately after prolonged sitting or inactivity.
- Confirm personal protective equipment is appropriate to the hazards (e.g. safety toed boots, appropriate gloves, etc.).
- Stand close to the load and face the intended direction of travel.
- Ensure good body balance. Feet should be shoulder width apart, with one foot beside and the other foot behind the object that is to be lifted.
- Bend the knees; do not stoop. Keep the back straight, but not vertical. There is a difference. The neck should be in a natural position with eyes forward.
- Engage (tighten/flex) abdominal muscles. Use legs to start the load moving and continue pushing up with the legs. This makes full use of the strongest set of muscles.
- Keep the arms and elbows close to the body while lifting smoothly without jerking.
- To lower the object, bend the knees. Do not stoop. To deposit the load on a bench or shelf, place it on the edge and push it into position. Confirm that your hands and feet are clear when placing the load.

4.5.4 Carrying/Holding Guidelines

- Manual carrying is an inefficient way of transporting materials in the work place. Where possible, reduce or eliminate manual carrying tasks.
- Never carry a load above the shoulders.
- Do not twist the body while carrying the load. To change direction, shift foot position and turn the entire body.
- Watch direction of travel!
- Carry an object close to the body using both hands. The optimal carry zone should have the elbows at a 90 degree angle with elbows tight to the body. One-handed carries are awkward and tend to unbalance the body.
- Do not carry objects that are so large they will obstruct visibility.
- Do not change grips on an object while carrying or holding an object. Rest the object on a secure surface prior to changing grip.
- If an object is of a size, shape, or mass that it requires two people to carry, use two people of similar size and physique.
 - Ensure the item lifted and carried by the team weighs no more than 50 pounds (22.7kg). Remember manual handling weight limits may decrease from 50 pounds (22.7kg) depending upon several variables. Refer to *S3AM--014-ATT1 Recommended Weight Limit Calculations*.
 - Two-person lifts should be planned and coordinated before performing the lift.
 - Lift the item in unison.
- Avoid carrying objects on stairs, particularly where the line of sight may be obstructed or the object can interfere with leg movement. All travel on stairs requires use of a handrail at all

times, so only carry objects that can be safely handled with one hand. Always maintain handrail contact when carrying an object up or down stairs.

4.6 Specific Handling - Pushing/Pulling Guidelines

- 4.6.1 Check the condition of the floor, ground, or other surface prior to pushing or pulling an object across it.
- 4.6.2 Be aware of the "break out" force of the object; this is the force at which a push or pull overcomes the frictional force between the surface and object. Adjust lower body posture to have a solid base in order to avoid losing balance when this point is reached.
- 4.6.3 Get assistance when moving or guiding a large load.
- 4.6.4 Where possible, always push rather than pull a load.
- 4.6.5 When possible push at waist height not shoulder height. The force capability at shoulder height is 50% less than at waist level.
- 4.6.6 Casters or wheels on carts should be at least 6 inches (15.24 centimeters) diameter for heavier loads in order to exercise adequate control on rough or inclined surfaces. Tire materials should be suitable for the surface of travel.
- 4.6.7 Never load the cart or load-carrying device in such a manner that visibility is obstructed in the path of travel.
- 4.6.8 When pushing or pulling an object on an inclined surface, ensure control of the load and direction of travel before proceeding. Obtain additional support to control the load if necessary.
- 4.6.9 Never leave carts or loads in an area that will present a hazard to other workers. Make sure carts or transport devices are secured in position before leaving them unattended.

4.7 Specific Handling – Square or Rectangular Objects

- 4.7.1 Place one foot slightly in front of the other.
- 4.7.2 Squat as close to the object as possible.
- 4.7.3 Grasp one of the top corners away from the body and the opposite bottom corner closest to the body.
- 4.7.4 Tilt the object slightly away from the body, tilt forward at the hips, keep the back straight.
- 4.7.5 Test to confirm that the object is loose from floor and will lift without snagging.
- 4.7.6 Straighten the legs, keeping the spine straight, pull the object into the body, and stand up slowly and evenly without jerking or twisting.
- 4.7.7 If turning or change of direction is required, turn with feet without twisting the torso and step in the direction of travel.
- 4.7.8 To set an object down, reverse the sequence, being sure not to trap the bottom hand between the object and the surface on which the object is set.



4.8 Specific Handling – Cylindrical Objects

- 4.8.1 When lifting/moving round or cylindrical objects, the objects should be rolled wherever possible.
 - Check the integrity of drums of gas cylinders before handling. Confirm lids or caps are secured prior to moving.
 - Rolling must be controlled by chute, tagline, or other means of limiting acceleration.

- Workers must not be positioned downhill from rolled objects.
- Use of the legs for pushing and tagline control of rolled objects must be stressed.

4.8.2 Cylindrical objects, such as drums that must remain upright, are to be handled manually by slightly tilting the object, using the legs for control, and balancing the object on the bottom edge. The handler then walks besides the object, with the object tilted toward the body, positioning the hands on the top edge away from the body and moving so they do not cross, thus maintaining balance and a steady, controlled, forward motion. Motion must be controlled so that ceasing to walk and moving the hands will stop forward motion.

4.8.3 Use carts or trucks to transport cylinders. Never attach a lifting or moving device to the cap or lid.

4.8.4 Use two people to transport a cylinder if carts cannot be used. Use lifting straps to improve grip.

4.9 Specific Handling – Bags and Sacks

4.9.1 The best way to handle a bag depends on its size, weight, and how far it is to be carried. When lifting, remember to:

- Straddle the end of the bag.
- Bend the hips and knees.
- Keep the back straight.
- Grasp the bag with both hands under the closer end. Keep elbows inside the thighs.



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- Lean forward, straightening the knees to set the bag upright.
- Readjust the straddle position moving feet closer to the bag.
- Readjust the grasp, with one hand clasping the bag against the body and the other hand under the bag.
- Stand up by thrusting off with the back leg and continuing in an upward and forward direction.
- Thrust the bag up with the knee while straightening the body. If possible place the bag on an intermediate platform to enable the grip / grasp to be readjusted.
- Put the bag on the shoulder opposite the knee used to thrust the bag up.
- Stabilize the bag on the shoulder.
- Move off without bending sideways.

4.9.2 Avoid unloading a bag from the shoulder directly to floor level. Use an intermediate platform or get help from a co-worker, remember to:

- Stand close to the platform.
- Place one foot in front of the platform.
- Bend hips and knees.
- Keep the back straight.
- Ease the bag off the shoulder and put it upright on the platform.
- Pull the bag slightly over the edge of the platform.
- Stand close to the platform with the bag touching the chest.
- Clasp the bag against the body with one hand, the other hand holding bottom of the bag.
- Step back.
- Bend hips and knees, keeping back straight.

- Ease the bag onto the floor.

4.9.3 Bulkier sacks are easier to carry on a worker's back. The worker is to lift the sack to his/her back from a platform:

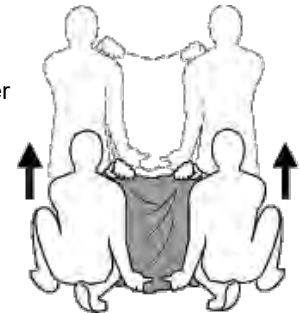
- Move the sack to the edge of the platform.
- Put back against the sack.
- Grasp with both hands on the upper corners of the sack.
- Ease the sack onto the back, bending hips and knees before taking the weight.
- Keeping the back straight, stand up, straighten hips and knees and stabilize the sack.
- Move away without bending sideways.



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4.9.4 Two-person handling of a sack:

- Position one person on either side of the sack.
- Squat with one foot balancing behind the sack.
- Keeping the back straight, grasp with the outer hand on the upper corner of the sack and the other hand holding the bottom of the sack.
- On one person's command:
 - Stand up and straighten the hips and knees.
 - Move toward the intended location.
 - Put the sack in its intended location.



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4.10 Specific Handling – Sheet Materials

4.10.1 When lifting sheet materials:

- Stand close to the pile of sheets in a walking stance.
- Grasp sheet firmly at the midpoint of its long side with the closer hand.
- Pull sheet up and toward the body.
- Change grip using the other hand and put fingers on top of the sheet.
- Pull sheet up to the vertical position and to the side until one half is off the pile.
- Grasp the lower edge of the sheet with the free hand and support the hand by placing it on your knee.
- Stand up without bending or twisting body.

4.10.2 Whenever moving sheet materials, be cognizant of wind conditions.

4.10.3 To carry sheets (drywall, glass, metal, etc.):

- Use drywall carts or sheet hand trucks to carry sheet materials.
- Get help from another person where carts are not available.
- Apply carrying handles for manual carrying.
- Always use gloves and carrying handle for glass and other materials with sharp edges.

4.10.4 Use team lifting and carrying where other solutions are inappropriate.

- Remember that the combined strength of the team is less than the sum of individual strength. The item lifted by the team should be no more than 50 pounds (22.7kg).

- Select team members of similar height and strength and assign a leader to the team.
- Determine a set of commands to be used such as "lift," "walk," "stop," and "down." Make sure that everyone knows what to do when they hear the command.
- Follow the commands given by the team leader.
- Practice team lifting and carrying together before attempting the task.

4.11 Material Storage

- 4.11.1 Store materials at a convenient height.
- 4.11.2 Leave the lowest shelf unused if necessary.
- 4.11.3 Use vertically mobile shelves or elevating platforms to avoid bending and overhead reaching.
- 4.11.4 Use bin racks for storing small items.
- 4.11.5 Store heavy and frequently used materials between knee and shoulder height; preferably waist height.
- 4.11.6 Do not store materials at floor level.
- 4.11.7 Use hand trucks with elevating devices in storage and loading areas.
- 4.11.8 Use trucks with a tilting device to avoid bending.

5.0 Records

- 5.1 None

6.0 Attachments

- 6.1 [S3AM-014-ATT1 Recommended Weight Limit \(RWL\) Calculations](#)

Americas

Recommended Weight Limit (RWL) Calculations

S3AM-014-ATT1

This lifting equation, developed by the National Institute for Occupational Safety and Health (NIOSH), takes into account the weight of an object plus several other variables in lifting tasks that contribute to the risk of injury. For example, if the situation requires frequent lifts or lifting loads far away from the body, there is an increased risk of injury. Under these conditions, the weight limit would be reduced from a baseline weight or "load constant" (LC) to a recommended weight limit (RWL). A "load constant" (LC) of 23 kg (about 51 pounds) has been established by NIOSH as a load that, under ideal conditions, is safe for 75% of females and 90% of males. More information on the NIOSH Lifting Equation can be found on the Centers for Disease Control and Prevention website.

To calculate the RWL, you must first measure or assess several variables related to the lifting task. The six variables that are considered in determining the RWL are:

- The horizontal distance (H) the load is lifted (distance of hands from midpoint between ankles),
- The starting height of the hands from the ground (V),
- The vertical distance of lifting (D),
- The time between lifts or frequency of lifting (F),
- The angle of the load in relation to the body (e.g., straight in front of you or off to the side, A), and
- The quality of the grasp or handhold based on the type of handles available (hand-to-load coupling, C).

Each of these variables is then assigned a numerical value (multiplier factor) from look-up charts. The equation includes six multiplier factors to calculate the RWL:

$$RWL = LC \times HM \times VM \times DM \times FM \times AM \times CM$$

Where LC is the load constant (23 kg) and other factors in the equation are:

- HM, the "Horizontal Multiplier" factor,
- VM, the "Vertical Multiplier" factor,
- DM, the "Distance Multiplier" factor,
- FM, the "Frequency Multiplier" factor,
- AM, the "Asymmetric Multiplier" factor, and
- CM, the "Coupling Multiplier" factor.

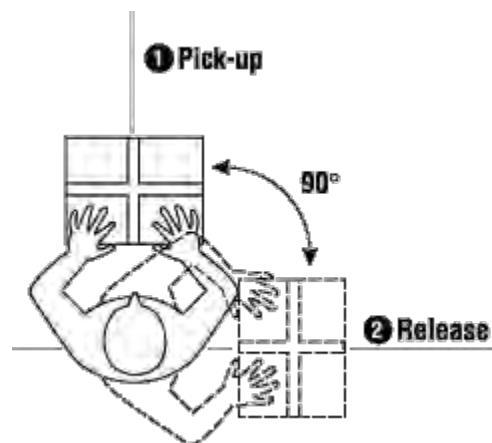
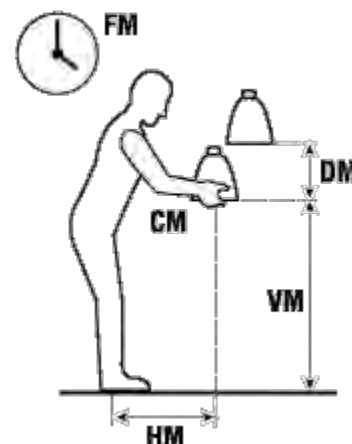
Horizontal Multiplier is the distance the object is from the body. Measure (in centimeters) the distance from in between the person's ankles to their hands when holding the object. Write down this number. Next, look up the number on the accompanying chart and find the matching "multiplier factor". Use this factor in the lifting equation.

Vertical Multiplier is measured as the starting point of the lift and is the distance in centimeters of the hands up from the ground. Measure this distance and use the number to determine which value to use on the chart.

Distance Multiplier is the number of centimeters the load travels up (or down) from the starting position. Measure this distance and use the number to determine which value to use on the chart.

Frequency Multiplier is how often the lift is repeated within a certain time period. You need to determine if the lift is done while standing or stooping, for more or less than one hour (in total time for the shift), and how much time there is for rest between lifts.

Asymmetric Multiplier measures if the body must twist or turn during the lift. This measurement is done in degrees (with 360° being one complete circle).



Coupling Multiplier determines the "coupling" or type of grasp the person has on the container. It rates the type of handles as good (handles), fair (make-shift cut outs in cardboard boxes) or poor. You also need to know if the lift is done in a standing or stooping position.

When these multipliers are placed into the equation, determine the RWL. If the weight of the object to be lifted exceeds the RWL, the task is considered to be dangerous. Assess the relevant factors which contribute most to the risk (the lower the factor, the more it contributes to the risk) and redesign the handling task.

The lifting equation only applies in certain situations. It does not apply in situations where a person is lifting (or lowering):

- With one hand,
- For over 8 hours,
- While seated or kneeling,
- In a restricted work space,
- Objects that are unstable (such as buckets or containers of liquids),
- While pushing or pulling,
- With wheelbarrows or shovels,
- With high speed motion (faster than about 30 inches/second or 76 centimeters/second),
- Extremely hot or cold objects or in extreme temperatures, or
- With poor foot/floor coupling (high risk of a slip or fall).

This equation applies to most workers for:

- Two-handed lifting,
- Comfortable lifting postures, and
- Comfortable environments and non-slip floorings.

FACTORS USED IN RWL CALCULATIONS

Horizontal Multiplier (HM): Horizontal distance (H, in cm) from the midpoint between the ankles to the hands while holding the object.

H = Horizontal Distance (cm)	HM Factor
25 or less	1.00
30	0.83
40	0.63
50	0.50
60	0.42

Vertical Multiplier (VM): The vertical distance (V, in cm) of the hands from the ground at the start of the lift.

V = Starting Height (cm)	VM Factor
0	0.78
30	0.87
50	0.93
70	0.99
100	0.93
150	0.78
175	0.70
>175	0.00

Distance Multiplier (DM): The vertical distance (D, in cm) that the load travels.

D = Lifting Distance (cm)	DM Factor
25 or less	1.00
40	0.97
55	0.90
100	0.87
145	0.85
175	0.85
>175	0.00

Asymmetric Multiplier (AM): The twisting angle (A) of the body while lifting, measured in degrees.

A = Angle (degrees)	AM Factor
90°	0.71
60°	0.81
45°	0.86
30°	0.90
0°	1.00

Frequency Multiplier (FM): The frequency (F) of lifts and the duration of lifting (in minutes or seconds) over a work shift.

F = Time Between Lifts	FM Factor			
	Lifting While Standing		Lifting While Stooping	
	One Hour or Less	Over One Hour	One Hour or Less	Over One Hour
5 min	1.00	0.85	1.00	0.85
1 min	0.94	0.75	0.94	0.75
30 sec	0.91	0.65	0.91	0.65
15 sec	0.84	0.45	0.84	0.45
10 sec	0.75	0.27	0.75	0.27
6 sec	0.45	0.13	0.45	-
5 sec	0.37	-	0.37	-

Coupling Multiplier (CM): The quality of grasp (or coupling, C) classified as good, fair or poor and depends on the body position (either standing or stooping).

C = Grasp	CM Factor	
	Standing	Stooping
Good (handles)	1.00	1.00
Fair	1.00	0.95
Poor	0.90	0.90

Cold Stress

S3AM-112-PR1

1.0 Purpose and Scope

- 1.1 To protect employees from the severest effects of cold stress (hypothermia) and cold injury and to identify exposures to cold working conditions under which it is believed nearly all employees can be repeatedly exposed without adverse health effects.
- 1.2 This procedure applies to all AECOM Americas based employees and operations, and any other entity and its personnel contractually required to comply with this document's content, working outdoors in damp and cool (below 50 degrees Fahrenheit [°F] or 10 degrees Celsius [°C]) conditions or anytime temperatures are below 32°F or 0°C.

2.0 Terms and Definitions

- 2.1 **Cold Stress** – The production of physiological effects due to cold temperatures and/or wind chill.
- 2.2 **Equivalent Chill Temperature (ECT)** – Also known as Wind Chill (see below).
- 2.3 **Frostnip** – Superficial cooling of tissues without cellular destruction.
- 2.4 **Frostbite** – Freezing of tissue, resulting in tissue destruction.
- 2.5 **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.
- 2.6 **Wind Chill** – The combined effect of air temperature and wind. Also expressed as "equivalent chill temperature" (ECT), wind chill is defined as heat loss resulting from the effects of air temperature and wind velocity upon exposed skin.

3.0 References

- 3.1 S3AM-003-PR1 SH&E Training
- 3.2 S3AM-128-PR1 Medical Screening & Surveillance Program
- 3.3 S3AM-208-PR1 Personal Protective Equipment
- 3.4 S3AM-314-PR1 Working Alone
- 3.5 S3AM-315-PR1 Working On or Near Water
- 3.6 S3AM-333-PR1 Marine Safety & Vessel Operations

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Manager

- Ensuring the safety of employees on their project sites, consistent with regulatory standards.
- Implement cold stress prevention measures as applicable at each work site.
- Develop/coordinate a work-warning regimen, as applicable.
- Confirm cold stress hazard assessments/evaluations were completed for the planned activities.
- Assign employees physically capable of performing the assigned tasks. Consider acclimation to cold weather when evaluating employee capability.

- Confirm employees are properly trained to recognize the symptoms of cold stress.

4.1.2 **Safety, Health and Environment (SH&E) Manager**

- Conduct/support cold stress assessments/evaluations.
- Conduct/support incident investigations related to potential cold stress-related illnesses.
- Assist project teams develop appropriate work-warming regimens.
- Provide cold stress awareness training.

4.1.3 **Supervisor**

- Identify the tasks that may be most impacted by cold stress and communicate the hazard to the assigned employees.
- Confirm that employees have been trained on the recognition of cold stress-related illnesses.
- Confirm that adequate supplies of warm fluids/drinks are readily available to employees.
- Confirm that a warm/sheltered rest area is available, as applicable.
- Conduct cold stress monitoring, as applicable.
- Implement the work-warming regimen.
- Confirm that first aid measures are implemented once cold stress symptoms are identified.
- Confirm that employees are physically capable of performing the assigned tasks and are not in a physically compromised condition.

4.1.4 **Employee**

- Observe each other for the early symptoms of cold stress-related illnesses.
- Maintain an adequate intake of available fluids.
- Report to work in a properly rested condition.
- Report all suspected cold stress-related illnesses.

4.2 **Requirements**

- 4.2.1 Carefully plan work anticipated to be performed in cool or cold conditions. If possible, heavy work should be scheduled during the warmer parts of the day or when the wind is most calm. Include costs in project budgets for specialized equipment and supplies needed to complete the field activities.
- 4.2.2 Staff working in extreme cold (wind chill or ECT below 10°F or -12°C) shall not work alone. The Buddy System shall be utilized to keep an eye on each other and to watch for signs of cold stress. Refer to *S3AM-314-PR1 Working Alone*. Watch for symptoms and signs of hypothermia
- 4.2.3 Monitor weather forecasts and weather conditions such as ambient temperature, wind speed, and precipitation. Use observations prior to entering and while in the field to ensure appropriate protections are in place:
- If possible, move the work to a warm location.
 - If possible and as applicable, erect shelters or screens around the work area.
 - If possible, heat the work area.
 - If possible, adjust schedule according to the cold conditions, work level and worker acclimatization.
 - Implement a work-warming regimen by taking breaks out of the cold. As applicable, consult *S3AM-112 ATT1 Temperature Thresholds* to determine wind chill and work-warming schedule.
 - Take frequent short breaks in warm dry shelters to allow your body to warm up. Limit time of exposure to the cold. If shelter is not readily available, consider supplying temporary shelters.

- Provide assistance to prevent body heat loss, such as:
 - Providing appropriate sources of heat (e.g. warm packs, portable heaters, etc.).
 - Use of insulating materials on equipment handles when temperatures drop below 30°F (-1°C).

4.2.4 All staff working in extreme cold or snow conditions should understand the following guidelines for preventing and detecting hypothermia and frostbite; refer to *S3AM-112-ATT2 Symptoms & Treatment*:

- Ensure appropriate PPE requirements are established and adhered to.
- Avoid exhaustion or fatigue because energy is needed to keep muscles warm.
- Because prolonged exposure to cold air or to immersion in cold water at temperatures even well above freezing can lead to dangerous hypothermia, whole-body protection shall be used.
- Eat high calorie snacks to help maintain body metabolism.
- Confirm extra blankets or sleeping bags are on-site.
- Drink plenty of warm liquids. It is easy to become dehydrated in cold weather.
- Avoid caffeine and alcohol, which can act as diuretics. Alcohol consumption, depending upon quantity, can dilate blood vessels enhancing body heat loss or constrict blood vessels decreasing heat delivery to extremities.
- NEVER IGNORE SHIVERING. Persistent or violent shivering is a clear warning that you are on the verge of hypothermia.
- If you experience frost bite or hypothermia, find shelter and warmth and contact a medical practitioner if symptoms persist, refer to *S3AM-128-PR1 Medical Screening & Surveillance*.

4.3 Training

Before they begin work in a cold environment, employees that might be exposed to cold stress will be informed of the potential for cold stress and how to prevent cold stress. Employees that have not had the training within the twelve prior months shall repeat the training before exposure to cold stress, refer to *S3AM-003-PR1 SH&E Training*. Employees potentially exposed to cold stress will receive training including, but not limited to:

- 4.3.1 Sources of cold stress, the influence of protective clothing, and the importance of acclimatization.
- 4.3.2 How the body loses heat.
- 4.3.3 Recognition of cold-related illness symptoms.
- 4.3.4 Cold stress preventative/corrective measures including, but not limited to:
 - Weather monitoring.
 - Proper eating and drinking practices.
 - Work-warming schedules and proper re-warming techniques.
 - Buddy system.
 - Safe cold work practices appropriate to the work that is to be performed.
 - Proper use of cold environment personal protective clothing.
- 4.3.5 The harmful effects of excessive alcohol consumption in a cold stress environment.
- 4.3.6 The hazards associated with unstable snow or ice build ups.
- 4.3.7 First aid procedures for symptoms related to cold stress.

4.4 Personal Protective Equipment (PPE)

Wearing the right clothing is crucial to avoiding cold stress. The type of fabric also makes a difference. Cotton loses its insulation value when it becomes wet. Wool, on the other hand, retains its insulation even when wet. Adequate insulating dry clothing will be required in air or wind chill temperatures below 40 °F (4.4°C)

All PPE will comply with the requirements of *S3AM-208-PR1 Personal Protective Equipment* and consider the following requirements:

- 4.4.1 Wear at least 3 layers of clothing to help prevent cold stress. It is important to preserve the air space between the body and the outer layer of clothing to retain body heat.
 - Wear a middle layer of down, wool, or similar materials to provide insulation.
 - Avoid cotton, especially blue jeans.
 - Wear an outer layer to break the wind and allow some ventilation (e.g., Gortex® or nylon)
 - Do not wear tight clothing. Loose clothing allows better ventilation.
- 4.4.2 Wear proper clothing, including head coverings and gloves or mittens for cold, wet, and windy conditions.
- 4.4.3 Wear a hat or hardhat liner. Up to 40 percent of body heat can be lost when the head is left exposed.
- 4.4.4 Use insulated footwear with adequate traction to prevent slips and falls.
- 4.4.5 Wear insulated boots or other insulated footwear, and insulated gloves to help reduce the chance of frostbite.
- 4.4.6 Keep a change of dry clothing available in case work clothes become wet.
- 4.4.7 Eye and face protection for employees employed outdoors in a snow and/or ice-covered terrain should be supplied.
 - Sunglasses (with UVA and UVB protection) and sunscreen should be used when there is a persistent combination of snow and direct sun.
 - Special safety goggles to protect against blowing ice crystals and ultraviolet light and glare (which can produce temporary conjunctivitis and/or temporary loss of vision) should be required when there is an expanse of snow coverage causing a potential eye exposure hazard.
 - Ensure face guards are used to protect skin in cold, windy conditions, including riding on an unshielded vehicle.

4.5 General Cold Stress Prevention Measures

- 4.5.1 In order to prevent hypothermia:
 - Wear appropriate clothing and PPE as determined by the weather conditions.
 - When active, ventilate excess heat by opening or removing outer layers of clothing to avoid sweating.
 - Start with the mitten or gloves, unless protection from ice, snow, or cold metal surfaces is needed.
 - Next remove head gear and neck wrappings.
 - Then coats/parkas should be opened at the waist and sleeves.
 - Finally, layers of clothing should be taken off.
 - When resting or tired, or colder conditions are encountered, add additional layers of clothing/ close outer layers in the reverse of the above order, or get out of the cold. Have a sweet drink but do not indulge in heavy eating.

- Garments worn to keep out rain and spray should also allow water vapor to escape.
- Take advantage of heat from the sun and stay out of the wind as much as possible.
- Have available emergency shelter providing protection from wind and rain and insulation from the ground.
- Replace wet clothing. If wet clothing cannot be replaced, then cover it with a layer of non-breathing material to prevent evaporation. Place an insulation layer over this non-breathing material.
- Get adequate rest; conserve energy.
- Get adequate nutrition to replenish energy stores; rest after meals.
- Drink adequate fluids to avoid dehydration.
- If any project / location staff member shows signs of hypothermia, stop and treat him/her.

4.5.2 In order to prevent frost bite:

- Dress to prevent hypothermia and protect the feet and hands.
- Avoid obstruction of circulation by, for example, tight boots or tightly fitting clothing.
- Avoid nicotine (particularly cigarettes) and do not consume alcohol.
- Keep ears and nose covered and out of the wind.
- Frostbite of the corneas of the eyes can be prevented by protective goggles.
- Adopt a "buddy system" of constantly watching the faces of others in the party for white skin tissue, which is evidence of frostbite (frostnip).
- Practice constant personal vigilance for signs of trouble in one's own fingers and toes; when in doubt, investigate thoroughly before it is too late.

4.5.3 Adequate, insulating dry clothing that will help maintain core temperatures above 96.8°F (37°C) shall be provided to employees if work is performed in air temperatures below 40°F (4.4°C). Wind chill cooling rate and the cooling power of air are critical factors. The higher the wind speed and the lower the temperature in the work area, the greater the insulation value of the protective clothing required.

4.5.4 An Equivalent Chill Temperature (ECT) chart relating the actual dry bulb air temperature and the wind velocity is presented in *S3AM-112-ATT1 Temperature Thresholds*. Unless unusual or extenuating circumstances exist, cold injury to other than hands, feet, and head is not likely to occur without the development of the initial signs of hypothermia. Superficial or deep local tissue freezing will occur only at temperatures below 32°F (0°C) regardless of wind speed. However, older employees, those with circulatory problems and those with previous cold injuries require special precautionary protection against cold injury. The use of extra insulating clothing and/or a reduction in the duration of the exposure period are among the special precautions that should be considered.

4.5.5 Continuous exposure of skin should not be permitted when the air speed and temperature results in an ECT of -25°F (-32°C) or below.

4.5.6 At air temperatures of 40°F (4.4°C) or less, it is imperative that employees who become immersed in water or whose clothing becomes wet be immediately removed from the cold environment, provided a change of clothing, and be treated for hypothermia.

4.5.7 If the air velocity at the job site is increased by wind, draft, or artificial ventilating equipment, the cooling effect of the wind should be reduced by shielding the work area or by wearing an easily removable windbreak garment.

4.5.8 Adequate protection, such as general ventilation, shall be incorporated into any warming shelter design to prevent carbon monoxide poisoning.

- 4.5.9 Operation of internal combustion or similar devices within warming shelters is prohibited.
- 4.5.10 If the available clothing does not give adequate protection to prevent hypothermia or frostbite, work should be modified or suspended until adequate clothing is made available or until weather conditions improve.
- 4.5.11 Walking and working surfaces shall be cleared of ice and snow to prevent slips and falls.
- 4.5.12 Confirm that employees carry fire starter materials if working in remote areas.
- 4.5.13 Supplies such as PPE, fuels, enclosures, de-icing, traction aids, warm drinks, and batteries will be specified by the SH&E Manager and/or the Manager and made available. These supplies will be inspected at least weekly during cold weather projects and replaced when necessary.
- 4.6 Cold Stress Prevention Measures for the Hands
 - 4.6.1 Special protection of the hands is required to maintain manual dexterity for the prevention of accidents including, but not limited to the following:
 - If fine work is to be performed with bare hands for more than 10 to 20 minutes in an environment below 60°F (15°C), special provisions should be established for keeping the employees' hands warm. For this purpose, warm air jets, radiant heaters (fuel burner or electric radiator), or contact warm plates may be utilized. Metal handles of tools and control bars should be covered by thermal insulating material at temperatures below 30°F (-1° C).
 - If the air temperature falls below 60°F (15°C) for sedentary work, 40°F (4.4° C) for light work, or 20°F (-6°C) for moderate work, and fine manual dexterity is not required, employees should use gloves.
 - 4.6.2 To prevent contact frostbite, employees should wear anti-contact gloves:
 - When cold surfaces below 20°F (-6°C) are within reach, each employee should be warned to prevent inadvertent contact by bare skin.
 - If the air temperature is 0°F (-18°C) or less, employees should protect their hands with mittens or appropriate gloves. Machine controls and tools for use in cold conditions should be designed so that they can be handled without removing the mittens or gloves.
 - Ensure an adequate supply of dry gloves is available to replace wet gloves.
 - 4.6.3 Provisions for additional total body protection are required if work is performed in an environment at or below 40°F (4.4°C). The employees should wear cold protective clothing appropriate for the level of cold and physical activity.
 - 4.6.4 Additional Cold Stress Prevention Measures:

For work practices at or below 10°F (-12°C) ECT, the following will apply:

 - The employee should be under constant protective observation (buddy system or supervision).
 - The work rate should not be so high as to cause heavy sweating that will result in wet clothing. If heavy work is being performed, rest periods should be taken in heated shelters and opportunities to change into dry clothing should be provided.
 - New employees should not be required to work full time in the cold during the first days of employment until they become acclimated to the working conditions and required protective clothing. Refer to *S3AM-112-ATT1 Temperature Thresholds* for guidance.
 - The weight and bulkiness of clothing should be included in estimating the required work performance and weights to be lifted by the employee.
 - The work should be arranged in such a way that sitting still or standing still for long periods is minimized. Unprotected metal chair seats should not be used. The employee should be protected from drafts to the greatest extent possible.

- 4.6.5 Employees handling evaporative liquid (gasoline, alcohol, or cleaning fluids) at air temperatures below 40°F should take special precautions to avoid soaking of clothing or gloves with the liquids because of the added danger of cold injury due to evaporative cooling. Special note should be taken of the particularly acute effects of splashes of “cryogenic fluids” or those liquids with a boiling point that is just above ambient temperature.
- 4.6.6 Trauma sustained in freezing or subzero conditions requires special attention, because an injured employee is predisposed to cold injury. Special provisions should be made to prevent hypothermia and freezing of damaged tissue in addition to providing for first aid treatment.

4.7 Hypothermia in Water

- 4.7.1 Loss of body heat to the water is a major cause of deaths in boating and working near water incidents. Often the cause of death is listed as drowning; however, the primary cause is often hypothermia. It should also be noted that alcohol lowers the body temperature around 2 to 3 degrees by dilating the blood vessels. Do not drink alcohol around cold water. The following table shows the effects of hypothermia in water:

WATER TEMPERATURE	EXHAUSTION	SURVIVAL TIME
32.5°F (0°C)	Under 15 minutes	Under 15 to 45 minutes
32.5 to 40°F (0 to 4°C)	15 to 30 minutes	30 to 90 minutes
40 to 50°F (4 to 10°C)	30 to 60 minutes	1 to 3 hours
50 to 60°F (10 to 16°C)	1 to 2 hours	1 to 6 hours
60 to 70°F (16 to 21°C)	2 to 7 hours	2 to 40 hours
70 to 80°F (21 to 27°C)	3 to 12 hours	3 hours to indefinite
Over 80°F (27°C)	Indefinite	Indefinite

- 4.7.2 Some points to remember when water is a potential hazard:

- Wear a personal flotation device when drowning is a potential hazard. Refer to *S3AM-315-PR1 Working On or Near Water*, and *S3AM-333-PR1 Marine Safety & Vessel Operations*.
- If the water is less than 50°F (10°C), wear a wet suit or dry suit for work in water (e.g., wading, or if a significant potential to fall in water exists).
- While in the water, do not attempt to swim unless to reach nearby safety. Unnecessary swimming increases the rate of body heat loss. Keep the head out of the water. This will increase survival time.
- Keep a positive attitude about rescue. This will increase chances of survival.
- If there is more than one person in the water, huddling is recommended to conserve body heat.

- 4.7.3 If an employee or equipment is to work on ice and the water beneath the ice is or may be more than 3¼ feet (1m) deep at any point:

- Test the ice prior to commencing to ensure it will support the load to be placed on it. Ongoing testing may be necessary.
- If there is any risk of falling through the ice employees must wear personal protective equipment that will ensure buoyancy and protect against hypothermia at all times while on the ice.

4.8 Work-Warming Regimen

- 4.8.1 If work is performed continuously in the cold at an equivalent chill temperature (ECT) at or below 19°F (−7°C), heated warming shelters (tents, cabins, rest rooms, etc.) should be made available nearby. The employees should be encouraged to use these shelters at regular intervals; the frequency will depend on the severity of the environmental exposure. Refer to *S3AM-112-ATT1 Temperature Thresholds* for guidance.

- 4.8.2 The onset of heavy shivering, minor frostbite (frostnip), the feeling of excessive fatigue, drowsiness, irritability, or euphoria are indications for immediate return to the shelter.
- 4.8.3 When entering the heated shelter, the outer layer of clothing should be removed and the remainder of the clothing should be loosened to permit sweat evaporation or a change of dry work clothing provided.
- 4.8.4 A change of dry work clothing should be provided as necessary to prevent employees from returning to the cold environment with wet clothing.

5.0 Records

- 5.1 Exposure assessments will be documented in the location's files.

6.0 Attachments

- 6.1 [S3AM-112-ATT1 Temperature Thresholds](#)
- 6.2 [S3AM-112-ATT2 Symptoms & Treatment](#)

Americas

Temperature Thresholds

S3AM-112-ATT1

1.0 Purpose and Scope

- 1.1 The following Tables 1 and 2 give apparent temperatures (wind chill or equivalent chill temperature [ECT]) for various combinations of wind and air temperature, as well as guidelines to the danger of skin exposure.

Table 1. Wind Chill Chart (C)

Actual Temp (°C)	Wind Speed in km/hour									
	8	16	24	32	40	48	56	64	72	80
	Ambient Temperature (°C)									
0	-2	-8	-11	-14	-16	-17	-18	-19	-19	-20
-5	-7	-14	-18	-21	-23	-25	-26	-27	-28	-28
-10	-12	-20	-25	-28	-31	-33	-34	-35	-36	-36
-15	-18	-26	-32	-35	-38	-40	-42	-43	-43	-44
-20	-23	-32	-38	-43	-46	-48	-50	-51	-52	-52
-25	-28	-38	-45	-50	-53	-56	-57	-59	-59	-60
-30	-33	-45	-52	-57	-61	-63	-65	-67	-67	-68
-35	-39	-51	-59	-64	-68	-71	-73	-75	-75	-76
-40	-44	-57	-65	-71	-75	-79	-81	-83	-83	-84
-45	-49	-63	-72	-78	-83	-86	-89	-90	-91	-92
-50	-54	-69	-79	-85	-90	-94	-96	-98	-99	-100

Note: A. Little Danger: if less than one hour of exposure to dry skin.

B. Danger: Exposed flesh freezes within one minute.

C. Great Danger: Flesh may freeze within 30 seconds.

Source: *2014 Threshold Limit Values (TLV™) and Biological Exposure Indices (BEI™) booklet; published by ACGIH, Cincinnati, Ohio.

Table 2. Equivalent Chill Temperature Chart (F)

Estimated Wind Speed (mph)	Actual Temperature Reading (°F)									
	50	40	30	20	10	0	-10	-20	-30	-40
	Equivalent Chill Temperature (°F)									
Calm	50	40	30	20	10	0	-10	-20	-30	-20
5	48	37	27	16	6	-5	-15	-26	-36	-47
10	40	28	16	4	-9	-24	-33	-46	-58	-70
15	36	22	9	-5	18	-32	-45	-58	-72	-85
20	32	18	4	-10	-25	-39	-53	-67	-82	-96
25	30	16	0	-15	-29	-44	-59	-75	-88	-104
30	28	13	-2	-18	-33	-48	-63	-79	-94	-109
35	27	11	-4	-20	35	-51	-67	-82	-98	-113
40	26	10	-6	-21	-37	-53	-69	-85	-100	-116
Wind speeds >40 mph have little additional effect	LITTLE DANGER				INCREASING DANGER			GREAT DANGER		
	Trenchfoot and immersion foot may occur at any point on this chart.									

- 1.2 How fast a person's body cools in cold weather depends on: air temperature, wind speed, heat of the sun, and work being done.
- 1.2.1 The following Table 3 provides guidelines for establishing periods of work to warming break periods based on ambient temperature and wind speed for workers wearing dry clothing.
- 1.2.2 Notes following the Table take into account additional factor such as physical exertion, whether workers are acclimatized, etc.

Table 3. Work-Warming Schedule Guidelines

Air Temp. (Sunny Sky) °F	No Noticeable Wind		5 mph Wind (8 km/h)		10 mph Wind (16 km/h)		15 mph Wind (24 km/h)		20 mph Wind (32 km/h)		25 mph Wind (40 km/h)		Air Temp. (Sunny Sky) °C
	Max. Work Period	Breaks	Max. Work Period	Breaks	Max. Work Period	Breaks	Max. Work Period	Breaks	Max. Work Period	Breaks	Max. Work Period	Breaks	
above 5°	Normal Work Schedule		Normal Work Schedule		Normal Work Schedule		Normal Work Schedule		Normal Work Schedule		Normal Work Schedule		above -15°
5° to -1°											100 min	2	-15° to -17°
0° to -4°											100 min	2	75 min
-5° to -9°							100 min	2	75 min	2	55 min	3	-21° to -22°
-10° to -14°					100 min	2	75 min	2	55 min	3	40 min	4	-23° to -25°
-15° to -19°					100 min	2	75 min	2	55 min	3	40 min	4	30 min
-20° to -24°	100 min	2	75 min	2	55 min	3	40 min	4	30 min	5	Cease Work	-29° to -31°	
-25° to -29°	75 min	2	55 min	3	40 min	4	30 min	5	Cease Work	Cease Work		-32° to -34°	
-30° to -34°	55 min	3	40 min	4	30 min	5	Cease Work	Cease Work				-35° to -37°	
-35° to -39°	40 min	4	30 min	5	Cease Work	Cease Work						-38° to -39°	
-40° to -44°	30 min	5	Cease Work	Cease Work								-40° to -42°	
-44° & below	Cease Work											-43° & below	

Modified from ACGIH 2014 Threshold Limit Values for Chemical Substances and Physical Agents.

- Note 1: Schedule describes the maximum continuous duration of work and number of 10-15 minute breaks to be observed during any 4-hour work period and assumes that period will be followed by an extended warm-up period (e.g., lunch). Allowed breaks should be taken in a warm environment.
- Note 2: Schedule applies to moderate to heavy work performed by acclimated workers wearing appropriate layered clothing. For light to moderate work apply the schedule for conditions one step lower. For unacclimated workers apply the schedule for conditions two steps lower. These modifications are additive.
- Note 3: For work under 25%–50% overcast/clouds, apply the schedule for conditions one step lower. For work at night or under greater than 50% overcast/clouds, apply the schedule for conditions two steps lower. These modifications are additive with any applicable modifications from Note 2.

Note 4: For wind speeds in excess of 25 mph (40 km/h), cease all nonemergency work when temperatures fall below 5°F (-21°C).

Note 5: When the work involves riding on an unshielded vehicle or some other activity that generates wind, the number of breaks should be increases appropriately.

Note 6: If effective protection against the wind can be provided by shields or screens, work modifications or measures, then the work warm-up schedule for “No Noticeable Wind” would apply.

Note 7: If reliable weather reports are not available, use the following as a guide to estimate wind velocity:

- A 5 mph (8 km/h) wind will move a light flag
- A 10 mph (16 km/h) wind will fully extend the flag
- A 15 mph (24 km/h) wind will raise a newspaper sheet
- A 20 mph (32 km/h) wind will produce blowing and drifting snow.

Symptoms & Treatment

S3AM-112-ATT2

1.0 Cold Stress-related Illnesses

1.1 Frostbite

- 1.1.1 Frostbite is a localized cold injury characterized by freezing of the tissues with ice crystal formation. There are several degrees of damage. Frostbite can be categorized into:
- **Frost Nip or Initial Frostbite:** (1st degree frostbite) Characterized by blanching or whitening of skin.
 - **Superficial Frostbite:** (2nd degree frostbite) Skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient. Blistering and peeling of the frozen skin will follow exposure.
 - **Deep Frostbite:** (3rd degree frostbite) Tissues are cold, pale, and solid; extremely serious injury with possible amputation of affected area.
- 1.1.2 Frostbite injury is almost always limited to the upper and lower extremities (finger and toes) or to such appendages as the ears, nose or cheeks.
- 1.1.3 Conditions conducive to frostbite include sub-zero temperatures, hypothermia, dehydration, obstruction of the blood supply to the extremities (by constricting clothing, especially on the feet or at the wrists or ankles), contact with cold metal, contact with organic liquids (such as gasoline or solvents that have been left outdoors in sub-zero temperatures), use of substances that cause vasoconstriction (such as smoking tobacco), or other injury or shock.
- 1.1.4 Frostbite can occur without hypothermia when the extremities do not receive sufficient heat. Frostbite occurs when there is freezing of the fluids around the cells of the affected tissues.
- 1.1.5 Contact by the skin with tools or other metal objects below 20°F (-7°C) may result in contact frostbite.
- 1.1.6 The first symptom of frostbite is an uncomfortable sensation of coldness and pain, followed by numbness. There may be tingling, stinging, or cramping. Ongoing symptoms of frostbite include:
- Sudden and complete cessation of cold or discomfort in affected fingers or toes, often followed by a pleasant feeling of warmth;
 - Subsequently the only symptom may be the absence of any sensation in the frozen part;
 - Paleness in the affected tissues;
 - Firm or hard tissues; and
 - Purple tissue, if a large area, such as an entire hand or foot, is frostbitten.
- 1.1.7 If exposure occurs in temperatures that are below freezing (32°F or below), frostbite or trench foot (immersion foot) may accompany or complicate the symptoms of hypothermia. Frostbite is the freezing of living tissues with a resultant breakdown of cell structure. Symptoms due to frostbite may include, but is not limited to:
- Superficial redness of the skin;
 - Slight numbness;
 - Blisters;
 - Obstruction of blood flow (ischemia);
 - Blood clots (thrombosis); and
 - Skin discoloration due to insufficient oxygen in the blood (cyanosis).

1.1.8 Frostbite may occur if the skin comes into contact with objects with a surface temperature below freezing, such as metal tool handles. Trench foot is caused by continuous exposure to cold combined with persistent dampness or immersion in water. Injuries in this case include permanent tissue damage due to oxygen deficiency, damage to capillary walls, severe pain, blistering, tissue death, and ulceration.

1.1.9 Additionally, cold exposures may either induce or intensify vascular abnormalities. These include chilblain (a swelling or sore), Raynaud's disease, acrocyanosis (blueness of hands and feet) and thromboangiitis (inflammation of the innermost walls of blood vessels with accompanying clot formation). Workers suffering from these ailments should take particular precautions to avoid chilling.

1.2 Hypothermia

1.2.1 Hypothermia is a lower than normal body temperature that occurs when outer cold cools the body faster than the body can produce heat to stay warm. When this situation first occurs, blood vessels in the skin constrict in an attempt to conserve vital internal heat. Hands and feet are the first affected.

- If the body continues to lose heat, involuntary shivers begin. This is the body's way of attempting to produce more heat, and it is usually the first real warning sign of hypothermia.
- Further heat loss produces speech difficulty, confusion, loss of manual dexterity, collapse, and finally death.

1.2.2 Hypothermia can be caused by exposure to wind, cold, and/or moisture. The combination of wind, cold, and moisture can be deadly. Wet clothes or immersion in cold water greatly increases the hypothermia risk. The progressive clinical presentation of hypothermia is described in the table below.

Condition	Core Body Temp.	Signs/Symptoms	Treatment
Mild Hypothermia	99 – 97 F 37 – 36 C	Normal, shivering may begin	Seek dry shelter; replace wet clothing, insulate whole body and head, avoid sweating, use external warmth (bath, fire) only if core above 95 degrees F, give warm sweet drinks and food.
	97 – 95 F 36 – 35 C	Cold sensation, goose bumps, unable to perform complex tasks with hands, shiver can be mild to severe, hands numb.	
Moderate Hypothermia	95 – 93 F 35 – 34 C	Intense shivering, muscle in-coordination becomes apparent, movements slow and labored, stumbling pace, mild confusion may appear alert.	Avoid exercise and external warmth, gently rest; give warm sweet drinks and calories, internal warming via warm moist air, monitor pulse and breathing.
	93 – 90 F 34 – 32 C	Violent shivering persist, difficulty speaking, sluggish thinking, amnesia starts to appear, gross muscle movements sluggish, unable to use hands, stumbles frequently, signs of depression, withdrawn.	
Severe Hypothermia	90 – 86 F 32 – 30 C	Shivering stops, exposed skin blue or puffy, muscle coordination very poor, inability to walk, confusion, incoherent/irrational behavior, but may be able to maintain posture and appearance of awareness.	Medical emergency, give nothing by mouth, wrap in an insulated blanket, avoid rapid rewarming, transfer to hospital immediately.
	86 – 82 F 30 – 28 C	Muscle rigidity, semiconscious, stupor, loss of awareness of others, pulse and respiration rate decrease, possible heart fibrillation.	
	82 – 78 F 28 – 25.5 C	Unconscious, heart beat and respiration erratic, pulse may not be palpable.	
	78 – 75 F 25.5 – 24 C	Pulmonary edema, cardiac and respiratory failure, death. Death may occur before this temperature is reached.	

- 1.2.3 Early warning signs of hypothermia:
 - Feeling of being cold and tired;
 - Heavier breathing and increased pulse rate;
 - Tendency to keep moving (e.g., stamping feet, rubbing hands, continued walking/pacing);
 - Goose bumps, holding arms tightly wrapped around the body, hunching of shoulders, and
 - Shivering.
- 1.2.4 Hypothermia damages both the body's internal temperature mechanisms (hypothalamus) and the peripheral mechanisms to prevent heat loss (vasoconstriction and perspiration.) These effects may last up to three years after the initial hypothermia episode. Symptoms of hypothermia may include, but are not limited to:
 - Pain in the extremities;
 - Severe shivering and numbness;
 - Low core body temperature;
 - Drowsiness and muscular weakness;
 - Apathy;
 - Mental confusion;
 - Loss of consciousness;
 - Shock, and
 - Decreasing pulse and breathing rate.

2.0 Recommended Treatment for Cold Stress-related Illnesses

- 2.1 Frostbite
 - 2.1.1 Wrap the victim in woollen blanket and keep dry until he or she can be brought inside.
 - 2.1.2 Remove the victim from the cold environment.
 - 2.1.3 Do not rub, chafe, or manipulate frozen parts.
 - 2.1.4 Place the victim in warm water (102°F to 105°F) and make sure the water remains warm. Test the water by pouring it on the inner surface of your forearm. Never thaw affected body parts if the victim has to go back out into the cold; refreezing can cause significant tissue damage.
 - 2.1.5 Do not use hot water bottles or a heat lamp, and do not place the victim near a hot stove.
 - 2.1.6 Do not allow the victim to walk if his or her feet are affected.
 - 2.1.7 Have the victim gently exercise the affected parts once they are thawed.
 - 2.1.8 Seek immediate medical attention for thawing of serious frostbite.
- 2.2 Hypothermia
 - 2.2.1 Bring the victim into a warm room or shelter as quickly as possible.
 - 2.2.2 Give artificial respiration and stop any bleeding, if necessary.
 - 2.2.3 If the victim cannot be moved (spinal injury, etc.), carefully place newspapers, blankets, or some other insulation between the victim and the ground.
 - 2.2.4 Remove all wet clothing.
 - 2.2.5 Provide an external heat source, because the body cannot generate its own heat. Wrap the victim in prewarmed blankets, place him or her in the liner of a portable hypothermia treatment unit, put the torso (not the extremities) into a tub of warm water, or use body-to-body contact to rewarm the body core. These measures will slowly reopen the peripheral circulation, minimizing the possibility

of after-shock or after-drop (the flowing of cooled, stagnated blood from the limbs to the heart), which may cause ventricular fibrillation, cardiac arrest, or death.

- 2.2.6 Do not allow the victim to sleep.
- 2.2.7 Give warm, sweet drinks. Do not give alcohol or pain relievers.
- 2.2.8 Keep the victim still. Do not try to walk.
- 2.2.9 Do not rub numb skin.
- 2.2.10 Get medical attention as soon as possible.

Heat Stress

S3AM-113-PR1

1.0 Purpose and Scope

- 1.1 Establishes a Heat Illness Prevention Program to guide employees in preventing heat illness, recognition of the symptoms of heat stress-related illnesses and in taking the appropriate corrective action.
- 1.2 This procedure applies to all AECOM Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.

2.0 Terms and Definitions

- 2.1 **Acclimated** – Employees who have developed physiological adaptation to hot environments characterized by increased sweating efficiency, circulation stability, and tolerance of high temperatures without stress. Acclimatization occurs after 7 to 10 consecutive days of exposure to heat and much of its benefit may be lost if exposure to hot environments is discontinued for a week.
- 2.2 **Chemical Protective Clothing (CPC)** – Apparel that is constructed of relatively impermeable materials intended to act as a barrier to physical contact of the Employee with potentially hazardous materials in the workplace. Such materials include Tyvek® coveralls (all types) and polyvinyl chloride coveralls and rain suits.
- 2.3 **Heat Cramps** – A form of heat stress brought on by profuse sweating and the resultant loss of salt from the body.
- 2.4 **Heat Exhaustion** – A form of heat stress brought about by the pooling of blood in the vessels of the skin and in the extremities.
- 2.5 **Heat Rash** – A heat-induced condition characterized by a red, bumpy rash with severe itching.
- 2.6 **Heat Stress** – The combination of environmental and physical work factors that constitute the total heat load imposed on the body.
- 2.7 **Heat Stroke** – The most serious form of heat stress, which involves a profound disturbance of the body's heat-regulating mechanism.
- 2.8 **Sunburn** – Caused by unprotected exposure to ultraviolet radiation present in sunlight that is damaging to the skin (Refer to *S3AM-121-PR1 Non-Ionizing Radiation*). The injury is characterized by red painful skin, blisters, and/or peeling.
- 2.9 **Unacclimated** – Employees who have not been exposed to hot work conditions for one week or more or who have become heat-intolerant due to illness or other reasons.

3.0 References

- 3.1 S3AM-003-PR1 SH&E Training
- 3.2 S3AM-004-PR1 Incident Reporting, Notifications & Investigation
- 3.3 S3AM-010-PR1 Emergency Response Planning
- 3.4 S3AM-121-PR1 Non-Ionizing Radiation
- 3.5 S3AM-208-PR1 Personal Protective Equipment
- 3.6 S3AM-209-PR1 Risk Assessment & Management

4.0 Procedures

4.1 Roles and Responsibilities

4.1.1 Managers

- Evaluate the need for heat illness prevention measures and incorporate as appropriate into the Safe Work Plan or Task Hazard Analysis.
- Allocate sufficient resources for the management of heat illness in the field including the provision of water, a shaded break area, and sufficient schedule to allow for breaks.

4.1.2 Safety, Health and Environment (SH&E) Manager

- Provide heat illness awareness training.
- Assist in developing appropriate work-rest schedules.
- Conduct/support incident investigations related to potential heat stress-related illnesses.

4.1.3 Supervisor

- Identify those tasks that may be most impacted by heat stress and communicate the hazard to the assigned Employees.
- Confirm that Employees have been trained on the recognition of heat illness.
- Confirm that this procedure, along with any applicable Safe Work Plan and/or Task Hazard Analysis (and heat exposure control plan that may be contained therein) are made available to affected Employees.
- Confirm that adequate supplies of appropriate fluids are readily available to Employees.
- Confirm that a proper rest area is available.
- Conduct heat illness monitoring, as applicable.
- Implement the work-rest schedule.
- Confirm that first aid measures are implemented once heat stress symptoms are identified.
- Confirm personnel are physically capable of performing the assigned tasks and are not in a physically compromised condition.
- Report all suspected heat illnesses.

4.1.4 Employee

- Observe each other for the early symptoms of heat illnesses.
- Maintain an adequate intake of available fluids.
- Be familiar with heat stress hazards, predisposing factors, and preventative measures.
- Report to work in a properly vested and hydrated condition.
- Report all suspected heat stress-related illnesses.

4.2 Restrictions

- 4.2.1 The Buddy System is required when working in high heat conditions; Employees shall not work alone.
- 4.2.2 Employees shall not be exposed to levels exceeding those specified for the given work level and work-rest regimen as listed in *S3AM-113-ATT1 Heat Stress – Temperature Thresholds*.
- 4.2.3 Clothing corrections shall be applied in accordance with the tables provided in *S3AM-113-ATT1 Heat Stress – Temperature Thresholds*.

4.3 Exposure Controls

4.3.1 It shall be determined whether Employees are or may be exposed to hazardous heat levels. The Supervisor shall:

- Conduct a heat stress assessment to determine the potential for hazardous exposure of Employees. Assessment shall include, but not limited to:
 - Ambient temperature.
 - Amount of sunshine (cloudy, clear). Refer to *S3AM-121-PR1 Non-Ionizing Radiation* additional direction concerning ultraviolet radiation exposures.
 - Other radiant heat sources (e.g. motor, fire, etc.).
 - Humidity.
 - Air flow.
 - Amount or type of physical labor being performed,
 - Physical condition of the Employees (e.g., acclimated/not)
 - Protective clothing in use.
 - Referral to *S3AM-113-ATT1 Heat Stress – Temperature Thresholds* to assist in determining whether hazardous heat exposures may exist.
- If potential for hazardous exposure is identified, the Supervisor shall develop and implement a heat stress exposure control plan within the Safe Work Plan and/or Task Hazard Analysis. Refer to *S3AM-209-PR1 Risk Assessment & Management*.

4.3.2 If Employees are or may be exposed, the Supervisor shall implement engineering controls (e.g., shelters, cooling devices, etc.) to reduce the exposure of Employees to levels below those specified for the given work level and work-rest regimen as listed in *S3AM-113-ATT1 Heat Stress – Temperature Thresholds*.

4.3.3 If engineering controls are not practicable, the Supervisor shall reduce the exposure of Employees to levels below those listed in *S3AM-113-ATT1 Heat Stress – Temperature Thresholds* by providing administrative controls, including a work-rest cycle or personal protective equipment, if the equipment provides protection equally effective as administrative controls.

4.3.4 If Employees are or may be exposed, the Supervisor shall provide and maintain an adequate supply of cool, fresh, potable water close to the work area for the use of a heat exposed Employee. Water shall be provided (paid) by the project or program; if Employees purchase their own drinking water because water is not otherwise available on site, they shall be reimbursed.

4.3.5 If an Employee shows signs or reports symptoms of heat stress or strain, they shall be removed from the hot environment and treated by an appropriate first aid attendant on site, if available, or by a physician, refer to *S3AM-113-ATT2 Heat Stress – Symptoms & Treatment* for more specifics.

4.4 Heat Stress Planning

4.4.1 Heat stress can be a significant site hazard, especially for Employees wearing CPC. To prepare for emergency response planning, refer to *S3AM-010-PR1 Emergency Response Planning* procedure.

4.4.2 The project and site-specific heat related risks shall be identified. Appropriate prevention and control measures shall be developed and documented in the project's SH&E Plan or included as a supplement to the SH&E Plan (e.g., *S4[DCS]AM-113-FM1 Heat Illness Prevention Plan – DCS Americas*) and the Task Hazard Assessments (THA). Refer to the *S3AM-209-PR1 Risk Assessment & Management* procedure.

4.4.3 The heat a worker is exposed to may be a combination of air temperature, radiant heat, and humidity. The WBGT (wet-bulb globe thermometer) is a useful index of the environmental

contribution to heat stress. Because WBGT is only an index of the environment, the contributions of work demands, clothing, and state of acclimatization shall also be accounted for, as described in the following steps.

- Monitor ambient temperatures and conduct heat stress monitoring in accordance with the location specific SH&E Plan. Revise the heat stress monitoring and controls if there are any reports of discomfort due to heat stress.
- Monitor temperatures in each unique environment in which workers perform work (e.g., take WBGT measurements inside truck cabs for truck drivers, and take separate WBGT measurements in the outdoor area where field employees work, etc.). Follow manufacturer's instructions on proper use of the WBGT.
- Determine if individual workers are acclimatized or un-acclimatized. Full heat acclimatization requires up to 3 weeks of continued physical activity under heat-stress conditions similar to those anticipated for the work. Its loss begins when the activity under those heat-stress conditions is discontinued, or when there is a sustained increase in temperatures of 10 °F (5.6 °C) or more, and a noticeable loss occurs after 4 days. A worker can be considered acclimatized for the purpose of this procedure when they have been exposed to the site conditions (including level of activity) for 5 of the last 7 days.
- Determine the approximate workload of each worker or group of workers. The following examples (Table 1) can be used for comparison:

Table 1
Examples of Activities within Workload Categories

Categories	Example Activities
Resting	Sitting quietly
	Sitting with moderate arm movements
Light	Sitting with moderate arm and leg movements
	Standing with light work at machine or bench while using mostly arms
	Using a table saw
	Standing with light or moderate work at machine or bench and some walking about
Moderate	Scrubbing in a standing position
	Walking about with moderate lifting or pushing
	Walking on level at 3.5 miles/hr (6 km/hr) while carrying 6.6 lbs (3kg) weight load
Heavy	Carpenter sawing by hand
	Shoveling dry sand
	Heavy assembly work on a non-continuous basis
	Intermittent heavy lifting with pushing or pulling (e.g., pick-and-shovel work)
Very Heavy	Shoveling wet sand

- Determine the approximate proportion of work within an hour during a typical shift. Typically, the initial work schedule will be 60 minutes of work per hour (100 percent work) with a small break in the morning and afternoon, as appropriate, and a 30-minute lunch break mid-day.
- For workers wearing cloth coveralls (e.g., Nomex fire resistant clothing), add 3 to the measured WBGT. For impermeable clothing, such as Tyvek or Saranex, the WBGT procedures cannot be used. For these situations, workers should begin physiological monitoring as soon as the temperature in the work area exceeds 70°F (21°C).
- Use the collected information to develop appropriate work to rest schedules as detailed in *S3AM-113-ATT1 Heat Stress – Temperature Threshold*. Work-rest schedules and water provision shall be documented in the applicable SH&E Plan or supplementary Health Illness Prevention Plan and may be additionally documented using logs such as *S3AM-113-FM2 Daily Heat Illness Prevention Log*.

- 4.4.4 Given the work demands (light, moderate, heavy or very heavy), heat of the work environment, and such aspects as PPE in use, workload will be adjusted appropriately to allow for proper acclimation.
- This is the process by which the body "gets used to" hot work environments. This is achieved by slowly increasing workloads.
 - New and returning Employees (absent one week or more) who have not had time to acclimatize may be more susceptible to heat related illnesses, even in seemingly low risk heat exposures.
 - All Employees shall be allowed time to acclimatize in the event of a heat wave. All Employees assigned to a new process with additional heat exposures shall be allowed to acclimatize.
 - Minimize workload and gradually increase as tolerance is built up. Allow for more frequent breaks.
 - While acclimatization normally takes approximately 5 to 7 days, heightened monitoring of these Employees will be maintained for the first 14 days.
- 4.4.5 Employees shall be instructed in the recognition of heat stress symptoms, the first aid treatment procedures for severe heat stress, and the prevention of heat stress injuries. Employees shall be encouraged to immediately report any heat stress that they may experience or observe in fellow Employees. Supervisors shall use such information to adjust the work-rest schedule to accommodate such problems.
- 4.4.6 Wherever possible, a designated break area should be established in an air-conditioned space, or in shaded areas where air conditioning is impractical. The break area should be equipped to allow Employees to loosen or remove protective clothing, and sufficient seating should be available for all Employees. During breaks, Employees shall be encouraged to drink plenty of water or other liquids, even if not thirsty, to replace lost fluids and to help cool off. Cool water should be available at all times in the break area, and in the work area itself unless hygiene/chemical exposure issues prevent it.
- 4.5 Symptoms and Treatment
- 4.5.1 Refer to *S3AM-113-ATT2 Heat Stress – Symptoms & Treatment*.
- 4.5.2 Employees who exhibit ANY signs of significant heat stress (e.g., profuse sweating, confusion and irritability, pale, clammy skin) shall be relieved of all duties at once, made to rest in a cool location, and provided with large amounts of cool water.
- 4.5.3 Severe heat stress (heat stroke) is a life-threatening condition requiring immediate emergency medical care (e.g., call 911). Anyone exhibiting symptoms of heat stroke (slurred speech, unconsciousness, etc.) shall be taken immediately to the nearest medical facility. Steps shall be taken to cool the person during transportation (clothing removal, wet the skin, air conditioning, etc.).
- 4.6 Prevention
- 4.6.1 Requirements for working in extreme heat may be triggered by regulatory established criteria (e.g. CAL/OSHA requires high heat procedures when temperature equals or exceeds 95°F) or as a result of a hazard analysis assessing various contributory factors (refer to *S3AM-113-ATT1 Heat Stress – Temperature Thresholds*). Employees working in extreme heat or sun should understand and apply the following guidelines for preventing and detecting heat exhaustion and heat stroke.
- When possible, begin hydrating at least three days prior to working in high heat conditions.
 - Review the heat stress exposure control plan within the SH&E Plan, and/or Task Hazard Analysis.
 - If the supervisor is not immediately available confirm a reliable method of communication is in place to allow for contact with supervision. In the absence of cellular reception, a satellite phone or similar device may be required.

- Take frequent short breaks in areas sheltered from direct sunlight; eat and drink small amounts frequently.
- Try to schedule work for the coolest part of the day, early morning and evening.
- Avoid strenuous physical activity outdoors during the hottest part of the day.
- Avoid sudden changes of temperature. Refer to *S3AM-113-ATT1 Heat Stress – Temperature Thresholds*.
- Air out a hot vehicle before getting into it.
- Obtain medical direction if taking diuretics during hot weather (a lower dose may be necessary).
- When working in heat, drink 1 quart of water per hour of work.
- Avoid caffeine and alcohol as they increase dehydration.
- Monitor urine frequency and color to detect dehydration. Refer to the *S3AM-113-ATT3 Dehydration Chart*.
- The Buddy System is required when working in high heat conditions to enable effective communication and cross-observation for indications of heat stress.
- Initiate emergency response procedures when necessary, including contacting emergency medical services as appropriate and in accordance with the Emergency Response Plan.

4.6.2 Personal Protective Equipment

- Review the *S3AM-208-PR1 Personal Protective Equipment* procedure.
- Wear a hat and light-colored, loose-fitting clothing to reflect the sun.
- Apply sunscreen to exposed skin (SPF 30 or greater, follow directions on label).
- Wear sunglasses with UV protection.
- Pack extra water to avoid dehydration (try freezing water in bottles overnight to help keep the water cooler for longer during the day).

4.7 Work-Rest Schedule Practices

- 4.7.1 Intake of fluid will be increased beyond that which satisfies thirst, and it is important to avoid "fluid debt," which will not be made up as long as the individual is sweating.
- Two 8-ounce glasses of water should be taken prior to beginning work, then up to 32 ounces (1 quart) per hour during the work shift; fluid replacement at frequent intervals is most effective.
 - The best fluid to drink is water; liquids like coffee or soda do not provide efficient hydration and may increase loss of water.
 - If commercial electrolyte drinks (e.g., Gatorade) are used, the drink should be diluted with water, or 8 ounces of water should be taken with each 8 ounces of electrolyte beverage.
- 4.7.2 Additional salt is usually not needed and salt tablets should not be taken.
- 4.7.3 Fluids for drinking should be cool and fresh, but not cold.
- 4.7.4 Breaks will be taken in a cool, shaded location, and any impermeable clothing should be opened or removed.
- A relatively cool, shaded area shall be provided for breaks when working in hot environments. For hazardous waste sites, the rest area should be located in the support zone adjacent to the contamination reduction zone, situated so that part of it is in the decontamination area so workers can take breaks without going through full decontamination.

- If shade is not available, shaded areas shall be constructed. This same type of canopy can be set up to shade personnel performing various types of work in hot weather.
- Cooling measures other than shade (e.g., misting, air-conditioned break areas, air conditioned vehicles, etc.) can be used in lieu of shade provided it can be demonstrated that they are at least as effective in cooling employees.
- 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.

4.7.5 Dry clothing or towels should be available to minimize chills when taking breaks.

4.7.6 Manual labor will not be performed during breaks, other than paperwork or similar light tasks.

4.7.7 Other controls that may be used include:

- Scheduling work at night or during the cooler parts of the day (6 am–10 am, 3 pm–7 pm).
- Erecting a cover or partition to shade the work area.
- Auxiliary cooling - wearing cooling devices beneath protective garments, but over any underclothing.
 - If cooling devices are worn, only physiological monitoring will be used to determine work activity.
 - These vests typically provide cooling via one of two methods: the use of ice or other frozen media, or the use of a vortex cooler. Each method has its advantages and disadvantages.
 - The frozen media vest requires a means for freezing the media, and the media (usually water or "blue ice") will melt, requiring replacement.
 - The vortex cooler tends to cool more uniformly. Instead of frozen media, this vest uses the expansion of compressed air to cool the wearer. The drawback is the compressed air requirement, but this is negated when the wearer is already using an airline respirator supplied by a compressor. A vortex cooler should not be supplied from air cylinders, as this will draw down the cylinders rapidly.
- Auxiliary cooling should be considered when the following conditions exist:
 - Ambient temperature over 80°F (26°C).
 - Workers are wearing impermeable garments (i.e., Tyvek, Saranex, Chemrel, etc.).
 - It is desirable to have long work shifts with minimum interruption.

4.8 Evaluating the Work-Rest Schedule's Effectiveness

4.8.1 Once a work-rest schedule is established, the Supervisor shall continually evaluate its effectiveness through observation of Employees for signs/symptoms of heat stress. Have workers assess themselves and their body's reaction to the heat and work conditions (self-assessment), and report any signs or symptoms of heat illness. These can include nausea or dizziness, heat cramps, extreme thirst, or very dark urine.

4.8.2 Measurement or physiological monitoring of each Employee's vitals (e.g., pulse, blood pressure, and temperature) can provide additional information in determining if the schedule is adequate. Refer to *S3AM-113-ATT1 Heat Stress – Temperature Thresholds* for additional guidance on when physiological monitoring should be conducted.

4.8.3 Frequency of physiological monitoring is increased or decreased depending upon such factors as worker fitness, acclimatization, temperature of the work environment, type of PPE, etc.

Based on the results of the physiological monitoring and on the workers' self-assessments, the work period may be adjusted as follows:

- The work period may be increased (generally, by 5- to 10-minutes intervals, up to a maximum of 4 hours) if the results of the first 2 hours of the physiological monitoring and the workers' self-assessments indicate that workers are recovering adequately (see below), and on the judgment of the SH&E Manager.
 - The work period shall be decreased if the results of the physiological monitoring and the workers' self-assessment indicate that workers are NOT recovering adequately (see below).
- 4.8.4 If physiological monitoring is conducted, the Employee and/or the SH&E Manager (or appropriate designate) shall measure and record body temperature and pulse rate as described below.
- 4.8.5 Monitor body temperature to determine if Employees are adequately dissipating heat build-up. Ear probe thermometers which are adjusted to oral temperature (aural temperature) are convenient and the preferred method of measurement. Determine work/rest regimen as follows:
- Measure oral body temperature at the end of the work period. Oral body temperatures are to be obtained prior to the employee drinking water or other fluids.
 - If temperature exceeds 99.6°F (37.5°C), shorten the following work period by 1/3 without changing the rest period.
 - If, at the next rest period, temperature still exceeds 99.6°F (37.5°C), the worker should not be allowed to continue work until repeated temperature measurements are in the acceptable range (i.e., less than 99.6°F). Do not leave the worker alone during the recovery time. Watch for signs of heat illness and be prepared to implement emergency response as necessary.
 - Do not allow a worker to wear impermeable PPE when his/her oral temperature exceeds 100.6°F (38.1°C).
- 4.8.6 At the start of the workday each Employee's baseline pulse rate (in beats per minute [bpm]) is determined by taking a pulse count for 15 seconds and multiplying the result by four or by using an automated pulse count device. Pulse rates can then be measured at the beginning of each break period and two minutes thereafter to determine if the rest period allows for adequate recovery.
- Take the radial (wrist) pulse as early as possible in the rest period and determine the worker's heart rate in beats per minute. The heart rate is determined by counting the pulse for ten seconds and multiplying the number by 6 to get the beats per minute. Record this as P1.
 - Wait 2 minutes and repeat the pulse measurement. Record this as P2.
 - If P1 is greater than or equal to 110 beats per minute (bpm) and if (P1 – P2) is less than or equal to 10 bpm (indicating that workers are not recovering adequately), shorten the next work cycle by 1/3 without changing the rest period.
 - At the next rest period, if P1 is still equal to or greater than 110 bpm, and if (P1 – P2) is still less than or equal to 10 bpm, shorten the following work cycle by 1/3 without changing the rest period.
 - At the third rest period, if P1 is still equal to or greater than 110 bpm and (P1 – P2) is still less than or equal to 10 bpm, the worker should not be allowed to continue work until repeated pulse measurements are in the acceptable range (i.e., P1 is less than 110 bpm and (P1 – P2) is greater than 10 bpm). Do not leave the worker alone during the recovery time. Watch for signs of heat illness and be prepared to implement emergency response as necessary.
- 4.8.7 Use of an automated or similar blood pressure device will be used to assess each Employee's blood pressure at the beginning and end of each break period to determine if the rest period allows adequate cooling by applying the following criteria:
- If the blood pressure of an Employee is outside of 90/60 to 150/90, then the Employee will not be allowed to begin or resume work; extend the break period by at least five minutes, at the end of which blood pressure rates will be re-measured and the end-of-break criteria again applied.

4.8.8 All physiological monitoring of heat stress will be documented using *S3AM-113-FM1 Heat Stress Monitoring Log*.

4.9 Training

4.9.1 Employees and their Supervisors that may be exposed to the hazard will be trained and oriented to the hazard and the controls prior to work commencing.

4.9.2 Those Employees, including Supervisors, potentially exposed to heat stress will receive training, refer to the *S3AM-003-PR1 SH&E Training* procedure. Training will include, but is not limited to:

- Sources of heat stress (environmental and personal), influence of protective clothing, and importance of acclimatization;
- How the body handles heat and acclimatization;
- Recognition of heat-related illness symptoms;
- Preventative/corrective measures including, but not limited to;
 - Employees will be informed of the harmful effects of excessive alcohol consumption in the prevention of heat stress.
 - All Employees will be informed of the importance of adequate rest and proper diet in the prevention of heat stress.
- First aid procedures for heat stress-related illnesses; and
- Immediate reporting of any heat-related incident (injury, illness, near-miss), refer to the *S3AM-004-PR1 Incident Reporting, Notifications & Investigation* procedure.

5.0 Records

5.1 None

6.0 Attachments

6.1 [S3AM-113-ATT1 Heat Stress - Temperature Thresholds](#)

6.2 [S3AM-113-ATT2 Heat Stress - Symptoms & Treatment](#)

6.3 [S3AM-113-ATT3 Dehydration Chart](#)

6.4 [S3AM-113-FM1 Heat Stress Monitoring Log](#)

6.5 [S3AM-113-FM2 Daily Heat Illness Prevention Log](#)

6.6 [S3\[DCS\]AM-113-FM1 Heat Illness Prevention Plan – DCS Americas](#)

Heat Stress – Temperature Thresholds

S3AM-113-ATT1

1.0 Work-Rest Schedule

The prevention of heat stress is best performed through Supervisor observation of Employees and routine heat stress awareness training activities. However, it is also necessary to implement a work routine that incorporates adequate rest periods to allow Employees to remove protective clothing, drink fluids (vital when extreme sweating is occurring), rest and recover. The frequency and length of work breaks shall be determined by the Supervisor based upon the ambient temperature, amount of sunshine, humidity, the amount of physical labor being performed, the physical condition of the Employees (e.g., acclimated/not), and protective clothing being used.

1.1 Establishing a Work-Rest Schedule:

1.1.1 AECOM permits the use of either of two techniques to initially determine an appropriate daily work-rest schedule. These methods are:

- Wet Bulb Globe Thermometer (WBGT) Method: This method is preferred if a WBGT meter is available.
- Adjusted Temperature Method: This method should be used only if WBGT data is not available.

1.1.2 Either procedure will provide the Supervisor with a recommended routine; however, adjustments to this routine may be required to accommodate the specific daily conditions at the work site.

1.2 WBGT Work-Rest Schedule Guidelines:

1.2.1 If the measured WBGT is less than the action limit value, there is little risk of excessive exposure to heat stress, and work can continue.

- Continue to monitor ambient conditions with the WBGT. However, if there are reports of the symptoms of heat-related disorders, then the analysis of little risk should be reconsidered.
- If the measured WBGT is greater than the values in the following two tables, institute heat stress controls, including the associated work-rest cycle, and perform physiological monitoring as described in *S3AM-113-PR1 Heat Stress*.
- Because of the physiological strain associated with very heavy work among less fit workers regardless of WBGT, values are not provided in Table 1 or 2 for continuous work or 75% work – 25% rest regimen. Physiological monitoring should always be implemented under these conditions.

1.2.2 Table 1, the Non-CPC Activities WBGT Chart, is intended for use where personnel are not utilizing Chemical Protective Clothing (CPC). Where workers are required to utilize CPC, Table 2, the CPC Activities WBGT Chart, will be used.

1.2.3 WBGT readings are compared directly with the values of the applicable WBGT Chart for the applicable work rate (where light work corresponds to minimal physical activity besides standing/watching; very heavy work corresponds to significant, continuous physical labor) to determine the work-rest frequency.

Table 1. Non-CPC Activities WBGT Chart

Work-Rest Regimen	WBGT			
	Light Work	Moderate Work	Heavy Work	Very Heavy Work
Continuous Work	85°F (29.4°C)	81°F (27.2°C)	78°F (25.6°C)	
75% Work – 25% Rest	86°F (30°C)	83°F (28.3°C)	81°F (27.2°C)	
50% Work – 50% Rest	88°F (31.1°C)	85°F (29.4°C)	83°F (28.3°C)	81°F (27.2°C)
25% Work – 75% Rest	90°F (32.2°C)	87°F (30.6°C)	86°F (30°C)	85°F (29.4°C)

Modified from ACGIH's 2014 *Threshold Limit Values for Chemical Substances and Physical Agents*, for acclimatized workers.

Table 2. CPC Activities WBGT Chart

Work-Rest Regimen	WBGT			
	Light Work	Moderate Work	Heavy Work	Very Heavy Work
Continuous Work	74°F (23.3°C)	70°F (21.1°C)	67°F (19.4°C)	
75% Work – 25% Rest	75°F (23.9°C)	72°F (22.2°C)	70°F (21.1°C)	
50% Work – 50% Rest	77°F (25°C)	74°F (23.3°C)	72°F (22.2°C)	70°F (21.1°C)
25% Work – 75% Rest	79°F (26.1°C)	76°F (24.4°C)	75°F (23.9°C)	74°F (23.3°C)

Modified from ACGIH's 2014 *Threshold Limit Values for Chemical Substances and Physical Agents*, for acclimatized workers.

1.3 Humidex Based Work-Rest Schedule Guidelines

1.3.1 The Humidex method is a simplified way of protecting workers from heat stress. It is an equivalent scale intended to express the combined effects of warm temperatures and humidity. Humidex is used as a measure of perceived heat that results from the combined effect of excessive humidity and high temperature.

1.3.2 This method requires only a local air temperature and relative humidity value. Monitoring shall continue throughout the day for changing conditions. Identify a representative location where measurements can be taken. Measurements should be recorded at least hourly when ambient temperatures and 90°F (32°C) for personnel wearing normal permeable work clothes.

- Step 1: On the Humidex table below, look up the temperature on the left (Celsius is located below RH>) and the relative humidity (RH) on the top. Determine the Humidex value.

F	RH>	100%	95%	90%	85%	80%	75%	70%	65%	60%	55%	50%	45%	40%	35%	30%	25%	20%
108	42													55	52	50	48	46
106	41												55	53	51	48	46	44
104	40											55	53	51	49	47	45	43
102	39										55	53	51	49	47	45	43	41
100	38	Step 1 - Determine HUMIDEX VALUE								54	53	51	49	47	45	43	42	40
99	37								54	52	51	49	47	45	44	42	40	38
97	36					57	55	53	52	50	49	47	45	44	42	40	39	37
95	35				56	54	53	51	50	48	47	45	43	42	40	39	37	36
93	34		56	55	53	52	51	49	48	46	45	43	42	40	39	37	36	34
91	33	55	54	53	51	50	48	47	46	44	43	41	40	39	37	36	34	33
90	32	53	51	50	49	48	46	45	44	42	41	40	38	37	36	34	33	32
88	31	50	49	48	47	45	44	43	42	40	39	38	37	35	34	33	32	30
86	30	48	47	46	44	43	42	41	40	39	37	36	35	34	33	31	30	29
84	29	46	45	43	42	41	40	39	38	37	36	35	33	32	31	30	29	28
82	28	43	42	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27
81	27	41	40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25
79	26	39	38	37	36	35	34	33	33	32	31	30	29	28	27	26	25	24
77	25	37	36	35	34	33	33	32	31	30	29	28	27	26	26	25	24	23

- **Step 2:** Place the Humidex value into the Heat Index Adjustment Table below. Determine the applicable adjustments based on the given work or task.

Heat Index Adjustment Table

Step 2 - Risk Factor Adjustment		
Write in value	What is the HUMIDEX value from the table in Step 1?	
Radiant Heat		Adjustment
	Working in full-sun	Add 2
	Working in ½ or partial sun or weak radiant heat source	Add 1
	Working near very hot equipment surfaces or processes	Add 2
Clothing: Pick One Only		
	Short/long sleeve shirt and pants – no overalls	None
	Overalls (e.g., Nomex suit)	Add 3
	Double layer overalls	Add 5
Stop	Impermeable clothing	Perform Physiological Monitoring
Acclimatization		
	Have been working at least 5 of last 7 days in heat stress conditions.	Subtract 4
Work Load & Miscellaneous Factors		
	Light Work (Standing, slow walking)	Subtract 2
	Medium Work (Walking about with moderate lifting or pushing)	None
	Heavy Work (Shoveling dry sand, carrying 50 lbs)	Add 2
	Very Heavy Work (Shoveling wet sand)	Add 3
TOTAL – Compare to Heat Index Response Plan		

- **Step 3:** Compare adjusted Heat Index Total to the Heat Index Response Plan table to obtain guidance for work/rest.

Heat Index Response Plan*

TOTAL NUMBER	Final Step 3 - HEAT INDEX Response
30-33	alert & information & water
34-37	warning & increase water
38-39	75% work - 25% rest & monitor for signs of heat stress
40-41	50% work - 50% rest & monitor for signs of heat stress
42-44	25% work - 75% rest & monitor for signs of heat stress
45+	Perform Physiological Monitoring

* Percent work and rest/recovery are on a per hour basis. Adjustments and subsequent work/rest cycle recommendations are rough guidelines only. No heat stress prediction scheme can replace monitoring of symptoms or a health care practitioners advice in the case of individuals with special medical conditions or predisposing circumstances for heat related illness. Always pay attention to the way workers are feeling. Recuperate if fatigued, nauseated, dizzy or thirsty,

1.4 Adjusted Temperature Work-Rest Schedule Guidelines:

This method can be utilized where WBGT data is not available, and requires only that the ambient temperature be known. Adjustment factors are applied to the ambient temperature to account for departures from ideal conditions (sunny conditions, light winds, moderate humidity and a fully acclimated work force). The adjustments will be made by addition or subtraction to the ambient temperature reading, or changes in table position, as indicated in Table 3. Adjustments are independent and cumulative, all applicable adjustments should be applied. The result is the Adjusted Temperature, which can be compared with the values in Table 4 for the applicable work rate (where light work corresponds to minimal physical activity besides standing/watching; very heavy work corresponds to significant, continuous physical labor) to determine the work-rest schedule.

Table 3. Temperature Adjustment Factors

Time of Day	
Before daily temperature peak ¹	+2°F (+1.11°C)
10 am – 2 pm (peak sunshine)	+2°F (+1.11°C)
Sunshine	
No clouds	+1°F (+0.56°C)
Partly Cloudy (3/8 – 5/8 cloud cover)	-3°F (-1.67°C)
Mostly Cloudy (5/8 – 7/8 cloud cover)	-5°F (-2.78°C)
Cloudy (>7/8 cloud cover)	-7°F (-3.89°C)
Indoor or nighttime work	-7°F (-3.89°C)
Wind (<i>ignore if indoors or wearing CPC</i>)	
Gusts greater than 5 miles per hour at least once per minute	-1°F (-0.56°C)
Gusts greater than 10 miles per hour at least once per minute	+2°F (+1.11°C)
Sustained greater than 5 miles per hour	-3°F (-1.67°C)
Sustained greater than 10 miles per hour	-5°F (-2.78°C)
Humidity (<i>ignore if wearing CPC</i>)	
Relative Humidity greater than 90%	+5°F (+2.78°C)
Relative Humidity greater than 80%	+2°F (+1.11°C)
Relative Humidity less than 50%	-4°F (-2.23°C)
Chemical Protective Clothing (CPC)	
Modified Level D (coveralls, no respirator)	+5°F (+2.78°C)
Level C (coveralls w/o hood, full-face respirator)	+8°F (+4.45°C)
Level C (coveralls with hood, full-face respirator)	+10°F (+5°C)
Level B with airline system (hooded chemical resistant clothing)	+9°F (+5.56°C)
Level B with SCBA (hooded chemical resistant clothing)	+9°F (+5.56°C) and right one column ²
Level A (totally encapsulating chemical protective suit)	+14°F (+7.78°C) and right one column
Other	Specified in the HASP
Miscellaneous	
Unacclimated work force	+5°F (+2.78°C)
Partially acclimated work force	+2°F (+1.11°C)
Working in shade	-3°F (-1.67°C)
Breaks taken in air conditioned space	-3°F (-1.67°C)

**For complete descriptions of Level A through D Protective Clothing refer to
Unites States 29 CFR 1910.120 Appendix B**

¹ This adjustment accounts for temperature rise during the day. If the temperature has already reached its daytime peak it can be ignored.

² Locate the proper column based on work rate, then move one column to the right (next higher work rate) before locating the corresponding adjusted temperature.

Table 4. Work-Rest Schedule Based on Adjusted Temperature

Work-Rest Regimen	Adjusted Temperature			
	Light Work	Moderate Work	Heavy Work	Very Heavy Work
No specified requirements	< 80°F (26.67°C)	< 75 (23.88°C)	< 70 (21.11°C)	< 65 (18.33°C)
15 minute break every 90 minutes of work	80°F – 90°F (26.67°C) - (32.22°C)	75 – 85 (23.88°C) - (29.44°C)	70 – 80 (21.11°C) - (26.67°C)	65 – 75 (18.33°C) - (23.88°C)
15 minute break every 60 minutes of work	>90 – 100 (32.22°C) - (37.77°C)	> 85 – 95 (29.44°C) - (35°C)	>80 – 85 (26.67°C) - (29.44°C)	>75 – 80 (23.88°C) - (26.67°C)
15 minute break every 45 minutes of work	>100 – 110 (37.77°C) - (43.33°C)	>95 – 100 (35°C) - (37.77°C)	>85 – 90 (29.44°C) - (32.22°C)	>80 – 85 (26.67°C) - (29.44°C)
15 minute break every 30 minutes of work	>110 – 115 (43.33°C) - (46.11°C)	>100 – 105 (37.77°C) - (40.55°C)	>90 – 95 (32.22°C) - (35°C)	>85 – 90 (29.44°C) - (32.22°C)
15 minute break every 15 minutes of work	>115 – 120 (46.11°C) - (48.88°C)	>105 – 110 (40.55°C) - (43.33°C)	>95 -100 (35°C) - (37.77°C)	>90 – 95 (32.22°C) - (35°C)
Stop Work	>120 (48.88°C)	>110 (43.33°C)	>100 (37.77°C)	>95 (35°C)

Note: Time spent performing decontamination or donning/doffing CPC should not be included in calculating work or break time lengths.

Work-rest schedules and water provisioning may be documented using logs such as *S3AM-113-FM2 Daily Heat Illness Prevention Log*.

Heat Stress – Symptoms & Treatment

S3AM-113-ATT2

1.0 Heat Illness Symptoms

1.1 The following are four stages of heat-related illness:

1.1.1 Heat Rash

Heat rash (prickly heat) may result from continuous exposure to heat or humid air. It appears as red papules (elevated skin lesion), usually in areas where the clothing is restrictive, and gives rise to a prickly sensation, particularly as sweating increases. It occurs in skin that is persistently wetted by un-evaporated sweat. The papules may become infected unless treated.

1.1.2 Heat Cramps

Heat cramps are painful muscle cramps caused by heavy sweating and inadequate electrolyte replacement due to over-exertion in extreme heat. Symptoms include:

- Muscle spasms; and
- Pain in the hands, feet, and abdomen.

1.1.3 Heat Exhaustion

Heat exhaustion is the next stage. Heat exhaustion occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Symptoms include:

- Cool, moist, pale, flushed or red skin;
- Heavy sweating;
- Headache;
- Nausea or vomiting;
- Dizziness;
- Exhaustion;
- Mood changes (irritable, or confused/can't think straight), and
- Fainting

The key here is that the victim is still sweating, so the cooling system is still working; it's just under severe stress. The body core temperature may be elevated, but not higher than 104°F (40°C). It is important to recognize and treat these symptoms as soon as possible, as the transition from heat exhaustion to the very hazardous heat stroke can be quite rapid.

1.1.4 Heat Stroke

Heat exhaustion can sometimes lead to heat stroke, the most serious form of heat stress, which can be fatal and requires emergency treatment. Heat stroke happens when body temperature regulation fails and body temperature continues to rise to critical levels, often to 105 degrees Fahrenheit (°F) (40.5 degrees Celsius [°C]) or higher. Immediate action must be taken to cool the body before serious injury and death occurs. Competent medical help must be obtained. Symptoms of heat stroke:

- Vomiting;
- Decreased alertness level or complete loss of consciousness;
- Slurred speech;
- High body temperature (sometimes as high as 105°F [40.5°C]);
- Red, hot, usually dry skin;
- Lack of or reduced perspiration;
- Skin may still be moist or the victim may stop sweating and the skin may be red, hot, and dry;

- Rapid, weak pulse or rapid, strong pulse;
- Rapid, shallow breathing;
- Nausea;
- Dizziness and confusion; and
- Coma.

2.0 Recommended Treatment for Heat Stress-related Illnesses

2.1 Heat Rash

2.1.1 Treatment for heat rash includes:

- Shower after work, dry off thoroughly, and put on clean, dry underwear and clothes;
- Try to stay in a cool place after work;
- If, in spite of this, you develop heat rash, contact WorkCare.

2.2 Heat Cramps

2.2.1 Treatment for heat cramps includes:

- Gently stretch the cramped muscle and hold the stretch for about 20 seconds, then gently massage the muscle. Repeat these steps if necessary;
- Take more frequent breaks and drink more water;
- Move victim to a cool place;
- Administer drinks of cool water;
- Apply manual pressure to cramped muscles;
- Once spasms disappear, you may return to work;
- Seek medical attention if symptoms are not alleviated or if more serious problems are indicated.

2.3 Heat Exhaustion

2.3.1 Treatment of heat exhaustion includes:

- Get out of the sun to a cool location and drink cool water, a little at a time;
- Remove or loosen tight clothing and elevate the feet;
- If you are nauseated or dizzy, lie down;
- Move the victim to a cool place, administer drinks of cool water and fan to cool;
- Seek medical attention immediately.


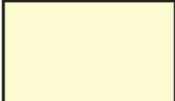




2.4 Heat Stroke

2.4.1 Treatment of heat stroke, or if a person's temperature exceeds 102°F (38.9 °C) includes:

- Call for immediate medical help and then try to lower the temperature as quickly as possible:
 - Apply cool (not cold) water the person's whole body, then fan the person;
 - Wrap in wet sheet;
 - If available, use cold packs under arms, neck, and ankles;
 - Body temperature is measured frequently, often constantly. To avoid overcooling, cooling is stopped when the body temperature is reduced to about 102°F (38°C);
- Do not give aspirin or acetaminophen to reduce the temperature;
- Treat as a true medical emergency. Seek medical help immediately;
- Protect from injury during convulsion;
- Ensure that the person's airway is open;
- Transfer to a medical facility immediately.

GUIDANCE TOOL FOR MONITORING DEHYDRATION

URINE COLORATION CHART

					
1	2	3	4	5	6
Target		Dehydration		Severe Dehydration	
CONTINUE DRINKING WATER TO MAINTAIN CURRENT HYDRATION LEVELS.		INCREASE WATER CONSUMPTION TO IMPROVE HYDRATION LEVELS, INCREASE BREAKS FREQUENCY, TAKE BREAKS IN A COOL SHADED AREA.		STOP WORK! FIND A SHADED AREA AND BEGIN TO DRINK COOL TO ROOM TEMPERATURE WATER SLOWLY AND STEADILY.	

PREVENTING DEHYDRATION

- Start hydrating at least 3 days prior to working in high heat conditions
- Always bring enough water to maintain hydration. CalOSHA requires consuming 1 quart per hour of your work shift - more may be needed

Note: This information is guidance only and should not supersede the recommendation or instruction of a personal physician or medical professional. Contact your physician or medical professional if you have a personal medical condition or take medication for a personal condition which may be adversely affected by dehydration. Urine color can be affected by medications, vitamins and or other personal health conditions.

Americas

Heat Stress Monitoring Log

S3AM-113-FM1

The purpose of this form is to monitor employees for heat illness when applicable. It is the responsibility of the Foreman or Supervisor-in-Charge to ensure that each person completes the required information.

Project Name:			Foreman/Supervisor:						Work/Rest Schedule¹: IN (min) OUT (min)							
Date:	Water Provided¹		Acclimated²		Initial Vitals³	Vital Signs and Time In/Out³			Celcius <input type="checkbox"/> / Farenheit <input type="checkbox"/> (select one)							
Employee Name	Yes	No	Yes	No	Vitals	In (P ₁)	Out (P ₁)	Vitals	In (P ₁)	Out (P ₁)	Vitals	In (P ₁)	Out (P ₁)	Vitals	In (P ₁)	Out (P ₁)
					P			P			P			P		
					BP			BP			BP			BP		
					Temp			Temp			Temp			Temp		
					P			P			P			P		
					BP			BP			BP			BP		
					Temp			Temp			Temp			Temp		
					P			P			P			P		
					BP			BP			BP			BP		
					Temp			Temp			Temp			Temp		
					P			P			P			P		
					BP			BP			BP			BP		
					Temp			Temp			Temp			Temp		
					P			P			P			P		
					BP			BP			BP			BP		
					Temp			Temp			Temp			Temp		
					P			P			P			P		
					BP			BP			BP			BP		
					Temp			Temp			Temp			Temp		

- 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.
- 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 "Min In" by 50 percent for that Employee until the 5 - 7 -day period is reached.
- "Vitals" refers to Employee vital signs (e.g., pulse [P], blood pressure [BP], body temperature [Temp], etc.). Initial vitals must be taken and recorded before the start of work and at each break period, or as specified in the Heat Stress Exposure Control Plan.

Heat Stress Monitoring Log (S3AM-113-FM1)

Revision 1 December 15, 2016

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*FOR COMPLETION BY SSO FORECASTED TEMP + ADJUSTMENT FACTORS (SEE TABLE BELOW) = ADJUSTED TEMP

Morning High Calculation: _____ + _____ = _____

Afternoon High Calculation: _____ + _____ = _____

Time of Day	
Before daily temperature peak ¹	+2°F (+1.11°C)
10 am – 2 pm (peak sunshine)	+2°F (+1.11°C)
Sunshine	
No clouds	+1°F (+0.56°C)
Partly Cloudy (3/8 – 5/8 cloud cover)	-3°F (-1.67°C)
Mostly Cloudy (5/8 – 7/8 cloud cover)	-5°F (-2.78°C)
Cloudy (>7/8 cloud cover)	-7°F (-3.89°C)
Indoor or nighttime work	-7°F (-3.89°C)
Wind (ignore if indoors or wearing CPC)	
Gusts greater than 5 miles per hour at least once per minute	-1°F (-0.56°C)
Gusts greater than 10 miles per hour at least once per minute	+2°F (+1.11°C)
Sustained greater than 5 miles per hour	-3°F (-1.67°C)
Sustained greater than 10 miles per hour	-5°F (-2.78°C)
Humidity (ignore if wearing CPC)	
Relative Humidity greater than 90%	+5°F (+2.78°C)
Relative Humidity greater than 80%	+2°F (+1.11°C)
Relative Humidity less than 50%	-4°F (-2.23°C)
Chemical Protective Clothing (CPC) ²	
Modified Level D (coveralls, no respirator)	+5°F (+2.78°C)
Miscellaneous	
Unacclimated work force	+5°F (+2.78°C)
Partially acclimated work force	+2°F (+1.11°C)
Working in shade	-3°F (-1.67°C)
Breaks taken in air conditioned space	-3°F (-1.67°C)

°F = degrees Fahrenheit °C = degrees Celsius

¹ This adjustment accounts for temperature rise during the day. If the temperature has already reached its daytime peak, it can be ignored.

² Refer to S3AM-113-ATT1 for addition Chemical Protective Clothing (Type C – A)

****Attach copy of receipts for water purchases**

Apply the adjusted temperature to the below table given the anticipated Workload to determine the appropriate Work-Rest Regimen code.

Code	Work-Rest Regimen	Adjusted Temperature			
		Light Work	Moderate Work	Heavy Work	Very Heavy Work
0	No specified requirements	< 80°F (26.67°C)	< 75°F (23.88°C)	< 70°F (21.11°C)	< 65°F (18.33°C)
1	15 minute break every 90 minutes of work	80°F – 90°F (26.67 - 32.22°C)	75 – 85°F (23.88 - 29.44°C)	70 – 80°F (21.11 - 26.67°C)	65 – 75°F (18.33 - 23.88°C)
2	15 minute break every 60 minutes of work	>90 – 100°F (32.22 - 37.77°C)	> 85 – 95°F (29.44 - 35°C)	>80 – 85°F (26.67 - 29.44°C)	>75 – 80°F (23.88 - 26.67°C)
3	15 minute break every 45 minutes of work	>100 – 110°F (37.77 - 43.33°C)	>95 – 100°F (35 - 37.77°C)	>85 – 90°F (29.44 - 32.22°C)	>80 – 85°F (26.67 - 29.44°C)
4	15 minute break every 30 minutes of work	>110 – 115°F (43.33 - 46.11°C)	>100 – 105°F (37.77 – 40.55°C)	>90 – 95°F (32.22 - 35°C)	>85 – 90°F (29.44 - 32.22°C)
5	15 minute break every 15 minutes of work	>115 – 120°F (46.11 - 48.88°C)	>105 – 110°F (40.55 - 43.33°C)	>95 -100°F (35 - 37.77°C)	>90 – 95°F (32.22 - 35°C)
SW	Stop Work	>120°F (48.88°C)	>110°F (43.33°C)	>100°F (37.77°C)	>95°F (35°C)

Hazardous Materials Communication

S3AM-115-PR1

1.0 Purpose and Scope

- 1.1 Provides a Hazard Communication Program so that AECOM employees are informed of the hazards of the chemicals to which they may be exposed in the course of their work by way of container labeling and other forms of warning, safety data sheets (SDS), and employee training.
- 1.2 This procedure applies to all AECOM Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.
- 1.3 The program applies to the use of any hazardous substances which are known to be present in the workplace in such a manner that employees may be exposed under normal conditions of use or in a foreseeable emergency.
- 1.4 The program does not apply to general consumer products, for example, cleaners, printer toner, white out, etc.

2.0 Terms and Definitions

- 2.1 **Acute Effect** – An adverse effect on the human body with immediate onset of symptoms.
- 2.2 **Article** – A manufactured item: (1) which is formed to a specific shape or design during manufacture; (2) which has end use function(s) dependent in whole or in part upon its shape or design during end use; and, (3) which does not release or otherwise result in exposure to, a hazardous chemical, under normal conditions of use.
- 2.3 **Carcinogen** – Those chemicals appearing in any of the following reference sources are established as carcinogens for hazard communication purposes:
 - National Toxicology Program (NTP) Annual Report on Carcinogens.
 - International Agency for Research on Cancer (IARC) Monographs, Volumes 1-34. Note: The Registry of Toxic Effects of Chemical Substances published by NIOSH indicates whether a substance has been found by NTP or IARC to be a potential carcinogen.
- 2.4 **Chemical Name** – The scientific designation of a substance in accordance with the nomenclature system developed by the International Union of Pure and Applied Chemistry or the system developed by the Chemical Abstracts Service.
- 2.5 **Chronic Effect** – An adverse effect on the human body with symptoms which develop slowly over a long period of time or which frequently recur.
- 2.6 **Combustible Liquid** – Any liquid having a flash point at or above 100°F (37.8°C) but below 200°F (93.3°C), except any mixture having components with flash points of 200°F (93.3°C), or higher, the total volume of which makes up 99% or more of the total volume of the mixture.
- 2.7 **Common Name** – Any designation or identification such as code name, code number, trade name or brand name used to identify a substance other than by its chemical name.
- 2.8 **Container** – Any bag, barrel, bottle, box, can, cylinder, drum, reaction vessel, storage tank or the like that contains a hazardous chemical. For purposes of this procedure, pipes or piping systems, and engines, fuel tanks, or other operating systems in a vehicle are not considered to be containers.
- 2.9 **Location** – Any separate and distinct AECOM office, laboratory or other company facility.
- 2.10 **Exposure** – Any situation arising from work operations where an employee may ingest, inhale, absorb through the skin or eyes or otherwise come into contact with a hazardous substance.
- 2.11 **Flammable** – A substance that falls into one of the following categories:

- 2.11.1 **Flammable Aerosol** – An aerosol that when tested by the method described in 16 CFR 1500.45, yields a flame projection exceeding 18 inches at full valve opening or flashback (a flame extending back to the valve) at any degree of valve opening.
- 2.11.2 **Flammable Gas** – A gas that at ambient temperature and pressure:
- Forms a flammable mixture with air at a concentration of 13% of volume or less; or
 - Forms a range of flammable mixtures with air wider than 12% by volume, regardless of the lower limit.
- 2.11.3 **Flammable Liquid** – Any liquid having a flash point below 100°F (37.8°C), except any mixture having components with flash points of 100°F (37.8°C) or higher, the total of which make up 99% or more of the total volume of the mixture.
- 2.11.4 **Flammable Solid** – A solid, including a powdered, granular or pasty mixture of a substance that is liable to cause fire through friction, absorption of moisture, spontaneous chemical change or retained heat from manufacturing or processing or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious hazard.
- Flammable Solids do not include blasting agents or explosives as defined in 8 CCR 5237(a).
- 2.12 **Flash Point** – Minimum temperature of a liquid at which it gives off sufficient vapors to form an ignitable mixture with the air near the surface of the liquid or within the container used.
- 2.13 **GHS** – The Globally Harmonized System of Classification and Labelling of Chemicals developed by the United Nations with the goal of an international system to define and classify the hazards of chemical products, and communicate health and safety information on labels and safety data sheets.
- 2.14 **Hazardous Chemical** – Those chemicals appearing in any of the following reference sources are established as hazardous chemicals for hazard communication purposes.
- 29 CFR Part 1910, Subpart Z, Toxic and Hazardous Substances, OSHA.
 - Hazardous Products Act, R.C.S. 1985, c. H-3, section 2, Canada.
 - For operations within the state of California, the list of hazardous substances prepared by the California Director of Industrial Relations pursuant to Labor Code Section 6382. The concentrations and footnotes, which are applicable to the list, shall be understood to modify the same substance on all other source lists or hazard determinations set forth in § 8 CCR 5194(d)(3)(B) and (d)(5)(D).
- 2.15 **Hazardous Substance** – A hazardous chemical or carcinogen, or a product or mixture containing a hazardous chemical or carcinogen provided that:
- 2.15.1 The hazardous chemical is 1% or more of the mixture or product or 2% if the hazardous chemical exists as an impurity in the mixture; or
- 2.15.2 The carcinogen is 0.1% or more of the mixture or product;
- 2.15.3 Manufacturers, importers and distributors will be relied upon to perform the appropriate hazard determination for the substances they produce or sell.
- 2.15.4 The following materials are not covered by the Hazard Communication Standard:
- Any hazardous waste as defined by the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended (42 USC 6901 et seq.) when subject to regulations issued under that act by the Environmental Protection Agency.
 - Tobacco or tobacco products;
 - Wood or wood products. Note: Wood dust is not exempt since the hazards of wood dust are not “self-evident” as are the hazards of wood or wood products;
 - Consumer products (including pens, pencils, adhesive tape) used in the work place under typical consumer usage;
 - Articles (i.e. plastic chairs);

- Foods, drugs, or cosmetics intended for personal consumption by employees while in the work place;
- Foods, drugs, cosmetics in retail store packaged for retail sale; and
- Any drug in solid form used for direct administration to the patient (i.e., tablets or pills).

Hazardous substance shall be considered the equivalent term to 'controlled substance'.

- 2.16 **Hazardous Substance Inventory (HSI) / WHMIS Log** – A listing of all chemicals stored or used at an office or project site. Note that the list may be imbedded in a project Health and Safety Plan.
- 2.17 **Immediate Use** – Means that the hazardous chemical will be under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.
- 2.18 **National Fire Protection Association (NFPA)** – The NFPA is a trade association that issues standards and codes concerning risks associated with fire. A system of categories has been established by NFPA standard 704; colors and numbers, to provide basic hazard information concerning hazardous materials. It enables firefighters and other emergency personnel to easily decide whether or not to evacuate an area or proceed with emergency control operations. The three principal categories of identification are Health, Flammability and Instability. A numerical range of "0 to 4" indicates the severity of the hazard. A "4" indicates the most severe and a "0" indicates a minimal hazard. Refer to *S3AM-115-ATT1 Pictograms & Sample Labels* for an example.
- 2.19 **Mixture** – Any solution or intimate admixture of two or more substances which do not react chemically with each other.
- 2.20 **Reactivity** – A measure of the tendency of a substance to undergo chemical reaction with the release of energy.
- 2.21 **SDS** – A Safety Data Sheet prepared pursuant to state and federal regulations, OSHA Form 174 and Canada regulations (Hazardous Products Act & Regulation).
- 2.22 **SDS Administrator** – The individual or group designated by the Office Manager (Operations) or Project Manager to maintain the location-specific inventory list or log and the SDS binder required if that location uses or stores hazardous substances.
- 2.23 **Solubility** – The ability of substance to blend and mix uniformly with another.
- 2.24 **Specific Gravity (density)** – Ratio of the weight of a substance to the weight of the same volume of another substance. As used in this directive, specific gravity or density refers to the weight of substance as compared to the weight of an equal volume of water.
- 2.25 **Vapor Density** – The weight of a vapor-air mixture resulting from the vaporization of a volatile liquid at equilibrium temperature and pressure conditions, as compared with the weight of an equal volume of air under the same conditions.
- 2.26 **WHMIS** – The Workplace Hazardous Materials Information System (WHMIS) is Canada's national hazard communication standard. The key elements of the system are cautionary labeling of containers of WHMIS "controlled products", the provision of safety data sheets (SDSs) and worker education and training programs.

3.0 References

- 3.1 Additional definitions can be found in the Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Hazardous Material Regulations (HMR), the Transportation of Dangerous Goods (TDG) Regulations, and the International Air Transport Association (IATA) Dangerous Goods Regulation (DGR).
- 3.2 S3AM-003-PR1 SH&E Training
- 3.3 S3AM-117-PR1 Hazardous Waste Operations
- 3.4 S3AM-208-PR1 Personal Protective Equipment

3.5 S3AM-209-PR1 Risk Assessment & Management

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 SH&E Manager / SH&E Department

- Audit their regional offices to confirm that they maintain a location-specific Hazardous Substance Inventory (HSI).
- Audit their regional offices to confirm that if a location-specific HSI is required, that current SDSs are available for each substance listed on the HSI.
- Provide interpretation of SDSs and hazard information for GHS labels/WHMIS labels/NFPA labels and other information to assist in training employees.
- Provide hazard communication training to AECOM employees and file documentation related to this training (e.g. trainer name, date trained, brief description of training, etc.).
- Review SDS for adequacy of completion to meet the OSHA and Canadian standard and returning them to supplier, if necessary.

4.1.2 Manager / Site Safety Officer (SSO) / Supervisor

- Have an operations-specific, written hazard communication program which at least describes how the requirements of this Procedure and the US OSHA and Canadian Hazard Communication requirements for labels and other forms of warning, safety data sheets, and employee information and training will be met.
- Appoint an SDS administrator for their location if they store or use hazardous substances.
- Confirm, if required, that the SDS Administrator maintains an HSI for their location.
- Confirm that a copy of this Procedure and the site-specific SDS are available to all employees (and/or their designated representative). Employees shall be instructed in the location of this Procedure and the SDSs.
- Confirm that all employees (including new employees) under their supervision have received the appropriate training required by this procedure prior to assigning employees to tasks involving the use of, or potential exposure to, hazardous substances.
- Notify employees of hazardous substances covered by this procedure that are used in their work area.
- Determine the potential fire, toxic, or reactivity hazards which are likely to be encountered in the handling or utilization of a hazardous substance and will communicate this information to their affected employees, before any are permitted to work with it.
- Confirm that a current SDS (is replaced as new versions are issued) is available for each hazardous substance used, or potentially encountered, in the work areas or on the projects that are under their supervision.
- Confirm hazardous substances are properly labelled.
- Notify subcontractors (working for AECOM) of any hazardous substances that are used or stored by AECOM to which the subcontractor's employees may be exposed.
- Notify clients or property owner/operators of chemicals brought onto their property by AECOM or AECOM's subcontractors.
- Request SDSs from all subcontractor organization for the relevant chemicals they bring onto an AECOM controlled site.
- Access or obtain, and maintain copies of SDS from:

- The product manufacturer or supplier;
- All AECOM subcontractors bringing chemicals onto the project site; and
- The client, for all of the client's chemicals to which AECOM or AECOM subcontract employees are potentially exposed.

4.1.3 **Employee**

- Confirm that they have received appropriate hazard communication training prior to working with materials that fall under the procedure.
- Only work with materials for which they have been instructed on how to find an SDS and how to work with that material safely.
- Utilize the appropriate Personal Protective Equipment (PPE) and spill containment materials as per the SDS.
- Provide a copy of all SDSs received to the SDS Administrator at their facility.
- Verify that an SDS is available in their work area for each hazardous substance that they use.

4.2 **General Procedure**

- 4.2.1 Confirm that containers of hazardous substances that they use are properly labelled. All employees have a right to, and should, know the properties and potential hazards of substances to which they may be exposed.
- 4.2.2 Should AECOM assign employees that do not read and speak English to tasks with chemical exposures, communications will be provided in the language understood by that employee.

4.3 **Employee Information and Training**

- 4.3.1 Training of employees on hazardous substances in their work area shall be conducted:
- At the time of their initial assignment;
 - Whenever a new hazardous substance is introduced into their work area; and
 - According to jurisdictional requirements (e.g., GHS, WHMIS, etc.).
- 4.3.2 As a minimum, the training requirements apply to employees in the following job categories:
- All employees who perform field work that involves the use of, shipping / receiving of, or potential exposure to, hazardous substances covered under the OSHA Hazard Communication Standard and WHMIS; and
 - Laboratory Employees.
- 4.3.3 The Initial Training will provide instruction in the following:
- Methods and observations that may be used to detect the presence or release of a hazardous substance in the work area (such as personal monitoring, visual appearance or odor of hazardous substances being released, etc.);
 - The physical and health hazards of substances in the work area and measures and procedures AECOM has implemented to protect employees; and
 - The details of this hazard communication program, including an explanation of the labelling system and the SDS, and how he/she can obtain and use appropriate hazard information;
 - Any operations in their work area in which hazardous substances are present;
 - Location and availability of this written hazard communications program (this procedure);
 - Their right to personally receive information regarding hazardous substances to which they may be exposed;

- Their right to have their physician receive information regarding hazardous substances to which they may be exposed; and
- Any relevant jurisdictional regulation, such as an employee's right against discharge or other discrimination (in California) due to the employee's exercise of rights afforded pursuant to provisions of the California Hazardous Substances Information and Training Act.

4.3.4 Periodic Training and Training for Non-Routine Tasks

Additional training will be provided to employees who have received initial training whenever:

- A new hazardous substance is introduced into their work area;
- A new or significantly increased risk has been identified related to an existing hazardous substance (e.g. as identified in an updated SDS); and
- Non-routine tasks are performed, which will potentially result in exposure to hazardous substances, or exposure under circumstances, which were not addressed during initial training.

Supervisors, in coordination with their SH&E Manager, shall provide such training through an explanation of the information on the contents of the SDS for that substance.

When training their employees, supervisors shall explain:

- Any health hazards associated with use of the substance or mixture;
- Proper precautions for handling;
- Necessary personal protective equipment or other safety precautions to prevent or minimize exposure; and
- Emergency procedures for spills, fire, disposal, and first aid.

For most projects involving field work, this periodic training requirement will be facilitated through the implementation of the site specific SH&E Plan that has been developed for the project.

4.3.5 Documentation of Initial and Periodic Training

- All training required shall be documented at the time it is performed by having the employee sign a copy of a training attendance sheet.

4.4 Hazardous Waste Exemption

- #### 4.4.1
- In the U.S., hazardous wastes are excluded from the state and federal Hazard Communication standards. AECOM employees who handle or are otherwise exposed to hazardous wastes are covered by the requirements of the Resource Conservation and Recovery Act (RCRA) and other local waste related laws and regulations and the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) standard at 29 CFR 1910.120 and *S3AM-117-PR1 Hazardous Waste Operations*.

4.5 Hazardous Substance Inventory and Chemical Usage

Establishment of a Specific Hazardous Substance Inventory (HSI) or WHMIS Log, as referenced or contained within the safe to work plan, refer *S3AM-209-PR1 Risk Assessment & Management*, shall include:

- #### 4.5.1
- If an AECOM location uses or stores additional hazardous substances, a location-specific HSI or WHMIS Log shall be maintained at that location.
- #### 4.5.2
- If it is determined that an office-specific HSI is needed, the Manager shall confirm that one is developed and maintained by someone appointed as the location's SDS Administrator.
- #### 4.5.3
- The HSI or WHMIS Log may be hard copy or managed through an electronic SDS management system.

- 4.5.4 The content of the HSI or WHMIS Log shall be updated as new hazardous substances are procured for, or removed from the location, and shall be verified by the SH&E Manager through regular inspections of the location.
- 4.5.5 In order to meet the 30-years-after-employment-termination record retention requirement, the office or project specific HSIs shall be managed as a permanent record.

Prior to using any chemical, a Task Hazard Analysis (THA) shall be completed by the employees assigned to use the chemical. The analysis will identify the hazards associated with the chemical (e.g. review the SDS to identify carcinogens or extremely hazardous chemicals), the tasks to be performed, and prescribe the Personal Protective Equipment (PPE) to be used, refer to *S3AM-208-PR1 Personal Protective Equipment*.

4.6 Safety Data Sheets (SDS)

4.6.1 Location-Specific SDS Inventory

- If it is determined that an AECOM location is required to maintain a location-specific inventory SDSs for the specific hazardous substances shall be maintained on file at that location.
- The SH&E Manager shall audit the local office or project for SDS request and maintenance and report deficiencies to the appropriate management level, as necessary, to confirm compliance with this procedure.

4.6.2 Field Project Sites and Client Facilities

- The Project Manager and/or the Site Safety Officer shall access or obtain, and maintain copies of SDS from:
 - The product manufacturer or supplier;
 - All AECOM subcontractors bringing chemicals onto the project site; and
 - The client, for all of the client's chemicals to which AECOM or AECOM subcontract employees are potentially exposed.

4.6.3 Employee Access to SDSs

SDSs should be maintained at the local location that uses that hazardous substance. Copies of this program and the SDS should be made available to the employee upon request to the office's SDS Administrator.

4.6.4 Field Access to SDSs

When hazardous substances are brought into the field, the user shall confirm that a copy of the SDS for that substance accompanies it and is available at the field location where it is to be used.

4.6.5 SDSs for AECOM Products

It is unlikely that AECOM activities would create a chemical for which a new SDS were needed. If such a chemical were created, the SH&E Department shall work with the appropriate operations groups to draft, review, and publish the new SDS.

4.6.6 Content of the SDS:

- Safety Data Sheets, previously referred to as Material Safety Data Sheets, will now require a 16-section format that is essentially the same as the ANSI standard for Hazardous Workplace Chemicals-Hazard Evaluation and Safety Data Sheets and Precautionary Labeling Preparation (ANSI Z400.1 & Z129.1 – 2010).
- Section 1, Identification includes product identifier; manufacturer or distributor name, address, phone number; emergency phone number; recommended use; restrictions on use.
- Section 2, Hazard(s) identification includes all information regarding the hazards of the chemical and the appropriate warning information associated with the hazards including classification, signal word, hazard statement, pictograms, and precautionary statement.

- Section 3, Composition/information on ingredients includes information on chemical ingredients; trade secret claims.
- Section 4, First-aid measures includes important symptoms/ effects, acute, delayed; required treatment.
- Section 5, Fire-fighting measures lists suitable extinguishing techniques, equipment; chemical hazards from fire.
- Section 6, Accidental release measures lists emergency procedures; protective equipment; proper methods of containment and cleanup.
- Section 7, Handling and storage lists precautions for safe handling and storage, including incompatibilities.
- Section 8, Exposure controls/personal protection lists OSHA's Permissible Exposure Limits (PELs); Threshold Limit Values (TLVs); appropriate engineering controls; personal protective equipment (PPE).
- Section 9, lists the physical and chemical properties of the hazardous substance.
- Section 10, Stability and reactivity lists chemical stability and possibility of hazardous reactions.
- Section 11, Toxicological information includes routes of exposure; related symptoms, acute and chronic effects; numerical measures of toxicity.
- Section 12, Ecological information
- Section 13, Disposal considerations
- Section 14, Transport information
- Section 15, Regulatory information
- Section 16, Other information, includes the date of preparation or last revision.

SDSs that do not contain this information shall be returned to the distributor or manufacturer to be updated.

4.6.7 Trade Secrets

Some hazardous substance suppliers may claim the information requested on SDSs is proprietary and not provide the information to AECOM.

When SDSs supplied to the SH&E Manager indicate that proprietary information has been withheld, the SH&E Manager will either obtain the necessary information to make a hazard assessment or reject the material for use within AECOM.

4.6.8 For Canadian operations, all relevant SDS shall be current (no more than 3 years old) and readily available (in French and English) for all hazardous materials.

4.7 Labeling

4.7.1 Containers of hazardous substances used or stored in each AECOM location shall be labeled, tagged or marked with the following information:

- Product name or Identifier;
- Hazard Pictogram;
- Signal Word;
- Physical, Health, Environmental Statements;
- Supplemental Information;
- Precautionary Measures and Pictograms;

- First Aid Statements;
- Name and Address of Company; and
- Telephone Number.

4.7.2 Refer to *S3AM-115-ATT1 Pictograms & Sample Labels*.

4.7.3 Labels on containers shall not be removed or defaced. Labels or other forms of warning shall be legible, in English and French (Canada), and prominently displayed on the container.

4.7.4 Formal and informal inspections shall include observing that hazardous materials are properly labeled.

4.7.5 Immediately replace lost or illegible labels provided the product can be conclusively identified. Any failure to have the appropriate labeling information on a container at any time, or illegible or missing labels will be cause to suspend use of the product until the product is conclusively identified and is properly labeled.

4.7.6 Carcinogen Labeling

Chemicals which have been indicated as positive or suspect carcinogens by either OSHA, ACGIH, the International Agency for Research on Cancer (IARC) (World Health Organization), or the National Toxicology Program (NTP) will be considered to be carcinogenic for purpose of the HCS.

4.7.7 Stationary Process Containers

If there is stationary process equipment within a work area (e.g., vessels, piping systems, etc.), signs, placards, pictograms, process sheets, batch tickets, operating procedures, or other such written materials may be used in lieu of fixed labels on the containers, as long as the alternative method conveys the appropriate hazard information. The written materials shall be readily accessible to the employees in the work area.

4.7.8 Portable Containers

Portable containers of hazardous substances need not be labelled when the substance is transferred from labelled containers and will be used immediately by the employee who performs the transfer, however the container shall still contain the product identifier (name). Immediate use means the container will remain in the employee's immediate possession and direct oversight until the container is fully emptied or contents are returned to a labelled container.

Containers of hazardous substances transferred from labelled containers and not intended for the immediate use of the employee performing the transfer shall be labelled with the chemical name and a hazard warning label meeting workplace label requirements in accordance with the OSHA Hazard Communication Standard or WHMIS (as applicable to the given jurisdiction).

4.8 Chemical Storage

4.8.1 Hazardous chemicals are to be stored in labeled containers with the lids securely closed using appropriate undamaged caps or lids. Confirm liners are in place if used.

4.8.2 Flammable and combustible materials shall be stored in fire impervious cabinets in designated stockroom areas. Chemicals shall be stored in compliance with instructions provided on their labels, SDS, or the manufacturer's specifications (e.g. compatibility with other substances, environmental conditions, etc.).

NOTE: Flammable gases or other compressed gases should not be stored in flammable material cabinets as these cabinets are not designed for containment of pressurized gases.

4.8.3 All hazardous chemicals shall be stored in a manner that prevents spillage and leakage from exposing people or the environment to the chemical.

4.8.4 Hazardous chemicals shall not be stored with foods or beverages. Food and beverages shall not be consumed in areas where hazardous chemicals are used or stored.

4.9 Chemical Use in Offices

4.9.1 In general, hazardous substances should not be taken into office areas, conference rooms, or break areas, contact the SH&E Manager for guidance if this general requirement is infeasible.

4.9.2 General exceptions to this rule are the following:

- Liquid paper;
- Toner;
- Cleaners;
- Isobutylene calibration gas; and
- pH calibration solutions for instruments.

4.9.3 Each office or location using or storing hazardous materials will develop a written office/ location-specific Hazard Communication/WHMIS Program.

4.9.4 If the local office decides to implement the requirements of the standard in any way that differs from this procedure, they shall verify the changes with the SH&E Manager, document the changes, and communicate the differences to all affected employees.

4.10 Canada-specific

4.10.1 Consumer products are exempt from supplier labels and SDS requirements. Some cleaning solvents may be packaged as consumer products and these shall be labeled in accordance with the Consumer Product Act requirements.

4.10.2 In addition to the labelling of storage containers in the workplace, the contents of process piping (including valves), process vessels and reaction vessels are required to be identified through the use of colour coding, labels, placards or other modes of identifications that shall be communicated to workers through training programs. It is important for employees to be aware of and understand Client labelling requirements for these types of process systems.

5.0 Records

5.1 HSI or WHMIS Logs shall be retained in project or office files for a minimum of 30 years or according to jurisdictional requirements.

5.2 Training documentation shall be retained in accordance with *S3AM-003-PR SH&E Training*.

6.0 Attachments










6.1 S3AM-115-ATT1 Pictograms & Sample Labels

Americas

Pictograms & Sample Labels

S3AM-115-ATT1

1.0 Hazard Pictograms

<p>Health Hazard</p>  <ul style="list-style-type: none"> ▪ Carcinogen ▪ Mutagenicity ▪ Reproductive Toxicity ▪ Respiratory Sensitizer ▪ Target Organ Toxicity ▪ Aspiration Toxicity 	<p>Flame</p>  <ul style="list-style-type: none"> ▪ Flammables ▪ Pyrophorics ▪ Self-Heating ▪ Emits Flammable Gas ▪ Self-Reactives ▪ Organic Peroxides 	<p>Exclamation Mark</p>  <ul style="list-style-type: none"> ▪ Irritant (skin and eye) ▪ Skin Sensitizer ▪ Acute Toxicity (harmful) ▪ Narcotic Effects ▪ Respiratory Tract Irritant ▪ Hazardous to Ozone Layer (Non-Mandatory)
<p>Gas Cylinder</p>  <ul style="list-style-type: none"> ▪ Gases Under Pressure 	<p>Corrosion</p>  <ul style="list-style-type: none"> ▪ Skin Corrosion/Burns ▪ Eye Damage ▪ Corrosive to Metals 	<p>Exploding Bomb</p>  <ul style="list-style-type: none"> ▪ Explosives ▪ Self-Reactives ▪ Organic Peroxides
<p>Flame Over Circle</p>  <ul style="list-style-type: none"> ▪ Oxidizers 	<p>Environment (Non-Mandatory)</p>  <ul style="list-style-type: none"> ▪ Aquatic Toxicity 	<p>Skull and Crossbones</p>  <ul style="list-style-type: none"> ▪ Acute Toxicity (fatal or toxic)

3.2 Sample Supplier Label

3.2.1 Supplier labels may be one bilingual label, or two labels (one English and another in French).

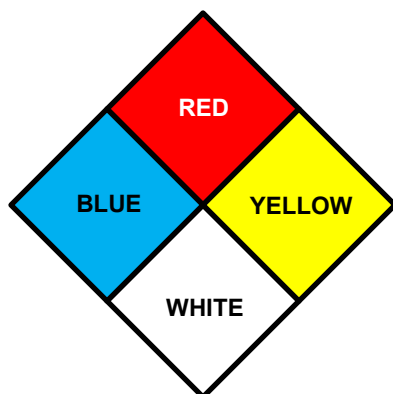
Product K1 / Produit K1



<p>Danger Fatal if swallowed. Causes skin irritation.</p> <p>Precautions: Wear protective gloves. Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product.</p> <p>Store locked up. Dispose of contents/containers in accordance with local regulations.</p> <p>IF ON SKIN: Wash with plenty of water. If skin irritation occurs: Get medical advice or attention. Take off contaminated clothing and wash it before reuse. IF SWALLOWED: Immediately call a POISON CENTRE or doctor. Rinse mouth.</p>	<p>Danger Mortel en cas d'ingestion. Provoque une irritation cutanée.</p> <p>Conseils : Porter des gants de protection. Se laver les mains soigneusement après manipulation. Ne pas manger, boire ou fumer en manipulant ce produit.</p> <p>Garder sous clef. Éliminer le contenu/récipient conformément aux règlements locaux en vigueur.</p> <p>EN CAS DE CONTACT AVEC LA PEAU : Laver abondamment à l'eau. En cas d'irritation cutanée : Demander un avis médical/consulter un médecin. Enlever les vêtements contaminés et les laver avant réutilisation. EN CAS D'INGESTION : Appeler immédiatement un CENTRE ANTIPOISON ou un médecin. Rincer la bouche.</p>
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Compagnie XYZ, 123 rue Machin St, Mytown, ON, N0N 0N0 (123) 456-7890

4.0 NFPA Label



BLUE Health Hazard	RED Flammability Hazard	YELLOW Instability Hazard	WHITE Special Hazard
4 = Can be lethal	4 = Will vaporize and readily burn at normal temperatures	4 = May explode at normal temperatures and pressures	OX = Oxidizer
3 = Can cause serious or permanent injury	3 = Can be ignited under almost all ambient temperatures	3 = May explode at high temperature or shock	SA = Simple asphyxiant gas
2 = Can cause temporary incapacitation or residual injury	2 = Must be heated or high ambient temperature to burn	2 = Violent chemical change at high temperature or pressures	W = Reacts explosively or violently with water
1 = Can cause significant irritation	1 = Must be preheated before ignition can occur	1 = Normally stable. High temperatures make unstable	
0 = No hazard	0 = Will not burn	0 = Stable	

Hazardous Materials Shipping

S3AM-116-PR1

1.0 Purpose and Scope

- 1.1 This procedure prescribes the minimum requirements for shipping samples, hazardous materials (HzM) and dangerous goods. These minimum requirements are intended to prevent shipping-related incidents and prevent injuries to employees, members of the public, and emergency response personnel. This procedure is also designed to provide a framework for compliance with the requirements of:
- The U.S. Department of Transportation (DOT) Hazardous Materials Regulations (HMR) published under 49 CFR;
 - Transport Canada Transportation of Dangerous Goods Regulations (TDG Regulations) for shipment of hazardous materials/dangerous goods by land;
 - The International Air Transportation Association (IATA) Dangerous Goods Regulations (DGR) for shipping dangerous goods by air; and
 - Other related regulations applicable to the Americas.
- 1.2 This document is not a replacement for the regulatory requirements, but is intended to provide information surrounding the shipment of HzM and/or Dangerous Goods.
- 1.3 Examples of hazardous materials / dangerous goods regulated by the DOT and IATA that may be encountered or used during AECOM business may include, but are not limited to, certain field environmental samples, compressed gases (fire extinguishers, calibration gases, compressed air, and welding and cutting gases), ionizing radiation sources used to calibrate detection equipment or analytical equipment, nuclear-density meters, laboratory reagents, hazardous wastes, materials used for bench-scale and pilot plant operations, oils, greases, lubricating fluids, cleaning solvents, degreasing solvents, paints, spray paints, paint removers and/or strippers, diesel fuel, gasoline, pesticides, inks, glues and other adhesives, battery fluids, ammonia cleaning solutions, and peroxide solutions.
- 1.4 This procedure applies to all AECOM Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.

2.0 Terms and Definitions

A complete list of definitions can be found in their entirety in the HMR, the TDG Regulations, and the IATA DGR. The terms and definitions below are representative of those most likely applicable to AECOM operations.

- 2.1 **Agency Letter** – A letter approved by both AECOM's Legal Department and the client and that authorizes AECOM to act as its agent for the purpose of arranging for the transport and/or disposal of waste, and indemnifies AECOM's liability when acting "As an Agent of [client's name]".
- 2.2 **Carrier** – Also called the transporter. A person engaged in the transportation of passengers or property by land, water, or air either as a common, contract, private carrier, or civil aircraft.
- 2.3 **Consignor** – Also referred to as **Offeror**. The person who, prior to offering goods for transport, performs functions including selecting packaging, classifying hazardous materials, physical transfer (not to be confused with transport) of hazardous materials, preparing shipping papers, signing hazardous material certifications on shipping papers (as agent for), marking or placarding vehicles or packagings, or providing placards to carriers. See also **Generator**.
- 2.4 **Consignee** – Also called the receiver. The person or place shown on a shipping document, package marking, or other media as the location to which a carrier is directed to transport a hazardous material.

- 2.5 **Dangerous Goods** – Products, substances, or organisms which are capable of posing a risk to health, safety, property, or the environment and which are shown in the list of dangerous goods in the TDG Regulations and/or IATA DGR or which are classified according to the TDG Regulations and/or IATA DGR, generally synonymous with hazardous materials.
- 2.6 **Delegation of Authority (DoA)** – The framework of authority within which AECOM (Americas) carries out its day-to-day operations.
- 2.7 **Generator** – Any person, by site, whose act or process created the hazardous waste; hazardous waste generators are divided into categories based on the amount of waste they produce each month. A generator may also be referred to as a **Consignor** when offering the hazardous waste for transport.
- 2.8 **Hazardous Materials (HzM)** – A substance or material which has been determined by the U.S. Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and includes hazardous substances, hazardous wastes, marine pollutants, and elevated temperature materials. Hazardous materials may include, but are not limited to: batteries, adhesives, paints, compressed gases, nuclear density meters, laboratory reagents, field samples, soil and sand siftings, hazardous wastes, and materials used for bench scale and pilot plant operations. While most environmental samples (both water and soil) do not meet the definition of hazardous material, extreme care must be taken to properly classify materials. HzM Classifications:
- Class 1 Explosives
 - Class 2 Gases
 - Class 3 Flammable Liquid and Combustible Liquid
 - Class 4 Flammable Solid, Spontaneously Combustible, and Dangerous When Wet
 - Class 5 Oxidizer, Organic Peroxide
 - Class 6 Poison (Toxic), Poison Inhalation Hazard, Infectious Substance
 - Class 7 Radioactive
 - Class 8 Corrosive
 - Class 9 Miscellaneous Hazardous Material.
- 2.9 **Hazardous Waste (HzW)** – A “solid waste” which because of its quantity, concentration, or physical, chemical, or infectious characteristics may
- (1) pose a substantial hazard or potential hazard to human health or the environment when improperly treated, stored or disposed of, or otherwise mismanaged; or
- (2) cause or contribute to an increase in mortality, or an increase in irreversible or incapacitating illness.
- Four types of hazardous waste exist:
- Listed Waste: Wastes that USEPA has determined are hazardous. The lists include the F-list (waste from common manufacturing and industrial processes), K-list (wastes from specific industries), and P- and U-lists (wastes from commercial chemical products);
 - Characterized Wastes: Wastes that do not meet any of the listings above but that exhibit ignitability, corrosivity, reactivity, or toxicity;
 - Universal Wastes: Batteries, pesticides, mercury-containing equipment and lamps;
 - Mixed Wastes: Waste that contains both radioactive and hazardous waste components.
- 2.10 **Hazardous Waste Manifest System** – A set of forms, reports, and procedures designed to track hazardous waste from the time it leaves the generator facility where it was produced, until it reaches the off-site waste management facility that will store, treat, or dispose of the hazardous waste.

- 2.11 **HzM Employee** – A person who is employed by a HzM employer, who in the course of employment directly affects dangerous goods/hazardous materials transportation safety. This term includes employees who prepare hazardous materials for transportation, or are responsible for safety of transporting hazardous materials.
- 2.12 **HzM Employer** – A person who uses one or more of its employees in connection with transporting dangerous goods/hazardous materials in commerce, causing hazardous materials to be transported or shipping in commerce.
- 2.13 **HMR** – Hazardous Material Regulation.
- 2.14 **IATA** – International Air Transport Association.
- 2.15 **ICAO** – International Civil Aviation Organization.
- 2.16 **Hazardous Waste Manifest** – A paper document that contains information on the type and quantity of the waste being transported, instructions for handling the waste, and signature lines for all parties involved in the disposal process, which must be signed by each party that handles the waste.
- 2.17 **Materials of Trade (MOT)** – A hazardous material, other than a hazardous waste, that is carried on a motor vehicle:
- For the purpose of protecting the health and safety of the motor vehicle operator or passengers;
 - For the purpose of supporting the operation or maintenance of a motor vehicle (including its auxiliary equipment); or
 - By a private motor carrier in direct support of a principal business that is other than transportation by motor vehicle.
 - Refer to *S3AM-116-ATT1 Materials of Trade Limits*.
- 2.18 **NAPL** – Non-aqueous phase liquid
- 2.19 **Offeror** – Refer to **Consignor**.
- 2.20 **Reportable Quantity (RQ)** – The spill-related or incident-related quantity of a material listed in the applicable Federal, State, or Provincial regulations requiring a formal report.
- 2.21 **TDG** – Transportation of Dangerous Good – Canadian Act and Regulation.
- 2.22 **Transporter** – Refer to **Carrier**.

3.0 References

- 3.1 S3AM-003-PR1 SH&E Training
- 3.2 S3AM-004-PR1 Incident Reporting, Notification & Investigation

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Manager / Supervisor

- Verifying the potential to ship HzM via a carrier during the planned scope of services and if confirmed, identify the appropriately trained individuals are available to support the HzM shipment;
- Prior to authorizing an AECOM employee to sign a client's Hazardous Waste Manifest, the Manager will:
 - Verify with the Office of Risk Management that the necessary Delegations of Authority (DoA), Americas approvals are in-place.

- Obtain an Agency Letter approved by both the client and AECOM Counsel.
- Prior to assignment, confirm that employees are properly trained to perform their job-specific assignments.
- Filing copies of all HzM shipping documents in the associated program or project files.
- As applicable, providing for the appropriate storage of the HzM in the office or other necessary location.
- Verifying that the HzM to be shipped is prepared / packaged by the designated AECOM DOT Level 1 or 2 Shipper (United States), appropriately TDG trained personnel (Canada), or personnel trained to the requirements of the applicable jurisdiction, type of HzM and method of transport.
- Immediately reporting any incident, spill, release, mishandling, mislabeling, etc. related to an HzM shipment to AECOM's Incident Reporting Line, refer to *S3AM-004-PR1 Incident Reporting, Notifications & Investigations*.

4.1.2 **SH&E Department**

- Contracting a 24-hour emergency response service with a telephone number that will be answered by a person either with information on the hazards of the shipment or with immediate access to such a person.
- Maintaining the annual renewal of AECOM's U.S. DOT Hazardous Materials Registration and applicable renewals of Canadian TDG Permits.
- Posting AECOM's Hazardous Materials Registration and Permits on the AECOM intranet.
- Defining the training to be required of employees involved in HzM shipping and facilitating the delivery of that training.

4.1.3 **SH&E Manager**

- Providing resources to employees involved in shipping hazardous materials.
- Approving the designation of a AECOM DOT Level 2 Shipper (United States).
- Supporting the delivery of HzM shipping and Hazardous Waste Manifest training.

4.1.4 **Counsel**

- Reviewing and approving the Agency Letter authorizing AECOM to sign a client's Hazardous Waste Manifest "As an Agent of [client's name]".
- Updating the template Agency Letter to address additional liabilities, as necessary.
- Providing the template Agency Letter to Managers, as requested.

4.1.5 **Office of Risk Management**

- Supporting Managers in understanding the applicable *Sub-Delegations of Authority, Americas* requirements as it pertains to signing a client's Hazardous Waste Manifest "As an Agent of [client's name]".

4.1.6 **Employee**

- Completing training appropriate to role(s) in hazardous materials shipping.
- Shipping or transporting HzM as authorized and in compliance with training.
- Signing a client's Hazardous Waste Manifest as authorized.
- Immediately reporting any incident, spill, release, mishandling, mislabeling, etc. related to a HzM shipment to the Manager or Supervisor and in accordance with *S3AM-004-PR1 Incident Reporting, Notifications & Investigations*.

- As required and applicable, initiating emergency response procedures.

4.1.7 **AECOM DOT Level 1 Shipper (United States)**

- Identifying, with the support of an AECOM DOT Level 2 Shipper, the appropriate HzM shipping requirements (e.g., mode of transportation, packaging, labelling, regulated status, and shipping documents, etc.).
- Preparing the HzM for shipment (e.g., packaging, labelling, etc.).
- Preparing the necessary HzM shipping documents.
- Contacting a AECOM DOT Level 2 Shipper if uncertain of the shipping requirements.
- Maintaining the appropriate training as required by the HMR, TDG, and IATA.

4.1.8 **AECOM DOT Level 2 Shipper (United States)**

- Serving as the HzM shipping Subject Matter Expert for the Geography, Business Group, or business unit, as appropriate.
- Supporting information requests from AECOM DOT Level I Shippers.

4.2 General Requirements

4.2.1 Do not offer packages for shipment without knowing the contents and classifying the packages in accordance with the DOT or TDG requirements, and, if applicable, IATA regulations.

4.2.2 Select the best way to ship the hazardous material based on the quantity, hazard(s), and mode of transportation (e.g., air, land, water). When possible, only use ground carriers for transportation of hazardous material, since more restrictive requirements apply to air shipments.

- The air shipment of environmental samples represents a significant percentage of hazardous materials/dangerous goods shipped by AECOM.
- Although most environmental samples (both water and soil) do not meet the definition of hazardous, extreme care must be taken to properly classify materials.
- AECOM employees must follow the IATA Dangerous Goods Regulations for any air transportation of hazardous materials.

4.2.3 Employees trained and designated as AECOM HzM DOT Level 1 or 2 Shippers (United States), appropriately TDG trained personnel (Canada), or personnel trained to the requirements of the applicable jurisdiction, are the only individuals authorized to physically transport or prepare documents to ship HzM via a carrier.

- Employees shall confirm training documentation is valid and readily available when handling or transporting dangerous goods.

4.2.4 Shipments of HzM must be placed in appropriate containers to prevent any leaks or releases of the HzM. Containers of dangerous materials, no matter what shape or size, shall be labeled;

- Specific packaging and shipping instructions apply to all hazardous material shipments. These instructions vary by chemical/product and are different for passenger aircraft and cargo aircraft.
 - Carrier-specific requirements can be obtained from the Internet or by calling the carrier's customer service line.
- Carrier (transporter) shall confirm cargo is securely loaded, properly segregated and free of leaks prior to departure.
- Carrier (transporter) shall refuse consignments of hazardous materials that are offered for transport that do not meet the requirements of the applicable regulations.

- Vehicles that transport dangerous materials as per regulations shall appropriately display the applicable placards (e.g. correct placard(s), clean and in appropriate locations) and any other required information (e.g. motor vehicle carrier number, etc.).
 - Carrier (transporter) shall replace any marks that are damaged or lost while in transport.
- 4.2.5 Proper shipping documents or the appropriate exemption Permit, must accompany every shipment of dangerous materials.
- 4.2.6 Specific technical names must be used on shipping documents (i.e., Shipper's Declaration for Dangerous Goods); never use an acronym (i.e., LNAPL) as the technical name.
- 4.2.7 AECOM has selected INFOTRAC® (<http://www.infotrac.net/>) to provide 24-hour emergency response support service in the United States and Canada. All HzM shipping papers which list INFOTRAC® for 24-hour emergency response must list AECOM's account number 74984.
- All HzM shipments via a carrier must be reported to INFOTRAC.
- 4.2.8 If AECOM is the consignor (shipper or generator), registration with CANUTEC (Canada) to provide 24-hour emergency contact is permitted and shall be confirmed prior to shipment. If AECOM is listed on the shipping document (Canada) as carrier (transporter) only, registration with CANUTEC does not apply, and an alternate 24-hour emergency number shall be in place (e.g. INFOTRAC).
- Emergency response procedures applicable to the dangerous materials transported shall be developed and followed in the event of an incident.
 - Employees shall be appropriately trained to these procedures, AECOM incident reporting requirements (refer to *S3AM-004-PR1 Incident Reporting, Notification & Investigation*) and any applicable external reporting requirements.
 - A copy of applicable emergency response information should be supplied with the shipping papers for responders to use in emergency situations (e.g. Canada – Emergency Response Assistance Plan [ERAP, appropriate pages from the DOT Emergency Response Guidebook [ERG], and/or Safety Data Sheets [SDS]).
 - The external reporting requirements and to which agency or body, as specified in regulation, vary according to jurisdiction and the class of the goods spilled, released, lost, stolen or misplaced (e.g. local authorities or police, National Response Center, Center for Disease Control, etc.).
 - External reporting requirements for spills, releases, loss, theft or misplacement of hazardous materials are dependent upon the quantities or levels of the hazardous materials involved in the incident.
 - AECOM shall submit a written report of all incidents involving the transportation of hazardous materials as required to all appropriate entities, that could include:
 - The U.S. Department of Transportation;
 - U.S. National Response Center
 - Transport Canada within 30 days of a reportable occurrence (Dangerous Occurrence Report); or
 - Any other agency as required by regulation.
 - Report in any other manner as specified by the applicable jurisdiction.
- 4.2.9 Employees are not authorized to physically transport HzM quantities, in a motor vehicle, in excess of the MOT limits. Refer to *S3AM-116-ATT1 Materials of Trade Limits*.
- 4.2.10 Carrier (transporter) shall inspect for transportation of dangerous materials compliance as a part of vehicle inspections.
- 4.2.11 AECOM will never be identified as the GENERATOR on a client's Hazardous Waste Manifest.
- Employees are only authorized to sign a client's Hazardous Waste Manifest if:

- The necessary approvals have been obtained per the *Sub-Delegations of Authority, Americas*;
- The client could not logistically sign the manifest given they were not on the site;
- An Agency Letter was signed by the client and approved by AECOM Counsel; and
- Employees completed the required training.
- Never sign a client's Hazardous Waste Manifest as AECOM; sign "As an Agent of [client name]".

4.2.12 Carrier (transporter) shall transport materials using identified "Dangerous Goods Routes" as applicable.

4.2.13 Carrier (transporter) shall verify that trans-national movement of waste meets requirements of the Basel Convention, as well as appropriate internationally recognized standards for the mode (e.g., International Maritime Dangerous Goods [IMDG] Code, International Air Transport Association [IATA] Dangerous Goods Regulations [DGR], etc.).

4.3 Security

4.3.1 AECOM sites that transport or offer the following types or quantities of materials for transportation in the United States must have a Hazardous Material Transportation Security Plan on site and must ensure that all applicable employees are trained in the plan:

- Any quantity of a Division 1.1, 1.2, or 1.3 material.
- A quantity of a Division 1.4, 1.5, or 1.6 material requiring placarding in accordance with subpart F.
- A large bulk quantity of Division 2.1 material.
- A large bulk quantity of Division 2.2 material with a subsidiary hazard of 5.1.
- Any quantity of a material poisonous by inhalation, as defined in 49 CFR 171.8.
- A large bulk quantity of a Class 3 material meeting the criteria for Packing Group I or II.
- A quantity of desensitized explosives meeting the definition of Division 4.1 or Class 3 material requiring placarding in accordance with subpart F.
- A large bulk quantity of a Division 4.2 material meeting the criteria for Packing Group I or II.
- A quantity of a Division 4.3 material requiring placarding in accordance with subpart F.
- A large bulk quantity of a Division 5.1 material in Packing Groups I and II; perchlorates; or ammonium nitrate, ammonium nitrate fertilizers, or ammonium nitrate emulsions, suspensions, or gels.
- Any quantity of organic peroxide, Type B, liquid or solid, temperature controlled.
- A large bulk quantity of Division 6.1 material (for a material poisonous by inhalation see paragraph (e) above).
- A select agent or toxin regulated by the Centers for Disease Control and Prevention under 42 CFR 73 or the United States Department of Agriculture under 9 CFR 121.
- A quantity of uranium hexafluoride requiring placarding under 49 CFR 172.505(b).
- International Atomic Energy Agency (IAEA) Code of Conduct Category 1 and 2 materials including Highway Route Controlled quantities as defined in 49 CFR 173.403 or known radionuclides in forms listed as RAM-QC by the Nuclear Regulatory Commission.
- A large bulk quantity of Class 8 material meeting the criteria for Packing Group I.

4.3.2 The specific HzM security plan shall be reviewed annually and updated if required.

4.4 Training

- 4.4.1 Employees involved in shipping hazardous materials/dangerous goods (e.g., packaging, preparing paperwork, loading and/or unloading, and transporting hazardous materials) are required to have documented training prior to shipping activities, refer to *S3AM-003-PR SH&E Training*. Training requirements are based on the type of materials shipped (e.g., calibration/compressed gases, laboratory reagents, field samples, hazardous wastes, etc.) and employee responsibility.
- AECOM (US) DOT Level 1 Shipper Performance Training: The specific content of this training (typically 4 hours) is focused on proper procedures for packaging, labeling and shipping HzM/HzW over land and sea. This training has a three year renewal requirement.
 - AECOM (US) DOT Level 2 Shipper Performance Training: A comprehensive 2-day HzM shipping training course typically completed in an in-person seminar.
 - IATA Performance Training: This training supplements (US) DOT Level 1 training and provides additional information for the proper shipment of HzM/HzW via air transportation. This training has a two year renewal requirement.
 - Resource Conservation and Recovery Act (RCRA) Part B Awareness Training (US Project Sites): Applicable to employees shipping HzW, including listed wastes, from US project sites. General RCRA Awareness training can be completed through online vendors. Additional project-specific training regarding HzW generation, project site roles and responsibilities, HzW management and shipment will need to be coordinated between the Manager and Client. Training may also include procedures for signing waste documents, i.e. profiles and characterization forms, where permitted by client contracts. Training will be provided in accordance with Permits, Consent Orders or other Regulatory Agency-issued agreements regarding project site HzW generation. This training has an annual renewal requirement.
 - TDG Training: Training is focused on proper procedures for labeling, placarding, documenting and shipping of HzM/HzW. This training has a three year renewal requirement.

4.5 Documentation

4.5.1 Permits

- The carrier (transporter) shall obtain any required permits prior to transporting hazardous materials.

4.5.2 Bills of Lading

- Bills of Lading documents include those generated when shipping non-hazardous materials and hazardous materials and include Oilfield Waste Manifests and Hazardous Waste Manifests. Bills of Lading are to be completed as follows:
 - Consignor (shipper or generator) shall input or provide the appropriate information, including the consignor's information (e.g. name, address, etc.) and the appropriate identifiers for the materials to be transported.
 - If the item is a dangerous material, it must be clearly identified as a dangerous good (e.g. marked with an "X" in the DG column), and the primary class and subsidiary class must be entered along with the UN number, name, packing group (if applicable) and quantity.
 - The carrier (transporter) shall enter in full the Carrier information, such as:
 - Company name, address, date, truck unit number, and telephone number.
 - The applicable emergency response information, including the 24-hour emergency number.
 - Carrier's employee shall confirm the bill of lading has been properly completed, print his/her name and sign the form prior to transport.
 - The carrier (transporter) driver shall maintain the bill of lading within immediate reach when restrained by a seatbelt and visible to a person entering the vehicle, or in a holder mounted on the inside of the driver's door.

- Once the waste is transported to the destination, the consignee (receiver) completes their appropriate sections.
- Copies are maintained by the consignor, carrier and consignee.

5.0 Records

- 5.1 Bill of Lading and Shipper's Declaration for Dangerous Goods shall be retained in the project files for a minimum of 2 years.
- 5.2 Agency Letters and hazardous waste manifests shall be retained in the project files for at least 3 years after the initial carrier accepted the material.

6.0 Attachments

- 6.1 [S3AM-116-ATT1](#) [Materials of Trade Limits](#)

Materials of Trade Limits

S3AM-116-ATT1

1.0 United States

- 1.1 The Department of Transportation (DOT) "Materials of Trade" or "MOTs" exception applies to hazardous materials, other than hazardous waste, that are carried on a motor vehicle for one of the following purposes:
 - 1.1.1 To protect the health and safety of the motor vehicle operator or passengers, such as insect repellent or a fire extinguisher;
 - 1.1.2 To support the operation or maintenance of a motor vehicle (including its auxiliary equipment), such as a spare battery or gasoline; or
 - 1.1.3 To directly support a principal business of a private motor carrier (including vehicles operated by a rail carrier) that is other than transportation by motor vehicle – for example, landscaping, pest control, painting, plumbing, or welding services.
- 1.2 Some AECOM activities (e.g., environmental sampling and other field services), may be able to use this exception. The exception is found in the Code of Federal Regulations at 49 CFR 173.6. A HzM-trained employee should make the determination as to whether this exception will apply to the shipment.
- 1.3 The MOTs exception allows AECOM employees to transport certain amounts of chemicals aboard their vehicles without preparing shipping papers, emergency response information, placarding, or formal training.
- 1.4 MOTs must be packaged in the manufacturer's original packaging, or a packaging of equal or greater strength or integrity. Gases must be in DOT specification cylinders. If the inner container (such as the bottle) is secured against movement inside the vehicle (if it is kept in a cabinet or tool box), then no outer packaging (such as a cardboard box) is required. The MOT must be marked with a common name or the technical name.
- 1.5 No HzM training is required, except that the driver must have general knowledge of the MOT regulations, quantity limitations, packaging requirements, and marking and labeling requirements. The driver is not allowed to exceed total aggregate weight of 440 pounds of MOTs aboard the vehicle.
- 1.6 The HzM classes and quantities of HzM items typically transported by AECOM can be transported as MOTs:
- 1.7 The inner container of a Packing Group II and III material in Class 3, 8, 9, Division 4.1, 5.1, 5.2, 6.1, or ORM-D cannot exceed 66 pounds (30 kilograms) or 8 gallons each.
- 1.8 A Division 2.1 or 2.2 cylinder cannot exceed 220 pounds (100 kilograms).
- 1.9 The inner container of a Packing Group II or III material in Division 4.3 cannot exceed 1 ounce (28 grams).

2.0 Canada

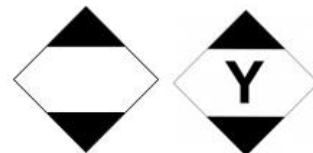
- 2.1 Canada's TDG Regulations apply to everyone. They even apply when an individual transports dangerous goods such as gasoline, oxygen and propane for personal use. However certain exemptions exist for small quantities or for specific situations.
 - 2.1.1 Most of these exemptions, which are called "special cases", are found in Part 1 of the TDG Regulations, under section 1.15 to 1.48. This document contains a basic overview of a few of these "special cases."
 - 2.1.2 These "special cases" may exempt the parties involved from documentation requirements, or placarding and training requirements of the TDG Regulations.
 - 2.1.3 Please refer to the TDG Regulations for further guidance before applying exemptions.

2.2 150 kilogram gross mass exemption

- 2.2.1 The total gross mass of all dangerous goods (i.e. oxygen, propane, gasoline, etc.) must not be greater than 330 pounds (150 kilograms). "Gross mass" includes the weight of the container and all of its contents.
- 2.2.2 The dangerous goods must be packed in containers that weigh 66 pounds (30 kilograms) or less (except for gases).
- 2.2.3 The dangerous goods must be available to the general public and transported by the user/purchaser or by a retailer to or from a user/purchaser.
- 2.2.4 The containers must be designed not to leak under normal conditions of transport.
- 2.2.5 When using the "150 kilogram Gross Mass Exemption" for class 2 gases, remember:
 - If transporting a gas such as propane or oxygen, the cylinder must be certified for use in Canada and marked with the letters TC or DOT/TC;
 - Flammable gases, such as propane or acetylene, are limited to a cylinder size of 46L.

2.3 Limited Quantity

- 2.3.1 A limited quantity is a small quantity of dangerous goods to which the general public normally has access, such as aerosol sprays and small cans of paint.
- 2.3.2 Since dangerous goods cannot all be shipped as limited quantities, consult Column 6(a) of Schedule 1 of the TDG Act and Regulation.
- 2.3.3 Do not ship dangerous goods as a "limited quantity" when a "0" is in Column 6(a) of Schedule 1.
- 2.3.4 Each means of containment (i.e. box, etc.) must have a gross mass of 66 pounds (30 kilograms) or less and display one of the following international marks:



2.4 Gases in Small Means of Containment

- 2.4.1 This exemption allows for the transport up to 1102 pounds (500 kilograms) of the gases listed below. When using this exemption, the maximum amount of cylinders is limited to five. The cylinders must be visible from outside the vehicle.
 - UN1001, ACETYLENE, DISSOLVED;
 - UN1002, AIR, COMPRESSED;
 - UN1006, ARGON, COMPRESSED;
 - UN1013, CARBON DIOXIDE;
 - UN1060, METHYLACETYLENE AND PROPADIENE MIXTURE, STABILIZED;
 - UN1066, NITROGEN, COMPRESSED;
 - UN1072, OXYGEN, COMPRESSED; or
 - UN1978, PROPANE.

Hearing Conservation

S3AM-118-PR1

1.0 Purpose and Scope

- 1.1 Establishes procedures to confirm that personal noise exposure remains within acceptable limits and establishes the requirements of an acceptable hearing conservation program.
- 1.2 This procedure applies to all AECOM Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.

2.0 Terms and Definitions

- 2.1 **ABC System** – The system used in Canada to classify hearing protectors on the basis of the attenuation provided by the hearing protection.
- 2.2 **Action Level** – May also be referred to as **Monitoring Level**. An eight-hour, time-weighted average established by the applicable jurisdiction, measured on the A-scale, slow response. Depending upon jurisdiction, this can vary anywhere from 74dBA to 85dBA, and may additionally be defined as 50% of the allowable noise dose. In the absence of a specified jurisdictional action level, 85dBA shall be used as the default action level.
- 2.3 **Attenuation** – The reduction of the sound level at the ears of a person wearing hearing protectors.
- 2.4 **Decibel (dB)** – Logarithmic unit of measurement of sound level.
- 2.5 **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 the given jurisdiction (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 jurisdiction.
- 2.6 **Standard Threshold Shift (STS)** – 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).
- 2.7 **Noise Reduction Rating (NRR)** – The measure, in decibels, of how well a hearing protector reduces noise (attenuation), as specified by the United States of America Environmental Protection Agency. It is a requirement in the USA that all hearing protectors have the NRR stamped on their packaging.
- 2.8 **Time-Weighted Average (TWA) Sound Level** – That sound level, which if constant over an 8-hour exposure, would result in the same noise dose as is measured.

3.0 References

- 3.1 S3AM-003-PR1 SH&E Training
- 3.2 S3AM-127-PR1 Exposure Monitoring
- 3.3 S3AM-128-PR1 Medical Screening & Surveillance

4.0 Procedure

- 4.1 Roles and Responsibilities
 - 4.1.1 **SH&E Manager**
 - Provide access to initial and refresher hearing conservation training.

- Inform employees of noise monitoring results when full-shift noise exposure is at or above the action level.
- Designate areas and tasks where employees' exposure is at or above the action level.
- Conduct noise monitoring and supervise noise surveys, as applicable, and support hazardous noise assessment/evaluation efforts.

4.1.2 **Manager**

- Implement the hearing conservation program.
- Confirm that a hazardous noise assessment/evaluation has been conducted.
- Confirm that a hazardous noise assessment/evaluation is conducted when a change in equipment, procedures, or personnel may increase employee exposure to noise.
- Implement engineering controls to reduce noise levels when such measures are considered feasible and when required by regulation.
- Purchase, monitor, and replenish for employees' use, a supply of hearing protection devices with a minimum Noise Reduction Rating (NRR) of 26 dBA, or of the appropriate classification for the applicable jurisdiction.
- Confirm that individuals included in the program receive training and that the training meets the criteria outlined in this program.
- Investigate and implement corrective action to all reports of non-conformance with this procedure, including reports of standard threshold shifts or employees' failure to wear hearing protectors in designated areas.
- Maintain an awareness of the noise levels in work areas for which he/she is responsible.
- Place warning signs in areas where sound levels would require the use of hearing protectors.
- Request that a hazardous noise assessment/evaluation be conducted when a change in equipment, procedures, or personnel may increase employee exposure to noise above action levels.
- Confirm that all employees are aware of the requirements for hearing protection for any designated area or task.
- Enforce the use of hearing protection by employees in designated areas and for designated tasks.

4.1.3 **Employee**

- Comply with the requirements of the Hearing Conservation program.
- Wear hearing protection devices in designated areas or for designated tasks.
- Inspect and maintain hearing protection devices.
- Report any suspected change in noise levels of work area to supervisor.
- Report any signs or symptoms experienced that could be the result of overexposure to noise to supervisor.
- Participate in audiometric testing and hearing protection training when required.

4.2 **General Requirements**

- 4.2.1 The requirements of this procedure apply to all locations/facilities/projects where employee noise exposure may equal or exceed the action level.
- 4.2.2 SH&E Plans and Task Hazard Assessments (THA) shall identify applicable hazards related to noise exposure. Identify established exposure limits and action levels specified by the applicable jurisdiction, or in the absence of specifications, an 8-hour TWA of 85 dBA.

- The below chart is intended to provide basic established exposure limits by jurisdiction. Please consult the applicable jurisdictional legislation to obtain further information and to verify accuracy.

	8hr TWA Established Exposure Limit (dBA)	8hr TWA Action Level (dBA)
OSHA	90	85
Canada - Federal	87	74
Alberta	85	85
British Columbia	85	82
Manitoba	85	80
New Brunswick	85	80
Newfoundland	85	85
Northwest Territories	85	80
Nova Scotia	85	85
Nunavut	85	85
Ontario	85	85
Prince Edward Island	85	85
Quebec	90	85
Saskatchewan	85	80
Yukon	85	80

- Acceptable methods of adjusting this limit to correspond to a different exposure period (e.g. 10 hours) vary by jurisdiction.
- 4.2.3 When processes or areas present noise exposures that are or could be at or above the action level identified for the given jurisdiction, monitoring and interpretation of results shall be undertaken by a trained and competent individual using approved equipment (sound level meters, sound dosimeters) to assess the hazard.
- 4.2.4 Resulting documentation (e.g. noise maps, results of the sound level survey data, etc.) will be posted at the location.
- 4.2.5 Noise assessments shall be repeated when there is any change in processes or equipment that could affect the noise level or the exposure duration.
- 4.2.6 Eliminate noise sources or reduce noise levels to the extent possible prior to implementing hearing protection PPE. Examples of controls that shall be considered include:
- Adding or replacing mufflers on motorized equipment.
 - Adding mufflers to air exhausts on pneumatic equipment.
 - Following equipment maintenance procedures to lubricate dry bearings and replace worn or broken components.
 - Isolating loud equipment with barriers.
 - Replacing loud equipment with newer and quieter models.
 - Using caution signs and Hearing Protection Required signs to designate noisy work areas.
 - Installing hearing protection device-dispensing stations at the entrance to noisy work areas.
- 4.2.7 Where practicable, a clearly visible warning sign shall be posted at every approach to an area in the workplace where the sound level regularly exceeds 85 dBA.

4.3 Hearing Protectors

- 4.3.1 Hearing protectors will be used in the event that administrative or engineering controls are either not effective or not feasible.
- 4.3.2 Selection of appropriate hearing protectors shall be based on actual or anticipated exposure levels, the attenuation provided by the device, and the manufacturer's information about the use and limitations of the device.
- 4.3.3 At a minimum, hearing protectors shall provide a level of protection that brings actual or anticipated exposure below the established exposure limit for the applicable jurisdiction. Additional information relative to hearing protector use is as follows:
 - The use of hearing protectors is required in any location where powered or motorized equipment, portable tools or any other noise source could reasonably be expected to exceed noise levels specified by the applicable jurisdiction, or in the absence of specifications, an 8-hour TWA of 85 dBA.
 - Hearing protection will be mandatory for all employees working in any area that has not been evaluated for noise exposure and the ambient noise level in the area is such that a raised voice is necessary to have a normal conversation with someone less than three feet (1 meter) away, and/or when within 25 feet (7.6 meters) of an operating piece of heavy equipment.
 - Hearing protection will be mandatory for all employees who work on or near heavy equipment unless personal dosimetry or other techniques have been used to document actual exposure.
 - Hearing protectors will be made available to all employees at no cost to the employees who may be exposed to noise levels specified by the applicable jurisdiction, or in the absence of specifications, an 8-hour TWA of 85 dBA.
 - Hearing protection will be mandatory for all employees exposed to 85 dBA for any period of time and who have experienced an STS.
 - Whenever information indicates that any employee's exposure may equal or exceed specified levels (or as applicable, an 8-hour TWA of 85 dBA), the manager will be responsible for enforcing the proper use of hearing protectors.
 - At least two types of hearing protectors shall be available to employees free of charge, and the type of hearing protector shall be suitable to the task and approved to the applicable jurisdiction.
 - Hearing protectors shall be used in accordance with manufacturer's specifications to effectively protect hearing. Refer to *S3AM-118-ATT1 Hearing Protection Guidelines*.
- 4.3.4 Evaluate the effectiveness of the hearing protectors chosen.
- 4.3.5 The manufacturer's assigned noise reduction rating (NRR) or attenuation for hearing protection devices can seldom be achieved in workplace conditions; therefore this rating shall be adjusted for real world conditions and use.
 - For devices with an NRR rating, subtract 7 from the NRR of the protector provided by the manufacturer. Divide this result by 2, and then subtract the remained from the observed "A" scale sound level measurement collected in the employee's work area (see Section 4.B). If this number is below 85, the hearing protectors are adequate for use in the work area.
- 4.3.6 Implement a hearing conservation program as applicable and in accordance with jurisdictional requirements

4.4 Training

- 4.4.1 All employees with potential exposure above the action levels applicable to their jurisdiction, or who otherwise utilize any type of hearing protector will participate in a hearing conservation training program. Refer to *S3AM-003-PR1 SH&E Training*.

4.4.2 The initial and subsequent annual hearing conservation training will address, at a minimum, the following topics:

- The effects of noise on hearing, recognizing hazardous noise, and symptoms of overexposure to hazardous noise.
- When and/or where hearing protectors are required to be worn.
- The purpose of hearing protectors.
- The advantages, disadvantages, and effectiveness of various types of protectors.
- Instructions on care and use of hearing protectors, including its limitations, proper fitting, inspection and maintenance and, if applicable, the cleaning and disinfection of the protector.
- The purpose of audiometric testing, including an explanation of the test procedures.
- Hearing Conservation Program requirements and responsibilities.

4.4.3 Hearing protection training is 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.

4.5 Audiometric Testing

4.5.1 All AECOM personnel with exposure greater than the action level shall be enrolled in the medical surveillance program and undergo a baseline audiogram within 6 months of the first exposure (consult local jurisdiction for more stringent timelines).

4.5.2 Thereafter, annual audiograms will be compared with the baseline exam. Testing to establish a baseline audiogram will be preceded by 14 hours without exposure to noise, including noise exposure away from work. Hearing protectors may be used as a substitute for the requirement that a baseline audiogram will be preceded by 14 hours without exposure to noise.

4.5.3 Enrolled employees will receive audiograms during their exit physicals; refer to *S3AM-128-PR1 Medical Screening & Surveillance Program*.

- Audiometric tests will be performed by a person meeting the requirements specified by the applicable jurisdiction.
- The medical surveillance provider will notify employees of the need to avoid high levels of non-occupational noise exposure during the 14-hour period immediately preceding the audiometric examination.
- For multi-year projects, an annual audiogram will be obtained for each employee exposed at or above the level specified by the applicable jurisdiction, or in the absence of specifications, an 8-hour TWA of 85 decibels.

4.5.4 Each employee's annual audiogram will be compared to that employee's baseline audiogram to determine if the audiogram is valid, and if there is a standard threshold shift (STS).

4.5.5 When a Standard Threshold Shift (STS), as identified by the AECOM Medical Consultant, is noted between the last valid baseline and the annual audiogram, the following steps will be taken:

- A retest will be conducted within 30 days to confirm the STS. The employee will not be exposed to workplace/hobby noise for 14 hours or will be provided with adequate hearing protection prior to testing.
- If the STS persists, ear protection will be evaluated and refitted, and may be upgraded to one with a greater NRR or classification. The hearing protection will have a minimum NRR of 26 dBA, or be of the appropriate classification for the applicable jurisdiction.
- The employee will be counselled and AECOM will obtain information regarding the employee's possible noise exposure away from the workplace or existing ear pathology.
- Qualified medical personnel will review the audiograms. This group will determine the need for a medical referral.

- The employee will be notified in writing by either the **SH&E Manager** or the AECOM Medical Provider of the STS, within 21 days of determination, or as required by the applicable jurisdiction.
 - The employee's supervisor will be notified of the shift in hearing threshold.
- 4.5.6 An employee who has experienced an STS shall comply with any recommendations made by medical personnel as they relate to the employees assigned work duties (e.g. dual hearing protection of earplugs and earmuffs).
- 4.6 Employee Monitoring
- 4.6.1 When information indicates that any employee's exposure may equal or exceed the applicable action level, the SH&E Manager shall develop and implement a site-specific monitoring program to identify employees for inclusion in the hearing conservation program and to enable the proper selection of hearing protectors. Refer to *S3AM-118-FM1 Site-Specific Hearing Conservation Program* and *S3AM-127-PR1 Exposure Monitoring*.
- 4.6.2 Noise surveys shall be conducted in a manner that reasonably reflects the exposure of the affected employees. Surveys shall be conducted under the supervision of an AECOM SH&E Manager. Refer to *S3AM-118-FM2 Sound Level Survey* and *S3AM-118-FM3 Noise Dosimetry Record*.
- 4.6.3 Sound-level meters and audio dosimeters used to determine employee exposure to noise sources shall be Type II (accurate to within +/- 2 dBA), operated in "slow" response, on the "A" scale, and be calibrated to factory guidelines (including periodic factory recalibration).

5.0 Records

- 5.1 Noise exposure measurement records, surveys and Site-Specific Hearing Conservation Plans will be retained at the project/facility for the duration of the project.
- 5.2 Audiogram records will be retained in the employee's medical records as per *S3AM-128-PR1 Medical Screening & Surveillance Program*.
- 5.3 Employee training session documentation will be retained in accordance with *S3AM-003-PR1 SH&E Training*.

6.0 Attachments

- 6.1 [S3AM-118-ATT1 Hearing Protection Guidelines](#)
- 6.2 [S3AM-118-FM1 Site-Specific Hearing Conservation Program](#)
- 6.3 [S3AM-118-FM2 Sound Level Survey](#)
- 6.4 [S3AM-118-FM3 Noise Dosimetry Record](#)

Hearing Protection Guidelines

S3AM-118-ATT1

Comparison of Hearing Protection	
Ear Plugs	Ear Muffs
Advantages: <ul style="list-style-type: none"> • small and easily carried • convenient to use with other personal protection equipment (can be worn with ear muffs) • more comfortable for long-term wear in hot, humid work areas • convenient for use in confined work areas • may be disposable (cleaning not necessary) 	Advantages: <ul style="list-style-type: none"> • less attenuation variability among users • designed so that one size fits most head sizes • easily seen at a distance to assist in the monitoring of their use • not easily misplaced or lost • may be worn with minor ear infections
Disadvantages: <ul style="list-style-type: none"> • requires more time to fit • more difficult to insert and remove • require good hygiene practices • may irritate the ear canal • easily misplaced • more difficult to see and monitor usage 	Disadvantages: <ul style="list-style-type: none"> • less portable and heavier • more inconvenient for use with other personal protective equipment • more uncomfortable in hot, humid work area • more inconvenient for use in confined work areas • safety or prescription glasses can reduce hearing protection by breaking the seal between the earmuff and the skin. • must be cleaned/decontaminated as necessary

1.0 Care and Use

- 1.1 Follow the manufacturer's instructions.
- 1.2 Inspect the earplugs prior to use. Dirty earplugs and insertion with dirty hands can result in ear infections. Moldable or foam earplugs should be discarded if dirty or the pliability has been lost
- 1.3 To correctly insert earplugs pull the ear up and back with the opposite hand in order to widen and straighten the ear canal. Foam earplugs should be compressed to insert deeply into the canal. Hold the plug in place until the foam expands to ensure optimal blockage. Confirm hair or clothing does not impede the fit.
- 1.4 Ensure the earmuff ear cushion seal around the ear is complete and is not compromised by hair, clothing or glasses. If equipped with a headband, the fit should be snug, but not so tight as to produce discomfort.
- 1.5 Check hearing protection regularly for wear and tear.
- 1.6 Replace ear cushions or plugs that are no longer pliable or cracked.
- 1.7 Hearing protection using head bands shall be replaced when the ear cushions are not kept snugly against the head, or semi-insert earplugs are not adequately held in place.
- 1.8 Disassemble ear muffs to clean.
- 1.9 Wash ear muffs with a mild liquid detergent in warm water, and then rinse in clear warm water. Sound-attenuating material inside the ear cushions must not get wet.
- 1.10 Use a soft brush to remove skin oil and dirt that can harden ear cushions.
- 1.11 Squeeze excess moisture from the plugs or cushions and then place them on a clean surface to air dry.
- 1.12 Store earplugs and earmuffs in a cool, dry and clean place.

Americas

Site-Specific Hearing Conservation Program

S3AM-118-FM1

Site (Project): _____ Location : _____

This program developed by:	Date:
Description of noise monitoring to be conducted (refer to S3AM-118-FM2 Sound Level Survey and S3AM-118-FM3 Noise Dosimetry Report) :	
Such monitoring will consist of (check those that apply): <input type="checkbox"/> Noise Dosimetry <input type="checkbox"/> Sound Level Meter Survey	

Monitoring

Specific instrumentation to be used is (make/model):

Make	Model

and will be calibrated at a frequency of _____ and documented in the _____.

Monitoring strategy is as follows (list all equipment and activities on site that may involve sound pressure levels above 80 dBA and an explanation of the strategy to document actual exposures):

Area/Equipment	Monitoring Strategy

Where areas or equipment are not clearly identified, all monitoring will be documented utilizing an illustrated layout (attach illustration developed for the specific site). Monitoring frequency will be in accordance with the strategy outlined above and when the following changes in site conditions/activities occur:

1.
2.
3.
4.
5.

Employee Notification

All site employees exposed above the regulated action level of _____ dBA will be notified of the monitoring results by (insert name/title) _____ at an interval not to exceed _____ after completion of monitoring.

Notification shall be written, with a copy to the SH&E Department. Documentation of employee notifications and corresponding signatures of notified employees will be kept in the site health and safety logbook/files.

Observation of Monitoring

All employees affected by the monitoring, or a designated employee representative, shall be given the opportunity to observe noise monitoring procedures. This will be achieved by:

Audiometric Testing Program and Requirements

AECOM employees who perform field activities where noise exposure above action levels is expected are required to participate in an audiometric testing program. Additionally, any subcontractors performing work on AECOM projects where noise levels exceeding action level will be required to provide documentation that they participate in an audiometric testing program that meets the applicable regulations. Documentation of participation in the testing program will be maintained by _____ and will be located at _____.

Hearing Protectors and Estimating Attenuation

A selection of suitable hearing protectors will be made available to all employees who are expected to have 8-hour TWA noise exposures above _____ dBA. The types anticipated to be available include:

Protection Type	Attenuation

Hearing protector attenuation will be evaluated by *(insert name/title)* for specific noise environments according to the following method prior to determining their suitability for use:

1.
2.
3.

The following employees will be required to wear hearing protectors during specific activities according to the results of site-specific monitoring conducted in accordance with this procedure. (This section can be completed after monitoring, if necessary).

Employee Name	Activity Type	Type of Protection

As applicable, hearing protectors will be properly fitted by _____ upon initial distribution to site workers.

Training in the use and care of hearing protectors shall be conducted by _____ during the initial site-specific health and safety training. Training contents shall meet the requirements set forth in this procedure and the applicable regulations.

Hearing protectors will be distributed by _____ from the storage location at the _____.

Access to Information and Training Materials

All information required by regulation to be made available to the employees will be posted by *(insert name / title)* _____ at the _____.

Local Occupational Health and Safety Regulations will also be kept on site.

Recordkeeping

Records required by AECOM's Hearing Conservation Program and Regulations shall be completed by _____ and shall be maintained at the _____ and placed on permanent file at the _____ for the minimum duration required by the standard. Employees can access their individual records by contacting _____.

All records required by this section will be transferred to any employee's successive employer if AECOM ceases to do business.

Approvals

Manager (print):

Signature: _____

Date: _____

SH&E Manager (print): _____

Signature: _____

Date: _____

Americas

Voluntary Use of Respirators

S3AM-123-FM2

Instructions: An employee that is opting to use a respirator for non-overexposure conditions shall read this page, and then sign on the bottom of the page. A copy shall be maintained in the employee's training file.

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirator use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for employees. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the employee.

Sometimes employees may wear respirators to avoid exposures to hazards, even if the amount of the hazardous substance does not exceed the limits set by regulatory standards. Voluntary masks may be used for nuisance dust, pollen, and sometimes noxious odors. If your employer provides respirators for your own voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not pose a hazard.

1. Read and follow all instructions provided by the manufacture on use, maintenance, cleaning, and care, and warnings regarding the respirators limitations.
2. Choose respirators certified for use to protect against the contaminant of concern. A label or statement of certification should appear on the respirator or respirator packaging; it will tell you what the respirator is designed for and how it will protect you. "The National Institute for Occupational Safety and Health (NIOSH) certifies respirators in the U.S and Canada."
3. Do not wear your respirator into atmospheres containing contaminants against which your respirator is not designed to protect. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, fumes, smoke, or very small solid particles.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.
5. If you have any health conditions (e.g., asthma; high blood pressure; emphysema; heart disease, etc.) that could be aggravated by using a respirator, you should check with your doctor before using one.

I have read and understand this information:

Date: _____

Employee's Name (Please Print):

Employee's Signature:

Americas

Noise Dosimetry Record

S3AM-118-FM3

Sample Identification

Sample #: _____ Date: _____
Employee Monitored: _____ Employee #: _____
Job: _____ Location: _____

Dosimeter Information

Model: _____ Serial # _____
Criterion Level (in dBA): _____ Threshold (in dBA): _____ Exchange Rate (in dBA): _____
Calibration (in dBA): _____ Initial _____ Final _____
Weighting: Fast ☐ Slow ☐

Calibrator Information

Model: _____ Serial #: _____ Class ☐ 1 ☐ 2
Battery Check Completed: ☐ Date of Factory Calibration: _____

Sample Information

Time On: _____ Time Off: _____ Total Run Time (in min): _____
Time Weighted Average (in dBA): _____ %Dose: _____ Est. %Dose: _____
Average Sound Level (L_{avg}): _____ Peak Sound Level (L_{pk}): _____
Maximum Sound Level (L_{max}): _____ Minimum Sound Level (L_{min}): _____

Workplace Conditions

Scheduled Hours per Shift: _____ Operations: Normal? ☐ Abnormal? ☐
Explain: _____

Hearing Protection: Type _____ % of Time Worn _____

Work Description/Comments

Sampled By: _____

Personal Protective Equipment

S3AM-208-PR1

1.0 Purpose and Scope

- 1.1 Provide an effective Personal Protective Equipment (PPE) Program to protect AECOM employees from potential workplace safety and health hazards.
- 1.2 This procedure applies to all AECOM Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.
- 1.3 The proper use of appropriate PPE, in combination with effective engineering and administrative controls, can provide AECOM employees with protection against potential workplace hazards and can reduce the potential for workplace injury and illness.

2.0 Terms and Definitions

- 2.1 **ANSI** – American National Standards Institute
- 2.2 **CSA** – Canadian Standards Association
- 2.3 **PPE** – Personal Protective Equipment
- 2.4 **SDS** – Safety Data Sheets
- 2.5 **THA** – Task Hazard Assessment

3.0 References

- 3.1 S3AM-123-PR1 Respiratory Protection
- 3.2 S3AM-209-PR1 Risk Assessment & Management
- 3.3 S3AM-301-PR1 Confined Spaces
- 3.4 S3AM-304-PR1 Fall Protection
- 3.5 S3AM-315-PR1 Working On & Near Water
- 3.6 S3AM-317-PR1 Hand Safety

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Managers or Supervisors

- Confirm the location specific SH&E Plan documents required hazard controls.
- Confirm Task Hazard Assessments (THAs) are conducted and hazards identified are eliminated through substitution, engineering, or administrative controls first before assigning PPE for hazard mitigation.
- Confirm appropriate subject matter experts, manufacturer's specifications, and regulatory requirements are consulted as necessary to assist with proper PPE selection.
- Match the appropriate PPE to those hazards that cannot be eliminated; support employees in exercising Stop Work Authority if the task is too hazardous to be mitigated
- Provide and document employee training on use and care of PPE.
- Determine which staff requires employee-issued PPE.

- Determine PPE requirements for visitors.
- If applicable, manage medical monitoring of employees using PPE (e.g. respirators, hearing protection, radiation, etc.).
- Approve the purchase of company-issued PPE.
- Confirm that appropriate PPE is utilized by employees when required or necessary. This may periodically be documented using *S3AM-208-FM2 Personal Protective Equipment Inspection*.
- Exercise Stop Work Authority if PPE is inadequate to address hazards.

4.1.2 SH&E Managers

- Provide guidance to Managers, Supervisors, and staff on the assessment of hazards and the selection of PPE.
- Provide training materials to Managers and Supervisors for employee training

4.1.3 Employee

- Review all relevant SH&E Plans, THAs and applicable SDS prior to commencing work.
- Exercise Stop Work Authority if the task is too hazardous.
- In accordance with training and instructions, utilize appropriate PPE that has been issued when required or necessary.
- Inspect PPE prior to and after use to confirm that it is functional, and maintain PPE in a clean and functional condition.
- Follow instructions and manufacturers' guidance on the care, use, and storage of PPE.
- Replace PPE when worn out, expired or damaged.
- Refrain from wearing PPE outside of the work area for which it is required if doing so would constitute a hazard.

4.2 Hazard Assessment

- 4.2.1 The location specific SH&E plan and THA shall assess the hazards and identify the necessary control measures. Refer to *S3AM-209-PR1 Risk Assessment & Management*.
- 4.2.2 These control measures shall include direction and guidance concerning the appropriate PPE required as the last line of defense to the anticipated hazards of the specific operations and tasks. A PPE specific assessment may assist in identifying PPE requirements. *S3AM-208-FM1 Personal Protective Equipment Assessment* may be completed and included in the SH&E Plan.
- 4.2.3 Various tasks and operations, including but not limited to, demolition, remediation, spill response, asbestos abatement, and lead removal, may require additional direction concerning selection, use, care, and disposal of PPE from a subject matter expert (e.g. protector manufacturer, industrial hygienist, asbestos professional, etc.).
- Obtained direction shall be included in the SH&E Plan.
 - Consultation with subject matters may be limited to the planning phase or they may be retained to provide technical assistance for a portion of or duration of the project.

4.3 Training

- 4.3.1 All employees shall be informed of their right to Stop Work if the task is too hazardous to mitigate through use of elimination, substitution, engineering controls, administrative controls, and PPE.
- 4.3.2 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 PPE is required.
- When it is required.
- Why it 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.

4.3.3 Retraining may be required as applicable (e.g., observed non-compliance, changes in procedure, etc.).

4.3.4 Staff are responsible for confirming that they have reviewed the operation manual/instructions for the PPE before work commences.

4.3.5 All staff will receive a location specific orientation to the hazards on the job site as well as appropriate PPE requirements.

4.4 Determining the Need for PPE

4.4.1 Prior to beginning work, the SH&E plan shall be consulted and THAs developed to identify the PPE requirements.

4.4.2 After the hazard assessments have been completed, the manager and/or employee shall select the appropriate PPE for each job category or task, as necessary. PPE will be provided to each employee appropriate for the hazards present.

- All PPE selected, purchased and used by AECOM will meet or exceed the appropriate ANSI/CSA standards or other standards as determined by federal, provincial, territorial, or state legislation.

4.4.3 If the hazard can be mitigated through using appropriate PPE shall:

- Properly fit the employee's body. Reasonable attempts shall be made to procure gender-specific gear / sizing.
- Be selected and used in accordance with recognized standards and provide effective protection.
- Not in itself create a hazard to the wearer (e.g., scratched safety glasses which could cause impaired vision should be replaced with clear safety glasses).
- Be compatible so that one item of PPE does not interfere with other PPE.
- Be maintained in good working order and in a sanitary condition.
- Not be altered in any way.

4.4.4 Prior to entering any controlled or restricted work area, employees shall review the SH&E plan and corresponding THA(s) to confirm that they are equipped with the applicable ANSI/CSA-approved PPE, appropriate to the specific work area's hazards.

4.5 Eye and Face Protection

4.5.1 AECOM employees shall use appropriate eye and face protection when eye or face hazards are present or potential from flying particles, molten metal, liquid chemicals, acid and caustic liquids, chemical gases or vapors, or injurious light radiation.

4.5.2 Safety glasses with side protection is the minimum eye protection requirement. Additional eye protection shall be suitable to the anticipated hazards (e.g. goggles, safety glasses with a face-shield, welder's helmet, etc.). Refer to *S3AM-208-ATT1 Eye & Face Protection*.

4.6 Head Protection

- 4.6.1 Appropriate protective hardhats are required when employees are working in areas where there is any potential for injury to the head.
- 4.6.2 Head protection shall be suitable to the anticipated hazards (e.g. working near exposed electrical conductors requires hardhats designed to reduce electrical shock). Refer to *S3AM-208-ATT2 Head Protection*.
- 4.7 Foot Protection
 - 4.7.1 AECOM employees shall use appropriate foot protection when hazards to feet are present or potential; including impact, puncture, cut, electrical, thermal or chemical hazards.
 - 4.7.2 Refer to *S3AM-208-ATT3 Foot Protection*.
- 4.8 Hand Protection
 - 4.8.1 Appropriate hand protection is required when employee's hands are exposed to hazards such as those from skin absorption of harmful substances, cuts and lacerations, abrasions, punctures, chemical burns, thermal burns, electricity, or harmful temperature extremes.
 - 4.8.2 Refer to *S3AM-208-ATT4 Hand Protection* and *S3AM-317-PR1 Hand Safety*.
- 4.9 Chemically Resistant Clothing
 - 4.9.1 Chemically resistant clothing is required when there is significant potential for the employee to come in direct contact with the chemicals being handled. Tasks that involve chemical handling will be evaluated for potential splashing or spilling. Refer to *S3AM-208-ATT5 Limb & Body Protection*.
 - 4.9.2 The process for selecting chemical resistant clothing will be similar for the selection of chemical resistant gloves (refer to *S3AM-208-ATT4-Hand Protection* and *S3AM-317-PR1 Hand Safety*).
- 4.10 High-Visibility Apparel
 - 4.10.1 "High visibility safety apparel" means personal protective safety clothing that is intended to provide conspicuity during both daytime and nighttime usage and that meets the Performance Class II or III requirements of ANSI/CSA standards. Refer to *S3AM-208-ATT6 High Visibility Safety Apparel*.
 - 4.10.2 Color of apparel (orange or lime) may be client/project-specific. If there is a specific need to be visible to the passing public, to machine operators, or to other crew members, high visibility vests shall be worn (and retro-reflective striping on arms and legs at night).
 - 4.10.3 Work conducted at night may require that the minimum level of apparel worn be, at minimum, ANSI/CSA Class III, and in accordance with the governing legislation.
- 4.11 Personal Clothing
 - 4.11.1 Employees on a project site shall wear full length trousers and shirts that cover shoulders.
 - 4.11.2 For personal safety on the job site, do not wear
 - Loose or unsecured clothing or loose fitting cuffs;
 - Greasy or oily clothing, gloves, or boots; or
 - Torn or ragged clothing.
 - Jewelry (e.g. rings, bracelets, neck chains) when working with moving parts or there is a risk or entanglement.
 - 4.11.3 Long hair shall be tied back or otherwise confined when working with moving parts or there is a risk of entanglement.
 - 4.11.4 Clothing made of synthetic fibers can be readily ignited and melted by electric flash or extreme heat sources. Cotton or wool fabrics are recommended for general use.

- 4.11.5 Footwear shall be suitable for the site conditions and task requirements. No athletic shoes, sandals, flip flops, permitted on active job sites.
- 4.11.6 It is recommended to use clothing with sun protection properties when working in high sun UV exposure
- 4.12 Specialized PPE
 - 4.12.1 In addition to basic PPE, additional specialized PPE may be required to provide appropriate protection to the employee. Refer to applicable legislation and related SH&E procedures for additional information on PPE requirements.
 - Fall Protection – Only full-body harnesses with shock-absorbing lanyards will be used for personal fall arrest. Refer to *S3AM-304-PR1 Fall Protection*.
 - Respiratory Protection – Respiratory protection shall be selected based on the contaminant and concentration to which the employee will be exposed. Refer to *S3AM-123-PR1 Respiratory Protection*, the task- or project-specific hazard assessments and the applicable SDSs for specific requirements.
 - Fire Resistant Clothing (FRC) – Approved fire-resistant outer clothing may be required at work locations with flammable or explosive materials or environments. Refer to *S3AM-208-ATT5 Limb & Body Protection*.
 - Other Head Protection – Operators and passengers (if trained and permitted) of all-terrain vehicles and snowmobiles will wear approved helmets. Refer to *S3AM-208-ATT2 Head Protection*.
 - Protection from Drowning – Appropriate personal floatation devices shall be worn when work working over and near water. Refer to *S3AM-315 Working On & Near Water*.
 - Temperature Extremes – Work in cold environments may require additional layers and insulated clothing, gloves, boots and accessories such as balaclavas, hardhat liners. Confirm these items are approved and do not introduce additional unacceptable hazards (e.g. insufficient visibility, conductivity, etc.).
 - Hearing Protection – Noise levels in the work environment that cannot be eliminated or reduced to acceptable levels requires worker be protected from exposure. Refer to *S3AM-118-PR1 Hearing Conservation*.
 - Traction Devices – Traction devices applied to the base of work boots may be necessary if the employee may be walking on icy surfaces. Refer to *S3AM-208-ATT3 Foot Protection*.
 - Rescue – Confined spaces hazards may necessitate the use of specific harnesses attached to retrieval lines to facilitate rescue. Refer to *S3AM-301-PR1 Confined Spaces*.
- 4.13 Maintaining PPE Supplies
 - 4.13.1 Employees shall inspect their required PPE prior to use. Defective equipment shall be removed from service and replaced.
 - 4.13.2 Each AECOM location will maintain a supply of safety equipment of appropriate types and sizes, including hard hats, high visibility vests, safety glasses, gloves, hearing protection and chemically resistant clothing based on the nature of their field activities. The Manager or designee will be responsible for maintaining this inventory.
 - 4.13.3 Use of PPE by employees and adequacy of protection should be evaluated on a routine basis. This may periodically be documented using *S3AM-208-FM2 Personal Protective Equipment Inspection*.
 - 4.13.4 At a minimum, locations will review their PPE program annually.
- 4.14 Obtaining Personalized Safety Gear
 - 4.14.1 Employees are not expected to provide their own general PPE. Most basic PPE will be provided to the employee at no charge (e.g. safety glasses, hard hat, gloves, hearing protection, etc.) with the

exception of the below personalized safety equipment (prescription safety glasses, safety-toed boots, any washable coveralls).

- 4.14.2 Certain personalized safety gear such as prescription safety glasses, safety-toed (capped) boots, and any washable coveralls will be ordered and sized specifically by the user. A partial cost reimbursement to the employee may be made if their location provides a specialized PPE purchase program.
- 4.14.3 All specialized PPE (e.g. fall protection equipment, respirators, helmets, etc.) will be provided by AECOM for employee use at no charge to the employee, with the exception of the above personalized safety equipment (prescription safety glasses, safety-toed boots, any washable coveralls).

5.0 Records

- 5.1 Completed SH&E plans, THAs documenting PPE requirements, and as applicable, PPE assessments and PPE inspections, will be maintained in the location's safety files.

6.0 Attachments

- 6.1 [S3AM-208-ATT1 Eye & Face Protection](#)
- 6.2 [S3AM-208-ATT2 Head Protection](#)
- 6.3 [S3AM-208-ATT3 Foot Protection](#)
- 6.4 [S3AM-208-ATT4 Hand Protection](#)
- 6.5 [S3AM-208-ATT5 Limb & Body Protection](#)
- 6.6 [S3AM-208-ATT6 High Visibility Safety Apparel](#)
- 6.7 [S3AM-208-FM1 Personal Protective Equipment Assessment](#)
- 6.8 [S3AM-208-FM2 Personal Protective Equipment Inspection](#)

Eye & Face Protection

S3AM-208-ATT1

1.0 Introduction

- 1.1 This fact sheet has been developed to inform employees about why eye and face protection is needed, when it should be worn, how to wear and adjust it properly, the limits of this type of PPE, and how to properly maintain and clean the eye and face protection issued.
- 1.2 AECOM will provide ANSI or CSA-approved (as appropriate to the jurisdiction) eye and face protection appropriate to the anticipated eye and face hazards and as required by client or site requirements. Employees shall wear the appropriate eye and face protection while engaged in activities where a risk of injury to the eyes or face may exist.
- 1.3 Safety glasses may be identified by the manufacturer or supplier logo, but shall contain the applicable standard marked (or etched) on all components (lenses, frames [front and temple], removable side shields, and any other parts of the glasses, goggles, or helmets).
- 1.4 Supervisors are responsible for ensuring that crews have access to the eye and face protection and confirming they are worn.

2.0 Types of Eye and Face Protection

- 2.1 There are three major types of eye and face protection:

2.1.1 Primary Protection

- Safety Glasses (side shields required)
- Safety goggles
 - Vented goggles—impact only
 - Indirectly vented—chemical splash and impact, dust
 - Non-vented—chemical fumes

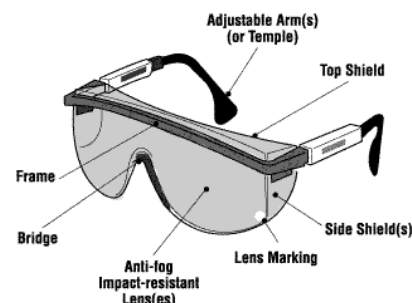
2.1.2 Faceshields

2.1.3 Radiation protection / welding helmets

2.2 Safety Glasses and Safety Goggles

- 2.2.1 The most widely used form of eye protection is safety glasses. To prevent lateral exposure to impact fragments, safety glasses are often 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. At a minimum, AECOM will provide safety glasses with permanently attached side-shields or directly vented goggles to all employees whose work may present any eye or face hazard.

- In some cases such as moderate dust levels, safety glasses may include foam seals on frames to improve sealing against dust. If dust irritation of the eyes is an issue, the employee should contact the supervisor to evaluate the condition and provide more protective or better fitting safety eyewear (e.g. goggles).
- The frames of safety glasses are stronger than everyday eyewear frames, are often heat resistant, and designed to prevent the lenses from being pushed into the eyes.



- High impact eye protection utilizes plastic polycarbonate lenses which are stronger than regular lenses, are impact-resistant, and come in prescription and non-prescription forms.
- 2.2.2 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. Goggles are required when working in an area or at a process that involves high dust or particulate concentrations.
- Direct vented goggles only provide impact resistance, but afford comfort due to air flow and reduction of fogging.
 - Indirect vented goggles are also impact resistant, but have capped vents to allow air flow while also protecting against splashes or flying particles. Restricted air flow may result in fogging.
 - Non-vented and indirectly vented goggles will be worn when employees are handling chemicals.
- 2.2.3 Manufacturers may apply anti-fogging and uv coatings to lenses of safety eyewear. Consider the use an anti-fogging agent if fogging of lenses is an issue.
- 2.3 Faceshields
- 2.3.1 Wear faceshields when there is a severe danger from impact from flying particles or chemical splash. Faceshields are secondary protectors and shall be worn over safety glasses or goggles.
- 2.3.2 Face shields providing impact protection shall be certified to the specifications of the applicable jurisdiction's standard (e.g., ANSI Z87+, CSA Z94.3, etc.).
- 2.3.3 Face shields shall be made available or installed whenever they may be required.
- 2.4 Radiation Protection / Welding Helmet
- 2.4.1 When welding or cutting, employees shall use equipment with filter lenses that has a shade number appropriate for protection against injurious light radiation.
- 2.4.2 When exposed to hazards such as lasers or beta radiation, employees shall use equipment with filter lenses that afford appropriate for protection against the laser or radiation hazard.

3.0 Prescription Glasses/Contact Lenses

- 3.1 If you wear corrective lenses, contact your SH&E coordinator for information about how to obtain prescription safety glasses. Prescription safety glasses shall be worn with appropriate side shields.
- 3.2 Regular prescription eyeglasses and sport glasses shall not be substituted for safety eyeglasses. Regular eyeglasses do not offer the same impact resistance of the lens and frame assembly as safety glasses and are not American National Standards Institute (ANSI) / Canadian Standards Association (CSA) approved.
- 3.3 Contact lenses are not recommended for any industrial job. Dust caught underneath the lens can cause painful abrasions. Some chemicals can react with your contacts to cause permanent injury.
- 3.3.1 When contact lenses are worn (and where a hazard exists), extra precautions are required to reduce the potential for injury. PPE for contact lens wearers includes splash or dust-resistant goggles, and safety glasses.

4.0 Cleaning and Maintaining Safety Eyewear

- 4.1 Clean lenses and frames regularly with mild soap and water and according to manufacturer's recommendations. Store protective eyewear in a clean, dry area.
- 4.2 Replace scratched, pitted, cracked, or broken safety eyewear immediately.

5.0 Proper Fit/Adjusting Glasses

- 5.1 PPE that fits poorly will not afford the necessary protection. When fitting devices for eye protection against dust and chemical splashes, be sure that the devices are sealed to the face. Confirm safety glasses fit properly. The arms or temples fit comfortably over the ears, the frame is as close to the face as possible and adequately supported by the bridge of the nose. If the temple bars of the glasses are too long, the glasses will have a tendency to fall forward and slide down your nose. Check with your SH&E representative if you require glasses with adjustable temple bars. Standard safety glasses are 2 ¼ inches (58 millimeters); however, smaller sizes (2 ⅛ inches [2.54 millimeters]) are also available.

WHEN TO WEAR PROTECTION

Hazard	Concern	Glasses	Goggles	Faceshield
Impact	Flying fragments from front/sides.	Safety glasses with sideshields.	Vented goggles.	Severe danger from impact. Wear with glasses/goggles.
Chemicals	Splash.		Indirectly vented.	Severe splash. Wear with goggles.
Chemicals	Fumes.		Non-vented.	
Dust	Dust entering the eye.	Safety glasses with sideshields.	Vented goggles.	
Optical Radiation	Bright Light		Welding goggles with appropriate shaded lens.	Welding helmet with appropriate shaded lens.
	Ultra Violet			
	Infra-red (Heat)			
	Visible Light (Glare)			

Notes: Information provided by UVEX.











6.0 Guidelines

- 6.1 Dual eye protection – face shields shall be worn in addition to safety glasses or goggles when using chipping, grinding or buffing tools. Hazards associated with drilling or operations involving striking should be assessed for the need for dual eye protection.
- 6.2 Eye protection shall be worn when handling (e.g. transferring, spraying, applying, etc.) hazardous liquid or powder chemicals, and when draining or breaking joints on any pressure vessel, line, or equipment. In some situations, a face shield should be used in conjunction with goggles for additional eye and face protection.
- 6.2.1 Awkward positions, working overhead, or windy conditions may require retraining straps, mono-goggles or sealed eye wear.
- 6.2.2 Comfort and fit are very important in the selection of safety eyewear. Lens coatings, venting, or fittings may be needed to prevent fogging or to fit with regular prescription eyeglasses.
- 6.2.3 Safety sunglasses shall be worn when glare is a concern. Glare from sun and snow or water should be taken seriously as it can cause reduced vision and fatigue.

6.2.4 A combination of types of PPE may be necessary if more than one type of hazard exists. For example, where the potential hazards are chemical splashes and flying objects, chemical splash goggles used in combination with safety glasses may be required.

6.2.5 Lens color shall be appropriate to the environment and task. Use the below chart as a guideline only; always consult the manufacturer guidelines and specifications.

Safety Glasses Lens Color

	Clear Safety Glasses General indoor use
	Grey Safety Glasses Outdoor use where light and glare can cause eye strain and fatigue. Provides good color recognition.
	Clear with Slight Mirror Coating Safety Glasses Indoor / outdoor use. Serves same purpose as grey lens, but lets more visible light through. Reduces glare from artificial light.
	Gold, Blue, Silver Mirror Safety Glasses Outdoor use where light and glare can cause eye strain and fatigue. Provides good color recognition. Mirror reflects light, reducing the amount of light that passes through the lens.
	Dark Green Safety Glasses General purpose protection from glare and UV radiation.
	Brown/Espresso Safety Glasses Outdoor use where sunlight and glare cause eye strain and fatigue. Meets color traffic signal recognition requirements.
	Vermilion Safety Glasses Enhances contrast while reducing all color equality for best color recognition. Ideal for indoor inspection.
	Amber Safety Glasses Blocks blue portion of light spectrum while letting in red and green, creating high contrast. Hazardous at night when eye needs blue light to process visual information.
	SCT Safety Glasses (various tints) Spectrum control technology (SCT) lens is designed to absorb select wavelengths of light into the polycarbonate lens.
	Filter Shades (Glasses, Goggles, Helmets) Protects against ultraviolet and infrared radiation when working with molten metal, welding, cutting, soldering and brazing. (See Lens Shade Chart in Electric Arc Welding section of this document)

6.2.6 Brushing hair or removing clothing, eyewear, hard hats, etc. may release accumulated dust and/or metal particles. Bowing head and closing the eyes when removing these articles can prevent the particles from inadvertently entering the eyes.

6.2.7 Confirm an eyewash station is available in case flushing the eye becomes necessary

6.2.8 DO

- Replace pitted, scratched, bent, and poorly fitted PPE (damaged face/eye protection interferes with vision and will not provide the protection it was designed to deliver).
- Wear proper fitting eye protection (close to the face).
- Clean safety glasses daily, or more often if needed.
- Store safety glasses in a safe, clean, dry place when not in use.

6.2.9 DON'T

- Modify eye/face protection.
- Use eye/face protection that does not have ANSI/CSA certification.

Head Protection

S3AM-208-ATT2

1.0 Introduction

- 1.1 This fact sheet has been developed to inform employees about why head protection is needed, when it should be worn, how to wear and adjust it properly, the limits of this type of PPE, and how to properly maintain head protection issued.
- 1.2 Use hard hats in areas where there is the possible danger of head injury from the impact of falling or flying objects, striking against objects, electrical shock and/or burns, or any combination of these hazards. Hard hats will be worn when required by site safety procedures, client/site requirements, or when posted as an entry requirement.
- 1.3 The main type of head protector is the hardhat. Hardhats are designed to protect from impact and penetration caused by objects hitting your head and from limited electrical shock or burns. 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. AECOM recommends ratchet style suspension for rapid adjustment during changing site conditions.
- 1.4 Helmets are required when operating or as a passenger of All-Terrain Vehicles, Snowmobiles or motorcycles. Helmets to be worn shall have a chinstrap that can affix snugly under the operators chin and the helmet shall be certified by the appropriate jurisdictional body. It is an offence in certain jurisdictions to not wear helmets for off-road vehicles.
- 1.5 Supervisors are responsible for confirming that employees have the appropriate ANSI/CSA -approved protective headwear necessary for their safety. This may include, as required by the specific job task and associated hazards:
 - 1.5.1 Hard hat, or
 - 1.5.2 Helmet.

2.0 Hard Hat Impact Types

- 2.1 Type I Hard Hats
 - 2.1.1 Type I hard hats provide crown protection from penetration and impact. These hard hats are intended to reduce the force resulting from a blow only to the top (crown) of the head.
- 2.2 Type II Hard Hats
 - 2.2.1 Type II hard hats provide crown and lateral penetration and impact protection. These hard hats are intended to reduce the force resulting from a blow that may be received off center or to the top of the head. A Type II hard hat typically is lined on the inside with thick, high-density foam.
- 2.3 Electrical Classes
 - 2.3.1 Class G (General) – Class G hard hats are intended to reduce the danger of contact exposure to low voltage conductors. Test samples are proof-tested at 2,200 volts (phase to ground). However, this voltage is not intended as an indication of the voltage at which the hard hat protects the wearer. Please note: Class G hard hats were formerly known as Class A.
 - 2.3.2 Class E (Electrical) – Class E hard hats are intended to reduce the danger of exposure to high voltage conductors. Test samples are proof-tested at 20,000 volts (phase to ground). However, this voltage is not intended as an indication of the voltage at which the hardhat protects the wearer. Please note: Class E hard hats were formerly known as Class B.
 - 2.3.3 Class C (Conductive) – Class C hard hats are not intended to provide protection against contact with electrical conductors.

- 2.4 Do not use bump caps as protection against head injury, except when the only potential hazard is striking against objects and the use has been approved by a Manager.
- 2.5 No cowboy-style hard hats are permitted.
- 2.6 For tasks requiring face protection using face shields, hard hats designed for face shield attachment should be used. Some hard hats include attachment slots for hearing protection muffs.

3.0 Proper Fit / Maintenance

- 3.1 The suspension of the hard hat shall be adjusted to fit the wearer and to keep the shell a minimum distance of 1-1.5 inches (3 centimeters) above the wearer's head. Periodically inspect the suspension of your hard hat. Look for loose or torn cradle straps, loose rivets, broken sewing lines, or other defects. Replace the hat after a major impact.
- 3.2 Do not store materials in the suspension. Cold weather liners and perspiration control bands may be utilized within the hard hat unless specifically excluded by the manufacturer.
- 3.3 Any head covering worn under a hard hat should not contain any metal components, be close fitting, and not compromise the fit or stability of the hard hat in any manner. Baseball caps are prohibited from being worn under a hard hat.
- 3.4 Wear hard hats in the forward position unless written verification and instructions from the hard hat manufacturer indicate your hard hat model has been tested and found to be compliant when worn backwards.

4.0 Guidelines

- 4.1 On all construction projects and in the event that an overhead hazard exists, a four-point or six point suspension Type II, Class G or E hard hat will be provided to affected employees.
- 4.2 ANSI/CSA -approved industrial protective headwear that is appropriate to the hazards and meets applicable legislative requirements shall be worn by all personnel while engaged in construction, operation, maintenance, or other activities where there exists a foreseeable danger of injury to a worker's head at a work site and/or a significant possibility of lateral impact to the head.
- 4.3 Visitors to areas where the above activities are being conducted shall comply with the hard hat requirement.
- 4.4 Hardhats, hard hats, and hard hat accessories (as required) shall be provided by AECOM and shall be appropriate to the anticipated hazards (e.g. fire resistant, arc rated, etc.)
- 4.5 Wear integral chinstraps when there is a risk of the hard hat dislodging, when working in high-wind conditions, working overhead or near helicopters.
- 4.6 Proper care is required for headgear to perform efficiently. The service life is affected by many factors including temperature, chemicals, sunlight, and ultraviolet radiation (welding). The usual maintenance for headgear is simply washing with a mild detergent and rinsing thoroughly.
- 4.7 Do not store a hard hat in direct sunlight (e.g. vehicle back window) as it will be subjected to unnecessary UV exposure. A hard hat with a chalky appearance rather than having a glossy finish or flaking of the shell indicates UV damage.
- 4.8 Some insect repellants can degrade hard hat materials. Consult the manufacturer's recommendations and avoid any contact of the hard hat with insect repellant.
- 4.9 Do not alter hard hats in a way that will downgrade their efficiency. Typical prohibited alterations include painting, drilling holes in shell, application of metal jewelry, etc. Replace hats with these alterations or with excessive scratches.

- 4.10 Do not apply unapproved stickers to a hard hat. Placement of approved stickers on hardhats shall not hamper the ability to conduct a proper pre-use inspection. No stickers or reflective tape shall be placed within $\frac{3}{4}$ of an inch of the hard hat edge to prevent the risk of a decal acting as a conductor.
- 4.11 Inspect hard hats before use.
- 4.11.1 Remove from service if pitting, cracking, tearing, fraying, chalking, flaking, unapproved modifications or damaged suspension systems are observed.
- 4.11.2 Remove hard hats and their components from service and replace as recommended by the manufacturer. Hard hats shall be replaced after no more than 5 years.
- 4.11.3 Replacement suspensions are available for most hard hats. Note: Such things as hair oils, perspiration, hairspray and insect repellent can cause deterioration of the suspension.
- 4.11.4 DO
- Replace headgear that has been subjected to a blow even though damage cannot be seen.
 - Remove from service any headgear if its serviceability is in doubt.
 - Replace headgear and components according to manufacturers' instructions.
 - Consult the Safety, Health and Environment team or your supplier for information on headgear.
- 4.11.5 DON'T
- Drill, remove peaks, or alter the shell or suspension in any way.
 - Put chin straps over the brims of Class E headgear.
 - Use any liner that contains metal or conductive material.
 - Carry anything in the hard hat while wearing the hard hat.

Foot Protection

S3AM-208-ATT3

1.0 Introduction

- 1.1 AECOM employees shall use appropriate foot protection when hazards to feet are present or potential.
- 1.2 Foot injuries may occur if feet are unprotected, due to, but not limited to the following:
- Impact from heavy objects falling or rolling across the foot.
 - Puncture or cuts – sharp objects falling, stepped on otherwise contacted.
 - Puncture or cuts – high pressure water or equipment such as chainsaws, compacting equipment, snow blowers or ground brushing machines.
 - Improper ankle support when walking on uneven surfaces.
 - Electrical contact.
 - Extreme heat or cold – immersion or contact with extremely hot or cold materials or substances.
 - Chemical / hazardous substance contact - hazardous chemicals / products that can cause skin injury or irritation such as cement and petroleum products may contact feet and legs. Immersion in contaminated water.
 - Snake bites.

2.0 Guidelines

- 2.1 ANSI/ASTM or CSA -approved (as appropriate to the given jurisdiction) safety-toed (steel or composite) boots with a minimum of 6 inch (15.2 centimeters) ankle support, an oil-resistant sole, and a distinctive heel (unless a heel presents additional hazard), shall be the minimum footwear requirement of all employees engaged in construction, operation, maintenance, or other activities where a risk of injury to the feet may exist.
- 2.1.1 Supervisors are responsible for confirming that employees have and additional foot protection necessary to ensure their safety. This may include the following types or combination thereof, as required by the specific job task:
- Caulk / Cork boots – spike-soled boots generally utilized in logging or timber operations.
 - Boots providing metatarsal protection – provide above-the-toe protection from rolling or crushing hazards (e.g. railroad track work), as well as punctures or cuts from equipment such as chainsaws, compacting equipment, snow blowers or ground brushing machines.
 - Acid and/or chemical-resistant boots – provide protection from chemicals or chemical products that could cause injury or irritation.
 - Chemical-resistant boot covers – may be utilized for visitors, workers not routinely involved in the task or when potentially exposed to radiation hazards.
 - Insulated boots – provide protection from extreme hot or cold.
 - Rubber boots and non-slip wading boots – provide traction and immersion protection.
 - Electric shock resistant – provide protection from electricity that may be conducted through the feet.
- Note:** Electric shock resistant soles deteriorate with wear and in wet conditions. Static dissipative soles without toe protection are not certified by CSA.
- Traction devices – provide traction in icy conditions. Confirm the addition of ice cleats or other traction devices do not pose additional hazards (e.g. ice cleats made of conductive or sparking material in a flammable environment; loss of traction on concrete, etc.).

- 2.2 Employees assigned to field projects who are not required to wear specified protective footwear (e.g., steel-toed boots, metatarsal protection, rubber boots, chemical resistant boots, insulated boots, etc.) will wear substantial leather, high-sided work boots. Shoes (leather, canvas, tennis, deck, or other types of material), sandals, high-heeled shoes, etc., are not allowed on field project sites. In some cases protective over-boots may be required for specific-site access.
- 2.3 Employees are responsible for confirming their footwear is in good working condition and is appropriate to the conditions before work commences.
- Footwear must be, be fully laced and have adequate tread to maintain traction.
 - Replace footwear that is defective (e.g. exposed toe-caps).
 - Do not modify protective footwear.

3.0 Standards

- 3.1 Safety boots must meet the regulated standard.
- Safety boots are made with a steel or composite-reinforced box toe to protect the foot from being pierced or crushed by a falling object.
 - Safety boots with flexible steel insoles provide puncture resistance. They will stop or deflect nails or other objects that have penetrated the sole of the boot.
 - Oil-resistant soles provide the added safety feature of preventing slips and trips on slippery work floors.
- 3.2 The following standards apply to foot protection equipment:
- 3.2.1 Safety footwear may contain the following safety symbols denoting the protection offered:
- Green Triangle indicates that it is a class 1 toe cap with puncture resistant sole.
 - Yellow Triangle indicates that it is a class 2 toe cap with puncture resistant sole.
 - White Rectangle (with orange omega symbol) indicates electrical protection.
 - Yellow Square (with green SD) indicates anti-static protection.
 - Red Square (with black C) indicates electrically conductive.
 - Fir Tree indicates protection against chain-saws.
- 3.2.2 ASTM footwear may be labeled in the following manner: ASTM F2413-05 M/I/75/C/75
- The ASTM F2413- 05 indicates compliance with the standard
 - M stands for "Male" (or F for "Female")
 - I/75 indicates impact rating of 75 pounds
 - C/75 indicates compression rating of 75 (75 = 2500lbs of pressure, 50 = 1750lbs of pressure)
- 3.2.3 Examples of symbols:
-
- 3.2.4 When required by the regulations or the client, AECOM will provide affected employees with safety-toed boots that meet the requirements of the applicable ANSI/CSA standard.
- 3.2.5 The purchase of normal footwear for work is the responsibility of the employee.

4.0 Proper Fit

- 4.1 With most PPE, the more comfortable it is to use, the more likely to be used. The fit of the safety boot is of the utmost importance. Try safety boots on before purchasing. When selecting boots, be sure that they are American National Standard (ANSI), American Society for Testing and Materials (ASTM), or Canadian Standards Association (CSA) approved, as appropriate to the jurisdiction. Consult with your supervisor about how to obtain safety boots.
- 4.2 The former ANSI standard for protective footwear has been replaced by ASTM standards. Footwear certified to the former ANSI Z41 1999 standard does not require replacement unless user inspection identifies safety deficiencies.

Hand Protection

S3AM-208-ATT4

1.0 Introduction

- 1.1 This fact sheet will inform employees about why and when hand protection is needed, the limits of gloves, and how to properly clean and dispose of gloves. Refer to *S3AM-317-PR1 Hand Safety* for additional information and guidance.
- 1.1.1 Gloves most commonly used in the construction industry are made from:
- Kevlar (or engineered fabrics).
 - Leather.
 - Cotton.
 - Rubber.
 - Synthetic rubbers and other manmade materials.
- 1.2 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.

2.0 Types of Hand Protection

- 2.1 After physical guards, gloves provide the most common hand protection. There is no glove that protects against all hand hazards. The information below can assist the employee in selecting the appropriate glove for the hazardous condition. In all cases, the gloves should meet testing standards for the appropriate hazard they are protecting against.
- 2.2 As a general rule, always consult the manufacturer for specifications to ensure the gloves will provide the appropriate hand protection needed.
- 2.3 When selecting appropriate gloves, cuff design (open or closed) and glove length should also be considered.
- 2.4 Skin absorption of harmful substances
- 2.4.1 Nitrile offers good resistance to certain chemicals, but they tear and rip easily when sharp objects are handled.
- 2.4.2 The AECOM manager and employee shall consult the Safety Data Sheet (SDS) of the material being handled and, as appropriate, subject matter experts to appropriately select the chemical resistant glove.
- 2.4.3 The glove selection and any applicable liner gloves shall be based on proposed use and the manufacturer's chemical compatibility data, which indicates how each glove material performed in breakthrough time tests against certain chemicals. Examples:
- Butyl, polyethylene, or Silver Shield/4H gloves should be used for painting where significant potential for skin exposure to isocyanates exists.
 - Porous painters or mechanics gloves should have butyl, polyethylene, or nitrile gloves worn underneath and are only appropriate for activities with incidental chemical contact and short-term use.
 - Butyl or Silver Shield®/4H® gloves should be worn for adequate skin protection from acetone or methyl ethyl ketone (MEK). Nitrile gloves are not recommended.

- 2.4.4 In some cases, inner disposable chemical gloves (e.g., nitrile) will be required for protection of hands during removal of contaminated gloves.
- 2.4.5 Do not substitute another type of glove for the appropriately identified chemical resistant gloves that have been selected for the hazard; they may not offer adequate protection for the chemicals you handle.
- 2.4.6 Chemical gloves and chemical protective clothing often require taping the glove to the clothing to prevent gaps.
- 2.5 Severe cuts lacerations and punctures
 - 2.5.1 Gloves providing cut resistance may be constructed of leather, synthetic materials (e.g. polyester, nylon), high performance materials (e.g. Kevlar), and metal mesh.
 - 2.5.2 Leather gloves offer very little cut and puncture protection, however, they do offer some abrasion protection (see abrasion protection below). If cut or laceration hazards are present, an appropriate ANSI cut resistant rated glove should be used (Canada does not identify cut resistant ratings).
 - 2.5.3 ANSI provides cut resistant ratings for various gloves to assist the user in selecting the right type of protection. The ratings are based upon how well the glove withstands ASTM testing methods.
 - 2.5.4 Please note not all gloves that provide good cut/laceration resistance provide equal puncture resistance. When selecting a glove for puncture protection, please look at the manufacturer's specifications specific to puncturing. When selecting a glove for cut/laceration resistance, the information below can be used as a guide:
 - **ANSI Level 1: Lowest cut hazard potential.** For example, paper cuts, parts assembly, light material handling, paper, assembling cardboard boxes, etc.
 - **ANSI Level 2: Low cut hazard potential.** For example, packaging, light rope handling, moving office supplies, mechanical assembly work.
 - **ANSI Level 3: Medium cut hazard potential.** For example, light glass handling, glass bottle/sample jar handling, light sheet metal handling, medium rope handling, and light utility knife handling.
 - **ANSI Level 4: High cut hazard potential.** For example, thin sheet metal handling, rope handling, working around sharp edges, and medium utility knife handling.
 - **ANSI Level 5: Highest cut hazard potential.** For example, thin sheet metal handling, working around sharp edges, heavy utility knife handling, and picking up broken glass.
- 2.6 Abrasions
 - 2.6.1 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 cut and lacerations are of minimal concern.
 - 2.6.2 If cut or laceration hazards are present, an appropriate ANSI cut resistant rated glove should be selected. If medium to high abrasion protection is needed, select a glove that is approved to the appropriate level.
 - 2.6.3 Gloves manufacturer with abrasion resistant surfaces in high contact areas (e.g. knuckles, palm) should be considered for tasks involving high potential for abrasion hazards (e.g. construction activities, mechanics, etc.).
- 2.7 Vibration
 - 2.7.1 Gloves that meet the applicable ANSI standard for vibration reduction (also known as Anti-Vibration gloves) should be selected if performing activities that require handling vibrating tools (e.g. chainsaw, jackhammer, grinder, etc.).
 - 2.7.2 Match the glove type to the hazard. Consult the glove manufacturer for guidance on selecting the right glove for the task. All Anti-Vibration gloves should completely cover the fingers.

2.8 Electrical Protection

- 2.8.1 Electrically insulated gloves used to protect from electrical hazards must be appropriately rated for the anticipated voltage.
- Insulated gloves and protectors must be inspected, tested and maintained according to manufacturer's specifications. Metal splinters, punctures or tears and cracking from ozone damage can all provide a path to conduct electricity
 - Leather protectors must always be worn over insulated gloves worn for electrical protection. Never wear leather protectors without insulated gloves
- 2.8.2 Do not rely on glove color for identification of type and protection as color coding can be inconsistent. Ensure labels and manufacturer specifications are consulted to correctly identify glove type.
- 2.8.3 Do not wear hand PPE with metal parts near electrical equipment.

2.9 Temperature extremes and other hazards

- 2.9.1 Heat/flame resistant: depending on the activity and hazard, gloves or mittens that have been tested in accordance to ASTM standards should be selected when handling hot materials. Match the glove to the appropriate heat exposure level. The glove manufacturer may need to be contacted to help determine if the glove will meet and exceed hand protection.
- 2.9.2 Cold resistant: depending on the activity and hazard, insulated gloves or mittens should be used to protect the user's hands from cold conditions.
- 2.9.3 Wet gloves will diminish any insulating properties increasing the risk of frostbite in cold conditions. Conductivity is also increased when gloves become wet and pose a significant hazard in the presence of electricity.
- 2.9.4 Welding requires gloves that are fire resistant (e.g. leather) and extend up the forearm.
- 2.9.5 Employees subjected to radiation hazards may require lead-lined rubber, plastic or leather gloves.

2.10 Dexterity and Slip Resistance

- 2.10.1 Gloves should be selected according to the level of contact the user requires to conduct work tasks. Some work activities require more finger dexterity to safely do the work while other tasks or applications have a high risk/potential for cuts and abrasions to the hands. The protection selected must be appropriate to the type of hazard, but in the event of any discrepancies the protection required for the highest risk will prevail.
- 2.10.2 Gloves made of slip resistance of material may be required (e.g. climbing rung ladders, handling slippery objects).
- 2.10.3 Synthetic cut protection material such as Kevlar and Dyneema can be very slippery. A coating is often applied to provide grip.

3.0 Proper Fit/Cleaning Disposal

3.1 Use gloves that fit properly.

- 3.1.1 Tight-fitting gloves can cause fatigue while loose-fitting gloves can be hazardous. Always select the right size of glove.
- 3.1.2 Measure the circumference of your hand around the palm area. This measurement, in inches, is closest to your actual glove size. For example, 7" is equal to a size 7 glove. Always select the right size glove.
- 3.1.3 Form fitting gloves should be worn when working with moving machinery; bulky gloves can get caught or tangled in equipment.

- 3.2 When protective factors are not negatively impacted, glove liners or approved powder may be used to reduce friction that could be encountered.
- 3.3 Dispose of chemically resistant gloves in accordance with the established protocols at the site or office. The product SDS will need to be consulted if the glove is contaminated from chemical handling.
- 3.4 As applicable and appropriate to the glove type, wash all chemicals and fluids off gloves before removing hand PPE.
- 3.5 Gloves will deteriorate over time depending on the type of work and amount of chemicals gloves are exposed to. Remove excessive chemical residue that builds up on the glove. Replace cracked, ripped, or torn gloves or when breakthrough occurs. Breakthrough is the time between initial contact of the chemical on the glove surface and the detection of the chemical on the inside of the glove.
- 3.6 Follow manufacturer's instructions on the care and use of the hand PPE you are using.

4.0 Additional Points to Remember

- 4.1 Consult applicable SDSs, the SH&E Manager, and/or subject matter experts for questions related to the selection, use and maintenance of hand PPE.
- 4.2 Consideration must be given to allergies and alternatives shall be provided if necessary.
- 4.3 Always review performance characteristics as listed by the manufacturer.
- 4.4 The user shall inspect and test hand protection daily to determine if any deficiencies exist, such as holes, rips, excessive wear and tear, and saturation with water, oil or other substances that diminish the protection offered by the glove.
 - 4.4.1 Effort must be made to keep gloves from becoming soiled with oil or other hydrocarbons. These can pose a fire hazard particularly when exposed to high concentrations of oxygen.
 - 4.4.2 All rubber and synthetic gloves shall be tested for leaks prior to use. Inflate the glove by swinging it out a few times to trap air. Grasp the cuff to prevent the air from escaping and squeeze to cause the glove to expand allowing any escaping air to identify holes or tears.

Limb & Body Protection

S3AM-208-ATT5

1.0 Introduction

- 1.1 If there is a danger that a worker's hand, arm, leg or torso may be injured, the appropriate and properly fitting hand, arm, leg or body protection equipment is worn for the hazard identified.
- 1.2 Workers shall wear the appropriate chainsaw chaps when operating a chainsaw and snake chaps if potentially exposed to snake bites.
- 1.3 Limb and body protection should not be modified without manufacturer's approval as the protective qualities may be compromised (e.g. slits cut in coveralls or protective suits to access pockets can result in increased susceptibility to exposure; materials used for secondary stitching may conduct electricity or melt upon high temperature exposures).

2.0 Chemical Resistant Clothing

- 2.1 The need for chemical resistant clothing will be determined by the Manager after consulting the products SDS, any necessary subject matter experts, and the SH&E Manager. The Manager will issue the required clothing to the employee.
- 2.2 Like gloves, the objective of whole body protection is to separate the person from a contaminating or hazardous material. Disposable garments, such as Tyvek coveralls or aprons, provide this type of barrier.
 - Uncoated Tyvek coveralls are made of a porous fabric and are designed to prevent contact with particulates.
 - Coated Tyvek coveralls provide a nonporous barrier to protect the worker from chemical splash and vapors.
 - Protective aprons are made from nitrile or neoprene rubber like that used to make chemical resistant gloves.
- 2.3 Whenever there is a potential for chemical splashing, disposable, chemical resistant clothing, such as a coated Tyvek coverall or apron will be worn. The following tasks are examples where chemical resistant clothing should be used:
 - Cleaning of spills (large or small).
 - Handling materials that are hazardous to skin.
 - Sampling hazardous liquids/material.
 - Equipment decontamination.
 - Non-routine tasks involving the use of chemicals.
 - The transfer of large quantities of chemicals from large containers to smaller ones.

3.0 Fire Retardant & Flame Resistant Clothing (FRC)

- 3.1 The terms 'Fire' and 'Flame', and 'Retardant' and 'Resistant', in reference to FRC are often used interchangeably and definitions can vary considerably. Regardless of the term used, it is important to know how the particular clothing provides protection.
- 3.2 Fabric used in FRC may be composed of fibers that resist ignition and withstand heat while other fabric may be treated with a chemical to provide flame resistance.
- 3.3 Some chemical treatments (such as Proban) can begin to lose effectiveness after 25 to 35 washes, whereas fabric composed of FRC fibers will not lose effectiveness due to washing.
- 3.4 If FRC is soiled the protection afforded is severely diminished. In some cases the residue, such as hydrocarbons, may be flammable.
- 3.5 Tears or holes in clothing can diminish its protective capacity and possibly pose a snagging hazard.

- 3.6 Do not roll up sleeves or pant legs, or neglect to fasten the front (zipper, snap) as intended.
- 3.7 Ensure the manufacturer's instructions and recommendations are followed when laundering or mending FR clothing.
- 3.8 Do not use fabric softener or bleach on FRC.
- 3.9 Wash on low temperature separately from other garments.
- 3.10 If a worker may be exposed to a flash fire or electrical equipment flashover, workers shall wear the appropriate rated outerwear and use other PPE appropriate to the hazard.
- 3.11 If FRC is to be worn, the clothing beneath the outerwear and against the skin shall be made of FRC fabrics or of natural fibers that will not melt when exposed to heat. Synthetic clothing is prohibited.
- 3.12 Situations requiring FRC include, but are not limited to:
 - Risk of fire or explosion.
 - Ground disturbance over or near live pressurized lines containing hydrocarbons.
 - Work conducted within 165ft (50m) of a live facility.
 - Jurisdictional requirements.
 - Customer requirements.
 - SDS or Task Hazard Assessments identify as necessary.
- 3.13 If static charge is an ignition concern work wear with anti-static properties may be required.
- 3.14 Clothing shall cover potentially exposed areas as completely as possible.

4.0 Arc Rated Clothing

- 4.1 Arc rated clothing has been tested for exposure to an electric arc. Note: If FRC does not have an arc rating it has not been tested for exposure to an electric arc.
- 4.2 Arc rated clothing is issued the lower value of either an ATPV or EBT value.
 - ATPV – arc thermal performance value
 - EBT – break open threshold
- 4.3 The arc rating is expressed in cal/cm².
- 4.4 An arc flash hazard analysis shall be conducted by a competent person to determine the appropriate rating required for protective clothing and when it shall be worn. Refer to *S3AM-302-PR1 Electrical Safety*.
- 4.5 When arc rated clothing is worn it shall cover all affected parts of the body as well as any other clothing. The arc rated clothing shall be the outermost layer when arc protection is required.
- 4.6 Areas or electrical equipment may be labeled indicating the required PPE and the minimum arc rating for clothing.
- 4.7 Clothing that is not arc rated, but worn in conjunction with arc rated clothing shall not be used to increase the arc rating of the clothing system.

High Visibility Safety Apparel

S3AM-208-ATT6

1.0 Class 1 Safety Apparel

- 1.1 Class 1 safety apparel provides the minimum amount of required material to differentiate the wearer from the work environment.
- 1.2 At a minimum, this shall include 217 square inches (in²), or 0.14 square meters (m²), of fluorescent yellow-green, orange-red, or red background materials combined with 155 in² (0.10 m²) retro-reflective material. As an alternative, the apparel can have 310 in² (0.20 m²) of combined-performance material (i.e., materials that are both retro-reflective and fluorescent).
- 1.3 Class 1 safety apparel typically consists of a sleeveless traffic vest with retro-reflective bands no less than 0.98 inches (25 mm) in width.
- 1.4 Those occupational activities under which Class 1 safety apparel is typically used:
 - 1.4.1 Permit full and undivided attention to approaching traffic;
 - 1.4.2 Provide ample separation of the pedestrian worker from conflicting vehicle traffic; and
 - 1.4.3 Permit optimum conspicuity in backgrounds that are not complex with vehicle and moving equipment speeds not exceeding 25 miles per hour (mph), or 40 kilometers per hour (kph).
- 1.5 Examples of pedestrian workers who could work in these situations may include:
 - 1.5.1 Workers directing vehicle operators to parking/service locations;
 - 1.5.2 Workers exposed to the hazards of warehouse equipment traffic;
 - 1.5.3 Roadside "right-of-way" or sidewalk maintenance workers; and
 - 1.5.4 Delivery vehicle drivers.

2.0 Class 2 Safety Apparel

- 2.1 Class 2 safety apparel provides superior visibility for the wearers by the additional coverage of the torso and is more conspicuous than Class 1.
- 2.2 At a minimum, this shall include 775 in² (0.50 m²) of fluorescent yellow-green, orange-red, or red background materials combined with 201 in² (0.13 m²) retro-reflective material. Combined-performance materials may not be used without background materials in Class 2.
- 2.3 Class 2 safety apparel typically consists of a full-torso sleeveless traffic vest with retro-reflective bands no less than 1.38 inches (35 mm) in width.
- 2.4 Those occupational activities under which Class 2 safety apparel is typically used:
 - 2.4.1 Greater visibility is desired during inclement weather conditions;
 - 2.4.2 Complex backgrounds are present;
 - 2.4.3 Employees are performing tasks which divert attention from approaching vehicle traffic;
 - 2.4.4 Work activities take place in close proximity to vehicle traffic; and
 - 2.4.5 Vehicle and moving equipment speeds exceed 25 mph (40 kph).
- 2.5 Examples of pedestrian workers who could work in these situations may include:
 - 2.5.1 Roadway construction workers;
 - 2.5.2 Utility workers;
 - 2.5.3 Survey crews;
 - 2.5.4 Railway workers;
 - 2.5.5 Forestry workers;

- 2.5.6 Parking and/or toll gate personnel;
- 2.5.7 Airport baggage handlers/ground crew;
- 2.5.8 Emergency response personnel;
- 2.5.9 Law enforcement personnel; and
- 2.5.10 Accident site investigators.

3.0 Class 3 Safety Apparel

- 3.1 Class 3 safety apparel 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 the arms and/or legs.
- 3.2 At a minimum, this shall include 1240 in² (0.80 m²) of fluorescent yellow-green, orange-red, or red background materials combined with 310 in² (0.20 m²) retro-reflective material. Combined-performance materials may not be used without background materials in Class 3.
- 3.3 Class 3 safety apparel typically consists of a coveralls, jumpsuits, long or short-sleeved jackets, or long-sleeved shirts with retro-reflective bands no less than 1.97 inches (50 mm) in width. A sleeveless garment or vest alone shall not be considered Class 3 apparel.
- 3.4 Those occupational activities under which Class 3 safety apparel is typically used:
 - 3.4.1 Workers are exposed to significantly high vehicle speeds and/or reduced sight distances (note that several sources have interpreted the vehicle speed requirements as 50 mph (80 kph) or more);
 - 3.4.2 The worker and vehicle operator have high task loads, clearly placing the worker in danger; or
 - 3.4.3 The wearer must be conspicuous through a full range of body motions at a minimum of 1280 feet (390 m) and must be identifiable as a person.
- 3.5 Examples of pedestrian workers who could work in these situations may include:
 - 3.5.1 Roadway construction personnel;
 - 3.5.2 Utility workers;
 - 3.5.3 Survey crews;
 - 3.5.4 Emergency response personnel; and
 - 3.5.5 Flagging crews.

4.0 Class E Safety Apparel

- 4.1 Class E apparel includes trousers or shorts which are part of a Class 3 apparel ensemble. Frequently a Class 2 vest is paired with Class E trousers, creating an overall ensemble which meets Class 3 apparel requirements. Class E garments are not intended to be worn without Class 2 or 3 garments.
- 4.2 At a minimum, Class E trousers shall have 465 in² (0.30 m²) of fluorescent yellow-green, orange-red, or red background materials combined with 108 in² (0.07 m²) retro-reflective material. Retro-reflective material shall encircle each leg (360° of visibility) and be placed not less than 1.97 inches (50 mm) above the bottom leg of the trouser.
- 4.3 At a minimum, Class E shorts shall have 465 in² (0.30 m²) of fluorescent yellow-green, orange-red, or red background materials combined with 108 in² (0.07 m²) retro-reflective material. Retro-reflective material shall encircle each leg.

5.0 Headwear

- 5.1 Headwear is considered an important accessory and compliments the overall visibility of the wearer. High-visibility headwear enhances visibility to the head of a moving worker in daylight and helps define the shape of the human form during nighttime exposures.
- 5.2 At a minimum, high-visibility headwear shall have 78 in² (0.05 m²) of fluorescent yellow-green, orange-red, or red background materials combined with 10 in² (0.0065 m²) retro-reflective material. As an alternative, the headwear can have 78 in² (0.05 m²) of combined-performance material.

Americas

Personal Protective Equipment Assessment

S3AM-208-FM1

Location: _____ Job No.: _____

Date: _____ Assessment conducted by: _____

Specific tasks performed at this location: _____

*If any of the indicated hazards are present, eliminate the hazard or use the indicated PPE.
Include any additional guidance in the available section below each item.*

Overhead Hazards

- | | | |
|---|--|---|
| 1. Suspended/elevated loads, beams, or objects that could fall or strike head | <input type="checkbox"/> Yes <input type="checkbox"/> No | Hard hat, ANSI Z89, Class G, E or C |
| 2. Flying objects that could strike head | <input type="checkbox"/> Yes <input type="checkbox"/> No | Hard hat, ANSI Z89, Class G, E or C |
| 3. Energized wires or equipment that could strike head | <input type="checkbox"/> Yes <input type="checkbox"/> No | Hard hat, ANZI Z89, Class G or E (dependent on potential voltage) |
| 4. Sharp objects or corners at head level | <input type="checkbox"/> Yes <input type="checkbox"/> No | Hard hat, ANSI Z89, Class G, E or C |

Eye Hazards

- | | | |
|--|--|--|
| 5. Chemical splashes or irritating mists | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety goggles |
| 6. Excessive dust | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety glasses or goggles |
| 7. Smoke and/or fumes | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety goggles |
| 8. Welding operations | <input type="checkbox"/> Yes <input type="checkbox"/> No | Welding goggles |
| 9. Lasers/optical radiation | <input type="checkbox"/> Yes <input type="checkbox"/> No | Consult subject matter expert for proper selection |
| 10. Projectiles | <input type="checkbox"/> Yes <input type="checkbox"/> No | Dual eye protection |
| 11. Sawing, cutting, chipping, and/or grinding | <input type="checkbox"/> Yes <input type="checkbox"/> No | Dual eye protection |

Face Hazards

- | | | |
|---|--|-----------------------------------|
| 12. Chemical splashes or irritating mists | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety goggles |
| 13. Welding operations | <input type="checkbox"/> Yes <input type="checkbox"/> No | Welding goggles or welding helmet |
| 14. Projectiles | <input type="checkbox"/> Yes <input type="checkbox"/> No | Dual eye protection |

***If any of the indicated hazards are present, eliminate the hazard or use the indicated PPE.
Include any additional guidance in the available section below each item.***

Hand Hazards

- | | | |
|--|--|--|
| 15. Chemical exposure | <input type="checkbox"/> Yes <input type="checkbox"/> No | Use chemical-resistant gloves specific to hazard; consult SDS, subject matter expert, and/or Safety Representative |
| 16. Sharp edges, splinters, sharp tools, machine parts, etc. | <input type="checkbox"/> Yes <input type="checkbox"/> No | Leather or Kevlar gloves |
| 17. Impact or crush hazards | <input type="checkbox"/> Yes <input type="checkbox"/> No | Impact resistant gloves |
| 18. Temperature extremes – heat | <input type="checkbox"/> Yes <input type="checkbox"/> No | Leather gloves, welder's gloves, hot mill gloves |
| 19. Temperature extremes – cold | <input type="checkbox"/> Yes <input type="checkbox"/> No | Insulated gloves |
| 20. Blood, fungus, biological agents | <input type="checkbox"/> Yes <input type="checkbox"/> No | Nitrile gloves |
| 21. Exposure to live electrical currents | <input type="checkbox"/> Yes <input type="checkbox"/> No | Electrical gloves; consult Safety representative |
| 22. Vibrating tool operation | <input type="checkbox"/> Yes <input type="checkbox"/> No | Anti-Vibration gloves |
| 23. Material handling | <input type="checkbox"/> Yes <input type="checkbox"/> No | Leather, cotton, synthetic gloves |

Foot Hazards

- | | | |
|---|--|---|
| 24. Heavy materials (greater than 50 pounds) handled by employees | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety shoes or boots |
| 25. Potential to crush or cut whole foot | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety shoes or boots with metatarsal guard |
| 26. Sharp edges or points (puncture risk) | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety shoes or boots |
| 27. Exposure to electrical hazards | <input type="checkbox"/> Yes <input type="checkbox"/> No | <p>Safety shoes or boots with:</p> <p>Conductive - Protects the wearer in an environment where the accumulation of static electricity on the body is a hazard.</p> <p>Static dissipative - Reduces accumulation of excess static electricity by conducting body charge to ground while maintaining a sufficiently high level of resistance.</p> <p>Electrical hazard - Provides a secondary source of protection against accidental contact with live electrical circuits, electrically energized conductors, parts or apparatus, and is manufactured with non-conductive electrical shock resistant soles and heels.</p> |

***If any of the indicated hazards are present, eliminate the hazard or use the indicated PPE.
Include any additional guidance in the available section below each item.***

- | | | | |
|-----|-------------------------|--|---|
| 28. | Slippery conditions | <input type="checkbox"/> Yes <input type="checkbox"/> No | Rubber-soled boots or grips |
| 29. | Chemical contamination | <input type="checkbox"/> Yes <input type="checkbox"/> No | Rubber, PVC, or polyurethane boots or boot covers with puncture and protective toe if task required |
| 30. | Wet conditions | <input type="checkbox"/> Yes <input type="checkbox"/> No | Rubber boots or boot covers |
| 31. | Construction/demolition | <input type="checkbox"/> Yes <input type="checkbox"/> No | Safety boots with metatarsal guard if foot-crushing hazard exists |

Fall Hazards

- | | | | |
|-----|---|--|---------------------------------------|
| 32. | Elevations above 4 feet (general industry) or 6 feet (construction) without guardrails | <input type="checkbox"/> Yes <input type="checkbox"/> No | ANSI A-10.14 Type 1 full-body harness |
| 33. | Suspended scaffolds, boatswain's chairs, float scaffolds, or suspended staging | <input type="checkbox"/> Yes <input type="checkbox"/> No | ANSI A-10.14 Type 1 full-body harness |
| 34. | Working in trees | <input type="checkbox"/> Yes <input type="checkbox"/> No | ANSI A-10.14 Type 1 full-body harness |
| 35. | Working in vehicle-mounted elevating work platforms (e.g., bucket trucks, aerial lifts) | <input type="checkbox"/> Yes <input type="checkbox"/> No | ANSI A-10.14 Type 1 full-body harness |

Water Hazards

- | | | | |
|-----|--|--|--|
| 36. | Working on or above water where a risk of drowning exist | <input type="checkbox"/> Yes <input type="checkbox"/> No | U.S. Coast Guard approved personal floatation device; Type I, II, or III |
|-----|--|--|--|

Excessive Heat or Flame

- | | | | |
|-----|---|--|--|
| 37. | Full body chemical protective clothing in temperatures greater than 80 °F | <input type="checkbox"/> Yes <input type="checkbox"/> No | Cooling vest |
| 38. | Work around molten metal or flame | <input type="checkbox"/> Yes <input type="checkbox"/> No | Nomex or heat reflective clothing |
| 39. | Welding activities | <input type="checkbox"/> Yes <input type="checkbox"/> No | Welding leathers for those areas that are exposed to flame, spark, or molten metal |

Respiratory Hazards

- | | | | |
|-----|---|--|---|
| 40. | Airborne particulates, gases, vapors, or mists in excess of established exposure limits | <input type="checkbox"/> Yes <input type="checkbox"/> No | Refer to <i>S3AM-123-PR1 Respiratory Protection</i> for respirator selection guidance |
|-----|---|--|---|

Excessive Noise

- | | | | |
|-----|-------------------|--|--------------------------|
| 41. | Exposure to noise | <input type="checkbox"/> Yes <input type="checkbox"/> No | Ear plugs, muffs or both |
|-----|-------------------|--|--------------------------|

***If any of the indicated hazards are present, eliminate the hazard or use the indicated PPE.
Include any additional guidance in the available section below each item.***

Body and Leg Protection

- | | | | |
|-----|--|--|---|
| 42. | Chemical exposure | <input type="checkbox"/> Yes <input type="checkbox"/> No | Contact SH&E Representative and/or subject matter expert for assistance in proper selection |
| 43. | Using chainsaw, cutting brush | <input type="checkbox"/> Yes <input type="checkbox"/> No | Chainsaw chaps |
| 44. | Exposure to snakes | <input type="checkbox"/> Yes <input type="checkbox"/> No | Snake chaps |
| 45. | Exposure to vehicle traffic or heavy equipment | <input type="checkbox"/> Yes <input type="checkbox"/> No | High visibility apparel |

I certify that the above inspection was performed to the best of my knowledge and ability, based on the hazards present on: _____

Name _____ Signature _____

This document should be included in the location specific SH&E Plan.

Americas

Personal Protective Equipment Inspection

S3AM-208-FM2

Name of Inspector _____ Date Inspected _____

Hard Hats – adequate to the hazards? <input type="checkbox"/> Yes <input type="checkbox"/> No Comments:	
1. The brim or shell does not show signs of exposure and excessive wear, loss of surface gloss, chalking, or flaking.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
2. Suspension system in hard hat does not show signs of deterioration, including cracking, tearing, or fraying.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
3. The brim or shell is not cracked, perforated, or deformed.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
4. Employees use hard hats in marked areas.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
5. Areas requiring hard hat usage are marked.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Foot Protection – adequate to the hazards? <input type="checkbox"/> Yes <input type="checkbox"/> No Comments:	
6. Safety shoes used by employees do not show signs of excessive wear.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
7. Areas requiring safety shoes are marked.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Hand Protection – adequate to the hazards? <input type="checkbox"/> Yes <input type="checkbox"/> No Comments:	
8. Gloves are available and worn when needed.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
9. Gloves are appropriate for the task.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
10. Gloves do not show signs of excessive wear such as cracks, scrapes, or lacerations, thinning or discoloration, or break-through to the skin.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Protective Clothing – adequate to the hazards? <input type="checkbox"/> Yes <input type="checkbox"/> No Comments:	
11. Protective clothing (e.g. high visibility apparel, fire resistant clothing) is worn by employees when required.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Hearing Protection – adequate to the hazards? <input type="checkbox"/> Yes <input type="checkbox"/> No Comments:	
12. Noise hazard areas are posted.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
13. Employees are using earplugs or muffs when using noise producing equipment or working in posted noise hazard areas.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Eye and Face Protection – adequate to the hazards? <input type="checkbox"/> Yes <input type="checkbox"/> No Comments:	
14. Eye hazard areas are marked or posted.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
15. Employees use safety glasses/goggles when working in eye hazard areas or working with equipment that produces an eye hazard.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
16. Face shields are used when required and worn over safety goggles.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

REMARKS (All “No” answers indicate a hazard which needs to be fixed.)

Risk Assessment & Management

S3AM-209-PR1

1.0 Purpose and Scope

- 1.1 This procedure requires hazard identification, risk evaluation, control measures, and documentation to manage safety, health, and environment (SH&E) risks associated with work activities.
- 1.2 The objective is to establish and enhance SH&E performance, to mitigate and reduce losses due to injury, illness, property damage, or environmental impairment incident, and maintain regulatory compliance.
- 1.3 This procedure applies to all AECOM Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.

2.0 Terms and Definitions

- 2.1 **Control Measure** - Actions that can be taken to reduce the potential of exposure to the hazard. The control measure could be to remove the hazard or to reduce the likelihood of the risk of the exposure to that hazard being realized.
- 2.2 **Hazard** - An object, condition or behavior that has the potential to cause human injury or illness, property damage, damage to the environment, business interruption, or a combination of these.
- 2.3 **Risk** – The possibility of loss or injury.
- 2.4 **Task Hazard Assessment (THA)** – A THA is a tool for evaluating work activities for the purpose of:
 - Identifying the SH&E hazards and risks associated with the activity being performed;
 - Identifying and implementing control measures to eliminate or reduce hazards and risks; and,
 - Evaluating the effectiveness of control measures and making modifications as needed.

3.0 References

- 3.1 S2-001-ATT4 Catastrophic and Critical Consequences Guidance – AECOM Global
- 3.2 S3AM-002-PR1 Stop Work Authority
- 3.3 S3AM-004-PR1 Incident Reporting, Notifications & Investigation
- 3.4 S3AM-010-PR1 Emergency Response Planning
- 3.5 S3AM-204-PR1 Environmental Compliance
- 3.6 S3AM-216-PR1 Compliance Assurance

4.0 Procedure

4.1 Roles & Responsibilities

4.1.1 SH&E Manager

- Assisting management personnel to identify any required SH&E planning documentation.
- Assisting in the preparation of necessary SH&E risk assessment documentation.
- Reviewing and approving SH&E risk assessment documentation prior to its implementation for work activities.
- Providing SH&E technical and regulatory input as necessary.

4.1.2 Manager

Risk Assessment & Management (S3AM-209-PR1)
Revision 15 December 31, 2021

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- Confirming appropriate SH&E planning and risk assessment activities are undertaken in the proposal support and pre-award stages of a project.
- Confirming the completion of SH&E risk assessment documentation as required, that addresses the full range of work activities, SH&E risks and that all requirements and procedures are implemented and enforced post-award, during the work activities.
- Confirming SH&E requirements are implemented successfully, including but not limited to:
 - Subcontractor evaluations and performance monitoring
 - SH&E training
 - Personal protective equipment
 - First aid and emergency response
 - Client requirements
- Contacting the SH&E Manager to discuss SH&E risk assessment documentation needs/ requirements at the start of each new project involving AECOM and at designated intervals or:
 - When changes occur to the work operations or work location/ conditions
 - When work activities are modified/ changed, or
 - When additional tasks are added to the work scope.
- Confirming that the SH&E Plan has been reviewed and approved by the SH&E Manager prior to its use by AECOM personnel or prior to release to clients, outside agencies or organizations.
- Making appropriate resources available to protect the health and safety of AECOM employees, the environment and to comply with occupational health and safety, and environmental legislation and for the effective implementation of this procedure.
- Identifying and reporting to a Manager/Supervisor when changes occur to the work operations or work location/conditions.
- Identifying appropriate and applicable SH&E regulatory requirements and implement into respective SH&E Plan.
- Confirming appropriate SH&E review and assessment activities are undertaken in the close-out stage of a project.

4.1.3 Employee

- Obtaining necessary training identified in the SH&E Plan and associated documents.
- Understanding the potential hazards and controls of the task before work commences.
- Complying with all required controls as identified in the SH&E Plan and associated documents. Reporting any program, SH&E plan or regulatory variances to their Supervisor.

4.2 Risk Assessment Strategy

4.2.1 Hazard Identification

Hazard identification is the precursor to being able to assess risk. Before undertaking any activity, the hazards shall be identified by persons competent to recognize them using professional experience and training including the following:

- a. Utilization of a formal hazard identification process;
- b. Information from review and improvement processes;
- c. Consideration of hazardous materials required for task(s);
- d. Location of work and proximity to outside hazards or equipment;

- e. Anticipation or possible change of conditions;
- f. Consideration of risk of human error;
- g. Identifying level of training required for task; and
- h. Any other factors that can introduce hazard or risk into the activity.

4.2.2 Hazard identification should consider:

- a. Routine and non-routine activities;
- b. Activities of all persons having access to the workplace (including contractors and visitors);
- c. Human behavior, capabilities and other human factors;
- d. Identified hazards originating outside the workplace capable of adversely affecting the health and safety of persons under the control of AECOM within the workplace;
- e. Hazards created in the vicinity of the workplace by work-related activities under the control of AECOM and neighboring activities not under AECOM control;
- f. Infrastructure, equipment, materials at the workplace, whether provided by AECOM or others;
- g. Changes or proposed changes in the organization of AECOM, its activities, or materials;
- h. Modification to the SH&E management system, including temporary changes, and their impacts on operations, processes, and activities;
- i. Applicable legal obligations relating to risk assessment; implementation of necessary controls;
- j. The design of work areas, processes, installations, machinery/equipment, operating procedures, and work organization, including their adaptation to human capabilities; and
- k. Driving and travel activities.

4.2.3 Risk Assessment

- a. Evaluate work area for hazards as defined above (applies to field, office, and travel settings).
- b. Determine whether identified hazards could affect employees, subcontractors, members of the public, visitors, or others.
- c. Assess the severity and probability of any identified hazard occurring. This is generally based on experience, although incident statistics are available for most industries. The assessment of probability must also take into consideration the frequency with which exposure to a particular hazard will take place (e.g., the probability of occurrence is much greater if the activity is a daily event involving a number of individuals, compared with the same activity carried out twice a year by few individuals as part of a maintenance procedure).
- d. Severity: Be realistic when considering how severe the result of exposure to a hazard could be. For example, it is remotely possible that someone tripping over a cable in an office may be killed, but the most probable result is bruising or a fractured bone. If, however, the cable is trailing across the top of a very busy stairway, a more severe injury is possible.

The following table shall be used to evaluate severity:

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 Time /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
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e. Probability: Determining the probability of a hazard actually causing harm can be much more difficult than determining the severity. The factors affecting the analysis of probability are:

- The number of times the situation occurs
- The position of the hazards
- Distractions
- The duration of exposure
- Quantities of materials involved
- Environmental conditions
- Competence of the people involved
- Condition of equipment.

In analyzing the probability of harm, it will be necessary to take into account the possibility of the control measures not being used because of human error, lack of maintenance, difficulty in compliance, complexity, etc.

The following table shall be used to determine probability:

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

4.2.4 Risk Matrix

A quantitative risk rating can be derived for each hazard using the following table.

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

Use of the quantitative risk table shown above can help to determine whether or not the level of risk is tolerable. This can assist in deciding priorities for action. In general, higher risks (yellow and red) may require the provision of considerable additional resources involving special equipment, training, high levels of supervision, and consideration of the most effective methods of eliminating or controlling hazards. Lower-level risks may be considered as acceptable, but actions should still be taken to try to reduce them further, if possible. The risk rating for a project should be revised if the scope of work changes and at a minimum, the risk rating should be re-assessed on an annually basis.

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 Operations Lead/Supervisor & SH&E Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & SH&E Director

4.2.5 High Potential Risk

The hazards associated with all tasks will be assessed using the risk matrix. Tasks assessed with a risk rating of 10 to 25 are considered to be High Potential (HiPo) Risk tasks. In general, the following tasks are considered HiPo tasks (also identified in *S3AM-314-PR1 Working Alone*). Depending upon the factors contributing to the severity and probability assessment of a hazard associated with a particular task, other HiPo tasks or activities could be added to this list.

- Working at heights > 4 ft. (1.22 m) (Including aerial lifts, snooper trucks, scaffolds, etc.).
- Working in a confined space.
- Working in a trench or excavation.
- Performing tasks requiring lock out/tag out.
- Work on energized equipment.
- Working with electricity.
- Working with hazardous substances or materials (including all HAZWOPER projects).
- Working with material under pressure.
- Working where there is a possible threat of violence, including civil unrest.
- Working in avalanche areas.
- Working on water or ice.
- Working in remote or wilderness isolation.
- Working in a controlled area.
- Extreme heat or cold stress environments.
- Working with power tools/equipment (drill, chainsaw, grinder, etc.).
- Working with/operating heavy equipment or machinery, including drill rigs.
- Working in isolation from first aid services or immediate/emergency assistance.
- Working around mobile equipment.
- Exposure to vehicular traffic (highways, roads, parking lots, etc.).
- All-terrain vehicle work.
- Working on railroads or within 25 ft. (7.62 m) of tracks.
- Any activity/task involving non-voluntary use of respiratory protection, including for site access.
- Working with people diagnosed with Coronavirus or other pandemic diseases.

4.2.6 Hierarchy of Controls

Controlling exposures to hazards is the fundamental method of protecting workers. Traditionally, a hierarchy of controls has been used as a means of determining how to implement feasible and effective control solutions.



Source: <http://www.cdc.gov/niosh/topics/hierarchy/>

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.

A minimum of one control above Administrative Controls (Elimination, Substitution, Engineering)

OR

Two controls below Engineering Controls (Administrative, PPE) is required to control any hazards that may contribute to a Catastrophic or Critical Consequence (see Risk Assessment Severity Table in this document).

Please consult [S2-001-ATT4 Catastrophic and Critical Consequences Guidance](#) for additional information.

****Note:** When engineering, administrative and PPE controls are used, and in many cases substitution, the **hazard is still present** and can still cause harm.

- Layers of control or redundancy shall be established whenever possible (e.g., engineered control further supplemented by safe work practices and PPE).
- The use of interim controls may be necessary while longer-term solutions are developed and implemented.
- Elimination examples: entry into hazardous area unnecessary due to controls / sensors designed and constructed to be operated / monitored external to the area, fall hazard eliminated by lowering a workpiece to the ground, confined space hazards eliminated through use of remote cameras to inspect vaults, trip hazard removed, hazardous chemicals removed from the worksite, etc.
- Substitution examples: use of water-based paint in place of a solvent-based paint, use of an electric motor rather than a gas motor, use of a hand cart rather than manually moving materials, etc.

- Engineering Control examples: ventilation to reduce atmospheric hazards, enclosures to reduce machine noise, machine or equipment guards around pinch or crush points, interlocks to prevent inadvertent equipment operation, keyboard trays to enable proper posture, etc.
- Administrative Control examples: procedures (e.g., use of personal electronic devices prohibited while operating a vehicle, requirement to vacuum harmful dust rather than sweep, Task Hazard Assessments, etc.), training, job rotation, signage, or temporary barriers to warn of a hazard or describe safe procedures, etc.
- Personal Protective Equipment (PPE) examples: safety glasses, hardhats, gloves, hearing protection, etc. PPE is considered the least effective method of controlling a hazard, as the equipment only places a barrier between the worker and the hazard but does not prevent the occurrence of the incident. PPE failure would expose workers to the hazard, and is dependent upon proper selection and fit, and employee compliance.

***Always assess the control measures taken for any hazards the control may create or introduce (e.g., heaters introducing exhaust hazards, electrical equipment presenting ignition hazards, bulky PPE reducing mobility, scheduling producing congested sites, etc.). These created or introduced hazards shall be properly assessed for risk and may require an alternative control to be developed or additional controls developed for the created or introduced hazards.

4.3 Preplanning for Development of Risk Assessment Documentation

4.3.1 In order to adequately assess a proposed pursuit, SH&E impacts require assessment. If the project's scope review finds the project includes hazards or SH&E requirements that may have critical impact on AECOM personnel, the client, the environment, or financial outcomes, the hazards and impacts should be assessed further during the pre-bid and start-up stages of the project.

- Proposal teams and/or Managers should consult [S2-001-ATT4 Catastrophic and Critical Consequences Guidance](#) for additional information and may engage subject matter experts, such as SH&E personnel, to obtain an accurate pre-bid SH&E risk assessment and summary of potential impacts.
- This information may be used by the proposal team and/or manager to populate the SH&E sections of a prospective project's overall risk assessment, thereby informing go or no-go decisions and, when preparing a bid, budgetary and staffing for safety considerations.

4.3.2 Coordination must be made by management with representatives of the client, regulatory authorities (if needed), contractors as applicable, and other appropriate personnel to determine and coordinate such items as:

- Measures to protect the public and/or other persons exposed to the work operations.
- Client requirements and local, state, and/or federal laws and regulations that are applicable to the project.
- Procedures for handling and reporting incidents, property damage, and other emergencies.
- Disciplinary policies and management of restricted access for company employees and subcontractors/vendors.

4.3.3 As soon as possible, conduct an initial review of the work location and review the proposed work activity to determine, to the extent possible, existing or probable hazardous conditions and restricted areas.

4.4 Risk Assessment Documentation

Business Groups may approach risk assessment processes and documentation in different manners. As a minimum, risk assessment activities shall begin during the project planning stages, with hazards further assessed for risk and control development through start-up and execution.

- Project SH&E Plans shall be developed and include hazard identification and risk assessment documentation (risk registers / hazard assessments) applicable to the scope of work prior to project kickoff.
- Project execution activities shall ensure the Project SH&E Plan is reviewed and hazards are further assessed in light of current conditions.
- Field level hazard assessments (Task Hazard Assessment [THAs]) shall be developed or reviewed and updated immediately prior to initiating a task at the work location by those conducting the task.
- Risk assessment of potential severity and probability shall be completed for all incidents and near misses. Refer to *S3AM-004-PR1 Incident Reporting, Notifications & Investigation*.
- Hazard Assessment results shall be communicated to employees and subcontractors on-site. Copies of the Hazard Assessment documentation will be kept on-site for review.

4.4.1 **SH&E Plan** (equivalent terms may be used such as, Health and Safety Plan [HASP], Safe Work Method Statement [SWMS], SH&E Management Plan (SHEMP), etc.). The Safety, Health & Environment (SH&E) Plan addresses health and safety concerns associated with AECOM-managed activities. It defines the roles, responsibilities, requirements, and authority of the SH&E program.

- Development of the Project SH&E Plan in the start-up stage allows for adequate preparation for the prevention of incidents.
- All AECOM office locations are required to prepare an SH&E Plan using *S3AM-209-FM1 Office SH&E Plan Template*.
- AECOM requires an SH&E Plan to be developed for work activities outside of an AECOM office. The SH&E Plan is also often required by regulation, insurance policy requirements, or client requirement. A template is provided in *S3AM-209-FM2 Industrial Site / Project SH&E Plan Template* as well as business group-specific templates.
- Americas and business group specific templates are also available for low-risk site visits (e.g., *S3AM-209-FM2A Short Visit SH&E Plan Template - Americas*, *S4[DCS]AM-209-FMA Site Visit Safe Work Plan Template – DCSA*). These templates are only appropriate if the scope of work is limited to driving, walking, taking notes, and taking photographs, for a duration of time no longer than 3 days. It should not be used if the conditions at the site being visited are hazardous or high risk. Use at an active construction site is acceptable if escorted by the Client, or General Contractor (or similar).
- A typical SH&E Plan includes, but is not limited to, the following components:
 - Descriptions of roles and responsibilities for the activity.
 - Risk registers / hazard assessments for each task and operation found in the work plan (documented using *S3AM-209-FM4 Pre-Job Hazard Assessment* or equivalent).
 - Attached AECOM procedures applicable to the scope of work. Utilize *S3AM-209-FM3 Procedure Checklist* to assist in determining which AECOM procedures apply.
 - Supplementary information to the attached procedures (e.g., jurisdiction-specific requirements, client requirements, etc.)
 - Supervision.
 - Training requirements.
 - Personal protective equipment requirements for the separate tasks or operating areas.
 - Medical surveillance requirements (for chemical exposure, noise, radiation, etc.).
 - Frequency and types of monitoring for physical and chemical hazards.
 - Pre-entry briefings requirements for visitors and workers.

- Location-specific Emergency Response Plan. Refer to *S3AM-010-PR1 Emergency Response Planning*.
- Client requirements that are more stringent than AECOM's SH&E requirements.
- In California, the SH&E Plan must also address the Injury Illness Prevention Program. Refer to *S3AM-209-ATT1* for additional information.
- A SH&E Plan for hazardous waste operations may also include, but not be limited to:
 - Site access and control measures.
 - Site specific information on chemical, biological or radiation hazards.
 - Decontamination procedures.
 - Confined Space Entry plan.
 - Spill containment plan.
 - Waste management.
- An SH&E Plan for construction activities may also include, but not be limited to:
 - Traffic plan and site access controls.
 - Electrical and machinery protective measures.
 - Trench and excavation safety.
 - Fall protection and rescue plans.
 - Storage for combustible and flammable materials.
 - Sediment and community noise control plans.
- An SH&E Plan for a demolition project may also include, but not be limited to:
 - Materials movement plan.
 - Critical task sequencing.
 - Explosives safety.
 - Dust control measures.
 - Removal of asbestos and lead-containing materials.
- The Project SH&E Plan is reviewed, and hazards are further assessed in light of current conditions and based on lessons learned during the course of project execution.

4.4.2 **Pre-Job Hazard Assessment.** The principal activities associated with the scope of work to be performed, the inherent risks, and the control measures for those risks shall be assessed and documented in order to properly plan the project work. This is accomplished through risk registers / hazard assessments contained in the project SH&E Plan. The business group process may also establish a process using Pre-Job Hazard Assessments.

- Pre-Job Hazard Assessments, or equivalent documentation, shall be completed before the work activities commence and are updated based on lessons learned. Refer to *S3AM-209-FM4 Pre-Job Hazard Assessment*.
- Workers involved in the anticipated activities should participate in the hazard assessment process so that best practices are shared, and all possible hazards of the activities are identified.
- Pre-job Hazard Assessments are performed by:
 - Identifying the principle activities of the scope of work to be performed.
 - Potential hazards are identified for each activity and the initial risk rating is determined using the Risk Matrix.

- Control measures are then identified for each activity using the hierarchy of controls and may include reference to applicable procedures or plans.
- Each hazard is then re-evaluated and assigned a final risk rating using the Risk Matrix.
- 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 are needed before the activity can begin.
- A Pre-Job Hazard Assessment, or equivalent document, may be completed as a stand-alone document, or may be incorporated into an SH&E Plan. Developed Pre-Job Hazard Assessments should be consulted when completing applicable field level hazard assessment (THA) activities.

4.4.3 Daily Tailgate Meeting. A tailgate meeting for all project personnel shall be held daily (excluding fixed-facility locations where AECOM employees permanently work full time). A record of the meetings shall include the name of all attendees, items discussed, and date/time of meeting. *S3AM-209-FM5 Daily Tailgate Meeting Form* may be used to document the meeting (DCSA may replace this form with the electronic Daily Tailgate Meeting Tool available on the [Ecosystem Daily Tailgate Meeting App Site](#)).

At a minimum, the meeting will involve representatives from all organizations with a direct contractual relationship with AECOM on the project site (e.g., AECOM employees, subcontractors, client representatives, etc.). Other contractors working in the area of AECOM's activities should also be invited to the meeting when possible. All members of the meeting should be engaged and encouraged to participate and provide input and feedback. Objectives for the meeting should include:

- Eliminating injuries, illnesses, and damage to the environment or property.
- Review planned work activities.
- Clarify roles and responsibilities.
- Confirm work crew is fit-for-duty.
- Assess, identify and mitigate hazards.
- Share lessons learned and observations.
- Review simultaneous operations with other non-AECOM controlled activities (e.g., other contractors performing work in the vicinity of AECOM's operations, fuel delivery at the location, utility company working near AECOM operations).

4.4.4 Task Hazard Assessment (THA). A THA is the most important element in an effective hazard identification and risk reduction program. *S3AM-209-FM6 Task Hazard Assessment* (or *S3AM-209-FM6-ES or equivalent approved Business Group specific form*) shall be completed before every assigned task at the work location. The THA is to be completed at the worksite by the individual(s) who is intended to conduct the task immediately prior to initiating the associated task. The intent of the THA is to engage the end-user in actively assessing the hazards associated with their task, as well as identify changes and capture nuances or specifics immediately present that may otherwise remain unacknowledged in the project's pre-planning hazard assessment documentation (risk registers, hazard assessments, etc.).

The focus of the analysis shall be on the specific assigned task and the evaluation of risks and assignment of control measures based on actual work conditions. THA is a portion of the overall job scope, focused at the specific foreman and/or crew level. Task Hazard Assessments must be completed prior to the start of work. Re-assessment must also be completed when a significant change of scope occurs or if conflicting work is being done. Completion of the THA involves both the site supervision and employees involved in the work.

Task Hazard Assessment steps:

- Assemble employees involved in the work.
- Review the scope of work being performed.
- Review the risk registers / hazard assessments obtained from the Project SH&E Plan for content applicable to the immediate task.
- As necessary, review the associated procedure.
- The THA shall:
 - Break the task into individual steps.
 - Identify actual and potential hazards.
 - Rank the risk using the Risk Matrix.
 - Develop appropriate controls measures for each hazard.
 - Rank the post control measure risk using the Risk Matrix.
- Review the THA for any additions or edits.
- Confirm communication of the THA to all affected employees.
- Confirm the THA is reviewed by any visitors or additional or new personnel brought on to perform the task.

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 are required before the activity can begin.

Employees shall monitor the activities for compliance with the THA. Workers should stop any work on a task if conditions change from the planned and agreed approach to the work. The THA should be updated to reflect new conditions or changes in task methods.

Business Group Task Hazard Assessment processes may vary from the above description; however comprehensive hazard identification associated with the task, identification of appropriate controls, and effective communication between all involved and affected shall be incorporated into the Business Group process.

4.5 Key Elements in Risk Management at a Site

- 4.5.1 Regularly, or at least once per month, conduct safety meetings for supervisory personnel, including those of other contractors and subcontractors. Suggested action items for these meetings include:
- Reviewing of THAs, safety procedures and policies applicable to the project.
 - Identifying responsibilities of the various parties, including contractor(s) and subcontractor(s) obligations.
 - Reviewing noted and anticipated hazards, and plan methods to eliminate or control them.
 - Discussing incidents and near misses to determine causes and steps necessary to prevent reoccurrence.
 - Discussing suggestions and ideas for improving the project's safety program.
 - Maintaining a record of these meetings; this will be done by the safety representative or supervisor.
- 4.5.2 Regular inspections of active work areas will be made by the project supervisors and the site SH&E representative. Refer also to *S3AM-216-PR1 Compliance Assurance* for additional guidance.
- To be effective, such inspections should occur on all shifts, should be unannounced, and should occur at varied intervals.
 - Imminent danger situations must be stopped and corrected immediately. Refer to *S3AM-002-PR1 Stop Work Authority*.

- Inadequate or deficient protective measures and unsafe or unhealthy work practices must be brought to the immediate attention of the appropriate supervisor and/or manager for correction and disciplinary action, as required.
 - Inform the manager of all deficiencies not immediately correctable, and/or that may result in damage to facilities, equipment, or work in progress, or that create hazardous exposures to employees or the public.
 - Projects that exhibit unsatisfactory SH&E performance present risk to AECOM personnel, the client, the public, property or the environment.
 - Further evaluation may be required and a risk reduction plan, including monitoring activities may be determined as necessary.
 - Considerable additional resources may be required involving personnel, special equipment, training, high levels of oversight, and consideration of the most effective resources and methods of improving safety program performance.
- 4.5.3 Signs and posters of appropriate size and design, and bearing standard pertinent regulations, will be used to convey warnings, directions, and instructions to personnel and the public, as required by the client and other applicable regulations. The observance of such safety and incident prevention signs will be strictly required of company employees and visitors while on the project site.
- 4.5.4 Consideration must be given to make the project environmental protection plan effective.
- The type and extent of the measures needed for pollution control, hazardous materials handling, hazardous waste control and disposal, and for relating occupational health issues will depend upon the contract stipulations, hazard involved, type of operation, and the mandatory requirements of regulatory authorities.
 - Such measures will include appropriate control methods necessary to prevent or reduce to safe levels exposure to hazardous substances.
 - Refer also to *S3AM-204-PR1 Environmental Compliance* for additional guidance.
- 4.5.5 It is the practice of AECOM to commend and reward employees and their supervisors for achieving excellence in their field of work, particularly when that work is performed safely. Project management is encouraged to promote and participate in safety recognition programs by developing project-specific safety goals and including safety incentive programs in project budgets. Project goals should include proactive goals such as training participation and training support, safety observations conducted, and management participation in safety reviews (e.g., safety walk-downs).
- 4.5.6 Concerning worksites in which other employers control concurrent operations and SH&E issues related to the worksite, the manager shall coordinate with those conducting concurrent operations to confirm appropriate control measures are in place to protect employees from the hazards associated with activities to be performed.
- Coordination shall occur prior to work commencing, periodically thereafter, and as necessary given changes in scope and/or working conditions.
 - Affected employees (including managers and supervisors) shall seek to participate in all site SH&E meetings related to concurrent operations.
- 4.5.7 All employees are empowered and expected to stop work or not start work when it is unsafe. Employees will be trained on stop work authority upon initial assignment. Refer to *S3AM-002-PR1 Stop Work Authority*.
- 4.6 Other Requirements
- 4.6.1 The following requirements apply to SH&E risk assessment documentation:
- Preparation of the SH&E documentation may be performed by a member of the project team or SH&E.

- SH&E documentation (including draft versions of documents) will be reviewed by a SH&E Manager prior to release for outside agency review (e.g., clients, regulatory agencies, etc.) and prior to its field implementation.
- Changes to approved SH&E documentation require concurrence from a SH&E Manager (or designee). This includes those made in response to changing field conditions or operational requirements and those made in response to regulator/client comments. Any written responses made to regulator/client comments also must be reviewed by the SH&E Manager.
- The SH&E documentation for any project lasting twelve (12) months or longer will be reviewed at periodic intervals, but at least annually. The SH&E Manager will review the changes and determine whether modifications are required to the existing SH&E planning documentation. This confirms that the documentation continues to reflect the current scope of work and knowledge of site conditions, and that any revised regulatory requirements are properly addressed. The Manager will provide a master copy of the SH&E documentation to be maintained on site for reference by personnel, together with copies of any required SH&E-related records or operational documentation. The master copy must be current in all respects, and will include any changes or modifications made as work progresses.
- Managers will confirm that SH&E documents have been reviewed with affected personnel prior to implementation of field work. Sign-off and concurrence is mandatory and to be kept in the project records.

5.0 Records

- 5.1 Completed SH&E Plans, risk registers / hazard assessments, Tailgate Meeting Forms, and Task Hazard Assessments will be filed in the appropriate project file.

6.0 Attachments

All Business Groups

- | | | |
|------|----------------------------------|---|
| 6.1 | S3AM-209-ATT1 | California Injury & Illness Prevention Program |
| 6.2 | S3AM-209-FM1 | Office SH&E Plan Template |
| 6.3 | S3AM-209-FM2 | Industrial Site / Project SH&E Plan Template |
| 6.4 | S3AM-209-FM2-A | Short Term SH&E Plan Template |
| 6.5 | S3AM-209-FM3 | Procedure Checklist |
| 6.6 | S3AM-209-FM4 | Pre-Job Hazard Assessment |
| 6.7 | S3AM-209-FM5 | Daily Tailgate Meeting Form |
| 6.8 | S3AM-209-FM6 | Task Hazard Assessment |
| 6.9 | S3AM-209-FM6(ES) | Evaluación de Riesgos de las Tareas (THA – Spanish) |
| 6.10 | S3AM-209-FM7 | Office Relocation Plan |

Supplementary Business Group Specific

- | | | |
|------|---|---|
| 6.11 | S4[CS]AM-209-FM6-A | Task Hazard Assessment – Focus 4 Plus 2 – CS-BC Group |
| 6.12 | S4[DCS]AM-209-FM2-A | Safe Work Plan Template - DCS Group |
| 6.13 | S4[DCS]AM-209-FM2-A[ES] | Plan de Trabajo Seguro – (SWP Spanish) DCS Group |
| 6.14 | S4[DCS]AM-209-FM2-B | Site Visit Safe Work Plan Template - DCSA Group |
| 6.15 | S4[DCS]AM-209-FM2-B[ES] | Visita a Sitio – Plan de Trabajo Seguro – DCSA Group |

6.16	S4[DCS]AM-209-FM2-C	Universal Health & Safety Plan Template - DCSA Group
6.17	S4[DCS]AM-209-FM2-C[ES]	Plan Universal de Salud y Seguridad (HASP) – DCSA Group
6.18	S4[DCS]AM-209-FM2-D	Disaster Recovery Health & Safety Plan Template - DCSA Group
6.19	S4[DCS]AM-209-FM2-F	Safety Work Plan Template – Short Duration Work Zone – DCSA Group
6.20	S4[DCS]AM-209-FM2-G	Safety Work Plan Template – Highway Work Zone – DCSA Group
6.21	S4[DCS]AM-209-FM4-A	Risk Register – DCSA Group
6.22	S4[DCS]AM-209-FM6-A	Task Hazard Assessment – DCSA Group
6.23	S4[DCS]AM-209-FM6-A(ES)	Evaluación de Riesgos de Tareas (THA Spanish) – DCSA Group
6.24	S4[DCS]AM-209-FM6-A(FR)	Évaluation des Dangers de la Tâche (THA French) – DCSA Group

California Injury & Illness Prevention Program

S3AM-209-ATT1

1.0 Purpose and Scope

- 1.1 Establishes the requirements to facilitate compliance with the California regulatory requirements to establish, implement, and maintain an effective Injury and Illness Prevention Program (IIPP).

2.0 Procedure

2.1 Roles and Responsibilities

2.1.1 Employees

Responsible for fulfilling all applicable safety training, complying with safe work practices, reporting all real or potential work-related injuries and illnesses to their supervisors immediately after their occurrence.

2.1.2 Manager

Responsible for ensuring all employees receive applicable safety training, employee compliance with safe work practices, and ensuring that unsafe conditions in their work place are eliminated and that injuries/illnesses are reported immediately.

2.1.3 Office Manager (Operations)

Responsible for the implementation, staff training, and the posting of the IIPP.

Region Responsible for providing technical support as to Cal-OSHA requirements and guidance relative to the implementation of the IIPP.

2.2 Injury and Illness Prevention Program

- 2.2.1 For projects, the site-specific SH&E Plan serves as the project Injury and Illness Prevention Program, refer to *S3AM-209-PR1 Risk Assessment & Management*.
- 2.2.2 All AECOM offices will provide a written IIPP for all of its operation based in or conducted in California. The program will be in writing, available to all employees and at minimum:
- 2.2.3 Identify the person or persons with authority and responsibility for implementing the Program.
- 2.2.4 Include a system for confirming that employees comply with safe and healthy work practices.
- 2.2.5 Include a system for communicating with employees in a form readily understandable by all affected employees on matters relating to occupational safety and health, including provisions designed to encourage employees to inform the employer of hazards at the worksite without fear of reprisal.
- 2.2.6 Include procedures for identifying and evaluating workplace hazards including scheduling periodic inspections to identify unsafe conditions and work practices. Inspections shall be made to identify and evaluate hazards.
- 2.2.7 Include a procedure to investigate occupational injury or occupational illness. Refer to *S3AM-004-PR1 Incident Reporting, Notifications & Investigation*.
- 2.2.8 Include methods and/or procedures for correction of unsafe or unhealthy conditions, work practices and work procedures in a timely manner based on the severity of the hazard.
- 2.2.9 Provide training and instruction for **employees**, refer to *S3AM-003-PR1 SH&E Training*. Training on the IIPP is required:
- When a safety program is first established
 - When an employee is first hired

- When an employee is given a new job assignment
- When new substances, processes, or equipment is introduced into the workplace that may create a new occupational hazard
- When the employer becomes aware of a new or previously unrecognized hazard
- When supervisors need to become aware of specific hazards and potential unsafe conditions in the workplace
- All safety, health and environmental training will be managed as described in *S3AM-003-SH&E Training*

2.2.10 Include requirements for recordkeeping that addresses the following, at a minimum:

- Inspections – Inspections shall be conducted monthly at a minimum and documented on an Office Inspection Form. The documented inspection records will be maintained for three years by the **Manager**.
- Training – Documentation of safety and health training for each worker, including the worker's name or other identifier, training dates, type of training, and training providers, are recorded on sign-in sheet and/or training certification. SH&E training documentation will be maintained using AECOM's Learning Management System. In addition, **employees** should maintain copies of the training certificates or acknowledgement forms required for their job function.
- Injury and Illness – AECOM will record each fatality, injury, or illness that is work-related or that meets one or more of the general recording keeping requirements specified in 8 CCR 14300 as a new case. Each case meeting the requirements will be documented on a Cal-OSHA 300 and 301 form. Logs for the past year will be posted from February to April of the following year. Historical logs will be maintained by the office location for five years.
- Exposure Records – Exposure records will be maintained for 30 years unless a specific occupational safety and health regulation provides a different period of time. Results of exposure assessment will be reviewed and maintained by AECOM's occupational physician, refer to *S3AM-127-PR1 Exposure Monitoring* and *S3AM-128PR1 Medical Screening & Surveillance*.

2.2.11 Program Evaluation

- Evaluate the IIPP for each location on an annual basis and document in accordance with *S3AM-216-PR1 Compliance Assurance*.

3.0 Model IIPP

- 3.1.1 The state of California provides IIPP models for both high hazard employers and non-high hazard employers.
- 3.1.2 An annual High Hazard Industry List, including the relevant NAICS industry codes, is published by the State of California.
- 3.1.3 The model Injury and Illness Prevention Program (IIPP) on the following pages has been prepared by the State of California for use by employers in industries which have been determined by Cal/OSHA to be high hazard.
- 3.1.4 AECOM offices / locations are not required to use this model; however, it does provide the essential framework required for an IIPP for high hazard AECOM offices / locations and exceeds that for non-high hazard AECOM offices / locations.

MODEL

INJURY AND ILLNESS PREVENTION PROGRAM FOR HIGH HAZARD EMPLOYERS

ABOUT THIS MODEL PROGRAM

Every California employer must establish, implement and maintain a written Injury and Illness Prevention (IIP) Program and a copy must be maintained at each workplace or at a central worksite if the employer has non-fixed worksites. The requirements for establishing, implementing and maintaining an effective written injury and illness prevention program are contained in Title 8 of the California Code of Regulations, Section 3203 (T8 CCR 3203) and consist of the following eight elements:

- Responsibility
- Compliance
- Communication
- Hazard Assessment
- Accident/Exposure Investigation
- Hazard Correction
- Training and Instruction
- Recordkeeping

This model program has been prepared for use by employers in industries, which have been determined by Cal/OSHA to be high hazard. You are not required to use this program. This model program was written for a broad spectrum of employers and it may not match your establishment's exact needs. However, it does provide the essential framework required for an Injury and Illness Prevention Program.

Proper use of this model program requires the IIP Program administrator of your establishment to carefully review the requirements for each of the eight IIP Program elements found in this model program, fill in the appropriate blank spaces and check those items that are applicable to your workplace. The recordkeeping section requires that the IIP Program administrator select and implement the category appropriate for your establishment. Sample forms for hazard assessment and correction, accident/exposure investigation, and worker training and instruction are provided with this model program.

This model program must be maintained by the employer in order to be effective.

INJURY AND ILLNESS PREVENTION PROGRAM

RESPONSIBILITY

The Injury and Illness Prevention Program (IIP Program) administrator,

Program Administrator

has the authority and responsibility for implementing the provisions of this program for

Establishment Name

All managers and supervisors are responsible for implementing and maintaining the IIP Program in their work areas and for answering worker questions about the IIP Program. A copy of this IIP Program is available from each manager and supervisor.

COMPLIANCE

Management is responsible for ensuring that all safety and health policies and procedures are clearly communicated and understood by all employees. Managers and supervisors are expected to enforce the rules fairly and uniformly.

All employees are responsible for using safe work practices, for following all directives, policies and procedures, and for assisting in maintaining a safe work environment.

Our system of ensuring that all workers comply with the rules and maintain a safe work environment include:

1. Informing workers of the provisions of our IIP Program;
2. Evaluating the safety performance of all workers;
3. Recognizing employees who perform safe and healthful work practices;
4. Providing training to workers whose safety performance is deficient;
5. Disciplining workers for failure to comply with safe and healthful work practices; and
6. The following practices:

COMMUNICATION

We recognize that open, two-way communication between management and staff on health and safety issues is essential to an injury-free, productive workplace. The following system of communication is designed to facilitate a continuous flow of safety and health information between management and staff in a form that is readily understandable and consists of one or more of the following checked items:

- ☐ New worker orientation including a discussion of safety and health policies and procedures.
- ☐ Review of our IIP Program.
- ☐ Workplace safety and health training programs.
- ☐ Regularly scheduled safety meetings.
- ☐ Effective communication of safety and health concerns between workers and supervisors, including translation where appropriate.
- ☐ Posted or distributed safety information.
- ☐ A system for workers to anonymously inform management about workplace hazards.
- ☐ Our establishment has less than ten employees and communicates with and instructs **employees orally about general safe work practices and with respect to hazards unique to each employee's job assignment.**
- ☐ A labor/management safety and health committee that meets regularly, prepares written records of the safety and health committees meetings, reviews results of the periodic scheduled inspections, reviews investigations of accidents and exposures and makes suggestions to management for the prevention of future incidents, reviews investigations of alleged hazardous conditions, and submits recommendations to assist in the evaluation of employee safety suggestion.
- ☐ Other:

HAZARD ASSESSMENT

Periodic inspections to identify and evaluate workplace hazards shall be performed by the following competent observer(s) in the following areas of our workplace:

Competent Observer	Area

Periodic inspections are performed according to the following schedule:

1. _____
Frequency (Daily, weekly, monthly, etc.)
2. When we initially established our IIP Program;
3. When new substances, processes, procedures or equipment which present potential new hazards are introduced into our workplace;
4. When new, previously unidentified hazards are recognized;
5. When occupational injuries and illnesses occur;
6. When we hire and/or reassign permanent or intermittent workers to processes, operations, or tasks for which a hazard evaluation has not been previously conducted; and
7. Whenever workplace conditions warrant an inspection.
Periodic inspections consist of identification and evaluation of workplace hazards utilizing applicable sections of the attached Hazard Assessment Checklist and any other effective methods to identify and evaluate workplace hazards.

ACCIDENT/EXPOSURE INVESTIGATIONS

Procedures for investigating workplace accidents and hazardous substance exposures include:

1. Visiting the accident scene as soon as possible;
2. Interviewing injured workers and witnesses;
3. Examining the workplace for factors associated with the accident/exposure;
4. Determining the cause of the accident/exposure;
5. Taking corrective action to prevent the accident/exposure from reoccurring; and
6. Recording the findings and corrective actions taken.

HAZARD CORRECTION

Unsafe or unhealthy work conditions, practices or procedures shall be corrected in a timely manner based on the severity of the hazards. Hazards shall be corrected according to the following procedures:

1. When observed or discovered;
2. When an imminent hazard exists which cannot be immediately abated without endangering employee(s) and/or property, we will remove all exposed workers from the area except those necessary to correct the existing condition. Workers necessary to correct the hazardous condition shall be provided with the necessary protection; and
3. All such actions taken and dates they are completed shall be documented on the appropriate forms.

TRAINING AND INSTRUCTION

All workers, including managers and supervisors, shall have training and instruction on general and job-specific safety and health practices. Training and instruction shall be provided as follows:

1. When the IIP Program is first established;
2. To all new workers, except for construction workers who are provided training through a Cal/OSHA approved construction industry occupational safety and health training program;
3. To all workers given new job assignments for which training has not previously provided;
4. Whenever new substances, processes, procedures or equipment are introduced to the workplace and represent a new hazard;
5. Whenever the employer is made aware of a new or previously unrecognized hazard;
6. To supervisors to familiarize them with the safety and health hazards to which workers under their immediate direction and control may be exposed; and
7. To all workers with respect to hazards specific to each employee's job assignment.
8. Workplace safety and health practices for all industries include, but are not limited to, the following:

Explanation of the employer's IIP Program, emergency action plan and fire prevention plan, and measures for reporting any unsafe conditions, work practices, injuries and when additional instruction is needed.
9. Use of appropriate clothing, including gloves, footwear, and personal protective equipment.
10. Information about chemical hazards to which employees could be exposed and other hazard communication program information.
11. Availability of toilet, hand-washing and drinking water facilities.
12. Provisions for medical services and first aid including emergency procedures.
13. In addition, we provide specific instructions to all workers regarding hazards unique to their job assignment, to the extent that such information was not already covered in other training.

RECORDKEEPING

We have checked one of the following categories as our recordkeeping policy.

- ☐ **Category 1.** Our establishment is on a designated high hazard industry list. We have taken the following steps to implement and maintain our IIP Program:
1. Records of hazard assessment inspections, including the person(s) or persons conducting the inspection, the unsafe conditions and work practices that have been identified and the action taken to correct the identified unsafe conditions and work practices, are recorded on a hazard assessment and correction form.
 2. Documentation of safety and health training for each worker, including the worker's name or other identifier, training dates, type(s) of training, and training providers are recorded on a worker training and instruction form. We also include the records relating to worker training provided by a construction industry occupational safety and health program approved by Cal/OSHA.
 3. Inspection records and training documentation will be maintained according to the following checked schedule:
 - ☐ For one year, except for training records of employees who have worked for less than one year which are provided to the worker upon termination of employment; or
 - ☐ Since we have less than ten workers, including managers and supervisors, we maintain inspection records only until the hazard is corrected and only maintain a log of instructions to workers with respect to worker job assignments when they are first hired or assigned new duties.
-
- ☐ **Category 2.** We are a local governmental entity (any county, city, or district, and any public or quasi-public corporation or public agency therein) and we are not required to keep written records of the steps taken to implement and maintain our IIP Program.

LIST OF TRAINING SUBJECTS

We train our workers about the following checked training subjects:

- ☐ The employer's Code of Safe Practices.
- ☐ Confined spaces.
- ☐ Safe practices for operating any agricultural equipment.
- ☐ Good housekeeping, fire prevention, safe practices for operating any construction equipment.
- ☐ Safe procedures for cleaning, repairing, servicing and adjusting equipment and machinery.
- ☐ Safe access to working areas.
- ☐ Protection from falls.
- ☐ Electrical hazards, including working around high voltage lines.
- ☐ Crane operations.
- ☐ Trenching and excavation work.
- ☐ Proper use of powered tools.
- ☐ Guarding of belts and pulleys, gears and sprockets, and conveyor nip points.
- ☐ Machine, machine parts, and prime movers guarding.
- ☐ Lock-out/tag-out procedures.
- ☐ Materials handling.
- ☐ Chainsaw and other power tool operation.
- ☐ Tree falling/bucking procedures and precautions, including procedures for recognizing and working with hazard trees, snags, lodged trees, and unsafe weather conditions.
- ☐ Yarding operations, including skidding, running lines, unstable logs, rigging and communication.
- ☐ Landing and loading areas, including release of rigging, landing layout, moving vehicles and equipment, and log truck locating, loading and wrapping.
- ☐ Fall protection from elevated locations.
- ☐ Use of elevated platforms, including condors and scissor lifts.
- ☐ Safe use of explosives.
- ☐ Driver safety.
- ☐ Slips, falls, and back injuries.
- ☐ Ergonomic hazards, including proper lifting techniques and working on ladders or in a stooped posture for prolonged periods at one time.
- ☐ Personal protective equipment.
- ☐ Respiratory Equipment.
- ☐ Hazardous chemical exposures.
- ☐ Hazard communication.
- ☐ Physical hazards, such as heat/cold stress, noise, and ionizing and non-ionizing radiation.
- ☐ Laboratory safety.
- ☐ Bloodborne pathogens and other biological hazards.
- ☐ Other job-specific hazards, such as

HAZARD ASSESSMENT AND CORRECTION RECORD

Date of Inspection:

Person Conducting Inspection:

Unsafe Condition or Work Practice:

Corrective Action Taken:

Date of Inspection:

Person Conducting Inspection:

Unsafe Condition or Work Practice:

Corrective Action Taken:

Date of Inspection:

Person Conducting Inspection:

Unsafe Condition or Work Practice:

Corrective Action Taken:

Cal/OSHA Consultation Programs

Toll-free number: 1-800-963-9424 • Internet: www.dir.ca.gov

On-site Assistance Program Area Offices



Your call will in no way trigger an inspection by Cal/OSHA enforcement.

- **Voluntary Protection Program**



San Francisco, CA
94142 (415) 703-5272

- **Research and Education Unit**

Sacramento, CA 95825
(916) 574-2528

Global Office Safety, Health & Environment Plan

<Facility Name>

<Building Name>

<Street Address, State/Province/Territory, Country>

<Insert Month, Year of Implementation/Review>

<Insert Month, Year of Next Review Date>

Preparer Insert Name Insert Title	Signature	[Date]
Reviewer: Office SHER; Insert Name Insert Title	Signature	[Date]
Approval: Office Manager Insert Name Insert Title	Signature	[Date]

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Appendices

Appendix A — Stop Work Authorization Forms

Americas — S3AM-002-FM1 Stop Work Order – AECOM Employees & Direct Subcontractors

Appendix B — Office Inspection

Americas — S3AM-216-FM2 Office Inspection

Appendix C — Location Specific Emergency Response Plan Forms

Americas — S3AM-010-FM2 Location Specific Emergency Response Plan Template

Appendix D — Additional and Optional Content

Americas — S3AM-209-FM3 — Procedure Checklist

Americas — S3AM-209-FM7 — Office Relocation Plan

<list any additional documents appending this SH&E Plan>

As applicable, your action items after reviewing this template are to:

- 1. Add your office specific information and gather additional information needed to complete the remainder of the template.**
- 2. Select the applicable forms and information for your office from Appendix A, B, C and D above and delete the others that do not apply. Update the above appendices list accordingly.**
- 3. Add any additional appendices with forms or content applicable to your office.**

1.0 Introduction

AECOM has developed this Global Office SH&E Plan template to provide a framework for sustaining a safe and healthy office environment for AECOM employees. This plan was developed by taking best practices implemented throughout our worldwide operations and identifies a methodology for employing those best practices throughout all AECOM office locations. This Global Office SH&E Plan standardizes the AECOM approach to office safety, health and environmental performance.

How to use this template: **Office management should utilize this template to customize a specific SH&E Plan applicable to your office location and geography, as well as the nature of your business activities.** Included in the template are places to insert your office-specific information. In addition, there is an appendix section with two examples of forms from which to choose.

- STEP 1: Review this template, add your office-specific information and gather additional information needed to complete the remainder of this template.
- STEP 2: Review the forms and additional content in Appendix A, B, C and D. Complete and include those that are applicable to your office (or equivalent) and delete those that do not apply.
- STEP 3: Add additional appendices, as needed, to customize this plan for your specific needs.

Employees are required to comply with and ensure adherence to these fundamental office safety, health and environmental requirements. Supervisory and management staff will conduct additional assessments and insert supplemental information to this plan for hazards or potential hazards not already specifically addressed in this plan's contents. These situations will be addressed through an appendix addition to this standard plan.

As changes in the local office environment necessitate a change or update to this information, the plan will be updated accordingly, and communicated to the locally affected personnel. At a minimum, this plan will be reviewed and updated at least annually by local supervisory and/or management personnel.

2.0 SH&E Policy and Life-Preserving Principles

2.1 SH&E Policy

Safety, Health & Environment Policy

Purpose

This policy establishes the framework to attain best-in-class Safety, Health and Environmental (SH&E) performance in the interest of benefitting AECOM's employees and stakeholders in the global marketplace.

Policy

AECOM is committed to exceptional levels of performance in safeguarding people and the environment as one of our Core Values. In recognition of the right to a safe and healthy working environment, keeping our people and stakeholders safe is our most important measure of success. We strive to be the beacon of safety excellence in the industries and global communities in which we work.

To advance our SH&E program, we are committed to:

- Zero work-related injuries to AECOM employees and stakeholders, and protection of the environment as a result of our activities.
- Providing a safe and healthy work environment, and a highly effective SH&E management system that drives continual review and improvement.
- Meeting client requirements and properly incorporating all applicable safety, health and environmental legal requirements and regulations at the local, state, provincial and national levels.
- Developing an exceptional safety culture where our people and stakeholders embrace ownership for the safety of themselves and others.
- Advancing our goals of pollution prevention, resource conservation and environmental sustainability.
- Setting and meeting aggressive SH&E performance goals and Core Value Metrics to promote continuous improvement.
- Working with employees and business partners in order to continuously improve SH&E performance.
- Recognizing and celebrating those who contribute to excellent SH&E performance.
- Striving to make AECOM the provider of choice for the safe execution of design, build, finance, operate and maintenance work globally.

The commitment to this policy by the leadership, management and employees of AECOM provides the foundation for a safe workplace, operational excellence and long-term business success.

Expectations

Safety is a core value and a key to our success. We demand continuous improvement in our journey toward a "zero" incident culture, where everyone is committed to safety, health and environmental excellence.

To that end, we demand our leaders, managers, supervisors, employees, and subcontractors:

- Demonstrate their commitment in their actions and decisions to assure that every person goes home safe every day.
- Embrace safety as a core value both on and off the job.
- Commit to his/her own safety and that of his/her fellow employees.
- Incorporate AECOM's Life-Preserving Principles into work planning and execution.
- Proactively and aggressively identify, manage and eliminate hazards and reduce risk in the workplace.
- Engage in training and preparations to have the knowledge, skills, competency and equipment required to work safely.
- Take action to stop work if the work cannot be executed safely or if conditions or behaviors on the work activity are unsafe.
- Immediately report safety, health and/or environmental incidents, near-misses, unsafe conditions, and at-risk behaviors to their supervisor; and that we diligently work to correct the problem.

Our SH&E expectations will be accomplished by the demonstrated leadership of management, compliance with regulatory requirements, and consultation with and participation of AECOM personnel.

Review and Communication

This Policy will be reviewed annually to ensure it meets the needs of the company, and will be made available and communicated to all persons under the control of the company.



Troy Rudd
Chief Executive Officer

August 28, 2020

Date

2.2 Life-Preserving Principles

Life-Preserving Principles

AECOM has adopted these “Life-Preserving Principles” to help demonstrate the commitment of our Safety for Life program. We firmly believe these “Life-Preserving Principles” will enable AECOM to achieve its goal of zero employee injuries, property damage and an environmentally friendly and sustainable workplace.

Demonstrated Management Commitment

Our executive, senior and project managers will lead the Safety, Health and Environment improvement process and continuously demonstrate support and commitment.

Employee Participation

Our employees will be encouraged and empowered to become actively engaged in our safety processes through their active participation in safety committees, training, audits, observations and inspections. Employees will be encouraged to participate in health initiatives and adopt a healthy lifestyle.

Budgeting and Staffing for Safety

Our safety staff will be competent, fully trained and qualified to provide technical resources to our internal and external clients. A budget to support safety activities will be included project proposals.

Pre-Planning

Our design, engineering, project and construction management staffs will deploy effective risk mitigation efforts to design, plan and build safety into every project. Pre-Project and Pre-Task planning will be an effective tool in protecting our employees and the environment.

Contractor Management

Our project staff will work closely with our sub-consultants, subcontractors, contractors and Joint Venture Partners to provide a safe work environment for employees and members of the public. Our goal of SH&E performance excellence will be equally shared by all project participants.

Recognition and Rewards

Our employees will be recognized for their efforts in working safely and their support of our safety efforts.

Safety Orientation and Training

Our employees will be provided with effective safety training in order to identify and mitigate hazards in the workplace to prevent injuries to themselves and others who may be affected by their actions.

Incident Investigation

Our managers and safety professionals will investigate all recordable incidents and serious near misses to identify contributing factors and root causes in order to prevent a reoccurrence. Lessons learned shall be identified, communicated and implemented.

Fit for Duty

Our employees are responsible to report to work each day fit for duty and not to pose a health and safety hazard to themselves or others.

3.0 Purpose and Scope

The Global Office SH&E Plan is to provide general guidance and direction to all persons working in or visiting AECOM office locations. This Plan provides a framework for a safe, healthy and environmentally conscious office environment.

The scope of this document includes:

- Consideration of, and compliance with, relevant legislative, regulatory and statutory obligations;
- Corporate governance, including duty of care;
- Hazard identification, risk assessment and risk control requirements for routine and non-routine activities;
- Incident prevention initiatives; and
- Training, awareness and communication requirements.

4.0 Legal and Other Requirements

It is AECOM's policy to fully comply with all laws, rules and regulations applicable in the locations in which we operate. Safety, Health and Environmental laws enacted in **<insert your geographic location, i.e. State/Province/Territory and Country>** applicable to the office located at **<insert office location address>**.

In addition to company policies and procedures, employees are expected to comply with all applicable laws. Any violation of any law, regulation or policy by AECOM employees or others must be reported immediately to the employee's manager/supervisor. Employees may also call the AECOM hotline if they are unable to communicate their concerns with their supervisor.

<Please tailor the below chart to your operations.>

Country	Country Provider and/or Access Code	Toll-free Number (second stage dialing)/or Collect #
Brazil	Brazil - 0-800-890-0288	888-299-9602
Peru	Peru - Telefonica - 0-800-50-288	888-299-9602
	Americatel - 0-800-70-088	888-299-9602
	Telefonica - 0-800-50-000	888-299-9602
China	China - 10-811	888-299-9602
	China - 108-888	888-299-9602
Colombia	Colombia - 01-800-911-0010	888-299-9602
	Colombia - 01-800-911-0011	888-299-9602
Ecuador	Ecuador - 1-800-225-528	888-299-9602
	Ecuador - 1-999-119	888-299-9602
Ireland	Ireland - 1-800-550-000	888-299-9602
	UIFN - 00-800-222-55288	888-299-9602
Malaysia	Malaysia - 1-800-80-0011	888-299-9602
France	France Telecom - 0-800-99-0011	888-299-9602
	Telecom Development - 0805-701-288	888-299-9602
Spain	Spain - 900-99-0011	888-299-9602
Germany	Germany 0-800-225-5288	888-299-9602
Trinidad / Tobago	Trinidad / Tobago - 1-800-203-8074	888-299-9602
Canada	Canada	888-299-9602
United States	United States	888-299-9602
All Other Countries*	Collect - Reverse Charges	1-770-613-6322*

*When using this number, you can reverse the charges. Just tell your local operator that you would like to place a reverse call to the United States. If the operator asks for your name to place the call, you can use the AECOM name to remain anonymous.

4.1 Office Administration / Property Management

This facility is managed by:

<Insert building owner or property management company name, point of contact name, address, phone number, and email if applicable.>

4.2 Permits, Consents and / or Licenses

The safety, health or environmental permits, consents and licenses applicable to this Office are detailed below (if applicable, to be completed by a Senior Office Manager or their designee):

<i>Authority</i>	<i>Contact Office</i>	<i>Type of Consent</i>	<i>Renewal date</i>	<i>Specific Requirements*</i>

*mention any stated performance or measurement criteria imposed by the consent.

Copies of these consents or licenses can be found *<insert location and custodian of documents>*.

5.0 Key Objectives and Targets

The key objectives and targets are:

- To comply with relevant certifications;
- To systematically reduce AECOM SH&E incidents;
- To improve office SH&E awareness amongst employees;
- To ensure AECOM employees complete compliance based SH&E training;
- To provide a secure environment to reasonably protect employees from external threats such as intruders, thieves, bomb threats, natural disasters and hazardous office working conditions; and
- To promote a safe, barrier free, accessible workplace for the mobility challenged and other employees with disabilities in accordance with local regulations and in line with AECOM's commitment to being an equal opportunity employer.

SH&E targets are set annually. AECOM is committed to meeting the following targets:

- Achievement of a Total Recordable Injury Rate of less than **<insert TRIR Target>**; and
- **<insert additional location specific targets>**.

6.0 SH&E Awareness Campaign

The AECOM SH&E Awareness campaign aims to facilitate communication on local hazards and applicable SH&E information directly to AECOM employees. Our goal is to promote and sustain a proactive safety culture. The SH&E Awareness campaign communicates messages to staff members to ensure they are mindful of risks potentially encountered through day-to-day activities and tasks.

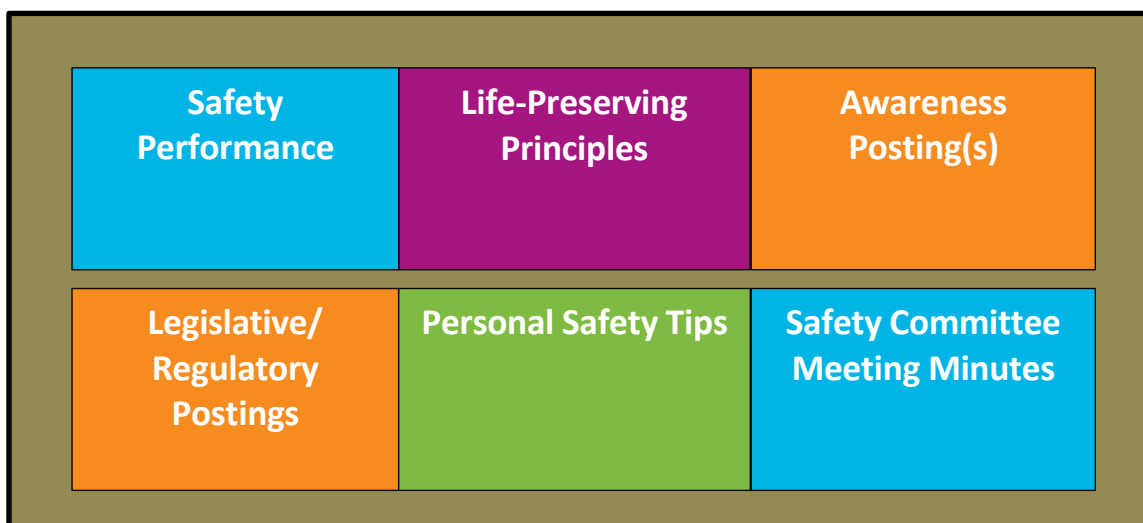
AECOM provides an environment where employees are encouraged to voice their concerns on any SH&E issues within the business. Information is regularly distributed to employees to keep them informed of SH&E matters that may contribute positively to maintaining a safe and healthful working environment.

Communication methods may include, but are not limited to:

- Team Briefs;
- Safety Committee Meetings;
- SH&E Bulletin Boards; and
- Safety Alerts.

6.1 Typical SH&E Bulletin Board Sample Layout

Each office with five or more staff must have an SH&E bulletin board or a substantial location dedicated to safety, health and the environment to display posters and informational materials. The SH&E Bulletin Board will have current, relevant materials posted to include the SH&E policy, Life-Preserving Principles as well as any other local legislative or geography specific information. All postings should be in the appropriate local language and in English.



6.2 Additional SH&E Awareness Campaign Suggestions

- Awards and Recognition for SH&E performance;
- Project logo shirts or caps;
- Stickers, buttons, key chains;
- Challenge Coins for on-the-spot recognition;
- Volunteer SH&E Advocates;
- Posters created by employees;
- Programs to recognize national safety, health, environment and fire protection events;
- Guest speakers for employee meetings;
- Banners addressing specific hazards;
- Banners promoting employee SH&E awareness;
- Whiteboards for workers to identify Today's Biggest Risks in This Area;
- Litter collection/recycling campaigns including moving to an office environment that minimizes the use of individual waste paper bins;
- Safety for Life Awareness Materials; and
- Personal safety awareness.

7.0 Roles and Responsibilities

AECOM has identified and allocated financial and physical resources to enable the effective implementation of the AECOM SH&E Management System.

7.1 Responsibility, Accountability and Authority

The SH&E Manager will maintain documents and records pertinent to the development, implementation and maintenance of this system. The SH&E Manager will provide technical guidance to operations in support of the requirements of applicable procedures and to enable a viable SH&E Office Inspection Program is effectively implemented at the location.

7.1.1 Office Operations Management

Office Operations Management or their designee has overall responsibility for providing a safe and healthy working environment and for maintaining safe work practices for all employees, contractors and sub-consultants working in AECOM offices.

7.1.2 Management and Supervisory Staff

Managers and Supervisors are responsible for the SH&E performance of the work areas under their control and have responsibility and authority for the following:

- Reporting on the performance of their respective business sectors to relevant AECOM management for review and as the basis for improvement;
- Acquiring and keeping up-to-date knowledge of relevant safety and health matters;
- Understanding the nature of the operations of the business and the hazards and SH&E risks associated with the business operations;
- Confirming a hazard reporting system is utilized and available;
- Consulting with employees who carry out work that could be affected by a potential SH&E risk;
- Coordinating with landlords and/or leasing agents to assure that facility-protective systems (e.g., sprinklers, fire extinguishers, alarms, and emergency lights) are periodically inspected and operational
- Developing a location-specific Emergency Response Plan.
- Establishing a routine office inspection program.
- Identifying and controlling any restricted work areas
- Reporting incidents;
- Reporting near misses;
- Confirming employees are properly trained on relevant SH&E topics by a qualified and competent person;
- Confirming SH&E is discussed during meetings;
- Providing employees with personal protective equipment relevant to the tasks and duties they are required to perform;
- Participating in incident investigations and incident reviews as required; and
- Confirming staff compliance with any jurisdictional, local and/or building property management required training.

7.1.3 Office Reception

Reception Staff in AECOM Offices will ensure that visitors are met at reception, sign into a log — electronic, or hard copy — and complete a visitor's induction overview. Reception staff will record and communicate all safety alerts, emergency situations or security concerns that they receive as the point of contact.

7.1.4 Fire / Floor Wardens and First Aid Officers / Providers

Please see Section 14 Emergency Preparedness and Response.

7.1.5 All Employees, Contractors, Sub-Contractors, Sub-Consultants and Visitors

Employees of AECOM, sub-consultants, contractors, sub-contractors, and others are required to:

- Inspect their own office work stations and areas and correcting conditions within their control to ensure compliance with this procedure.
- If requested, cooperate with Office Manager (Operations) to participate in site inspections or audits
- Take reasonable care and responsibility for their own safety and health, and the safety and health of others who may be affected by their actions or omissions in the workplace;
- Not introduce hazards to the premises by bringing or storing any items in the office that present a risk to life and safety;
- Comply with any reasonable instructions and directions issued by AECOM or organization's controlling work sites or locations (other than company controlled work sites or locations) at which the employees are required to work;
- Comply with the SH&E policies, procedures and instructions issued by AECOM or the organization controlling the work site or location;
- Not willfully damage, interfere with or misuse items or facilities provided in the interests of safety, health and welfare of the company employees and others;
- Report potential and actual hazards incidents, and near misses in accordance with company procedures;
- Use personal protective equipment and other safety promoting equipment when provided by the employer;
- Not willfully injure himself or herself.

7.2 SH&E Committee (Charter/Constitution)

AECOM offices shall establish a functioning SH&E Committee meeting requirements of local regulations that meets at least monthly. The SH&E Committee will establish a charter/constitution to outline how they will uphold and proactively manage SH&E concerns as well as implementation and enforcement of the AECOM Office Safety Plan. Where practicable, one SH&E Committee could be designated for several small offices where appropriate. The SH&E Committee shall:

- Encourage the active participation of all employees in the prevention of incidents and the promotion of safety, health and environmental activities in the workplace.
- Coordinate the SH&E Program and local legislative requirements for the office.
- Make recommendations to management on office or staff concerns brought to the committee or representatives attention.
- Minutes and action tracking from meetings should occur.

7.2.1 SH&E Committee Members

The functions of SH&E Committee Members Include:

- Representing their department in matters relating to SH&E;
- Investigating complaints from members of their department relating to SH&E;
- Inspecting the workplace, or any part of it, as assigned;
- Refer SH&E concerns to the committee;
- Promptly reporting any hazard or potential hazard to AECOM management;
- Consulting and cooperating with management on all matters relating to the SH&E of persons in the workplace; and
- Liaising with the employees regarding SH&E concerns.

8.0 Stop Work Authority

AECOM employees have not only the authority but also the responsibility to stop an unsafe act. This applies to work controlled by AECOM, AECOM employees and AECOM controlled sub-contractor work activities. See Appendix A for Stop Work Authority forms for each geography.

AECOM's goal is to protect employees from harm in their work above all other operational goals. To this end, we empower any employee, supervisor, manager or subcontractor to Stop Work if they believe a danger exists to any persons, property or the environment.

Prior to commencing a formal Stop Work Order, AECOM employees and subcontractors must conduct an informal Stop Work to discuss the concern and attempt to remove, mitigate or isolate the hazard in coordination with the supervisor and office manager. If the supervisor and office manager cannot sufficiently resolve the concern, a formal Stop Work Order will be enacted which elevates the concern to the SH&E Manager for assistance. Work associated with the affected area or operation will not resume unless all corrective actions identified have been resolved to an acceptable level.

Employees will never be penalized for exercising their responsibility to Stop Work.

9.0 Training and Competency

All AECOM employees, including managers and supervisors, will be trained on Office SH&E Plan requirements by a qualified and competent person. A qualified person will be knowledgeable of the specific Office SH&E Plan details, including applicable emergency evacuation and shelter-in-place procedures. Fire / Floor Wardens and First Aid Officers / Providers will be trained in accordance with local governing regulations. Specific instructions as related to emergency office evacuations and shelter-in-place training must be provided specific to the office location. This will be complete with emergency exit, rally / muster point and accountability procedures.

Office specific training will be administered for any hazard or risk not specifically addressed in this plan. Each office location will provide a supplement to fundamental training as necessary as an Appendix.

Any questions regarding qualified and competent trainers should be addressed with your local SH&E representative.

9.1 Employee Inductions / Orientations

Safety Inductions / Orientations will be conducted for all AECOM employees to familiarize employees and supervisors with SH&E potential hazards specific to work assignments as specified below.

- As a new AECOM employee;
- When the Office SH&E Plan is first established;
- When there are changes in the work environment or conditions that necessitate a change to the established Office SH&E Plan; and
- When employees are given a new job assignment with hazards or potential hazards that were not covered in the previous induction training.

9.2 Visitors

AECOM Office visitors will be issued a visitor's badge/tag or some identifiable means designating them as a visitor. The badge/tag must be worn for the duration of the visit. Visitors are to be informed of office emergency procedures including emergency exits, rally points and shelter-in-place locations. Visitors are to be accompanied by an inducted AECOM employee for the duration of their visit, or they must undergo the employee induction / orientation for that office location. For security reasons, many offices require visitors be accompanied by an AECOM employee while in the building, even if an Office Safety Induction / Orientation has been completed. All visitor escorts will ensure that their visitors are informed and aware of the hazards or potential hazards in the office they are visiting.

< insert any additional location specific information related to Visitors >

9.3 General Office Safety and Security

AECOM employees will promote safety and security in the office environment, perform and document safety inspections, and implement appropriate corrective actions designed to minimize risk and enhance operational SH&E performance.

Managers must ensure that employees working in that location understand any location specific risks, are briefed in the correct emergency response procedures and have access to support, such as first aid kits and firefighting equipment available for use, in the event of an incident or emergency.

Office and building evacuation means of escape should be inspected at least monthly to identify and address any specific hazards. Hazards that cannot be immediately addressed must be communicated to other employees, and corrective actions must be developed for resolution.

9.3.1 Office Ergonomics

Poor ergonomic work factors, such as repetitive motion, lack of motion/movement or improper workstation layout increase the risk of sustaining musculoskeletal injury. Advocate to employees to follow the 20-20-20 rule. Every 20 minutes, take a 20 second break and move 20 feet away from your workstation.

All equipment and workstation design shall take ergonomic performance into account. Ergonomics scientifically fits the job to the worker by reducing risk and obtaining maximum work efficiency with regards to work, work tools and the work environment.

Equipment and workstations shall be, as far as practicable, designed to suit the individual(s) interacting with them. Mechanical equipment or assistance shall be used whenever possible to reduce the manual material handling frequency, duration or load for workers. All office equipment and furniture should be used for its intended purpose and as recommended by the manufacturer

Formal workplace ergonomic hazard assessments will be carried out, as needed, to assess exposure and reduce risk. An ergonomic assessment will produce recommendations to improve the fit of the task to the worker most efficiently.

9.3.2 Slips, Trips and Falls

Slip, Trips and Falls are the most common hazards encountered that lead to employee injury. In order to abate these hazards:

- Clean up any spill immediately or notify property management if necessary.
- When utilizing a stairway, always use the handrail.
- Keep work spaces neat and orderly to prevent the accumulation of materials, boxes, etc. to minimize trip hazards.
- Keep pathways and aisle ways clear of obstructions and hazards.
- If work at heights is required, office staff will ensure the proper stool or ladder in good condition is provided and utilized in accordance with local regulations. Reference local working at height and/or fall protection procedures for specific guidance on applicable regulations and adequate stool and ladder specifications.

9.3.3 Housekeeping

Good housekeeping practices are an integral part of maintaining a safe office environment. This includes:

- Stacking materials neatly;
- Preventing electrical cords from being in aisle ways or passages;
- After using office supplies and/or equipment, putting them in their proper storage location;
- Cleaning up any spill immediately, and notifying property management when necessary;
- Turning off all electrical equipment at the end of the day;
- Implementing healthy housekeeping routines to ensure on-going and proactive upkeep; and
- Keeping all cabinet drawers and doors closed.

9.3.4 Manual Handling and Safe Lifting

Manual handling presents significant risk due to the potential for awkward postures, heavy or difficult to handle loads, space configuration hazards and unsuitable flooring. AECOM employees will observe safe lifting practices in order to minimize the potential to sustain a lifting related injury. When possible, employees will use a dolly to move items such as boxes. Special caution should be given to awkward lifting situations, such as in a tight space, or an oddly shaped or weighted item.

9.3.5 Motor Vehicles

Driving a motor vehicle presents significant risk due the possibility of vehicle collision or other event where personal injury or property damage may occur.

Motor vehicles must be selected, equipped, operated and maintained in a way that protects personnel from harm. **<Insert location guidance for vehicle assignment>**

Only authorized drivers, who are fit for duty, shall operate a motor vehicle. At-risk driving behavior by AECOM employees shall be identified and managed accordingly.

9.3.6 Electrical Safety

Electricity presents significant risk from electrical shock or due to an arc flash. An arc flash is a flash over of electrical current that causes it to leaves its intended path and travel through the air from one conductor to another or to the ground. Results are often violent and when a person is in close proximity to the arc flash severe injury or even death can occur.

All electrical work must be identified and completed against a defined set of criteria.

Efforts will be made to follow local safety codes and manufacturer's specifications to eliminate the need to directly work on live electrical systems where practicable.

Electrical work must be planned and managed by competent personnel. Including, but not limited to the, revision of the electrical system, de-energizing electrical systems and permit to work.

Only authorized and fit for work personnel shall perform work on, or near, live electrical system components.

9.3.7 Globally Harmonized System for Hazard Communication (HazCom)

HazCom is a system to ensure that information regarding chemical hazards in the workplace is communicated to all potentially affected employees. Any chemical container that is brought into the office must have the proper warning labels. Where practicable, chemicals will be stored in the original manufacturer's container with clearly legible labels.

If an employee has to utilize an item that poses a potential chemical hazard, they will first obtain a copy of the current Safety Data Sheet (SDS) formerly known as the Material Safety Data Sheet (MSDS).

9.3.8 Workplace Violence, Sexual Harassment, and Racial Harassment

Managers shall take deliberate steps to let all workers know the Company's position on workplace violence, sexual harassment and racial harassment by providing a method of confidential reporting and the understanding that all claims will be investigated and remedied promptly.

Employee complaints made in good faith shall be made without fear of retribution. Managers shall assess the workplace for potential scenarios and incorporate findings into the Emergency Preparedness and Response planning where applicable.

< insert any additional location specific information related to Workplace Violence, Sexual Harassment, and Racial Harassment>

AECOM's Workplace Violence and Harassment policies can be found **<insert location>** and are posted on the Office SHE Board.

10.0 Incident Management Process

The following events or situations as applied to AECOM employees and/or AECOM-controlled operations are considered SH&E Incidents:

- Any work-related injury or illness to an AECOM employee;
- Fire, explosion or flash that is not an intended result of a remediation process, laboratory procedure or other planned event;
- Any incident involving company-owned, rented or leased vehicles (including personal vehicles used to conduct company business);
- Property damage resulting from any AECOM or subcontractor activity;
- Unexpected release or imminent release of a hazardous material;
- Unexpected chemical exposures to workers or the public; and
- Any government agency inspection, citation or notice of violation.

10.1 Incident Reporting

All incidents must be reported to a manager/supervisor or designee as soon as practicable. Managers/Supervisors will ensure there is a Timely Notice of Loss in the online incident management system (e.g., IndustrySafe), within four hours of the incident or notice that the incident occurred. The IndustrySafe guide is available on AECOM's Corporate SH&E webpage.

10.1.1 Employee Responsibilities

If an incident appears to be a risk to life, limb or eyesight, seek immediate emergency medical services.

Only trained and competent employees, specifically to the blood borne pathogens rules and regulations and those that have proper protective equipment, may provide first aid when the response involves coming in contact with blood or bodily fluids.

Employees are responsible for reporting all occupationally related or potentially occupationally related incidents immediately to their manager/supervisor. All incidents must be reported no matter how minor the incident appears. Provide as much detail about the incident occurrence as possible, including:

- Who was injured;
- Extent and nature of the injury;
- Where it occurred;
- When it occurred; and
- Name witnesses to the incident.

If medical treatment is sought, the injured employee will obtain a copy of their work status report from the treating physician when practicable. Employees shall provide their manager/supervisor and the AECOM Workers Compensation Analyst a copy of their work status report within 24 hours after any appointment for the treatment of the occupational injury/illness.

10.1.2 Manager/Supervisor Responsibilities

Once a Manager/Supervisor becomes aware that an incident has occurred, assess the situation. If there is a risk to life, limb or eyesight, seek immediate emergency medical services for the injured.

- Arrange for proper medical care, if necessary, and ensure that the AECOM Workers Compensation Analyst is informed; and
- Ensure the incident is logged into the online incident management system (e.g., IndustrySafe, GSMART), within four hours of the incident occurrence, or knowledge of incident occurrence.

Only trained and competent employees, specifically to the blood borne pathogens rules and regulations and those that have proper protective equipment, will provide first aid when the response involves coming in contact with blood or bodily fluids.

There are a number of ways AECOM Management/Supervision could potentially be informed of an incident. Such as: an employee reports an incident directly to the manager/supervisor; notified by a physician either verbally or through written correspondence that an incident occurred; notified by a family member either verbally or through written correspondence that an incident has occurred; notified by an attorney either verbally or through written correspondence that an incident occurred; or notified by a Regulatory Body either verbally or through written correspondence that an incident occurred.

AECOM may need to file a Workers Compensation, Defense Base Act, General Liability (in the case of an automobile accident) or similar type claim even if AECOM is not at fault or has not accepted liability for an incident. Notify the AECOM Workers Compensation Analyst when any of the above scenarios occur.

10.2 Incident Investigation, Corrective and Preventive Action

Incident investigations are a vital element of our Office SH&E Plan because these investigations provide us with information in order to prevent similar incidents from occurring in the future. An investigation's objective is to identify the root cause of the incident, such as a system failure, unsafe acts and conditions or noncompliance with or ineffectiveness of an established safety rule, regulation, policy or procedure.

Corrective and Preventative actions must be implemented for every incident that occurs no matter how minor it may appear.

10.3 Fit for Duty

Fit for Duty simply translated means an individual is in a physical, mental and emotional state which enables them to perform the essential tasks of their work assignment in a manner that does not threaten the safety or health of oneself, co-workers, property or the public at large.

Employees must report to work in a fit state that does not place themselves or others at risk due to physical, mental and emotional factors.

Employees that report to work in an unfit state must inform their supervisor so that adjustments to their activities can be made accordingly. This may include:

- Drugs and Alcohol including prescription medication;
- Temporary Conditions such as fatigue, and stress
- Physical limitations such as eyesight, hearing, flexibility and lifting restrictions;
- Cognitive limitations such as brain damage; and
- Psycho-social factors such as depression, anxiety and fears that may restrict clear thinking.

Employees or supervisors that observe another employee that may be working in an impeded manner should consult with local management and human resources to determine a course of action.

Where an incident has occurred and there is reason to believe the individual may not have been fit for duty the local safety department and human resources should be contacted immediately and an appropriate investigation conducted.

11.0 Audits, Assessments and Inspections

Periodic office inspections will be performed, at minimum, in accordance with the following schedule:

- Prior to the occupation of any new facility by staff;
- When the Office SH&E Plan is initially established;
- Monthly;
- As required by any applicable governing regulation;
- When new tasks that were not previously performed at this location are now performed;
- When new hazards are introduced to the office environment; and
- When office conditions necessitate an inspection.

See Appendix B for example Office Inspection Checklists used in each geography.

11.1 Safety, Health and Environmental Inspections and Auditing

Inspections will be conducted prior to the occupation of any new facility and on a monthly basis, at minimum, utilizing appropriately qualified office staff employees. 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 will be documented and retained in accordance with local records retention policy.

11.2 Documentation and Records Management

Office Management is responsible for taking steps to establish, implement and maintain the storage of records in accordance with AECOM's records retention requirements.

Common records that should be accounted for in the records retention chart are:

- Medical Monitoring Records;
- Training Records;
- Near Miss and Incident Reports;
- Lead and Asbestos Records;
- Chemical Exposure List;
- Audit and Inspection Findings;
- Corrective and Preventative Actions; and
- Industrial Hygiene Monitoring Reports.

This location's records retention requirements are **<Insert record retention chart>**.

12.0 Hazard Identification and Risk Assessment

Here is a list of anticipated hazards that are typically associated with the office work environment:

- Fire from ignited combustible materials by sparks typically generated from an applicant, power strip or electrical equipment;
- Injury from Trips, Slips or Falls;
- Injury from a Natural Disaster such as high winds, earthquake, tornado, hurricane or a wind storm;
- Motor vehicle incident resulting in injury either as a motorist or as a pedestrian;
- Musculoskeletal injuries that arise out of repetitive motions, body posturing and/or poor ergonomic practices;
- Stress related to the work environment;
- Cuts from sharp objects or paper; and
- Injury resulting from falls off of ladders or stools.

12.1 Hazard / Risk Assessment, Control and Evaluation

A Manager or Supervisor shall prepare and maintain a risk register for monitoring and evaluating all risks identified within an office. The risk register shall be reviewed on an annual basis or as high level risks or relevant SH&E legislative changes are identified. Controls shall be put in place to mitigate these risks.

The risk register shall also be reviewed by the **< insert locally responsible point of contact >** on a monthly basis (or as required) as part of the Management Review.

12.1.1 Operations

All hazards and risks identified will be assessed and controlled to the level of “As Low as Reasonably Practical.”

Hazards associated with business operations and environments are subject to a risk assessment. The results of assessments including recommended controls shall be communicated to the leadership group.

Hazards with a high risk rating (likely to cause significant harm) are assigned highest priority and are reported to management immediately. All hazards are to be reviewed by the Office Management Team and appropriate personnel. Mitigating controls are to be implemented to eliminate or reduce the reported hazards.

13.0 Environmental Management

This section addresses environmental compliance conditions and activities that could apply in the office as well as environmental sustainability activities. Complete section 13.1.4 as applicable.

13.1 Environmental Compliance

There are a number of environmental laws and regulations that could be applicable to office conditions and activities. Some of these are listed below:

13.1.1 Storage of Chemicals and Samples

Any chemicals or samples stored in the offices must be properly labeled. Depending on the time the chemicals and samples are stored, it may be necessary to obtain a permit for storage.

13.1.2 Shipment of Materials

This applies to shipment of materials considered to be hazardous and/or dangerous. Local laws and regulations in some countries have requirements for the proper labeling of materials shipped, via air or ground, and have training and documentation requirements for people involved with the shipment of these materials.

13.1.3 Obtaining of Permits Prior to Field Activities

Offices should ensure, prior to the start of field activities, that all necessary permits have been obtained. These permits can include: air permits for remediation systems, which may have air emissions; water discharge permits that may be required for remediation systems, which could discharge wastewater; storm water permits; waste storage and others.

13.1.4 Office Environmental Compliance Applicability

Office Activities	If Yes — Actions	Name the Office Lead Person and describe the process to ensure compliance (provide attachments as needed)
Does the office store chemicals or retain samples?	Ensure the chemicals and samples are stored properly, with appropriate labeling and have the applicable permits for storage.	
Does the office arrange for shipment of materials considered to be hazardous or dangerous?	Ensure people involved with arranging the shipment are properly trained with documentation available.	
Does the office perform field activities that require permits — air, water or waste?	Ensure permits are obtained prior to going to the field.	

13.2 Environmental Sustainability

13.2.1 Waste Management

The following waste contractors are used to remove waste from this site (as applicable):

Contractor	Waste Stream	Carriers/Brokers License Expiry date	Proposed Waste Disposal Facility (WDF)	Is WDF licensed or exempt to accept this waste stream?
	Paper			
	Glass			
	Plastic			
	Cans			
	Fluorescent Light Tubes			
	Waste Oils			
	IT Equipment			
	Interceptor Sludge			
	Batteries			
	Etc.			

All waste consignment notes (if applicable) are to be retained by **<insert who and where>** (Note: Non-hazardous waste transfer notes are to be kept for at least two years. Hazardous waste consignment notes are to be kept for at least three years).

Recycling is undertaken wherever possible and the materials that are being recycled are: (examples)

- Paper — **<insert how & where>;**
- Glass — **<insert how & where>;**
- Plastic — **<insert how & where>;**
- Cans — **<insert how & where>; and**
- Other — **<insert what, how & where>.**

13.2.2 Water Management

Fresh water is recognized as a depleting resource and measures have been implemented at this workplace to try and reduce our water usage.

<insert water conservation measures taken at this office>

Consideration is also given to the contamination of water sources. Waste is stored appropriately to reduce the risk of contamination through drainage networks, and where applicable, authorization is sought from the sewage network provider for discharge into the network (e.g. for toilet facilities).

13.2.3 Energy Use

Efficient use of energy resources are managed through specific initiatives. These may include:

- Turning off lights and heaters when out of room;
- Don't leave equipment on standby;
- Energy saving devices installed;
- Car sharing initiatives;
- Movement sensors for lights; and
- Thermostat controls set at reasonable temperatures and controlled during normal business hours.

13.3 Other Environmental Activities

13.3.1 Asbestos Management (As Applicable)

An asbestos assessment **<is/is not going to be conducted>** at this facility.

< An assessment has revealed that asbestos or asbestos containing materials **<is/is not present>**. >

< If Asbestos is present The Asbestos Management Plan for this workplace is kept **<insert location>** and **<insert name>** is responsible for keeping it current and ensuring monitoring takes place at the required intervals.>

< The outcome of all asbestos testing on the premises undertaken by appropriate authorities, including the building management is to be reviewed by locally qualified staff with the appropriate authority and retained in the records report. The company will work with the appropriate authorities to ensure the remediation of any identified asbestos issues.>

13.3.2 Air Quality Management

The outcome of all air-quality testing on the premises undertaken by appropriate authorities, including the building management is to be reviewed by locally qualified staff with the appropriate authority and retained in the records report. The company will work with the appropriate authorities to ensure the remediation of any identified air quality issues.

13.3.3 Energy Emergencies

In the event of a power/energy emergency, the type of power/energy used to include the service providers to facilitate quick communications in the event of an emergency includes:

- **Gas — name of service provider;**
- **Gas oil — name of service provider;**
- **Fuel oil — name of service provider; and**
- **Electricity — name of service provide>.**

14.0 Emergency Preparedness and Response

<Insert Office Location> has a Location Specific Emergency Response Plan specific to the premises and geographic location of the office. The Emergency Response plan is located **<insert specific location of the plan>**. All employees will be familiar with the Emergency Evacuation Plan as part of their Induction Training.

Geographic specific Emergency Response Planning procedures provide detail on the:

- Structure of the emergency response organization;
- Responsibilities for preparation, implementation review of emergency response processes;
- Training;
- Response strategies; and
- Testing of the emergency drill.

Location Specific Emergency Response Plans provide:

- Emergency contact lists;
- Applicable maps (office location, location of exits, emergency equipment, muster / rally points, etc.);
- Emergency procedures; and
- Emergency response evaluation.

A Manager or Supervisor shall ensure appropriate resources are allocated and that the Emergency Response Plan is implemented. Leadership will decide the need for periodical testing across each office.

14.1 Fire / Floor Wardens and First Aid Officers / Providers

In the event of a medical or fire or natural disaster emergency, fully trained and competent First Aid Officers and Floor wardens are to be in their designated location in order to provide assistance. In some localities, the property management provides appropriately trained Floor wardens. Contact your property management company and coordinate the delegated duties as appropriate.

14.2 First Aid Kits and Automated External Defibrillators AEDs

Stocked First Aid Kits are available at **<insert specific location of First Aid Kits on site>**.

AEDs are available at **<insert specific location of AEDs on site>**.

14.3 Emergency Response Plan

The Location Specific Emergency Response Plan is included as Appendix **<insert Appendix Number>**.

For an emergency evacuation of the office, alarms and/or flashing lights will be observed.

Employees will follow the directions provided by the floor wardens and proceed to the designated muster or rally points.

Every AECOM employee must know what to do in an emergency situation and how to obtain assistance. In the event of natural disasters, a fire, medical, hazardous chemical spill, elevator malfunction, security incident, power failure, emergency evacuation or shelter in place notify your Supervisor and Office/Facility Manager as soon as practicable.

14.4 Security

Each office will assess the potential for violence and establish appropriate security procedures consistent with building manager's protocol.

15.0 Contractors/Subcontractors

AECOM engages contractors, sub-consultants and sub-contractors to assist in the delivery of client projects. All sub-contractors must meet this office's minimum requirements with respect to safety documentation and reporting.

Service providers who perform work in the office environment unsupervised must complete a visitor's induction / orientation and be advised if any planned high-risk activities are to be performed, at minimum.

15.1 Service Providers

Office Management will be responsible to ensure the selection of competent contractors to carry out all maintenance/cleaning operations. Copies of named maintenance and cleaning contractors' agreements can be located **<insert location of information>**.

If the service provider is selected by the Property Management Company, contact the point of contact if any high-risk activities are occurring within workspace that has the potential to pose a risk to AECOM personnel.

15.2 Monitoring and Review

Surveillance and audit activities will be performed and provide a level of assurance that the subs have implemented planned arrangements. The project manager will plan for such surveillance and audit activity.

Where the sub will be engaging in high-risk activities, or where a sub's project safety plan is a contractual requirement, the project manager must ensure the plan(s) are reviewed and any non-conformances are rectified prior to work commencing.

AECOM recognizes that some clients may have specific requirements in relation to how contractors working on the client's sites are managed. In these circumstances, the client's specific requirements shall override AECOM procedures. The client-specific requirements will be made available to our staff.

16.0 Management Review

To ensure continuing suitability, adequacy and effectiveness of the SH&E Management System, a continual review process will be implemented. Management and Supervisory staff will review the SH&E Management System through management team meetings and reports. At minimum, the following items are addressed:

- Results of any internal or external SH&E related audits or inspections;
- Progress of the SH&E KPIs to include leading and lagging indicators;
- Incident Reports;
- Hazard Identification;
- Corrective Actions; and
- Changes to regulatory requirements

17.0 Office Closeout

At the conclusion of a project or lease, any property in which AECOM is a tenant, Office Management is responsible for vacating the premises, to include the removal of any AECOM-owned or personal property. Some leases may require that AECOM remove cabling from walls, closets and server rooms. Real Estate Services will provide direction as to AECOM's requirements as per the lease.

It is important that AECOM be present for a final walk through with the landlord or the building management's point of contact to come to a consensus on the condition of the space at time of turnover. AECOM and building management will agree upon satisfactory turnover conditions or resolutions. The AECOM representative should take photographs to document the condition of the space with a focus on spaces that appear to have excessive wear and/or damage.

18.0 Appendices

As applicable, your action items after reviewing this template are to:

- 1. Add your office specific information and gather additional information needed to complete the remainder of the template.**
- 2. Select the applicable forms and information for your office from Appendix A, B, C and D above and delete the others that do not apply. Update the above appendices list accordingly.**
- 3. Add any additional appendices with forms or content applicable to your office.**

Appendix A — Stop Work Authorization Forms

Americas — S3AM-002-FM1 Stop Work Order – AECOM Employees and Direct Subcontractors

Appendix B — Office Inspection

Americas — S3AM-216-FM2 Office Inspection

Appendix C — Location Specific Emergency Response Plan Forms

Americas — S3AM-010-FM2 Emergency Response Plan Template

Appendix D — Additional and Optional Content

Americas — S3AM-209-FM3 — Procedure Checklist

Americas — S3AM-209-FM7 — Office Relocation Plan

<list any additional documents appending this SH&E Plan>

Additional documents may be added.

Americas

Industrial Site / Project SH&E Plan

S3AM-209-FM2

[Industrial Site / Project Name]

[Industrial Site / Project Location]

Prepared for:

[Client]

[Address]

[City, State/Province, Zip./Postal Code]

[Month XX, 20XX]

Industrial Site / Project No.: [00000.00]

Plan Expiration Date:

[insert date 1 year from approval date]

THIS SH&E PLAN IS TO BE USED FOR THE SPECIFIC INDUSTRIAL SITE OR PROJECT DESCRIBED HEREIN. IT IS NOT TO BE USED FOR ANY OTHER INDUSTRIAL SITE OR PROJECT. THIS PLAN MUST BE REVISED AS APPROPRIATE TO ADDRESS CHANGING SITE CONDITIONS OR MODIFIED SCOPE OF WORK.

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 therefore. The existence and use of this 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.

SH&E Plan**Approval Page**

By signing below, I acknowledge that I have reviewed and hereby approve the SH&E Plan for the [insert industrial site or project name]. This SH&E Plan has been written for the exclusive use of AECOM, its employees, and its subcontractors.

Prepared by:

(signature)

Date

[Preparer's Name]

[Preparer's Title]

[Preparer's Phone Number]

Reviewed by:

(signature)

Date

[Safety Prof Name]

[Safety Prof Title]

[Safety Prof Phone Number]

Approved by:

(signature)

Date

[Proj Mgr Name]

Program/Project Manager

[Proj Mgr Phone Number]

EXECUTIVE SUMMARY

The purpose of this Safety, Health, and Environmental (SH&E) Plan is to address health and safety concerns related to AECOM-managed activities at the [site name] site, located at [site address] in [city, state]. The specific roles, responsibilities, authority, and requirements as they pertain to the safety of employees and the scope of services are discussed herein. The document is intended to identify known potential hazards and to facilitate communication and control measures to prevent injury or harm. Additionally, provisions to control the potential for environmental impact from these activities are included where applicable.

Below is a brief description of the site, scope of services and responsible party:

AECOM will be...

Subcontractor X will be...

Subcontractor Y will be...

The primary physical hazards that may be encountered include:

[list PRIMARY physical hazards]

The chemical hazards that may be encountered include:

[list anticipated chemical hazards]

All staff are bound by the provisions of this SH&E Plan and are should understand the anticipated hazards and respective onsite controls. The discussion will cover the entire SH&E Plan subject matter, putting emphasis on critical elements of the plan; such as the emergency response procedures, personal protective equipment, site control strategies, and monitoring requirements. In addition, daily tailgate safety meetings will be held to discuss the anticipated scope of work, required controls, incident reporting, and any lessons learned or concerns from the previous day; to identify new hazards and controls; and to review the results of inspections.

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Attachments

Attachment A	Location Specific Emergency Response Plan
Attachment B	Pre-Job Hazard Assessment
Attachment C	Task Hazard Assessment (Blank)
Attachment D	SH&E Procedure Checklist and Applicable AECOM SH&E Procedures
Attachment E	Daily Tailgate Meeting (Blank)
Attachment F	Safety Data Sheets
Attachment G	Client Specific Health & Safety Guidelines [delete if not applicable]

[insert additional attachments as applicable e.g., Site Security Plan, Fall Protection and Rescue Plans, etc.]

1.0 Emergency Contacts & Facilities Information

This SH&E Plan addresses the requirements for AECOM and subcontractor personnel to conduct field activities to support the [Industrial Site or Project Name, Scope of Work, and Location].

Emergency Coordinators / Key Personnel			
Name	Title/Workstation	Telephone Number	Mobile Phone
[insert]	Client Contact	[insert]	[insert]
[insert]	Manager	[insert]	[insert]
[insert]	Site Supervisor	[insert]	[insert]
[insert]	Site Safety Officer	[insert]	[insert]
[insert]	SH&E Manager	[insert]	[insert]

[Delete the below table if not applicable]

Subcontractor Site Safety Officers			
Name	Subcontractor Name	Telephone Number	Mobile Phone
[insert]	[insert]	[insert]	[insert]
[insert]	[insert]	[insert]	[insert]
[insert]	[insert]	[insert]	[insert]
[insert]	[insert]	[insert]	[insert]
[insert]	[insert]	[insert]	[insert]

Medical Treatment Facilities			
Name	Address	Telephone Number	Days/Hours of Operation
EMERGENCY - [HOSPITAL insert]	[insert]	[insert]	[insert]
NON-EMERGENCY [OCCUPATIONAL CLINIC insert]	[insert]	[insert]	[insert]

A complete Location Specific Emergency Response Plan is provided in Attachment A. [Complete S3AM-010-FM2 Location Specific Emergency Response Plan and attach in Attachment A.]

2.0 AECOM's Safety for Life & Life Preserving Principles

"Safety for Life" is a comprehensive internal program that drives our nearly 100,000 employees toward the company's commitment to achieving zero work-related injuries and/or illnesses; preventing damage to property and the environment; and maintaining an environmentally friendly and sustainable workplace. Our Safety for Life program is supported by 9 Life Preserving Principles that apply to all AECOM activities.

Life-Preserving Principles

AECOM has adopted these “Life-Preserving Principles” to help demonstrate the commitment of our Safety for Life program. We firmly believe these “Life-Preserving Principles” will enable AECOM to achieve its goal of zero employee injuries, property damage and an environmentally friendly and sustainable workplace.

Demonstrated Management Commitment

Our executive, senior and project managers will lead the Safety, Health and Environment improvement process and continuously demonstrate support and commitment.

Employee Participation

Our employees will be encouraged and empowered to become actively engaged in our safety processes through their active participation in safety committees, training, audits, observations and inspections. Employees will be encouraged to participate in health initiatives and adopt a healthy lifestyle.

Budgeting and Staffing for Safety

Our safety staff will be competent, fully trained and qualified to provide technical resources to our internal and external clients. A budget to support safety activities will be included project proposals.

Pre-Planning

Our design, engineering, project and construction management staffs will deploy effective risk mitigation efforts to design, plan and build safety into every project. Pre-Project and Pre-Task planning will be an effective tool in protecting our employees and the environment.

Contractor Management

Our project staff will work closely with our sub-consultants, subcontractors, contractors and Joint Venture Partners to provide a safe work environment for employees and members of the public. Our goal of SH&E performance excellence will be equally shared by all project participants.

Recognition and Rewards

Our employees will be recognized for their efforts in working safely and their support of our safety efforts.

Safety Orientation and Training

Our employees will be provided with effective safety training in order to identify and mitigate hazards in the workplace to prevent injuries to themselves and others who may be affected by their actions.

Incident Investigation

Our managers and safety professionals will investigate all recordable incidents and serious near misses to identify contributing factors and root causes in order to prevent a reoccurrence. Lessons learned shall be identified, communicated and implemented.

Fit for Duty

Our employees are responsible to report to work each day fit for duty and not to pose a health and safety hazard to themselves or others.

3.0 Introduction

This SH&E Plan addresses the requirements for AECOM and subcontractor personnel to conduct field activities to support the [Industrial Site or Project Name, Scope of Work, and Location].

The requirements of this SH&E Plan apply to AECOM-managed operations only. No change to this SH&E Plan that could affect the health or safety of personnel, the community, or the environment may be made without prior approval of the AECOM Manager and the SH&E Manager. Concurrence with the provisions of this SH&E Plan is mandatory for all personnel at the site covered by this plan and must be evidenced by each individual signing the acknowledgement page of this plan.

3.1 Regulatory Requirements

3.1.1 This SH&E Plan meets the requirements and follows the respective Occupational Health and Safety requirements and the guidelines established by the jurisdiction of [identify applicable jurisdiction] as required: [choose and reference all regulatory requirements AND delete those that are not applicable]

- [For United States only] Federal Occupational Safety and Health Administration (OSHA) Code of Federal Regulation Title 29, Part 1910 (29 CFR Part 1910), Occupational Safety and Health Standards
- [For United States only] Federal Occupational Safety and Health Administration (OSHA) Code of Federal Regulation Title 29, Part 1926 (29 CFR Part 1926), Safety and Health Regulations for Construction
- [For Canada only] [reference to the applicable provincial occupational health and safety act or Canada Labour Code if Federal]
- [insert any additional state, provincial, Federal or other Occupational Health or Environmental requirements]

3.1.2 The requirements specified in this SH&E Plan also conform to AECOM's SH&E Management System. Procedures from the SH&E Management System that are applicable to the work activities planned during this project may be found in Attachment D.

3.2 Site Safety and Health Organization

3.2.1 Manager [Insert Name, if available]

- THE MANAGER HAS OVERALL MANAGEMENT AUTHORITY AND RESPONSIBILITY FOR ALL SITE OPERATIONS, INCLUDING SAFETY. THE MANAGER WILL PROVIDE THE SITE SUPERVISOR WITH WORK PLANS, STAFF, AND BUDGETARY RESOURCES THAT ARE APPROPRIATE TO MEET THE SAFETY NEEDS OF THE PROJECT OPERATIONS.

3.2.2 Site Safety Officer [Insert Name, if available – if there is to be no SSO remove all references to this position within this document]

- The Site Safety Officer (SSO) has the overall responsibility and authority to provide onsite safety support to the manager and provide guidance to any safety requirements to the site supervisors (site inspection, assisting incident investigation). The SSO will work directly with the Manager and Site Supervisor with work plans, training requirements and any other regulator safety compliance requirements and ensure all employees and subcontractor employees are fit for duty.

3.2.3 Site Supervisor [Insert Name, if available]

- The site supervisor has the overall responsibility and authority to direct work operations at the job site according to the provided work plans. The Manager may act as the site supervisor while on site.
- Responsibilities (Site Supervisor)

The site supervisor is responsible for:

- Observing and providing guidance with regard to safe work behavior and site safety training;
- Ensure all employees and subcontractor employees are fit for duty;
- Discussing deviations from the work plan with the Site Safety Officer (SSO) and Manager;
- Discussing safety issues with the Manager, SSO, and field personnel;
- Assisting the SSO with the development and implementation of corrective actions for site safety deficiencies;
- Assisting the SSO with the implementation of this SH&E Plan and with confirming compliance; and
- Assisting the SSO with inspections of the site for compliance with this SH&E Plan and applicable SH&E procedures.

- Authority (Site Supervisor)

The site supervisor has authority to:

- Verify that all operations are in compliance with the requirements of this SH&E Plan and stop any activity that poses a potential hazard to personnel, property, or the environment.
- Temporarily suspend individuals from field activities for infractions against the SH&E Plan pending consideration by the SSO, the SH&E Manager, and the Manager.

3.2.4 Employees

- Responsibilities (Employees)

Responsibilities of employees associated with this industrial site or project include, but are not limited to:

- Understanding and abiding by the policies and procedures specified in the SH&E Plan and other applicable safety policies, and clarifying those areas where understanding is incomplete.
- Providing feedback to SH&E management relating to omissions and modifications in the SH&E Plan or other safety policies.
- Reporting for work fit for duty.
- Immediately notifying the SSO of unsafe conditions and acts and complete written reports, if necessary.

- Authority (Employees)

The safety and health authority of each employee assigned to the site includes the following:

- The right to refuse to work and/or stop work authority when the employee feels the work is unsafe (including subcontractors or team contractors), or where specified safety precautions are not adequate or fully understood.
- The right to refuse to work on any site or operation where the safety procedures specified in this SH&E Plan or other safety policies are not being followed.
- The right to contact the SSO or the SH&E Manager at any time to discuss potential concerns.
- The right and duty to stop work when conditions are unsafe, and to assist in correcting these conditions.

4.0 Site Description and Planned Work Operations

4.1 General Description

The [site name] site is located at [site address]. [Insert description. This should include any significant physical features of the site (i.e., terrain, buildings, size, location, bodies of water etc., any relevant background or historical information related to the site, and any applicable concurrent operations occurring or to occur on the site)]

4.2 Planned Work Operations

[Provide a description of the overall objective for what is being done for the job and what is supposed to be accomplished. This does not have to actually spell out the steps for the job, as that will be covered in the bullets below.]

- [Provide a bulleted list of the tasks that will be accomplished throughout the job]

5.0 Hazard Assessment & Control

5.1 Pre-Job Hazard Assessment

5.1.1 A Pre-Job Hazard Assessment has been completed for all activities identified in the Scope of Work. The completed *Pre-Job Hazard Assessment* is provided in Attachment B.

5.2 Task Hazard Assessment (THA)

5.2.1 The THA is to be completed by the individual(s) intended to conduct the task immediately prior to initiating the associated task. The intent of the THA is to engage the end-user in actively assessing the hazards associated with their task, as well as capture nuances or specifics immediately present that may otherwise remain unacknowledged. A blank *Task Hazard Assessment* form is available as Attachment C.

5.3 Unanticipated Work Activities/Conditions

5.3.1 As a result of unanticipated work activities or changing conditions, additional Pre-Job Hazard Assessment may be required. All additional Pre-Job Hazard Assessments will be reviewed and approved by the SH&E Manager.

5.4 SH&E Procedures

5.4.1 Personnel may be exposed to a variety of chemical, physical, and radiological hazards resulting from task or equipment-specific activities.

5.4.2 The *Procedure Checklist* has been completed for activities identified in the Scope of Work, and the applicable procedures, along with related procedure attachments and forms, have been included. These can be found in Attachment D.

5.5 Geography or Business Group-Specific Requirements

[Add to the below content as applicable to the Industrial Site or Project AND delete the other option]

5.5.1 Requirements specific to [insert geography and/or Business Group] not addressed in a procedures contained in Attachment D are itemized in the below bullets.

- [insert requirements specific to the geography and/or Business Group]

OR

Requirements specific to [insert geography and/or Business Group] are adequately addressed in procedures contained in Attachment D.

6.0 Health and Safety Requirements

6.1 Site-Specific Safety Training

[Add to the below content as applicable to the Industrial Site or Project]

All AECOM personnel performing activities at the site will receive a documented site / project specific orientation prior to the commencement of their activities.

Visitors are required to complete an orientation appropriate to the location or site they are to visit, and subsequently abide by AECOM SH&E policies and procedures when visiting our premises or sites. Visitors to AECOM premises or sites shall be escorted by an AECOM employee who shall confirm local security arrangements are applied and the visitor is aware of SH&E management requirements, including those for emergency response and incident reporting.

All AECOM personnel performing activities at the site will be trained in accordance with S3AM-003-PR1 SH&E Training. All personnel are required to remain current in all of their required training and evaluate their need for additional training when there is a change in work. Safety training documentation is to be maintained.

In addition to the general SH&E training programs, personnel will be required to complete any supplemental task specific training developed for the tasks to be performed. **DELETE if not required. Required supplemental training may include:**

- [insert any supplemental training requirements]

Administration and compliance with the requirements for additional task-specific training will be the responsibility of the project or lead manager. Any additional required training that is completed will be documented and tracked.

6.2 Short Service Employees

[Delete section if not applicable OR add to the below content as applicable to the Industrial Site or Project]

Appropriate mentoring and oversight of newly hired or transferred employees shall be maintained in accordance with *S3AM-015-PR1 Short Service Employees*. Short Service Employees shall be easily identified by:

- [insert the required garment to be worn, hard hat or other method of identification].

6.3 Medical Screening & Surveillance

[Delete section if not applicable OR add to the below content as applicable to the Industrial Site or Project]

Medical screening & surveillance shall be conducted in a alignment with S3AM-128-PR1 Medical Screening & Surveillance. Employees involved in the following tasks or exposures shall participate in the medial screening or surveillance identified in the table below.

Task or Exposure	Type of Screening or Surveillance
[insert task or exposure]	<ul style="list-style-type: none"> • [insert type of screening or surveillance] • [insert type of screening or surveillance]
[insert task or exposure]	<ul style="list-style-type: none"> • [insert type of screening or surveillance] • [insert type of screening or surveillance]

6.4 Fitness for Duty

[Add to the below content as applicable to the Industrial Site or Project (e.g., defined hours of work or fatigue management plan, substance abuse testing requirements, etc.)]

Fitness for duty may be affected by significant fatigue, stress, emotional issues, illness, injury, or the effects of drugs and alcohol. Employees who are not fit for duty may present a safety hazard to themselves, to other employees, to the Company, or to the public. In order to provide a safe work environment, employees must be fit for work, be able to perform their job duties in a safe, secure, productive, and effective manner, and remain able to do so throughout the entire time they are working.

6.5 Tailgate Meetings

Prior to the commencement of daily activities, a tailgate meeting will be conducted to review the specific requirements of this SH&E Plan. Attendance at the daily tailgate meeting is mandatory for all employees and subcontractors at the site covered by this SH&E Plan and must be documented on the attendance form. A copy of a blank *S3AM-209-FM5 Daily Tailgate Meeting Form* is included as Attachment E, and may be used to document the tailgate meeting.

6.6 Hazard Communication

Hazardous materials that may be encountered as existing on-site environmental or physical/health contaminants during the work activities must be addressed in this SH&E Plan including but not limited to their properties, hazards, and associated required controls will be communicated to all affected staff and subcontractors.

In addition, any employee or organization (contractor or subcontractor) intending to bring any hazardous material(s) onto this AECOM-controlled work site must first provide a copy of the item's Safety Data Sheet (SDS) to the SSO for review and filing (the SSO will maintain copies of all SDS on site). In the event where a SDS was not made available for locally obtained products, the material in question will not be brought onto the worksite.

All personnel shall be briefed on the hazards of any chemical product they use, and shall be aware of and have access to all SDS.

All containers on site shall be properly labeled to indicate their contents. Labeling on any containers not intended for single-day, individual use shall contain additional information indicating potential health and safety hazards (flammability, reactivity, etc.). Materials that need to be separated into smaller containers shall have workplace labels in accordance to *S3AM-115-PR1 Hazardous Materials Communication*.

Attachment F provides copies of SDS for those items planned to be brought on site at the time this SH&E Plan is prepared. This information will be updated as required during site operations.

6.7 Incident Reporting, Notifications & Investigation

[Add to the below content as applicable to the Industrial Site or Project]

In an emergency/life-threatening situation, use the appropriate local emergency phone numbers and seek immediate medical care. All work-related injuries, illnesses and incidents, including near miss events, shall be reported to a supervisor immediately.

- [Insert appropriate telephone number of reporting line]

Injuries, illness and incidents shall be entered into the Online Reporting Database in accordance with *S3AM-004-PR1 Incident Reporting, Notifications & Investigation*.

6.8 Hazardous, Solid, or Municipal Waste

[Add to the below content as applicable to the Industrial Site or Project]

If hazardous, solid, and/or municipal wastes are generated during any phase of the project, the waste shall be accumulated, labeled, and disposed of in accordance with applicable federal, state, provincial, territorial and/or local regulations. Consult the SH&E Manager for further guidance. In addition, any hazardous materials or waste that may potentially pose harm to humans, and/or the environment must meet *S3AM - 204 Environmental Compliance*. Hazardous materials and waste shall not be discarded as regular waste.

6.9 General Safety Rules

[Add to the below content as applicable to the Industrial Site or Project]

All site personnel shall conduct themselves in a safe manner and maintain a working environment that is free of additional hazards, in adherence to *S3AM-001-PR1 Safe Work Standards and Rules* and *S3AM-013-PR1 Housekeeping*.

6.10 Housekeeping

[Add to the below content as applicable to the Industrial Site or Project]

During site activities, work areas will be continuously policed for identification of excess trash and unnecessary debris. Excess debris and trash will be collected and stored in an appropriate container (e.g., plastic trash bags, garbage can, roll-off bin) prior to disposal. At no time will debris or trash be intermingled with waste PPE or contaminated materials.

6.11 Smoking, Eating, or Drinking

[Add to the below content as applicable to the Industrial Site or Project]

Smoking, eating and drinking will not be permitted inside any controlled work area at any time. Field workers will first wash hands and face immediately after leaving controlled work areas (and always prior to eating or drinking). Consumption of alcoholic beverages is prohibited at any AECOM site. Smoking, eating or drinking must be in a designated area.

6.12 Personal Protective Equipment

The purpose of personal protective equipment (PPE) is to provide a barrier to shield or minimize the risk or exposure from the chemical and/or physical hazards that may be encountered during work activities. *S3AM-208-PR1 Personal Protective Equipment* lists the general requirements for selection and usage of PPE. The table below identifies the minimum PPE required during site operations and additional PPE that may be necessary. The specific PPE requirements for each work task are specified in the Pre-Job Hazard Analysis or THA.

Personal Protective Equipment	
All site personnel	<ul style="list-style-type: none"> [insert description of minimum work clothing requirement as appropriate e.g., fire resistant, full length sleeves, etc.] [insert minimum glove type requirement] [insert class of Hardhat] [insert minimum foot protection e.g., safety toe boots, rubber boots, traction devices, etc.] [insert minimum eye protection requirements e.g., safety glasses with side shields, safety goggles, etc.] [insert minimum high visibility apparel requirements e.g., Class 3 apparel for work at night or during periods of poor visibility] [insert minimum hearing protection requirements] [insert additional requirement e.g., insect repellent, sunscreen]
[DELETE ROW IF NOT REQUIRED – insert task type or circumstances where minimum PPE requirements are to be supplemented]	<ul style="list-style-type: none"> [insert description of additional PPE requirements specific to the task or circumstances] [example work clothing requirement e.g., fire resistant coveralls, chemically resistant coveralls] [example gloves type(s) e.g., outer nitrile gloves, Kevlar, etc.] [example of respiratory protection e.g. full-face air purifying respirator with organic vapor cartridges. To use a respirator, employees must be trained, fit tested and medically qualified.] [example foot protection specific to the task(s) e.g., metatarsal protection, chemical protection, etc.] [example eye protection requirements e.g., dual eye protection, welding helmet class, etc.] [example fall protection requirements e.g. full body harness, shock-absorbing lanyard, reference to Fall Protection Plan]
[DELETE or ADD ROWS AS REQUIRED – insert task type or circumstances where minimum PPE requirements are to be supplemented]	<ul style="list-style-type: none"> [insert description of additional PPE requirements specific to the task or circumstances]

6.13 Personal Hygiene

[Add to the below content as applicable to the Industrial Site or Project]

The following personal hygiene requirements will be observed:

Water Supply: A water supply meeting the following requirements will be utilized:

Potable Water - An adequate supply of potable water will be available for field personnel consumption. Potable water can be provided in the form of water bottles, canteens, water coolers, or drinking fountains. Where drinking fountains are not available, individual-use cups will be provided as well as adequate disposal containers. Potable water containers will be properly identified in order to distinguish them from nonpotable water sources.

Nonpotable Water - Nonpotable water may be used for hand washing and cleaning activities. Nonpotable water shall not be used for drinking purposes. All containers of nonpotable water will be marked with a label stating:

**Nonpotable Water
Not Intended for Drinking Water Consumption**

Toilet Facilities: A minimum of one toilet will be provided for every 20 personnel on site, with separate toilets maintained for each sex except where there are less than 5 total personnel on site. For mobile crews where work activities and locations permit transportation to nearby toilet facilities on-site facilities are not required.

Washing Facilities: Employees will be provided washing facilities (e.g., buckets with water and Alconox) at each work location. The use of water and hand soap (or similar substance) will be required by all employees following exit from the Exclusion Zone, prior to breaks, and at the end of daily work activities.

6.14 Air Monitoring

[Delete section if not applicable OR add to the below content as applicable to the Industrial Site or Project]

Air monitoring will be conducted using [insert monitor or detector type here] calibrated to [insert substance(s)]. The monitoring equipment must be calibrated in accordance with the manufacturer's instructions. In addition, the results of daily instrument calibrations must be recorded in the field notes. Continuous monitoring is required during intrusive work. Document readings in the field notes. Additional monitoring may be required to enter an excavation or confined space. [Replace the following example of air monitoring requirements and table with content applicable to the industrial site or project.] The action levels below assume that no more than 4% of the VOCs present are benzene. This action level table is for BTEX contaminated sites. If the site contaminants of concern are different than BTEX, the table below needs to be revised to reflect the specific contaminants. If needed, contact a SH&E Manager for assistance.]

ACTION LEVEL TABLE

Analyzer Reading	Location	Duration	Action	Personal Protective Equipment
< 10 ppm	Point of Operations/Release Source Point	_____	Continue periodic monitoring.	Minimum Site Ensemble (Hardhat, Steel-toed boots, eye protection, hearing protection)
> 10 ppm	Point of Operations/Release Source Point	>1 minute	Monitor OBZ; don protective clothing; establish work zones	Minimum Site Ensemble, Plus Coveralls, Nitrile Outer Gloves, & Nitrile Inner (surgical) Gloves
< 10 ppm	OBZ	-----	No respirators required.	Same as above
> 10 ppm	OBZ	>1 minute	Improve engineering controls. If not effective, provide respiratory protection; establish decontamination area and contact the Safety Manager	Add full-face air purifying respirators with organic vapor cartridges. Cartridges will be changed on a daily basis.
>100 ppm OR > 100 ppm	OBZ OBZ	>1 minute instantaneous	Stop work; move upwind while vapors dissipate. If elevated levels remain, cover boring and cuttings, evacuate upwind and notify the Safety Manager	As specified by the Safety Manager

6.15 Stop Work Authority

All employees have the right and duty to stop work when conditions are unsafe and to assist in correcting these conditions as outlined in *S3AM-002-PR1 Stop Work Authority*. Whenever the SSO determines that workplace conditions present an uncontrolled risk of injury or illness to employees, immediate resolution with the appropriate supervisor shall be sought. Should the supervisor be unable or unwilling to correct the unsafe conditions, the SSO is authorized and required to stop work, which shall be immediately binding on all affected AECOM employees and subcontractors.

6.16 Additional Plans

[Delete section if not applicable OR add to the below content as applicable to the Industrial Site or Project]

Based on the scope of work the following plans have been developed and are considered part of this SH&E Plan as additional attachments:

Additional Plans	
Attachment H	• [example: Fall Protection & Rescue Plan]
Attachment I	• [example: Exposure Mitigation Plan]
Attachment J	• [example: Site Security Plan]

6.17 Client Specific Safety Requirements

[Select option and add content as applicable to the Industrial Site or Project AND delete the other options]

The client has specified no additional health and safety requirements.

OR

Client-specific health and safety guidelines are included in Attachment G of this SH&E PLAN. All site activities must be performed in accordance with client-specific requirements and procedures.

OR

[insert client-specific requirements]

Attachment A

Location Specific Emergency Response Plan

Attachment B

Pre-Job Hazard Assessment

Attachment C

Task Hazard Assessment

Attachment D
Applicable AECOM SH&E Procedures
(Attach completed Procedure Checklist S3AM-209-FM3 and identified procedures)

Attachment E

Daily Tailgate Meeting

Attachment F

Safety Data Sheets

Attachment G

Client Specific Health & Safety Guidelines

Americas

Short Visit SH&E Plan

S3AM-209-FM2-A

CAUTION: This Short Visit SH&E Plan template is intended for low risk site visits only. This document is only appropriate if the scope of work is limited to driving, walking, taking notes, and taking photographs, for a duration of time no longer than 3 days, and should not be used if the conditions at the site being visited are identified as high risk (assessed using the AECOM Risk Matrix. Use at an active construction site is acceptable if escorted by the Client, or General Contractor (or similar). If these parameters cannot be met, this template shall not be used; please utilize *S3AM-209-FM2 Industrial Site or Project SH&E Plan*. Contact the applicable AECOM Safety, Health, & Environment Representative for assistance if needed and for review and approval upon completion.

Note: This document contains hyperlinks that require connection to the AECOM network and access to Ecosystem.

Project Name: [insert]		Project Number: [insert]	
Project Manager: Print Name and Sign	[insert]		Date: [insert]
List all personnel making the site visit.	[insert]		Duration and Expected End Date: [insert]
Print Name and Sign:	[insert]		Escort Required? If so, provide name and company: [insert]
	[insert]		
	[insert]		
	[insert]		
SH&E POC (Approver): Print Name and Sign:	[insert]		Approval Date: [insert]

SITE INFORMATION AND SCOPE OF WORK

Site Description:	Insert an address or legal land description and description of location. This description should include any significant physical features of the site (e.g., terrain, buildings, size, location, bodies of water, etc.)
Client or Third-Party Operations	Briefly describe the activities performed by the client or a third-party (including Contractors) at the site. This description should include any operations or nearby activities that could lead to hazards to AECOM employees. Public traffic along roadways should be included in this description if applicable.
Scope of Work	Provide a description of activities performed by AECOM personnel (e.g., driving to a site, meeting a client, taking photographs, etc.) and any equipment and/or tools used.

See **Attachment B Pre-Job Hazard Assessment** for identified hazards applicable to the scope of work, the associated risk ratings, and the developed control measures.

Immediately report ALL SH&E Incidents, to the appropriate supervisor no matter how minor (including Near Misses)

See **Attachment A** for the completed *Short Visit Emergency Response Plan*.

In an emergency/life-threatening situation, use the appropriate local emergency phone numbers and seek immediate medical care.

For work-related non-emergency medical support contact **Incident Reporting Line: [\[insert number\]](#)** immediately, regardless of time of day/day of week.

Complete a report within four hours of a Significant Incident and 24 hours for all other SH&E incidents. If injury/illness prevents completing the report, the Supervisor will be responsible for completing the report. Refer to *S3AM-004-PR1 Incident Reporting, Notifications & Investigation* for further direction.

Record all good work practice and hazardous condition observations **[\[identify method of reporting\]](#)**.

Minimum Personal Protective Equipment (Note: If any PPE beyond that listed is required, do not use this template)	
<input type="checkbox"/> First Aid Kit <input type="checkbox"/> Gloves: <u>Type</u> <input type="checkbox"/> Insect Repellent <input type="checkbox"/> Flame Resistant Clothing <u>Type</u> <input type="checkbox"/> Sunscreen <input type="checkbox"/> Hearing Protection: <u>Type</u>	
Hard Hat (mandatory) <u>Type</u> Safety Vest (mandatory) <u>Type</u> Safety Shoes (mandatory) <u>Type</u> Safety Glasses (mandatory) <u>Type</u>	
Training: <u>[List any training as required by the scope of work, the client, or associated with the specific site.]</u>	
Stop Work Authority: All employees have the right and duty to stop work when conditions are unsafe and to assist in correcting these conditions as outlined in <i>S3AM-002-PR1 Stop Work Authority</i> .	
Task Hazard Assessment: A THA is required daily in addition to this <i>Short Visit SH&E Plan</i> . <i>S3AM-209-FM6 Task Hazard Assessment</i> shall be completed before every assigned task at the work location. The THA is to be completed at the worksite by the individual(s) who is intended to conduct the task immediately prior to initiating the associated task (handwritten). The intent of the THA is to engage the end-user in actively assessing the hazards associated with their task, as well as capture nuances or specifics immediately present that may otherwise remain unacknowledged. If the hazard(s) cannot be successfully mitigated, the task shall not commence. All employees and visitors shall sign the THA daily. Refer to Attachment D for a blank copy of <i>S3AM-209-FM6 Task Hazard Assessment</i> .	
Worker Check-in/Check-out Procedure: <u>If visit will be by one lone AECOM employee to a site at which no AECOM employees are present, complete this section. Describe anticipated duration of visit. Provide name and appropriate method of checking-in with supervisor, project manager, or other (e.g., communication means, intervals, etc.). Indicate "No lone worker" if this section does not apply.</u>	
Journey Management Plan: 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 (JMP). Vehicles shall have a written inspection before use (personal, rental, or fleet) as part of the JMP. Attachment E contains the completed Journey Management Plan and blank Vehicle Inspection Checklist. <u>[If not applicable, delete this row]</u>	
Safety, Health, and Environment Policies and Procedures: AECOM procedures applicable to the scope of work have been identified. Attachment C contains the <i>AECOM Procedure Checklist</i> and the applicable procedures, forms, and attachments. <u>[Insert any requirements specific to [insert geography and/or Business Group] not addressed in a procedures contained in Attachment C]</u>	
Client Specific Requirements: <u>[Select option and add to the below content as applicable AND delete the other option]</u> The client has specified no additional health and safety requirements. OR <u>[Insert client-specific requirements]</u>	

ATTACHMENTS

- Attachment A: Short Visit Emergency Response Plan
- Attachment B: Pre-Job Hazard Assessment
- Attachment C: AECOM SHE Procedure Checklist and selected Procedures
- Attachment D: Task Hazard Assessment
- Attachment E:** Journey Management Plan [delete if not applicable]

Attachment A

Short Visit Emergency Response Plan

The preparer shall download and complete the AECOM *Short Visit Emergency Response Plan* (S3AM-010-FM2-A) and attach it after this cover sheet.

Attachment B

Pre-Job Hazard Assessment

The preparer shall download and complete the AECOM *Pre-Job Hazard Assessment* ([S3AM-209-FM4](#)) and insert it after this cover sheet.

Attachment C

AECOM Procedure Checklist & Applicable Procedures

The preparer shall download and complete the AECOM *Procedure Checklist* ([S3AM-209-FM3](#)) and insert it after this cover sheet along with the relative procedures identified in the checklist (electronic versions/access are permitted).

Attachment D

Task Hazard Assessment (THA)

The preparer shall download a blank copy of the AECOM *Task Hazard Assessment* ([S3AM-209-FM6](#)) and insert it after this cover sheet.

Attachment E

Journey Management Plan

The preparer shall download and complete the AECOM *Journey Management Plan* ([S3AM-005-FM1](#)) and a blank copy of the *Vehicle Inspection Checklist* ([S3AM-005-FM2](#)), and insert these after this cover sheet.

Americas

Procedure Checklist

S3AM-209-FM3

The following AECOM SH&E Procedures generally apply to all projects. Review the requirements of each procedure and determine appropriate steps to ensure project compliance with the requirements.

Determine the applicability of these procedures to the work activity	Yes	See #	Determine the applicability of these procedures to the work activity	Yes	See #
Safe Work Standards and Rules	Yes	001	Housekeeping	Yes	013
Stop Work Authority	Yes	002	Manual Lifting	Yes	014
SH&E Training	Yes	003	Injury & Illness Recordkeeping	Yes	017
Incident Reporting, Notifications & Investigation	Yes	004	Injury & Claims Management	Yes	018
Driving	Yes	005	Substance Abuse Prevention	Yes	019
Behavior Based Safety	Yes	007	Recognition & Rewards	Yes	020
Fitness for Duty	Yes	008	Risk Assessment & Management	Yes	209
Emergency Response Planning	Yes	010	Regulatory Inspections	Yes	211
Fire Protection	Yes	011	Compliance Assurance	Yes	216
First Aid	Yes	012	Permit to Work	Yes	218

The following SH&E procedures only apply when specific activities are conducted by AECOM and AECOM subcontractor personnel. If you answer "Yes" to any of the questions below, review the SH&E procedure indicated and determine the appropriate steps necessary to ensure compliance with the requirements.

Will work activities involve any of the following?	No	Yes	See #	Will work activities involve any of the following?	No	Yes	See #
Abrasive blasting or exposure to abrasive blasting media or waste?	<input type="checkbox"/>	<input type="checkbox"/>	335	Excavations or exposure to excavation hazards?	<input type="checkbox"/>	<input type="checkbox"/>	303, 331
Potential exposure to ticks, snakes, poisonous plants, and other biological hazards?	<input type="checkbox"/>	<input type="checkbox"/>	313	Flammable or combustible materials used or stored which could constitute a fire hazard?	<input type="checkbox"/>	<input type="checkbox"/>	011, 126
Use of aerial lifts (e.g. boom trucks, scissor lifts, under bridge inspection units, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	323	Use of portable, gas powered, electric, and/or powder actuated hand tools?	<input type="checkbox"/>	<input type="checkbox"/>	305, 327
Potential exposure to air contaminants in hazardous concentrations?	<input type="checkbox"/>	<input type="checkbox"/>	110, 123, 127	Hazardous materials shipping?	<input type="checkbox"/>	<input type="checkbox"/>	116
Asbestos surveys or abatement oversight?	<input type="checkbox"/>	<input type="checkbox"/>	109	Hazardous substances – chemical or health hazards?	<input type="checkbox"/>	<input type="checkbox"/>	110, 115, 127

Potential exposure to Bloodborne Pathogens (i.e. blood or other bodily fluids)?	<input type="checkbox"/>	<input type="checkbox"/>	111	Hazardous waste activities (investigative or remedial)?	<input type="checkbox"/>	<input type="checkbox"/>	117, 204
Work over or near water?	<input type="checkbox"/>	<input type="checkbox"/>	315	Heat Stress potential to employees working in: <ul style="list-style-type: none"> Hot environments; or Impermeable Chemical Protective Clothing? 	<input type="checkbox"/>	<input type="checkbox"/>	113
California job activities?	<input type="checkbox"/>	<input type="checkbox"/>	209	Heavy equipment use?	<input type="checkbox"/>	<input type="checkbox"/>	309
Corrosive materials used or handled?	<input type="checkbox"/>	<input type="checkbox"/>	125	Hot Work (welding, cutting, grinding)?	<input type="checkbox"/>	<input type="checkbox"/>	332
Confined space entries?	<input type="checkbox"/>	<input type="checkbox"/>	301	Drilling, boring and direct-push probing?	<input type="checkbox"/>	<input type="checkbox"/>	321, 331
Cranes or hoists?	<input type="checkbox"/>	<input type="checkbox"/>	310	Lead exposures (lead paint removal, lead in dust, etc)?	<input type="checkbox"/>	<input type="checkbox"/>	110
Demolition activities of any type of structures?	<input type="checkbox"/>	<input type="checkbox"/>	336, 339	International travel?	<input type="checkbox"/>	<input type="checkbox"/>	214
Drilling activities?	<input type="checkbox"/>	<input type="checkbox"/>	321, 331	Use of Manbasket (Crane Suspended Personnel Platforms) for working at heights?	<input type="checkbox"/>	<input type="checkbox"/>	310
Use of small watercraft (e.g., boats, canoes)?	<input type="checkbox"/>	<input type="checkbox"/>	333	Work on or near streets and/or roadways?	<input type="checkbox"/>	<input type="checkbox"/>	306
Environmental and hazardous waste laws and regulations are applicable to activities?	<input type="checkbox"/>	<input type="checkbox"/>	204	Commercial motor vehicles used?	<input type="checkbox"/>	<input type="checkbox"/>	320
Exposure to chemical/physical/biological agents and/or activities that require Medical Surveillance? Examples would include exposures to; Noise, Asbestos, Silica, Lead, Hazardous Waste, High Altitudes, Carcinogens, Respirator Use.	<input type="checkbox"/>	<input type="checkbox"/>	128	Working at heights of greater than 4 feet (1.22 meters), 6 feet (1.83 meters) for construction/demolition, or as defined by jurisdiction?	<input type="checkbox"/>	<input type="checkbox"/>	304
Noise exposures?	<input type="checkbox"/>	<input type="checkbox"/>	118	Potential exposure to subsurface and/or overhead utilities?	<input type="checkbox"/>	<input type="checkbox"/>	322, 331
Ladder use?	<input type="checkbox"/>	<input type="checkbox"/>	312	A chartered aircraft?	<input type="checkbox"/>	<input type="checkbox"/>	318
Exposure to eye, head, hand, foot, or other hazards that require the use of personal protective equipment?	<input type="checkbox"/>	<input type="checkbox"/>	208	Exposure to uncontrolled energy sources including electrical, fluid, pneumatic, fuel, steam, gravity, and hazardous material?	<input type="checkbox"/>	<input type="checkbox"/>	325
Use of portable gauges (e.g., nuclear-density gauges) containing sealed radioactive source materials?	<input type="checkbox"/>	<input type="checkbox"/>	122	Work with live electrical systems and/or potential electrical hazards?	<input type="checkbox"/>	<input type="checkbox"/>	302
Respiratory protection use – required and/or voluntary?	<input type="checkbox"/>	<input type="checkbox"/>	123	Work at altitudes greater than 7,000 feet (~ 2,100 meters)?	<input type="checkbox"/>	<input type="checkbox"/>	124
Scaffolding?	<input type="checkbox"/>	<input type="checkbox"/>	311	All-terrain vehicle use?	<input type="checkbox"/>	<input type="checkbox"/>	319

Compressed gases?	<input type="checkbox"/>	<input type="checkbox"/>	114	Use of computer workstations for data entry, CADD, word processing, etc.?	<input type="checkbox"/>	<input type="checkbox"/>	016
Laboratory activities?	<input type="checkbox"/>	<input type="checkbox"/>	119	Tool, equipment or job-specific potential for musculoskeletal disorder hazards?	<input type="checkbox"/>	<input type="checkbox"/>	016
Work on or near railroad transportation systems?	<input type="checkbox"/>	<input type="checkbox"/>	329	Exposure to recognized hand hazards?	<input type="checkbox"/>	<input type="checkbox"/>	317
Work at a client site requiring compliance with the OSHA Process Safety Management Standard?	<input type="checkbox"/>	<input type="checkbox"/>	328	Are employees or contractors required to operate Powered Industrial Vehicles (e.g., forklift trucks)?	<input type="checkbox"/>	<input type="checkbox"/>	324
Subcontractors to perform activities (e.g., drilling, excavation, hot work, etc.) with their own personnel and/or equipment?	<input type="checkbox"/>	<input type="checkbox"/>	213	Down-hole geologic logging operations associated with geotechnical explorations or caisson inspections?	<input type="checkbox"/>	<input type="checkbox"/>	330
Competent person required to be designated?	<input type="checkbox"/>	<input type="checkbox"/>	202	Potential exposure to non-ionizing radiation?	<input type="checkbox"/>	<input type="checkbox"/>	121
Potential personnel exposure to temperatures below 32°F?	<input type="checkbox"/>	<input type="checkbox"/>	112	Potential exposure to ionizing radiation?	<input type="checkbox"/>	<input type="checkbox"/>	120
AECOM personnel newly hired or transferred from another position?	<input type="checkbox"/>	<input type="checkbox"/>	015	Potential inhalation of chromium VI (hexavalent chromium)?	<input type="checkbox"/>	<input type="checkbox"/>	110
Work at a site regulated by the Mine Safety Health Administration (MSHA)?	<input type="checkbox"/>	<input type="checkbox"/>	341	Working alone in an area where they cannot be seen/heard by another person?	<input type="checkbox"/>	<input type="checkbox"/>	314
Diving activities?	<input type="checkbox"/>	<input type="checkbox"/>	334	Hoists, elevators or conveyors being used?	<input type="checkbox"/>	<input type="checkbox"/>	343
Coordinate construction material storage on-site?	<input type="checkbox"/>	<input type="checkbox"/>	316	Tunnels, shafts and caissons?	<input type="checkbox"/>	<input type="checkbox"/>	330
Operating and testing compressed air systems?	<input type="checkbox"/>	<input type="checkbox"/>	337	Signs, signals or barricades will be used onsite?	<input type="checkbox"/>	<input type="checkbox"/>	346
Temporary floors, stairs, railings, or toeboards being created?	<input type="checkbox"/>	<input type="checkbox"/>	342	Project security will be required?	<input type="checkbox"/>	<input type="checkbox"/>	010
Concrete will be poured or handled?	<input type="checkbox"/>	<input type="checkbox"/>	338	Installation of cofferdams being performed?	<input type="checkbox"/>	<input type="checkbox"/>	344
Steel erection activities being performed?	<input type="checkbox"/>	<input type="checkbox"/>	340	Use or handling of explosive or blasting agents?	<input type="checkbox"/>	<input type="checkbox"/>	336
Work on or transfer to/from marine transportation (e.g. barge, vessel)?	<input type="checkbox"/>	<input type="checkbox"/>	333	Mining operations are conducted or controlled by AECOM?	<input type="checkbox"/>	<input type="checkbox"/>	345
Working conditions or schedule (more than 12 hours/day) may increase worker fatigue?	<input type="checkbox"/>	<input type="checkbox"/>	009	Exposure to hazards associated with moving parts of equipment and machinery?	<input type="checkbox"/>	<input type="checkbox"/>	326
Use of unmanned aircraft systems?	<input type="checkbox"/>	<input type="checkbox"/>	347	Potential exposure to respirable crystalline silica?	<input type="checkbox"/>	<input type="checkbox"/>	129

Americas

Pre-Job Hazard Assessment

S3AM-209-FM4

Location: [Click here to enter text.](#)Date: [Click here to enter text.](#)Prepared By: [Click here to enter text.](#)Approved By: [Click here to enter text.](#)

Principal Activities	Potential Safety/Health Hazards	Initial Risk Rating	Control Measures	Final Risk Rating
List principal activities involved in the scope of work	Identify each safety or health hazard		Identify elimination, substitution, engineering & administrative controls & any specific required PPE	
ACTIVITY 1 – Click here to enter text.	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
ACTIVITY 2 – Click here to enter text.	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
ACTIVITY 3 – Click here to enter text.	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
ACTIVITY 4 – Click here to enter text.	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
ACTIVITY 5 – Click here to enter text.	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#

Principal Activities	Potential Safety/Health Hazards	Initial Risk Rating	Control Measures	Final Risk Rating
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
ACTIVITY 6 – Click here to enter text.	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
ACTIVITY 7 – Click here to enter text.	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
ACTIVITY 8 – Click here to enter text.	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
ACTIVITY 9 – Click here to enter text.	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#
	Click here to enter text.	#	Click here to enter text.	#

SPECIAL REQUIREMENTS

Step #	Equipment to be Used	Inspection requirements	Training Requirements
	List equipment to be used in work activity	List inspection/permit requirements for work activity	List training requirements including hazard communication
1.	Click here to enter text.	Click here to enter text.	Click here to enter text.
2.	Click here to enter text.	Click here to enter text.	Click here to enter text.
3.	Click here to enter text.	Click here to enter text.	Click here to enter text.
4.	Click here to enter text.	Click here to enter text.	Click here to enter text.
5.	Click here to enter text.	Click here to enter text.	Click here to enter text.
6.	Click here to enter text.	Click here to enter text.	Click here to enter text.
7.	Click here to enter text.	Click here to enter text.	Click here to enter text.
8.	Click here to enter text.	Click here to enter text.	Click here to enter text.
9.	Click here to enter text.	Click here to enter text.	Click here to enter text.

INSTRUCTIONS AND RISK MATRIX

Hazard Evaluation – Identify principal steps of the task. Identify potential safety/health hazards for each step and determine initial risk rating using the matrix provided below. Identify control measures including PPE for each hazard. Re-evaluate hazard potential and assign a final risk rating. 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. The final risk rating cannot be reduced to 4 or lower, additional approvals are needed before the activity can begin. Add additional rows as required to cover all major steps/aspects of the activity.

Special Requirements – Identify equipment to be used including specific PPE required. Identify inspection requirements such as competent person, permit issue, documented task hazard analysis, etc. Identify training requirements such as hazard communication, scaffold user, fall protection, etc.

		High ←————→ Low				
High ↑ ↓ Low	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
10-25 (red) are high risk, 5-9 (yellow) are medium risk, and 1-4 (green) are low risk						

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

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 Operations Lead/Supervisor & SH&E Manager
10 to 25 (High)	Risk requires the approval of the Operations Manager & SH&E Director

Americas

Daily Tailgate Meeting

S3AM-209-FM5

Instructions: Conduct meeting prior to sending crews to individual tasks. Require attendance of all AECOM employees and subcontractors. Invite personnel from simultaneous operations for coordination purposes. Review scope of work and briefly discuss required and applicable topics. **This meeting is a daily refresher, not a full orientation.** Task-specific discussions associated with Task Hazard Assessment (THA) follow this meeting at the task location immediately before individual task is started.

AECOM Supervisor Name:

Phone Number:

AECOM SH&E Rep. Name:

Phone Number:

Meeting Leader:

DCS Americas - This form may be replaced by the electronic Daily Tailgate Meeting Tool. Link - [Ecosystem Daily Tailgate Meeting App Site](#)

Date:	Project Name/Location:	Project Number:	
Today's Scope of Work:			
Muster Point Location:	First Aid Kit Location:	Fire Extinguisher Location:	Spill Kit Location:
1. Required Topics		2. Discuss if Applicable to Today's Work	
<p>Fitness for Duty requirements, all sign in / sign out</p> <p>Required training (incl. task specific) completed and current</p> <p>SH&E Plan onsite - understood, reviewed, signed by all (incl. scope, preplanning hazard assessments / risk registers, controls, procedures, requirements, etc.)</p> <p>Task Hazard Assessments (THAs) are to be reviewed and completed for each task immediately prior to conducting</p> <p>STOP WORK Right & Responsibility- all task changes/changed conditions re-assess with THA</p> <p>Requirement to report to supervisor any injury, illness, damage, near miss, unsafe act / condition</p> <p>Emergency Response Plan – including muster point, first aid kit, fire extinguisher, clinic/hospital location</p> <p>Personal Protective Equipment (PPE) - Required items per hazard assessments in good condition / in use by all</p> <p>Equipment/machinery inspected (documented as required) and in good condition - operators properly trained/certified</p> <p>Work area set up and demarcation/ barricades in place to protect workers, site staff, and the public</p> <p>Required checklists/records available, understood (describe):</p> <p>Lessons Learned / SH&E improvements (describe):</p>		<p>Check <input checked="" type="checkbox"/> as reviewed or mark <input type="checkbox"/> as not applicable</p> <p>Biological/ Chemical / Electrical Hazards</p> <p>Ergonomics - Lifting, Body Position</p> <p>Lock Out/ Tag Out</p> <p>Short Service Employees - visual identifier and mentor/ oversight assignment</p> <p>Simultaneous/ Neighbouring Operations</p> <p>Slip/ Trip/ Fall Hazards</p> <p>Specialized PPE Needs</p> <p>Traffic Control</p> <p>Waste Management/ Decontamination</p> <p>Weather Hazards / Heat Stress / Cold Stress</p> <p>Subcontractor Requirements (e.g., JHAs, THAs, procedures, reporting, etc.)</p> <p>Work Permits / Plans required (e.g., Fall Protection, Confined Space, Hot Work, Critical Lifts, etc.); in place, understood (identify/attach):</p> <p>Other Topics (describe/attach):</p> <p>Client specific requirements (describe):</p>	
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:	
<i>The site is being left in a safe condition and work crew checked out as fit unless otherwise specified as above.</i>			
Site Supervisor Name	Signature	Date Time (at end of day / shift)	

Worker Acknowledgement / Sign In Sign Out sheets applicable to this meeting are on reverse and, if applicable, attached.

Daily Tailgate Meeting (S3AM-209-FM5)

Revision 10 June 1, 2021

PRINTED COPIES ARE UNCONTROLLED. CONTROLLED COPY IS AVAILABLE ON COMPANY INTRANET.

All employees:

- **STOP WORK** if concerned / uncertain about safety / hazard or additional precaution is not recorded on the THA.
- **Be alert and communicate any changes in personnel or conditions at the worksite to the supervisor.**
- **Reassess task, hazards, & mitigations on an ongoing basis; amend the THA if needed.**

SITE WORKERS (including AECOM Contractors and Subcontractors): Your signature below means that you understand:

- * The requirement to participate in creating, reviewing, & updating hazard assessments (THA) applicable to your task(s).
- * The hazards & control measures associated with each task you are about to perform.
- * The permit to work requirements applicable to the work you are about to perform (if it includes permitted activities).
- * That no tasks or work is to be performed without a hazard assessment.
- * Your authority & obligation to "Stop Work" intervene, speak up/ listen up.

Your initials (right columns) certify that you arrived & departed fit for duty, & have reported all incidents/near misses; meaning:

- * You are physically and mentally fit for duty and have inspected your required PPE to ensure satisfactory condition.
- * You are not under the influence of any type of 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 / 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
		In & Fit	Out & Fit

(Attach additional Site Worker sign-in/out sheets if needed) Identify number of attached sheets: _____

SITE VISITOR / SITE REPRESENTATIVE

Name	Company Name	Arrival Time	Departure Time	Signature

S3AM-209-FM6

Date:	Project Name / Location:	
Permit / Job Number:	Project Number:	
Description of Task:		

Yes — review the steps, hazards, and precautions. Attach and reference JHA in the form below. Add any additional steps, hazards, and precautions to this form otherwise unidentified on JHA.

No – list all steps, hazards, and precautions associated with the task in the form below.

[illegible]**Originator**

Supervisor

Print Name

Signature

Print Name

Signature

Risk Matrix on Reverse

THIS FORM IS TO BE KEPT ON JOB SITE.

WORKER SIGN ON

NAME (Please Print) TIME SIGNATURE

I participated in the development and understand the content of this Task Hazard Assessment.

Task Hazard Assessment Follow-Up/Review

Initials/Time Initials/Time Initials/Time

Instructions:

Identify basic steps of the task and associated hazards. Calculate the initial risk rating. Identify control measure to eliminate or reduce the hazard's risk and calculate the residual risk rating. If the risk rating (after controls are implemented) cannot be reduced to 4 or lower, additional approvals are needed before the activity can begin.

Employees shall monitor the activities for compliance with this document. Workers should **STOP WORK** on a task if conditions change from the planned and agreed approach to the work.

This document should be updated to reflect new conditions or changes in task methods.

VISITOR SIGN ON

I have read and understand the content of this Task Hazard Assessment.

Emergency Meeting / Assembly Area

--

Emergency Contact

--

Method of Communication

--

Risk Rating 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

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 Operations Lead/Supervisor & SH&E Manager
10 to 25 (High)	Risk requires the approval of the Operations 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

S3AM-209-FM6-ES

Cliente	Permiso N°
Localización	Proyecto N°
Descripción de la Tarea	Fecha

Pasos básicos de la tarea (explicar como se llevará a cabo la tarea)	Peligros (identificar todos los peligros presentes y potenciales)	Riesgo (inicial)	Medidas (describir cómo ese peligro puede ser controlado)	Riesgo (final)	Iniciales
			Mayor Índice de Riesgo		

Generado por

Supervisor

Firma

Firma

Matriz de riesgos en el reverso

ESTE FORMULARIO DEBE GUARDARSE EN EL LUGAR DE TRABAJO

TRABAJADORES

NOMBRE

FIRMA

He participado en el desarrollo de esta evaluación de riesgos de las tareas a realizar y he entendido su contenido.

Matriz de Riesgos

Probabilidad	Severidad				
	5 - Catastrófico	4 - Crítico	3 - Mayor	2 - Moderado	1 - Menor
5 - Frecuente	25	20	15	10	5
4 - Probable	20	16	12	8	4
3 - Ocasional	15	12	9	6	3
2 - Remoto	10	8	6	4	2
1 - Improbable	5	4	3	2	1

Indice de Riesgo (Probabilidad x Severidad)	Autoridad para aceptar el riesgo
1 a 4 (Bajo)	El riesgo es tolerable, gestionar a nivel local
5 a 9 (Medio)	El riesgo requiere aprobación por parte del jefe de operaciones (<i>Operations Lead</i>) / supervisor y Responsable de Seguridad (<i>Safety Manager</i>)
10 a 25 (Alto)	El riesgo requiere la aprobación del Director de las operaciones (<i>Operations Manager</i>) y Director de Seguridad (<i>Safety Director</i>)

Severidad – Consecuencias potenciales				
	Personal	Daños a la propiedad	Impacto ambiental	Imagen pública/Reputación
Catastrófico	Fallecimiento, Múltiples incidentes mayores	>\$1 Mill. USD, Colapso estructural	Impacto fuera del emplazamiento que requiere remediación	Intervención del gobierno
Crítico	Discapacidad permanente, enfermedad/lesión de larga duración	>\$250.000 a \$1 Mill. USD	Impacto dentro del emplazamiento que requiere remediación	Intervención de los medios de comunicación
Mayor	Días de trabajo perdido/restringido	> \$10.000 a \$250.000 USD	Vertido igual o mayor que los límites reportables	Intervención del propietario
Moderado	Tratamiento médico	> \$1.000 a \$10.000 USD	Vertido menor que los límites reportables	Atención local o en una comunidad
Menor	Primeros auxilios	≤ \$1.000 USD	Vertido químico pequeño contenido en el emplazamiento	Queja individual

Probabilidad		
Frecuente	Se espera que ocurra durante la actividad o tarea.	9/10
Probable	Es probable que ocurra durante la actividad o tarea.	1/10
Ocasional	Puede ocurrir durante la actividad o tarea.	1/100
Remoto	No es probable que ocurra durante la actividad o tarea.	1/1,000
Improbable	Es muy improbable pero posible que ocurra durante la actividad o tarea.	1/10,000

Punto de encuentro / reunión en emergencias

Nº Contacto de emergencia

Canal de radio para emergencias

La zona ha quedado segura, limpia y ordenada al final de la jornada/tarea.

Supervisor (nombre)

Firma

VISITANTES

NOMBRE

FIRMA

HORA

Seguimiento/revisión de la evaluación de riesgos

Primer descanso

Iniciales

Comida

Iniciales

Segundo descanso

Iniciales

Office Relocation Plan

S3AM-209-FM7

Includes control measures for the Coronavirus Pandemic

Contents

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8.0	Attachment A – Coronavirus Task Hazard Analysis	9

1.0 GENERAL INFORMATION	
Description:	Planned move date:
Move From: <i>(street address)</i>	
Move To: <i>(street address)</i>	
KEY CONTACTS	
AECOM Move Coordinator	
Moving Company contact	
Location SHE Representative	
Area SH&E Manager	
IT Contact	
Workplace Readiness Representative	
TELEPHONE NUMBERS	
Medical/Fire Emergency	911
Incident Reporting hotline OR	800-348-5046
AECOM Nurse Line	1-512-419-5016

2.0 WORK DESCRIPTION

Office personnel will be required to pack their individual workspace in preparation for the office move. A professional moving company has been hired to relocate all office files, supplies, equipment, and furniture.

Specific job tasks will include:

- Cleaning out office of unneeded items such as documents and reports
- Removing personal items and transporting them home or to new office
- Transporting personal laptop and monitor to the new office
- Packing/unpacking files, books, reference materials, office supplies, and/or personal items
- Using hand carts/dollies to relocate boxed materials
- Setting up the new office location (refer also to the Workplace Readiness Plan)
- Sorting and packing field equipment storage areas to prepare for the move.

2.1 EQUIPMENT

- Office equipment (e.g. computers, printers, monitors, phones, etc.)
- Personal items
- Books, binders, and reference materials
- Project equipment (e.g. sample coolers, survey tools, water pumps, generators)
- Hand carts/dollies (if necessary for employees required to pack office contents into boxes)
- Move carts provided by moving company
- Totes provided by moving company
- Face covering/masks
- Disinfectant wipes/spray
- Hand sanitizer
- Tissues
- Nitrile gloves

Other:

3.0 HAZARDS/ CONTROLS	
3.1	PHYSICAL HAZARDS
<ul style="list-style-type: none"> • Lifting heavy or awkward items (back strain) • Cuts from boxes, broken items, or sharp edges • Blind corners and unfamiliar pathways • Use of hand carts, dollies, etc. • Trip hazards (e.g. poor housekeeping, cords, carpet, boxes in the walkways, carrying items) • Slips, trips, or falls going to vehicle as a result of inclement weather • Using cleaning supplies • New vehicle parking and traffic environment 	
Controls	
<ul style="list-style-type: none"> • Identify the individuals responsible for oversight in moving of specialty equipment (e.g. nuclear density meters, IT servers, air monitoring equipment, company vehicles, field samples) • Use materials handling equipment to lift, move, and/or carry heavy or /bulky items to designated collection areas • The unassisted maximum lift limit is 25 pounds, and employees must take into account their personal limitations which may require lifting less. • Stack items on dollies/carts only waist high to help prevent back strain • Inspect materials handling equipment prior to use • Slow down when approaching corners while moving equipment • All walkways should be kept clear of clutter and materials (e.g., boxes, materials handling equipment, cords) • Do not use box cutters or other open blade type cutting tools • Keep one hand on the handrail at all times going down stairs; ensure stairs are well lit and free of debris • Only open one drawer of a filing cabinet at a time; empty the top drawers first when packing and load the bottom drawers first when unpacking • Conduct a physical inspection before move day • Communications to employees describe the new building layout including parking and any traffic safety concerns • Check the AECOM Housekeeping procedure (S3AM-013-PR) before beginning the tasks. 	

3.2 ERGONOMIC HAZARDS

- Heavy lifting
- Awkward postures
- Awkwardly sized items and/or materials
- Certain field equipment (e.g. generators, pumps) often exceed 100 lbs.
- New desk/cubicle arrangements may create workstation ergonomic hazards

Controls

- It is preferable that the moving company be responsible for heavy lifting. If required, use either mechanical lifting equipment or a two-person lift
- When lifting heavier items, use your legs and not your back to support the lift
- Use some form of assistance (another person, dolly, etc.) to move an item if it is awkwardly sized or shaped
- Follow the AECOM Manual Lifting procedure (S3AM-014-PR1)
- Employees to conduct a self-assessment of their new workstation using the AECOM Office Ergonomics Self-Assessment (S3AM-016-FM1)

3.3 CHEMICAL HAZARDS

- Cleaning supplies
- Field project chemicals (e.g. survey marking paint, preservatives, calibration gas,)

Controls

- Use proper PPE (e.g. safety glasses and nitrile gloves) as per the Safety Data Sheet (SDS)
- Proper packing of bottles and other chemicals
- Prior to the move arrange for disposal of chemicals no longer needed

3.4 CORONAVIRUS RELATED HAZARDS

- Potential Coronavirus exposure during relocation.
 - Being in an enclosed space with poor air circulation in close contact with other people.
 - Working Around Others.
 - Handling Shared Equipment and Tools.
 - Common Areas (building and office).

- Common touch points and surfaces include but are not limited to:
 - Arms on chairs
 - Tabletops
 - Doorknobs and handles
 - Countertops
 - Elevator Buttons
 - Coffee Pots
 - Refrigerator / microwave / dishwasher / toaster handles
 - Water Dispensers
 - Cabinet and file drawer knobs / handles
 - Shared office supplies such as staplers, paper cutters, scissors, packaging tape dispensers, writing utensils
 - Phone receivers, keypads
 - Copier / printer / fax control buttons
 - Sink faucets
 - Light switches

Controls

- Ensure you are fit for duty
- Work from home when possible
- Maintain social distance minimum of 2 meters (6 feet) from others.
- Coronavirus related PPE needed for the move (mask, safety glasses, gloves)
- Make sure there are enough disinfection supplies for the move
- Avoid any interaction with movers if possible and assess the potential interaction and pathways beforehand.
- Do not enlist visitor's help.
- Stagger times to come in (keeping occupancy at a minimum)
- Shared food is dis-allowed
- Employees shall bring their own food and water
- Avoid sharing tools or clean them before and after their use
- Clean your hands often
- Communicate with employees to understand needs before doing the move
- Complete the applicable and required training
- **Review of new office approved Workplace Readiness Plan** for familiarity

Coronaviruses are a large family of viruses found in both animals and humans. The U.S. Centers for Disease Control (CDC) advises a novel Coronavirus is a new strain of Coronavirus, previously identified in humans, with the virus named "SARS-CoV-2" and the disease it causes has been named "Coronavirus disease 2019" (abbreviated "Coronavirus")

Key AECOM resources can be found at the [AECOM Ecosystem Coronavirus Information Center](#) on the Ecosystem homepage or at this link, the [Coronavirus Smart Card](#), and the AECOM Pandemic Procedure: SR1-003-PR2. Additional resources can be found at the following non-AECOM websites:

- [Center for Disease Control and Prevention \(CDC\).](#)
- [World Health Organization \(WHO\).](#)

4.0 APPLICABLE AECOM PROCEDURES

- Emergency Response Planning (S3AM-010-PR1)
- Fire Protection (S3AM-011-PR1)
- Housekeeping (S3AM-013-PR1)
- Manual Lifting (S3AM-014-PR1)
- Ergonomics (S3AM-016-PR1)
- Office Safety Plan (S3AM-209-FM1)
- Risk Assessment & Management (S3AM-209-PR1)

5.0 EMERGENCY PROCEDURES

- Review the Fire Protection and Emergency Response Plans for the for the new location
- Call 911 for medical emergencies
- Immediately report all injuries, illness, and near-misses to your Supervisor.
- If you experience signs/symptoms of illness (see images below) or find out that you have come into contact with a person who has been confirmed positive with the Coronavirus, notify the site supervisor and the project manager, your Area, Regional, or Business Line SH&E Manager, and go home and/or stay home. Notify the AECOM Incident Reporting Hotline (1-800-348-5046) and/or the AECOM Nurse Line (1-512-419-5016). Managers will work with the local SH&E and/or Resiliency teams to respond according to the AECOM Pandemic Procedure: [SR1-003-PR2](#).

6.0 GENERAL SAFETY CONSIDERATIONS

1. Plan the move. Have meetings/calls with staff/walking them through the move
2. Be on the lookout for slip, trip, and/or fall hazards and immediately report such hazards to management or maintenance personnel, or if feasible, safely eliminate the hazard.
3. Use caution when entering areas under desks to plug in cords; the best approach is to look at the area first and identify any hazards (e.g. metal brackets)
4. Do not attempt to move Items that a professional moving service will handle.
5. If an item is suspected of weighing more than your personal lifting capabilities or a maximum of 50 lbs, do not attempt to lift it without seeking assistance (mechanical or another person). Do not exceed your personal capabilities when lifting items and limit your lifts if directed by a medical professional.
6. Inspect all material handling equipment prior to use (e.g., hand cart tires, hand cart handle for sharp edge, broken components, etc.)
7. Avoid using heavy tape that will require cutting. Use tape that can be torn by hand or plastic containers that do not require tape.
8. Do not access ladders unless you have been properly trained.
9. Be cognizant of Global Harmonizing System (Safety Data Sheets) for chemicals handled during the move. Review cleaning chemical GHS sheets to ensure you are not allergic to the cleaning supplies and to follow all requirements for PPE and emergency response.

7.0 APPROVALS/ EMPLOYEE SIGNATURES

SIGNATURES

Area Health and Safety Manager

Office Manager

Office SH&E Representative

EMPLOYEES

I have read the plan, understand it, and agree to comply with all of its provisions (use additional sheets as needed).

Print Name	Signature	Date

8.0 Attachment A – Task Hazard Analysis

*Please add Task Hazard Assessment (THA) template(s) as appropriate.

1.0 Purpose and Scope

- 1.1 This procedure applies to all AECOM Americas based employees and operations and to subcontractors of any tier. A subcontractor is a person or business which has a contract (and is not an employee) with AECOM to provide some portion of the work or services on a project which AECOM has agreed to perform for the client.
- 1.2 This procedure does not apply to vendors. For the purposes of this procedure, a vendor is a service provider and, is a person or business which performs services. Examples of a vendor could be a food machine vendor supplier for a site canteen; a portable toilet delivery company; an office equipment repair service; etc.
- 1.3 This procedure does not apply to third-party contractor operations where there is no subcontract relationship between the contractor and AECOM. Safety issues regarding third-party contractor operations are governed by project-specific contracts, and are not covered by this procedure.
- 1.4 This procedure provides requirements on the evaluation of subcontractor safety, health, and environmental programs; contractual risk management; subcontractor safety performance on the job site; and the responsibilities of the Manager with respect to subcontractor jobsite performance.
- 1.5 Each AECOM subcontractor must be evaluated at least annually using *S3AM-213-FM1 Subcontractor SH&E Evaluation Form*, or equivalent process (e.g., third-party qualification vendor, internal pre-qualification databases), in order to perform work on any AECOM projects.

2.0 Terms and Definitions

- 2.1 Subcontractor - For the purposes of this procedure, a person or business which has a contract directly with AECOM to provide work or services related to AECOM or client work scopes beyond delivery or basic repairs. Examples of a subcontractor could be an engineer; a sign installer; a welding company; an office renovation company; etc. A person or business with a contract directly with AECOM that does not fall clearly within this definition may also be required by the applicable business group to comply with this procedure.

3.0 References

- 3.1 S3AM-015-PR1 Newly Hired or Transferred Employees
- 3.2 S3AM-209-PR1 Risk Assessment & Management

4.0 Procedure

- 4.1 Implementation of this procedure is the responsibility of the AECOM manager (Manager) directing activities of the facility, site, or project location.
- 4.2 The AECOM manager shall ensure appropriate training of AECOM personnel responsible for overseeing subcontractor work.
- 4.3 Subcontractors shall be appropriately trained, competent, and capable to perform their activities in a safe, healthful, and environmentally responsible manner.
 - As applicable, verification of subcontractor training or competency, or medical clearance may be required.
- 4.4 AECOM direction shall be provided to the subcontractor's management (foreman, supervisor, Site Safety Representative, etc.). Direction of subcontractor employees shall be the responsibility of the subcontractor's management.

- 4.5 Pre-qualification of Subcontractor – The Manager shall complete the following procedures for all subcontractors proposed for projects covered by this procedure unless an equivalent process (e.g., third-party prequalification vendor, internal pre-qualification databases and procurement processes, etc.) is used. The Manager shall also require subcontractors to follow these procedures with respect to pre-qualification of sub-subcontractors of any tier.
- 4.5.1 Request all subcontractor candidates to complete the attached *S3AM-213-FM1 Subcontractor SH&E Evaluation Form* or equivalent (e.g., third-party prequalification vendors, internal pre-qualification databases).
 - 4.5.2 Conduct an assessment of each subcontractor's qualifications with respect to the Subcontractor Evaluation Criteria contained in *S3AM-213-ATT1 Subcontractor Evaluation Criteria*.
 - 4.5.3 If the subcontractor does not meet criteria outlined in *S3AM-213-ATT1 Subcontractor Evaluation Criteria*, the decision shall be that the subcontractor shall not be used. However, if a unique business need exists (e.g., subcontractor is a specialty subcontractor, only bid, client required, small business/minority set asides), the Manager shall initiate *S3AM-213-FM2 Subcontractor Variance Form* (or equivalent vendor/database approval).
 - Subcontractor Variance documentation shall clearly identify how the risk of the unmet criteria will be managed, including expectations and requirements of the subcontractor in managing the risk. Examples may include, but are not limited to requiring the subcontractor to:
 - Submit a detailed safety mitigation plan associated with the unmet criteria.
 - Utilize the AECOM Safety Management System in place of the subcontractor system.
 - Utilize specific programs associated with the AECOM Safety Management system.
 - Provide disclosures of specific criteria or engage in inspections at greater frequency.
 - Potential risk and liability impact of variance content can vary considerably based on contract, type of subcontractor, and workplace activities. Legal counsel should be consulted to ensure that the proposed variance for the subcontractor does not impose undue risk and liability for AECOM.
 - Variance requirements shall be acknowledged and agreed to by the subcontractor prior to work commencing and compliance with the variance requirements shall be monitored by the Manager.
 - Failure to comply with the variance requirements shall be grounds for termination (this shall be specified in the subcontract).
 - 4.5.4 If the subcontractor has been successfully evaluated within the last 12 months, the successful evaluation may be substituted for the pre-qualification evaluation.
 - 4.5.5 For long-term operations, update this evaluation within 12 months of the previous evaluation.
- 4.6 Contractual and Risk Management Requirements of Subcontractors
- 4.6.1 Ensure that the subcontractor is contractually bound to comply with applicable client and AECOM SH&E Program requirements (e.g. alcohol and drug policies, procedures, insurance, licenses, registrations, etc.).
 - 4.6.2 The AECOM SH&E Plan does not, nor is it intended to, address procedures of subcontractors during their site activities.
 - 4.6.3 The subcontractor shall maintain appropriate SH&E procedures, that at a minimum comply with client and AECOM requirements and those procedures applicable to work that is exclusive to their activities on the site, and for which they may have superior knowledge.

- Depending upon the contractual agreement between AECOM and the subcontractor, the subcontractor may be required to develop a project SH&E Plan. Subcontractors' SH&E Plans shall, at a minimum, conform to the requirements of the AECOM SH&E Plan
 - AECOM's scope of work under the client contract and the contract with the subcontractor can determine to what extent AECOM is required to review subcontractor plans and procedures. If in doubt consult legal counsel. In general, concerning subcontractors contracted to AECOM:
 - AECOM can be expected to review subcontractor plans and/or procedures in which AECOM can reasonably be expected to have adequate knowledge (e.g., Fitness for Duty, Hazard Assessment & Risk Management, Stop Work Authority, etc.).
 - AECOM can be expected to verify documentation and general adequacy of relevant subcontractor SH&E plans and/or procedures for which the subcontractor has superior knowledge.
- 4.6.4 Ensure that AECOM has the right in its subcontract, without liability to AECOM, to stop the subcontractor's work in the event of any violations of the applicable safety requirements.
- 4.6.5 Managers shall require subcontractors to follow pre-qualification procedures for lower-tiered subcontractors.
- 4.7 Subcontractor Safety Representative
- 4.7.1 Require each subcontractor to appoint a Subcontractor Safety Representative (SSR) who:
- Is knowledgeable of the subcontractor's activities.
 - Understands the safety requirements of the subcontractor's activities.
 - Has the ability to recognize and the authority to correct safety deficiencies and execute a stop work order should an imminent danger arise.
 - Has the responsibility for the administration of the subcontractor safety program.
 - Will serve as the direct contact with AECOM regarding resolution of SH&E issues
 - Will report work-related injuries/illnesses/incidents, environmental incidents and regulatory inspections/violations to AECOM according to AECOM procedures and/or client requirements.
- 4.8 Communication
- 4.8.1 Provide the SSR with information regarding site safety program including but not limited to:
- Client Requirements
 - Project SH&E Plan
 - AECOM SH&E Program
 - Site Hazard Communication Program
 - Site Emergency Plan
 - Any additional safety information from other contractors or subcontractors working on the site.
- 4.8.2 Subcontractors and their employees shall engage in a hazard assessment and risk management process equivalent to or exceeding that of AECOM. Refer to *S3AM-209-PR1 Risk Assessment & Management*.
- If the subcontractor process is deficient, the subcontractor management shall utilize AECOM's process to supplement for the deficiency and train their employees appropriately.
- 4.8.3 Subcontractors shall participate in site safety briefings including, and as applicable, orientations, project kick-off meetings, hazard assessments, inspections, tailgate / toolbox meetings, and post-job meetings.

- 4.8.4 Subcontractors shall comply with all safety directives and/or stop work orders issued by the AECOM representatives.
- 4.8.5 Subcontractors shall notify the AECOM manager when they will utilize short service employees (SSE) to perform on-site activities. The AECOM manager approval of any SSE shall be obtained by the subcontractor prior to mobilization. Subcontractor site management will interact with the short service employee to verify their level of competency and manage the subcontractor SSE in accordance with *S3AM-015-PR1 Newly Hired or Transferred Employees* or an equivalent process.
- 4.8.6 Prior to the start of work, roles, responsibilities, communication chain-of-command, and emergency preparedness procedures shall be established.
- 4.9 Subcontractor Performance
 - 4.9.1 To the extent reasonable in light of AECOM's scope of work under the client contract, the AECOM Manager (or designee) should visit the site and periodically observe subcontractor's operations (e.g., conduct spot checks) to assess whether subcontractor appears to be conducting their operations in accordance with applicable safety requirements. Periodically review any required subcontractor health and safety performance and written documentation for compliance with applicable requirements. *S3AM-213-FM4 Subcontractor SH&E Data Submission* may be used to obtain monthly SH&E metrics from the subcontractor.
 - 4.9.2 Information shall be compiled and subcontractor performance assessment should be documented using *S3AM-FM3 Subcontractor SH&E Performance Assessment* or equivalent.
 - 4.9.3 In the event that unsafe acts or unsafe conditions are observed, immediately stop work, and bring them to the attention of the SSR for resolution.
 - 4.9.4 The AECOM Manager shall ensure incidents and significant near misses related to subcontractor operations are investigated to identify causes and corrective actions.
 - 4.9.5 In the event of serious and/or continuing subcontractor breaches of applicable requirements, contact legal counsel to assess whether formal contractual action is appropriate under the subcontract.
 - 4.9.6 Once a job is completed, a subcontractor's performance should be reviewed and feedback provided to subcontractor management. This should be documented using *S3AM-FM3 Subcontractor SH&E Performance Assessment* or equivalent.

5.0 Records

The following documentation will be maintained in the project file:

- 5.1 S3AM-213-FM1 Subcontractor SH&E Evaluation Form or equivalent.
- 5.2 S3AM-213-FM2 Subcontractor Variance Form or equivalent, if applicable.
- 5.3 S3AM-213-FM3 Subcontractor SH&E Performance Assessment or equivalent.
- 5.4 S3AM-213-FM4 Subcontractor SH&E Data Submission, if applicable.
- 5.5 Identified safety deficiencies as applicable for subcontractors and verification of correction of conditions.
- 5.6 All other safety-related subcontractor documentation (e.g., training certifications, incident reports, etc).

6.0 Attachments

- 6.1 [S3AM-213-ATT1 Subcontractor Evaluation Criteria](#)
- 6.2 [S3AM-213-FM1 Subcontractor SH&E Evaluation Form](#)
- 6.3 [S3AM-213-FM2 Subcontractor Variance Form](#)

- 6.4 [S3AM-213-FM3 Subcontractor SH&E Performance Assessment](#)
- 6.5 [S3AM-213-FM4 Subcontractor SH&E Data Submission](#)

Prior to engaging a subcontractor on a project, Managers are required to ensure that the subcontractor has an effective safety program and is capable of conducting its operations in a safe manner. The following criteria shall be followed in determining whether the subcontractor may be used on an AECOM project.

If the subcontractor does not meet the criteria outlined below, the decision will be that the subcontractor will not be used. However, if a unique business need exists (e.g., subcontractor is a specialty subcontractor, lowest or only bid, client required, small business/minority set asides), the Manager should initiate *S3AM-213-FM2 Subcontractor Variance Form*.

Note: Some questions/answers (Sections 5 through 10) from *S3AM-213-FM1 Subcontractor Evaluation Form* are not discussed in the evaluation criteria below. These questions and the answers provided are intended to help the Manager understand the culture and/or priorities of the subcontractor.

If subcontractor has performed work for AECOM previously, check safety performance history with previous AECOM Manager.

The sections below directly correspond to the questions in *S3AM-213-FM1 Subcontractor Evaluation Form*.

1.0 Workers' Compensation Experience Information

- 1.1 If the EMR exceeds 0.99 (U.S.) or the subcontractor has a surcharge (International), the subcontractor does not meet AECOM's requirements and a variance is required.
- 1.2 If the subcontractor does not have workers' compensation insurance, legal counsel shall be consulted to determine whether the variance process is applicable (e.g., verify coverage is not required by the applicable regulatory jurisdiction, AECOM would not be placed in a potentially liable position, etc.).

2.0 Safety Performance

- 2.1 If the subcontractor has had a fatality (for any year in line 3 on the table), the subcontractor does not meet AECOM requirements and a variance is required.
- 2.2 For any Lost Work Day Case Rate (for any year in line 11 on the table) listed as greater than 1.0, subcontractor does not meet AECOM requirements and a variance is required.
- 2.3 For any Total Recordable Incident Rate (for any year in line 10 on the table) listed as greater than 4.0, subcontractor does not meet AECOM requirements and a variance is required.
- 2.4 A subcontractor with willful, serious and repeat citations does not meet AECOM requirements and a variance is required.

3.0 Risk Management / Insurance Data

- 3.1 The ability to provide Insurance Certificates naming AECOM as an additional insured is required. Refer any questions to the AECOM Legal Department.
- 3.2 Proof of Workers' Compensation Insurance (or proof of exemption) is required. Refer any questions to the AECOM Legal Department.

4.0 Safety Program

- 4.1 For Sections 4 through 9, if a subcontractor answers 'No' to any of the questions, the Manager needs to consider the type of work the subcontractor will be performing to determine if the answer is acceptable.
- 4.2 A "No" answer should be discussed with Operations and Safety, Health & Environment (SH&E) Management. For small subcontractors, a 'No' answer may be acceptable with good incident and insurance rate statistics. Generally, some minimal program is expected depending on the breadth and complexity of the work. If a 'No' answer is determined to be not acceptable the subcontractor does not meet AECOM requirements and a variance is required.

- 4.3 It is expected that a subcontractor being hired to perform services on the project site should be the best prepared to address safety issues for their operations, especially when specialty work is being conducted, or for work in which the subcontractor possesses superior knowledge of their operations.

Americas

Subcontractor SH&E Evaluation Form

S3AM-213-FM1

It is the policy of AECOM to provide a safe and healthful environment for all of its employees through the prevention of incidents. As such, AECOM considers safety as paramount and requests the following information of our subcontractors.

Company Name:	_____	Date:	_____
Address:	_____	Contact Name:	_____
	_____	Title:	_____
City:	_____	Telephone:	_____
State/Province:	_____	Fax:	_____
Zip/Postal Code:	_____	Email:	_____
Type of services performed: _____			

Has your company previously performed work as a subcontractor to AECOM? ☐ Yes ☐ No

If "Yes" explain the nature of the work, project location, and project date, and AECOM Project Manager and telephone number.

How many years has your organization been in business under your firm's name? _____

If applicable, what was your organization's previous name(s)? _____

Does your company have the appropriate licenses, registrations and insurance? ☐ Yes ☐ No

1.0 Workers' Compensation Experience Information

(United States Only)

Insurance Carrier(s): _____

Contact for Insurance Information: _____

Title: _____ Telephone: _____ Fax: _____

1.1 For U.S. operations - List your firm's Interstate Workers' Compensation Experience Modification Rate (EMR) for the three most recent years: (Information is available from your workers' compensation insurance carrier.)

1.2 For international operations - List the applicable performance rating (e.g., WCB variance/experience rate in Canada) for your company.

Year	Rate
_____	_____
_____	_____
_____	_____

1.3 We require verification of your rate. Please attach the endorsement page from your policy/account listing your rating, or have your insurance carrier or broker provide this information on their letterhead.

1.4 If your EMR exceeds 0.99 (US) or you have a surcharge (International) for any one or more years above, please explain why:

Comments: _____

2.0 Safety Performance Data

2.1 Please consolidate your firm's injury and illness data for the last 3 years and complete the table below. The information provided must be for your company as a whole, not an individual office location. See page 7 for definitions of terms used below. For U.S. operations, provide copies of your OSHA 300 and 300A logs for the last 3 years.

	YEAR	YEAR	YEAR
1. Average Number of Employees			
2. Hours Worked			
3. Fatalities ¹			
4. Permanent Total Disabilities (PTD)			
5. Lost Workday Cases (LWC)			
6. Restricted Workday Cases (RWC)			
7. Medical Treatment Cases (MTC)			
8. Lost Work Days (LWD)			
9. Total Recordable Cases (TRC)			
10. Total Recordable Incident Rate (TRIR)			
11. Lost Workday Case Rate (LWCR)			
12. Days Away, Restricted & Transfer Case Rate (DART)			
13. Severity Rate			
14. Environmental Occurrences			

¹ For each fatality, please attach a description of the incident, including cause, lessons learned, actions taken resulting from that fatality, and actions taken to prevent future fatalities.

- 2.2 Has your company been issued any health and safety or environmental related citations/orders from any federal, state, province, or local regulatory agency during the past 3 years? ☐ Yes ☐ No

If "Yes", please explain the nature of the citation/order, classification, and final fine (if applicable) in an attachment to your evaluation form submittal.

3.0 Risk Management / Insurance Data

- 3.1 Are you able to provide AECOM (or applicable subsidiary company) with insurance certificates naming AECOM, and if requested, AECOM's client as an additional insured? ☐ Yes ☐ No

- 3.2 Please provide proof of current workers' compensation insurance coverage or proof of exemption.

4.0 Safety Program

- 4.1 Does your company operate a health and safety management system that is third-party registered or certified? ☐ Yes ☐ No

If "Yes," please include a copy of the registration/certification.

- 4.2 Does your company maintain a written Safety program? ☐ Yes ☐ No

If "Yes," please include a copy of the Table of Contents.

- 4.3 Is your company capable of preparing safety procedures specific to your work proposed for this project? ☐ Yes ☐ No

- 4.4 Does your firm have a full-time safety manager/representative? ☐ Yes ☐ No

If "Yes," please provide name and telephone number.

Name: _____ Telephone: _____

- 4.5 Do you hold jobsite safety meetings? ☐ Yes ☐ No

How Often?

Daily ☐ Weekly ☐ Bi-Weekly ☐ Monthly ☐ Less Often, As needed ☐

Are the safety meetings documented? ☐ Yes ☐ No

- 4.6 Does your firm have the following policies/procedures?
If "Yes," please provide copies of the policies/procedures.

- Stop Work? ☐ Yes ☐ No
- Short Service Employee? ☐ Yes ☐ No
- Fitness for Duty? ☐ Yes ☐ No

- 4.7 Is a program in place for the reporting and correction of workplace hazards? ☐ Yes ☐ No

- 4.8 Are workers encouraged to intervene when unsafe conditions are observed? ☐ Yes ☐ No

- 4.9 Have the safety hazards associated with your job activities been identified? ☐ Yes ☐ No

- 4.10 Has a risk assessment been performed on these hazards? ☐ Yes ☐ No

- 4.11 Does your company use subcontractors? ☐ Yes ☐ No
If "Yes", please provide details of how you select and manage subcontractors.
-

5.0 Incident Reporting, Investigation, and Injury Management

- 5.1 Does your company have a process in place for immediate reporting, investigation, and follow-up of incidents, near-misses and occupational injuries? ☐ Yes ☐ No

If "Yes," who receives copies of the report? (Job Title) _____
(Job Title) _____
(Job Title) _____

- 5.2 Who is responsible for investigation and completion of your incident report forms? (Job Title) _____

Please provide your company's incident reporting procedures.

- 5.3 Does your company have an injury management procedure? ☐ Yes ☐ No
If "Yes", provide a copy of the injury management procedure.

- 5.4 Does your injury management procedure include the use of occupational clinics (for non-critical injuries) as a preferred method of medical care? ☐ Yes ☐ No

- 5.5 Does your company have a nurse or doctor on staff? ☐ Yes ☐ No

- 5.6 Does your company use a third-party to provide medical advice to injured employees? ☐ Yes ☐ No

If "Yes", which third-party company is used? _____

6.0 Training and Competence

- 6.1 Have employees been trained in appropriate job skills? ☐ Yes ☐ No

- 6.2 Are employees' job skills certified where required by regulatory or industry standards? ☐ Yes ☐ No

- 6.3 Have your employees received the required safety training and retraining? ☐ Yes ☐ No

- 6.4 Does your company have a formal safety orientation program for new employees? ☐ Yes ☐ No
If "Yes," submit an outline for evaluation.

If "Yes", are records kept? ☐ Yes ☐ No

If "Yes", who conducts the orientation? (Job Title) _____

If "No", how are new employees informed of safety policies, procedures and expectations?

6.5 Do you have additional safety training for newly hired or promoted foremen / superintendents? ☐ Yes ☐ No

6.6 Do you maintain a record of all employees' training? ☐ Yes ☐ No

6.7 Are your employees enrolled in a Defensive Driving Training Program? ☐ Yes ☐ No

7.0 Medical / Drug Testing

7.1 Does your company have a Drug/Alcohol policy or program? ☐ Yes ☐ No

If "Yes", does your drug and alcohol program include the following:

- Pre-employment testing ☐ Yes ☐ No
- Testing for Cause ☐ Yes ☐ No
- Post-incident testing ☐ Yes ☐ No
- Random testing ☐ Yes ☐ No

7.2 Does your company have an ongoing medical surveillance program as required by applicable governmental regulations? ☐ Yes ☐ No

7.3 Do you conduct medical examinations for:

- Pre-employment ☐ Yes ☐ No
- Pre-placement Job Capability ☐ Yes ☐ No
- Hearing Function (Audiograms) ☐ Yes ☐ No
- Pulmonary ☐ Yes ☐ No
- Respiratory ☐ Yes ☐ No

8.0 Compliance Assurance

8.1 Does your company conduct safety system audits and/or inspections? ☐ Yes ☐ No

- How often? _____
- Who conducts the audits/inspections? (Job Title) _____
- Who receives the reports? (Job Title) _____
- Are audits/inspections documented? ☐ Yes ☐ No

9.0 Environmental Management and Sustainability

9.1 Has your company been issued any environmental related citations/orders from any federal/state/province, or local regulatory agency during the past 3 years? ☐ Yes ☐ No

If "Yes", please explain the nature of the citation/order, classification, and final fine (if applicable) in an attachment to your evaluation form submittal.

9.2 Does your company have an Environmental Management and/or Sustainability Policy Statement (can be incorporated into a company policy statement)? ☐ Yes ☐ No

9.3 Does your company have any of the following?

- Process to assess environmental compliance requirements? ☐ Yes ☐ No
- Process to identify environmental impacts? ☐ Yes ☐ No

- Waste Management Program (including recycling)? ☐ Yes ☐ No
- Procurement policies requiring purchase of recycled materials? ☐ Yes ☐ No
- Energy use tracking and management policies? ☐ Yes ☐ No
- Green House Gas emissions reduction program? ☐ Yes ☐ No
- Tracking of "Carbon Footprint"? ☐ Yes ☐ No
- Environmental Certifications (e.g., ISO 14001)? ☐ Yes ☐ No
- Water Management/Conservation? ☐ Yes ☐ No
- Environmental Performance Metrics? ☐ Yes ☐ No

Comment on any other areas of your company's programs and policies that you think will be appropriate in our evaluation.

10.0 Verification Data

Please have an officer of the company sign below certifying that the information provided in this document is current and correct. Misrepresentation of data requested is grounds for immediate termination of contracts and disqualification from future consideration.

Name

Title

Signature

Date

11.0 Required Information Submittal

Please provide copies of the following documents with the completed evaluation form. **If the following information is not included, provide a written reason for the failure to do so.**

- ☐ Workers' compensation rating documentation
- ☐ U.S. Only - OSHA 300 and 300A Logs (Past 3 Years) – *Employee names must be removed.*
- ☐ Description for any fatalities (if applicable)
- ☐ Explanation of any health and safety related order/citation (if applicable)
- ☐ Safety Program (Table of Contents)
- ☐ Stop Work, Short Service Employee, Fitness for Duty Policies/Procedures (if applicable)
- ☐ Incident Reporting Procedure
- ☐ Injury Management Procedure
- ☐ Safety Orientation for New Hires (Outline)
- ☐ Explanation of any environmental related order/citations (if applicable)

Definitions for Section 3.1.

Hours Worked - The total number of hours worked during the given year including paid overtime and training but excluding leave, sickness and unpaid overtime hours. Hours worked should be calculated separately for company and contractor personnel.

Fatality - A death resulting from a work-related injury or occupational illness, regardless of the time intervening between the incident causing the injury or exposure causing illness and the death.

Permanent Total Disability (PTD) - Any work-related injury that permanently incapacitates an employee and results in termination of employment.

Lost Workday Case Rate (LWCR) - The number of cases with days away from work per 200,000 exposure hours. (Formerly called Lost Time Incident Rate).

$$\frac{\text{Number of Lost Workday Cases} \times 200,000 \text{ hours}}{\text{Hours Worked}}$$

Lost Work Days (LWD) – The total number of days away from work experienced by all employees during the year.

Severity Rate -

$$\frac{\text{Total number of lost work days} \times 200,000 \text{ hours}}{\text{Hours Worked}}$$

Days Away, Restricted & Transfer Case Rate (DART) - Cases involving days away from work, or days of restricted work activity, or both per 200,000 exposure hours. This rate is determined by the following formula:

$$\frac{\text{Total number of (LWC+RWC)} \times 200,000 \text{ hours}}{\text{Hours Worked}}$$

Total Recordable Cases (TRC) - The sum of injuries/illness resulting in fatalities, permanent total disabilities, lost workday cases, restricted work cases and medical treatment cases.

Total Recordable Incident Rate (TRIR) - The number of total recordable cases (see definitions above) per 200,000 exposure hours. This rate is determined by the following formula:

$$\frac{\text{Number of Total Recordable Cases} \times 200,000 \text{ hours}}{\text{Hours Worked}}$$

Environmental Occurrence – Any environmental occurrence required to be reported to a statutory body.

This page is to be completed by AECOM.

Subcontractor Name: _____

Manager Evaluation:

- Pass ☐ Subcontractor meets the criteria established in *S3AM-213-ATT1 Subcontractor Evaluation Criteria*, and no further action is required.
- Fail ☐ Subcontractor does not meet the criteria established in *S3AM-213-ATT1 Subcontractor Evaluation Criteria*. If a unique business need exists for hiring this specific subcontractor, and no other qualified subcontractor can be located or used, then a subcontractor variance must be initiated using *S3AM-213-FM2 Subcontractor Variance Form*.

Manager Name: _____

Signature: _____

Date: _____

Americas

Subcontractor Variance Form

S3AM-213-FM2

Subcontractor Name _____

Project or Site Location _____

Project # _____

Description of Work to Be Performed _____

Explain any of the following conditions that apply to the subcontractor:

- ☐ EMR exceeds 0.99 (U.S.) or company has a surcharge (International)
 - ☐ No workers' compensation insurance
 - ☐ Fatalities in the past 3 years
 - ☐ Lost Time Injury Rate greater than 1.0 in the past 3 years
 - ☐ Total Recordable Incident Rate greater than 4.0 in the past 3 years
 - ☐ Willful, serious or repeat regulatory citation
 - ☐ Inadequate Safety Program(s)
-
- _____
-
- _____
-
- _____

What conditions warrant selection of this subcontractor?

- ☐ Sole subcontractor available for specialty work
 - ☐ Current subcontractor for work to be continued
 - ☐ Small or minority business set aside requirement
 - ☐ Existing site or client agreement requires use of subcontractor
 - ☐ Site/project security requirements preclude other subcontractors
 - ☐ Subcontractor has made efforts to improve safety performance and improvements are apparent
 - ☐ Other (explain below)
-
- _____
-
- _____

Have other similar subcontractors been evaluated? If so, please explain.

Mitigations by AECOM and Subcontractor actions required to manage the risks.

Manager Requesting Variance**Safety Director/Manager Approval**

Name:	<hr/>	<hr/>
Date:	<hr/>	<hr/>
Signature:	<hr/>	<hr/>
Comments:	<hr/>	
<hr/>		
<hr/>		

SUBCONTRACTOR ACKNOWLEDGEMENT

The subcontractor representative, on behalf of the subcontractor, acknowledges and agrees to the content and requirements contained in this document.

Subcontractor

Name:

Representative
Name:

Date:

Signature:

OPERATIONAL VICE PRESIDENT APPROVAL

Required for:

- Fatalities in the last three years
- No workers' compensation insurance
- Wilful, serious, or repeat citations

Name:

Date:

Signature:

Americas

Subcontractor SH&E Performance Assessment

S3AM-213-FM3

Company Name:	_____	Date:	_____
Address:	_____	Contact Name:	_____
	_____	Title:	_____
City:	_____	Telephone:	_____
State/Province:	_____	Fax:	_____
Zip/Postal Code:	_____	Email:	_____
Type of services performed: _____			

- ☐ Assessing performance of subcontractor on a project or during activity.
- ☐ Assessing performance of a subcontractor at the end of a project or activity.
- ☐ Completing an annual assessment of subcontractor performance.

Describe the nature of the work, project/program location, and project/program start date, and AECOM Manager and telephone number.

Assessment

Has the subcontractor met its contractual obligations and requirements? ☐ Yes ☐ No

If unsatisfactory describe any deficiencies and include examples / evidence.

Did or does the subcontractor follow a health and safety management system suitable to the activities or work scope? ☐ Yes ☐ No

If unsatisfactory describe any deficiencies and include examples / evidence.

Did or does the subcontractor maintain and submit documentation evidencing a health and safety management system is employed during the course of the activities or work scope (e.g., monthly training reports, monthly leading / lagging indicator performance, etc.)? ☐ Yes ☐ No

If unsatisfactory describe any deficiencies and include examples / evidence.

Did or does the subcontractor SH&E performance meet or exceed AECOM requirements?

- | | | |
|--|------------------------------|-----------------------------|
| Did or do subcontractor personnel receive site specific orientations prior to commencing work? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or do subcontractor personnel have appropriate training / certification for the job scope? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor have an SH&E plan that is acknowledged by its employees? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor hold jobsite safety meetings? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor identify and assess the risk of workplace hazards? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor identify and implement corrective actions for identified hazards? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or do subcontractor workers intervene when unsafe acts or conditions are observed? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor have a system to report identified hazards? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor immediately report incidents and near-misses? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor investigate and establish corrective actions? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor assign responsibility and track actions to completion? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor actively implement claims and injury management practices? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor routinely inspect and audit work sites? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor maintain medical surveillance program if required? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor routinely incorporate environmental sustainability practices? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor employ subcontractors? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor utilize a pre-qualification process to hire subcontractors? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Did or does subcontractor monitor SH&E performance of hired subcontractors? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

If any items are assessed as unsatisfactory, describe any deficiencies and include examples / evidence.

Recommendations

Subcontractor Representative Name

Title

Signature

Date

AECOM Representative Name

Title

Signature

Date

Americas

Subcontractor SH&E Data Submission

S3AM-213-FM4

Subcontractor Name: _____

Year: _____

Completed By (name): _____

Project: _____

This document is completed and submitted to AECOM Project Management by the named Subcontractor.
Subcontractors shall be prepared to provide evidence to support the below data.

Month

	JAN		FEB		MAR		APR		MAY		JUN	
# hours worked												
Avg. # of employees												
	#	Comment	#	Comment	#	Comment	#	Comment	#	Comment	#	Comment
# Site specific orientations												
# Short service workers onsite												
# Jobsite safety meetings												
# Hazard assessments												
# Worksite inspections & audits												
# First aid incidents												
# Medical aid incidents												
# Lost time incidents												
# Restricted work incidents												
# Environmental incidents												
# Property damage incidents												
# Preventable vehicle incidents												
# Near miss incidents												
# Observations												
# Investigations												
Other: _____												
Other: _____												

	JUL		AUG		SEP		OCT		NOV		DEC	
# hours worked												
Avg. # of employees												
	#	Comment	#	Comment	#	Comment	#	Comment	#	Comment	#	Comment
# Site specific orientations												
# Short service workers onsite												
# Jobsite safety meetings												
# Hazard assessments												
# Worksite inspections & audits												
# First aid incidents												
# Medical aid incidents												
# Lost time incidents												
# Restricted work incidents												
# Environmental incidents												
# Property damage incidents												
# Preventable vehicle incidents												
# Near miss incidents												
# Observations												
# Investigations												
Other: _____												
Other: _____												

Compliance Assurance

S3AM-216-PR1

1.0 Purpose and Scope

- 1.1 This procedure establishes the protocol for assessment and audits of the Safety, Health and Environment (SH&E) program and its application, as well as the process to identify and monitor corrective actions.
- 1.2 This procedure provides direction for AECOM employees to perform, document and track workplace Safety, Health and Environment (SH&E) inspections, reviews, and assessments, and to implement appropriate corrective actions designed to minimize risk and enhance operational SH&E performance. The goal is to minimize risk and enhance operational SH&E performance.
- 1.3 This procedure applies to all Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.
- 1.4 This procedure does not supersede AECOM client SH&E requirements provided they meet or exceed this procedure, however projects/sites are still subject to the compliance assurance requirements of this procedure as determined by AECOM management.

2.0 Terms and Definitions

- 2.1 **Certificate of Recognition (COR)** – In Canada, a program established by a provincial or territorial government authority which certifies that a company has an established and functioning SH&E program meeting specific criteria (as determined by an audit). COR provides financial incentives in the form of workers compensation rebates; it is also a client requirement in most jurisdictions.
- 2.2 **Corrective Action Plan** – A document that lists items requiring correction and establishes a timeline and necessary priorities for resolving the identified issues. It also lists completion dates for each item.
- 2.3 **Program SH&E Review** – A systematic review conducted by Senior Management of a project's or program's field activities and the application of AECOM's Safety, Health and Environment Management System. The review is comprised of a Program SH&E Review Assessment, Program SH&E Review Summary and a Program SH&E Review Presentation.
- 2.4 **SH&E Program Evaluation** – An evaluation of the general implementation of the SH&E program. The assessment is based on the knowledge, expertise, and opinion of the individual completing the assessment (whereas an audit also assesses completed documentation and formal interviews).
- 2.5 **SH&E Audit** – A systematic review of operations, procedures, equipment, and records in order to identify, evaluate, document, and report actual or potential safety, health, and/or environmental risks or hazards. An audit includes site observations, document review, and formal interviews or consultations with affected personnel.
- 2.6 **SH&E Audit Report** – A document outlining the results of the audit. A corrective action plan will be a part of the audit report.
- 2.7 **SH&E Inspection** – A systematic review of operations, procedures, equipment, and records in order to identify, evaluate, document, and report actual or potential safety, health and/or environmental risks or hazards. An inspection is normally less formal and less consuming from a time and resources standpoint to conduct than is an audit. This does not apply to government inspections (see *S3AM-211-PR1 Regulatory Inspections*).
- 2.8 **SH&E Records** – Information and documentation related to SH&E aspects of the program, project, or other operations unit including but not limited to SH&E Plan personnel acknowledgement sheets, Job Safety Analyses /Task Hazard Assessment sign-off sheets, Pre-Job or Pre-Entry Briefing sign-off sheets, SH&E training attendance and course completion records, medical surveillance records, exposure monitoring results, and equipment calibration records.

- 2.9 **SH&E Self-Inspection (Walkthrough)** – Informal walkthrough by Managers and/or designated SH&E staff of work areas, offices, storage areas, and other operations. Depending on the scope of work, pace of operations, and types and severity of physical and/or chemical hazards, self-inspections will be conducted on a frequent but not less than weekly basis.

3.0 Reference

- 3.1 S3AM-211-PR1 Regulatory Inspections

4.0 Procedure

- 4.1 Roles and Responsibilities

4.1.1 Manager

- Provide the resources needed to complete, document, and report audits in their location where an audit program is established and provide the resources for effective corrective action implementation.
- Schedule workplace inspections, and confirm results are reported in accordance with this procedure.
- Actively participate in the SH&E inspection, audit and program SH&E review processes at their sites and will provide those conducting the processes access to SH&E records, equipment, work areas, and personnel as appropriate.

4.1.2 SH&E Manager

- Provide training and technical guidance to operations in support of the requirements of this procedure.
- Schedule Program Safety Reviews as required.
- Confirm that a viable SH&E audit program is implemented within the Business Group / Business Unit where it is required either by AECOM, its clients, or local legislation.
- Assist with the implementation of Corrective Actions which are within their realm of responsibility.

4.1.3 Employees

- Cooperate with SH&E Department and audit, review, or inspection team personnel.
- Participate in the workplace inspections, reviews, audits, and/or corrective actions, if requested.

- 4.2 SH&E Inspections

- 4.2.1 Active, ongoing AECOM project sites and workplaces, including offices, shall be inspected monthly or at a frequency determined by the Manager and/or SH&E Manager to meet the local regulations.

- Refer to *S3AM-216-FM1 Site Inspection* or *S3AM-216-FM2 Office Inspection*.
- Alternately, *S3AM-216-FM4 Monthly Inspection Checklist* may be utilized with the approval of the Manager and SH&E Manager.

- 4.2.2 On oversight projects where AECOM has or shares the responsibility for project safety, the AECOM supervisor will coordinate with the Contractor's SH&E inspection program and provide observations to the Contractor.

- 4.2.3 Unscheduled inspections may be requested by the SH&E Manager in response to incidents such as a work-related injury, illness, or significant near miss; regulatory agency inquiry or inspection; or SH&E-related employee report of unsafe condition or similar issue.

- 4.2.4 Self-inspections include identifying and correcting SH&E compliance issues, housekeeping or material storage issues, life and fire safety violations, deficiencies with mobile equipment, or other adverse conditions or unsafe behaviors.
- Use of *S3AM-216-FM1 Site Inspection* or *S3AM-216-FM2 Office Inspection* is not required for these walkthroughs. However, issues will be documented by the inspector and corrective actions taken by the location's Supervisor or SH&E representative (on the spot, where feasible) when hazards, compliance violations, and/or other deficiencies are observed.
- 4.3 SH&E Program Evaluations and Program SH&E Reviews
- 4.3.1 The **SH&E Manager** shall schedule a Program SH&E Review at the request of Senior Management.
- The Program SH&E Review shall commence with an assessment of the program or project's active application of the SH&E Management System. The order of the assessment is in accordance with AECOM's Life Preserving Principles.
 - The assessment findings are recorded and scored as detailed within *S3AM-216-FM5 Program SH&E Review Assessment*. The assessment shall include a summary of findings, corrective actions, and assignment of responsible parties.
 - The Program SH&E Review Assessment shall be used to complete *S3AM-216-FM6 Program SH&E Review Summary* and *S3AM-216-FM7 Program SH&E Review Presentation*. The summary and presentation are intended to provide the Program SH&E Review findings and recommendations to program or project management and any other relevant stakeholders.
- 4.3.2 SH&E Program Evaluations are conducted by the program or project's management and do not require Senior Management request.
- SH&E Program Evaluation requirements, such as frequency, may be established by the Business Group, Business Unit, or project or program management.
 - Refer to *S3AM-216-FM3 SH&E Program Evaluation*.
- 4.4 Audits
- 4.4.1 Annual audits shall be implemented in AECOM locations, including worksites and/or offices where required by AECOM, its clients, or local legislation.
- 4.4.2 Audits may be conducted as a part of an accreditation process, such as Certificate of Recognition (COR) in Canadian jurisdictions, or as part of a third-party pre-qualification process.
- The format of the audit will be dictated by the requirement for the audit; for example, Canadian COR audits will follow the mandated audit structure of the province/territory.
 - External auditors shall be escorted when present on any AECOM location.
 - Key AECOM personnel shall be identified to coordinate, prepare for and support this audit process. This may include, but not be limited to:
 - Liaising with external auditor personnel.
 - Collecting documentation required for review.
 - Coordinating location visits and any preparation required of the external auditor personnel for the location visit(s).
 - Informing AECOM personnel of audit processes in preparation.
 - Arranging any required pre- or post-audit meetings.
 - Accompanying and supporting auditor as necessary during the audit process.

- 4.4.3 Internal or self-assessment audits may be ongoing requirements associated with external or third party audit processes or may be established by an AECOM Business Group or Business Unit as an internal requirement.
 - Internal or self-assessment audits associated with an external or third party shall be submitted to the appropriate agency or body according to the requesting entity's requirements.
 - Internal or self-assessment audits may be conducted by worksite or office employees, but shall be augmented by the supporting SH&E Manager, the project site safety representative, or designee (e.g. local SH&E Coordinator) as appropriate.
 - Internal or self-assessment audits established as an internal requirement shall follow audit protocols identified by the appropriate AECOM Business Group or Business Unit.
- 4.4.4 Auditors should conduct a courtesy pre-audit briefing with personnel affected by the audit (e.g. site management team, project workers) to explain how the audit will be conducted and their expected level of participation, if any. Auditors should avoid disrupting routine work activities as far as practical.
- 4.4.5 Auditors will confirm that appropriate SH&E records pertaining to the project, location, or business unit are thoroughly reviewed. Original documentation will remain at the audit site so as not to be misplaced or lost.
- 4.4.6 Auditors should plan to have access to, and interview, a cross-section of AECOM employees at the audit location in order to engage employees in the audit process and to verify/validate audit questions and criteria as needed.
- 4.4.7 Audit documents should specifically identify the location or locations encompassed by the audit.
- 4.4.8 The audit will conclude after the auditor(s) has conducted a closing conference with the location's management team to review the results and document any required corrective actions.
- 4.4.9 Prior to formal audit issuance, draft audit findings shall be reviewed by local management.
- 4.5 Corrective Actions / Corrective Action Plans
 - 4.5.1 All discrepancies noted during an inspection, evaluation, review, or audit shall be documented and tracked in the appropriate online management system (e.g. IndustrySafe).
 - 4.5.2 All action items identified shall be corrected in a timely manner by local operations management. On-the-spot corrective action will be taken for imminent danger issues, life and fire safety deficiencies, and SH&E compliance violations. Other problem issues will be corrected on-the-spot when feasible.
 - 4.5.3 For issues that cannot be corrected the same day (e.g. findings such as employee training or knowledge deficiencies, missing SH&E records, management failure to document procedures, etc.), the appropriate management team will document necessary follow-up action and assign accountability for corrective actions. These shall be additionally documented in the appropriate online management system (e.g. IndustrySafe) to assist with tracking.
 - 4.5.4 If corrective actions will take more than 30 calendar days to complete, interim actions shall be implemented to prevent injury, illness, property loss, or impairment to the environment until planned/long-term corrective measures are put in place. The SH&E Manager shall be consulted as appropriate.
 - 4.5.5 The management teams associated with the inspected, evaluated, reviewed or audited location and the related corrective actions will inform the SH&E Manager on the status of open corrective action plan items on a quarterly basis at a minimum.

5.0 Records

- 5.1 Copies of the most recently conducted inspections, evaluations, reviews, audits and attached corrective action plans shall be posted on the location's safety bulletin board to enable access for all employees.

- 5.2 Copies of all inspections, evaluations, reviews, audits and attached corrective action plans will be provided to the SH&E Manager and maintained in the applicable files (e.g. office, program, project, etc.).
- 5.3 Management teams associated with the inspected, evaluated, reviewed, or audited location and the related corrective actions are responsible for recording, reporting, and tracking results.

6.0 Attachments

- 6.1 [S3AM-216-FM1 Site Inspection](#)
- 6.2 [S3AM-216-FM2 Office Inspection](#)
- 6.3 [S3AM-216-FM3 SH&E Program Evaluation](#)
- 6.4 [S3AM-216-FM4 Monthly Inspection Checklist](#)
- 6.5 [S3AM-216-FM5 Program SH&E Review - Assessment](#)
- 6.6 [S3AM-216-FM6 Program SH&E Review - Summary](#)
- 6.7 [S3AM-216-FM7 Program SH&E Review – Presentation](#)

Hand & Power Tools

S3AM-305-PR1

1.0 Purpose and Scope

- 1.1 This procedure provides the AECOM requirements for all manually operated hand and power tools and associated use, handling and storage. These requirements apply to tools provided by AECOM for employee use as well as tools provided by employees for use on AECOM work sites.
- 1.2 This procedure applies to all AECOM Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.

2.0 Terms and Definitions

- 2.1 None

3.0 References

- 3.1 S3AM-003-PR1 SH&E Training
- 3.2 S3AM-118-PR1 Hearing Conservation
- 3.3 S3AM-208-PR1 Personal Protective Equipment
- 3.4 S3AM-302-PR1 Electrical Safety
- 3.5 S3AM-325-PR1 Lockout Tagout

4.0 Procedure

- 4.1 Roles and Responsibilities
 - 4.1.1 **Managers/Supervisors**
 - Ensure that all aspects of this procedure are followed and adhered to on all AECOM projects, sites and locations.
 - If a specific tool is not included in the work instructions related to this procedure, appropriate guidelines shall be established prior to work associated with that tool, including following manufacturer's recommendations.
 - Ensure compliance with applicable client requirements and restrictions regarding hand or power tools.
 - 4.1.2 **Safety, Health and Environment (SH&E) Manager**
 - Provide technical guidance and support as to this procedure and associated work instructions.
 - 4.1.3 **Employees**
 - Work only with tools for which they are appropriately trained and familiar with.
 - Follow manufacturer's recommendations for its use and never modify the equipment without first obtaining authorization from the manufacturer.
 - Comply with applicable client requirements and restrictions regarding hand or power tools.
- 4.2 Requirements
 - 4.2.1 Always conduct a task hazard assessment (THA) prior to work commencing and include the identified hazards associated with the anticipated tool use.

- 4.2.2 No employee shall use any hand or power tool, unless they are familiar with the use and operation of the equipment or have received specific instruction on its use and operation.
- 4.2.3 All tools will be used 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 screw driver as a chisel, pry bar, wedge or punch or wrenches as hammers.
- 4.2.4 Use approved tools only. Never modify or use makeshift tools.
- 4.2.5 Do not apply excessive force or pressure on tools unless permitted by the manufacturer's specifications. This includes additional force by hammering with body weight, foot or other tools.
- 4.2.6 Keep surfaces and handles clean and free of excess oil and grease to prevent slipping.
- 4.2.7 Do not carry sharp tools (e.g. knife, chisel, screwdriver, etc.) in pockets; this practice may cause puncture wounds.
- 4.2.8 All tools shall 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.
- 4.2.9 Ensure proper ergonomics principles are observed when using hand and power tools, such as but not limited to:
 - Avoid static and awkward positions when possible.
 - Move at intervals to reduce muscle fatigue.
 - Consider tools with a trigger strip, rather than a trigger button. This strip will allow the exertion of more force over a greater area of the hand that, in turn, will reduce muscle fatigue
 - Do not apply excessive force or pressure on tools.
 - If possible use tools with comfortable grips that are designed to allow the wrist to stay straight. Avoid using a bent wrist.
 - Choose hand tools that have a centre of gravity within or close to the handle.
 - Frequently used tools that weigh more than 1 pound (0.45 kilograms) should be counter-balanced.
 - Ensure proper body positioning when using a tool to prevent slips or falls in the event of unanticipated tool behaviour (slip, kickback, etc.). Avoid over-reaching.
 - Pull on tools such as a wrench 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.
 - Hand-arm vibration exposure is associated with the use of hand tools.
 - Reduce power to the lowest setting that can complete the job safely. This action reduces tool vibration at the source.
 - Consider the need for controls such as limiting time of use.
 - If safe to do so, adjust to a looser but stable grip, and use anti-vibration gloves.
 - Use of heavy tools such as jackhammers can cause fatigue and strains. Heavy rubber grips can reduce these effects by providing a secure handhold.
 - Do not increase a tool's leverage by adding sleeved additions (e.g. a pipe or snipe) to increase tool handle length.
- 4.2.10 Avoid placing fingers and hands in danger zones:
 - Ensure hands and fingers have sufficient clearance in the event the tool slips.
 - Ensure stability of the work-piece. Use work-piece holders (e.g. vise, chisel holder, etc.) whenever possible to prevent injury to hands or deflection of tool or work-piece.

- Use push sticks or guides when cutting or machining smaller material.
- 4.2.11 Secure 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.
- 4.2.12 Utilize good housekeeping practices to ensure tools do not present a tripping hazard.
- 4.2.13 Ensure no part of a tool extends over the edge of the bench top. Place sharp tools (e.g., saws, chisels, knives) on benches so that sharp points or edges face away from the edge.
- 4.2.14 When using saw blades, knives, or other tools, if possible direct the tools away from aisle areas and away from other employees working in close proximity.
- 4.2.15 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.
- 4.2.16 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.
 - Iron or steel hand tools may produce sparks that can be an ignition source around flammable substances. Where this hazard exists, spark-resistant tools made of non-ferrous materials shall be used.
 - Electrical tools shall be identified as intrinsically safe.
- 4.2.17 If the task presents electrical hazards, worker must be competent 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.
- 4.2.18 The fluid used in hydraulic power tools must be an approved fire-resistant fluid and must retain its operating characteristics at the most extreme temperatures to which it will be exposed. The exception to fire-resistant fluid involves all hydraulic fluids used for the insulated sections of derrick trucks, aerial lifts, and hydraulic tools that are used on or around energized lines. This hydraulic fluid shall be of the insulating type.
- 4.2.19 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.
- 4.2.20 Do not allow loose clothing, long hair, loose jewelry, rings, and chains to be worn while working with power tools.
- 4.2.21 Make provisions to prevent tools from automatically restarting upon restoration of power. Refer to *S3AM-325-PR Lockout Tagout*.
- 4.3 Training
 - 4.3.1 Instruction in the proper use, safe handling, and maintenance of tools will be provided to employees unfamiliar with the tool.
 - Assess the employee's training needs as per *S3AM-003-PR1 SH&E Training* procedure.
 - Refer to the applicable work instructions associated with this procedure for any additional training specifics.
 - Training shall include applicable manufacturer's recommendations and guidelines.
 - 4.3.2 Employees shall demonstrate knowledge and competency in the use, safe handling and maintenance of the applicable tool prior to operation.
- 4.4 Personal Protective Equipment (PPE)
 - 4.4.1 Utilize basic PPE appropriate to the task; gloves, safety-toed boots, hard hats and safety glasses with side shields. Refer to *S3AM-208-PR1 Personal Protective Equipment*.
 - 4.4.2 Ensure lockout devices (padlocks, multiple lock hasps, tags) are utilized as necessary. Refer to *S3AM-325-PR Lockout Tagout*.

- 4.4.3 Ensure PPE is appropriate to the work and use additional PPE as required (e.g. mono-goggles, hearing protection, respiratory protection, etc.).
- Dual eye protection is required to be worn by any employee undertaking or within 3 ½ feet (1 meter) of a task that produces projected particles or material.
 - Head and face protection is recommended for employees working with pneumatic tools.
 - 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.
- 4.4.4 Screens shall also be set up to protect nearby workers from being struck by flying fragments around chippers, riveting guns, staplers, or air drills.
- 4.4.5 Refer to the applicable work instructions associated with this procedure for any additional specialized PPE.
- 4.5 Inspections
- 4.5.1 All tools must be inspected prior to each use.
- Any tool that is defective or has missing parts must not be used.
 - Every broken or defective tool must be tagged 'out of service' or 'do not use' and immediately removed from service.
 - Tagged tools will be returned to the supervisor for repair or replacement.
- 4.5.2 All tools must be inspected to manufacture's specifications and according to tool rests and guard adjustment tolerances. All tools will be inspected to ascertain that all safety devices are present and functioning properly. Refer to *S3AM-305-FM1 Hand & Power Tool Maintenance Inventory* and *S3AM-305-FM2 Hand & Power Tool Inspection Report*.

5.0 Records

- 5.1 None

6.0 Attachments

- 6.1 [S3AM-305-ATT1 Chainsaw](#)
- 6.2 [S3AM-305-ATT2 Circular Saw](#)
- 6.3 [S3AM-305-ATT3 Cut Off Saw](#)
- 6.4 [S3AM-305-ATT4 Handheld Grinder](#)
- 6.5 [S3AM-305-ATT5 Impact Wrench](#)
- 6.6 [S3AM-305-ATT6 Nail Gun](#)
- 6.7 [S3AM-305-ATT7 Dustless Vacuum](#)
- 6.8 [S3AM-305-ATT8 Power Drill](#)
- 6.9 [S3AM-305-ATT9 Pressure Washer](#)
- 6.10 [S3AM-305-ATT10 Reciprocating Saw](#)
- 6.11 [S3AM-305-ATT11 Sander](#)
- 6.12 [S3AM-305-ATT12 Knives](#)

- 6.13 [S3AM-305-ATT13 Clearing & Grubbing Equipment](#)
- 6.14 [S3AM-305-ATT14 Pneumatic Tools](#)
- 6.15 [S3AM-305-ATT15 Manual Hand Tools](#)
- 6.16 [S3AM-305-ATT16 Small Engines](#)
- 6.17 [S3AM-305-ATT17 Electric & Battery Hand Tools](#)
- 6.18 [S3AM-305-FM1 Hand & Power Tool Maintenance Inventory](#)
- 6.19 [S3AM-305-FM2 Hand & Power Tool Inspection Report](#)

Chainsaw

S3AM-305-ATT1

1.0 Objective / Overview

- 1.1 Available in a variety of types and capacities, chainsaws are one of the most powerful, yet dangerous cutting tools available.
- 1.2 Working safely with a chain saw includes proper training, good body mechanics and felling technique, well-maintained equipment, and protective clothing.

2.0 Hazards

- 2.1 Improper operation (kickback – sudden and violent reverse movement of the saw)
- 2.2 Hand/arm vibration
- 2.3 Noise
- 2.4 Flying/falling debris
- 2.5 Sharp, moving blade
- 2.6 Defective tool

3.0 Safe Operating Guidelines

- 3.1 Only approved operators are permitted to operate a chainsaw.
- 3.2 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT16 Small Engines* for additional guidelines.
- 3.3 Inspect saws prior to use and periodically during use:
 - 3.3.1 A sharp chainsaw is safer than a dull one. Worn chains shall be replaced immediately.
 - 3.3.2 Keep the saw clean, lubricated, and adjusted.
 - 3.3.3 Inspect and test the chain brake, chain catch, throttle lock, handles and guards, all nuts and bolts, spark arrestor, and muffler and air filter.
 - 3.3.4 The chain tension should be properly adjusted and the carburetor tuned. The idle must be correctly adjusted; the chain should not move when the saw is in the idle mode.
 - 3.3.5 Ensure the saw is fitted with an inertia break and hand guard.
 - 3.3.6 Ensure the saw is fueled with the appropriate fuel type.
 - 3.3.7 Do not operate a chain saw that is damaged or improperly adjusted, or is not completely and securely assembled. If a chainsaw is defective, remove it from service, and tag it clearly "Out of service for repair" or "Do Not Use". Replace damaged equipment immediately – do not use defective tools "temporarily." DO NOT ATTEMPT FIELD REPAIRS.
- 3.4 Never "drop start" the saw (the saw is held in the air with one hand on the handlebar and the other on the pull cord) as no control is provided to prevent rotation of the saw back toward the user.
- 3.5 Ensure an appropriately sized fire extinguisher or fire-fighting equipment is readily available.
- 3.6 A chainsaw is not only dangerous to the operator but also to surrounding persons. Do not allow others in the area when chainsaws are operated.
- 3.7 Never operate a chain saw when fatigued.

- 3.8 Make sure there are no nails, wire, or other imbedded material in the material to be cut that can cause flying particles or kickback.
- 3.9 Keep all parts of the body away from the saw chain when the engine is running.
 - 3.9.1 Keep the saw close to the body.
 - 3.9.2 Bend from the knees, not the waist. Improper lifting techniques and poor posture contribute to injuries.
 - 3.9.3 Always avoid standing on the log and making cuts with the saw between your legs; always cut with the saw to the outside of your legs.
 - 3.9.4 Always stand to one side of the limb to be cut, never straddle it.
 - 3.9.5 Never cut above chest height.
- 3.10 Determine where the tree/limb will fall prior to cutting.
 - 3.10.1 Start cutting only after a clear escape path has been made.
 - 3.10.2 Always ensure that personnel and equipment are not in the path of the falling tree/log, and that you have time to move away.
 - 3.10.3 If necessary, flag/or fence off the area to prevent entry.
- 3.11 Always keep in mind where the chain will go if it breaks; never position body or allow others in line with the chain.
- 3.12 Avoid operations that could result in kickback of the saw towards the operator.
- 3.13 Keep the chain out of the dirt, debris will fly, the teeth will be dulled and the chain life shortened.
- 3.14 Shut the saw off when carrying through brush or on slippery surfaces. The saw may be carried no more than 50 feet (15 meters) while idling.



Blade nose strikes another object



Improper starting of bore



Top or blade nose touches bottom or side of kerf during reinsertion

4.0 Personal Protective Equipment

- 4.1 Dual eye protection – safety glasses with side shields and a face shield
- 4.2 Chainsaw Chaps
- 4.3 Wear appropriate apparel. Long hair, loose or baggy clothing, ties, or jewellery can become caught in moving parts.
- 4.4 Safety toe work boots
- 4.5 Hardhat with lateral impact protection
- 4.6 Gloves providing impact, abrasion, cut, tear, & puncture resistance
- 4.7 Hearing Protection

Americas

Circular Saw

S3AM-305-ATT2

1.0 Objective / Overview

- 1.1 The circular saw is used in cutting wood products (e.g. plywood, construction lumber, etc.).
- 1.2 Safe measures for use include proper training, good body mechanics and operating technique, well-maintained equipment, and protective equipment.

2.0 Hazards

- 2.1 Kickback – Sudden and violent reverse movement of the saw
- 2.2 Noise
- 2.3 Flying debris
- 2.4 Sharp, moving blade (severe cuts)
- 2.5 Defective tool
- 2.6 Improper operation



3.0 Safe Operating Guidelines

- 3.1 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT17 Electric & Battery Hand Tools* for additional guidelines.
- 3.2 Use sharp blades and ensure cracked and dull blades are removed from service. Dull blades cause binding, stalling and possible kickback.
- 3.3 Use the correct blade for the application and check for proper operation before each cut.
- 3.4 Check often to ensure that guards return to their normal position quickly. Never defeat the guard to expose the blade.
- 3.5 Portable circular saws having a blade greater than 2 inches (5.08 centimeters) in diameter must be equipped at all times with guards. An upper guard must cover the entire blade of the saw.
- 3.6 A retractable lower guard must cover the teeth of the saw, except where it makes contact with the work material. The lower guard must automatically return to the covering position when the tool is withdrawn from the work position.
- 3.7 Before starting a circular saw, be sure the power cord and extension cords are out of the blade path and are long enough to freely complete the cut. A sudden jerk or pulling on the cord can cause loss of control of the saw and a serious accident.
- 3.8 Secure the work being cut to avoid movement.
- 3.9 For maximum control, hold the saw firmly with both hands after securing the work piece.
- 3.10 Keep the upper and retracting lower blade guard and the motor free from dust.
- 3.11 Do not hold or force the retracting lower guard in the open position.
- 3.12 Do not over tighten the blade-locking nut.
- 3.13 Do not twist the saw to change, cut or check alignment.
- 3.14 Do not use a saw that vibrates or appears unsafe in any way.
- 3.15 Do not force the saw during cutting.
- 3.16 Do not cut materials without first checking for obstructions or other objects such as nails and screws.
- 3.17 Check frequently to be sure clamps remain secure.

- 3.18 Avoid cutting small pieces that can't be properly secured and material on which the saw shoe can't properly rest. Use a push stick or guide when cutting operation requires the hands of the operator to come close to the blade.
- 3.19 Do not overreach. Keep proper footing and balance.
- 3.20 When starting the saw, allow the blade to reach full speed before contacting the work piece.
- 3.21 Circular saws are designed for right-hand operation; left-handed operation will demand more care to operate safely.
- 3.22 Never place hand under or in front of the shoe or guard of the saw when operating.
- 3.23 Cut at the proper depth ($\frac{1}{4}$ inch / 0.64 centimeters) below work surface. Set the depth of the blade prior to use, when the saw is unplugged.

4.0 Personal Protective Equipment

- 4.1 Wear proper apparel for the task. Long hair, loose or baggy clothing, ties, or jewelry can become caught in moving parts.
- 4.2 Gloves that provide cut, abrasion and impact resistance.
- 4.3 Kickback apron as necessary.
- 4.4 Safety toed boots.
- 4.5 Safety glasses with side shields and faceshield.
- 4.6 Hearing Protection.

Cut Off Saw

S3AM-305-ATT3

1.0 Objective / Overview

- 1.1 Cut-off saws are high-speed cutting tools and very dangerous to operate. Therefore, it is very important to review the general safety rules, training, Personal Protective Equipment and procedures for working with portable cut off saws.
- 1.2 Cut off saws are used in a variety of activities (i.e. concrete, piping, metal, etc.).

2.0 Hazards

- 2.1 Noise
- 2.2 Flying debris
- 2.3 Sharp, moving blades (severe cuts)
- 2.4 Ignition sources (hot engine, sparks)
- 2.5 Hand/arm vibration
- 2.6 Kickback – Sudden and violent reverse movement of the saw

3.0 Safe Operating Guidelines

- 3.1 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT17 Electric & Battery Hand Tools* or *S3AM-305-ATT16 Small Engines* for additional guidelines
- 3.2 In addition to inspecting the general tool prior to operation, inspect the abrasive wheel for cracks and chips and appropriate wheel type.
 - 3.2.1 If cracked or chipped, replace wheel before use.
 - 3.2.2 Do not use abrasive-type wheels for rough grinding.
- 3.3 Ensure the saw is started in accordance with manufacturer's specifications:
 - 3.3.1 Start the saw on firm ground or other solid surface in an open area.
 - 3.3.2 Never "drop start" the saw as in the above picture (the saw is held in the air with one hand on the handlebar and the other on the pull cord) as no control is provided to prevent rotation of the saw back toward the user.
- 3.4 Handling
 - 3.4.1 Hold the saw firmly with two hands when the engine is running, and whenever the blade is rotating until it comes to a complete stop.
 - 3.4.2 Carry the saw with engine stopped, muffler away from your body, while protecting the cutting wheel from striking the ground or other objects.
- 3.5 Cutting
 - 3.5.1 Clear the working area.
 - 3.5.2 Begin cutting at full throttle and continue at full throttle until the cut is finished.
 - 3.5.3 Avoid standing in a direct line with the cutting wheel.
 - 3.5.4 Use only downward pressure on the saw, as lateral pressure may cause the blade to break and shatter.

- 3.5.5 Do not change the direction of the cut once started, as this can also cause the blade to break and shatter.
- 3.5.6 Do not cut above shoulder height.
- 3.5.7 Avoid operating the saw if the terrain is wet and/or frozen.
- 3.5.8 Keep flammable and combustible materials away from saw while cutting.
- 3.5.9 Ensure an appropriate fire extinguisher or fire-fighting equipment is readily available.
- 3.6 Maintenance
 - 3.6.1 Shut off the engine and remove the spark plug wire before adjusting or working on the saw.

4.0 Personal Protective Equipment

- 4.1 Safety glasses with side shields and faceshield.
- 4.2 Chainsaw chaps.
- 4.3 Safety toe work boots.
- 4.4 Gloves that provide cut abrasion and impact resistance.
- 4.5 Hearing protection: earplugs and/or earmuffs.
- 4.6 Respirator if required (concrete operations).

Handheld Grinder

S3AM-305-ATT4

1.0 Objective / Overview

- 1.1 Handheld grinders are high-speed electric- or pneumatic-powered grinding tools used to shape or cut metal, and can be dangerous to operate.
- 1.2 Grinders are used in a variety of activities (i.e., piping installation/repair, metal, restoring, polishing, sharpening, etc.).

2.0 Potential Hazards

- 2.1 Kickback – Sudden and violent reverse movement of the grinder
- 2.2 Electric shock
- 2.3 Flying debris
- 2.4 An improperly installed or incompatible wheel can break or explode and cause injury.
- 2.5 Moving parts (severe cuts)
- 2.6 Fire hazard from sparks igniting nearby debris or objects
- 2.7 Noise
- 2.8 Hand/arm vibration

3.0 Safe Operating Guidelines

- 3.1 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT17 Electric & Battery Hand Tools* for additional guidelines.
- 3.2 Inspect the tool before every use. Damaged tools must be removed from use and tagged "DO NOT USE".
- 3.3 Grinder guards are to be used at all times and must not be altered.
 - 3.3.1 US requirements specify a maximum of 180° of the grinding wheel to be exposed.
 - 3.3.2 While 120° coverage may be permissible in certain jurisdictions, guards that are greater are not to be cut down.
 - 3.3.3 Replace damaged or defective guards immediately
- 3.4 Grinders must be used with an unmodified manufacturer supplied handle at all times. If removal of the handle is required the reason must be appropriately documented and approved by project / location manager and SH&E manager or designee. Client approval may also be required.
- 3.5 Trigger locks are not permitted. If a grinder is found with a trigger lock, the lock shall be disabled.
- 3.6 Never use the grinder for jobs for which it is not designed (e.g. cutting with a grinding wheel vs. cutting disc).
- 3.7 Grinders must be permanently marked with the manufacturer's established maximum RPM (revolutions per minute).
- 3.8 Inspect the disk or wheel prior to operation:
 - 3.8.1 Wire wheels must be inspected for loose and broken wires.



- 3.8.2 Ensure the RPM (as posted on the wheel) is equal to or greater than that posted on the grinder, the disk / wheel is the correct size for the grinder, and the type of wheel is compatible with the material being ground or cut.
- 3.8.3 Wheels must be replaced as specified by the manufacturer. In the absence of specifications a wheel shall not be worn down to a size which would allow the mounting flange assembly to contact the work-piece or work-piece holding fixture.
- 3.8.4 Ensure the disk or wheel is checked for cracks or other damage. A ring test can be conducted on clean, dry, unmounted wheels greater than 4" (10.16 centimeters) in diameter:
 - Suspend the wheel by its arbor hole;
 - Use a non-metallic tool (wood, plastic) to gently tap the wheel at 45° from the vertical center line on either side of the wheel, approximately 1 to 2 inches (2.5 – 5 centimeters) from the edge;
 - Rotate the wheel 45° and repeat the process until the entire wheel has been tested;
 - A wheel that emits a metallic ring indicates absence of damage, whereas a dull sound means the wheel should be removed from service.
- 3.8.5 If cracked, chipped, or there is any other evidence of damage, remove from service and replace wheel before use.
- 3.9 When mounting the wheels:
 - 3.9.1 Grinders must be unplugged before changing wheels, discs or positioning guards.
 - 3.9.2 Follow manufacturer's specifications (e.g. stamp facing grinder, mount up, mount down, etc.)
 - 3.9.3 Ensure that the mounting flanges are clean and the mounting blotters are used.
 - 3.9.4 Do not over tighten the mounting nut.
 - 3.9.5 Before grinding or cutting, run newly mounted wheels at operating speed to check for vibrations.
- 3.10 General Safety Provisions
 - 3.10.1 Ensure abrasive wheels are stored according to manufacturer specifications (absence of temperature extremes and solvents, dry area protected from impact, first in first out).
 - 3.10.2 Keep the work area clean. Do not grind near flammable and combustible materials. Sparks can ignite debris and flammable vapors. A fully charged fire extinguisher must be located nearby. Use of a fire blanket may be necessary.
 - 3.10.3 All observers should be kept at a safe distance from the work area to ensure they are protected from flying debris / sparks. Whenever practicable, use screens or shields.
 - 3.10.4 Always secure work with clamps or a vise, freeing both hands to operate the tool. Never clamp a handheld grinder in a vice.
 - 3.10.5 Use grinding wheels only at their rated speed.
 - 3.10.6 Ensure safety guard(s) is positioned properly prior to start-up.
 - 3.10.7 Allow the grinder to come to full operating speed before beginning grinding operation.
 - 3.10.8 Do not use the side of a grinding wheel unless the wheel is designed for side grinding.
 - 3.10.9 Always stand to the side of the wheel, never directly behind it.
 - Be sure to keep your footing and maintain proper balance. Keep hands, fingers, and other body parts from coming into contact with the revolving wheel.
 - While in operation, grinder shall be held with a firm grip using both hands. One engaging the trigger, and the second holding the handle.

3.10.10 Grinding aluminum is prohibited.

3.10.11 Tools shall be maintained with care. They should be kept clean and sharp for the best performance. Follow instructions in the user's manual for lubricating and care instructions.

4.0 Personal Protective Equipment (PPE)

4.1 Please refer to *S3AM-208-PR1 Personal Protective Equipment* for further information.

4.2 Gloves providing appropriate heat, impact, abrasion, cut, tear, & puncture resistance.

4.3 Wear appropriate apparel. Long-sleeved shirts and pants are required; clothing shall be made of natural fibers. Synthetics are not permitted. Note: Long hair, loose or baggy clothing, hoodie strings, ties, or jewelry can become caught in moving parts.

4.4 Dual eye protection required - Safety glasses with sideshields and properly impact-rated face shield. Welding helmets used as a face shield shall be verified as approved by CSA / ANSI for protection against impact.

4.5 Safety toe work boots.

4.6 Hearing protection: earplugs and/or earmuffs.

4.7 Other PPE as necessary for the work site/activity (e.g., hard hat, respiratory protection).

Impact Wrench

S3AM-305-ATT5

1.0 Objective / Overview

- 1.1 Impact wrenches are mainly used for tire changing but that does not limit their use. They can be used in all applications when a certain amount of torque is needed to loosen or tighten nuts and bolts.
- 1.2 The danger comes in to play when employees try to use the wrong sockets with an air wrench. Employees using air wrenches must have a general understanding of how to use them.

2.0 Potential Hazards

- 2.1 Flying debris
- 2.2 Noise
- 2.3 Cuts
- 2.4 Hand/arm vibration

3.0 Safe Operating Guidelines

- 3.1 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT14 Pneumatic Tools* for additional guidelines.
- 3.2 Impact wrench sockets and accessories must be used with this tool. Do not use hand sockets and accessories.
- 3.3 The proper fastening torque may differ depending upon the kind or size of the bolt.
- 3.4 Check the torque with a torque wrench.
- 3.5 Connect tool to air hose of recommended size.
- 3.6 Never use a wire, soft pin, or nail to hold the socket onto the square spindle of the impact wrench.
- 3.7 If the proper retaining device on the tool is broken, the tool shall be removed from service to be repaired.
- 3.8 On applications where a low or critical level of torque is required, it is recommended that each fastener is impacted lightly. Then perform the final tightening with a hand torque wrench.

4.0 Personal Protective Equipment

- 4.1 Safety toed boots
- 4.2 Anti-vibration gloves with impact and abrasion and cut resistance.
- 4.3 Safety glasses with side shields.
- 4.4 Hearing protection.

Nail Gun & Stapling Tool

S3AM-305-ATT6

1.0 Objective / Overview

- 1.1 Nail guns and stapling tools (pneumatic power-fastening devices) are useful, but must be handled with care.
- 1.2 Nail guns and stapling tools have been shown to be the cause of unnecessary injuries when the design of the gun places emphasis on speed, rather than safety.

2.0 Potential Hazards

- 2.1 Flying debris/nails
- 2.2 Imbedded object
- 2.3 Puncture wounds
- 2.4 Noise

3.0 Safe Operating Guidelines

- 3.1 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT14 Pneumatic Tool* for additional guidelines.
- 3.2 Permit only experienced and trained persons to operate pneumatic nailing and stapling tools. Never let an inexperienced worker use a nail gun without supervised training.
- 3.3 Never point a nail gun or stapling tool toward the body or any other personnel.
 - 3.3.1 Never rest the gun against any part of your body, or try to climb a ladder with the gun cradled against your body.
 - 3.3.2 Be aware of other workers in the work area.
 - 3.3.3 Be aware of what is located behind the nailing surface. Never place hands or other body parts directly behind the nailing surface.
 - 3.3.4 Ensure no one is in the line of fire should an incorrectly selected fastener eject out the other side of the material.
- 3.4 Inspect a tool before connecting it to air supply:
 - 3.4.1 Check tool safety mechanisms if applicable. Never disable a safety tip on a nail gun or stapling tool.
 - 3.4.2 Tighten securely all screws and cylinder caps.
 - 3.4.3 Pneumatic power-fastening devices that shoot nails, rivets, staples, or similar fasteners and operate at pressures more than 100 pounds per square inch (6,890 kPa), must be equipped with a safety interlock to keep fasteners from being ejected, unless the muzzle is pressed against the work surface.
- 3.5 Check correct air supply and pressure before connecting a tool.
- 3.6 Check that the tool is correctly and securely connected to the air supply hose and that it is in good working order, with the safety mechanism operative, before using.
- 3.7 Always handle a tool as if it loaded with fasteners (nails, staples, etc.). Do not carry a tool with a finger on the trigger or with the trigger depressed.
- 3.8 Equip tools with a work-contacting element that limits the contact area to one that is as small as practical.
- 3.9 Make sure that the mechanical linkage between the work-contacting element and trigger is enclosed.

- 3.10 Disconnect a tool from the air supply and ensure the air is completely exhausted from the tool when the tool is unattended, when loading with fasteners (nails, staples), and during cleaning or adjustment.
- 3.11 Before clearing a blockage, be sure that depressing the trigger exhausts all air from the tool and the tool is disconnected from the air supply.
- 3.12 Use only fasteners recommended by the manufacturer. Ensure fasteners are appropriate to the work surface to ensure fastener does not eject completely through the material.
- 3.13 Avoid nailing into knots as nail can splinter wood.
- 3.14 Permit only properly trained people to carry out tool maintenance.
- 3.15 Do not depress the trigger unless the nosepiece of tool is directed onto a safe work surface and properly aligned both vertically and horizontally with the surface
- 3.16 Do not overreach. Keep proper footing and balance.
- 3.17 Ensure the hand not holding the nail gun or stapling tool is a minimum of 12 inches (30cm) away from the nosepiece of the tool.
- 3.18 Keep the gun properly aligned with your work both vertically and horizontally.

4.0 Personal Protective Equipment

- 4.1 Gloves providing appropriate protection to the task (e.g. impact, puncture, chemical, etc.).
- 4.2 Safety toed boots.
- 4.3 Use hearing protection, where required.
- 4.4 Wear safety glasses with side shields at all times and face shield if flying debris may be encountered.

Dustless Vacuum

S3AM-305-ATT7

1.0 Objective / Overview

- 1.1 Dustless decontamination system (also referred to as Pentek brand name) removes and packages surface contamination from concrete and steel structures.
- 1.2 The Pentek integrated suite of manually operated equipment (e.g., squirrel III, corner cutter, roto-peen, and crack chaser) is designed for the safe removal of radioactive materials, lead-based paints, polychlorinated biphenyls, pesticides, chemical residues, and other contaminated coatings.
- 1.3 The Pentek system incorporates a high-performance vacuum and waste packaging unit, the VAC-PAC, in conjunction with pneumatically operated equipment to remove contaminated material. Dust and debris are captured at the cutting tool surface. Supporting equipment required to operate the unit includes a 60 kilowatt generator and an air compressor (minimum 350 cubic feet capacity), as well as a drum grapple for drum handling activities.

2.0 Hazards

- 2.1 Noise
- 2.2 Vibration
- 2.3 Tripping
- 2.4 Hot surfaces (vacuum unit)
- 2.5 Electrical (high voltage)
- 2.6 Pinch
- 2.7 Back strain
- 2.8 High pressure air

3.0 Safe Operating Guidelines

- 3.1 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT14 Pneumatic Tool* for additional guidelines.
- 3.2 Prior to use, a pre-operation inspection must be completed to determine if the unit is in safe working condition.
- 3.3 The vacuum unit should be placed a minimum of 50 feet (15.2 meters) away from the work area.
- 3.4 Once in position to begin work, apply the brake to stabilize the unit. When raising the VAC-PAC to insert/remove a drum, do not place your body or any extremity under the VAC-PAC while it is in the raised position.
- 3.5 Two workers should be used to maneuver the unit into place.
- 3.6 A minimum 10 feet (3 meters) clearance will be established around the unit while in operation.
- 3.7 Workers should be aware of their position in relation to the hoses and cable to minimize tripping hazards.
- 3.8 A competent person will train each worker in the operation of the unit.
- 3.9 Maintenance in excess of preventive maintenance activities (e.g., lubrication) will be performed by manufacturer personnel ONLY. Always know where the emergency stop is located.
- 3.10 Operators of a motorized drum grapple must be trained in agreement with the powered industrial truck

standard. Refer to *S3AM-324-PR1 Powered Industrial Trucks*.

- 3.11 Review *S3AM-302-PR1 Electrical Safety* prior to refueling the electrical generator and/or compressor.

4.0 Personal Protective Equipment

- 4.1 Leather gloves (maintenance).
- 4.2 As applicable, Tyvek suit (with hood).
- 4.3 Anti-vibration gloves (operation).
- 4.4 Hearing protection (plugs or muffs).

Power Drill

S3AM-305-ATT8

1.0 Objective / Overview

- 1.1 Available in a variety of types and capacities, portable power drills are undoubtedly the most used power tools.
- 1.2 Because of their handiness and application to a wide range of jobs, drills often receive heavy use. For this reason, you will need to carefully check your drill's capacity limitations and accessory recommendations.

2.0 Hazards

- 2.1 Electricity
- 2.2 Flying debris
- 2.3 Rotating and sharp parts
- 2.4 Burns (hot bits)
- 2.5 Manual handling (sprains/strains - wrist)

3.0 Safe Operating Guidelines

- 3.1 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT17 Electric & Battery Hand Tools* for additional guidelines.
- 3.2 Always keep drill bits sharp.
- 3.3 Disconnect the power supply before changing or adjusting bit or attachments,
- 3.4 Do not use high speed steel (HSS) bits without cooling or using lubrication.
- 3.5 Be sure the chuck is tightly secured to the spindle. This is especially important on reversible-type drills. Tighten the bit securely as described by the owner/operators manual.
- 3.6 The chuck key must be removed from the chuck before starting the drill. A flying key can be an injury-inflicting missile.
- 3.7 Secure workpiece being drilled to prevent movement.
- 3.8 If the bit is long enough to pass through the material, select a shorter drill bit or provide against damage and injury.
 - 3.8.1 Prevent other workers from accessing the area.
 - 3.8.2 Remove or provide coverage for material that could be damaged by the drill bit.
- 3.9 Secure magnetic drills with a chain or rope to prevent falling. Label cord connections to prevent unplugging.
- 3.10 Check auxiliary handles, if part of the tool. Be sure they are securely installed.
- 3.11 Always use the auxiliary drill handle when provided. It gives you more control of the drill, especially if stalled conditions occur.
- 3.12 Grasp the drill firmly by insulated surfaces.
- 3.13 Always hold or brace the tool securely. Brace against stationary objects for maximum control. If drilling in a clockwise -- forward -- direction, brace the drill to prevent a counter-clockwise reaction.
- 3.14 Do not overreach. Always keep proper footing and balance.
- 3.15 Don't force a drill. Apply enough pressure to keep the drill bit cutting smoothly. If the drill slows down, relieve

the pressure. Forcing the drill can cause the motor to overheat, damage the bit and reduce operator control.

4.0 Personal Protective Equipment

- 4.1 Wear proper apparel for the task. Long hair, loose or baggy clothing, ties, or jewellery can become caught in moving parts.
- 4.2 Gloves that provide cut, abrasion and impact resistance.
- 4.3 Safety toed boots.
- 4.4 Safety glasses with side shields and face shield.
- 4.5 Hearing protection.

Pressure Washer

S3AM-305-ATT9

1.0 Objective / Overview

- 1.1 Pressure washing can be divided into three categories based on the water pressure the equipment is capable of producing:
- Ultra high pressure jetting – greater than 30,000 psi
 - High pressure washing – 5,000 to 30,000 psi
 - Pressure washing – less than 5,000 psi
- 1.2 Generally, light duty portable pressure washing equipment and car washes produce less than 5,000 psi. High pressure washing equipment is often used for such tasks as cleaning vessels and process piping. Ultra high pressure jetting is also often employed to clean vessels and to remove coatings and scaling of production equipment. If not used correctly and safely, pressure washers can be dangerous piece of work equipment.
- 1.3 AECOM only allows trained, authorized personnel to operate the high pressure washers. Along with training, other safety measures include: reviewing the manufacturers instructional booklet, proper maintenance of equipment, and personal protective equipment.

2.0 Hazards

- 2.1 Kickback – Sudden and violent reverse movement of the gun
- 2.2 Flying debris
- 2.3 Slips and trips on wet surfaces and hoses
- 2.4 Noise
- 2.5 Manual handling
- 2.6 Exhaust fumes/carbon monoxide (CO) in enclosed spaces
- 2.7 Contact with high pressure / high temperature fluids

3.0 Safe Operating Guidelines

- 3.1 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, *S3AM-305-ATT17 Electric & Battery Hand Tools* or *S3AM-305-ATT16 Small Engines* for additional guidelines.
- 3.2 Ensure area is properly flagged with tags identifying work being performed and hazards. Keep all unauthorized workers out of area while job in progress.
- 3.3 Inspect all hoses, fittings, wands, cords and hose reel for damage or defects.
- 3.3.1 Equipment is complete and assembled correctly (i.e. nozzle tip correctly connected to the wand and not directly to hose).
- 3.3.2 Ensure trigger mechanism is functioning properly.
- 3.3.3 Fittings are securely attached.
- 3.3.4 Insulated components are in place.
- 3.4 Check fuel connections and hoses for signs of leaks, defects or damage.
- 3.5 Confirm nozzle / jets are clear by turning on water, without pump pressure.

- 3.6 Check pressure pump oil level before use. Hold the wand firmly with the trigger released when turning the pump on.
- 3.7 Recheck hoses once the system is pressurized.
- 3.8 Never service equipment while energized or pressurized.
- 3.9 Ensure other personnel are clear of area while pressure washer is pressurized. Non-operators must remain a minimum of 25 feet (7.6m) from the operator.
- 3.10 Do not wash at a 90 degree angle to minimize spray and flying debris.
- 3.11 Never point a pressure washer at yourself or others. Contact with high pressure fluid can result in serious cut or injection injuries.
- 3.12 Increase pressure slowly during operation to prevent hose kick-back.
- 3.13 Do not drive over, pull on, or kink the high pressure hose. Damage to the hose may compromise the wire braiding inside and cause the hose to burst.
- 3.14 Whip checks must be used for all high pressure connections.
- 3.15 High-pressure washing equipment should be cleaned often to avoid dirt buildup, especially around the trigger and guard area.
- 3.16 Always set the trigger safety lock when the gun valve is not in use.
- 3.17 Relieve the pressure in the system before coupling and uncoupling hoses.
- 3.18 Visually inspect the full length of high pressure discharge hose and inspect other high pressure fluid-handling components for abrasions or cuts, damage caused by exposure to chemicals and for damage caused by kinks in the hose.
- 3.19 High pressure washers shall be used to clean or decontaminate equipment, surfaces or structures only.
- 3.20 High pressure washers WILL NOT be used to clean or decontaminate workers or personal protective equipment while it is being worn.
- 3.21 Maintain a distance from the spray contact point to reduce noise exposure and risk of being struck by flying debris. Avoid overreaching and maintain a stable stance.
- 3.22 When shutting down a pressure washer, turn the pump off before turning the water supply off.
- 3.23 After turning off pressure washer, ensure all residual pressure is released from system by squeezing the trigger. Consult the operator's manual for any other procedures specific to the equipment for shut-down.
- 3.24 Protect unit from freezing, when applicable.

4.0 Personal Protective Equipment

- 4.1 Hardhat.
- 4.2 Safety glasses with side shields and a face shield.
- 4.3 Gloves providing appropriate protection (rubber, chemical).
- 4.4 Hearing protection.
- 4.5 PVC (or equivalent) rain suit.
- 4.6 Safety toed boots with metatarsal protection.

Reciprocating Saw

S3AM-305-ATT10

1.0 Objective / Overview

- 1.1 The versatility of the reciprocating saw, in cutting metal, pipe, wood and other materials have made it a widely used tool.
- 1.2 By design, it is a simple tool to handle. Its demands for safe use, however, are very important.

2.0 Potential Hazards

- 2.1 Flying debris
- 2.2 Noise
- 2.3 Sharp, moving parts (cuts)
- 2.4 Hand/arm vibration
- 2.5 Electricity

3.0 Safe Operating Guidelines

- 3.1 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT17 Electric & Battery Hand Tools* for additional guidelines.
- 3.2 Use sharp blades. Dull blades can produce excessive heat, make sawing difficult, result in forcing the tool, and possibly cause an accident.
- 3.3 Ensure appropriate blade selection. Different work surfaces demand different blades
- 3.4 Position yourself to maintain full control of the tool, and avoid cutting above shoulder height. Always use two hands to operate the saw.
- 3.5 To minimize blade flexing and provide a smooth cut, use the shortest blade that will do the job.
- 3.6 The work piece must be clamped securely, and the shoe of the saw held firmly against the work to prevent operator injury and blade breakage.
- 3.7 Maintain firm contact between the saw's shoe and the material being cut.
- 3.8 When making a "blind" cut (cannot see behind what is being cut), be sure that hidden electrical wiring, or water pipes are not in the path of the cut.
- 3.9 If wires are present, they must be disconnected at their power source by a qualified person or avoided, to prevent the possibility of lethal shock or fire.
- 3.10 Water pipes must be drained and capped.
- 3.11 Always hold the tool by the insulated grouping surfaces. When making anything other than a through cut, allow the tool to come to a complete stop before removing the blade from the work piece. This prevents breakage of the blade, and possible loss of tool control. Do not operate reciprocating saw in explosive atmospheres.
- 3.12 Do not overreach. Keep proper footing and balance at all times.
- 3.13 Check for misalignment or binding of moving parts, breakage or parts and any other condition that may affect the tool's operation.

4.0 Personal Protective Equipment

- 4.1 Wear proper apparel for the task. Long hair, loose or baggy clothing, ties, or jewelry can become caught in moving parts.
- 4.2 Gloves that provide cut abrasion and impact resistance.
- 4.3 Kickback apron, as necessary.
- 4.4 Safety toed boots.
- 4.5 Safety glasses with side shields and face shield.
- 4.6 Hearing protection.

Sander

S3AM-305-ATT11

1.0 Objective / Overview

- 1.1 Sanders are commonly used at project sites for a variety of tasks.
- 1.2 Often times the hazards associated with sanders are overlooked; they don't appear threatening because they don't have sharp blades or bits. These misconceptions can be prevented through proper training and personal protective equipment (PPE) selection.

2.0 Potential Hazards

- 2.1 Kickback – Sudden and violent reverse of the sander
- 2.2 Noise
- 2.3 Hand/arm vibration
- 2.4 Dust exposure
- 2.5 Flying debris
- 2.6 Severe abrasive parts
- 2.7 Electricity
- 2.8 Fuel (fine dust) and ignition sources (electricity, friction)

3.0 Safe Operating Guidelines

- 3.1 Review manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT17 Electric & Battery Hand Tools* for additional guidelines.
- 3.2 Disconnect power supply before changing a sanding belt, making adjustments, or emptying dust collector.
- 3.3 Inspect sanding belts before use. Replace those belts that are worn or frayed.
- 3.4 Install sanding belts that are the same widths as the pulley drum.
- 3.5 Adjust sanding belt tension to keep the belt running true and at the same speed as pulley drum.
- 3.6 Secure the sanding belt in the direction shown on the belt and the machine. Keep hands away from the sanding belt.
- 3.7 Before starting a sander, be sure the power cord and extension cords are out of the belt path and are long enough to freely complete the task. The sander must be either double insulated or connected to a ground fault circuit interrupter.
- 3.8 Use two hands to operate sanders – one on the trigger and the other on the front handle knob. Move sanders away from the body.
- 3.9 Clean dust from the motor and vents at regular intervals.
- 3.10 Do not use a sander without an exhaust system or dust collector present that is in good working order. The dust created when sanding can be a fire and explosion hazard. Proper ventilation is essential as well as guarding against open flame and sparks.
- 3.11 Empty the collector when ¼ full. Minimise dust disturbance when emptying the collector.
- 3.12 Do not exert excessive pressure on a moving sander. The weight of the sander provides adequate pressure for the job.

- 3.13 Do not work on unsecured stock unless it is heavy enough to stay in place. Clamp the stop into place or use a 'stop block' to prevent movement.
- 3.14 Do not overreach. Always keep proper footing and balance.
- 3.15 Do not cover air vents of the sander.
- 3.16 Check often to ensure that guards are in their normal position.

4.0 Personal Protective Equipment

- 4.1 Wear proper apparel for the task. Long hair, loose or baggy clothing, ties, or jewellery can become caught in moving parts.
- 4.2 Gloves that provide cut, abrasion and impact resistance.
- 4.3 Safety toed boots.
- 4.4 Safety goggles and faceshield.
- 4.5 Hearing protection.
- 4.6 Respiratory protection, as necessary.

Americas**Knives****S3AM-305-ATT12****1.0 Objective / Overview**

- 1.1 Knives serve a variety of purposes at work sites, and can be a useful tool, when used safely and correctly.
- 1.2 Learning proper positioning and correct use of a knife will drastically reduce the potential of cut-related injuries.

2.0 Hazards

- 2.1 Improper body positioning
- 2.2 Improper knife selection
- 2.3 Defective knife
- 2.4 Improper knife operation (including storage)

3.0 Safe Operating Guidelines

- 3.1 Select the appropriate knife for the task. Consider using a rounded tip blade if the task allows.
- 3.2 Always be sure that knives are sharp and not dull. A dull blade will require more force to cut, increasing the likelihood of injury (e.g. hand slipping, knife breaking, etc.). Replace dull blades – A knife that tears rather than cuts, generally indicates the blade is dull.
- 3.3 Be sure the blade is seated in the frame of the knife correctly, closed, and fastened together properly.
- 3.4 Always direct the cut away from yourself and others
 - 3.4.1 Keep body parts away from the cut line, (e.g., fingers, leg, etc.)
 - 3.4.2 Ensure that the material being cut is stabilized and not against a body part (e.g. cutting rope against your leg).
 - 3.4.3 Always pull the knife, never push the knife (the blade may break, and momentum could cause the body to come into contact with broken blade).
- 3.5 Ensure knife blades are protected or retracted when not in use.
 - 3.5.1 Never carry a knife with an exposed blade in your pocket.
- 3.6 Use of razor and break away utility knives is prohibited.
 - 3.6.1 Purchase safety-equipped utility knives with guarding or automatically retracting blades.
- 3.7 When using a knife to cut thicker materials, use several passes. Increased force on the blade can cause it to stray from the intended cut path, or break the blade.
- 3.8 When changing blades, always handle from the non-sharp side. Cover blade with duct tape and dispose.
- 3.9 Use an alternate tool when possible (scissors, wire cutters, etc.).
- 3.10 Let a falling knife fall.

4.0 Personal Protective Equipment

- 4.1 Cut resistant gloves are mandatory when using knives (Kevlar, thick leather, etc.).

Americas**Clearing & Grubbing Equipment****S3AM-305-ATT13**

The following safety precautions will be followed during site clearing and tree falling.

1.0 General

- 1.1 Refer to *S3AM-305-PR1 Hand & Power Tools* for additional guidance.
- 1.2 As applicable, refer also to *S3AM-305-ATT15 Manual Hand Tools*, *S3AM-305-ATT16 Small Engines*, and *S3AM-305-ATT17 Electric & Battery Hand Tools* for additional guidance.
- 1.3 All clearing activities shall terminate during electrical storms and periods of high winds.
- 1.4 Dead, broken or rotted limbs or trees (widow makers) shall be felled first.
- 1.5 Be aware of the presence of other personnel when using any tool, especially picks or axes.

2.0 Machete, Pick and Axe Use

- 2.1 A machetes, picks and axes will only be used for their designated purpose; do not carelessly swing the tool when it is not needed.
- 2.2 To prevent lacerations, employees will wear Kevlar gloves and Kevlar chain saw chaps.
- 2.3 Machetes, picks and axes shall not be used when other employees are in the immediate work area.

3.0 Use of Weed Whips

- 3.1 Weed whips may be used to clear vegetation such as grass, light brush, briars and tree seedlings. The L-shaped weed whip cuts grass and weeds but is unstable for use on larger growth; the triangular-frame weed whip cuts briars and woody stems up to a half-inch in diameter. A "Suwannee" sling is a heavy duty weed whip that also has an axe blade. It does the same work as a weed whip, but can also cut through large materials. The heavier weight of this tool allows it to more easily cut off larger material than a weed whip.
- 3.2 When using weed whips, employees should follow these safety procedures:
 - 3.2.1 Select the correct tool for the types and size of vegetation present across the landfill.
 - 3.2.2 Employees will wear gloves that provide impact, abrasion, cut, tear, and puncture resistance when using weed whips.
 - 3.2.3 Weed whips are meant to be swung back and forth with both hands. Avoid using a golf swing. The tool should be swung no higher than an employee's side.
 - 3.2.4 Strong swings should be made to prevent the blade from bouncing or glancing off springy growth.
 - 3.2.5 Screws hold the serrated double-edge blade in place. These screws can work loose so check them before each use.
 - 3.2.6 At the end of the day, inspect the whips for damage. Clean, sharpen, and oil as necessary and store with a sheath in place.

4.0 Chain Saws

- 4.1 Refer to *S3AM-305-ATT1 Chainsaw*.

5.0 Felling Trees Manually

- 5.1 Before cutting begins, survey the work area for dead limbs, the lean of the tree to be cut, wind conditions and the location of other trees.

- 5.2 Remove lodged trees (tree has not fallen to the ground after being separated from its stump) as soon as possible. Never work under a lodged tree.
- 5.3 The distance between workers should be maintained at twice the height of the trees being felled.

6.0 Chipping Operations

- 6.1 Prior to use, make sure all safety devices and controls, such as emergency shut-off devices, are tested and verified to be functioning properly.
- 6.2 Access covers and doors shall not be opened until the drum or disk is at a complete stop.
- 6.3 Infeed and discharge ports shall be designed to prevent employee contact with disc, knives and blower blades.
- 6.4 The operator must be completely familiar with the controls and proper use of the equipment.
- 6.5 Workers feeding material into self-feeding wood chippers are at risk of being fed through the chipper if they reach or fall into the infeed hopper or become entangled in branches feeding into the machine.
 - 6.5.1 Make sure two workers (buddy system) are in close contact with each other when operating the chipper.
 - 6.5.2 Stand to the side of the chipper while inserting limbs into chipper, never stand directly in front.
 - 6.5.3 Insert trunk portion of tree/limb first. This will prevent the branches from getting entangled with clothing, etc. and pulling you in with the tree/limb.
 - 6.5.4 Bystanders should be kept at least 25 feet (7.6m) away when in operation.
 - 6.5.5 Keep the area around the wood chipper free of tripping hazards.
- 6.6 Never wear loose clothing that may get caught on feed material or moving parts.

7.0 Personal Protective Equipment

- 7.1 Wear proper apparel for the task.
 - 7.1.1 Long hair, loose or baggy clothing, ties, or jewellery can become caught in moving parts.
 - 7.1.2 Wear clothing with long sleeves and full length pants of durable material.
- 7.2 Use gloves that provide impact, abrasion, cut, tear and puncture resistance.
- 7.3 Safety toed boots with ankle support.
- 7.4 Safety glasses with side shields and face shield.
- 7.5 Hearing protection as necessary.

Pneumatic Tools

S3AM-305-ATT14

1.0 Objective / Overview

- 1.1 Pneumatic tools utilize air pressure to perform the tool's task.
- 1.2 Safe measures for use include proper training, good body mechanics and operating technique, well-maintained equipment, and protective equipment.
- 1.3 There are several dangers associated with the use of pneumatic tools. First and foremost is the danger of getting hit by one of the tool's attachments or by some kind of fastener the worker is using with the tool.

2.0 Hazards

- 2.1 Improperly secured air hoses
- 2.2 Noise
- 2.3 Flying debris
- 2.4 Defective tool
- 2.5 Improper operation

3.0 Safe Operating Guidelines

- 3.1 Review the manufacturer's operating manual, *S3AM-305-PR1 Hand & Power Tools*, and *S3AM-305-ATT17 Electric & Battery Hand Tools* for additional guidelines.
- 3.2 Never use bottled gas as a power source for pneumatic tools.
- 3.3 Drain water from air compressor tank and condensation from air lines.
 - 3.3.1 Blow out the air line before connecting a tool. Hold hose firmly and blow away from yourself and others.
- 3.4 Pneumatic tools must be checked to see that the tools are fastened securely to the air hose to prevent them from becoming disconnected. Pneumatic tools must have the air supply controlled according to manufacturer's specifications.
- 3.5 Make sure that hose connections fit properly and are equipped with a mechanical means of securing the connection between tool/hose/compressor to prevent whipping in case of disconnection or failure (e.g. chains, tie wires, whip checks or equivalent retaining devices).
- 3.6 Safety clips or tool retainers must be in place on pneumatic impact tools to prevent accessories (e.g. chisel on a chipping hammer) or attachments from being ejected.
- 3.7 If an air hose is more than 1/2-inch (12.7 mm) in diameter, a safety excess flow valve must be installed at the source of the air supply to reduce pressure in case of hose failure.
- 3.8 In general, the same precautions should be taken with an air hose that are recommended for electric cords, as the hose is subject to the same kind of damage or accidental striking, and because it also presents tripping hazards. Avoid creating trip hazards caused by hoses laid across walkways, curled underfoot, on ladders.
- 3.9 Airless spray guns that atomize paints and fluids at pressures of 1,000 pounds or more per square inch (6,890 kPa) must be equipped with automatic or visible manual safety devices that will prevent pulling the trigger until the safety device is manually released.

- 3.10 Ensure that the compressed air supplied to the tool is clean and dry. Dust, moisture, and corrosive fumes can damage a tool. An in-line regulator filter and lubricator increases tool life.
- 3.11 Keep tools clean and lubricated, and maintain them according to the manufacturers' instructions.
- 3.12 Use only the attachments that the manufacturer recommends for the tools in use.
- 3.13 Use the proper hose and fittings of the correct diameter and type for the pneumatic or hydraulic application.
 - 3.13.1 The manufacturer's recommended safe operating pressure for hoses, valves, pipes, filters, and other fittings must not be exceeded.
 - 3.13.2 Use hoses specifically designed to resist abrasion, cutting, crushing and failure from continuous flexing.
 - 3.13.3 Choose air supply hoses that have a minimum working pressure rating of 150 pounds per square inch gauge or 150 percent of the maximum pressure produced in the system, whichever is higher.
 - 3.13.4 Check hoses regularly for cuts, bulges and abrasions. Tag and replace, if defective.
- 3.14 Install quick disconnects of a pressure-release type rather than a disengagement type. Attach the male end of the connector to the tool, NOT the hose.
- 3.15 Reduce physical fatigue by supporting heavy tools with a counter-balance wherever possible.
- 3.16 Do not operate the tool at a pressure above the manufacturer's rating.
- 3.17 Turn off the air pressure to the hose, exhaust the airline and disconnect the tool from the air supply when not in use, before servicing or when changing power tools or attachments.
- 3.18 Do not carry a pneumatic tool by its hose.
- 3.19 Do not use compressed air for cleaning purposes unless the pressure is reduced to 30 pounds per square inch (psi) or less. This rule does not apply for concrete form, mill scale, green cutting, and similar cleaning operations. Proper respiratory, hand, eye, and ear protection must be worn.
- 3.20 Compressed air guns shall never be pointed toward anyone.
 - 3.20.1 Employees shall never "dead-end" them against themselves or anyone else.
 - 3.20.2 A chip guard shall be used when compressed air is used for cleaning.
 - 3.20.3 Never use compressed air to blow debris or to clean dirt from clothes or body.

4.0 Personal Protective Equipment

- 4.1 Gloves providing appropriate protection to the task (e.g. impact, puncture, chemical, etc.)
- 4.2 Safety toed boots
- 4.3 Use hearing protection, where required.
- 4.4 Wear safety glasses with side shields at all times and face shield if flying debris may be encountered.

Manual Hand Tools

S3AM-305-ATT15

1.0 General

- 1.1 Review manufacturer's operating manual and *S3AM-305-PR1 Hand & Power Tools* for additional guidelines.
- 1.2 Carry tools using a heavy belt or apron and hang tools at your sides.
- 1.3 Never carry tools in your pockets or hanging behind your back.

2.0 Hammers

- 2.1 Hammers are designed according to the intended purpose. Select a hammer that is comfortable for you and that is the proper size and weight for the job. Misuse can cause the striking face to chip, possibly causing a serious injury.
- 2.2 Choose a hammer with a striking face diameter approximately ½ inch (1.3 centimeters) larger than the face of the tool being struck (e.g., chisels, punches, wedges, etc.).
- 2.3 Strike a hammer blow squarely with the striking face parallel to the surface being struck. Always avoid glancing blows and over and under strikes. (Hammers with beveled faces are less likely to chip or spall).
- 2.4 Look behind and above you before swinging the hammer.
- 2.5 Watch the object you are hitting.
- 2.6 Hold the hammer with your wrist straight and your hand firmly wrapped around the handle.
- 2.7 Do not use handles that are rough, cracked, broken, splintered, sharp-edged or loosely attached to the head. Remove from service and replace the handle if possible.
- 2.8 Do not use any hammer head with dents, cracks, chips, mushrooming, or excessive wear.
- 2.9 Do not use a hammer for any purpose for which it was not designed or intended.
- 2.10 Do not use one hammer to strike another hammer, other hard metal objects, stones or concrete.
- 2.11 Do not redress, grind, weld or reheat-treat a hammer head.
- 2.12 Do not strike with the side or cheek of the hammer.

3.0 Pipe Cutters, Reamers, Taps and Threaders

- 3.1 Replace pipe cutter wheels which are nicked or otherwise damaged.
- 3.2 Use a three- or four-wheeled cutter, if there is not enough space to swing the single wheel pipe cutter completely around the pipe.
- 3.3 Choose a cutting wheel suitable for cutting the type of pipe material required:
 - 3.3.1 Thin wheel for cutting ordinary steel pipe.
 - 3.3.2 Stout wheel for cutting cast iron.
 - 3.3.3 Other wheels for cutting stainless steel, plastic and other materials.
- 3.4 Select the proper hole diameter and correct tap size to tap a hole. The hole should be sized so that the thread cut by the tap will be about 75 percent as deep as the thread on the tap.
- 3.5 Use a proper tap wrench (with a "T" handle) for turning a tap.
- 3.6 Use lubricant or machine cutting fluid with metals other than cast iron.

- 3.7 Do not permit chips to clog flutes (grooves in the tap that allow metal chips to escape from the hole). The chips may prevent the tap from turning – this may result in the tap breaking if you continue to apply pressure.
- 3.8 Do not attempt to thread hardened steel. This can chip or damage the die.
- 3.9 Do not thread any rod or other cylindrical object that is larger in diameter than the major diameter of the die thread.
- 3.10 Do not use a spiral reamer on a rotating pipe. The reamer may snag and cause serious injury.

4.0 Pliers and Wire Cutters

- 4.1 Pliers are made in various shapes and sizes and for many uses. Use the correct pliers or wire cutters for the job.
- 4.2 Choose pliers or wire cutters that have a grip span of 2½ – 3½ inches (6.4 – 8.9 centimeters) to prevent palm or fingers from being pinched when the tools are closed.
- 4.3 Use adjustable pliers that allow for a firm grip of the work piece while maintaining a comfortable handgrip (i.e., hand grasp is not too wide).
- 4.4 Use tools only if they are in good condition.
 - 4.4.1 Make sure that the cutting edges are sharp. Dull and worn-down cutting edges require many times more force for cutting.
 - 4.4.2 Make sure that the toothed jaws are clean and sharp. Greasy or worn-down jaws can result in compromised safety. Such tools also require increased force to hold the work piece which, in turn, increases the risk of muscular fatigue and repetitive strain injuries.
- 4.5 Oil pliers and wire cutters regularly. A drop of oil on the hinge will make the tools easier to use.
- 4.6 Pull on the pliers; do not push away from you when applying pressure. If the tool slips unexpectedly, you may lose your balance or injure your hand.
- 4.7 Cut at right angles. Never rock the cutting tool from side to side or bend wire back and forth against the cutting edges.
- 4.8 Do not cut hardened wire unless the pliers or wire cutters are specifically manufactured for this purpose.
- 4.9 Do not expose pliers or wire cutters to excessive heat.
- 4.10 Do not bend stiff wire with light pliers. Needle-nose pliers can be damaged by using the tips to bend large wire. Use a sturdier tool.
- 4.11 Do not use pliers as a hammer.
- 4.12 Do not hammer on pliers or wire cutters to cut wires or bolts.
- 4.13 Do not extend the length of handles to gain greater leverage. Use a larger pair of pliers for gripping or a bolt cutter for cutting.
- 4.14 Do not use cushion grip handles for jobs requiring tools with electrically insulated handles. Cushion grips are for comfort primarily and do not protect against electric shock.
- 4.15 Do not use pliers on nuts and bolts; use a wrench.

5.0 Screwdrivers

- 5.1 Screwdrivers are made in various shapes and sizes and for many uses. Use the correct screwdriver for the job.
- 5.2 Choose contoured handles that fit the shank tightly, with a flange to keep the hand from slipping off the tool.

- 5.3 Use a slot screwdriver with a blade tip width that is the same as the width of the slotted screw head.
- 5.4 For cross-head screws, use the correct size and type of screwdriver; a Phillips screwdriver may slip out of a screw head designed for use with the slightly flatter-tipped Pozidriv screwdriver.
- 5.5 Use a vise or clamp to hold the stock if the piece is small or moves easily.
- 5.6 Keep the screwdriver handle clean. A greasy handle could cause an injury or damage from unexpected slippage.
- 5.7 If work must be carried out on "live" electrical equipment, use screwdrivers that have insulated handles designed for electrical work and a non-conducting shaft. Remember, most plastic handles are designed for grip and comfort.
- 5.8 Use non-magnetic tools when working near strong magnets (e.g., in some laboratories).
- 5.9 Use a screw-holding screwdriver (with screw-holding clips or magnetic blades) to get screws started in awkward, hard-to-reach areas. Square-tipped screwdrivers (e.g., Robertson) that hold screws with recessed square holes are also useful in such situations.
- 5.10 Use an offset screwdriver in close quarters where a conventional screwdriver cannot be used.
- 5.11 Use a screwdriver that incorporates the following features when continuous work is needed:
 - 5.11.1 Use a pistol grip to provide for a straighter wrist and better leverage.
 - 5.11.2 Use a "Yankee drill" mechanism (spiral ratchet screwdriver or push screwdriver) which rotates the blade when the tool is pushed forward.
 - 5.11.3 Use a ratchet device to drive hard-to-move screws efficiently, or use a powered screwdriver.
- 5.12 File a rounded tip square making sure the edges are straight. A dull or rounded tip can slip out of the slot and cause hand injury or damage to materials.
- 5.13 Store screwdrivers in a rack or partitioned pouch so that the proper screwdriver can be selected quickly.
- 5.14 Do not lean or push on a screwdriver with any more force than necessary to keep contact with the screw. A screw properly piloted and fitted will draw itself into the right position when turned. Keep the shank directly over the screw being driven.
- 5.15 Do not hold the stock in one hand while using the screwdriver with the other as an injury may result if the screwdriver slips out of the slot.
- 5.16 Do not hammer screws that cannot be turned.
- 5.17 Do not grind the screwdriver tip to fit another size screw head.
- 5.18 Do not try to use screwdrivers on screw heads for which they are not designed (e.g., straight blade screwdrivers on Phillips, clutch head, Torx or multi-fluted spline screw heads).
- 5.19 Do not use defective screwdrivers (e.g. rounded or damaged edges or tips; split or broken handles; bent shafts).
- 5.20 Do not use a screwdriver for prying, punching, chiseling, scoring, scraping or stirring paint.
- 5.21 Do not use pliers on the handle of a screwdriver for extra turning power. A wrench should be used only on the square screwdriver shank designed for that purpose.
- 5.22 Do not expose a screwdriver blade to excessive heat. Heat can affect the temper of the metal and weaken the tool.
- 5.23 Do not use a screwdriver to check if an electrical circuit is live. Use a suitable meter or other circuit testing device.
- 5.24 Do not carry screwdrivers in clothing pockets.

6.0 Snips

- 6.1 Wear safety glasses and protective gloves when working with snips. Small pieces of metal may go flying in the air and cut edges of metal are sharp.
- 6.2 Snips are made in various shapes and sizes for various tasks. The handle can be like those on scissors with finger and thumb holes or like plier handles. Models are available for cutting in straight lines and in curves to the left or right.
- 6.3 Select the right size and type of snips for the job; check the manufacturer's specifications about the intended use of the snips (e.g., type of cut - straight, wide curve, tight curve, right or left, and maximum thickness and kind of metal or other material that can be cut).
 - 6.3.1 Universal snips can cut in both straight and wide curves.
 - 6.3.2 Straight snips and duckbill snips (flat blade, "perpendicular" to the handle, with pointed tips) are generally designed to cut in straight lines; some duckbill snips are designed for cutting curved lines.
 - 6.3.3 Hawk's bill snips (with crescent-shaped jaws) are used for cutting tight circles.
 - 6.3.4 Aviation snips have compound leverage that reduces the effort required for cutting.
 - 6.3.5 Offset snips have jaws that are set at an angle from the handle.
- 6.4 Use only snips that are sharp and in good condition.
- 6.5 Use snips for cutting soft metal only. Hard or hardened metal should be cut with tools designed for that purpose.
- 6.6 Use ordinary hand pressure for cutting. If extra force is needed, use a larger tool.
- 6.7 Cut so that the waste is on the right if you are right-handed or on the left if you are left-handed.
- 6.8 Avoid springing the blades. This results from trying to cut metal that is too thick or heavy for the snips you are using.
- 6.9 Keep the nut and the pivot bolt properly adjusted at all times.
- 6.10 Oil the pivot bolt on the snips occasionally.
- 6.11 Do not try to cut sharp curves with straight cut snips.
- 6.12 Do not cut sheet metal thicker than the manufacturer's recommended upper limit (e.g., cuts up to 16-gauge cold, rolled steel or 18-gauge stainless steel). Do not extend the length of handles to gain greater leverage.
- 6.13 Do not hammer or use your foot to exert extra pressure on the cutting edges.
- 6.14 Do not use cushion grip handles for tasks requiring insulated handles. They are for comfort primarily and not for protection against electric shocks.
- 6.15 Do not attempt to re-sharpen snips in a sharpening device designed for scissors, garden tools, or cutlery.

7.0 Wrenches

- 7.1 Use the correct wrench for the job - pipe wrenches for pipes and plumbing fittings, and general-use wrenches for nuts and bolts.
 - 7.1.1 Do not use pipe wrenches on nuts and bolts.
 - 7.1.2 Use a box or socket wrench with a straight handle, rather than an off-set handle, when possible.
 - 7.1.3 Do not use a conventional adjustable wrench for turning a tap – it will cause uneven pressure on the tap that may cause it to break.
 - 7.1.4 Do not use a makeshift wrench.

- 7.2 Inspect pipe wrenches periodically for worn or unsafe parts and replace them:
 - 7.2.1 Wrenches must not be used when jaws are sprung to the point that slippage occurs.
 - 7.2.2 Ensure that the teeth of a pipe wrench are sharp, clean and free of oil and debris.
 - 7.2.3 Do not use worn adjustable wrenches. Inspect the threads, knurl, jaw and pin for wear.
 - 7.2.4 Discard any bent or damaged wrenches (e.g., open-ended wrenches with spread jaws or box wrenches with broken or damaged points).
- 7.3 Select the correct jaw size to avoid slippage.
 - 7.3.1 Ensure that the jaw of an open-ended wrench is in full contact (fully seated, "flat," not tilted) with the nut or bolt before applying pressure.
 - 7.3.2 Face a pipe wrench or adjustable wrench "forward," adjust tightly and turn the wrench so pressure is against the permanent or fixed jaw. Do not pull on a wrench that is loosely adjusted.
 - 7.3.3 Adjust the pipe wrench grip to maintain a gap between the back of the hook jaw and the pipe. This concentrates the pressure at the jaw teeth, producing the maximum gripping force. It also aids the ratcheting action.
 - 7.3.4 Do not insert a shim in a wrench for better fit.
 - 7.3.5 Before applying pressure, ensure that the jaws have a good bite.
 - 7.3.6 Make sure adjustable wrenches do not "slide" open during use.
 - 7.3.7 Do not increase the leverage by adding sleeved additions (e.g., a pipe) to increase tool handle length. Use a larger wrench as necessary.
- 7.4 Ensure that the pipe or fitting is clean to prevent unexpected slippage and possible injury.
- 7.5 Maintain a proper stance with feet firmly placed to maintain balance.
 - 7.5.1 Position the body in a way that will prevent loss of balance and injury if the wrench slips or something (e.g., a bolt) suddenly breaks.
 - 7.5.2 Pull, rather than push on the wrench handle as body balance is more likely to be maintained if the wrench slips.
 - 7.5.3 Pull using a slow, steady pull; do not use fast, jerky movements.
- 7.6 Apply a small amount of pressure to a ratchet wrench initially to ensure that the ratchet wheel (or gear) is engaged with the pawl (a catch fitting in the gear) for the direction you are applying pressure.
- 7.7 Support the head of the ratchet wrench when socket extensions are used.
- 7.8 Stand aside when work is done with wrenches overhead.
- 7.9 Do not use a wrench on moving machinery.
- 7.10 Do not use the wrong tools for the job. For example: Do not use pliers instead of a wrench or a wrench as a hammer. Do not use pipe wrenches for lifting or bending pipes.
- 7.11 Do not strike a wrench (except a "strike face" wrench) with a hammer or similar object to gain more force.
- 7.12 Do not expose a wrench to excessive heat (like from a blow torch) that could affect the temper of the metal and ruin the tool.

8.0 Files/Rasps

- 8.1 Do not use a file as a pry bar, hammer, screwdriver, or chisel.
- 8.2 When using a file or a rasp, grasp the handle in one hand and the toe of the file in the other.
- 8.3 Do not hammer on a file.

9.0 Chisels and Punches

- 9.1 Use the right size and type of chisel (metal or wood) or punch (drift pin, centre, pin) for the job.
- 9.2 Use tools only if they are good condition (i.e., cutting edges are sharp, struck head is not mushroomed or chipped).
 - 9.2.1 Do not use chisels or punches if the cutting edge is dull, mushroomed or chipped, or if the point of a punch is slanted or damaged.
 - 9.2.2 Choose smooth, rectangular handles that have no sharp edges and are attached firmly to the chisel. Replace broken or splintered handles.
 - 9.2.3 Redress striking tools with burred or mushroomed heads.
 - Redress the point or cutting edge to its original shape.
 - Do not use a grinder to redress heat-treated tools. Use a whetstone.
 - Grind to a slightly convex cutting edge.
 - The point angle of the chisel should be 70° for hard metals, 60° for soft.
 - Do not apply too much pressure to the head when grinding a chisel. The heat generated can remove the temper. Immerse the chisel in cold water periodically when grinding.
 - 9.2.4 Replace any chisel or punch that is bent, cracked, shows excessive wear or cannot successfully be redressed.
- 9.3 Check stock thoroughly for knots, staples, nails, screws, or other foreign objects before chiseling or punching.
- 9.4 Hold the chisel, for shearing and chipping, at an angle which permits the bevel of the cutting edge to lie flat against the shearing plane.
- 9.5 Use the appropriate type and size of hammer for the chisel or punch, such as:
 - 9.5.1 A wooden or plastic mallet with a large striking face on chisels.
 - 9.5.2 Heavy-duty or framing chisels made of a solid or molded handle can be struck with a steel hammer.
 - 9.5.3 Ball-peen hammers are generally chosen for use with punches.
 - 9.5.4 Refer to the 'Hammers' section of this document for further guidance.
- 9.6 Chip or cut away from the body. Keep hands and body behind the cutting edge.
- 9.7 Make finishing or paring cuts with hand pressure alone.
- 9.8 Provide hand protection if possible:
 - 9.8.1 Use a sponge rubber shield, punch or chisel holder.
 - 9.8.2 Clamp small work pieces in a vise and chip towards the stationary jaw when working with a chisel.
 - 9.8.3 Do not allow bull point chisels to be hand-held by one employee and struck by another. Use tongs or a chisel holder to guide the chisel so that the holder's hand will not be injured.
- 9.9 Do not use cold chisels for cutting or splitting stone or concrete.
- 9.10 Do not use a drift pin punch (also called an aligning punch) as a pin punch intended for driving, removing, or loosening pins, keys, and rivets.
- 9.11 Do not use a wood chisel on metal.
- 9.12 Do not use a wood chisel as a pry or a wedge.
- 9.13 Place chisels safely within the plastic protective caps to cover cutting edges when not in use.

- 9.14 Store chisels in a “storage roll,” a cloth or plastic bag with slots for each chisel, and keep them in a drawer or tray.

10.0 Hacksaws

- 10.1 Select correct blade for material being cut.
- 10.2 Keep saw blades clean and lightly oiled using light machine oil on the blade to keep it from overheating and breaking.
- 10.3 Secure blade with the teeth pointing forward. Tighten the nut until the blade is under tension.
- 10.4 Keep blade rigid, and frame properly aligned.
- 10.5 Cut using steady strokes, directed away from you.
- 10.6 Use entire length of blade in each cutting stroke.
- 10.7 Cut harder materials more slowly than soft materials.
- 10.8 Clamp thin, flat pieces requiring edge cutting.
- 10.9 Do not apply too much pressure on the blade as the blade may break.
- 10.10 Do not twist when applying pressure.
- 10.11 Do not use when the blade becomes loose in the frame.

11.0 Vises

- 11.1 When clamping a long work piece in a vise, support the far end of the work piece by using an adjustable pipe stand, saw horse or box.
- 11.2 Position the work piece in the vise so that the entire face of the jaw supports the work piece.
- 11.3 Do not use a vise that has worn or broken jaw inserts, or has cracks or fractures in the body of the vise.
- 11.4 Do not slip a pipe over the handle of a vise to gain extra leverage.

12.0 Clamps

- 12.1 Do not use a C-clamp for hoisting materials.
- 12.2 Do not use a C-clamp as a permanent fastening device.

13.0 Pry Bars

- 13.1 Establish balance and stable footing when using a bar for prying.
- 13.2 Pry bars must be appropriate to the task to prevent slipping or tool breakage.

14.0 Jacks

- 14.1 All jacks—including lever and ratchet jacks, screw jacks, and hydraulic jacks—must have a stop indicator, and the stop limit must not be exceeded.
- 14.2 The manufacturer’s load limit must be permanently marked in a prominent place on the jack, and the load limit must not be exceeded.
- 14.3 A jack should never be used to support a lifted load. Once the load has been lifted, it must immediately be blocked up. Put a block under the base of the jack when the foundation is not firm, and place a block between the jack cap and load if the cap might slip.
- 14.4 To set up a jack, make certain of the following:

- 14.4.1 The base of the jack rests on a firm, level surface;
 - 14.4.2 The jack is correctly centered;
 - 14.4.3 The jack head bears against a level surface; and
 - 14.4.4 The lift force is applied evenly.
- 14.5 Clear all tools, equipment and any other obstructions from under the load before lowering the jack.
- 14.6 Proper maintenance of jacks is essential for safety. All jacks must be lubricated regularly. In addition, each jack must be inspected according to the following schedule:
- 14.6.1 For jacks used continuously or intermittently at one site—inspected at least once every 6 months;
 - 14.6.2 For jacks sent out of the shop for special work—inspected when sent out and inspected when returned; and
 - 14.6.3 For jacks subjected to abnormal loads or shock—inspected before use and immediately thereafter.

Small Engines

S3AM-305-ATT16

1.0 Objective / Overview

- 1.1 Operate small engine machines (liquid fuel tools), such as push mowers, weed trimmers, pumps and leaf blowers, in a safe manner.
- 1.2 Workers must be trained and competent in the safe operation and maintenance of the tool.

2.0 Potential Hazards

- 2.1 Flying debris
- 2.2 Noise
- 2.3 Moving and sharp parts
- 2.4 Hot surfaces

3.0 Safe Operating Guidelines

- 3.1 Review *S3AM-305-PR1 Hand & Power Tools* and the manufacturer's operating manual for further guidance.
- 3.2 Do not wear loose or baggy clothing around tools with rotating parts.
- 3.3 Never run the engine indoors, in poorly ventilated areas, or in a location where the exhaust could be drawn into a building through an opening.
 - 3.3.1 When an engine must be operated in an enclosed space, effective ventilation and/or proper respirators such as atmosphere-supplying respirators must be utilized to avoid breathing carbon monoxide.
- 3.4 Never store engine with fuel in fuel tank inside a building with potential sources of ignition such as hot water and space heaters, clothes dryers, electric motors, etc.
- 3.5 Ensure the fuel cap is in place. Never start or operate the engine with the fuel fill cap removed.
- 3.6 Refuelling:
 - 3.6.1 Never remove fuel cap or add fuel when engine is running.
 - 3.6.2 Shut down the engine and allow it to cool prior to refueling to prevent accidental ignition of hazardous vapors.
 - 3.6.3 Never pour gasoline on hot surfaces.
 - 3.6.4 Fill in well-ventilated area.
 - 3.6.5 Do not re-fuel around an open flame or while smoking.
- 3.7 Use only properly labelled, American National Standards Institute/Canadian Standards Association-approved red gasoline containers to store and dispense fuel.
- 3.8 The worker must be careful to handle, transport, and store gas or fuel only in approved flammable liquid containers, according to proper procedures for flammable liquids.
- 3.9 Noise hazards associated with gasoline engines must be mitigated by the use of proper hearing protection. Ear plugs, ear muffs or a combination of the two must be used to protect workers from excessive noise levels.
- 3.10 Appropriate fire extinguishers must also be available in the area.

- 3.11 Do not pour fuel from engine or siphon fuel by mouth.
- 3.12 Never leave the engine unattended while it is running.
- 3.13 Never operate the engine with an unguarded engine shaft.
- 3.14 Do not modify the engine or tamper with the factory setting of the engine governor.
- 3.15 Never operate the engine without a muffler guard in place and avoid touching hot areas of the engine.
- 3.16 Keep all flammable materials away from the muffler and the rest of the engine; do not idle or park the engine in dry grass or ground cover.
- 3.17 When working on the equipment, avoid accidental starts by removing the ignition key, turn off all engine switches, disconnect the battery and disconnect the spark plug, keeping it away from metal part.

4.0 Personal Protective Equipment

- 4.1 Always wear safety glasses with shields. Add face shield if potential for flying debris.
- 4.2 Gloves providing the appropriate protection (e.g. impact, abrasion, chemical, etc.).
- 4.3 Wear proper apparel for the task. Long hair, loose or baggy clothing, ties, or jewellery can become caught in moving parts. Long pants and long sleeve shirt.
- 4.4 Safety toe work boots.
- 4.5 Hearing protection (earmuffs or earplugs).

Electric & Battery Hand Tools

S3AM-305-ATT17

1.0 Objective / Overview

- 1.1 Electric and battery hand tools, also known as power tools, allow the user to perform their task more easily by providing more torque, speed, etc.

2.0 Hazards

- 2.1 Electricity

3.0 Safe Work Practices (General)

- 3.1 Review manufacturer's operating manual and *S3AM-305-PR1 Hand & Power Tools* for additional guidelines.
- 3.2 All electrical tools and equipment must be operated in accordance with the requirements of *S3AM-302-PR1 Electrical Safety*.
- 3.3 Keep all people not involved with the work at a safe distance from the work area.
- 3.4 Inspect power tools prior to each use.
 - 3.4.1 Ensure that the power tool has the correct guard, shield or other attachment that the manufacturer recommends.
 - 3.4.2 Ensure that the tools are properly grounded using a three-prong plug (no loose or faulty prongs), are double insulated (and are labeled as such), or are powered by a low-voltage isolation transformer; this will protect users from an electrical shock.
 - 3.4.3 Check the handle and body casing of the tool for cracks or other damage.
 - 3.4.4 If the tool has auxiliary or double handles, check to see that they installed securely.
 - 3.4.5 Inspect cords for defects: check the plug and power cord for cracking, fraying, and other signs of wear or faults in the cord insulation.
 - 3.4.6 Ensure power tool switches and triggers are fully functional.
 - 3.4.7 If equipped with a trigger-lock, ensure it is disabled.
 - 3.4.8 If a power tool is defective, remove it from service, and tag it clearly "Out of service for repair" or "Do Not Use". Replace damaged equipment immediately – do not use defective tools "temporarily."
DO NOT ATTEMPT FIELD REPAIRS.
- 3.5 Maintain tools with care; keep them sharp and clean for best performance.
- 3.6 Follow instructions in the user's manual for lubricating and changing accessories.
- 3.7 Do not over-reach. Be sure to keep good footing and maintain good balance when operating power tools.
- 3.8 If they are available, choose tools with double handles to permit easier holding and better manipulation of the tool.
- 3.9 Do not brush away sawdust, shavings or turnings while the power tool is running. Never use compressed air for cleaning surfaces or removing sawdust, metal turnings, etc.
- 3.10 Do not operate power tools that are not specified as intrinsically safe in an area containing explosive vapors or gases.
- 3.11 Do not clean tools with flammable or toxic solvents.
- 3.12 Do not surprise or touch anyone who is operating a power tool. Startling an operator could result in injury or

property damage.

- 3.13 Hand-held power tools must be equipped with a constant-pressure switch or control that shuts off the power when pressure is released.
 - 3.13.1 Powered hand tools shall not be capable of being locked in the ON position. Trigger locks are not permitted.
 - 3.13.2 All power tools should be ordered without trigger locks; if a tool is found with a trigger lock intact it must be disabled.
- 3.14 Avoid accidental starting. Do not hold fingers on the switch button, and ensure it is in the OFF position while plugging the tool in or while carrying an energized (plugged-in, battery in place) tool.
- 3.15 Do not leave a running tool unattended and ensure the power tool will not re-energize when not in use and when servicing, cleaning, making adjustments, applying flammable solutions or changing accessories:
 - 3.15.1 Ensure it has stopped running completely.
 - 3.15.2 Ensure the trigger or switch is OFF.
 - 3.15.3 Ensure the power tool is disconnected from the power supply (unplugged or battery removed).
- 3.16 Operate power tools within their design limitations.
- 3.17 Store power tools, batteries and electrical cords in a clean, dry area off the ground when not in use.
- 3.18 Do not use power tools in damp or wet locations unless they are approved for that purpose.
- 3.19 Keep work areas well lighted when operating power tools.
- 3.20 Equipment must have proper guards or shields and they must remain in place to protect the operator and others from the following:
 - 3.20.1 Point of operation.
 - 3.20.2 In-running nip points.
 - 3.20.3 Rotating parts.
 - 3.20.4 Flying chips and sparks.
- 3.21 If a guard is removed to clean or repair parts, replace it before testing the equipment and returning the machine to service
- 3.22 If, due to damage or deterioration, the original guard provided on a piece of equipment cannot be put in place, the tool must be removed from service.
- 3.23 Do not modify, remove, or disable any machine guards.
- 3.24 Remove any wrenches and adjusting tools before turning on a tool.
- 3.25 Use clamps, a vice or other devices to hold and support the piece being worked on, when practical to do so. This will allow you to use both hands for better control of the tool and will help prevent injuries if a tool jams or binds in a work piece.

4.0 Battery Powered Tools

- 4.1 Use only the type of battery specified by the tool manufacturer for the battery-powered tool to be used.
- 4.2 Recharge a battery or battery-powered tool only with a charger that specified for the battery.
- 4.3 Store a battery pack safely so that no metal parts, nails, screws, wrenches and so on can come in contact with the battery terminals; this could result in shorting out the battery and possibly cause sparks, fires or burns.

5.0 Safe Work Practice (Electric)

- 5.1 During use, keep power cords clear of tools and the path that the tool will take.
- 5.2 Employees' hands shall not be wet when plugging and unplugging cord and plug connected equipment and extension cords.
- 5.3 Portable electric equipment shall be disconnected when not in use, before servicing, and when changing accessories such as blades, bits, and cutters.
- 5.4 Portable electric equipment and extension cords used in potentially wet locations shall be approved for use in those locations by a nationally recognized testing laboratory, inspection agency, or other organization concerned with product evaluation (e.g., F.M., UL, etc.).
- 5.5 The outlet box for portable extension cords for outdoor use shall be weatherproof and shall be maintained in good condition.
- 5.6 Maintain electrical cords and connections in good working order:
 - 5.6.1 Cords and connection must be American National Standards Institute/Canadian Standards Association approved and bear a standardized certification marking (e.g., CSA, ANSI, UL, CE etc.).
 - 5.6.2 To prevent overheating, use only approved extension cords that have the proper wire size for the length of cord and power requirements of the electric tool to be used.
 - Do not connect or splice extension cords together to make a longer connection.
 - For outdoor work, use outdoor extension cords marked "W-A" or "W."
 - 5.6.3 Eliminate octopus connections: if more than one receptacle plug is needed, use a power bar or power distribution strip that has an integral power cord and a built-in overcurrent protection.
 - 5.6.4 Portable electrical equipment shall not be carried by the cord, nor raised or lowered by the cord.
 - 5.6.5 Electrical cords shall not be removed from a receptacle by pulling on the cord line.
 - 5.6.6 Cords shall not be placed across walkways unless appropriate cord and worker protection is in place to prevent damage to the cord and worker tripping hazards (e.g. cable protectors, cords suspended over walkway, etc.).
 - 5.6.7 Do not walk on or allow vehicles or other moving equipment to pass over unprotected power cords. Cords should be put in conduits or protected by placing planks on each side of them.
 - 5.6.8 A cord should not be pulled or dragged over nails, hooks, or other sharp objects that may cause cuts in the insulation.
 - 5.6.9 Keep cords away from heat, oil, sharp edges and moving parts.
 - 5.6.10 Never use extension cords as permanent wiring as they are for temporary use only. Do not run behind bookshelves, or furniture if the cord cannot be monitored for severe bending or damage.
 - 5.6.11 Inspect cords frequently for such damage such as fraying, kinks, cuts, and cracked or broken outer jackets. Any cord that exhibits damage or feels more than comfortably warm to the touch shall be removed from service, tagged "Do Not Use" and checked by an electrician.
 - 5.6.12 Do not tie power cords in knots. Knots can cause short circuits and shocks. Loop the cords or use a twist lock plug.
- 5.7 Electrical shock associated with power tool use can cause heart failure and burns, as well as injury from falls. Under certain conditions, even a small amount of electric current can result in fibrillation of the heart and death.
 - 5.7.1 Verify that the power source is the same voltage and current as indicated on the nameplate of the tool. Using a higher voltage can cause serious injury to the operator as well as burn out the tool.
 - 5.7.2 All electrical connections for these tools must be suitable for the type of tool and the working

conditions (wet, dusty, flammable vapors).

- 5.7.3 To protect the worker from shock and burns, electric tools must have a three-wire cord with a ground and be plugged into a grounded receptacle, be double insulated, or be powered by a low-voltage isolation transformer.
- 5.7.4 All outdoor receptacles must be protected by means of a ground fault circuit interrupter (GFCI or GFI) available in portable or fixed models. Do not use any electric power tools outdoors in a receptacle that is not properly protected.
- 5.7.5 Three-wire cords contain two current-carrying conductors and a grounding conductor. Any time an adapter is used to accommodate a two-hole receptacle, the adapter wire must be attached to a known ground.
- 5.7.6 The third prong must never be removed from the plug.
- 5.7.7 Double-insulated tools are available that provide protection against electrical shock without third-wire grounding. On double-insulated tools, an internal layer of protective insulation completely isolates the external housing of the tool.
- 5.7.8 Avoid body contact with grounded surfaces like refrigerators, pipes and radiators when using electric powered tools; this will reduce the likelihood of shock if the operator's body is grounded.
- 5.7.9 Report all shocks and/or sparks from electrical tools, no matter how minor. The tool in question should be tagged out and not be used until it has been checked for ground fault.
- 5.8 Only authorized persons are permitted to activate, de-activate or lockout electrical equipment.
- 5.9 Where there is or may be a danger to a worker, from the inadvertent operation of electrical equipment, then that equipment must be locked out and tagged prior to commencing work. Refer to *S3AM-325-PR1 Lockout Tagout*.
 - 5.9.1 Switch off all appropriate devices (MCC, Distribution Panel, Disconnect).
 - Stand to one side when engaging or disengaging an electrical circuit breaker to avoid electrical flash backs Lock and tag Electrical Supply devices in the "OFF" position.
 - 5.9.2 Test to be sure the equipment cannot be operated at the STOP-START switch.
 - 5.9.3 Test to be sure electrical equipment is de-energized.
 - 5.9.4 After completion of task, remove padlocks and destroy tags.

6.0 Personal Protective Equipment (Level D PPE)

- 6.1 Wear proper apparel for the task. Long hair, loose or baggy clothing, ties, or jewellery can become caught in moving parts.
- 6.2 Use gloves with protection appropriate to the task (e.g. impact, abrasion, puncture, etc.).
- 6.3 Safety toed boots.
- 6.4 Use hearing protection as necessary.
- 6.5 Kickback aprons as necessary.
- 6.6 Wear safety glasses with side shields at all times (or safety goggles) and face shield if flying debris may be encountered.

7.0 Belt Sanders

- 7.1 Refer to *S3AM-305-ATT11 Sanders*.

8.0 Drills

- 8.1 Refer to *S3AM-305-ATT8 Power Drill*.

9.0 Planers and Joiners

- 9.1 Use blades of the same weight and set at the same height.
- 9.2 Ensure that the blade-locking screws are tight.
- 9.3 Guard planers and joiners to prevent contact with the blades throughout the full length of the cutting area.
- 9.4 Support the material (stock) in a comfortable position that will allow the job to be done safely and accurately.
- 9.5 Check stock thoroughly for staples, nails, screws, or other foreign objects before using a planer.
- 9.6 Start a cut with the infeed table (front shoe) resting firmly on the stock and with the cutter head slightly behind the edge of the stock.
- 9.7 Use two hands to operate a planer - one hand on the trigger switch and the other on a front handle.
- 9.8 Do not put fingers or any object in a deflector to clean out chips while a planer is running.
- 9.9 Disconnect the power supply when stopping to dump out chips.
- 9.10 Do not set a planer down until blades have stopped turning.
- 9.11 Keep all cords clear of cutting area.

10.0 Routers

- 10.1 Ensure that the bit is securely mounted in the chuck and the base is tight.
- 10.2 Put the base of the router on the work, template or guide. Make sure that the bit can rotate freely before switching on the motor.
- 10.3 Secure stock. Never hold or have another individual hold the material. Sudden torque or kickback from the router can cause damage and injury.
- 10.4 Before using a router, check stock thoroughly for staples, nails, screws or other foreign objects.
- 10.5 Keep all cords clear of cutting area.
- 10.6 Always hold both hands on router handles, until a motor has stopped. Do not set the router down until the exposed router bit has stopped turning.
- 10.7 When inside routing, start the motor with the bit above the stock. When the router reaches full power, lower the bit to two times the required depth.
- 10.8 When routing outside edges, guide the router counter clockwise around the work.
- 10.9 When routing bevels, moldings and other edge work, make sure the router bit is in contact with the stock to the left of a starting point and is pointed in the correct cutting direction.
- 10.10 Feed the router bit into the material at a firm, controlled speed.
- 10.11 Softwood may enable fast router cutting speed. With hardwood, knotty and twisted wood, or with larger bits, cutting may be very slow.
- 10.12 The sound of the motor can indicate safe cutting speeds. When the router is fed into the material too slowly, the motor makes a high-pitched whine. When the router is pushed too hard, the motor makes a low growling noise.
- 10.13 When the type of wood or size of the bit requires going slow, make two or more passes to prevent the router from burning out or kicking back.
- 10.14 To decide the depth of cut and how many passes to make, test the router on scrap lumber similar to the work.

11.0 Circular Saws

11.1 Refer to *S3AM-305-ATT2 Circular Saw*.

12.0 Other Saws

- 12.1 Use lubricants when cutting metals.
- 12.2 Keep all cords clear of cutting area.
- 12.3 Cut green or wet material slowly and with caution. Check all material being cut for nails, hard knots, etc.
- 12.4 Make sure guards are installed and are working properly.
 - 12.4.1 Table saws must be fitted with blade guards and a splitter to prevent the work from squeezing the blade and kicking back on the operator.
 - Exposed parts of the saw blade under the table must be properly guarded.
 - All swing cutoff and radial saws that are drawn across a table with limit stops to prevent the saw from traveling beyond the edge of the table
 - 12.4.2 Ensure band saw blades are fully enclosed except at the point of operation.
 - 12.4.3 Ensure swing cut-off saws have a guard completely covering the upper half of the saw.
- 12.5 Remember sabre saws cut on the upstroke.
- 12.6 Position the saw beside the material before cutting and avoid entering the cut with a moving blade.
- 12.7 Secure and support stock as close as possible to the cutting line to avoid vibration.
 - 12.7.1 Hold the material being cut firmly against a back guide or fence and cut with a single, steady pass.
 - 12.7.2 Use a push stick or guide when cutting operation requires the hands of the operator to come close to the blade.
 - 12.7.3 When cutting long stock, provide extension tables and a helper to assist the operator.
 - 12.7.4 Keep the base or shoe of the saw in firm contact with the stock being cut.
 - 12.7.5 Automatic feed devices should be used whenever feasible.
- 12.8 Select the correct blade for the material being cut and allow it to cut steadily. Do not force it. Clean and sharp blades operate best.
- 12.9 Set the blade to go no further than 1/8 to 1/4 inch deeper than the material being cut.
- 12.10 Do not start cutting until the saw reaches its full power.
- 12.11 Do not force a saw along or around a curve. Allow the machine to turn with ease.
- 12.12 Do not insert a blade into or withdraw a blade from a cut or lead hole while the blade is moving.
- 12.13 Do not put down a saw until the motor has stopped.
- 12.14 Do not reach under or around the stock being cut.
- 12.15 Maintain control of the saw always. Avoid cutting above shoulder height.
- 12.16 External Cuts
 - 12.16.1 Make sure that the blade is not in contact with the material or the saw will stall when the motor starts.
 - 12.16.2 Hold the saw firmly down against the material and switch the saw on.
 - 12.16.3 Feed the blade slowly into the stock, maintaining an even forward pressure.

12.17 Internal Cuts

12.17.1 Drill a lead hole slightly larger than the saw blade. With the saw switched off, insert the blade in the hole until the shoe rests firmly on the stock.

12.17.2 Do not let the blade touch the stock until the saw has been switched on.

Americas

Hand & Power Tool Maintenance Inventory

S3AM-305-FM1

EQUIPMENT (MAKE, MODEL, SERIAL #)	EQUIPMENT OWNER	EQUIPMENT STATUS (ON HIRE, ACTIVE, DECOMMISSIONED)	FREQUENCY OF SERVICE	SERVICE TYPE	MANUFACTURER'S STANDARDS	INDUSTRY STANDARDS	LEGISLATED REQUIREMENTS	LOCATION OF EQUIPMENT

Americas

Hand & Power Tool Inspection Report

S3AM-305-FM2

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Americas

Highway and Road Work

S3AM-306-PR1

1. Purpose and Scope

To address potential hazards that may occur while working on public or private roadways or within the right-of-way of a public or private roadway.

- This procedure applies to all AECOM Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.
- This procedure is designed to assure that work on highway and roads meets the requirements established in federal, state, provincial, territorial, and local department of transportation laws, regulations, and guidance (jurisdictional requirements and guidance). If discrepancies exist between this procedure and other applicable materials, the most stringent option shall be selected.

2. Procedure

2.1 Planning Work in a Highway or Road Setting

2.1.1 The Project Manager will prepare an SH&E Plan consistent with *S3AM-209-PR1 Risk Assessment & Management* and include a thorough assessment of all hazards. Priority shall be placed on eliminating the need to place workers on an active roadway, followed by using barriers to physically separate workers from traffic. PPE and other warning devices that do not offer substantial protection from moving vehicles and equipment will be selected and used in combination with more advanced controls.

2.1.2 Traffic Control Plans and Traffic Protection Plans

- For work that occurs in the right-of-way (area that includes the traveled way, shoulders, and clear zone) or may otherwise expose workers to the motoring public, a Traffic Control Plan shall be developed and incorporated directly into the SH&E Plan or included as a separate Plan by attachment or reference. This applies to both long and short duration activities in/or adjacent to roadways even when not required by a local jurisdiction.
- For work within a worksite that involves the movement of vehicles or equipment, a Traffic Protection Plan shall be developed and incorporated directly into the SH&E Plan by or included as a separate Plan by attachment.
- Pedestrian traffic will be accommodated by separating, rerouting or otherwise isolating pedestrian traffic from the work zone to eliminate issues of pedestrian right of way. In cases where this cannot be accommodated, then control measures to assure pedestrian right of way through the work zone shall be included in the Traffic Control Plan and/or Traffic Protection Plan.

2.1.3 Applicable jurisdictional requirements and guidance as well as industry standards and best practices shall be consulted during plan development and appropriate control measures established. These include the Occupational Health and Safety regulations and associated standards or guidebooks, and local jurisdictional manuals on the uniformity of traffic control devices in temporary construction, maintenance, and utility work zones (e.g., U.S. Federal Motor Carrier Safety Administration, Ontario Traffic Manual Book 7, etc.).

2.1.4 Additional risk-specific plans may be necessary for specialized work. Examples include fall protection, respiratory protection, work over water, confined spaces, hazardous materials/waste, tunneling/blasting, heat/cold stress, excavation, heavy equipment operation, aerial lifts, and hearing conservation.

- 2.1.5** Emergency response plans specific to roadway emergencies that take into account limited access/egress areas such as bridges will be developed and included in the SH&E Plan. Refer to *S3AM-010-PR1 Emergency Response Planning – Americas*.
- 2.1.6** A system for checking workers in and out at a worksite and the work zone should be included in the SH&E Plan.
- 2.1.7** PPE requirements shall be designated on a task hazard assessment for each task performed on a project (surveying, inspection, environmental, management, equipment operation). Refer to *S3AM-208-PR1 Personal Protective Equipment*.
- 2.1.8** Where several projects occur simultaneously, the coordination of vehicle routes and communication between contractors shall occur to reduce vehicular struck-by and backing incidents.
- 2.1.9** A Traffic Control Plan shall be prepared by or reviewed by a Competent Person with credentials, certifications, and experience required by jurisdictional requirements and guidance.
- 2.1.10** A Traffic Protection Plan shall be prepared by a Competent Person with credentials, certifications, and experience required by jurisdictional requirements and guidance.
- For long-term duration work activities that are performed at construction projects, the constructor of the project is required to develop a Traffic Protection Plan.
 - If AECOM has assumed the role of constructor for the project, the Traffic Protection Plan shall be developed and implemented prior to the commencement of work activities at the project.
 - If AECOM is not the constructor for the project, the Traffic Protection Plan for the project shall be developed by our client or a constructor designated by the client.
 - The Traffic Protection Plan should be reviewed with AECOM employees during orientation to the project.

2.2 Selecting Protective Measures

Protective measures for traffic control and worker protection shall be selected in accordance with work conditions and prevailing requirement of jurisdictional requirements and guidance. Additionally, the Project Manager, Traffic Control Engineer (if applicable), and/or Competent Person shall reduce risk to Roadway Workers by employing the Hierarchy of Controls as described in *S3AM-209-PR1 Risk Assessment & Management*. Below are examples:

- Elimination: Completely eliminate public traffic from the work area and construction traffic. This can occur by locating survey monuments and other data gathering points outside of roadways, utilizing alternative data collection methods, constructing detours and alternate routes, or otherwise isolating the work zone.

- Substitution: Substitute the use of an exposed worker with an alternate method to perform the work such as aerial photography, remote sensing, and remote control such as Automated Flagger Assistance Devices (AFADs).

- Engineering Controls: Use prescribed temporary traffic control devices and layouts to effectively control traffic, through a work zone, permitting public traffic and construction to interact without the use of Flag Persons or other exposed workers. Positive protection, or devices that contain and redirect vehicles preventing their intrusion into the work zone. Please also refer to *S3AM-306-ATT1 Protective Devices for Temporary Traffic Control* and *S3AM-306-ATT2 Short and Long Duration Work Zones*.



- Administrative Controls: Schedule the work at times when traffic volume is low, reducing the exposure to traffic. This may also include requiring workers to perform work in a prescribed way such as facing traffic or using a Spotter. Training and emergency procedures are also considered administrative controls. Please also refer to *S3AM-306-ATT4 Safe Work Practices for Roadway Workers*.
- Personal protective equipment: Traffic vests, safety glasses, and high visibility clothing should always be worn to increase visibility but rarely, if ever, solely relied upon as a protective measure for moving traffic.

3. Responsibilities

3.1 Manager or Supervisor

- Verify development and administration of the procedures, communication methods, and the measures and configuration of the temporary traffic control zone in accordance with specifications for workers, motorists, and pedestrians, and the protection of AECOM employees. Please also refer to *S3AM-306-ATT1 Protective Devices for Temporary Traffic Control*.
- Confirm the SH&E Plan, Traffic Control Plan, and as applicable, the Traffic Protection Plan are developed and communicated to all involved and affected employees.
- Confirm compliance with the SH&E Plan, Traffic Control Plan, Traffic Protection Plan (if applicable), and this procedure.
- Confirm compliance with jurisdictional requirements and guidance governing highway and road work.
- Confirm site-specific or client-required safety training is completed and documented for all assigned Roadway Workers.
- Confirm employees assigned to work zones are trained in safe work practices and the use of traffic control systems, communication systems, and PPE. Please also refer to *S3AM-306-ATT3 Safe Work Practices for Roadway Workers*.
- Lead inspections or investigations, as appropriate.
- Identify the Competent Person and, as applicable, Traffic Control Engineer for the project.

3.2 Flag Person

- Comply with the applicable SH&E Plan, Traffic Control Plan, and Traffic Protection Plan (if applicable), and with communication requirements.
- Maintain training and competency in traffic control and flagging procedures.
- Receive and communicate specific instructions clearly, firmly, and courteously to other Roadway Workers and the public.
- Maintain alertness at their points of duty until relieved. Report to work "Fit-for-Duty" and able to move and maneuver quickly in order to avoid danger from errant vehicles.
- Properly use signaling devices (such as paddles and flags) in order to provide clear and positive guidance to drivers.
- Properly use PPE and communication devices and signals.
- Monitor work area for new and changing conditions and effectively communicate information to other Roadway Workers and Supervisors, including emergency or rapidly changing situations.
- Test and verify emergency procedures within a work zone.

3.3 SH&E Representative/Site Safety Officer

- Assist the Project Manager with implementation of SH&E Plan, Traffic Protection Plan (if applicable), and Traffic Control Plans at the work zone.
- Coordinate safety on the specified project to include traffic and non-traffic hazards.
- Conduct hazard assessments, inspections, and safety observations.
- Develop mitigating strategies, and review and monitor their implementation.
- Conduct worksite inspections including the use of traffic control devices as required, make recommendations for improvement, and coordinate changes with the Project Manager and, as applicable, the Traffic Control Engineer.
- Coordinate the modification of traffic control devices with the Project Manager and Traffic Control Engineer (if applicable), Flag Person, and Competent Person in order to provide mobility and positive guidance to road users and Roadway Workers.
- Stop work in the event of an unsafe act or condition.

3.4 Spotter

- Comply with the applicable SH&E Plan, Traffic Control Plan, and Traffic Protection Plan (if applicable), and with communication requirements.
- Facilitate the safe movement of equipment and vehicles within and between work zones.
- Spotters are not permitted to act as a Flag Person.
- Monitor surrounding areas for moving vehicles and provide warning to workers.
- Maintain training and competency in spotting procedures.
- Receive and communicate specific instructions clearly, firmly, and courteously to other workers and the public.
- Maintain alertness at their points of duty until relieved. Report to work "Fit-for-Duty" and able to move and maneuver quickly in order to avoid danger from moving vehicles.
- Properly use PPE, and communication devices and signals.
- Maintain a position that is visible to moving equipment and vehicles.
- Monitor work area for new and changing conditions and effectively communicate information to other workers and Supervisors, including emergency or rapidly changing situations.

3.5 Traffic Control Engineer

- Maintain certifications and credentials to perform duties.
- Maintain knowledge on current traffic control devices and methods.
- Perform engineering studies to evaluate best methods for traffic control and protection.
- Develop traffic protection and control strategies consistent with local jurisdiction guidance and requirements.
- Incorporate best practices and more conservative safety measures when they provide increased protection for workers and/or the public.
- Monitor effectiveness of traffic control strategies.

3.6 Competent Person, Traffic Control

- Maintain knowledge and experience in traffic control consistent with the work environment assigned.
- Determine communication methods (hand signals, warning alarms) to be used within a worksite.

- Provide training to workers on communication methods.
- Perform inspections of traffic control devices, make recommendations for improvement, and coordinate changes with the Project Manager and Traffic Control Engineer.
- Stop work in the event of an unsafe act or condition.

4. Help & Training

- All Roadway Workers shall be trained on how to work next to motor vehicle traffic in a way that eliminates or minimizes their exposure. Refer to *S3AM-003-PR1 SH&E Training* and *S3AM-306-ATT3 Safe Work Practices for Roadway Workers*.
- Individuals that oversee work occurring on highways and roads shall receive appropriate training per jurisdictional requirements and guidance.
- Workers with specific responsibilities and duties (Competent Person, Flag Person, Spotter, Supervisor) shall have additional training, experience, and authorization to perform assigned duties.
- All Roadway Workers shall receive a site-specific orientation to the hazards and controls, including as applicable, Traffic Protection Plan, Traffic Control Plan, and communication requirements for the site(s) to which they are assigned. No personnel shall be allowed onto the site without first reviewing the project-specific Traffic Control Plan and/or Traffic Protection Plan. Additional orientation topics are specified in the SH&E Plan.
- Only persons designated by the Project Manager, with appropriate training and experience will serve as a Flag Person (traffic control). Flag Person training shall comply with jurisdictional requirements and guidance, which may vary between work locations.
- Flag Persons and Spotters shall be instructed by the Competent Person on the specific project Traffic Protection Plan (if applicable) and Traffic Control Plan.
- Flag Persons shall be trained / certified in signaling methods. Training shall comply with jurisdictional requirements and guidance (American Traffic Safety Services Association or equivalent).
- Roadway Workers, Equipment Operators, and Drivers in internal work zones shall be trained to their respective tasks and know the routes of construction vehicles. Where AECOM is not a controlling contractor at the site, training should be provided by the controlling contractor or owner.
- Equipment Operators and Spotters shall know the hand signals to be used, and the communication methods and requirements applicable to the worksite.
- Equipment Operators, Spotters, and Roadway Workers shall be trained on the visibility limits and the "blind spots" for each vehicle on site.
- Roadway Workers shall be trained on the hazards associated with shift work and night work. Please also refer to *S3AM-306-ATT4 Safe Work Practices for Night Work*.

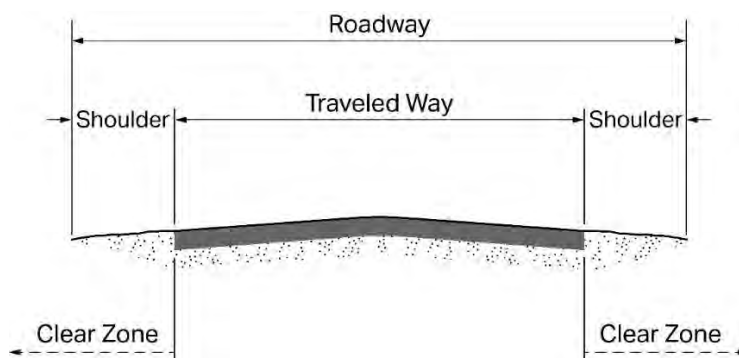
5. Terms and Definitions

- | | | |
|----|-------------------|---|
| a. | Channeling Device | devices to warn road users of conditions created by work activities in or near the roadway and to guide road users. Channelizing devices include cones, tubular markers, vertical panels, drums, barricades, and longitudinal channelizing devices. |
| b. | Clear Zone | the total roadside border area, starting at the edge of the traveled way that is available for an errant driver to stop or regain control of a vehicle. This area might consist of a shoulder, a recoverable slope, and/or a non-recoverable, traversable slope with a clear run-out area at its toe. See Figure 1. |
| c. | Competent Person | those who are knowledgeable about the fundamental principles of temporary traffic control and the work activities to be performed, and who have the authority to propose and implement corrective measures to eliminate hazardous |

situations associated with temporary traffic control.

- d. **Flag Person** a person who actively controls the flow of vehicle traffic into and/or through a temporary traffic control zone using hand-signaling devices or an Automated Flagger Assistance Device (AFAD).
- e. **Highway** a general term for denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.
- f. **Personal Protective Equipment (PPE)** safety clothing and equipment worn by workers in traffic areas to provide protection and heightened visibility from physical hazards, including moving vehicles and construction equipment.
- g. **Right-of-Way** a general term for denoting the traveled way, and adjacent clear zone, berms, shoulders, and sidewalks that encompass public space potentially impacted by construction, maintenance, or other activities.
- h. **Roadway** that portion of a highway improved, designed, or ordinarily used for vehicular travel and parking lanes. Excludes the sidewalk, berm, or areas used solely by persons riding bicycles or other human-powered vehicles. See Figure 1.
- i. **Roadway Worker** a person on foot whose duties place him or her within the right-of-way.
- j. **Temporary Traffic Control Zone** an area of a highway where road user conditions are changed because of temporary traffic control devices, flag persons, uniformed law enforcement officers, or other authorized personnel.
- k. **Temporary Traffic Control Device** a sign, signal, marking, or other device used to regulate, warn, or guide traffic, placed on, over, or adjacent to a street, highway, private road open to public travel, pedestrian facility, or shared-use path by authority of a public agency or official having jurisdiction, or, in the case of a private road open to public travel, by authority of the private owner or private official having jurisdiction.
- l. **Traffic Control Engineer** a person who by qualification, experience, and certification is licensed and authorized to perform the duties associated with the design of traffic control systems, including temporary traffic control.
- m. **Traffic Protection Plan** a detailed plan for the protection of workers within a work zone. The plan shall contain a written description of the traffic hazards to which workers may be exposed within the confines of a work zone. Traffic Protection Plans are commonly referred to as Internal Traffic Control Plans.
- n. **Traffic Control Plan** a detailed plan for the control of traffic (public) during construction, maintenance, or utility operations on a highway/road, taking into account the organized, systematic, safe conduct of the project, including, as applicable, detours, staging sequences, work vehicle access and egress from worksites, temporary barriers, removal of old pavement markings, and selection and planned implementation of appropriate typical layouts for traffic control. Plan shall be written to meet jurisdictional requirements and guidance. Traffic Control Plans are commonly referred to as Traffic Management Plans.
- o. **Traveled Way** the portion of the roadway for the movement of vehicles, exclusive of the shoulders, berms, sidewalks, and parking lanes. See Figure 1.
- p. **Work Zone** a controlled access area due to the presence of construction, maintenance, or operational activity.

Figure 1. Depiction of Traveled Way, Roadway, Shoulder, Clear Zone



6. References

List other procedures or external standards/regulations that apply to carrying out the process in this document. List using 'Alpha List' option from the AECOM Procedure List dropdown on the Home tab.

- a. S3AM-003-PR1 SH&E Training
- b. S3AM-208-PR1 Personal Protective Equipment
- c. S3AM-209-PR1 Risk Assessment & Management
- d. S3AM-202-PR1 Competent Person Designation
- e. S3AM-008-PR1 Fitness for Duty
- f. S3AM-008-PR1 Emergency Response Planning – Americas

7. Records

Traffic Protection Plans, Traffic Control Plans, and completed Equipment Checklists shall be maintained in project files.

8. Appendices

- a. [S3AM-306-FM1](#) [Equipment Checklist](#)
- b. [S3AM-306-ATT1](#) [Protective Devices for Temporary Traffic Control \(TCC\)](#)
- c. [S3AM-306-ATT2](#) [Short and Long Term Work Zones](#)
- d. [S3AM-306-ATT3](#) [Safe Work Practices for Roadway Workers](#)
- e. [S3AM-306-ATT4](#) [Safe Work Practices for Night Operations in Work Zones](#)
- f. [S4\[DCS\]AM-306-ATT1](#) [Subcontracting Temporary Traffic Control – DCSA Group](#)

9. Change Log

List the change history pertaining to this document including if it was identified differently throughout its life-cycle:

Rev #	Change Date	Description of Change	Location of Change
2	Mar 1, 2016	AECOM URS integration of legacy documents	
3	Dec 15, 2016	See Level III Americas Revision Summary - December 15, 2016	Various locations

Subcontracting Temporary Traffic Control

S4[DCS]AM-306-ATT1

1. Purpose and Scope

Contractors providing temporary traffic control (TTC) for work in roadways are a critical part of ensuring safety for all workers conducting lane closure activities.

TTC workers have an increased level of risk due to their exposure to active traffic and increasingly unpredictable behavior of drivers. The following requirements and guidelines have been developed to supplement *S3AM-306-PR1 Highway and Road Work* to further address this risk.

2. Requirements and Guidelines

Project Managers shall examine the full hierarchy of controls to determine and verify exposure to live traffic cannot be eliminated through other means (elimination, substitution).

Safety requirements and expectations should be communicated to traffic control contractors through coordination with AECOM Procurement. The Project Manager-prepared scope of work (request for proposal) and the subcontract's terms and conditions must include the following at a minimum:

- TTC contractor should conduct a site visit to develop the site-specific Traffic Control Plan. Positive protection (such as portable, movable, ballast filled barriers, shadow trucks, attenuators) and speed reductions should be included whenever possible, with approval from local jurisdiction.
- Supervisors provided by TTC contractor should have the following qualifications:
 - (2) years' TTC supervisor experience in a non-highway settings and
 - (5) years' TTC supervisor experience in a highway setting
- Workers provided by the TTC contractor should have verifiable training recognized by American Traffic Safety Services Association (ATSSA) or other equivalent certifying organization acceptable for the given jurisdiction.
- If a TTC contractor provides a worker(s) with less than six (6) months experience, the contractor shall assign a safety mentor consistent with AECOM's Newly Hired/Transferred Employee Program (e.g., Green Hat). TTC teams should not exceed one (1) newly hired employee per five (5) team members.
- In advance of work the TTC contractor shall submit risk assessment documents (Task Hazard Assessment) for the following tasks (at a minimum):
 - TTC scene set up
 - Flagging and directing traffic
 - TTC scene termination and retrieval

AECOM Project Manager shall conduct project safety orientations/kick-off within one (1) week of field work and include a management or supervisory representative from the TCC contractor in the orientation.

- TCC contractor's workers shall be included in each subsequent daily tailgate safety meeting and attendance shall be documented.

AECOM Field Supervisors shall receive advanced training from ATSSA or equivalent certifying organization so they can provide effective spot checks of TCC contractor performance.

1. Change Log

List the change history pertaining to this document including if it was identified differently throughout its life-cycle:

Rev #	Change Date	Description of Change	Location of Change
0	April 28, 2020	New Document	

Rev #	Change Date	Description of Change	Location of Change
4	Jul 31, 2019	See Level III Americas Revision Summary – July 31, 2019	Scope & Purpose
5	Nov 13, 2019	Complete rewrite & formatting – tracked changes document on file	Comprehensive changes
6	April 28, 2020	Added pedestrian content and examples of legislation	2.1.2 and 2.1.3 and 8.f

Americas

Highway and Road Work Equipment Checklist

S3AM-306-FM1

Name of Contractor (or N/A): _____ Project Name: _____

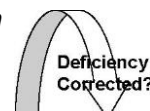
Location: _____ Project #: _____

Date: _____ Time: _____ Weather: _____

Person Conducting Inspection _____ Title: _____

*Note: As you conduct your inspection you should be able to answer each question with a **YES**. If the answer to any question is **NO**, this deficiency should be corrected as soon as possible.*

	YES	NO	OK	N/A
Is an approved traffic control/protection plan on site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are accident prevention signs, tags clearly visible?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are danger signs used where immediate hazards exist?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are caution signs used to warn against potential hazards or to caution against unsafe practices?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are exit signs posted at all exit locations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are proper visual warning signs posted prior to (in advance of) the work area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are flaggers provided with signs, signals, and barricades to provide the necessary protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are flaggers using red lights when signaling during periods of darkness?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are flaggers wearing highly visible warning garments?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are the flaggers trained in proper flagging procedures?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are all workers trained in working in proximity to motor vehicle traffic?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are warning garments worn at night reflectorized?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are highly visible flags used by the flaggers at least 18 inches (45 centimeters) square?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Are barricades used to totally obstruct the passage of people and vehicles to protect the work area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Do barricades meet the requirements set forth in the Manual of Uniform Traffic Control Devices?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Has effectiveness of the traffic control/protection plan been evaluated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



COMMENTS:

Americas

Protective Devices for Temporary Traffic Control (TCC)

S3AM-306-ATT1

1. Temporary Traffic Control Devices (TCC) - alphabetical

Protective Device	Common Applications	General Guidance (refer to jurisdictional requirements and guidance for further detail)
Arrow Boards	There are a variety of arrow board application: low-speed urban streets, intermediate speed facilities and for maintenance or mobile operations on high-speed roadways, high-volume motor vehicle traffic control projects, or those intended only for use on vehicles authorized by the state or local agency.	An arrow board should be used in combination with appropriate signs, channelizing devices, or other TTC devices. An arrow board should be placed on the shoulder of the roadway or, if practical, farther from the traveled lane. An arrow board should be delineated with retroreflective TTC devices. When an arrow board is not being used, it should be removed; if not removed, it should be shielded; or if the previous two options are not feasible, it should be delineated with retroreflective TTC devices.
Attenuator Vehicles	Conditions which require or recommend the use of an attenuator vehicle are generally specified in jurisdictional requirements and guidance. Other scenarios (bridge inspections, debris removal) may warrant the use of an attenuator vehicle. Attenuator vehicles are best suited for situations when workers or a hazard are confined to a limited area rather than spread over a longer distance.	It is good construction practice to place an attenuator truck or trailer (minimum) an appropriate distance and immediately in advance of workers in a work zone to protect workers from vehicle intrusions and to warn approaching drivers that the shoulder or traveled lane is occupied by work activities. The attenuator vehicle should be placed a sufficient distance to protect the work zone but avoid creating so much distance that a vehicle can travel around the attenuator vehicle and re-enter the lane ahead of the protected work. The tires should be placed so that if the vehicle is struck, it turns away from workers. Attenuator vehicles shall be equipped with flashing arrows, changeable message signs, and/or high-intensity rotating, flashing, oscillating or strobe lights to warn approaching motorists. Specific requirements for markings may be specified in jurisdictional requirements and guidance.
Automated Flagger Assistance Devices	These devices are designed to be remotely operated either by a single flag person at one end of the temporary traffic control zone or at a central location, or by separate flag persons near each device's location.	Automated Flagger Assistance Devices (AFADs) shall only be used in situations where there is only one lane of approaching traffic in the direction to be controlled.
Channelizing Devices	The function of channelizing devices is to warn road users of conditions created by work activities in or near the roadway and to guide road users. Channelizing devices include cones, tubular markers, vertical panels, drums, barricades, and longitudinal channelizing devices.	Channelizing devices should be placed to provide for smooth and gradual vehicular traffic flow from one lane to another, onto a bypass or detour, or into a narrower traveled way. Channelizing devices should be used to channelize vehicular traffic away from the work space, pavement drop-offs, pedestrian or shared-use paths, or opposing directions of vehicular traffic.

Protective Device	Common Applications	General Guidance (refer to jurisdictional requirements and guidance for further detail)
		<p>Channelizing devices should be selected and placed in work zones in accordance with jurisdictional requirements and guidance.</p> <p>Devices that are damaged or have lost a significant amount of their retro-reflectivity and effectiveness shall be replaced.</p> <p>Devices should be secured against tipping, particularly by wind generated by moving traffic (or other).</p> <p>Tubular markers are less visible and should only be selected where space restrictions prevent the use of other markers.</p>
Crash Cushions	<p>Crash cushions are systems that mitigate the effects of errant vehicles that strike obstacles either by smoothly decelerating the vehicle to a stop when hit head on or by redirecting the errant vehicle. Crash cushions include concrete barriers, ballast-filled barriers, and moveable concrete barriers, as well as shadow vehicles with truck-mounted attenuators, and vehicle arresting systems that prevent road users from entering a closed section of roadway.</p>	<p>Stationary crash cushions selected for use in a temporary traffic control zone must be crashworthy, designed for the application they are selected, periodically inspected, and promptly repaired or replaced to maintain their effectiveness. Specific information on the use of crash cushions can be found in jurisdictional requirements and guidance.</p>
Flag Person	<p>A flag person is a trained/qualified position used in conjunction with other TTC measures to facilitate the movement of vehicles away from the work zone. Flag persons also monitor the work zone for intrusions and give warnings to workers.</p>	<p>Flag persons shall stand in a safe position, be clearly visible, and have an unobstructed view of approaching traffic. Flag persons must remain visible to other road users.</p> <p>Flag persons shall be positioned a suitable distance away from the work area (a distance permitting vehicles to slow down or stop before reaching the work area). Distances are defined in local jurisdictional requirements and guidance.</p> <p>Flag person stations must be located such that an errant vehicle has additional space to stop without entering the work zone. Flag persons must have an escape route that can be used to avoid an errant vehicle.</p> <p>The Traffic Control Plan should include advanced warning signage notifying drivers of the presence of a flag person. "Flag Person Ahead" (or similar) signs shall be posted in advance of each flag person's station. Such signs shall be removed promptly when the flagging operation terminates. Specification for size, color, and proper use of the "Flag Person Ahead" sign is prescribed in jurisdictional requirements and guidance.</p> <p>Flag persons should use STOP/SLOW signs or paddles. Specification for size, color, and proper use of the STOP/SLOW paddles is prescribed in jurisdictional requirements and guidance.</p> <p>Flag person stations should be illuminated at night. Refer to S3AM306-FM5 Safe Practices for Night Work in Work Zones.</p> <p>Flag persons and others providing temporary traffic control shall wear high visibility retro-reflective clothing in compliance with jurisdiction requirements and guidance.</p>

Protective Device	Common Applications	General Guidance (refer to jurisdictional requirements and guidance for further detail)
		<p>Class III is typically the minimum requirement for normal conditions.</p> <p>Flag persons shall be provided with sufficient breaks, shade, water, and a rest area away from the roadway.</p> <p>Flag persons shall not be distracted, wear head phones, use a cell phone or mobile device, or engage in multitasking or other conversations while flagging.</p> <p>Flag persons should stand away from other workers, vehicles, and equipment but should be periodically monitored by the site supervisor or site safety officer to assure they are maintaining alertness, taking breaks, and performing duties as prescribed.</p> <p>If railroad tracks are adjacent to the work zone, the flag station should be positioned so that vehicles are stopped in advance of the railroad tracks and the work zone.</p>
Law Enforcement	Local law enforcement agencies can be useful in enforcing and supporting safe work zones, especially in areas where fines for speeding and other traffic violations exist, during nighttime operations, short-term and mobile operations with minimal controls, and around schools and other sensitive locations.	Use of local law enforcement agencies shall be coordinated in advance and frequent meetings shall be held to establish communication procedures.
Portable Changeable Message Signs	<p>Portable changeable message signs have a wide variety of applications in TTC zones, including roadway, lane, or ramp closures; incident management; width restriction information; speed control or reductions; advisories on work scheduling; road user management and diversion; warning of adverse conditions or special events; and other operational control.</p> <p>The primary purpose of portable changeable message signs in TTC zones is to advise the road user of unexpected situations. Portable changeable message signs are particularly useful as they are capable of:</p> <ul style="list-style-type: none"> A. Conveying complex messages, B. Displaying real time information about conditions ahead, and C. Providing information to assist road users in making decisions prior to the point where actions must be taken. 	When portable changeable message signs are used for route diversion, they should be placed far enough in advance of the diversion to allow road users ample opportunity to perform necessary lane changes, to adjust their speed, or to exit the affected highway.
Rolling Closures	A rolling closure is the use of police	In such cases, these very short duration operations can be

Protective Device	Common Applications	General Guidance (refer to jurisdictional requirements and guidance for further detail)
	<p>car(s), crash truck(s), and/or sign truck(s) to control the speed and restrain vehicles upstream of a construction site, so as to create a time window (usually 5 to 15 minutes) when the road downstream of the lead vehicles is effectively clear of vehicles, which creates an unhindered opportunity for workers to do work and/or make traffic control changes at the work site clear of live traffic.</p> <p>Example situations of where rolling closures may be a good method of traffic control include:</p> <p>Changing a lane closure on a freeway from a right lane closure to a left lane closure, or vice versa.</p> <p>Removing large debris from a roadway.</p>	<p>safely and efficiently carried out if traffic is temporarily prevented from entering the work zone. It is the decision of the road authority to use rolling closures.</p> <p>Paid-duty police officers and coordination and approval from local jurisdictions are required for freeway rolling closures due to increased hazard levels to the general public.</p> <p>Other road closures shall be coordinated with the road authority and executed in accordance with jurisdictional requirements and guidance.</p> <p>Prior to initiating a rolling closure, all parties shall have verbal communication to establish procedures, signals, and sequencing of the closure. Communication should be direct and verbal, or otherwise distinguishable from other roadways sounds (horns, sirens, etc.).</p>
Rumble Strips	<p>Transverse rumble strips consist of intermittent, narrow, transverse areas or rough texture or slightly raised or depressed road surface that extends across the travel lane.</p> <p>Transverse rumble strips alert drivers to unusual traffic conditions through noise and vibration. Longitudinal rumble strips alert drivers they are leaving a lane.</p>	<p>Design, placement, and use of rumble strips must be in accordance with jurisdictional requirements and guidance, and with approved Traffic Control Plan.</p>
Shadow Vehicles	<p>Shadow vehicles can be selected to provide greater warning to drivers and protection to the work zone, particularly in short duration scenarios where other TTC devices in use are lightweight/ mobile.</p>	<p>Shadow vehicles without an attenuator can cause increased injuries to the occupants of the shadow vehicle as well as the errant vehicle.</p> <p>Generally, shadow vehicles should be unoccupied when serving as protection from traffic. However, some mobile or short duration activities may require a driver to remain in the vehicle. If a driver remains in the vehicle, the driver's seatbelt and vehicle safety features must be used at all times.</p> <p>When used, shadow vehicles shall be equipment with flashing arrows, changeable message signs, and/or high-intensity rotating, flashing, oscillating, or strobe lights to warn approaching motorists. Specific requirements for markings may be specified in jurisdictional requirements and guidance.</p> <p>Roadway workers must maintain a buffer zone (minimum 50 feet) from shadow vehicles in the event the shadow vehicle is struck.</p> <p>Jurisdictional requirements and guidance for the design specification and use of shadow vehicles shall be followed.</p>

Protective Device	Common Applications	General Guidance (refer to jurisdictional requirements and guidance for further detail)
Spotters	<p>Spotters shall be used to facilitate the safe movement of equipment and vehicles within a work zone or construction site.</p> <p>Spotters shall be assigned to monitor traffic when a task prevents a worker from effectively monitoring traffic, or when road configuration prevents a worker from having visibility of traffic approaching the work area.</p> <p>Spotters can monitor traffic flow, backing vehicles, pedestrian access/egress, driveways, and parking activity.</p>	<p>Spotters are not to serve as flag persons unless they are trained and designated in a dual role by the project manager and duties are performed separately.</p> <p>Spotters are responsible for maintaining visibility by operators when performing their duties.</p> <p>Spotters must utilize the agreed upon and trained method of communicating (hand signals or other) with operators.</p> <p>Spotters shall not be distracted, wear head phones, use a cell phone or mobile device, or engage in multitasking or other conversations while spotting.</p>
Warning Signs	<p>Warning signs call attention to unexpected conditions on or adjacent to a highway or street and to situations that might not be readily apparent to road users. Warning signs alert road user to conditions that might call for reduction in speed or an action in the interest of safety.</p> <p>Warning signs internal to a construction zone may perform the same/similar function. Additional signage may be used to call attention to designated areas, paths of travel, restrictions, and appropriate use of certain areas.</p>	<p>The use of warning signs shall be selected by the traffic control engineer based on study or engineering judgement.</p> <p>Placement of signs in or near a work zone shall be determined based on driver perception, identification, emotion, and volition time. Generally, this is considered 6 seconds or more for high speed scenarios.</p> <p>Signs should not be placed so far in advanced distance that drivers may forget the warning and fail to respond.</p> <p>The location of driveways, parking, and similar locations between the warning sign and the work area should be considered in placing signs and providing warning to potential drivers of parked vehicles.</p> <p>Signage shall be of acceptable standards, in good condition, clean, legible, suited to the purpose, and meeting local legislation requirements.</p> <p>Signage shall be secured or weighted.</p> <p>Routinely inspect signage for placement, cleanliness, and physical damage.</p> <p>Cover road traffic control signage when no activity is present.</p> <p>Provide appropriate instructional signage such as: EVACUATION ROUTE; DO NOT ENTER; REDUCED SPEED AHEAD; ROAD CLOSED; WORKERS AHEAD; and NO OUTLET.</p>

2. Change Log

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Americas

Short and Long Duration Work Zones

S3AM-306-ATT2

1. Short-Term Traffic Protection

Short-term work zones are defined in jurisdictional requirements and guidance. In general, the following categories may apply:

- Mobile operations: move intermittently or continuously, such as litter and debris removal, pothole patching, utility operations.
- Very Short or Short Duration operations: occur for less than 1 hour (some jurisdictions are as low as 30 minutes). Roadside assistance, incident response, surveying, or other data collection may fall into this category.
- Short Duration, stationary: occurs for more than 1 hour (some jurisdictions are as low as 30 minutes) but less than one daylight period. Examples include maintenance and utility operations.

1.1 General

- 1.1.1 Most guidance allows for less permanent barriers and active devices (such as flashing arrow boards) to be used for short duration or mobile work tasks in order to reduce the amount of time that a worker is exposed to moving traffic.
- 1.1.2 When calculating the work duration, the time required to set up and take down traffic control should be included.
- 1.1.3 Personal protective equipment as defined in the SH&E Plan / Task Hazard Assessment (THA) shall be worn.

1.2 Safe Work Practices for Short Duration Work Zones

- 1.2.1 Consider timing of heaviest traffic flow on the specified roadway, and plan work to avoid roadway impact during high flow events such as morning and evening rush hours; holiday weekends; and notable community events such as fairs, parades, and entertainment venue events.
- 1.2.2 Minimize time for set-up and removal of traffic control devices:
 - Plan the number and placement of devices in advance to assure maximum protection with minimal number of devices.
 - Eliminate unnecessary steps from work or identify tasks that can be performed outside the work zone and locate those tasks in a fully protected area.
 - Substitute portable signage with vehicle-mounted signs that do not require additional time on the roadside to deploy.
 - Use lightweight portable signs.
 - Use a work vehicle to place devices.
- 1.2.3 Unexpected and emergency work:
 - Use high-intensity rotating, flashing, oscillating, or strobe lights on appropriately colored or marked vehicles.

- Arrow panels and portable changeable message signs can be used for advanced notifications and messaging to drivers.
- Law enforcement officers are often available in unexpected or emergency situations to assist with increasing visibility of the work zone.

1.2.4 Mobile operations (continuous movement at slow speeds with some short stops):

- Utilize vehicle-mounted devices (arrow boards, portable changeable message boards).
- Shadow and attenuator vehicles may be utilized to follow the work vehicle, especially in high speed or high-volume situations.

1.2.5 Managing intersections, driveways, and parking:

- Identify potential access points in pre-planning.
- Use flag persons or route diversion where needed to communicate the presence of the work zone.
- Consider law enforcement officers to assist with traffic control in complicated or high traffic flow intersections.
- Coordinate closures with owners/operators in advance of closing.
- Parking lane closures should include the use of channelizing devices in a manner that prevents vehicles from using or departing spaces and provide adequate buffer space for worker protection.

1.2.6 Accommodating non-motorized users and transit:

- Identify non-motorized facility user needs in and near the work area during pre-planning.
- Notify affected agencies.
- Incorporate non-motorized user and transit needs into Traffic Control Plan.
- Use temporary traffic control, including warning devices to alert users of changes and closures.
- Presence of transit facilities (rail) can increase work zone length or require additional flag persons and spotters.

1.2.7 Aerial Lift Trucks and other Work Vehicles:

- Never extend lifts over traffic lanes.
- Lane closures may be required for any lane over which a bucket will be extended.
- Use a shadow truck or attenuator vehicle when aerial lifts or other special purpose equipment is in use.
- Rolling stops, law enforcement, and other supporting jurisdictional services are required.
- Refer to *S3AM-323-Aerial Work Platforms* for further information.

2. Long-Term Traffic Protection

Long-term work zones are defined in jurisdictional requirements and guidance. In general, the following categories may apply:

- Intermediate-term stationary: more than one daylight period, up to 3 days or nighttime work lasting 1 hour.
- Long-term stationary: lasts more than 3 days in one location.

- 2.1.1 Traffic Control Plans may be extensive and require coordination with the supporting jurisdiction.
- 2.1.2 Traffic Protection Plans are required to facilitate the safe movement of vehicles and equipment within the work zone. These plans should include:
- Safe access and egress to and from the work zone;
 - Location of light stands, generators, cranes, bins, and other supporting features of the work;
 - Location of restrooms/handwashing, break areas; and
 - Parking.
- 2.1.3 Temporary Traffic Control devices should be selected so provide maximum separation of work zone from traffic using detours or through positive protection (Portable Concrete Barriers, Movable Concrete Barriers, Ballast-Filled Barriers, Shadow Vehicles, and Vehicle Arrestor Systems, or similar).
- 2.1.4 Personal protective equipment as defined in the SH&E Plan / Task Hazard Assessment (THA) shall be worn.
- 2.1.5 For long duration work zones, traffic accommodation shall be provided BEFORE the work starts and shall be maintained until the work is completed.

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Americas

Safe Work Practices for Roadway Workers

S3AM-306-ATT3

1. Safe Work Practices

Roadway workers shall abide by the following safe work practices:

- Roadway workers shall be fit-for-duty; refer to *S3AM-008-PR1 –Fitness for Duty*.
- All roadway workers shall be trained on how to work next to motor vehicle traffic in a way that eliminates or minimizes their exposure. Refer to *S3AM-003-PR1 SH&E Training*.
- All SH&E Plans, Traffic Control Plans, Traffic Management Plans (if applicable), and Task Hazard Assessments shall be reviewed and acknowledged by signature by each roadway worker prior to starting work.
- Roadway workers shall work distraction free. Use of cell phones, earphones/ear buds, or headsets or other distractions are prohibited while working within the work zone.
- Photography, videography, note, or measurement taking should be done with the use of a spotter to monitor traffic while engaged in immersive tasks.
- Seatbelts shall be worn, even when work vehicles are parked within a work zone.
- Vehicles should be positioned so that access and egress to and from vehicles are protected from traffic either by barriers or by entering and exiting the vehicle from the non-traffic exposed side of the vehicle.
- Roadway workers should maintain a body position that allows for visual monitoring of traffic; if such a position cannot be achieved or the assigned task prohibits a roadway worker from monitoring traffic, then a spotter(s) should be assigned.
- Crossing active lanes of traffic should be avoided. Crossing active lanes can be avoided by using short duration work zones, rolling closures, and parking in designated parking areas within lane closures.
- If accessing active lanes cannot be avoided due to a necessary work function (such as incident management, debris removal), then a spotter or warning signage to divert traffic should be deployed. Workers that enter lanes as a necessary work function shall be trained and evaluated on a method to assess vehicle speed and other risk factors for this task. Roadway workers shall notify their supervisors, or equivalent, prior to entering lanes and when they return from lanes.
- Roadway workers should maintain a body position that prevents them from being caught between two pieces of equipment, equipment and structures, or other crush points.

2. Change Log

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Americas

Safe Work Practices for Night Work

S3AM-306-ATT4

1. Safe Work Practices

- Shifting work to nighttime hours could provide an advantage in areas where traditional daytime traffic controls cannot achieve an acceptable balance between worker and public safety and traffic/community impact.
- Night work poses the increased risks of reduced visibility in darkness, potentially higher speeds on roads with fewer vehicles, and more impaired drivers especially on weekends and holidays.
- Night work on roadways should not be done unless there is sufficient justification that safety and community impact can be effectively balanced.
- A records review of impairment-related incidents can be completed to determine the risk level and appropriate levels of protection required.
- Local law enforcement should be used to calm traffic, monitor and enforce speed limits, identify and remove impaired motorists, and improve overall site security.
- Temporary traffic control devices may be larger and have increased reflectivity for night work.
- Spacing can be reduced between channelizing devices to discourage intrusions; in some settings (intersections, ramps), the channelizing device spacing should be reduced to half the normal tangent spacing or less to provide enhanced guidance through these critical areas.
- Reflectivity of surfaces on equipment, signs, and channelizing devices can be increased by adding reflective material.
- Attenuator vehicles and shadow vehicles are good choices for lane closures that occur at night and should be used for middle lane closures that occur at night, on highway, or where high speed traffic is present or possible.
- All reflective surfaces shall be cleaned as required so that the reflectivity of the material is not degraded. Any areas of reflective surface that are damaged or obscured shall be replaced.
- Personnel working at night shall have reflective tape on their hardhats and shall wear retroreflective ensembles that meet the jurisdictional requirements and guidance for night work. Refer to *S3AM-208-PR Personal Protective Equipment* and ANSI/ISEA 107-2015 for selection guidance.
- Additional measures, such as white coveralls, reflective bands, and personal battery-operated strobe lights may be used when practical. All devices should be planned to increase visibility by motorists as well as motorist ability to differentiate a worker from the background.
- Increasing the use of fluorescent materials during dawn or dusk may have a greater protective effect than reflectivity where light sources are low.

2. Illumination

- A lighting plan must be developed for long duration work zones that will have night work to assure proper lighting and support resources are provided.
- Whenever feasible and practical, light plants shall be used to illuminate the work area. Balloon or diffuse lighting portable light towers should be used along highways and where possible to provide glare-free illumination.
- On mobile operations, additional lighting such as spot lights, lights worn by workers and or lights added to equipment may be used to illuminate the work area.
- Lighting for workers on foot and equipment operators is to be at least 5 foot candles (54 Lux) or greater.

- All equipment shall have working lights and, at a minimum, have working strobe or warning beacon lights.
- All flag persons shall be placed in illuminated areas only.
- All lighting must be checked after setup to confirm that it is not interfering with approaching traffic and other equipment in the work zone and meets the jurisdictional requirements and guidance.

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Heavy Equipment

S3AM-309-PR1

1.0 Purpose and Scope

- 1.1 Outline the safe working requirements for working with and near heavy equipment and heavy equipment operation.
- 1.2 Military related vehicles and equipment (e.g. tanks) are not covered under this standard.
- 1.3 This procedure applies to all AECOM Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.

2.0 Terms and Definitions

- 2.1 **Heavy equipment** –All excavating equipment (e.g. scrapers, loaders, crawler or wheel tractors, excavators, backhoes, bulldozers, graders, agricultural and industrial tractors, etc.), cranes, lift trucks, drills, etc. This may include off-highway trucks (e.g. dump truck, heavy haul truck, etc.). For requirements related to crew trucks refer to *S3AM-005-PR1 Driving*.
- 2.2 **Operator** – Any person who operates the controls while the heavy equipment is in motion or the engine is running.
- 2.3 **Ground personnel/workers** – Personnel performing work on the ground around heavy equipment (note: operators are considered ground personnel when outside of the equipment cab).

3.0 References

- 3.1 S3AM-005-PR1 Driving
- 3.2 S3AM-202-PR1 Competent Person Designation
- 3.3 S3AM-213-PR1 Subcontractor Management
- 3.4 S3AM-303-PR1 Excavation
- 3.5 S3AM-322-PR1 Overhead Lines
- 3.6 S3AM-325-PR1 Lockout Tagout
- 3.7 S3AM-331-PR1 Underground Utilities & Subsurface Installation Clearance

4.0 Procedure

- 4.1 Roles and Responsibilities
 - 4.1.1 **Managers / Supervisors**
 - Responsible for confirming all equipment is in good working order and all equipment operators are verified as qualified on the piece of machinery they are assigned.
 - As applicable, review as-built drawings.
 - Maintain operation manuals at the site for each piece of equipment that is present on the site and in use.
 - Maintain a list of operators for the project, and the specific equipment that they are authorized to operate.
 - Prohibit equipment from being operated by any personnel who have not been specifically authorized to operate it.

- Confirm an equipment maintenance inventory is maintained, schedules adhered to and appropriate inspections of equipment are conducted.
- Confirm subcontractors are properly pre-qualified in accordance with *S3AM-213-PR1 Subcontractor Management*.
- Require that subcontractor employees follow established safety procedures in operation, inspection, and maintenance of vehicles and equipment.
- Inform AECOM and subcontractor machinery operators about applicable local regulations restricting the consecutive minutes of engine idling time allowed.
- Confirm subcontractor machinery and mechanized equipment is approved for use in accordance with the requirements of *S3AM-309-FM1 Approval of Machinery & Mechanized Equipment*.
- Confirm that all rented equipment bears any required current certification marks and arrives in proper working order with the manufacturer's operating manual before acceptance from the supplier.
- Confirm that AECOM and subcontractor machinery and mechanized equipment is certified, as applicable, in accordance with manufacturer specifications and/or regulatory requirements.
- Visually observe the subcontractors' vehicles and equipment, for any unsafe conditions or practices. Equipment or operation not in compliance with applicable safety standards is prohibited.

4.1.2 **Employees / Ground Personnel**

- Confirm that all rented equipment arrives in proper working order with the manufacturer's operating manual before acceptance from the supplier.
- Ground personnel when working in the vicinity of heavy equipment shall have received training, and comply with the applicable rules of engagement.

4.1.3 **Operators (of heavy equipment)**

- Operate the equipment safely, maintain full control of the equipment, and comply with manufacturer's operation manual and the laws governing the operation of the equipment.
- Inspect equipment and immediately report defects and conditions affecting the safe operation of the equipment to the appropriate Supervisor.
- Trainees may operate equipment in accordance with jurisdictional requirements and under the direct supervision of a trainer.

4.2 **Communication**

- 4.2.1 Communication between site Managers / Supervisors, heavy equipment Operators, and site Employees / Ground Personnel is a key method of preventing serious injury or death during heavy equipment operations.
- 4.2.2 Managers shall confirm the Industrial site or project specific SH&E Plan is developed and communicated to all affected and involved employees. Refer to *S3AM-209-PR1 Risk Assessment & Management*.
- 4.2.3 Task Hazard Assessments and Daily Tailgate meetings shall be conducted in accordance with *S3AM-209-PR1 Risk Assessment & Management*.
- 4.2.4 Concerning worksites in which other employers control concurrent operations and SH&E issues related to the worksite, the manager shall coordinate with those conducting concurrent operations to confirm appropriate control measures are in place to protect employees from the hazards associated with activities to be performed.

- Coordination shall occur prior to work commencing, periodically thereafter, and as necessary given changes in scope and/or working conditions.
- Affected employees (including managers and supervisors) shall seek to participate in all site SH&E meetings related to concurrent operations.

4.2.5 The following points outline the communication requirements during heavy equipment operations:

- Site Supervisors/t Managers shall confirm that all operators are notified/informed of when, where, and how many ground personnel will be working on site.
- Site Supervisors/ Managers shall inform all ground personnel before changes are made in the locations of designated work areas.
- Prior to work initiating on site, the Site Supervisor/ Manager is to confirm all operators and ground personnel are trained on the hand signals that will be used to communicate between operators and ground personnel.
- Ground Personnel working around heavy equipment operations are to maintain eye contact with operators to the greatest extent possible (always face equipment). Never approach equipment from a blind spot or angle.
- All heavy equipment whose backup view can be obstructed shall be equipped with reverse warning devices (e.g., backup alarms) that can be significantly heard over equipment and other background noise. Reverse signaling lights shall be in working order.
- When feasible, two-way radios shall be used to verify the location of nearby ground personnel.
- When an operator cannot adequately survey the working or traveling zone, a signal person shall use a standard set of hand signals to provide directions. Flags or other high visibility devices may be used to highlight these signals.

4.3 Ground Personnel

4.3.1 Ground clearance around heavy equipment may significantly reduce hazards posed during heavy equipment operations.

4.3.2 The following points outline the clearance requirements during heavy equipment operations:

- Ground Personnel shall always yield to heavy equipment.
- Ground Personnel shall maintain a suitable “buffer” area of clearance from all active heavy equipment.
- A task hazard assessment that identifies any special precautions shall be completed and communicated to all AECOM personnel associated with or affected by the activity.
- Site Supervisors/ Managers shall designate areas of heavy equipment operation and confirm that all ground personnel are aware of designated areas.
 - Designated areas shall include work zone boundaries and travel routes for heavy equipment.
 - Travel routes shall be set up to reduce crossing of heavy equipment paths and to keep heavy equipment away from ground personnel.
 - Work zone boundaries shall consider line of fire hazards related to the equipment and associated activities. Refer also to *S3AM-309-ATT2 Operator Line of Sight*.
 - If working near heavy equipment, Ground Personnel shall stay clear of loads to be lifted or suspended loads, and out of the travel and swing areas (excavators, all-terrain forklifts, hoists, etc.) of all heavy equipment.
 - During winch use, all swampers or other personnel will remain outside the “whip area” of the winch line or tow cable.

- At a minimum, employees shall maintain a distance of at least two pile lengths from where piles are being cut and dropped, other than in situations where cut piles are being guided to the ground utilizing mechanical means (e.g., pile driver and shackle) to control the direction and speed of fall of the cut pile.
- When feasible, Site Supervisors/ Managers shall set up physical barriers (e.g., caution tape, orange cones, concrete jersey barriers) around designated areas and confirm that unauthorized ground personnel do not enter such areas.
- Operators shall stop work whenever unauthorized personnel or equipment enter the designated area and only resume when the area has been cleared.
- Operators shall only move equipment when aware of the location of all workers and when the travel path is clear.
- Ground Personnel shall never stand between two pieces of operating heavy equipment or other objects (e.g., steel support beams, trees, buildings, etc.).
- Ground Personnel shall never stand directly below heavy equipment located on higher ground unless it can be verified ground stability is not a factor and grade of slope is such that it would not contribute to equipment tip-over.
- Ground Personnel may only enter the swing area, work area or path of travel of any operating equipment when:
 - They have attracted the operator's attention and established eye contact, and
 - The operator has idled the equipment down, placed it in neutral, grounded engaging tools, set brakes and communicated entry is permitted.
- Employees shall keep all extremities, hair, tools, and loose clothing away from pinch points and other moving parts on heavy equipment.
- Employees shall not talk, text, or otherwise use a cell phone while standing or walking on a roadway or other heavy equipment path.

4.3.3 At a minimum, all Ground Personnel and Operators outside of heavy equipment shall wear the following:

- High visibility safety vest (fluorescent background material and retro-reflective striping) meeting jurisdictional requirements that is visible from all angles.
 - Background material: should be fluorescent yellow-green, fluorescent orange-red or fluorescent red.
 - Combined-performance retro-reflective material (e.g. the stripes): should be fluorescent yellow-green, fluorescent orange-red or fluorescent red - and shall be in contrast (that is, have a distinct color difference) to the background material.
 - Hazards may require high visibility garments that cover torso, legs and arms.
 - Confirm that vest is not faded or covered with outer garments, dirt, etc.
- American National Standards Institute/Canadian Standards Association- (ANSI/CSA-) approved hard hat
- ANSI/CSA-approved safety glasses with side shields
- At a minimum, CSA or ASTM approved, high-cut (min. 6"), puncture, impact and compression resistant footwear.
- ANSI/CSA-approved hearing protection as needed
- Appropriate work clothes (e.g., full-length jeans/trousers and a sleeved shirt; no tank, crew tops or other loose clothing permitted).

4.4 Prior to work commencing

- 4.4.1 All heavy equipment will be inspected pre-shift and then regularly as required with the details of the inspection recorded in a log book.
- Roll-over protection systems (ROPS) and appropriate overhead protection (Fall Object Protection FOP) shall be in place given the specific equipment requirements. Utilize equipment with enclosed cabs where feasible or accessible.
 - Where use of equipment with enclosed cabs is not feasible or said equipment is not accessible, operators shall use any additional personal protective equipment determined as necessary (e.g. goggles, additional hearing protection, etc.).
 - Equipment operated in hazardous atmosphere environments shall be equipped with the proper safety equipment (e.g., spark arrestors, positive air shut off, etc.).
 - Operation of equipment that has or had cab glass (per the manufacturer's specifications) that is cracked/broken (obstructing the operator's view) or missing is prohibited.
 - A locking device shall be provided that will prevent the accidental separation of towed and towing vehicles on every fifth-wheel mechanism and two-bar arrangement.
 - Trip handles for tailgates of dump trucks and heavy equipment shall be arranged so that when dumping, the operator will be in the clear.
 - The Operator will report defects and conditions affecting the safe operation of the equipment to the Site Supervisor or employer. Any repair or adjustment necessary for the safe operation of the equipment will be made before the equipment is used.
 - Exposed moving parts on heavy equipment (belts, gears, shafts, pulleys, sprockets, spindles, drums, fan belts, flywheels, chains, or other reciprocating, rotating or moving parts) which are a hazard to the operator or to other workers will be guarded.
 - If a part will be exposed for proper function it will be guarded as much as is practicable consistent with the intended function of the component.
- 4.4.2 An approved 4A40BC fire extinguisher shall be present on all heavy equipment. An approved 4A40BC fire extinguisher of appropriate rating shall be present and readily accessible on all heavy equipment.
- Fire extinguishers shall be inspected by the operator prior to heavy equipment operation each shift. Monthly and annual inspections shall be documented.
- 4.4.3 All Operators shall inspect the area adjacent to the machine prior to starting.
- Evaluate ground conditions, concurrent operations and obstructions to identify approved routes of travel and work areas.
 - As applicable, check that there is sufficient swing room and that the outriggers are adequately supported on solid and stable ground
- 4.4.4 Managers / Supervisors shall inform the operators of the equipment that AECOM employees are in the area and inquire if there are any restricted areas or specific rules or requirements. In some industrial facilities, heavy equipment has the 'right of way'.
- 4.4.5 Where the Operator will not have a full view of the path of travel, a signal person will be used on the ground that has a full view of the load, the operator, and the path.
- 4.4.6 All heavy equipment with limited visibility (operator cannot directly or by mirror or other effective device see immediately behind the machine) operated around workers or on a construction site:
- Shall have an audible back-up alarm installed that functions automatically when the vehicle or equipment is put into rear motion.

- All bi-directional equipment shall be equipped with a horn, distinguishable from the surrounding noise level, which shall be operated as needed when the machine is moving in either direction.
- Backing up or movement in both directions for bidirectional equipment shall occur only when a signal person communicates that it is safe to do so if alarms or horns are not feasible.

4.5 Operation

- 4.5.1 The Operator of heavy equipment is the only worker permitted to ride the equipment unless the equipment is equipped by the manufacturer for passengers. Manufacturer operator's manual shall be complied with.
- 4.5.2 A person will not operate heavy equipment unless the person has received adequate instruction and training in the safe use of the equipment, and has demonstrated to a qualified supervisor or instructor competency in operating the equipment.
 - Oilers, apprentices, and other operators will not be allowed to operate equipment unless authorized by the Manager.
- 4.5.3 The Operator of heavy equipment will operate the equipment safely, maintain full control of the equipment, and comply with the manufacturer's operator manual and the laws governing the operation of the equipment.
 - Operation of company-owned, leased, or rented vehicles or equipment while under the influence of alcohol or illegal drugs or otherwise impaired is prohibited.
 - Do not operate any equipment beyond its safe load or operational limits.
 - Operator shall not talk on, text, or otherwise use mobile phones while operating heavy equipment.
 - Never use bucket teeth or boom for lifting or moving heavy objects.
- 4.5.4 When heavy equipment is used for lifting or hoisting or similar operations there shall be a permanently affixed notation stating the safe working load capacity of the equipment and the notation shall be kept legible and clearly visible to the operator.
- 4.5.5 A Supervisor or Manager will not knowingly operate or permit a worker to operate heavy equipment which is, or could create, an undue hazard to the health or safety of any person. Where compliance is refused, the Manager or his or her designate should be notified immediately.
- 4.5.6 The Operator of heavy equipment will not leave the controls unattended unless the equipment has been secured against inadvertent movement.
 - The Operator is not to leave suspended load, machine or part or extension unattended, unless it has been immobilized and secured against inadvertent movement.
 - Turn off heavy equipment, place gear in neutral and set parking brake prior to leaving vehicle unattended.
 - Buckets and blades are to be placed on the ground and with hydraulic gears in neutral when not in use.
 - Brakes shall be set and, as necessary, wheels chocked or equivalent (as applicable) when not in use.
- 4.5.7 The Operator will maintain the cab, floor and deck of heavy equipment free of material, tools or other objects which could create a tripping hazard, interfere with the operation of controls, or be a hazard to the operator or other occupants in the event of an accident.
- 4.5.8 If heavy equipment has seat belts required by law or manufacturer's specifications, the Operator and passengers will use the belts whenever the equipment is in motion, or engaged in an operation which could cause the equipment to become unstable.

- Seat belts shall be maintained in functional condition, and replaced when necessary to ensure proper performance.
- 4.5.9 All vehicles transporting material or equipment on public roads shall comply with local laws pertaining to weight, height, length, and width. Obtain any permits required for these loads.
- 4.5.10 Never jump on to or off of a piece of heavy equipment, always maintain 3-points of contact at a minimum.
- 4.5.11 Never exit heavy equipment while it is in motion.
- 4.5.12 Do not ride with arms or legs outside of the truck body of equipment cab.
- Never ride on the outside of a piece of heavy equipment (e.g. in a standing position on the body, on running boards, or seated on side fenders, cabs, cab shields, rear of truck bed, on the load, bucket, etc.).
- 4.5.13 Have vehicle headlights on at all times when driving in the area.
- 4.5.14 Park motor vehicles off the haul roads, or away from the work areas.
- 4.5.15 Do not wear loose clothing or jewelry where there is a danger of entanglement in rotating equipment.
- 4.5.16 Do not enter the swing area of machines such as cranes, heavy drill rigs, or excavators, without first making eye contact with the operator, and receiving permission to do so. Refer to *S3AM-309-ATT2 Operator Line of Sight*.
- 4.5.17 Stay out of the blind areas around heavy equipment and never assume that the equipment operators have seen you or are aware of your presence.
- 4.5.18 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 shall observe and be in constant communication with the operator to prevent contact.
- 4.5.19 Vibrations from moving traffic or heavy equipment can cause excavations or spoil piles to become unstable.
- Excavation activity shall be conducted according to *SOP S3AM-303-PR1 Excavation*.
 - Equipment not involved in the excavating activity or not required to be in the vicinity shall keep clear. Equipment that shall operate in the vicinity shall maintain appropriate setback distances from edges of excavations or spoil piles.
- 4.5.20 All heavy equipment shall be operated in a safe manner that will not endanger persons or property.
- When ascending or descending grades in excess of 5 percent, loaded equipment shall be driven with the load upgrade.
 - When operating an electric-powered, remote controlled, hydraulic device used for demolishing concrete structures and refractory linings as well as excavating, refer to the *S3AM-309-ATT1 Brokk 180* for more specifics.
- 4.5.21 All heavy equipment shall be operated at safe speeds. Do not drive any vehicle at a speed greater than is reasonable and safe for weather conditions, traffic, intersections, width, and character of the roadway, type of motor vehicles, and any other existing condition.
- 4.5.22 Always move heavy equipment up and down the face of a slope. Never move equipment across the face of a slope.
- 4.5.23 Slow down and stay as far away as possible while operating near steep slopes, shoulders, ditches, cuts, or excavations.
- 4.5.24 When feasible, Operators shall travel with the "load trailing", if the load obstructs the forward view of the operator.

- 4.5.25 Slow down and sound horn when approaching a blind curve or intersection. Signal people equipped with 2-way radio communications may be required to adequately control traffic.
- 4.5.26 All haulage equipment / trucks, whose payload is loaded by means of cranes, power shovels, loaders, or similar equipment, shall have a cable shield and/or canopy adequate to protect the operator from shifting or falling material. If protection is not available for the operator, the operator shall leave the vehicle and wait in a designated safe location until it is loaded..
- 4.5.27 Equipment shall be shut down prior to and during fueling.
 - Confirm proper grounding/ bonding between equipment and fuel vehicle prior to fueling operations.
 - During fuel operations confirm fuel nozzle remains in contact with the tank.
 - Do not smoke, use electrical devices or have an open flame present while fueling.
 - Fuel shall not be carried in or on heavy equipment, except in permanent fuel tanks or approved safety cans.
- 4.5.28 Site vehicles will be parked in a designated parking location away from heavy equipment.
- 4.5.29 Operators shall never push/pull “stuck” or “broken-down” equipment unless a spotter determines that the area is cleared of all personnel around and underneath the equipment.
- 4.5.30 If designated for work in contaminated areas/zones, equipment shall be kept in the exclusion zone until work or the shift has been completed. Equipment will be decontaminated within designated decontamination areas.
- 4.5.31 Equipment left unattended at night adjacent to travelled roadways shall have appropriate lights or reflectors, or barricades equipped with appropriate lights or reflectors, to identify the location of that equipment, and shall not be closer than 6 feet (1.8m) (or the regulatory requirement for the work location) to the active roadway.
- 4.5.32 Rubber / pneumatic-tired earthmoving haulage equipment shall be equipped with fenders on all wheels. Mud flaps may be used in lieu of fenders whenever motor vehicle equipment is not designed for fenders.
- 4.5.33 Lift trucks shall have the rated capacity clearly posted on the vehicle, and the ratings are not to be exceeded.
- 4.5.34 Steering or spinner knobs shall not be attached to steering wheels.
- 4.5.35 High-lift rider industrial trucks shall be equipped with overhead guards.
- 4.5.36 All hot surfaces of equipment, including exhaust pipes or other lines, that present a possible injury or fire hazard, shall be guarded or insulated.
- 4.5.37 All equipment having a charging skip shall be provided with guards on both sides and open end of the skip area to prevent persons from walking under the skip while it is elevated.
- 4.5.38 Platforms, foot walks, steps, handholds, guardrails, and toeboards shall be designed, constructed, and installed on machinery and equipment to provide safe footing and access ways.
- 4.5.39 Substantial overhead protection shall be provided for the operators of fork lifts and similar equipment.
- 4.5.40 In an effort to reduce air emissions, fuel costs, and run-time hours (that can impact equipment warranty), operators shall limit heavy equipment engine idling to not more than five consecutive minutes. Local regulations at the location of the vehicle operation could require less than five consecutive minutes idling time. The idling limit does not apply to:
 - Idling when queuing.
 - Idling to verify that the vehicle is in safe operating condition.

- Idling for testing, servicing, repairing or diagnostic purposes.
- Idling necessary to accomplish work for which the vehicle was designed (cranes, man-lifts, forklifts, etc.)
- Idling required to bring equipment/vehicle to operating temperature, as specified by the manufacturer. Engine heaters shall be used for cold weather starting to avoid engine idling where feasible.
- Idling necessary to ensure safe operation of the vehicle.
- Idling to keep equipment (including windows) clear of ice and snow.
- Idling to provide air conditioning or heat to ensure the health and safety of the operator, but only when seated inside the equipment or vehicle.

4.6 Utilities

- 4.6.1 When contacted by heavy equipment, aboveground and underground utilities may cause severe injuries or death as a result of electrocution, explosion, etc. Refer to the *S3AM-322-PR1 Overhead Lines* procedure for more specifics.
- 4.6.2 The following outline the requirements while performing heavy equipment operations that may lead to contact with aboveground or underground utilities:
- Always be aware of surrounding utilities.
 - Confirm all equipment (e.g., dump trailers, loaders, excavators, etc.) is lowered prior to moving underneath aboveground utilities.
 - Confirm utilities are cleared and identified prior to beginning any earthmoving operation. Contact the local utility service providers for clearance prior to performing work. Confirm documentation of the contact is made; date, number; contact name, organization, etc. Refer to *SOP S3AM-303-PR1 Excavation* and *S3AM-331-PR1 Underground Utilities & Subsurface Installation Clearance*.

4.7 Training

- 4.7.1 The Operator or other qualified supervisor will provide all on-site personnel with an orientation to the heavy equipment and its associated hazards and controls.
- 4.7.2 Only designated, qualified personnel shall operate heavy equipment.
- 4.7.3 Operators shall have all appropriate jurisdictional licenses or training to operate a designated piece of heavy equipment.
- 4.7.4 Operators shall be evaluated through documented experience and routine monitoring of activities unless the equipment is operated by an AECOM operator in which case a practical evaluation is required. Operators shall be knowledgeable and competent in the operation of a designated piece of heavy equipment.

4.8 Inspection and Maintenance

- 4.8.1 Maintenance records for any service, repair or modification which affects the safe performance of the equipment will be maintained and be reasonably available to the operator and maintenance personnel regulatory agencies upon request during work hours.
- 4.8.2 Maintenance records will be maintained on the site or project for heavy equipment.
- 4.8.3 Conduct maintenance as prescribed by the manufacturer in the Operation Manual for each piece of equipment.
- 4.8.4 Servicing, maintenance and repair of heavy equipment will not be done when the equipment is operating.
- Lockout and tagout safety procedures are followed. Refer to *S3AM-325-PR1 Lockout Tagout*.

- Motors are turned off, unless required for performing maintenance or repair.
- All ground-engaging tools are grounded or securely blocked.
- Controls are set in a neutral position and brakes are set.
- Electrically driven equipment is installed with provision for tagging and locking out the controls while under repair.
- Manufacturer's requirements for maintenance and repair are followed.
- If continued operation is essential to the process, a safe means of protection shall be provided.
- Provide and use a safety tire rack, cage, or equivalent protection when inflating, mounting, or dismounting tires installed on split rims, or rims equipped with locking rings or similar devices.

4.8.5 All heavy equipment shall have a documented inspection and if necessary, repaired prior to use.

- Operators shall not operate heavy equipment that has not been cleared for use.
- All machinery and mechanized equipment will be verified to be in safe operating condition (refer to *S3AM-309-FM1 Approval of Machinery & Mechanized Equipment*) by a competent person (refer to *S3AM-202-PR1 Competent Person Designation*) within seven days prior to operation on a new site or project. Clearance is valid for up to one year for the given site or project.
- As applicable, all machinery and mechanized equipment shall be inspected / certified and tested at appropriate intervals as required by the manufacturer and/or regulatory requirements.

4.8.6 All heavy equipment shall be inspected at a minimum to the manufacturer's recommendations prior to each work shift. All defects shall be reported to the Supervisor/ Manager immediately.

- Defective heavy equipment shall be immediately tagged and taken out of service until repaired.
- Inspection, maintenance, service and repair records shall be maintained at the site. If a manufacturer's or company-specific inspection checklist is not provided, use *S3AM-309-FM2 Heavy Machinery Pre-Operation Checklist*.
- Records shall be made available for review upon request. Note: Documents may be electronically stored in the project files.

4.9 Fueling and batteries

4.9.1 A well-ventilated area shall be used for refueling.

4.9.2 Only the type and quality of fuel recommended by the engine manufacturer shall be used.

4.9.3 Fuel tanks shall not be filled while the engine is running. All electrical switches shall be turned off.

4.9.4 If there is potential to spill fuel on hot surfaces, the surfaces shall be permitted to cool down prior to fueling. Any spillage shall be cleaned before starting engine.

4.9.5 Spilled fuel shall be cleaned with cotton rags or cloths and disposed of in the proper receptacle; do not use wool or metallic cloth.

4.9.6 Open flames, lighted smoking materials, sparking equipment or any other type of ignition source shall remain a minimum of 35' (10.7m) from the fueling area and/or fuel source. This clearance shall be increased if required or conditions warrant.

4.9.7 Heaters in carrier cabs shall be turned off when refueling the carrier or the drill rig.

4.9.8 Portable containers to be filled shall be placed directly on the ground or be properly grounded prior to filling to prevent creation of a static charge. Portable fuel containers shall not be filled completely to allow expansion of the fuel during temperature changes.

4.9.9 Control electrostatic hazards.

- Before activating fuel pump, touch some part of vehicle / equipment to de-energize any static electricity that may be present.
 - The fuel nozzle shall be kept in contact with the tank being filled to prevent static sparks from igniting the fuel.
 - Fuel containers and transfer hoses shall be kept in contact with a metal surface during travel to prevent build-up of a static charge.
- 4.9.10 Portable fuel containers shall not travel in the vehicle or carrier cab with personnel.
- 4.9.11 Batteries shall be serviced in a ventilated area while wearing appropriate Personal Protective Equipment.
- 4.9.12 When a battery is removed from a vehicle or service unit, the battery shall be disconnected ground post first. Consult the SDS applicable to the battery and/or contents for additional information including; handling, precautions, and first aid measures.
- Spilled battery acid shall be immediately flushed off the skin with a continuous supply of water. Battery storage or maintenance areas shall have readily accessible eye wash stations.
 - Should battery acid get into the eyes, the eyes shall be flushed immediately with copious amounts of water and medical attention shall be sought immediately.
- 4.9.13 When installing a battery, the battery shall be connected ground post last.
- 4.9.14 When charging a battery, cell caps shall be loosened prior to charging to permit gas to escape.
- 4.9.15 When charging a battery, the power source shall be turned off to the battery before either connecting or disconnecting charger loads to the battery posts.
- 4.9.16 To avoid battery explosions, the cells shall be filled with electrolytes. A flashlight (not an open flame) shall be used to check water electrolyte levels. Avoid creating sparks around batteries by shorting across a battery terminal. Lighted smoking materials and flames shall be kept at least a minimum of 35 feet (10.7 meters) away from battery-charging stations.

5.0 Records

- 5.1 Inspection, maintenance, service and repair records shall be maintained with the equipment.

6.0 Attachments

- 6.1 [S3AM-309-ATT1](#) [Brokk180 Safety Card](#)
- 6.2 [S3AM-309-ATT2](#) [Operator Line of Sight](#)
- 6.3 [S3AM-309-FM1](#) [Approval of Machinery & Mechanized Equipment](#)
- 6.4 [S3AM-309-FM2](#) [Heavy Machinery Pre-Operation Checklist](#)
- 6.5 [S3AM-309-FM3](#) [Rubber Tire Backhoe Operator Skill Evaluation](#)
- 6.6 [S3AM-309-FM4](#) [Scraper Operator Skill Evaluation](#)
- 6.7 [S3AM-309-FM5](#) [Bull Dozer Operator Skill Evaluation](#)
- 6.8 [S3AM-309-FM6](#) [Dump Truck Operator Skill Evaluation](#)
- 6.9 [S3AM-309-FM7](#) [Roller Compactor Operator Skill Evaluation](#)
- 6.10 [S3AM-309-FM8](#) [Front End Loader Operator Skill Evaluation](#)
- 6.11 [S3AM-309-FM9](#) [Grader Operator Skill Evaluation](#)
- 6.12 [S3AM-309-FM 10](#) [Excavator Operator Skill Evaluation](#)
- 6.13 [S3AM-309-FM11](#) [Water Truck Operator Skill Evaluation](#)

- 6.14 [S3AM-309-FM12](#) [Heavy Equipment Maintenance Inventory](#)
- 6.15 [S3AM-309-FM13](#) [Heavy Equipment Inspection Report](#)

Brokk 180

S3AM-309-ATT1

1.0 Objective/Overview

- 1.1 The Brokk 180 is an electric-powered, remote controlled, hydraulic device used for demolishing concrete structures and refractory linings as well as excavating. This machine includes attachments designed exclusively for demolishing work (e.g., grapple, bucket, hydraulic hammer, etc.). By using the remote control unit, an operator can move the machine and attachments in different directions and speeds from afar.

2.0 Potential Hazards

- 2.1 Flying debris
- 2.2 Crush/impact/pinch from extendable boom, tracks, and tipping over
- 2.3 Struck-by
- 2.4 Electricity (subsurface utilities when excavating)
- 2.5 Gas lines (subsurface utilities when excavating)
- 2.6 Noise



3.0 Safe Operating Guidelines

- 3.1 Prior to use, complete a pre-operation inspection to determine if the unit is in safe working condition.
- 3.2 Position the unit to safely perform the intended task, then deploy the outriggers to stabilize the unit.
- 3.3 Confirm that the operator knows what the lifting capacity is; do not exceed the lifting capacity.
- 3.4 Complete a subsurface utility clearance prior to excavating.
- 3.5 Operator should define a swing radius area and exclude workers from the area. Establish a minimum 15-foot (4.5-meter) clearance around the unit while operating.
- 3.6 Do not allow debris to build up around the unit. Maintain good housekeeping practices.
- 3.7 Prior to removing debris from under the boom, stop, disengage the unit, and position the boom so that the attachment is at rest on the ground.
- 3.8 Personnel operating the unit with the remote control device will be properly trained and certified by a competent person.
- 3.9 The operator will be able to maintain line of sight visual contact with the unit at all times to assess hazards and site security.
- 3.10 Maintenance in excess of preventive maintenance activities (e.g., lubrication, replenishing fluids, etc.) will be performed by manufacturer personnel ONLY.
- 3.11 All operations will comply with the manufacturer's recommended policies.

4.0 Training Requirements

- 4.1 Review of applicable Standard Operating Procedures.
- 4.2 Complete knowledge and understanding of remote control functions.
- 4.3 Review and follow manufacturers' recommended policies and practices.

5.0 Personal Protective Equipment

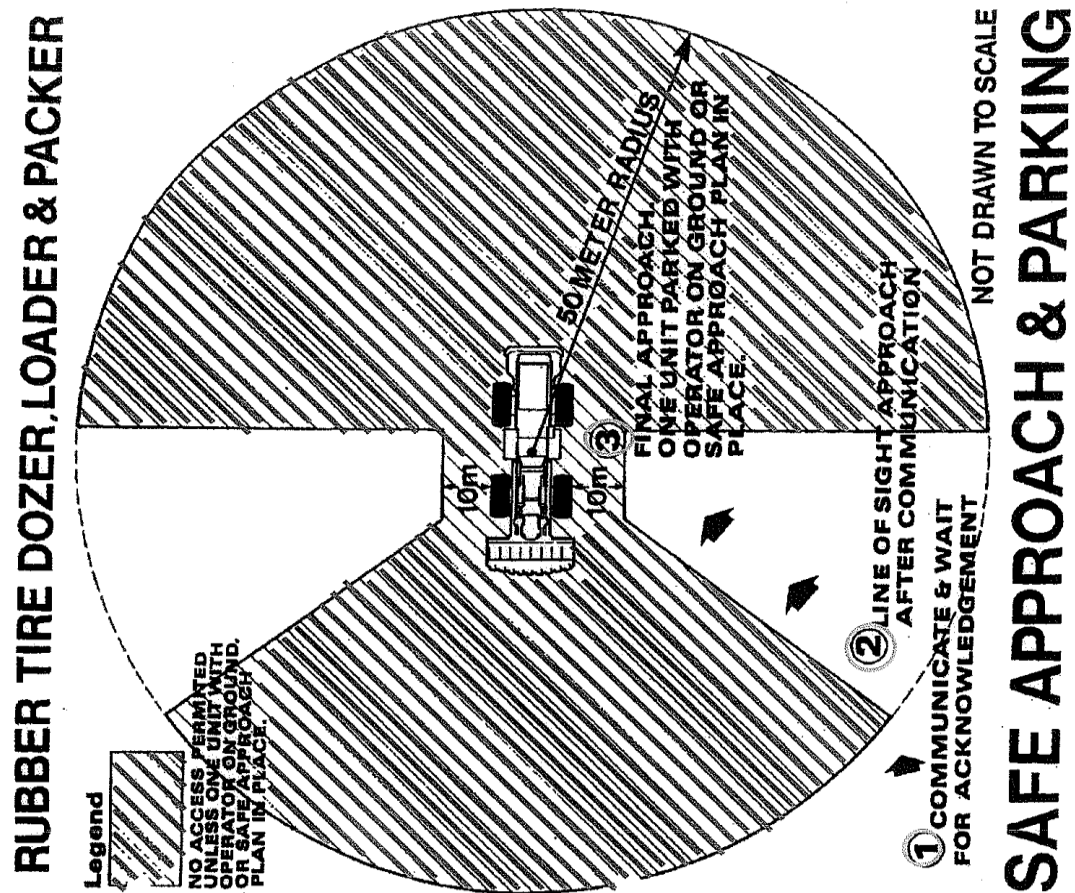
- 5.1 Class II (minimum) American National Standards Institute/Canadian Safety Association Safety Vest
- 5.2 Hard Hat
- 5.3 Safety Toe Boots
- 5.4 Safety glasses with side shields
- 5.5 Hearing protection (ear plugs and/or ear muffs)
- 5.6 Leather gloves

6.0 Other Safety Tips

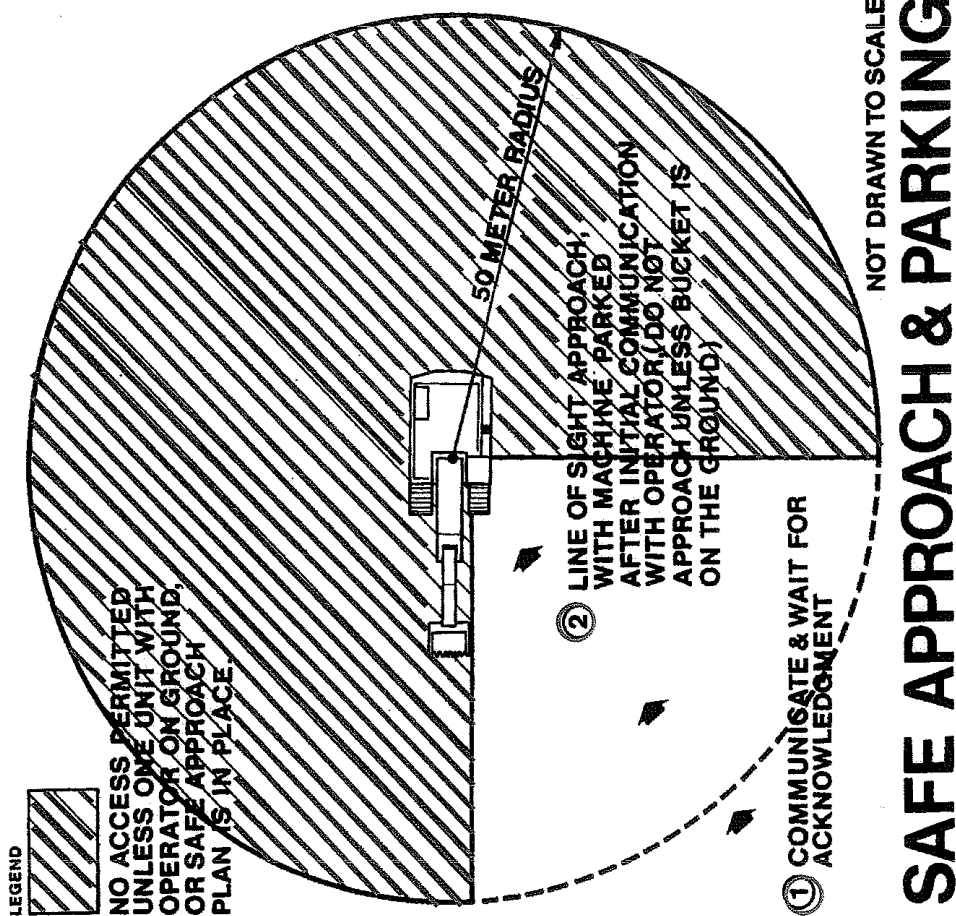
- 6.1 Never stand under a raised boom.
- 6.2 Pay close attention to power cords for potential tripping hazard and equipment entanglement.

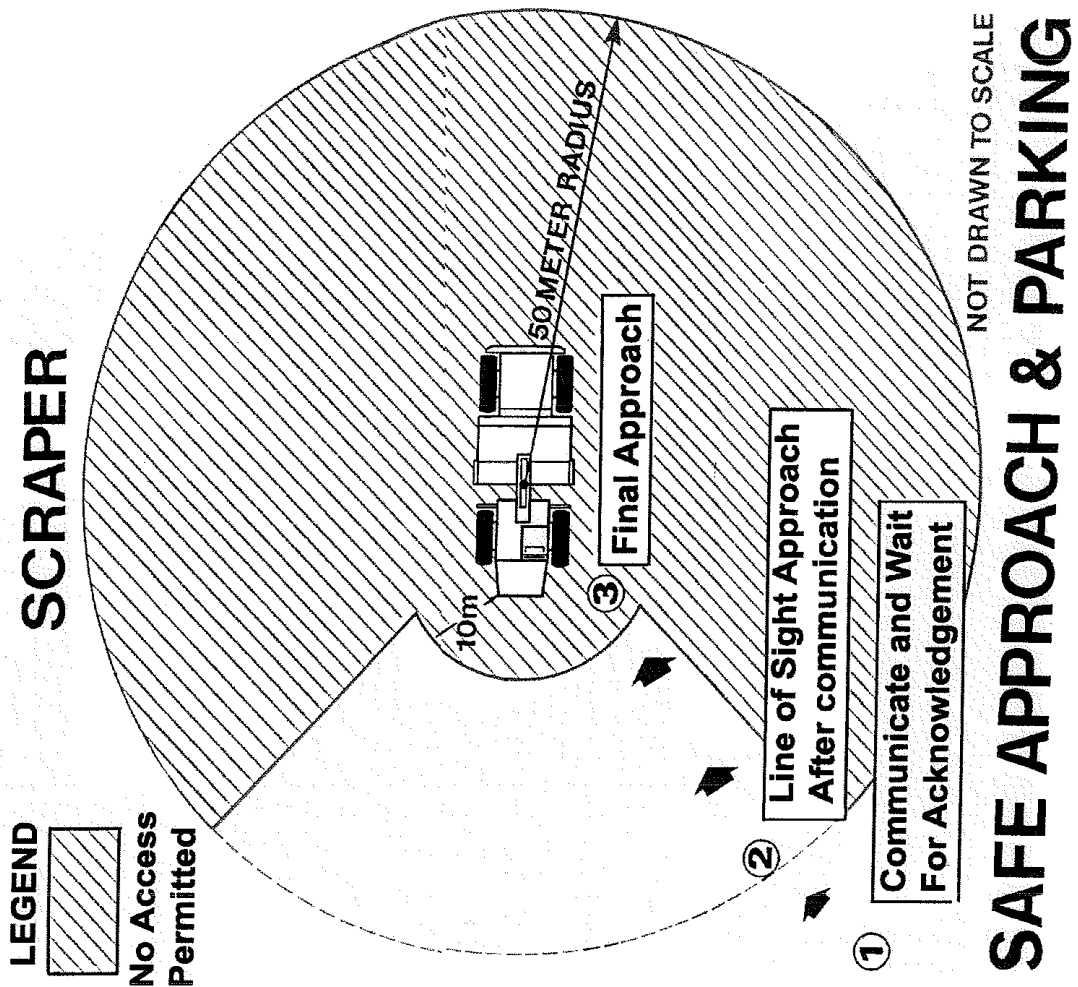
Operator Line of Sight

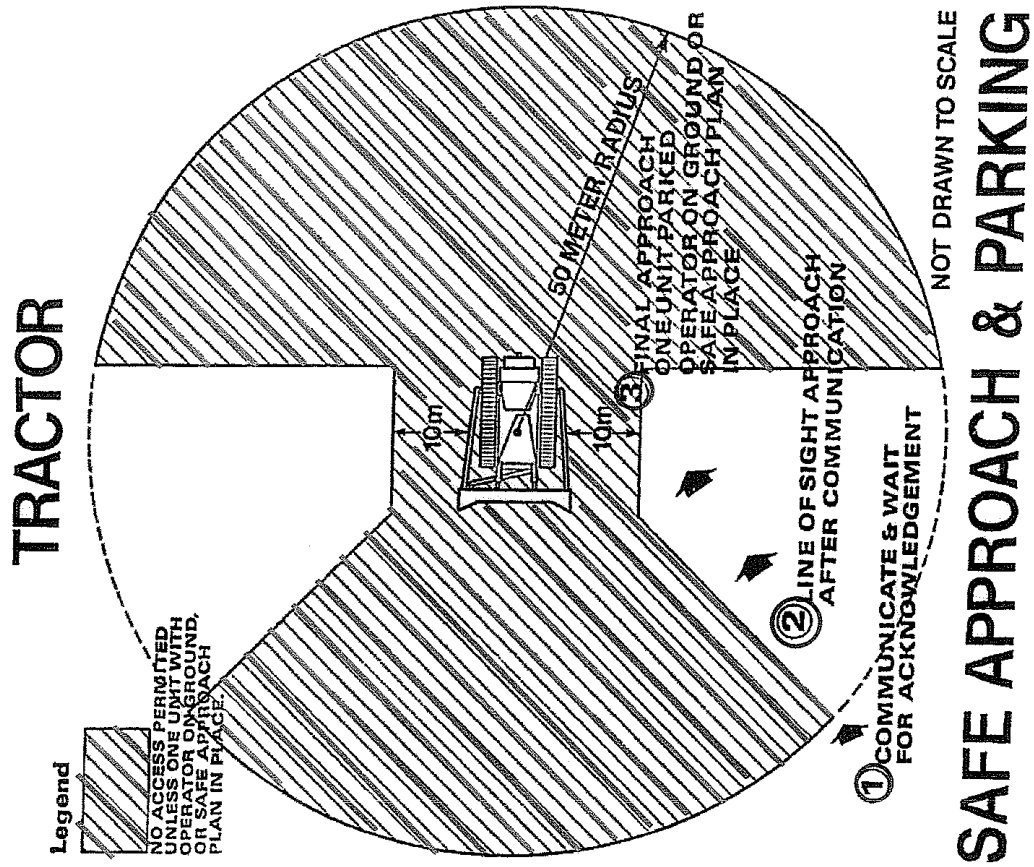
S3AM-309-ATT2

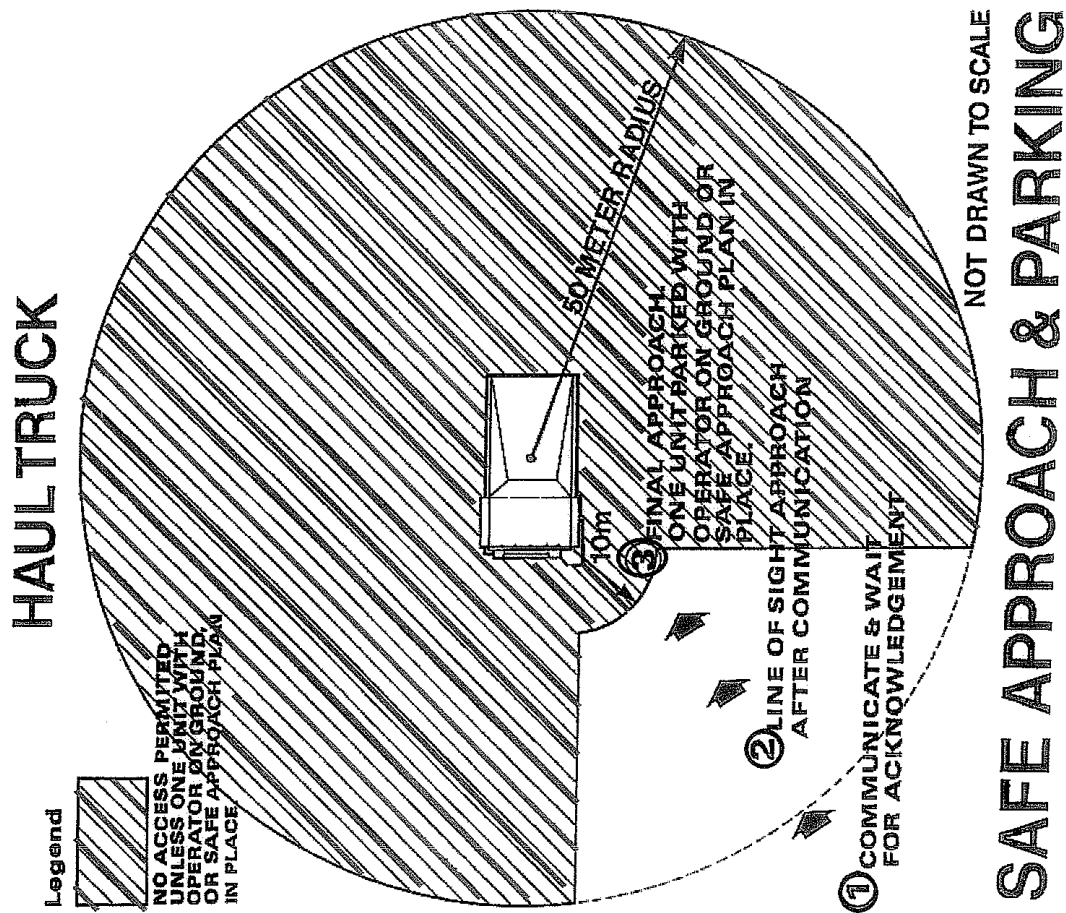


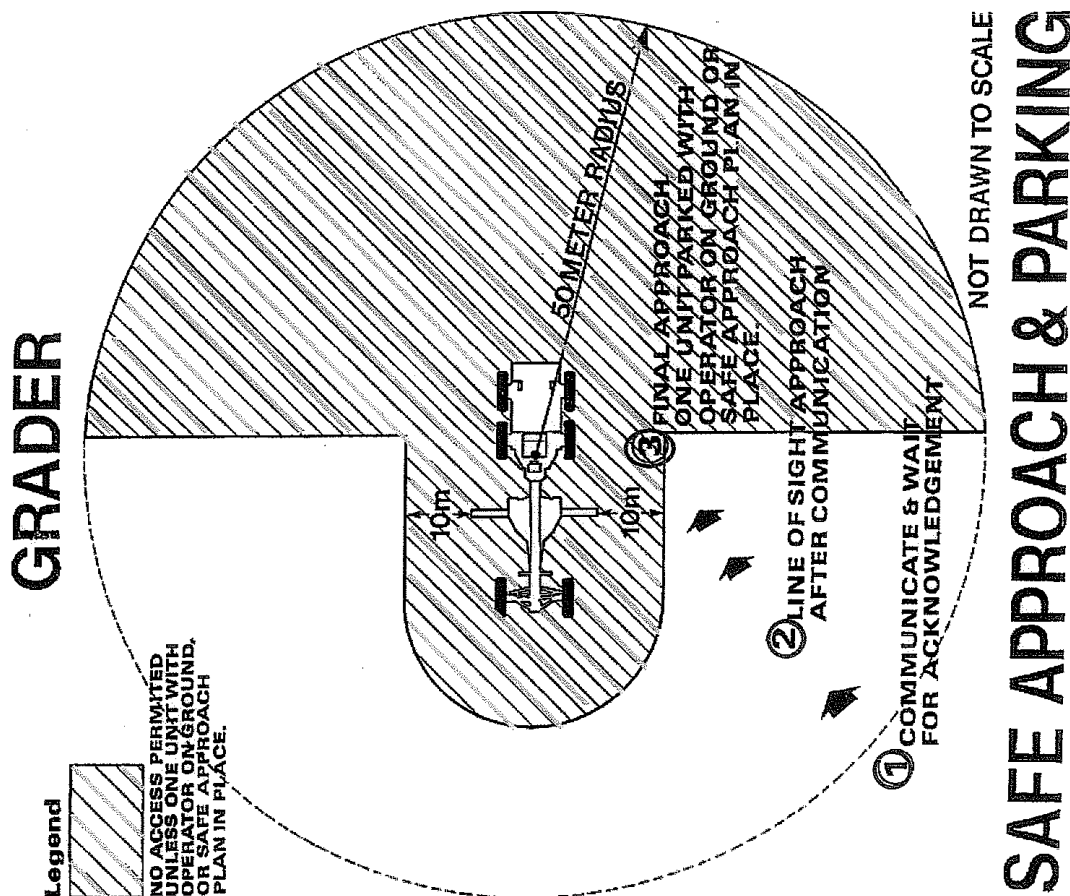
HYDRAULIC EXCAVATOR



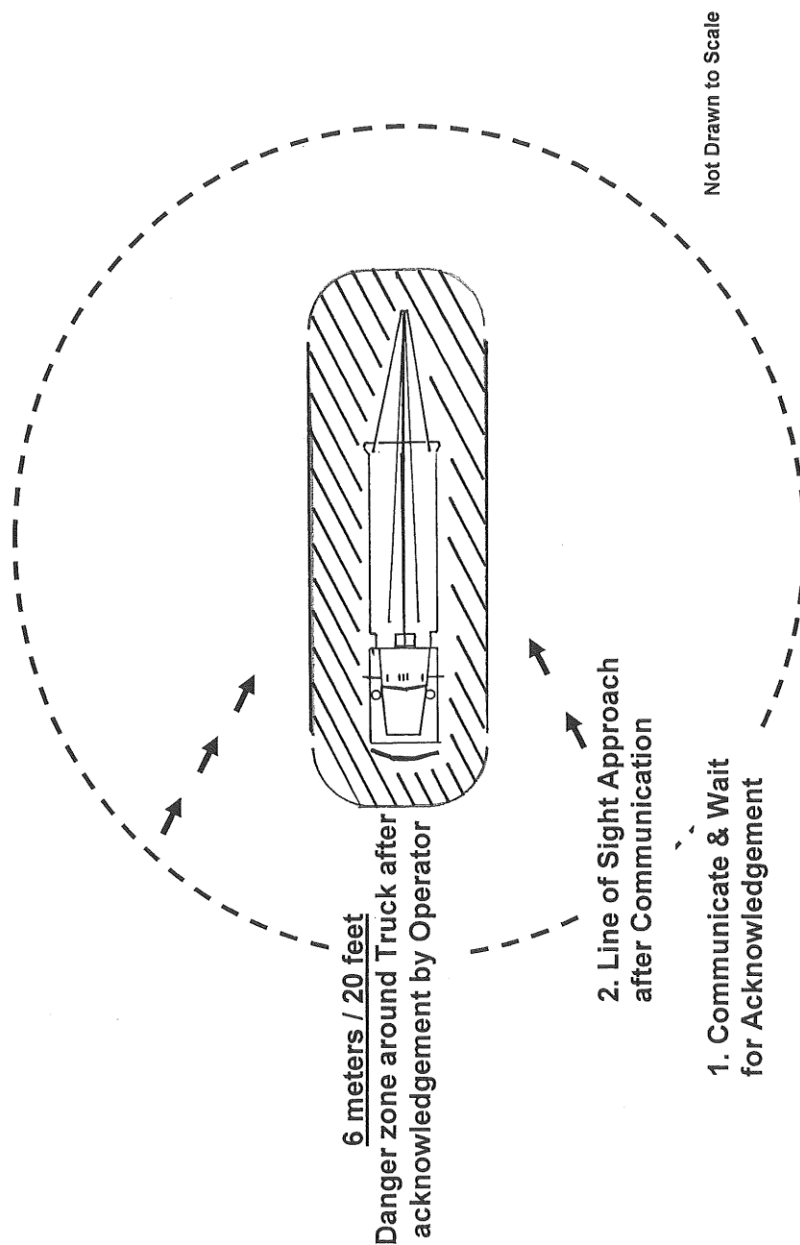








Bed / Pole Truck



SAFE APPROACH & PARKING

Americas**Approval of Machinery and Mechanized Equipment****S3AM-309-FM1****1.0 General Guidelines**

- 1.1 Subcontractor equipment shall comply with all applicable legislative requirements, local, State, Federal, Provincial, Territorial for motor vehicles and material handling heavy equipment.
- 1.2 Approval shall be obtained for all subcontractor machinery and mechanized equipment within seven calendar days of use on the project site.
- 1.3 As applicable, all machinery and mechanized equipment must be certified and tested at appropriate intervals as required by the manufacturer and/or regulatory requirements.
- 1.4 Heavy equipment includes, but is not limited to, drill rigs, front-end loaders, backhoes, trackhoes, bulldozers, forklifts, and similar equipment used for the implementation of the project Statement of Work.

2.0 Equipment Safety Inspections

- 2.1 The following presents general guidelines for certifying equipment is in safe operating condition before activities commence at the site and during site operations. The following guidelines are not meant to be all-inclusive.
 - 2.1.1 All machinery and mechanized equipment will be approved to be in safe operating condition (using the attached form) by a competent individual within seven calendar days in advance of operation on a new site or project. This approval is valid for one year for the given site or project.
 - 2.1.2 Equipment will be inspected on a daily basis by the owner/operator and daily logs will be maintained. All discrepancies shall be corrected prior to placing the equipment in service.
 - 2.1.3 Inspections shall include, but are not limited to, all hydraulic lines and fittings for wear and damage, all cable systems and pull ropes for damage and proper installation, exhaust systems, brake systems, and drill controls, etc.
 - 2.1.4 Drill rigs and related support equipment and vehicles shall be inspected by the driller in charge on a daily basis. These inspections shall be recorded on the Daily Drill Rig Checklist or on equivalent subcontractor forms.
 - 2.1.5 Preventive maintenance shall be conducted for all equipment according to manufacturer recommendations and/or the subcontractor's internal policies, schedules, and equipment Standard Operating Procedures.
 - 2.1.6 Only designated qualified persons shall operate and inspect machinery and mechanized equipment.
 - 2.1.7 The contractor shall maintain records of tests and inspections at the site and shall make the records available upon request of the designated authority; the records shall become part of the official project file.
 - 2.1.8 Equipment found to not be in safe operating condition or to have a deficiency that affects the safe operation of the equipment shall immediately be tagged, taken out of service, and its use prohibited until deficiencies have been corrected to a safe condition.
 - 2.1.9 All equipment shall be kept in the exclusion zone until decontaminated within designated decontamination areas.
 - 2.1.10 Equipment with an obstructed rear view must have an audible alarm that sounds when equipment is moving in reverse.

TO: AECOM

DATE:

FROM:

Project Name:

Project Number:

Project Location:

1. This form provides approval of machinery and mechanized equipment to be used on the referenced project for the following work:

Description of equipment work:	
Project site:	
Subcontractor providing equipment: Address:	
Dates (duration) of equipment work:	

2. Inspection and approval of machinery and mechanized equipment, as required by AECOM, has been made within seven calendar days in advance of use on the project site. This approval process shall be repeated for equipment that is used on the project or site for more than one year.

Identification of equipment (make, model, serial no.)		Date of Certification
1		
2		
3		

3. The above listed equipment has been inspected and tested as indicated on this form, and is DECLARED TO BE IN SAFE OPERATING CONDITION BY THE FOLLOWING COMPETENT INDIVIDUAL:

Name		Title
Company		
Signature		Date

4. If there are any questions regarding this certification, please contact the following AECOM representative:

Americas

Heavy Equipment Pre-Operation Checklist

S3AM-309-FM2

Project Name/Location:									Project #:								
Equipment # / Name:				Make/Model:					Annual Insp/Cert. Date:								
Hour meter reading:																	
Operator Name/Date																	
✓ = Satisfactory; in working order X = Unsatisfactory; not in working order/damaged N/A = Not Applicable																	
Check the following as appropriate	✓	X	N/A	✓	X	N/A	✓	X	N/A	✓	X	N/A	✓	X	N/A		
Side Shields/Screens/Grab Handles																	
Overhead Guard (ROPS, FOP)																	
Horn / Backup Alarm																	
Lights																	
Gauges / Temperature																	
Parking Brake / Service Brakes																	
Steering / Controls																	
Hydraulic System (full, no leaks)																	
Other Fluids (radiator, washer, etc.)																	
Blast Shields																	
Attachment (bucket, forks, compactor, jib)																	
Lift-arm Device																	
Tires / Tracks / Treads (visual)																	
Seat belt / Operator Seat Bar																	
Windows / Mirrors / Wipers																	
Exhaust Components																	
Fuel System (lines secure/no leaks)																	
Electrical Lines																	
Fire Extinguisher																	
Spark arrestor / Positive air shutoff																	
Safety signs																	
General condition (exterior clean/intact)																	
General condition (interior clean/tidy)																	
Quantity of Fuel Added																	
Quantity of Oil Added																	
Operator Signature																	
Comments (including any corrections):																	

Americas

Rubber Tire Backhoe Operator Skill Evaluation

S3AM-309-FM3

Date _____ Employee Name _____ Evaluator _____

<u>Description:</u>		
This equipment is used for primarily for excavation, although it may occasionally be used for other miscellaneous tasks for which crane or stick type equipment is required.		
STEPS	KEYPOINTS	SATISFACTORY
1)	Demonstrated abilities	<input type="checkbox"/> Yes <input type="checkbox"/> No
	b) Pre-shift inspection check list (<i>S3AM-309-FM2 Heavy Machinery Pre-Operation Checklist</i> or equivalent) <ul style="list-style-type: none"> i) Check equipment for loose bolts, leaks; oil, hydraulic and water ii) Make sure area around the equipment is clear of people and other equipment iii) Check for fire extinguisher iv) Make sure that the following equipment is operational <ul style="list-style-type: none"> a) Brakes b) Lights c) Back-up alarms d) Hand rails & ladders e) Seat belts f) Tires if applicable g) Glass, wipers h) Gauges, including temperature, oil, and fuel i) Wheel chocks v) Notify supervision of any equipment that is not operational vi) The operator can park a piece of equipment that is unsafe to operate if it poses a danger or hazard to employees or property 	
	c) Maintain three points of contact while entering and exiting the equipment	
2)	Identification of equipment controls	<input type="checkbox"/> Yes <input type="checkbox"/> No
3)	Excavating techniques <ul style="list-style-type: none"> a) Benching, sloping b) Spoil removal from side wall c) Back filling operations d) Aware of surroundings and personnel near the swing radius of boom 	<input type="checkbox"/> Yes <input type="checkbox"/> No
4)	Can arrange controls and boom for travel	<input type="checkbox"/> Yes <input type="checkbox"/> No
5)	Speed in relation to terrain (controlled speed)	<input type="checkbox"/> Yes <input type="checkbox"/> No
6)	Stock piling with front end bucket	<input type="checkbox"/> Yes <input type="checkbox"/> No
7)	Loading truck bed with bucket	<input type="checkbox"/> Yes <input type="checkbox"/> No
8)	Parking and shut down procedures <ul style="list-style-type: none"> a) Equipment line-up <ul style="list-style-type: none"> i) Straight line ii) Allow easy access for maintenance and servicing b) Turn off all accessories c) Set all park brakes d) Lower bucket to ground e) Place and position wheel chocks f) Perform a general walk around looking for items for maintenance 	<input type="checkbox"/> Yes <input type="checkbox"/> No

Any items checked 'No' require additional training of operator and the skill evaluation to be repeated until the operator successfully achieves a satisfactory status in all skill identified.

Americas

Scraper Operator Skill Evaluation

S3AM-309-FM4

Date _____ Employee Name _____ Evaluator _____

<u>Description:</u>		
Drives a tractor to pull a steel bowl-like or box-like scoop (scraper), mounted on wheels, which scrapes up earth and transports it to a designated place; manipulates a series of levers to lower cutting edge of scraper into the ground, to raise cutting edge when scraper is full, to empty scraper		
STEPS	KEYPOINTS	SATISFACTORY
1. Demonstrated abilities	<ul style="list-style-type: none"> a) Pre-shift inspection check list (S3AM-309-FM2 Heavy Machinery Pre-Operation Checklist or equivalent) <ul style="list-style-type: none"> i) Check equipment for loose bolts and leaks; check oil, air, hydraulic fluids and water ii) Make sure area around the equipment is clear of people and other equipment iii) Check for fire extinguisher iv) Make sure that the following equipment is operational <ul style="list-style-type: none"> a) Brakes b) Lights c) Back-up alarms d) Hand rails & ladders e) Seat belts f) Tires g) Glass, wipers h) Gauges, including temperature, oil, air and fuel i) Wheel chocks v) Notify supervision of any equipment that is not operational vi) The operator can park a piece of equipment that is unsafe to operate if it poses a danger or hazard to employees or property b) Maintain three points of contact while entering and exiting the equipment 	<input type="checkbox"/> Yes <input type="checkbox"/> No
2. Identification of equipment controls		<input type="checkbox"/> Yes <input type="checkbox"/> No
3. Loading techniques	<ul style="list-style-type: none"> a) Use of apron b) Use of cutting edge c) Push loading d) Push/pull loading e) Use of ejector 	<input type="checkbox"/> Yes <input type="checkbox"/> No
4. Shifting and hauling		<input type="checkbox"/> Yes <input type="checkbox"/> No
5. Rough cut and fill		<input type="checkbox"/> Yes <input type="checkbox"/> No
6. Spreading material		<input type="checkbox"/> Yes <input type="checkbox"/> No
7. Fine grading		<input type="checkbox"/> Yes <input type="checkbox"/> No
8. Obtaining compaction		<input type="checkbox"/> Yes <input type="checkbox"/> No
9. Parking and shut down procedures	<ul style="list-style-type: none"> a) Equipment line-up <ul style="list-style-type: none"> i) Straight line ii) Allow easy access for maintenance and servicing b) Turn off all accessories c) Lower apron d) Lower bowl to the ground e) Place and position wheel chocks f) Perform a general walk around looking for maintenance items 	<input type="checkbox"/> Yes <input type="checkbox"/> No

Any items checked 'No' require additional training of operator and the skill evaluation to be repeated until the operator successfully achieves a satisfactory status in all skill identified.

Americas

Bull Dozer Operator Skill Evaluation

S3AM-309-FM5

Date _____ Employee Name _____ Evaluator _____

<u>Description:</u>		
Operates a large tractor with a concave steel blade or push block mounted in front of the chassis to level, distribute and push earth. This equipment may be used to push earth carrying equipment. A ripper attachment may be used for ripping the earth prior to loading the scraper. Operator regulates height of blade or push block from ground and may help in adjustments to equipment as needed		
STEPS	KEYPOINTS	SATISFACTORY
1)	Demonstrated abilities a) Pre-shift inspection check list (S3AM-309-FM2 Heavy Machinery Pre-Operation Checklist or equivalent) i) Check equipment for loose bolts and leaks; check oil, air, hydraulic fluid and water ii) Make sure area around the equipment is clear of people and other equipment iii) Check for fire extinguisher iv) Make sure that the following equipment is operational a) Brakes b) Lights c) Back-up alarms d) Hand rails & ladders e) Seat belts f) Tracks g) Glass, wipers h) Gauges, including temperature, oil, air and fuel i) Audible horn v) Notify supervision of any equipment that is not operational vi) The operator can park a piece of equipment that is unsafe to operate if it poses a danger or hazard to employees or property b) Maintain three points of contact while entering and exiting the equipment	<input type="checkbox"/> Yes <input type="checkbox"/> No
2)	Identification of equipment controls	<input type="checkbox"/> Yes <input type="checkbox"/> No
3)	Pushing techniques a) Use of push blade b) Loading of push load equipment	<input type="checkbox"/> Yes <input type="checkbox"/> No
4)	Use of ripper shanks	<input type="checkbox"/> Yes <input type="checkbox"/> No
5)	Rough cut and fill	<input type="checkbox"/> Yes <input type="checkbox"/> No
6)	Spreading material	<input type="checkbox"/> Yes <input type="checkbox"/> No
7)	Fine grading	<input type="checkbox"/> Yes <input type="checkbox"/> No
8)	Obtaining compaction by tracking in material	<input type="checkbox"/> Yes <input type="checkbox"/> No
9)	Parking and shut down procedures a) Equipment line-up i) Straight line ii) Allow easy access for maintenance and servicing b) Turn off all accessories c) Lower rippers d) Lower blade to the ground e) Perform a general walk around looking for maintenance items	<input type="checkbox"/> Yes <input type="checkbox"/> No

Any items checked 'No' require additional training of operator and the skill evaluation to be repeated until the operator successfully achieves a satisfactory status in all skill identified.

Americas

Dump Truck Operator Skill Evaluation

S3AM-309-FM6

Date _____ Employee Name _____ Evaluator _____

Description:		
Drives a heavy-duty gasoline or diesel-powered truck used in hauling material to fill areas or dump sites. Truck is either tandem rear axle type, or tractor truck, single or tandem axle, pulling a trailer, articulated or fixed axle haul truck. May service and make necessary adjustments for proper operation of equipment.		
STEPS	KEYPOINTS	SATISFACTORY
1)	Demonstrated abilities a) Pre-shift inspection (S3AM-309-FM2 Heavy Machinery Pre-Operation Checklist or equivalent) i) Check equipment for loose bolts and leaks; check oil, air, hydraulic fluid and water ii) Make sure area around the equipment is clear of people and other equipment iii) Check for fire extinguisher iv) Make sure that the following equipment is operational (1) Brakes (2) Lights (3) Back-up alarms (4) Hand rails & ladders (5) Seat belts (6) Tires (7) Glass, wipers (8) Gauges, including temperature, oil, air and fuel (9) Wheel chocks v) Notify supervision of any equipment that is not operational vi) The operator can park or side line a piece of equipment that is unsafe to operate if it poses a danger or hazard to employees or property b) Maintain three points of contact while entering and exiting the equipment	<input type="checkbox"/> Yes <input type="checkbox"/> No
2)	Identification of equipment controls	<input type="checkbox"/> Yes <input type="checkbox"/> No
3)	Truck Weighing a) Tare weights b) Gross Weights	<input type="checkbox"/> Yes <input type="checkbox"/> No
4)	Loading Techniques a) Parking into load patterns b) Bed preparation for material c) Remains in cab in loading area and while being loaded	<input type="checkbox"/> Yes <input type="checkbox"/> No
5)	Shifting and Hauling	<input type="checkbox"/> Yes <input type="checkbox"/> No
6)	Stockpiling	<input type="checkbox"/> Yes <input type="checkbox"/> No
7)	Backing with the use of mirrors	<input type="checkbox"/> Yes <input type="checkbox"/> No
8)	Dumping/Spreading Material a) Fill material b) Base course material c) Surface materials d) Asphalt e) Lowers truck bed (dump trucks) or dump chutes (belly dumps) f) Follows spotters directions (when applicable)	<input type="checkbox"/> Yes <input type="checkbox"/> No
9)	Parking and shut down procedures a) Equipment line-up i) Straight line ii) Allow easy access for maintenance and servicing b) Turn off all accessories c) Use park brake d) Place and position wheel chocks e) Perform a general walk around looking for maintenance items	<input type="checkbox"/> Yes <input type="checkbox"/> No

Any items checked 'No' require additional training of operator and the skill evaluation to be repeated until the operator successfully achieves a satisfactory status in all skill identified.

Americas

Roller / Compactor Operator Skill Evaluation

S3AM-309-FM7

Date _____ Employee Name _____ Evaluator _____

<u>Description:</u>		
Operates a self-propelled gasoline or diesel machine, which has pneumatic tires, steel wheels/drums used to compact earth fills, flexible bases and all types of materials. Rollers are also used for compaction to achieve a desired or specified density. Rides on the machine platform and moves lever and pedals or throttles to control and guide machine.		
STEPS	KEYPOINTS	SATISFACTORY
1)	Demonstrated abilities a) Pre-shift inspection check list (S3AM-309-FM2 Heavy Machinery Pre-Operation Checklist or equivalent) i) Check equipment for loose bolts and leaks; check oil, air, hydraulic fluid and water ii) Make sure area around the equipment is clear of people and other equipment iii) Check for fire extinguisher iv) Make sure that the following equipment is operational a) Brakes b) Lights c) Back-up alarms d) Hand rails & ladders e) Seat belts f) Tires, if applicable g) Glass, wipers h) Gauges, including temperature, oil, air and fuel i) Wheel chocks v) Notify supervision of any equipment that is not operational vi) The operator can park a piece of equipment that is unsafe to operate if it poses a danger or hazard to employees or property b) Maintain three points of contact while entering and exiting the equipment	<input type="checkbox"/> Yes <input type="checkbox"/> No
2)	Identification of equipment controls	<input type="checkbox"/> Yes <input type="checkbox"/> No
3)	Rolling techniques to obtain compaction a) Use of controls b) Vibratory controls c) Turns and maneuvers d) Aware of surroundings	<input type="checkbox"/> Yes <input type="checkbox"/> No
4)	Rolling patterns a) Staggered patterns with other rollers	<input type="checkbox"/> Yes <input type="checkbox"/> No
5)	Parking and shut down procedures a) Equipment line-up i) Straight line ii) Allow easy access for maintenance and servicing b) Turn off all accessories c) Place and position wheel chocks d) Perform a general walk around looking for maintenance items	<input type="checkbox"/> Yes <input type="checkbox"/> No

Any items checked 'No' require additional training of operator and the skill evaluation to be repeated until the operator successfully achieves a satisfactory status in all skill identified.

Americas

Front End Loader Operator Skill Evaluation

S3AM-309-FM8

Date _____ Employee Name _____ Evaluator _____

<u>Description:</u>		
Operates rubber tire or crawler type tractor with attached bucket on front end. Moves lever to raise, lower and dump contents of bucket. Machine used to load materials from stockpiles, excavation, loading trucks.		
STEPS	KEYPOINTS	SATISFACTORY
1)	Demonstrated abilities a) Pre-shift inspection check list (<i>S3AM-309-FM2 Heavy Machinery Pre-Operation Checklist</i> or equivalent) i) Check equipment for loose bolts and leaks; check oil, air, hydraulic fluid and water ii) Make sure area around the equipment is clear of people and other equipment iii) Check for fire extinguisher iv) Make sure that the following equipment is operational a) Brakes b) Lights c) Back-up alarms d) Hand rails & ladders e) Seat belts f) Tires g) Glass, wipers h) Gauges, including temperature, oil, air and fuel i) Wheel chocks v) Notify supervision of any equipment that is not operational vi) The operator can park a piece of equipment that is unsafe to operate if it poses a danger or hazard to employees or property b) Maintain three points of contact while entering and exiting the equipment	<input type="checkbox"/> Yes <input type="checkbox"/> No
2)	Identification of equipment controls	<input type="checkbox"/> Yes <input type="checkbox"/> No
3)	Loading techniques a) Use of bucket and controls b) Crowding the pile c) Pump loading, etc. d) Loading patterns e) Loading trucks f) Loading scrapers	<input type="checkbox"/> Yes <input type="checkbox"/> No
4)	Control handling of soils	<input type="checkbox"/> Yes <input type="checkbox"/> No
5)	Shifting and hauling	<input type="checkbox"/> Yes <input type="checkbox"/> No
6)	Stockpiling	<input type="checkbox"/> Yes <input type="checkbox"/> No
7)	Mixing and moisture conditioning	<input type="checkbox"/> Yes <input type="checkbox"/> No
8)	Feeding crusher	<input type="checkbox"/> Yes <input type="checkbox"/> No
9)	Rough cut and fill	<input type="checkbox"/> Yes <input type="checkbox"/> No
10)	Spreading material	<input type="checkbox"/> Yes <input type="checkbox"/> No
11)	Parking and shut down procedures a) Equipment line-up i) Straight line ii) Allow easy access for maintenance and servicing b) Turn off all accessories c) Lower bucket to the ground d) Place and position wheel chocks e) Perform a general walk around looking for maintenance items	<input type="checkbox"/> Yes <input type="checkbox"/> No

Any items checked 'No' require additional training of operator and the skill evaluation to be repeated until the operator successfully achieves a satisfactory status in all skill identified.

Americas

Grader Operator Skill Evaluation

S3AM-309-FM9

Date _____ Employee Name _____ Evaluator _____

<u>Description:</u>		
Rides in cab of grader and moves levers and steering wheel to guide machine and regulate the scraper blade or ripper. Blade is mounted on a carrying and turning circle at the front of the machine. Equipment is used to level or mix soils and aggregates to grade and to lay asphalt and flexible base materials and clean haul roads.		
STEPS	KEYPOINTS	SATISFACTORY
1)	Demonstrated abilities a) Pre-shift inspection check list (S3AM-309-FM2 <i>Heavy Machinery Pre-Operation Checklist</i> or equivalent) i) Check equipment for loose bolts and leaks; check oil, air, hydraulic fluid and water ii) Make sure area around the equipment is clear of people and other equipment iii) Check for fire extinguisher iv) Make sure that the following equipment is operational a) Brakes b) Lights c) Back-up alarms d) Hand rails & ladders e) Seat belts f) Tires g) Glass, wipers h) Gauges, including temperature, oil, air and fuel v) Notify supervision of any equipment that is not operational vi) Wheel chocks vii) The operator can park a piece of equipment that is unsafe to operate if it poses a danger or hazard to employees or property b) Maintain three points of contact while entering and exiting the equipment	<input type="checkbox"/> Yes <input type="checkbox"/> No
2)	Identification of equipment controls	<input type="checkbox"/> Yes <input type="checkbox"/> No
3)	Leveling and scraping techniques a) Use of levers b) Use of cutting edge c) Controlling front wheel tilt d) Controlling crab motion e) Use of ripper	<input type="checkbox"/> Yes <input type="checkbox"/> No
4)	Shifting and traveling with loaded moe board	<input type="checkbox"/> Yes <input type="checkbox"/> No
5)	Rough cut and fill	<input type="checkbox"/> Yes <input type="checkbox"/> No
6)	Spreading material	<input type="checkbox"/> Yes <input type="checkbox"/> No
7)	Fine grading	<input type="checkbox"/> Yes <input type="checkbox"/> No
8)	Parking and shut down procedures a) Equipment line-up i) Straight line ii) Allow easy access for maintenance and servicing b) Turn off all accessories c) Lower moldboard to the ground d) Place and position wheel chocks e) Perform a general walk around looking for maintenance items	<input type="checkbox"/> Yes <input type="checkbox"/> No

Any items checked 'No' require additional training of operator and the skill evaluation to be repeated until the operator successfully achieves a satisfactory status in all skill identified.

Americas

Excavator Operator Skill Evaluation

S3AM-309-FM10

Date _____ Employee Name _____ Evaluator _____

<u>Description:</u>		
Operates a rubber tire or crawler type tractor with an attached bucket on front end. Moves a lever to raise and lower and dump contents of bucket. Machine is used to load materials from stockpiles, excavation, loading trucks.		
STEPS	KEYPOINTS	SATISFACTORY
1)	Demonstrated abilities a) Pre-shift inspection check list (<i>S3AM-309-FM2 Heavy Machinery Pre-Operation Checklist</i> or equivalent) i) Check equipment for loose bolts and leaks; check oil, air, hydraulic fluid and water ii) Make sure area around the equipment is clear of people and other equipment iii) Check for fire extinguisher iv) Make sure that the following equipment is operational a) Brakes b) Lights c) Back-up alarms d) Hand rails & ladders e) Seat belts f) Tires g) Glass, wipers h) Gauges, including temperature, oil, air and fuel i) Wheel chocks (for rubber tire type excavators) v) Notify supervision of any equipment that is not operational vi) The operator can park a piece of equipment that is unsafe to operate if it poses a danger or hazard to employees or property b) Maintain three points of contact while entering and exiting the equipment	<input type="checkbox"/> Yes <input type="checkbox"/> No
2)	Identification of equipment controls	<input type="checkbox"/> Yes <input type="checkbox"/> No
3)	Loading techniques a) Use of bucket and controls b) Crowding the pile c) Pump loading, etc. d) Loading patterns e) Loading trucks f) Loading scrapers	<input type="checkbox"/> Yes <input type="checkbox"/> No
4)	Control handling of soils	<input type="checkbox"/> Yes <input type="checkbox"/> No
5)	Shifting and hauling	<input type="checkbox"/> Yes <input type="checkbox"/> No
6)	Stockpiling	<input type="checkbox"/> Yes <input type="checkbox"/> No
7)	Mixing and moisture conditioning	<input type="checkbox"/> Yes <input type="checkbox"/> No
8)	Feeding crusher	<input type="checkbox"/> Yes <input type="checkbox"/> No
9)	Rough cut and fill	<input type="checkbox"/> Yes <input type="checkbox"/> No
10)	Spreading material	<input type="checkbox"/> Yes <input type="checkbox"/> No
11)	Parking and shut down procedures a) Equipment line-up i) Straight line ii) Allow easy access for maintenance and servicing b) Turn off all accessories c) Lower bucket to the ground d) Place and position wheel chocks (rubber tire type excavator) e) Perform a general walk around looking for maintenance items	<input type="checkbox"/> Yes <input type="checkbox"/> No

Any items checked 'No' require additional training of operator and the skill evaluation to be repeated until the operator successfully achieves a satisfactory status in all skill identified.

Americas

Water Truck Operator Skill Evaluation

S3AM-309-FM11

Date _____ Employee Name _____ Evaluator _____

<u>Description:</u>		
Drives articulated, pull type, single and two axle type water trucks. Waters roads, fills, and cut areas to suppress dust.		
STEPS	KEYPOINTS	SATISFACTORY
1)	Demonstrated abilities a) Pre-shift inspection check list (<i>S3AM-309-FM2 Heavy Machinery Pre-Operation Checklist</i> or equivalent or DOT daily inspection if applicable) i) Check equipment for loose bolts and leaks; check oil, air, hydraulic fluid and water ii) Make sure area around the equipment is clear of people and other equipment iii) Check for fire extinguisher iv) Make sure that the following equipment is operational a) Brakes b) Lights c) Back-up alarms d) Hand rails & ladders e) Seat belts f) Tires g) Glass, wipers h) Gauges, including temperature, oil, air and fuel i) Wheel chocks v) Notify supervision of any equipment that is not operational vi) The operator can park a piece of equipment that is unsafe to operate if it poses a danger or hazard to employees or property b) Maintain three points of contact while entering and exiting the equipment	<input type="checkbox"/> Yes <input type="checkbox"/> No
2)	Identification of equipment controls	<input type="checkbox"/> Yes <input type="checkbox"/> No
3)	Loading Techniques a) Minimizes spillage b) Uses chocks or turns into berm	<input type="checkbox"/> Yes <input type="checkbox"/> No
4)	Shifting and Hauling	<input type="checkbox"/> Yes <input type="checkbox"/> No
5)	Properly applies water to ramps/corners	<input type="checkbox"/> Yes <input type="checkbox"/> No
6)	Backing with the use of mirrors	<input type="checkbox"/> Yes <input type="checkbox"/> No
11)	Parking and shut down procedures a) Equipment line-up i) Straight line ii) Allow easy access for maintenance and servicing b) Turn off all accessories c) Use park break d) Place and position wheel chocks e) Perform a general walk around looking for maintenance items	<input type="checkbox"/> Yes <input type="checkbox"/> No

Any items checked 'No' require additional training of operator and the skill evaluation to be repeated until the operator successfully achieves a satisfactory status in all skill identified.

Americas

Heavy Equipment Maintenance Inventory

S3AM-309-FM12

[illegible]

Americas

Heavy Equipment Inspection Report

S3AM-309-FM13

[illegible]

Wildlife, Plants & Insects

S3AM-313-PR1

1.0 Purpose and Scope

- 1.1 Communicates the requirements and precautions to be taken by AECOM employees to protect against the biological hazards associated with insects, arachnids, snakes, poisonous plants, and other animals referred to herein collectively as “biological hazards”.
- 1.2 This procedure applies to all AECOM Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document’s content.

2.0 Terms and Definitions

- 2.1 **Field Work** – Any activity conducted at a site that contains brush, overgrown grass, leaf litter, poisonous plants, or is located near mosquito breeding areas and includes work in structures where animals might exist that harbor fleas or ticks or where spiders and mites could be present. Field work includes, but is not limited to, Phase I, Phase II, Operations Monitoring & Maintenance, biological surveys, and other work that meets the definition of field work.
- 2.2 **Poisonous** – Capable of harming or killing by or as if by poison; toxic or venomous.
- 2.3 **Phase I Environmental Site Assessment** – Investigation of real property to determine the possibility of contamination, based on visual observation and property history, but no physical testing. Under new Environmental Protection Agency regulations that went into effect on November 1, 2006, a Phase I, as it is called for short, will be mandatory for all investors who wish to take advantage of Comprehensive Environmental Response, Compensation, and Liability Act defenses that will shield them from liability for future cleanup, should that prove necessary. The new Phase I rules, called “All Appropriate Inquiry” or AAI, also require more investigation than previously mandated. Investors can expect to see dramatic price increases over prior experiences.
- 2.4 **Phase II Environmental Site Assessment** – Investigation of real property through physical samplings and analyses to determine the nature and extent of contamination and, if indicated, a description of the recommended remediation method.

3.0 References

- 3.1 RS2-001-PR1 Firearms Standard
- 3.2 S3AM-004-PR1 Incident Reporting, Notifications & Investigation
- 3.3 S3AM-008-PR1 Fitness for Duty
- 3.4 S3AM-113-PR1 Heat Stress
- 3.5 S3AM-208-PR1 Personal Protective Equipment
- 3.6 S3AM-209-PR1 Risk Assessment & Management

4.0 Procedure

- 4.1 Roles and Responsibilities
 - 4.1.1 **Managers / Supervisors**
 - Responsible for managing field work.

- Work with employees to see that a Task Hazard Analysis (THA) for the work to be conducted has been performed prior to the beginning of the field work and that it includes an assessment of potential biological hazards.
- Implement control measures at the location to reduce the potential for employees to be exposed to injuries and illnesses from biological hazards while working.
- If the exposures cannot be eliminated or managed with engineering controls, approve the use and cost of Personal Protective Equipment (PPE) and protective repellents and lotions and confirm that exposed employees have and use these products.

4.1.2 **SH&E Manager**

- Confirm training and guidance is provided to employees consistent with this procedure.
- During the performance of site visits, assess the precautions being taken against biological hazards for compliance with this procedure.
- Assist AECOM personnel in identifying hazards and selecting appropriate control measures.
- As applicable, review and approve relevant SH&E Plans for locations that have biological hazards.

4.1.3 **Employees**

- Participate in required training related this procedure.
- Participate in the development of THAs for the task, identify control measures to limit exposure and request PPE, repellents, and protective lotions identified by this procedure.
- Update the applicable THA when a new, unaccounted for biological hazard is identified. Employee shall stop work to identify appropriate elimination or control measures (and obtain any necessary guidance) before continuing work.
- Obtain approval from Managers and/or Supervisors to purchase selected PPE prior to purchasing.
- Implement the precautions appropriate to prevent exposure to the hazardous wildlife, insects and plants.
- Observe requirements for reporting (e.g. tick bites, skin irritations, etc.) as detailed within the procedure and attachments.

4.2 Training

4.2.1 Employees shall be trained to recognize organisms that represent a threat in the regions in which they work – experienced field staff shall provide on the job training to assist staff with hazard recognition.

4.2.2 Employees shall be properly trained to the anticipated tasks and the associated required PPE.

4.3 Overview

4.3.1 The procedures discussed below are detailed because these hazards have historically posed the most significant risk to AECOM employees. Note that this discussion is not a fully encompassing list of hazards. As part of the SH&E Plan and THA developed by the AECOM personnel, in accordance with *S3AM-209-PR1 Risk Assessment & Management*, additional consideration shall be given to other biological hazards.

4.3.2 Departments of Public Health local to the worksite, as well as the Centers for Disease Control (CDC) can serve as a resource for identifying biological hazards not discussed in this procedure.

4.3.3 If additional biological hazards are identified, employees should stop work and contact the SH&E Manager to discuss the hazards and identify effective control measures. Those control measures shall be implemented at the location prior to restarting work.

4.4 Employee Sensitivity

- 4.4.1 Sensitivity to toxins generated by plants, insects and animals varies according to dosage and the ability of the victim to process the toxin; therefore, it is difficult to predict whether a reaction will occur, or how severe the reaction will be. Employees should be aware that there are a large number of organisms capable of causing serious irritations and allergic reactions. Some reactions will only erupt if a secondary exposure to sunlight occurs. Depending on the severity of the reaction, the result can be severe scarring, blindness or even death.
- 4.4.2 Employees also need to consider whether they are sensitive to the use of insect repellents.

4.5 Planning and Hazard Assessment

- 4.5.1 AECOM personnel shall confirm that the potential for exposure to specific biological hazards are assessed prior to the commencement of work and that the procedures specified by this procedure are integrated into the THA planning process and conveyed to employees conducting the field work. This information shall be communicated in the location-specific SH&E plan, the THA, pre-project kickoff meetings, and tailgate meetings at the location.
- 4.5.2 It is important to note that the precautions to be taken by employees to decrease the risk of exposure to biological hazards can directly increase the risk of heat-related illness due to thermal stresses. Therefore, heat stress monitoring and precautions shall be included as a critical component of the task-specific THA in accordance with *S3AM-511-PR1 Heat Stress*.
- 4.5.3 During the preparation of the location-specific SH&E plan and task specific THA, Managers, Supervisors, and employees shall determine what biological hazards might be encountered during the task or operations and shall prescribe the precautions to be taken to reduce the potential for exposure and the severity of resulting illnesses. Consideration will be given to conditions such as weather, proximity to breeding areas, host animals, and published information discussing the presence of the hazards.
- 4.5.4 It should be assumed that at least one of the biological hazards exists whenever working on undeveloped property. This can include insect activity any time that local temperatures exceed 40 degrees Fahrenheit (4.5 degrees Celsius) for a period of more than 24 hours. The stubble and roots of poisonous plants can be a hazard any time of year, including when some plants are dormant or mown.
- 4.5.5 The hazard assessments shall also consider the additional hazards posed by vegetative clearing such as the increased risk of coming in contact with poison ivy, oak or sumac and hazards associated with the use of tools and equipment to remove vegetation.
- 4.5.6 Employees in the field where biological hazards exist shall not enter the hazard areas unless they are wearing the appropriate protective clothing, repellents, and barrier creams specified below. If the hazard is recognized in the field but was not adequately assessed during the THA, the field staff shall stop work and not proceed until the THA has been amended and approved and protective measures implemented.
- 4.5.7 Employees who have severe allergic reactions are strongly recommended to notify their Manager, field Supervisor and co-workers of the potential for a reaction and demonstrate what medication they might need, where they keep it and how it is administered.
- 4.5.8 A decision flow chart and table for determining the potential for biological hazards in the Americas has been provided in *S3AM-313-ATT1 Biological Hazard Assessment Flow Chart*.

4.5.9 Restrictions:

- No firearms or weapons are allowed to be used without express permission by the Region Executive and Chief Resilience Officer, refer to the *RS2-001-PR1 Firearms Standard*.
- No weapons related work shall occur without an assessment that includes appropriate hazard control measures and training.

- Staff with life-threatening reactions shall not undertake work in areas infested with the allergen (e.g., wasps, poison ivy), unless precautions are met which satisfy a medical practitioner's requirements. Refer to *S3AM-008-PR1 Fitness for Duty*.

4.5.10 Precautions

- Be aware of the potential irritants in your area and know how to recognize them.
- Modify activities to avoid encounters (diurnal rhythms, seasonal rhythms).
- Avoid wearing perfume and cologne and strong smelling deodorants, lotions, soaps, and shampoos.
- When working in areas where there may be small insects that "hitchhike" (e.g., ticks, spiders, scorpions), it is recommended that clothes are turned inside out and shaken at the end of day; do not wear same clothes two days in a row.
- Staff should always be aware of where they are placing their hands, or where they are sitting in order to avoid contact with potential toxins. Avoid reaching into areas where visibility is limited.

4.6 Wildlife Hazards (Wild Animals, Reptiles and Birds)

4.6.1 Employees shall not work alone in areas where the risk of an encounter with dangerous wildlife is high. Wildlife handling shall only be completed under direct supervision of an experienced individual. Refer to the following work instructions for more specifics:

- *S3AM-313-ATT13 Alligators*
- *S3AM-313-ATT9 Large Carnivores & Ungulates*
- *S3AM-313-ATT10 Bear Safety*
- *S3AM-313-ATT11 Small Mammals*
- *S3AM-313-ATT12 Snakes & Scorpions*

4.7 Ticks, Spiders and other Insects

4.7.1 Insects for which precautionary measures should be taken include but are not limited to: mosquitoes (potential carriers of disease aside from dermatitis), black flies, wasps, bees, ticks, fire ants and European fire ants.

4.7.2 Employees with known allergies to insect stings should consult their personal physician for advice on any immediate medications that they should carry with them. Epi-pens¹ shall be carried at all times in the field by employees who are aware that anaphylactic shock is a possibility for them. AECOM highly recommends that employees with known allergies inform their co-workers of the allergy and the location of the medications they might carry for the allergy.

4.7.3 Habitat Avoidance, Elimination and/or Control

- The most effective method to manage worker safety and health is to eliminate, avoid and/or control hazards. Clearing the location of brush, high grass and foliage reduces the potential for exposure to biological hazards. Clearing will not eliminate the exposure to flying insects and there might be an increased exposure to ticks and spiders during the clearing process.
- Projects such as subsurface environmental assessment or remediation are often candidates for brush and overgrown grass to be cleared. In these instances, the Manager shall either request that the client eliminate vegetation, or request approval from the client to have vegetation clearing added to the scope of work.
 - It should be noted that vegetation clearance may unintentionally serve to spread noxious and poisonous plant materials around the site.

¹ *Epi-pens must be prescribed by a personal physician. Renew epi-pens on a regular schedule to ensure effectiveness and make sure your field companions know where it is and how to use it if you cannot self-administer the dose.*

- As applicable, measures should be taken to prevent spread, such as but not limited to, confirming equipment and materials are not placed on affected areas, and equipment is decontaminated after use and before removal from site.
- When work shall be conducted in areas that cannot or may not be cleared of foliage, personal precautions and protective measures shall be prescribed.
- Mosquitoes breed in stagnant water and typically only travel a quarter mile (less than half a kilometer) from their breeding site. Whenever possible, stagnant water should be drained to eliminate breeding areas. Managers and client site managers should be contacted to determine whether water can be drained and the most appropriate method for draining containers, containment areas, and other objects of standing water.
- If water cannot be drained, products similar to Mosquito Dunks® can be placed in the water to control mosquitoes. Once wet, the Mosquito Dunks® kill the immature, aquatic stage of the mosquito. The active ingredient is a beneficial organism that is lethal to mosquito larvae, but harmless to fish, humans, and other animals. Mosquito Dunks® provide long-term protection for 30 days or more.

4.7.4 Ticks

- Ticks can be encountered when walking in tall grass or shrubs. They crawl up clothing searching for exposed skin where they will attach themselves. The most serious concern is a possibility of contracting a disease.
- Data from the CDC indicates that tick-borne diseases have become increasingly prevalent. At the same time, tick repellents have become both safe and effective so it is possible to prevent the vast majority of bites and, therefore, most related illnesses. The use of permethrin is strongly advised.
- The most common and severe tick-borne illnesses in the U.S. are Lyme disease, Ehrlichiosis, and Rocky Mountain spotted fever. A summary table listing CDC informational resources for these diseases is provided in *S3AM-313-ATT2 Ticks* along with a listing of CDC information resources and maps showing the distribution of common tick-borne diseases in the U.S.
- When working in areas where ticks may occur, it is recommended that clothes are turned inside out and shaken at the end of day; do not wear the same clothes two days in a row.
- Employees should conduct a thorough full body tick check upon exiting the field. Shower within two hours of coming indoors to help wash away loose ticks. Clothes should be laundered in hot water or tumble dry clothes in a dryer on high heat for 10 minutes to kill ticks.
- To remove ticks that are embedded in skin, utilize a tick key. Alternatively use tweezers or fingers to carefully grasp the tick as close to the skin as possible and pull slowly upward, avoiding twisting or crushing the tick. Do not try to burn or smother the tick. Cleanse the bite area with soap and water, alcohol, or household antiseptic. Note the date and location of the bite and save the tick in a secure container such as an empty pill vial or film canister. A bit of moistened paper towel placed inside the container will keep ticks from drying out. Follow AECOM incident reporting guidelines to report the tick bite within 4 hours and notify the Manager or Supervisor.
- Familiarize yourself with the characteristic bulls-eye pattern of Lyme disease infection surrounding the bite. If you notice this type of pattern or rash resulting from a tick bite, immediately report the issue to your supervisor and follow the incident reporting requirements for your business group.
- If you experience symptoms such as fever, headache, fatigue, and a skin rash, you should immediately visit a medical practitioner as Lyme disease is treated easily with antibiotics in the early stages, but can spread to the heart, joints, and nervous system if left untreated.

4.7.5 Chiggers

- Chiggers are mite larvae, approximately ½ millimeter in size, and typically invisible to the naked eye. While chiggers are not known to carry infectious diseases, their bites and resulting rashes and itching can lead to dermatitis and a secondary infection.
- Chiggers are typically active from the last hard freeze in the winter or spring to the first hard freeze. They are active all year in the Gulf Coast and tropical areas.

4.7.6 Spiders

- Spiders can be found in derelict buildings, sheltered areas, basements, storage areas, well heads and even on open ground. Spiders can be found year round in sheltered areas and are often present in well heads and valve boxes.
- Most spider bites produce wounds with localized inflammation and swelling. The Black Widow and Brown Recluse spiders in the U.S. and others outside the U.S. inject a toxin that causes extensive tissue damage and intense pain.
- Additional information on spider identification can be found in attachment *S3AM-313-ATT3 Poisonous Spider Identification*.

4.7.7 Mosquitoes

- When a mosquito bites, it injects an enzyme that breaks down blood capillaries and acts as an anticoagulant. The enzymes induce an immune response in the host that results in itching and local inflammation. The tendency to scratch the bite sites can lead to secondary infections.
- CDC data indicates that mosquito-borne illnesses, including the strains of encephalitis, are a health risk. At least one of the Encephalitis strains listed below is known to exist in every area of the U.S. and in many other countries as well:
 - Eastern Equine encephalitis
 - Western Equine encephalitis
 - West Nile Virus
 - St. Louis encephalitis
 - La Crosse encephalitis
- Mosquitoes can transmit the West Nile Virus and other forms of encephalitis after becoming infected by feeding on the blood of birds which carry the virus.
- Most people infected with the virus experience no symptoms or they have flu-like symptoms. Sometimes though, the virus can cause severe illness, resulting in hospitalization and even death, so proper precautions should be taken. Consult a medical practitioner if you suspect you have West Nile Virus. Other diseases including Dengue Fever and Malaria are spread by mosquitoes in the sub-tropic and tropical parts of the world. See *S3AM-313-ATT4 Mosquito Borne Diseases* for information on the locations where mosquito borne diseases are known to be present.

4.7.8 Bees, Wasps and Hornets

- Wasps and bees will cause a painful sting to anyone if they are harassed. They are of most concern for individuals with allergic reactions who can go into anaphylactic shock. Also, instances where an individual is exposed to multiple stings can cause a serious health concern for anyone. These insects are most likely to sting when their hive or nest is threatened.
- Bees, hornets, and wasps may be found in derelict buildings, sheltered areas, behind covers or lids and even on open ground. Other protective measures are not normally effective against aggressive, flying insects. Be aware of the potential areas for these types of insects, approach these locations cautiously. Avoid reaching into areas where visibility is limited.
- If you see a nest in the area you are working in stop work. Contact the Manager or Site Supervisor for procedures to have the nest removed.

- If stung by a wasp, bee or hornet, notify a co-worker or someone who can help should you have an allergic reaction. Stay calm and treat the area with ice or cold water. Follow AECOM incident reporting guidelines to report the sting within 4 hours and notify the Manager or Supervisor immediately. Seek medical attention if you have any reactions to the sting such as developing a rash, excessive swelling or pain at the site of the bite or sting, or any swelling or numbness beyond the site of the bite or sting.

4.7.9 Fire Ants

- The fire ant (southern and western U.S.) and the European fire ant (northeastern U.S. and eastern Canada) is often very abundant where it is established. It is very aggressive and commonly climbs up clothing and stings unprovoked when it comes into contact with skin. Painful irritations will persist for an hour or more.

4.7.10 Personal Protective Equipment (PPE)

- Chemically-treated field clothing, full-length clothing, or Tyvek® coveralls.
- Gloves shall also be worn consistent with the recommendations of the site-specific SWP and/or THA to minimize hand exposure.
- Where ticks, chiggers, and spiders are presumed to exist, the Tyvek® or chemically treated clothing will be taped to the work boots.
- See *S3AM-313-ATT2 Ticks* for configuration of clothing for protection against ticks and insects.
- Application of insect repellent to clothing and/or exposed skin. Oil of lemon eucalyptus, DEET, and Permethrin have been recommended by the CDC for effective protection against mosquitoes that may carry the West Nile virus and related diseases.
- Note that DEET will reduce the effectiveness of Fire Resistance Clothing (FRC) and should not be applied to this clothing. If working in FRC, employees can use Permethrin as it has been shown not to reduce the effectiveness of FRC. Permethrin will need to be applied to FRC well in advance of the planned work. If permethrin is unavailable employees can apply DEET to their skin and let dry prior to putting FRC on.
 - Oil of Lemon Eucalyptus is a plant-based insect repellent on the market as Repel Lemon Eucalyptus. The products have been proven to be effective against mosquitoes, deer ticks, and no-see-ums for up to six hours. Derived from Oil of Lemon Eucalyptus, this non-greasy lotion or spray has a pleasant scent and is not known to be toxic to humans. The spray or lotions will be effective for approximately two to six hours and should be reapplied every two hours to sustain protection. Lemon Eucalyptus products cannot be applied to fire retardant clothing.
 - Permethrin is an insecticide with repellent properties registered with the Environmental Protection Agency and recommended by the CDC.
 - Permethrin is highly effective in preventing tick bites when applied to clothing, but is not effective when applied directly to the skin. Two options are available for Permethrin treatment of clothing worn during field work: 1) pre-treatment of fabric by the clothing manufacturer; or 2) manual treatment of their personal clothing using Permethrin spray in accordance with manufacturers recommendations. This will likely require treatment at home or the office prior to field mobilization. Caution should be used when applying Permethrin as it is highly toxic to fish and house cats. AECOM strongly recommends the first option (employees obtaining pre-treated clothing) to avoid the time required, potential risk, and housekeeping issues involved with manually treating the clothing with spray. Purchase pre-treated clothing in accordance with *S3AM-208-PR1 Personal Protective Equipment* and with the approval of your Supervisor or Manager.
 - The Permethrin pre-treatment is odorless and retains its effectiveness for approximately 25 washings. After 25 washings, the pre-treated clothing will be

considered no longer effective and removed from service. Clothing that has been manually treated by employees will be considered effective for five wash cycles.

- Also, use of clothing that has been pre-treated with Permethrin offers a reduction in the use and application of other insect repellents that shall be applied directly to the skin. Supervisor or Manager approval is required prior to purchase.
- If the employee opts not to utilize chemically pre-treated clothing while potentially exposed to insects, spiders and/or ticks, they shall either: 1) wear Tyvek® coveralls taped to the boots, or 2) wear full-length clothing consisting of long-legged pants and long-sleeved shirts treated with an insect repellent containing Permethrin, DEET, or an oil of lemon eucalyptus to their work clothing.
- Safety Data Sheets (SDS) for the repellents, lotions, and cleansers discussed in this Procedure are not required because the repellents, lotion, and clothing are consumer products used in the manner intended for the general public. Although not required, a SDS should be obtained for the products used and placed into the office SDS library and site-specific safety plan.

4.8 Poisonous Plants

4.8.1 Habitat Avoidance, Elimination and/or Control

- If poisonous plants are identified in the work area, employees will mark the plants using either flags or marking paint, and discuss what the specific indicator will be to signal to other employees to avoid the designated area. If employees decide to use ground-marking paint to identify poisonous plants, they should discuss this tactic with the Manager (and Client as appropriate) for approval.
- If removal of the plants is considered, it should be subcontracted to a professional landscaping service that is capable and experienced in removing the plant. If herbicides are considered for use, a discussion shall need to occur with the Manager (and Client as appropriate) to determine whether it is acceptable to apply herbicides at the work site. Application of herbicides may require a license.
- Employees shall not attempt to physically remove poisonous plants from the work area unless a clearing procedure, including PPE, is prepared in advance and approved by the SH&E Manager. The clearing procedure should be included in the SH&E Plan and THA and the required PPE specified.

4.8.2 Poisonous plants that employees should recognize and take precautions to avoid include: poison sumac, poison ivy (terrestrial and climbing), poison oak, giant hogweed² (or giant cow parsnip), wild parsnip, devil's club and stinging nettle. Many others are extremely poisonous to eat (e.g., poison hemlock; water parsnip) – do not eat anything that has not been identified. Refer to *S3AM-313-ATT5 Plants of Concern* for information on locations where some of these poisonous plants are found in the U.S.

- Of the toxic plants in the cashew family, poison ivy (*Rhus radicans*) is most widespread. It grows in a variety of forms such as a low sprawling shrub, dense ground cover, or a thick woody vine that grows high into the tree canopy. Poison oak (*Rhus diversiloba*) is typically a low shrub in drier soils. Both of these plants have leaves of three and white berries. Poison sumac (*Rhus vernix*) is a tall shrub that is less prolific in distribution. It grows in wet areas, has a compound leaf with a red leaf stem (rachis), and white berries. All of these plants possess urushiol oils in all parts of the plant. Touching the plant causes an itchy skin rash that can show up within 4-72 hours following contact. People have a wide range of reactions including swelling, itching, rash and bumps, patches or blisters.
- Uroshiol oil can also transfer onto clothing and equipment. The oil can remain active on surfaces for up to 5 years and can be transferred to your skin.

² Phytodermatiti producer: keep skin covered and wash well after exposure

- Wild parsnip is found throughout the U.S. and contains a poison that produces a rash similar to poison oak and ivy. Unlike poison oak and ivy, the active oil will not be present on unbroken leaves. See *S3AM-313-ATT6 Wild Parsnip Identification* for additional information and photos of wild parsnip.
 - Several plants in the carrot family contain toxic sap that causes severe dermatitis if it comes into contact with skin that is then exposed to sunlight. The most serious reaction is caused by the giant hogweed (*Heracleum mantegazzianum*), a plant that is spreading in southern Ontario and is also present in southwestern British Columbia. The plant is enormous, attaining up to 16 feet (5 meters) in height, which it does in one growing season. Contact causes painful blistering that can cause permanent disfigurement. It is to be avoided. Similar but less serious reactions can be caused by meadow parsnip (*Pastinaca sativa*) and cow parsnip (*Heracleum lanatum*). Meadow parsnip can be very abundant on disturbed sites.
 - Nettles, particularly stinging nettle (*Urtica dioica*) and wood nettle (*Laportea canadensis*) contain urticating hairs on the leaves and stems that cause sharp pain or itchiness on contact with skin. The irritation is immediate and normally lasts no more than an hour and there are no lasting consequences.
 - Some plants contain abundant stiff spines that can present a safety hazard, particularly if one is to fall into them. These include the cactus (*Opuntia spp.*), devils club (*Oplopanax horridum*), and prickly-ash (*Zanthoxylon americanum*).
- 4.8.3 A large number of plants are not harmful to touch but may contain poisonous berries or foliage that could cause serious complications or death if they are ingested. It goes without saying to not eat any berries or plants if you are unsure of their identity.
- Remember that in the fall and winter the hazard still exists in the form of stubble and roots.
- 4.8.4 Personal Protective Equipment (PPE)
- Employees conducting clearing, grubbing, or similarly disturbing work activities in areas where poisonous plants exist shall wear long-sleeve clothing or Tyvek® coveralls, and disposable cotton, leather or synthetic gloves. Employees shall not touch exposed skin (neck and face) with potentially contaminated gloves. Tyvek® and gloves worn to protect from exposure to poisonous plants shall be treated as contaminated, removed from the body in a manner that the contamination is not spread, and placed in plastic bags for disposal.
 - Personal clothing that has been exposed to poisonous plants shall be decontaminated with a poisonous plant cleanser such as Tecnu® or removed in a careful manner, bagged and washed separately from other clothing to remove urushiol.
 - Work boots will be decontaminated with either soap and water or a cleansing agent such as Tecnu® cleanser.
 - If foliage is being cleared and includes poisonous plants, exposed skin shall be treated with a dermal barrier cream such as Tecnu®'s Oak 'n Ivy Armor or Enviroderm's Ivy Block and either a full-face respirator or a half-face respirator (with goggles) fitted with a P-100 (HEPA) dust filter.
- 4.9 Bird Droppings and Biological Soil Hazards
- 4.9.1 Work in any area where pigeons or other flying animals (e.g. bats) may nest requires a written statement from the client which states the potential for, and extent of, accumulation of excrement on/in the structure from pigeons or other winged animals.
- 4.9.2 Substantial accumulations of droppings can pose physical and health risks as slippery surfaces (if wet) and if the material is disturbed and becomes airborne, it can be inhaled or ingested if personal hygiene practices are not implemented. Inhalation of airborne droppings can cause diseases such as histoplasmosis. Exposure to surfaces with bird droppings shall be safeguarded by implementing proper work practices, training employees for awareness and using PPE. See *S3AM-313-ATT8 Bird Droppings*.

- 4.9.3 Tularemia is a problem with contaminated soil in some locations. Tularemia is a disease of animals and humans caused by the bacterium *Francisella tularensis*. Rabbits, hares, and rodents are especially susceptible and often die in large numbers during outbreaks. Workers can contract Tularemia through tick and deer fly bites, but also through inhalation of contaminated aerosols or agricultural dusts. Check work areas for carcasses before disturbing the ground (e.g. mowing, brushing, grubbing, excavation, etc.).
- 4.10 Personal Hygiene and Body Checks
- 4.10.1 Tick-borne diseases typically require that the tick be imbedded for four hours to begin disease transfer. The oils from poisonous plants can take up to 4 hours after exposure to penetrate the skin and react with the live proteins under the skin.
- 4.10.2 It is recommended that exposed skin be checked frequently for the presence of ticks, insects, rashes, or discolorations. External clothing should also be checked for the presence of ticks and insects; these should be retained for identification and to determine if medical treatment is needed.
- 4.10.3 Employees shall shower as soon as practical after working in the field and examine their bodies for the presence of ticks, insect bites, rashes, or swollen areas. If imbedded ticks are found, they should be removed using the technique described in *S3AM-313-ATT2 Ticks*.
- 4.11 Employees shall immediately notify their Manager or Supervisor of the presence of an imbedded tick, bee, wasp or hornet sting, other insect bite, rash, or any abnormal reaction. Reporting shall occur within 4 hours for a significant incident and 24 hours for all other SH&E incidents, and in accordance with *S3AM-004-PR Incident Reporting, Notifications & Investigation*.
- 4.12 The Manager or Supervisor shall forward the report to the SH&E Manager for follow up.

5.0 Records

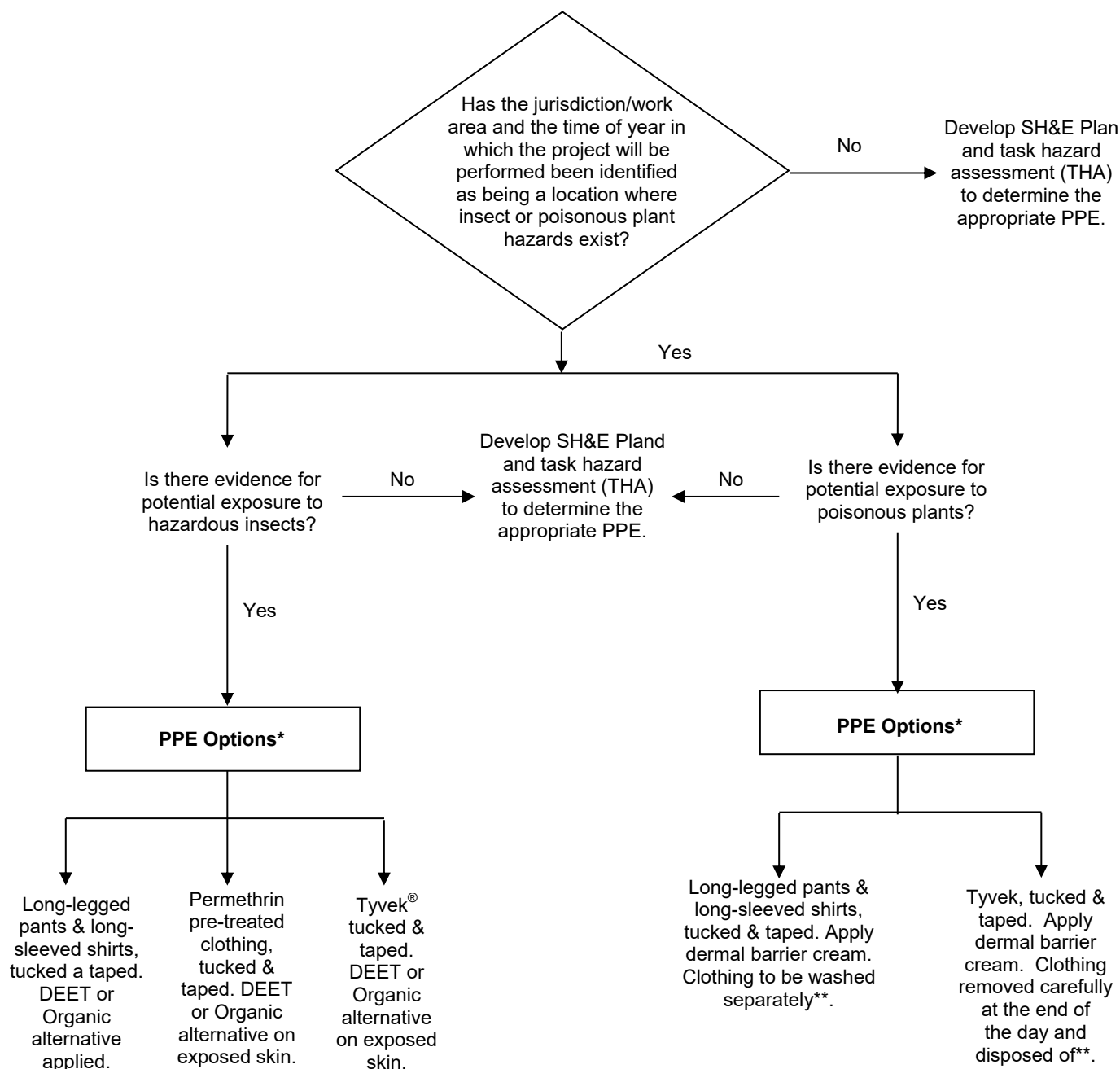
None

6.0 Attachments

- 6.1 [S3AM-313-ATT1 Biological Hazard Assessment Flow Chart](#)
- 6.2 [S3AM-313-ATT2 Ticks](#)
- 6.3 [S3AM-313-ATT3 Poisonous Spider Identification](#)
- 6.4 [S3AM-313-ATT4 Mosquito Borne Diseases](#)
- 6.5 [S3AM-313-ATT5 Plants of Concern](#)
- 6.6 [S3AM-313-ATT6 Wild Parsnip Identification](#)
- 6.7 [S3AM-313-ATT7 Alligators](#)
- 6.8 [S3AM-313-ATT8 Bird Droppings](#)
- 6.9 [S3AM-313-ATT9 Large Carnivores & Ungulates](#)
- 6.10 [S3AM-313-ATT10 Bear Safety](#)
- 6.11 [S3AM-313-ATT11 Small Mammals](#)
- 6.12 [S3AM-313-ATT12 Snakes & Scorpions](#)

Biological Hazard Assessment Decision Flowchart

S3AM-313-ATT1



* indicates that when both insect and poisonous plant hazards are recognized hazards at a project site, the most conservative combination of the available PPE choices will be selected. Include the selected PPE option in the respective SH&E Plan and THA.

** indicates that clothing that has been known or suspected to have come in contact with poisonous plants must be washed before it can be worn again. Similarly, Tyvek® that has been known or suspected to have come in contact with poisonous plants will be disposed of rather than reused during a subsequent day or project.

Americas

Ticks

S3AM-313-ATT2

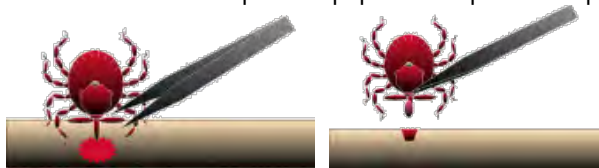
1.0 Background

- 1.1 The Public Health Agency of Canada and the Centers for Disease Control and Prevention work with States and Provinces, health authorities and other experts on research to define and monitor the occurrence of the ticks that carry bacterium that cause disease, including but not limited to:
 - 1.1.1 *Borrelia burgdorferi*, the bacterium that causes Lyme disease.
 - In the United States and Canada, the black-legged tick (*Ixodes scapularis*; often referred to as a deer tick) and the western black-legged tick (*Ixodes pacificus*) are the species known to transmit this disease-causing agent, as well as other less common agents.
 - 1.1.2 *Rickettsia rickettsia*, the bacterium that causes Rocky Mountain Spotted Fever.
 - In the United States and Canada, the American dog tick (*Dermacentor variabilis*), Rocky Mountain wood tick (*Dermacentor andersoni*), and brown dog tick (*Rhipicephalus sanguineus*) are known to transmit this disease-causing agent.
 - 1.1.3 *Francisella tularensis*, the bacterium that causes Tularemia.
 - In the United States, these include the American dog tick (*Dermacentor variabilis*), Rocky Mountain wood tick (*Dermacentor andersoni*), and Lone star tick (*Amblyomma americanum*).
 - 1.1.4 *Ehrlichiosis*, the general name to describe several bacterial diseases that affect animals and humans.
 - In the United States, these include the black-legged tick (*Ixodes scapularis*; often referred to as a deer tick) and the western black-legged tick (*Ixodes pacificus*), and Lone star tick (*Amblyomma americanum*).
- 1.2 Consult local health authorities to determine where tick populations are established or emerging. Locations where distribution may have previously been limited may show evidence of larger populations. Employees working in or adjacent to areas where there are established tick populations may have a greater chance of contact with ticks.
- 1.3 While there is a higher risk of coming in contact with infected ticks in areas where populations are established, there is also a low risk of tick-borne diseases being contracted almost anywhere in the Americas as migratory birds transport infected ticks over large geographic distances. Take precautions to reduce tick contact.
- 1.4 Lyme Disease
 - 1.4.1 The rate of infection of ticks with the bacterium that causes Lyme disease varies. Infection rates are typically higher in adult ticks compared to the other stages (nymphs and larvae).
 - 1.4.2 Despite the lower rates of infection, people are most likely to acquire Lyme disease from a nymph because this stage is so small and thus more likely to go unnoticed and feed for a sufficient amount of time for the Lyme disease bacterium to be transmitted (24-36 hours).
 - 1.4.3 Infection rates are often greater in tick populations that have been established for long periods of time compared to newly established ones.
 - 1.4.4 Lyme disease patients are most likely to have illness onset in April through November with onset peaking in June, July, or August and less likely to have illness onset from December through March

2.0 To Remove Attached Ticks



- 2.1 Use fine-tipped tweezers or notched tick extractor, and protect your fingers with a tissue, paper towel, or latex gloves (see figure). Persons should avoid removing ticks with bare hands.
- 2.2 Grasp the tick as close to the skin surface as possible and pull upward with steady, even pressure. Do not twist or jerk the tick; this may cause the mouthparts to break off and remain in the skin. (If this happens, remove mouthparts with tweezers. Consult your health care provider if illness occurs.)
- 2.3 After removing the tick, thoroughly disinfect the bite site and wash your hands with soap and water.
- 2.4 Do not squeeze, crush, or puncture the body of the tick because its fluids may contain infectious organisms. Skin accidentally exposed to tick fluids can be disinfected with iodine scrub, rubbing alcohol, or water containing detergents.
- 2.5 Save the tick for identification in case you become ill. This may help your doctor make an accurate diagnosis of potential diseases by determining what type of tick it is. Place the tick in a sealable plastic bag and put it in your freezer. Write the date of the bite on a piece of paper with a pencil and place it in the bag.



3.0 Folklore Remedies Don't Work

- 3.1 Folklore remedies, such as the use of petroleum jelly or hot matches, do little to encourage a tick to detach from skin. In fact, they may make matters worse by irritating the tick and stimulating it to release additional saliva or regurgitate gut contents, increasing the chances of transmitting the pathogen. These methods of tick removal should be avoided.

4.0 Configuration of Clothing

- 4.1 Loose-cuff trousers must be tucked into socks, wrapped with duct tape (or equivalent) completely around the cuff of the sock up on to the surface of the pant leg to prevent entry of insects between the sock and pants, and preferably reverse-wrapped with "sticky" side out (see figure below).



Americas

Poisonous Spider Identification

S3AM-313-ATT3

Black Widow Spider

- Found in warm, dry parts of throughout the United States and extend into the southern edge of Canada.
- Prefer to spin their webs in dark, sheltered spots close to the ground
- Abdomen usually shows hourglass marking.
- The female is 1 to 1.5 inches (3-4 centimeters) in diameter.
- Have been found in well casings and flush-mount covers.
- Not aggressive, but more likely to bite if guarding eggs.
- Light, local swelling and reddening of the bite are early signs of a bite, followed by intense muscular pain, rigidity of the abdomen and legs, difficulty breathing, and nausea.
- If bitten, see physician as soon as possible.

**Brown Spiders (Recluse)**

- Central and South U.S., although in some other areas, as well.
- 0.25-to 0.5-inch (0.6 to 1.3 centimeters)-long body and the size of silver dollar.
- Hides in decaying wood, baseboards, ceilings, cracks, and undisturbed piles of material.
- Bite either may go unnoticed or may be followed by a severe localized reaction, including scabbing, necrosis of affected tissue, and very slow healing.
- If bitten, see physician as soon as possible.

**Hobo Spider**

- Primarily found in Washington, Oregon, Wyoming, Colorado, Utah, Montana and the Pacific Northwest United States.
- 0.4-to 0.5-inch (1.1 to 1.3 centimeters)-long body and the size of silver dollar.
- Because of its common features and color, it is easily confused with other spider such as Brown Recluse Spiders.
- They rarely climb vertical surfaces and are uncommon above basements or ground level.
- Bite is initially painless. After 24 hours, the bite develops into a blister and after 24-36 hours, the blister breaks open, leaving an open, oozing ulceration.
- If bitten, see physician as soon as possible.



Exercise care when collecting samples and avoid reaching into areas where visibility is limited. If bitten by a spider, attempt to identify the spider, notify a co-worker or someone who can help should the bite site become painful, discolored, or swollen. Stay calm and treat the area with ice or cold water. Seek medical attention if you have any reactions to the sting such as developing a rash, excessive swelling or pain at the site of the bite or any swelling or numbness beyond the site of the bite.

Americas

Mosquito-Borne Diseases

S3AM-313-ATT4

1.0 Background

- 1.1 Employees working outdoors in the Americas may be exposed to mosquitoes that may transmit illnesses, including Encephalitis and Dengue.
- 1.2 Dengue is transmitted by the bite of a mosquito infected with one of the four dengue virus serotypes. Dengue is endemic to South America.
 - 1.2.1 Dengue is a febrile illness that affects infants, young children and adults with symptoms appearing 3-14 days after the infective bite.
 - 1.2.2 Symptoms range from mild fever, to incapacitating high fever, with severe headache, pain behind the eyes, muscle and joint pain, and rash.
 - 1.2.3 Severe dengue (also known as dengue hemorrhagic fever) is characterized by fever, abdominal pain, persistent vomiting, bleeding and breathing difficulty and is potentially fatal.
- 1.3 West Nile encephalitis is an infection of the brain that is caused by a virus known as the West Nile virus.
 - 1.3.1 Most individuals infected with WNV remain asymptomatic. West Nile (WN) fever is typically a mild illness lasting 3 to 6 days.
 - 1.3.2 The main symptoms are sudden onset of fever with chills, rash, malaise, headache, backache, arthralgia, myalgia and eye pain. Other non-specific symptoms may include nausea, vomiting, anorexia, diarrhoea, rhinorrhoea, sore throat, and cough.
 - 1.3.3 The main route of infection is via the bite of a mosquito that has been infected by feeding on West Nile Virus infected birds.
- 1.4 Arboviral encephalitis is a virus that exists in various forms in global distribution. Numerous forms occur in the Americas, including the following four primary forms that can be transmitted by mosquitoes:
 - 1.4.1 Eastern equine encephalitis (EEE) – United States and Canada
 - 1.4.2 Western equine encephalitis (WEE) – United States
 - 1.4.3 St. Louis encephalitis (SLE) – United States and Canada
 - 1.4.4 La Crosse (LAC) encephalitis.all of which are transmitted by mosquitoes – United States
- 1.5 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. Typically, mosquitoes will fly only a quarter of a mile (400 meters) from their breeding location.
- 1.6 The local Public Health Department and Center for Disease Control and Prevention (CDC) should be consulted to determine what diseases transmitted by mosquitoes are present and exposure prevention recommendations.

Plants of Concern

S3AM-313-ATT5

1.0 Background

- 1.1 Poison ivy, oak and sumac (poisonous plants) pose a significant threat to AECOM employees due to the dermatitis that results from exposure to the oil on these plants, called urushiol.



Poison Oak

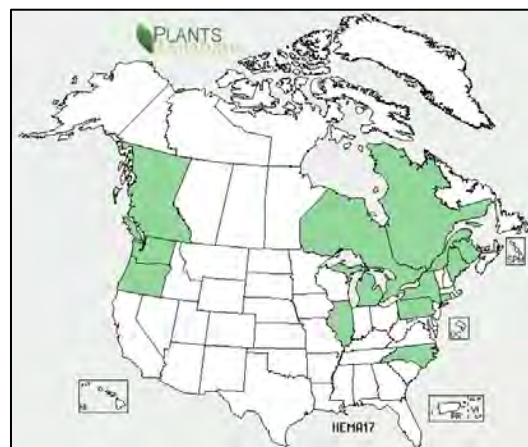
Poison Sumac

Poison Ivy

- 1.2 Exposure to urushiol produces a rash that can be irritating and cause the exposed employee to scratch the infected area, increasing susceptibility for an infection to result from the rash.
- 1.3 It should be noted that each time an employee is exposed to urushiol, it increases the severity of the reaction they will have in subsequent exposures.
- 1.4 Giant Hogweed is a phototoxic plant that causes skin irritation on contact with the sap and, when exposed to sun causes deep blisters.
- 1.5 Blisters from contact with Giant Hogweed can form black or purplish scars that can last for several years. Even a tiny amount of the sap in the eyes can cause temporary to permanent blindness.



Giant Hogweed



Giant Hogweed Distribution

Image obtained from
www.gclandscape.com

2.0 Treatment

- 2.1 In cases that involve severe rashes, medical treatment may be necessary to control the rash.
- 2.2 Employees that develop a rash as a result of exposure to poison ivy, oak or sumac should report the exposure immediately to their Supervisor, Project Manager and Region Safety, Health and Environment Manager.

Pacific Poison Oak Distribution



Image obtained from www.cdc.gov

Atlantic Poison Oak Distribution



Image obtained from www.cdc.gov

Poison Sumac Distribution



Image obtained from www.cdc.gov

Western Poison Ivy Distribution



Image obtained from www.cdc.gov

Eastern Poison Ivy Distribution



Image obtained from www.cdc.gov

Americas

Wild Parsnip Identification

S3AM-313-ATT6

1.0 Background

- 1.1 Wild parsnip (also known as poison parsnip) looks similar to a large carrot plant and is found in open places along roadsides and in waste places throughout the United States and Canada.
- 1.2 This plant produces a compound that causes severe blistering and discoloration after being exposed to sunlight—a condition known as photodermatitis. That is, when the skin comes in contact with this plant's juice and then is exposed to UV light, a severe burn develops.

2.0 Hazard

- 2.1 Everyone can get burned by wild parsnip. Unlike poison ivy, you don't need to be sensitized by a prior exposure. However, wild parsnip is only dangerous when the juice from broken leaves or stems gets on your skin—therefore, you can touch and brush against the undamaged plant without any danger.
- 2.2 If one gets some of the sap of hogweed (or meadow parsnip or cow parsnip) in contact with skin, it is critical that they stay out of the sun for 8 hours. If one needs to remove the plant they should be completely covered with overalls, gloves, hat and safety glasses.



Americas

Alligators

S3AM-313-ATT7

1.0 Hazard

- 1.1 Your chance of encountering an alligator is greatest during the animal's courtship and mating season, which takes place from March through September. This is when male alligators become most dominant and aggressive as they try to intimidate rival males and attract females by their show of power. Some males end up having to travel to find a mate. July through September is when mother alligators are guarding nests.
- 1.2 Mating season takes up much of the warmer months - a very popular time in the southeastern USA for outdoor activities - and alligators are solar-powered, so-to-speak. The warmth from the sun fires up their metabolism, giving them renewed energy; and renewed energy means great potential for conflict.

2.0 Encounter

- 2.1 The alligator is naturally wary of humans, and will flee quickly if you get too close to it, or it may utter a very audible and compelling warning hiss. In some cases, however, alligators may charge or attack. Here are some examples of such cases:
 - 2.1.1 An alligator that is accustomed to being fed by humans may not be so shy.
 - 2.1.2 An alligator that is surprised and alarmed by your approach may attack, thinking that it is being attacked itself.
 - 2.1.3 A mother alligator caring for her nest or for live babies. If you see alligator babies, or if you encounter a nest (usually a mound of vegetation mixed with mud), remove yourself to a safe distance, the mother alligator is sure to be close by. If you get close, the mother may sound a very audible and intimidating warning hiss. Such a nest may be difficult to identify for a non-expert, but it is likely the mother will issue you a warning.
 - 2.1.4 Alligator mothers are well-known to be practically fearless when defending their offspring, whether the little ones have hatched or not. A mother alligator was observed leaping, jaws agape, to attack a helicopter as it approached the nest area to land. The helicopter carried biologists studying alligator nests.
- 2.2 Also be careful near heavy vegetation in or near the water's edge. This is where an alligator likes to enjoy privacy and peace during the daylight hours. If you trudge through there and surprise it, the outcome may not be positive.
- 2.3 Generally, a good minimum distance to keep between you and an alligator or nest is 15 feet (4.6 meters).
- 2.4 When trying to get past an alligator, make sure not to walk between the alligator and the water, because if it's spooked, it's going to run to the water.
- 2.5 If an alligator does approach in a threatening manner, make as much noise and movement as possible. This should show the alligator that he has taken on more than he can handle and he'll back away.

**3.0 Alligator Charge**

- 3.1 The alligator is not a natural runner. Those short legs obviously don't serve it like a horse's legs do, and the alligator can actually tire out in a relatively short time. When it charges after a human or animal, it is either

trying to scare it away or seize it. It has a fast and furious burst of energy which serves it well for stealth hunting -- grabbing prey when it doesn't expect it. Furthermore, the reptile is opportunistic, which means, quite simply, it doesn't like to work very hard to get its food if it doesn't have to.

- 3.2 In the very rare event you are charged or chased by an alligator, move in as straight a line as possible away from it as fast as you reasonably can. In many cases, the vegetation features of the wild will serve to protect you by slowing the alligator down, like trees, bumps, bushes, etc. -- your comparatively long legs usually make it easier for you to maneuver through the trees and brush than an alligator's short legs do.
- 3.3 Most adult humans can outrun even a fast crocodilian, which has been clocked at a maximum of about 10 miles per hour (mph) (17 kilometers per hour [kph]), compared to a human speed of 15-17 mph (24-27 kph). But this doesn't matter much; an alligator will often give up the chase because it sees that the runner is moving away too quickly, and realizes that too much effort will be required to continue pursuit.
- 3.4 You may have heard somewhere that the zigzag run (running in a "z" pattern, side-to-side) is a good idea, but this is not only an unnecessary maneuver but probably a very unwise one. Here's why:
 - 3.4.1 Unless you're an Olympic athlete, running zigzag over natural topography increases your risk of tripping and falling over rocks, plants, roots, and the like. And it goes without saying that falling while being pursued by an alligator is not good.
 - 3.4.2 Furthermore, an alligator doesn't have the degree of stereoscopic vision we have. It actually has a small 'blind spot' directly in front of it. Hence, the alligator's vision is most effective in the 'sides' of its field of view. So, running zigzag not only slows your rate of distance from your pursuer, it may clearly indicate to the animal exactly where you are; even this point hardly matters since in many cases the alligator may keep its eyes shut while pursuing so as not to get them hit by twigs, grass stalks and branches in its path.
 - 3.4.3 Finally, an alligator bites very effectively in a side-swiping motion, so if you are trying to run zigzag and are slowed down by plants, rocks, or other obstacles, the backwards flying leg of a running human is an optimal target for side-swiping, chomping jaws (the operative word here is "side").
- 3.5 Simply put, when faced with an attack, move directly away from the alligator as quickly as possible, navigating the terrain as carefully as possible. The zigzag idea will likely not serve you well.

4.0 Alligator Attack

- 4.1 If it seizes prey, and the prey fights back hard, the alligator may release it, depending on factors such as its own size relative to that of the victim, its own level of aggression, and its measure of hunger. Merely struggling to break free may not be enough counter-aggression to stop an alligator, and may actually prompt a devastating "death roll" response, in which the reptile furiously spins on its central axis to tear muscle and bone free of the victim's body.
- 4.2 These armored saurian are among the toughest beasts in the animal kingdom, so an attack victim should channel his or her nervous energy and will to survive and take the offensive by fighting hard. Not struggling...fighting very, very, very hard. Others on hand during such an event may be able to help by fighting the reptile, too. This should include punching the snout, poking the eyes, and even jabbing the ears, which are seen as small slits behind the eyes.

Bird Droppings Safe Work Practices

S3AM-313-ATT8

1.0 Background

- 1.1 According to the National Institute for Occupational Safety and Health (NIOSH), histoplasmosis is an infectious disease caused by inhaling spores of a fungus called *Histoplasma capsulatum* (abbreviated *H. capsulatum*) that may inhabit accumulated masses of pigeon droppings and excrement of other birds and flying animals. Its symptoms vary greatly, but the disease primarily affects the lungs. Occasionally, other organs are affected. This form of the disease is called disseminated histoplasmosis, and it can be fatal if untreated. The acute respiratory disease form of histoplasmosis is characterized by respiratory symptoms, a general ill feeling, fever, chest pains, and a dry or non-productive cough. Distinct patterns may be seen on a chest x-ray. Chronic lung disease resembles tuberculosis and can worsen over months or years. If symptoms occur, they may start within 3 to 17 days of exposure, with an average of 10 days. On a positive note, histoplasmosis is not contagious.
- 1.2 Psittacosis, although primarily a respiratory disease, can cause a wide variety of clinical manifestations. Generally, about 10 days after infection occurs, the clinical illness begins abruptly with fever, chills, weakness, fatigue, muscle pain, anorexia, nausea, vomiting, excessive sweating and difficulty with breathing, headache, backache, and sensitivity to light.
- 1.3 Hypersensitivity pneumonitis is also known as pigeon breeder's disease.

2.0 Symptoms

- 2.1 The acute form of hypersensitivity pneumonitis is clinically characterized by chills, fever, cough, breathlessness without wheezing, and malaise 4-10 hours after exposure. In general, an acute attack subsides after 18 to 24 hours.

3.0 Treatment

- 3.1 If a person should develop any of the symptoms as noted above, or others, it is important to see a physician and inform him of an exposure to pigeon/bird or bat excrement. A failure to diagnose the preceding conditions could occur if a treating physician is unaware of a patient's exposure to pigeon/bird or bat excrement.

4.0 Prevention

- 4.1 Prior to work in any area where pigeons or other flying animals may nest, a written statement from the client shall be obtained in regards to the potential for, and extent of, accumulation of excrement on/in the structure from pigeons and other winged animals.
- 4.2 The client shall be asked to provide appropriate details as to the basis for their statement (e.g., date of last visual survey for pigeon/bird or bat excrement accumulation, date of last excrement removal effort, etc.).
- 4.3 In no case will an AECOM employee or contract employee be permitted to commence structure inspection procedures without the Project Manager having received and evaluated the aforementioned written statement from the client.
- 4.4 According to NIOSH, the best way to prevent exposure to *H. capsulatum* spores during survey and inspection work is to avoid situations where excrement and other potentially contaminated material can become airborne and inhaled. Therefore, it is preferable that the efforts to determine if, and to what extent, there is an accumulation of pigeon/bird or bat excrement on/in structures, or the efforts to clean-up/remove/dispose of such contaminated material, be left to the client or subcontracted out.

5.0 Safe Work Practices

- 5.1 In those cases where AECOM employees or contract employees are contracted by the client to determine the extent of accumulation of animal excrement in/on structures, the following minimum safety and health precautions shall be taken. (NOTE: precautionary measures are based on recommendations and best practices prescribed in the NIOSH 2004 public document titled *Histoplasmosis – Protecting Workers at Risk*).
- 5.2 All workers shall wear disposable protective clothing (Tyvek® coveralls). Disposable overalls with hoods shall be donned when working in areas where *H. capsulatum* spore-contaminated material is likely to fall from overhead.
- 5.3 All workers shall wear disposable shoe coverings fitted with ridged soles made of slip-resistant material to reduce the likelihood of slipping on wet or dusty surfaces. Gloves shall be worn.
- 5.4 All workers shall wear a full facepiece air purifying respirator fitted with P100 (HEPA) cartridges. If entering an enclosed area in which the extent of excrement contamination is unknown, additional protective measures shall be taken such that workers shall wear a powered air-purifying respirator (APR) with full facepiece fitted with P100 (HEPA) cartridges. Any variance from these requirements must be approved by the Region Safety, Health and Environment Manager. Workers donning APRs shall be medically screened, cleared, and trained in their proper use in accordance with AECOM safety program standards.
- 5.5 If contaminated material must be disturbed for purposes of removal/disposal or during the structure inspect process, it shall be wetted down prior to all work and will be rewetted as necessary to minimize airborne dusting.
- 5.6 After working in *H. capsulatum* spore-contaminated areas and before removing any respiratory protective equipment, workers shall remove all protective clothing and shoe coverings and seal them in a heavy-duty plastic bag for disposal.
- 5.7 Workers shall observe a high degree of personal hygiene, even if the exposure is casual. Special care shall be taken to wash hands, face, and other areas of exposed skin thoroughly before eating, drinking or smoking.

Americas

Large Carnivores & Ungulates

S3AM-313-ATT9

1.0 Hazard

- 1.1 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 towards humans; however, all wild animals can be dangerous if they feel threatened or if they are sick or starving.
- 1.2 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 the mating season (September to November) can be very aggressive, especially if provoked.

2.0 Personal Protective Equipment

- 2.1 Noise makers such as bear bangers, whistles and bells can be used as deterrents for an approaching animal.
- 2.2 Pepper (bear) spray can be used to ward off an imminent attack.

3.0 Safe Work Practice

- 3.1 Most negative encounters with ungulates or carnivores can be avoided with a few key preventative measures:
 - 3.1.1 When working in wilderness isolation, always travel in pairs and make lots of noise.
 - 3.1.2 Always store food in air-tight containers away from sleeping areas (if camping) and never carry strong smelling foods which could attract animals.
 - 3.1.3 Keep your eyes open for fresh animal signs which may indicate a dangerous situation:
 - 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.
 - A fresh kill or carcass which might indicate the presence of a carnivore that may become aggressive to defend its food.
- 3.2 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, you should move away to a safe location. Wildlife should not be enticed by reaching out or simulating calls.
- 3.3 Pets should be kept secure and away from wildlife as their actions can provoke an attack. Moose, deer and other wildlife may appear quite docile; however, if a dog makes them feel threatened, their behavior can become unpredictable.
- 3.4 **If you are approached by a carnivore (wolf, coyote, or cougar):**
 - 3.4.1 Pick up small children immediately.
 - 3.4.2 Try to appear bigger, hold your arms or an object over your head.
 - 3.4.3 Face the animal and retreat slowly. Do not run or play dead.
 - 3.4.4 Maintain steady eye contact with the animal.
 - 3.4.5 If the animal continues to approach, deter an attack by yelling, waving a stick or throwing rocks.
 - 3.4.6 If you are attacked, fight back. Hit the animal with a heavy stick or rock.
- 3.5 **If you are approached by an ungulate (moose, elk, deer, bison or caribou):**
 - 3.5.1 An angry moose, elk or deer will face you with its head and ears lowered.

- 3.5.2 Back away slowly.
- 3.5.3 Look for something to get behind like a tree or a car. You can go faster around an obstacle than the ungulate can.
- 3.5.4 An ungulate is more likely to bluff charge but if it continues the charge and you are attacked in the open, curl up in a ball on the ground. Always protect your head with your arms and lie still.
- 3.5.5 Stay still after the attack until the ungulate moves away.

Bear Safety

S3AM-313-ATT10

1.0 Hazard

- 1.1 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.
- 1.2 The hazard or risk associated with a bear encounter varies significantly depending on the location. It is important to research the project area before field work commences to determine the expected probability of encountering a bear. Remoteness from urbanized areas should not be a criterion, as bears have been encountered within city limits, especially near landfills.
- 1.3 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.
- 1.4 Preparing staff for any type of encounter is key to managing the risk.

2.0 Personal Protective Equipment

- 2.1 The best deterrent of a “bad bear encounter” is knowledge: a good understanding of the ecology and the behavior of the bears that will likely be encountered.
- 2.2 Bear Spray and Bear Bangers
 - 2.2.1 Staff must have hands-on training for the safe use of bear spray (a pre-season practice run is a good use of expired bear spray).
 - 2.2.2 Prior to work commencing, staff must ensure that the bear spray they are carrying is still valid and not past its expiration date.
 - 2.2.3 During travel, bear spray must be sealed in an airtight container or bag and must not travel in the cab of a vehicle, aircraft, or helicopter.
- 2.3 Firearms
 - 2.3.1 Environments and conditions which pose a high risk of bear encounters, may warrant the use of an armed wildlife monitor. Project managers, in consultation with appropriate project staff and Safety, Health and Environment Management, are responsible for determining the level of risk for their projects and whether or not such measures are required.
 - 2.3.2 A person hired as an armed bear monitor must be properly trained in wildlife monitoring as well as certified in the expert usage of firearms.
 - 2.3.3 The usage of an armed bear monitor is intended only as an additional precautionary measure to be used in specific environments to ensure the protection of field staff; staff should still be equipped and trained appropriately for the risk.

3.0 Restrictions

- 3.1 Staff must not work alone in areas where there is a medium or high risk of a bear encounter.
- 3.2 AECOM personnel shall not carry firearms or attempt to function as a wildlife monitor and/or perform their professional duties. For possible exceptions contact the Regional SH&E Manager who will evaluate the potential hazards with Regional Manager and Legal and provide written response. This can only be overridden with expressed permission of Region Executive and AECOM Chief Resilience Officer, refer to *WP-001-PR Firearms Standard*.

4.0 Training

- 4.1 In-house Bear Awareness training must be taken by all field staff who work in bear country every three years at a minimum, or more often as required.
- 4.2 The Bear Awareness training involves testing and improving the employee's knowledge about bear encounters, watching videos regarding bear awareness and behavior, and participating in group discussions about how to avoid and how to respond to bear encounters.
- 4.3 Specific considerations are given to black bear, grizzly bear, and polar bear encounters.

5.0 Safe Work Practice

- 5.1 Staff must be aware of wildlife signs and avoid wildlife encounters.
- 5.2 Bear Signs
 - 5.2.1 Fresh tracks – It is often better to see the bear's tracks than to see the actual bear. If you can tell the direction that the bear is travelling in, it is prudent to change your course of direction. Bears will travel down the same pathways people or other large animals use. If you have a clear track you can determine which type of bear has passed through the area. If you see more than one track, you can tell that it is possibly a female with cubs. Avoid females with cubs!
 - 5.2.2 Scat – Bear scat will look different depending upon the bear's diet. Close examination of bear scat can sometimes give you an indication of what the bears have been eating at that time of year. If the scat contains remnants of human garbage, there is a human food conditioned bear in the area. These bears associate people with food and can be the most dangerous type of bear to encounter.
 - 5.2.3 Animal carcasses – IF YOU COME ACROSS A CARCASS, LEAVE THE AREA IMMEDIATELY. Grizzly bears will often cover their kills for a few days and let it rot, then come back and eat it. THE BEAR WILL STAY CLOSE BY. Grizzly bears will defend their kill and this is a situation that could prompt a defensive attack by a bear.
 - 5.2.4 Torn-up logs and stumps – Bears will forage for insects in dead logs and rotting trees. You will often see torn up logs and stumps, evidence of their foraging.
 - 5.2.5 Evidence of digging – Holes dug into the ground are often made by grizzly bears digging for roots or ground squirrels. In particular, grizzlies will dig for food in the early spring soon after they leave their dens.
 - 5.2.6 Claw marks on trees – Claw marks can be left on trees by black bears when they have climbed up a tree. Grizzly bears will also leave claw marks on trees and on the ground. Bears will often chew a small tree or a sign-post, so watch for signs of chew marks along the trail.
 - 5.2.7 Hair on trees – Bears will rub against trees, usually trees with rough bark, to scratch themselves. You can find evidence of bears by the hair left in the tree's bark. The higher the hair left on the tree, the bigger the bear. Remember that the bear will often stand on its back legs to scratch its back on the tree.
 - 5.2.8 Daybeds – Bears will be most active in the early morning and in the evening. It would be prudent for field staff to restrict their field activities during the bear's most active foraging times as much as possible. During the heat of the day, bears will rest in daybeds. These can be shallow depressions of piled up leaves in the forest, trampled vegetation, a shallow scrape or a hole. Daybeds are usually located in cool places. Bears will make daybeds along streams and rivers. Daybeds are often associated with feeding places and therefore should be avoided.

5.3 Prevention

5.3.1 Your best defense against bears is to actively practice bear avoidance techniques when working in the field. You can prevent chance encounters by taking the following precautions:

- Know the areas and habitats bears use at different times of the year, and attempt to avoid such areas or be extremely cautious if you have to travel through them.
- Contact the local Fish & Wildlife Office to get current information on the bears in the area. Ask what other camps are in the area and if they are following good bear avoidance practices. (i.e., do they keep a clean camp?) If there are nearby human food sources available, e.g., an open dumpsite, the local bears may not be afraid to approach your camp.
- Always be aware of your surroundings. Stay alert. Watch for signs of bears along your route.
- Use binoculars to look around for bears when you are in open terrain.
- Never approach a bear if you see one feeding in the distance.
- Note the behavior of other wildlife in the area. Flocks of ravens can alert you to a possible animal carcass, and perhaps a bear. The area should be avoided. Bird or squirrel alarm calls might be telling you that a bear is near.
- Whenever possible, travel in daylight and try to avoid areas with restricted visibility, e.g., dense brush.
- Make lots of noise, especially when travelling in dense vegetation. Sing, shout, or talk loudly. You can carry portable air horns or cans of rocks. (Please note that bear bells are not effective – they do not make enough noise to warn a bear that you are approaching. You need to be loud so the bear can hear you coming.) Remember that the noise you make can be masked by loud natural sounds such as the wind or water. Therefore it is possible that the noise you make can go unnoticed by a bear whose attention is focused on feeding. You must make every attempt not to surprise a bear. In areas of loud natural noise, be louder!
- Stay together and travel in groups. Bears are less likely to attack groups of people. When travelling in groups, stay close together. Being in a group doesn't help if the individuals have spread apart along the trail.
- Pets should not accompany you when you are travelling in bear country. If you must take your pet, keep the animal on a short leash at all times. Unleashed dogs will harass bears and once scared, run back to their owner with an angry bear in pursuit.
- Do not wear perfumes or cosmetic products when you are travelling in bear country. Do not mask your human scent.
- All sanitary products should be stored in a similar fashion as food (stored at least 10 feet [3 meters] above site).
- Children should be kept very close by in bear country.
- Carry bear deterrents and know their limitations. Be familiar with how to use the deterrents, how to transport the deterrent safely and under what conditions it is most effective. Carry the deterrent in a belt, out in front and ready to grab at a moment's notice, never in your backpack.

5.4 Field Worker Precautions in Bear Country

5.4.1 Field workers should take extra precautions when working in bear country:

- Make every effort to go out into the field with another person; you should not be working alone in the field. One person can act as a lookout for the other. Keep watch for bear signs.
- Never approach a bear.
- Report where you are going and when you will return every time you leave camp. Have a plan of action if someone does not report back to camp at a specified time.

- Bears do get used to a camp's schedule and you will have fewer surprise encounters if everyone in the camp comes and goes at the same time every day.
- Take a two-way radio with you when you go out into the field.
- Always carry bear deterrents with you in the field and understand each deterrent's limitations. Carry your deterrents on a belt, out in front and ready to use instantly. Do not carry your deterrents in your backpack.
- Keep any food that you take with you sealed in odor-proof/bear-proof containers. Make every attempt to take odorless food with you, not something with a heavy scent.
- Pack out any garbage in odor-proof containers and burn once you return to camp.
- The noise of an ATV or skidoo can scare off a bear. Starting the machine and revving it up can scare off a curious bear. **DO NOT CHASE A BEAR WITH AN ATV OR SKIDOO.** You may need to drive the ATV around in circles to scare off the bear, but do not chase the bear.
- Take extra precautions when travelling along lakes or stream beds; bears use streams and river beds as travel routes. Be sure to carry noise makers.
- Limit your workday so you are not out in the early morning or evening when bears are most likely to be foraging.
- All **employees** should be proficient in First Aid. Do not go out into the field without first aid training.
- All field camps should have a First Aid Kit.
- All field camps should have means of communication with local ambulance or air ambulance personnel.
- A person's best defense against bears is to avoid them. If this is not possible, then being heard, smelled, or seen may lessen your chances of surprising a bear and/or provoking an attack.
- All wildlife should be respected, avoided, and not harassed at any time.
- Cooking in remote areas should be avoided. Any food should be stored in airtight containers and all garbage should be managed appropriately: "pack it in, pack it out".
- A bear in camp or within human structures is not a chance encounter. If this bear challenges you, you must fight, scream, and do whatever is necessary to live, no matter what species the bear is!
- In general, there are two types of bear encounters: Defensive and Non-defensive for grizzly bears and black bears. Your response will vary based on your assessment of the situation (your training will help you in identifying these situations and the appropriate response).

6.0 Encounters

6.1 General Recommendations When Encountering a Bear

- Consider your surroundings and assess the situation before you act.
- Remain calm. Do not turn your back to a bear.
- **DO NOT RUN** – Running may trigger the bear's natural pursuit response. Bears are able to reach speeds of 25 miles per hour [40 kilometers per hour], must faster than Olympic sprinters. Bears are also excellent swimmers.

6.2 Bear Encounters in the Field

- 6.2.1 Your response will depend upon the type of encounter.

- 6.2.2 Bears are more predictable than once believed and you can determine your best course of action in a confrontation by understanding the bear's characteristics and motivation. There are two pieces of information you should be aware of in any bear encounter:
 - The type of bear you are dealing with, and
 - The reason for the encounter.
- 6.2.3 Some people believe that when you stand your ground against a predatory black bear attack, the bear will feel threatened and leave. This has been effective in some cases. HOWEVER, it is not effective against a grizzly bear predatory attack and it is very difficult to know when it will be effective against black bears. Polar bears do not follow the same behavioral patterns as grizzly and black bears; polar bears are almost always aggressive and will not back down. Special considerations must be given to projects where polar bear encounters are anticipated.
- 6.3 If you can leave undetected:
 - 6.3.1 Leave the area quietly in the same direction that you came from.
 - 6.3.2 Move while the bear's head is down. Stop moving when the bear lifts its head to check its surroundings.
 - 6.3.3 Stay downwind so the bear will not pick up your scent.
 - 6.3.4 When you have moved a safe distance away, you can either watch and wait until the bear leaves or make a wide detour around the bear.
 - 6.3.5 If the bear is unaware of you and approaching, allow the bear the right of way.
- 6.4 If you cannot leave undetected:
 - 6.4.1 Let the bear know that you are present by smell first; therefore move upwind so they can pick up your scent.
 - 6.4.2 If it is possible, try to keep the bear in your sight. Watch to see if the bear leaves when it smells that a person is nearby.
 - 6.4.3 Attempt to move out of the way without being noticed by the bear. If you cannot do this, talk loudly to let the bear know where you are.
- 6.5 If the bear is aware of you but in the distance:
 - Remain calm.
 - Continue walking slowly in the same general direction, but head away from the bear.
 - DO NOT RUN.
 - If the bear begins to follow you, drop your pack or some article, (not food) to distract the bear. This may distract the bear long enough for you to escape. If you drop food for the bear – you will help the bear associate food with humans and teach it that aggressive behaviour will be rewarded with food.
 - If it is a grizzly following you, climb a tree if there is a large tree around. Proper escape up a tree would require scrambling at least 33 feet (10 m), however this is applicable only to Grizzly encounters. Black bears are excellent climbers. Tree climbing should be last resort.
- 6.6 If the bear is aware of you and close:
 - A bear will feel threatened in a close confrontation. The bear's natural tendency will be to reduce or to remove the threat. Assist the bear by acting as non-threatening as possible.
 - Do not make direct eye contact with the bear.
 - Do not make any sudden moves.
 - Do not run!

- The bear needs to identify you as a person, so talk in low tones and slowly wave your arms over your head.
- Attempt to give the bear an opportunity to leave. Be sure the bear has an open escape route. Do not corner a wild animal.
- Try to back away slowly and/or climb a tree if appropriate.
- Attempt to deter the bear if you are in a safe position.

6.7 If the bear is close and threatening:

- If you have a deterrent such as a bear banger or bear spray, be prepared to use it depending on how close the bear is. Try to scare the bear off.
- If you do not have a deterrent, or if using the deterrent is not successful, act as non-threatening as possible.
- Talk to the bear in a calm authoritative tone of voice.
- Do not startle or provoke the bear by making sudden moves.
- Never imitate the bear's aggressive sounds, signals or posture. The bear is attempting to establish dominance and imitating its moves is a challenge to its dominance.
- Back slowly away from the bear and drop a pack or some other article in order to distract the bear momentarily.
- Remember that the bear may be defending cubs that you have not yet seen or they have a food cache nearby. Attempt to look as non-threatening as possible.

6.8 If the bear is very close and approaching:

- A distance of less than 164 feet (50 meters) in an open area and closer in a forested area.
- If the bear continues to approach, use your deterrent.
- If the bear does not respond to the deterrent you must now **STAND YOUR GROUND!**
- If the bear continues to approach and is acting aggressive, **YOU MAY HAVE TO SHOOT** if you are carrying a firearm.

6.9 If the Bear Charges:

- A bear will charge you at high speed down on all four legs and often crouched low to the ground.
- Bears do not charge when standing up on the hind legs.
- Many charges are bluffs and the bear will often stop or veer off just at the last minute. It is difficult to know if the bear is bluff charging or not until it gets very close.
- When faced with a charging bear you have two options:
 - Use your bear deterrent; or
 - Roll into a ball and cover your neck and head with your arms if you are unarmed and have no other choice.

Small Mammals

S3AM-313-ATT11

1.0 Hazard

- 1.1 Working in the field either directly or indirectly with small mammals has inherent risks of injury or exposure to zoonotic diseases (infectious diseases that can be transmitted from animals to humans) that all field staff need to protect themselves against.
- 1.2 The risks are usually higher when there is direct contact with a wild animal, either through a break in the skin (blood), saliva, or excrement; however, there are also risks through air-borne diseases (e.g., Hantavirus).
- 1.3 Obviously, 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.

2.0 Personal Protective Equipment

- 2.1 Full-length clothing (long sleeves and pants)
- 2.2 Insect repellent
- 2.3 Respiratory equipment (when directly handling wildlife)
- 2.4 Gloves (when directly handling wildlife)

3.0 References

- 3.1 None.

4.0 Restrictions

- 4.1 Wildlife handling must only be completed under direct supervision of an experienced individual.

5.0 Training

- 5.1 Any staff that will be handling wildlife must be adequately trained and/or supervised by a wildlife biologist experienced in the job task.

6.0 Safe Work Practice

- 6.1 Wild animals can carry a variety of diseases that humans can contract: viral, parasitic, bacterial, and protozoal. Basic Personal Protective Equipment such as full-length clothing, gloves and a respiratory mask will greatly reduce the risk of exposure.
- 6.2 Treat unknown dogs encountered in field activities in the same manner as a wild animal. Be conscious of behaviors that seem to indicate anxiety (tail under the belly), defensiveness or aggressiveness, and attempt to leave the area if these are identified.
- 6.3 Whenever a wild animal must be handled, the procedure must be accomplished as safely and quickly as possible.
- 6.4 Proper techniques must be employed to avoid or minimize the risk of personal injury while, at the same time, avoiding or minimizing injury to the animal.
- 6.5 Gloves, catch sticks, caging, and other appropriate equipment may be necessary when handling a wild animal. Most of these animals will be extremely stressed, resisting every restraint attempt.

- 6.6 In the unfortunate circumstance that a person is bitten or scratched, he or she should cleanse the wound thoroughly with soap and flush with water immediately, providing for a mechanical removal of potentially infective organisms. This should be followed by cleansing under medical supervision and consultation with a physician to consider the potential exposure to the rabies virus.

7.0 Rabies

- 7.1 You will not be able to accurately determine if an animal has rabies simply by observation as traditional symptoms of rabies (foaming at the mouth, biting, etc.) do not occur in all animals nor at all stages. There are some mammals that are at a higher risk than others for the rabies virus, such as raccoons, skunks, stray cats and dogs, foxes, coyotes, rodents, and bats; however, any mammal can contract the virus.
- 7.2 Rabies is contracted by contact of an infected animal's saliva with an open wound – a bite or a scratch.
- 7.3 Symptoms of rabies in humans usually do not present themselves for a minimum of 10 days to a year or longer (the average is 30 to 50 days). Symptoms are typical of a flu, including malaise, loss of appetite, fatigue, headache, and fever. Over half of all patients have pain (sometimes itching) or numbness at the site of exposure. They may complain of insomnia or depression. Two to ten days later, signs of nervous system damage appear; these include hyperactivity and hypersensitivity, disorientation, hallucinations, seizures, and paralysis.
- 7.4 Because rabies is so difficult to detect and positively identify, it is very important to consult a physician immediately. If rabies is a possibility, begin treatment with the rabies vaccine as soon as possible (unlike other vaccines, rabies vaccination begins after exposure because the virus takes a comparatively long time to induce disease).

8.0 Hantavirus

- 8.1 Rodents can carry a variety of diseases; of notable concern is the North American hantavirus which can cause Hantavirus Pulmonary Syndrome (HPS).
- 8.2 A common host of the hantavirus is deer mouse and related species (*Peromyscus* spp.), which are common throughout much of North America.
- 8.3 Although infection is rare, it can be fatal and, therefore, it is necessary that risk of exposure be minimized. Infection can be spread to humans when they:
 - 8.3.1 Breathe air contaminated by deer mouse saliva, urine or feces containing infectious hantaviruses; or
 - 8.3.2 Accidentally rub eyes, mouth or broken skin with hantavirus-infected deer mouse saliva, urine or feces.
- 8.4 The following precautions will be taken for all field operations:
 - 8.4.1 Limit exposure to soils handling and use gloves where appropriate.
 - 8.4.2 Wash or sanitize hands often throughout the day and before meals.
 - 8.4.3 Equipment bags, storage areas, and vehicles will be inspected daily for signs of deer mouse infestation.
 - 8.4.4 Rodent-proof storage containers will be used when practical.
 - 8.4.5 Do not enter buildings infested with deer mice without adequate respiratory protection.
 - 8.4.6 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.
- 8.5 If flu-like symptoms develop three days to six weeks after exposure to rodents, a doctor should be contacted immediately (mechanical ventilation is the primary method of treatment).

9.0 Bubonic Plague

- 9.1 The bacteria that cause plague, *Yersinia pestis*, maintain their existence in a cycle involving rodents and their fleas.
- 9.1.1 In urban areas or places with dense rat infestations, the plague bacteria can cycle between rats and their fleas.
- 9.1.2 Humans may contract the plague bacteria through:
- Infected flea bites.
 - Contact with contaminated fluid or tissue of a plague infected animal.
 - Infectious droplets from an infected person coughing into the air (very uncommon in the United States, but relatively frequent in developing countries).
- 9.1.3 Individuals infected develop sudden onset of fever, headache, chills, and weakness and one or more swollen, tender and painful lymph nodes (called buboes).
- 9.1.4 Immediate medical attention is necessary to prevent complications or death.
- 9.1.5 Rodent control measures should be employed at AECOM locations.
- 9.1.6 Wear gloves if handling potentially infected animals to prevent contact between skin and the plague bacteria. Contact the local health department with and questions about disposal of dead animals.
- 9.1.7 Repellent shall be used if there is potential exposure to rodent fleas. Products containing DEET can be applied to the skin as well as clothing and products containing permethrin can be applied to clothing (always follow instructions on the label).

Snakes & Scorpions

1.0 Hazard

- 1.1 Snakes have the ability to inject venom. A bite from a venomous snake, which may inject varying degrees of toxic venom, is rarely fatal but should always be considered a medical emergency.

2.0 Personal Protective Equipment

- 2.1 Long pants and shirts
- 2.2 Heavy gloves if staff will be handling debris or be close to the ground
- 2.3 Rubber boots, or boots that fully cover the foot (not sandals!) and preferably are at least 10 inches (25 centimeters) high
- 2.4 Snake Chaps that cover at least the shin
- 2.5 Personal first aid kit

3.0 Restrictions

- 3.1 Staff must not work alone in areas where the risk of a snake encounter is high.

4.0 Safe Work Practice




- 4.1 Prior to going into the field, staff should research the area and identify what species are present. Once confirmed, staff should contact local hospitals to identify which carry anti-venom and include that information into the SH&E Plan and THA.
- 4.2 Staff working in areas known to be inhabited by venomous snakes should take extra precautions, be able to identify the local snake species, and understand the best practices for administering first aid.
- 4.3 Most snakes in Canada are non-venomous; and most snake bites are not fatal, only painful. Learning to identify snake species will assist you in responding appropriately to an encounter, and will assist medical professionals in determining if antivenin needs to be administered if anyone is bit.
- 4.4 Most snakes are non-aggressive and will only attack if immediately threatened.
- 4.5 Prevention
 - 4.5.1 Before venturing out into the wilderness, familiarize yourself with the snakes in your area, both venomous and non-venomous species.
 - 4.5.2 Learn which habitats the venomous species in your region are likely to be encountered in, and use caution when in those habitats.
 - 4.5.3 Try as much as possible not to take a snake by surprise.
 - 4.5.4 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, or when collecting firewood. Take care when overturning any objects on the ground when in snake country.
 - 4.5.5 If you see a snake, give it as much room as possible. Most snakes have a strike distance that is only half the length of their body.
 - 4.5.6 If you get very close to a rattlesnake, hold very still until it calms down and starts to move away. Then slowly move backwards until you are at least one snake-body length away.

4.6 Treatment


- 4.6.1 A bite from a venomous snake should be considered a major medical emergency. Emergency services should be contacted immediately and staff should follow the direction of the medical responders.
- 4.6.2 Try to keep the snakebite victim still, as movement helps the venom spread through the body.
- 4.6.3 Keep the injured body part motionless and just below heart level.
- 4.6.4 Keep the victim warm, calm, and at rest, and transport him or her immediately to medical care.
- 4.6.5 Do not allow him to eat or drink anything.
- 4.6.6 If medical care is more than half an hour away, wrap a bandage a few inches above the bite, keeping it loose enough to enable blood flow (you should be able to fit a finger beneath it). Do not cut off blood flow with a tight tourniquet. Leave the bandage in place until reaching medical care.
- 4.6.7 Identify the snake that caused the bite to determine if it is venomous, and if antivenin needs to be administered. Do not waste time or endanger yourself trying to capture or kill it. Note the shape and color of the snake's head.
- 4.6.8 If you are alone and on foot, start walking slowly toward help, exerting the injured area as little as possible.
 - Note that there are several species of snakes that superficially resemble rattlesnakes. Several species, including Bull, Milk, Fox, and Rat Snakes will even rattle their tails when startled.
 - Massasauga Rattlesnake is recognized as a Threatened Species in Ontario and it is an offence to harass, or destroy the habitat of this species.
- 4.6.9 Workers in scorpion habitat have the potential to be stung.
 - 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.
 - Scorpions are found in Southern and Southwestern United States.
 - One scorpion species, the Northern Scorpion (*Paruroctonus boreus*) occurs in semi-arid areas of southern British Columbia, Alberta, and Saskatchewan. It carries a stinger on the end of its tail. The sting is painful but not life threatening unless there is an allergic reaction.
 - Workers should wear longsleeves and pants. Clothing and shoes should be shaken out before put on.
 - Symptoms of a scorpion sting may include:
 - A stinging or burning sensation at the injection site (very little swelling or inflammation)
 - Convulsions
 - Staggering gait
 - Slurred speech
 - Drooling
 - Muscle twitches
 - Abdominal pain and cramps
 - Scorpion stings may be painful, but most are harmless. In the United States, only the Bark Scorpion has venom that can potentially cause severe symptoms.
 - Scorpions capable of lethal stings are found predominantly in Mexico and South America.
 - If there is any question as to what type of scorpion caused the sting, contact medical services immediately.





5.0 Species

5.1 Venomous Snakes in Canada

<p>Eastern Massasauga Rattlesnake (<i>Sistrurus catenatus</i>) found around Wainfleet, Windsor, Bruce Peninsula and eastern Georgian Bay in Ontario.</p>	 <p>Eastern Massasauga Rattlesnake picture by Michael Redmer/Courtesy Lincoln Park Zoo</p>
<p>Northern Pacific Rattlesnake (<i>Crotalus viridis</i>) found primarily in Okanagan and Thompson River valleys of southern British Columbia.</p>	 <p>LANCE TANNAHILL 2000</p>
<p>Prairie Rattlesnake (<i>Crotalus viridis</i>) found in south eastern Alberta, and south western Saskatchewan.</p>	

5.2 Venomous snakes in the United States

<p>Rattlesnake(<i>Crotalus cerastes</i>) found mostly concentrated in the southwestern United States, they extend north, east and south in diminishing numbers and varieties. Every contiguous state has one or more varieties of rattlesnake.</p> <p>The rattlesnake is found in many different biomes ranging from along the coast at sea level, the inland prairies and desert areas to the mountains at elevations of more than 10,000 feet.</p> <p>Species include: Sidewinder, Santa Catalina, Western,</p>	 <p>Western Rattlesnake</p>
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<p>Mojave, Red Diamond, Western Diamond, Ridge Nosed, Eastern Diamondback, and Pigmy.</p>	 <p>Eastern Diamondback</p>
<p>Copperhead (<i>Agkistrodon contortrix</i>) is the most common venomous snake found in the eastern United States. It can be found in the states of Texas, Oklahoma, Kansas, Missouri, Arkansas, Louisiana, Mississippi, Alabama, Georgia, Florida, South Carolina, North Carolina, Tennessee, Kentucky, Virginia, Illinois, Indiana, Ohio, Iowa, Pennsylvania, Maryland, New Jersey, Delaware, New York, Connecticut, and Massachusetts.</p>	
<p>Cottonmouths (water moccasins) (<i>Agkistrodon piscivorus</i>) found in the eastern United States from Virginia, south through the Florida peninsula and west to Arkansas, eastern and southern Oklahoma, and east and central Texas.</p>	
<p>Coral Snake (<i>Micrurus sp.</i>) found in the southern range of many temperate United States including North Carolina, Georgia, Alabama, Mississippi, Louisiana, Texas, Arkansas, Kentucky, Arizona, and New Mexico.</p>	 <p>Eastern Coral Snake, <i>Micrurus fulvius</i></p>

Working Alone

S3AM-314-PR1

1.0 Purpose and Scope

- 1.1 This procedure establishes the requirements for communication and accountability between personnel at a work site to reduce the potential for incidents occurring to one employee without help readily available and to facilitate the rapid mustering of assistance to employees in the event of an emergency.
- 1.2 This procedure applies to all AECOM America-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.

2.0 Terms and Definitions

- 2.1 **Buddy System** – A system of organizing employees at a work site in such a manner that each employee is accompanied by or in communication with at least one other employee or is escorted by a client or contractor representative during work site activities.
- 2.2 **Controlled Work Areas** – One or more designated work areas on a field project site where hazardous activities and/or strictly defined operations take place. Such controlled work areas include, but are not limited to, remediation or construction sites; a restricted radius where a critical lift operation will take place could be declared a controlled work area. On a HAZWOPER site, the controlled work area is divided into the exclusion zone, the contaminated reduction zone, and the support zone.
- 2.3 **Working Alone** – Performing work with no line of sight or direct voice communication with another person who is aware of your assignment and capable of initiating emergency response.

3.0 References

- 3.1 S3AM-005-PR1 Driving
- 3.2 S3AM-209-PR1 Risk Assessment & Management

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Manager or Supervisor

- Establish if employee is permitted to work alone, through evaluation of employee's experience, training and any personal limitations (e.g. life-threatening allergic reactions).
- Provide the resources, communication devices, emergency response plans, and check-in procedures as listed in the Task Hazard Assessment (THA) or SH&E plan, etc. necessary so that employees are not working alone or have a buddy system in place.
- Act as point of contact if employees miss their check-in.

4.1.2 Employees

- Complete training as required to prepare for working alone.
- Confirm emergency contacts are provided to the Manager or supervisor in case of an emergency.
- Establish a buddy system and check in procedure in accordance with the THA or SH&E Plan provided by the Manager and Supervisor.

4.1.3 SH&E Managers

- Review and approve relevant planning documents entailing employees working alone and on remote travel.

4.2 General

4.2.1 All projects/programs shall conduct a review of all tasks performed by AECOM to establish specific work alone procedural requirements as defined here. They shall have at minimum a THA and SH&E Plan that has been reviewed by the SH&E Manager.

4.2.2 Employees are discouraged from working alone on any site due to the risk of delayed assistance in the event of an incident. If they will be out of contact with other employees, they shall establish a buddy system or check-in procedure with another employee or responsible person.

4.2.3 Employees working alone or in small crews in remote isolation shall have an effective means of communication including cell/radio/satellite phone as well as established check-in times.

4.2.4 When traveling alone, staff shall take appropriate precautions, including notifying someone of their travel plans as well as carrying a communication device and safety equipment, as appropriate. See *S3AM-005-FM1 Journey Management Plan*.

4.3 No employee shall work by themselves or without a buddy system established if they are conducting a hazardous job task.

4.3.1 The following tasks are considered hazardous:

- Working at heights.
- Working in a confined space.
- Working in a trench.
- Lock out/tag out tasks.
- Work on energized equipment.
- Working with electricity.
- Working with hazardous substances or materials.
- Working with material under pressure.
- Working where there is a possible threat of violence, including civil unrest.
- Working in avalanche areas.
- Working on water or ice.
- Working in remote or wilderness isolation.
- Working in a controlled area.
- Extreme heat or cold stress environments.
- Working with power tools/equipment.
- Working with/operating heavy equipment or machinery.
- Working in isolation from first aid services or immediate/emergency assistance.
- Working around mobile equipment.
- Highway and road work.

4.3.2 The following tasks (identified as hazardous) may permit working alone provided it can be demonstrated there is no substantial increased risk associated with working alone:

- Working with power tools/equipment (e.g. power drill versus chainsaw).

- Working with material under pressure (e.g. small air compressor versus compressed gasses).

4.4 Office Work

- 4.4.1 The supervisor shall have in place and shall communicate as part of location specific orientation, its procedures for the safety and security of an employee working alone in the office. Contact numbers to be used in case of emergency are posted at all common gathering areas or major exits.
- 4.4.2 Employees working in the office after regular working hours or in situations where they are working alone shall keep the entrance to the office locked.
- 4.4.3 If the building is monitored by a security service, employees working in the office after regular working hours or working alone shall notify the security guard of their presence and anticipated hours. If the building does not have a security service, the employee working alone shall notify their supervisor or a family member or friend if agreed to by their supervisor.
- 4.4.4 During all working hours, employees shall stay alert to unauthorized entries into the building and to other suspicious activities and shall report them to security or their supervisor immediately.

4.5 Field Work

- 4.5.1 Prior to work commencing, a THA shall be prepared for all assignments on which employees are to work alone (in accordance with *S3AM-209-PR1 Risk Assessment & Management*). The THA shall consider travel time, weather, available communications, and the impact of working alone when establishing risk ratings of the hazards associated with the task and work environment.
- 4.5.2 The THA should also consider whether the employee assigned to work alone has sufficient training and qualifications in the tasks to be performed to allow the employee to work safely alone. The employee's personal medical conditions may be considered if the employee has voluntarily made the medical condition known to the Manager or Supervisor.
- 4.5.3 The THA should identify the controls required for the safety of employees as applicable to the job task and location. Some controls associated with working alone or in remote isolation include a buddy system, standardized check-in times, what to do if a check-in is missed (e.g. worker in proximity attends site, utilizing secondary communication method, etc.), specialized communication devices, and enhanced emergency supply kits.
- 4.5.4 The THA is completed in addition to the SH&E plan which details the work activities and the procedures to manage the hazards and in accordance with *S3AM-209-PR1 Risk Assessment & Management*.

4.6 Buddy System

- 4.6.1 When conducting non-hazardous work, employees shall work with a buddy (another responsible individual) or follow check –in procedures listed in the THA or SH&E Plan.
- 4.6.2 When conducting hazardous work, employees shall work with a buddy (another responsible individual) at all times.
- 4.6.3 Once assigned as buddies, personnel shall remain in contact.
- 4.6.4 When electronic communication devices are used, prior to starting work, a protocol shall be established and agreed to by each buddy to confirm that periodic effective and faultless communications are maintained
- 4.6.5 When unanticipated conditions develop that do not permit line of sight and direct voice contact, and alternate communication was not established in the THA, Stop Work and notify the Supervisor. If permission from the Supervisor is obtained to continue the work, voice contact shall be achieved using reliable electronic communication devices such as, but not limited to, hand-held radio or cell phone. The THA shall be updated to reflect this change.
- 4.6.6 If crews will separate once they reach their work site, they shall then be considered to be "working alone". The buddy system or check-in procedures shall be established, as determined by the work being hazardous or non-hazardous and as identified in the THA.

- 4.6.7 Client or contractor personnel may be substituted for an AECOM employee's buddy only if they are designated by the client or contractor and the AECOM manager or supervisor, and are properly trained to the tasks and the site's emergency response procedures.
- 4.6.8 A missed communication event shall initiate the applicable missed check-in actions established in the THA (e.g. worker in proximity attends site, utilizing secondary communication method, etc.) and may trigger emergency response procedures. The results of each communication event shall be documented in the program or project files.
- 4.7 Check-In Procedures
 - 4.7.1 All field crews shall establish check-in procedures as part of the THA or SH&E Plan prior to leaving the office. These procedures shall be reviewed daily as part of the Task Hazard Assessment review or more frequently if there is a change in work arrangements that could adversely affect a worker's well-being or a report that the system is not working effectively. These procedures shall be confirmed with the assigned Check-In Person daily.
 - 4.7.2 The timing and frequency of those check-in procedures schedule shall be established prior to the initiation of field operations and shall vary depending on the task and location of the work.
 - 4.7.3 If communication is lost between buddies or a check-in time is missed, it shall be assumed that an emergency situation exists, and the site's emergency response procedures shall be implemented. Site work shall cease until the emergency is resolved and the Supervisor directs personnel to restart work.
 - 4.7.4 If crews will separate once they reach their field site, they will then be considered to be "working alone" and will establish a buddy system with the other members of the crew.
 - 4.7.5 Employees working alone or in small crews in remote isolation will have an effective means of communication system including cell/radio/satellite phone as well as established check-in times.
 - 4.7.6 The Check-In Procedure will be reviewed daily as part of the THA review or more frequently if there is a change in work arrangements that could adversely affect a worker's well-being or a report that the system is not working effectively.
- 4.8 Emergency Response Procedures
 - 4.8.1 All field employees and the Check-In Person shall be provided with the location specific Emergency Response Plan (may be included in the THA or SH&E plan, or exist as a separate document).
 - 4.8.2 The Check-In Person shall have access to a route map or understands their anticipated route of travel.
 - 4.8.3 The established contact person shall follow the procedures below, with specifics established in the SWP Plan or THA, if a field employee has missed a check-in:
 - First, they shall attempt to make contact with the field employee directly.
 - If that fails to provide a response, they shall contact other persons who may have been on site, including client supervisors, or other locations where the field employee might be (e.g., hotel, home, office).
 - If the field employee still cannot be located, the emergency contact person notifies the manager or supervisor responsible for the employee.
 - Depending on the location and situation, they shall then dispatch another employee, another supervisor, or an appropriate emergency response agency (e.g., police) to travel to the last known location of the field employee.
 - If the dispatched responder arrives at the site but cannot locate the field employee, the appropriate public emergency contacts (e.g., police, search and rescue) shall be made and the employee's personal contacts shall be notified by Human Resources.

- If the dispatched responder finds the crew in an emergency situation (medical, environmental, structural, etc.), the appropriate steps shall be taken to isolate the hazard, administer first aid, and contact emergency support services.

4.9 Training

- 4.9.1 All employees shall receive an initial orientation that includes the hazards and controls associated with working alone.
- 4.9.2 If working in wilderness, all field employees will be able to orienteer using a map and compass—if not, the basic skills of orienteering will be provided by an experienced employee before work commences. Refer to the *S3AM-314-ATT1 Wilderness Isolation* instruction for more specifics.
- 4.9.3 Employees working alone should be trained in First Aid. Consideration should be given to Wilderness First Aid training based on the anticipated work environment.
- 4.9.4 Employees regularly working in remote, isolated wilderness locations will either participate in a wilderness survival course from a qualified provider (one or two day) or will obtain management approval based on their level of experience/competence in wilderness situations.

5.0 Records

- 5.1 None

6.0 Attachments

- 6.1 [S3AM-314-ATT1 Wilderness Isolation](#)

Wilderness Isolation

S3AM-314-ATT1

1.0 Planning

- 1.1 Working in wilderness isolation presents many more potential hazards and should only be conducted by teams with documented experience, safety plans, and equipment appropriate for the tasks and conditions of the work.
- 1.2 A safety plan and Task Hazard Analysis will be reviewed by the SH&E Manager.

2.0 Safety Equipment

- 2.1 All field employees should regularly carry the following on their person:
 - GPS Unit.
 - Compass.
 - Lighter, matches, or a "flint" of fire steel.
 - A knife or folding saw.
 - Map.
 - First aid kit.
 - Communication device appropriate to the type of coverage anticipated in the area.
- 2.2 When hiking long distances, it is recommended that a "mini survival kit" that includes the following items be carried in addition to the items listed above:
 - Fire starter (tinder). Cotton balls with lip balm work well, or paper egg cartons with cotton balls and paraffin wax; if buying commercial fire starter, test it after several months.
 - A whistle.
 - Heavy tinfoil (to melt snow, to cook on, or to boil water in).
 - Water and/or portable water purification device (e.g. steri-pens®).
 - Some high-energy food.
 - Cordage or rope (about 50 feet).
 - Bear spray and/or bear bangers.
- 2.3 When using an ATV or helicopter for isolated work, it is recommended that a survival bag or backpack that can be left at a known muster point be put together. This bag should include the following items:
 - Additional fire starter (tinder).
 - Matches, fire steel.
 - A multi-tool (like a Swiss Army knife).
 - A folding saw.
 - 3-8'x6" tarps plus one 12 X 16" tarp or larger (or a tent).
 - 100 " of utility cord or parachute cord.
 - A small pot.
 - A small stove (a small folding military stoves with trioxethelyne tablets will work well).
 - Closed cell foam pads or several square feet of double-wall bubble insulation (the silver sided bubble wrap used in construction) to use as a sleeping pad or for hypothermia treatment.
 - Emergency Food.
 - Water.
 - Sleeping bag with a mylar® bivouac (bivy) sack to be used as a vapor barrier inside.

3.0 Drinking Water

- 3.1 No surface water can be considered safe for human consumption without treatment. Even the cleanest looking spring water could be polluted. Untreated water may be contaminated with bacteria, viruses, or protozoa.
- 3.2 On short trips, carry treated water or obtain water from another safe source.
- 3.3 When field projects take you into remote isolation where there is the potential for not having access to clean drinking water, be sure to take the appropriate tools with you: a water filter, tin foil or a pot for boiling water, or tablets or chemicals for treating the water prior to consumption.
- 3.4 Generally, the chances of finding safe drinking water in the mountains increase as you gain altitude. Intense sunlight at high altitudes kills undesirable bacteria and viruses but harmful cysts are unaffected.
- 3.5 Runoff water from streams below glaciers is often cloudy with silt and should be filtered.
- 3.6 Well water and moving rivers are the best locations to obtain water. Avoid stagnant water, shoreline water, and water close to human habitations and campsites.
- 3.7 During the winter, it is best to use an open water source or to obtain water through a hole in the ice. Check the safety of the ice first. Melting ice and snow consumes fuel and takes extra time. Eating snow or ice directly can lead to chilling and hypothermia and could also cause stomach cramps and headaches. Beware of colored snow, which indicates the presence of algae that could cause diarrhea if ingested. Even in winter, all water should be purified.
- 3.8 Water Treatment
 - 3.8.1 Each method of water treatment has its advantages and disadvantages. Use only boiled or treated (filtered and disinfected) water for drinking, brushing teeth, or washing fruits and vegetables that will be eaten raw. Heat is the oldest, safest and most effective method of purifying water. However when boiling is not practical because of time and lack of a heat source, water should be treated by filtration and disinfection. This method may not be as effective as boiling the water.
 - 3.8.2 Use two water containers: one for treating water and the other for carrying purified water. After disinfection, shake the container vigorously. Wait five minutes. Shake it again with the lid loose so that some water leaks out to cleanse the mouth of the container. Then pour the water into a clean container for drinking water.
 - 3.8.3 Boiling. Bring the water to a boil for at least one minute (adding one more minute for each 300 m (1000 ft.) above sea level. If the water is cloudy, filter it before boiling.
 - 3.8.4 Filtration. Water filters for use in the wilderness are available. Avoid filters that allow particles larger than 0.5 microns to pass. Filters with a pore size of 0.1 to 0.3 micron can remove protozoa and some bacteria but may not remove viruses. Filtration alone is insufficient to purify water; hence, it should be combined with disinfection to kill viruses and bacteria.
 - 3.8.5 Disinfection. Disinfect with chlorine or iodine compounds, following the manufacturers instructions. Disinfection alone may not kill some protozoa..

Table 1: Summary of Water Purification Methods				
	Boiling	Chlorine	Iodine	Filters
Bacteria	E	E	E	M
Viruses	E	E	E	N
Protozoa	E	M	M	M
Chemicals	M	N	N	N

E = effective M = may be effective (see text) N = not effective

- 3.8.6 Additional portable water purification devices are available, using methods such as ozone disinfection, ultraviolet purification, or solar water disinfection.
- 3.8.7 Water treatment methods should be evaluated for suitability to the work environment, the potential water hazards, and limitation of the device.
- 3.8.8 Some water-borne diseases are difficult to diagnose. If you are not feeling well and have recently drunk water from a source in the wild, inform your doctor that you may have consumed untreated water.

Working On & Near Water

S3AM-315-PR1

1.0 Purpose and Scope

- 1.1 Establishes the minimum requirements and guidance for AECOM personnel assigned to projects that place them at risk of falling into water where a drowning hazard exists (e.g., more than 3 feet / 1 meter deep, fast-moving stream, water body with soft bottom creating entrapment hazard), including working ashore, near to, or over water or ice.
- 1.2 Employees performing tasks involving work on or under bridges, or on larger vessels, barges, or boats, who are constantly protected by guardrail systems, nets, or body harness systems are deemed to be adequately protected from the danger of drowning, and are not required to wear life jackets or buoyant work vests.
- 1.3 Projects conducted on a ship at sea or in port may not be required to comply with parts of this procedure provided:
 - AECOM can demonstrate the hazard and related controls as identified in this procedure are adequately addressed through controls established by another controlling entity (e.g. ship owner/operator, port authority, etc.) and these are available to AECOM personnel.
 - If AECOM cannot demonstrate adequate controls are in place, the related requirements of this procedure shall be met.
- 1.4 This procedure applies to all AECOM Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.

2.0 Terms and Definitions

- 2.1 **PFD** – Personal Flotation Device
- 2.2 **Life Jacket** – A personal flotation device that will turn over an unconscious worker in the water so their face and nose are not submerged.
- 2.3 **USCG** – United States Coast Guard
- 2.4 **Lifebuoy** – A throwable buoyant rescue ring with 90 feet (28 meters) buoyant line attached.

3.0 References

- 3.1 S3AM-003-PR1 SH&E Training
- 3.2 S3AM-208-PR1 Personal Protective Equipment
- 3.3 S3AM-209-PR1 Risk Assessment & Management
- 3.4 S3AM-333-PR1 Marine Safety & Vessel Operations
- 3.5 S3AM-334-PR1 Diving

4.0 Procedure

- 4.1 Roles and Responsibilities

4.1.1 Manager

Responsible for the overall success of a project and the performance of employees engaged in project activities (with the support of Supervisors), and as follows:

- Confirm that all appropriate Safety, Health and Environment (SH&E) procedures are identified and implemented and their applicability during the planning stage of field investigation projects.

- Allocate appropriate resources to implement the required measures.
- Designate a field staff person to implement and maintain these measures, maintain related documentation, and to communicate with appropriate parties as necessary.
- Consult with the purchasing department on the appropriate vendors for rentals/leases.
- Confirm that boat/watercraft rental/leasing vendors have appropriate paperwork (licenses, insurance, maintenance records, orientations, etc.).
- Confirm that the project is properly staffed with trained employees.
- Require that at least one employee trained in cardiopulmonary resuscitation (CPR) and first aid is on site during work activities.
- Designate at least one employee on site to respond to water emergencies and, as applicable, operate the rescue boat at times when there are employees above, in, or near water.
- Develop and submit a SH&E Plan and other relevant SH&E planning documents for review and approval by the SH&E Manager.
- Develop a written section in the SH&E Plan (or equivalent document) to address worker safety, water rescue, and personnel transfer procedures as required in this standard.
- Confirm Task Hazard Assessments (THA) are completed prior to tasks commencing.

4.1.2 SH&E Manager

Responsible for providing support to the Manager and his/her designee in the evaluation of safety and health risks and the identification of applicable policies, procedures, and appropriate precautions, and as follows:

- Review all project related SH&E Plans and THAs as required.
- Provide access to safety records, including training records, for field staff.
- Provide support to Manager.

4.1.3 Supervisors

Responsible for verifying current status of applicable staff's training and equipping them for the work at hand, and as follows:

- Conduct daily safety meetings to include a review of the hazards and control measures associated with working over/near water. Refer to *S3AM-209-PR1 Risk Assessment & Management*.
- Train employees on their responsibilities, the hazards and the control measures associated with working over/near water.
- Perform SH&E inspections.
- Confirm that all safety issues and equipment deficiencies are properly corrected, and that the proper equipment is available to the field staff to safely meet the goals and quality objectives of the project.

4.1.4 Employees

Responsible for complying with the safe work practices specified in this policy and all other applicable SH&E policies or procedures and reporting all unsafe working conditions, and as follows:

- Review, contribute to, and sign the SH&E Plan prior to beginning the project and whenever new tasks or environmental changes occur.
- Review, contribute to, and sign the THA prior to initiating the associated task.
- Confirming that their SH&E training is up to date.
- Confirming daily that equipment is properly maintained and functioning.
- Confirm they wear all required Personal Protective Equipment (PPE).

4.2 General Safety Considerations

- 4.2.1 During project preparation, consideration shall include, but not be limited to:
- The location and nature of the site.
 - Type of water hazard.
 - Underwater hazards and structures.
 - Access to the worksite and/or water body.
 - Scope of work.
 - Equipment to be used
 - Local climate.
- 4.2.2 The information shall be considered when determining the appropriate controls, PPE, and level of emergency preparedness that is required. All projects working near water hazards shall have an appropriate SH&E Plan and THA prepared. Refer to *S3AM-209-PR1 Risk Assessment & Management*.
- 4.2.3 PPE specified in the SH&E Plan and THA is to be worn as required, to meet the specific regulations of the work area, including as applicable, local and Federal legislation.
- 4.2.4 Whenever there exists the possibility of falling into water, personnel shall be attired in a USCG approved Type III or Type V PFD or Life jacket. Refer to *S3AM315-ATT1 Personal Floatation Devices*. The vest shall be properly sized for the individual and shall be secured at all times. For cold water conditions (water temperature less than 55 degrees Fahrenheit [13 degrees Celsius]), a USCG-approved Shallang/Mustang suit shall be worn to protect personnel from risks of cold water immersion.
- 4.2.5 For work at night, Type II, III, or V PFD should have a chemical light, or other appropriate survival light attached to facilitate rescue. All PFDs shall have reflective tape on them to facilitate visibility at night. For work in non-US areas, the PFD shall be approved by the appropriate local authority, or be approved as an International Maritime Organization (IMO)/Safety of Life at Sea (SOLAS) lifesaving device. This shall include either a Type II buoyant vest or a Type III flotation aid.
- 4.2.6 Swimming is prohibited, unless it is being conducted by certified divers in the completion of their assigned task, or to prevent a serious injury or loss of life in a person in a water/person overboard emergency.
- 4.2.7 The buddy system shall be utilized whenever there is the possibility of falling into water, in which two persons operate as a single unit in order to monitor and assist each other in performing tasks.
- 4.2.8 When work is performed in water where a drowning hazard exists, or on ice, at least one attendant and/or rescue boat operator will be utilized and be available to immediately respond to an emergency and/or launch the rescue boat. The attendant and/or boat operator are not to be assigned other duties beyond safety and rescue.
- 4.2.9 Conducting shoreline work alone should be avoided, unless constant communications is maintained between Staff and Supervisors, and prior approval by the Manager is granted.
- 4.2.10 Confirm a throwable lifebuoy with required rescue line attached (Type IV PFD) is available.
- 4.2.11 Confirm any additional equipment (e.g., sounding alarms, lifting gear, or rescue boat) as required by legislation is immediately available to recover an individual from the water.
- If the shortest dimension of the water body is greater than the length of line attached to the throw buoy, a skiff or boat shall be available to facilitate a rescue.
 - The rescue boat shall be capable of being launched by one person, and shall be properly equipped, and the operator shall be properly qualified per *S3AM-333-PR1 Marine Safety & Vessel Operation*.
 - If a rescue boat is not feasible due to site conditions (e.g., water depth), alternate rescue planning shall be provided in the safety plan.

4.3 Personal Protective Equipment (PPE)

- 4.3.1 PPE shall be selected based on the SH&E Plan and THA, and in accordance with the S3AM-208-PR1 *Personal Protective Equipment*.
- 4.3.2 The minimum PPE required for wading in water above the knees includes:
 - Personal Flotation Devices or lifejackets shall be worn by all workers who are exposed to the danger of drowning in water deep enough for the lifejacket to be effective.
 - All inflatable PFD or life jackets shall be approved and have documented regular inspections.
 - Shallang/Mustang suits – In water temperatures below 55 degrees Fahrenheit (13 degrees Celsius) (regardless of air temperature) personnel are required to wear a USCG-approved Shallang/Mustang jacket or full-flotation suit, depending on field conditions. This requirement will replace the need for a wearable PFD as these suits (if properly maintained) will provide adequate flotation.
 - Waders shall have a slip resistant sole suitable for the substrate.
 - Eye protection shall be worn to reduce glare.
 - Wading pole shall be used for supporting and testing the substrate before wading.
- 4.3.3 Confirm rescue equipment is on site that is appropriate to the situation (e.g., life buoys with 90 feet [28 meters]) of retrieval line, rescue boat, sounding device). Extra buoys shall be 200 feet (60 meters) or less from each other. During night operations, ring buoys shall have a USCG or SOLAS equivalent water light attached.
- 4.3.4 Confirm appropriate emergency supplies are available at the location (e.g. blankets, first aid kit).
- 4.3.5 Immersion suits, or survival suits as they are often called, can significantly improve survival time in cold water.
 - Recognizing that hypothermia is a major factor in lives lost at sea, the USCG requires that vessels operating in offshore waters north of 32 degrees North latitude carry an immersion suit for each person aboard.
 - These suits are to be used in place of a Type I PFD in an abandon ship situation.
 - It is recommended that personnel familiarize themselves with their use and practice donning the suit before leaving the dock. It is recommended that personnel be able to get into an immersion suit in under a minute.
 - If necessary to abandon ship, personnel, attired in an immersion suit with head covered in a hat, should enter the water slowly. If possible, keep the head out of the water.
- 4.3.6 Suits should be stored in a clean and dry location. Avoid stacking or compressing the suits in storage as it may result in a loss of buoyancy. Federal regulations require that immersion suits be stowed so that they are readily accessible to the individual for whom they are intended, from both the individual's normal work area and berthing area. If there is no location readily accessible to both areas, then a suit shall be stowed at each location.
- 4.4 Land-based water work (shoreline/bridge/pier – includes wading)
 - 4.4.1 All shore work shall be performed in accordance with a "Buddy System".
 - 4.4.2 If sampling near or in flowing water environments, be aware of slippery or steep banks and fast currents. If the current is fast or the water looks deeper than knee height, do not enter the water. If you must enter the water, a PFD and restraining system shall be worn and secured to the bank for your retrieval in the event of an emergency.
 - 4.4.3 Whenever possible, positive controls in the form of fencing or barricades should be considered for long-term waterfront projects to form a security perimeter 10 feet in from the water's edge to prevent field staff from being exposed to water hazards.
 - 4.4.4 Field staff involved in sampling contaminated sediments or surface waters or conducting shoreline surveys may require a Hepatitis A and/or tetanus vaccination depending on site conditions and are advised to consult with their Safety, Health and Environment Manager. An Occupational Safety

and Health Administration 40-hour HAZWOPER may be required for field staff working on site if warranted by the Project.

- 4.4.5 Take special care on slippery rocks along shorelines, lakeshores, riverbanks, and creeks. Always look ahead at the ground when walking around the water's edge and avoid stepping on stones that have algal growth, especially those in intertidal areas, as these are extremely slippery. It is suggested that workers not be permitted to access areas where these slip/fall hazards exist, especially in locations containing tidal water flow.

4.4.6 Personal Protective Equipment:

- AECOM requires that whenever there exists the possibility of falling into water, field staff shall be attired in a USCG-approved Type III or Type V work vest. This includes when working near fluid-filled tanks, ponds, lagoons, or natural waterways.
- The PFD vest shall be properly sized for the individual and shall be secured at all times. Prior to and after each use, the PFD/suit shall be inspected for defects, which may alter their strength or buoyancy. Defective units shall be discarded and replaced.
- Staff protective gear shall include long pants with adequate puncture resistance, and gloves appropriate to the hazard(s) (e.g., puncture resistant gloves such as Kevlar when sampling, picking up, or manipulating ground cover). It is recommended that field staff use a rake to move ground cover and debris and not touch these items directly by hand whenever possible.

4.5 Wading in a shallow stream or water body:

- 4.5.1 Chest waders may not be worn when working along, over, or in moving waters; or in waters influenced by tides or acted upon by waves when water depths exceed knee height unless specifically approved by the Manager.

- Chest waders may be worn in still waters in water depths up to the waist if bottom conditions are firm and well understood.
- Chest waders shall never be worn aboard a watercraft of any kind unless specifically approved by the SH&E Manager and required by the task (e.g., rubber or neoprene waders for electrofishing to protect from electric shock).

- 4.5.2 Always proceed upstream so that the wading team is walking into clear water (no turbidity caused by walking), there is good visibility for any debris floating downstream, and there is a reduced risk that the wading team will be pushed against debris or pushed into a deep hole by the current.

- 4.5.3 Wading in water deeper than knee height shall be undertaken as a two-person crew unless alternative suitable measures to control the hazard are employed. If conditions or legislation warrant a "rescue team," then an appropriately sized crew should be used, with the rescue team stationed on the shore with the appropriate rescue equipment, as per the site-specific safety plan.

4.5.4 Wading will not occur in the following circumstances:

- If the water is too turbid or too deep to see tripping hazards or deep holes.
- If it appears the bottom is composed of soft sediments where stepping in may result in sinking, or if the bottom consists of clay where slipping is likely.
- If large woody debris is abundant and will be difficult to step over or move around.
- If the water is over the waist of the shortest person on the wading teaming. This does not preclude wading in water bodies that have shallow shorelines that grade into deeper waters. By not wading over waist level there will be approximately 12 Inches (30 centimeters) of "safety distance" on the chest waders (if worn), should a member of the wading team step or slip into a deeper area.
- If there is a risk of the current pushing a member of the team downstream.
- If there is a risk of exposure to dangerous wildlife, or other hazardous conditions, unless appropriate mitigation procedures are in place.

4.6 Cold Water Operations

- 4.6.1 Cold water operations are defined as any situation that exposes an individual to falling into water that has a temperature of 55 degrees Fahrenheit (13 degrees Celsius) or less.
- 4.6.2 Sudden immersion in cold water can induce a gasping reaction and uncontrolled breathing which may cause the victim to ingest water and begin choking, experience cardiac arrest, and other physical body conditions all of which can result in a quick drowning.
- 4.6.3 Cold water incapacitation precedes hypothermia, making swimming and grasping for safety extremely difficult. So while death by hypothermia may occur in roughly one hour in a water temperature of 55 degrees Fahrenheit (13 degrees Celsius), incapacitation due to failing muscle function will occur in as little as 10 minutes, so regardless of your age, physical conditioning, or ability to swim – your odds of survival are greatly enhanced if you wear a life jacket.
- 4.6.4 AECOM requires personnel to wear a USCG-approved Shallang / Mustang suit at all times whenever there is the risk of falling into cold water. Employees working in these conditions view a training video on the physiological effects of cold water immersion found at: <http://www.coldwaterbootcamp.com>.
- 4.6.5 Consideration should be given to the use of immersion of survival suits when project work involves cold water operations.
- 4.6.6 Water and ambient air temperatures shall be directly measured at the start of each work shift, and no less than once daily. Shift/daily temperature records will be maintained in the site or field notes.
- 4.7 Working on Ice
 - 4.7.1 Working in situations where ice exists shall be strictly limited due to the extreme hazards associated with falling through the ice cap, cold water immersion, and the logistical difficulties associated with executing a rescue.
 - 4.7.2 Specific information and procedures for working on ice can be found in *S3AM-315-ATT2 Ice Safe Work Practices*.
 - 4.7.3 Ice conditions (e.g., thickness, color, cracking) shall be recorded at the start of each work shift, and no less than once daily. Ice condition records will be maintained in the site or field notes. If ice conditions do not meet the criteria specified in *S3AM-315-ATT2 Ice Safe Work Practices*, then work shall not proceed until the required conditions are met.
 - 4.7.4 Personnel working in or on ice shall be attired in a USCG-approved Shallang / Mustang survival suit and be supported by shore side personnel to assist in recovery in the event of a break through. Depending on the nature of the project, on-ice personnel should either wear a harness tethered back to shore, or push a flat bottom boat along on the ice and have the boat tethered back to shore.
 - 4.7.5 Personnel working on ice covered waters should dramatically reduce vessel speed to avoid damaging propellers, shafts, and rudders. Personnel should be cognizant of shoreline ice which can prevent access to alternative ramps and docks that were considered as egress points in emergency planning.
 - 4.7.6 Personnel should be wary that boat ramps on tidally influenced waters can flash freeze at low tide, precluding or compromising safe access and egress.
 - 4.7.7 Extra safety equipment:
 - Extra blankets should be kept on site (in a vehicle) when working on or near frozen water bodies.
 - An ice pick, ice chisel, and/or ice auger should be used by a member of the crew with experience or training in identifying thin or weak ice.
 - A braided rope, preferably 98 feet (30 meters) in length.
- 4.8 Emergency Response

- 4.8.1 Emergency preparedness applies to any work where there exists the risk of falling into water, especially moving waters, along piers, bulkheads, and river banks with a sharp drop off in bathymetry.
 - 4.8.2 Field staff working in or alongside waters, especially moving waters, where there exists the possibility of falling in shall have an Emergency Response Plan to recover someone in the event they have fallen in.
 - 4.8.3 A throwable rescue device (Class IV PFD) shall be immediately available in the event of an emergency situation. In these situations the position and accessibility of throw rings and other rescue devices (e.g., ladders) and the mechanism to recover a person from the water shall be considered.
 - 4.8.4 The number and placement of ladders and throw rings shall be sufficient so that the maximum swimming distance to them is no more than 25 feet.
 - 4.8.5 If workers have the potential to get stuck in mud or fluidized sediment, air injection equipment designed to free worker's feet/legs may need to be available on site. At a minimum, a safety line should be available to be deployed from safe ground. If a worker does get stuck, they should not struggle as this causes further sinking. Use a pole to conduct sediment probing to assess water depths, the stability of shoreline terrain, and the bearing capacity of bottom sediments ahead of the chosen path.
- 4.9 Training
- All Staff and Managers working on projects with exposure to open water shall receive training in their applicable tasks, the hazards, precautions, and rescue procedures associated with working in or over water, refer to the *S3AM-003-PR1 SH&E Training* program.
 - All staff working on or near frozen water bodies shall complete Ice Safety Awareness training.
 - Staff who will be working on frozen water bodies regularly or for extended periods of time should take an Ice Rescue Training course, or obtain management approval based on their level of experience/competence working on ice.
 - Staff working near cold water shall complete awareness level training on Cold Water Immersion.

5.0 Records

- 5.1 None

6.0 Attachments

- 6.1 [S3AM-315-ATT1 Personal Floatation Devices](#)
- 6.2 [S3AM-315-ATT2 Ice Safe Work Practices](#)

Personal Floatation Devices

S3AM-315-ATT1

1.0 Personal Flotation Devices

- 1.1 AECOM requires all personnel to wear a U.S. Coast Guard (USCG)- or Transport Canada (TC)-approved personal flotation device (PFD) or life jacket at all times whenever there exists the possibility of falling into water. The various types of PFDs to be considered are described below. Note: The USCG is working with the PFD community to revise the classification and labelling of PFDs to be redesigned to focus on performance criteria rather than construction standards.
- 1.1.1 **Type I** – Designed for extended survival in rough, open water and best for all waters, open ocean, rough seas, or remote water, where rescue may be slow coming.. This PFD has over 22 pounds of buoyancy and will usually turn an unconscious person face up in the water. It is, however, very bulky and restrictive and not well suited to working on deck; a Type III or Type V PFD is generally preferred. Regardless of this fact, all vessels working in unprotected waters are required to carry a Type I PFD for each person aboard. In the event of an abandon ship situation, all passengers are required to don their Type I PFD as this flotation device will keep you afloat in offshore waters where rescue may be slow in coming.
- 1.1.2 **Type II** – Designed for calm inland waters where there is a chance of a fast rescue. It is less bulky and less expensive than a Type I, and may turn an unconscious person face-up in the water.
- 1.1.3 **Type III** – Designed for use in calm water where there is a good chance of a fast rescue. Slightly lighter than a Type II, this PFD will generally not turn an unconscious person face-up in the water. Shallang/Mustang flotation jackets are considered in the Type III category.
- 1.1.4 **Type IV** – These are first response rescue devices designed to be thrown to a person overboard or person in the water. These devices include boat cushions, ring buoys, and horseshoe buoys. They are NOT designed to be worn and must be supplemented by wearable PFD. These devices need to be stowed in a location and in a manner that makes them immediately available for emergencies. Type IV devices should not be used for small children, non-swimmers, or unconscious people.
- 1.1.5 **Type V** – This is a special-use PFD and includes three-piece work vests, flotation deck suits for hypothermia protection (such as Shallang/Mustang suits), and hybrids for restricted use. Hybrid vests contain some internal buoyancy and are inflatable to provide additional flotation. Immersion suits for cold water survival are also classified as Type V flotation devices.

2.0 Standards

The following standards apply to lifejackets and personal flotation devices:

Association	Standard
United States Coast Guard (USCG) Standard	Lifesaving and Fire Safety Division, Commandant (CG-ENG-4); formerly CG-5214, CG-3PSE-4 and G-MSE-4: Personal Flotation Devices & Lights, Throwable PFDs (Ring Life Buoys & Buoyant Cushions).
Canadian General Standards Board (CGSB)	CGSB Standard CAN/CGSB-65.7-M88, Lifejackets, Inherently Buoyant Type with a minimum buoyancy of 93 N (21 lbs) CGSB Standard CAN/CGSB-65.11-M88, Personal Flotation Devices with a minimum buoyancy of 69 N (15.5 lbs) CGSB Standard 65-GP-14M, Lifejackets, Inherently Buoyant, Standard Type with a minimum buoyancy of 125 N (28 lbs)

Ice Safe Work Practices

S3AM-315-ATT2

1.0 Background

- 1.1 There is no such thing as 100-percent safe ice; there are a number of factors detailed herein which affect the bearing capacity of ice.
- 1.2 New ice is usually stronger than old ice. Four inches of clear, newly-formed ice may support one person on foot, while a foot or more of old, partially-thawed ice may not. Additional bearing capacity guidelines based on ice thickness can be found at: <http://www.dnr.state.mn.us/safety/ice/thickness.html>
- 1.3 Ice seldom freezes uniformly. It may be a foot thick in one location and only an inch or two just a few feet away.
- 1.4 Ice formed over flowing water and currents is often dangerous. This is especially true near streams, bridges and culverts. Also, the ice on the outside of river bends is usually weaker due to the undermining effects of the faster current.
- 1.5 The insulating effect of snow slows down the freezing process. The extra weight also reduces how much weight the ice sheet can support. Also, ice near shore can be weaker than ice that is further out.
- 1.6 Booming and cracking ice isn't necessarily dangerous. It only means that the ice is expanding and contracting as the temperature changes.
- 1.7 Schools of fish or flocks of waterfowl can also adversely affect the relative safety of ice. The movement of fish can bring warm water up from the bottom of the lake opening holes in the ice which can cause snowmobiles and cars to break through.
- 1.8 Heavy snowfall early in the season may result in reduced ice thickness due to the insulating effect of the snow.
- 1.9 A fresh fall of snow will often cover areas that would otherwise be recognized as hazardous.
- 1.10 Water overflow and ponding caused by increased water levels can cover hazardous areas. Be aware of overhanging riverbanks when ascending and descending.

2.0 Safe Work Practices

- 2.1 If considering work on frozen waters or in the presence of shoreline ice, the following requirements shall be followed:
 - 2.1.1 Working in situations where ice exists shall be strictly limited. The risks of cold water immersion; slippery shorelines, docks and boat ramps; and navigation hazards around ice and frozen shorelines should be avoided. Field work should be rescheduled to periods of warmer temperatures, when ice and cold water hazards are not an issue.
 - 2.1.2 Avoid working on water immediately prior to freeze-up because of floating ice sheet hazards. Avoid working on ice prior to break-up because of ice cover instability.
 - 2.1.3 Care should be exercised when near the following areas: tributary/stream inflows, lake narrows, beaver dams, riffle areas, industry discharges, sewage lagoons, and open water, as the ice is usually thinner in these areas. Pressure ridges should also be avoided, as there may be open leads, weak ice and/or slush ice in these areas.
 - 2.1.4 Work shall be performed in accordance with the "Buddy System" with rescue communications available.
 - 2.1.5 Do not walk or work on ice unless there is no other way of performing work. Whenever possible, use alternate methods. One suggestion is to have field staff push a flat-bottomed boat onto the ice.

The boat shall have a safety tether tied to it that can be handled by workers standing off the ice cover along the shore line.

- 2.1.6 Only walk on ice that is fully frozen, not cracked or brittle, with a thickness that will support the necessary weight of workers and associated equipment. Use supplemental traction-control footwear devices to reduce the risk of slips, trips, and falls.
- 2.1.7 If the ice consists of a "crust" that can be easily broken by hand, work may proceed by entering the water in accordance with all other safety procedures described in *S3AM-315-PR1 Working Over & Near Water*; however, the risk of entrapment beneath the ice still exists and work should not be conducted in any moving water, or still water that is more than waist-high.
- 2.1.8 If the ice thickness is such that it can't be easily broken by hand, but is less than the requirements listed in this procedure, then work shall not proceed until one of the prior conditions is met.
- 2.1.9 When working on or near an ice surface, field staff should always check the ice thickness and condition thoroughly using an ice pick, ice chisel, and/or ice auger. It is virtually impossible to describe all conditions that may be encountered while working on ice cover; however, the following can be used as guidelines:
 - The color of ice, which may range from blue to white to grey, provides an indication of its quality and strength.
 - Clear blue ice is generally the strongest.
 - White, opaque ice (snow ice) has relatively high air content and its strength depends on the density; the lower the density, the weaker the ice. High-density white ice has a strength approaching that of clear blue ice.
 - Grey ice generally indicates the presence of water as a result of thawing, and shall be considered highly suspect as a load-bearing surface.
- 2.1.10 Ice conditions (e.g., thickness, color, cracking) and ambient air temperature shall be recorded at the start of each work shift, and no less than once daily. Ambient water temperature shall be recorded along with ice thickness observations, whenever feasible. Ice condition records shall be maintained in the site or field notes. If ice conditions do not meet the criteria above, then work shall not proceed until the required conditions are met.
- 2.1.11 When possible, conduct a reconnaissance prior to freeze-up and prior to actually working on the ice cover to become familiar with any potential hazards.
- 2.2 Personal Protective Equipment (PPE)
 - 2.2.1 PPE shall be selected in accordance with the *S3AM-208-PR1 Personal Protective Equipment* and *S3AM-315-PR1 Working Over & Near Water*.
 - 2.2.2 Workers are required to wear an approved Shallang/Mustang flotation suit in accordance with the manufacturer's requirements.
 - 2.2.3 Workers shall wear a restraining system (a lifeline attached to the front of a full-body harness) and stay close enough to the edge to make it possible for a shoreline attendant to pull the individual back off the ice.
 - 2.2.4 Workers shall have available (on their person) tools that can be used to partially penetrate the ice and gain leverage to help in pulling themselves out of the water and back up onto the ice. Equipment is available with capped ends that can be worn safely until needed.
- 2.3 Unknown Conditions
 - 2.3.1 The following guidelines shall be used when there is insufficient evidence to prove the ice is safe for travel and when the job task cannot be postponed:
 - Select an area where the ice is of good quality and hazards are minimized.
 - Establish a two-person team where one person acts as an "anchorperson" on shore and the second person, connected to the anchorperson by a braided rope, acts as the "checker",

slowly moving out over the ice to sampling locations. (When working on a river, testing with an ice auger or ice bar shall be more frequent than on a lake due to the uncertain nature of river ice.)

- The anchorperson continually looks for hazards and signs of ice failure. (When testing the safety of an ice cover, the best method is to use an ice pick/axe.) The ice in front and to the sides should be struck a solid blow every few paces. The checker should proceed carefully outward checking the ice every few paces. Both staff should work to keep the rope from becoming snagged on ice blocks. The anchorperson should maintain their position as long as the site is deemed hazardous. If the anchorperson has to move, the checker should remain stationary until the anchor has re-established a secure position. When returning from the sample site, the checker should use the above procedure, if required.
- Crews should not be operating on ice greater than 98 feet (30 meters) (or the length of a rope) from shore without appropriate equipment and Rope/Harness Restraint and Rescue System training, unless there is sufficient evidence to prove the ice is safe for travel.

3.0 Vehicle Traffic

- 3.1 Vehicles operated on ice shall travel with their windows down and with their seatbelt off, and their speed should not normally exceed 9 miles per hour (mph) (15 kilometers per hour [km/hr]) (in order to avoid the effects of the hydrodynamic wave). Nor should speed be less than 1 mph (1.5 km/hr), in order to avoid the effects of a stationary load. Ice thickness should be checked frequently when travelling over long stretches of ice.
- 3.2 Particular care should be exercised when approaching or travelling close to shore, or over shallow water, because of severe stressing of the ice due to reflection of the generated wave.
- 3.3 Stationary loads should be relocated to shore as soon as feasible and not left overnight.

The following tables contain guidelines for weight loads on ice.

Table 1. Ice Strength for Continuous Travel

Permissible Load (kg)	Effective Ice Thickness (cm) (clear, blue ice)	
	Lake	River
One person on foot	5.0 (2.0 in)	6.0 (2.4 in)
Group, in single file	8.0 (3.2 in)	9.0 (3.5 in)
Passenger car 2,000 (4,400 lbs)	18 (7.1 in)	21 (8.3 in)
Light truck 2,500 (5,500 lbs)	20 (7.9 in)	23 (9.1 in)
Medium truck 3,500 (7,700 lbs)	26 (10.2 in)	30 (11.8 in)
Heavy truck 7,000 (15,400 lbs)	35 (13.8 in)	41 (16.1 in)
10,000 (22,000 lbs)	38 (15.0 in)	44 (17.3 in)
25,000 (55,100 lbs)	63 (24.8 in)	73 (28.7 in)
45,000 (99,200 lbs)	80 (31.5 in)	92 (36.2 in)
70,000 (154,300 lbs)	100 (39.4 in)	115 (45.3 in)
110,000 (242,500 lbs)	123 (48.4 in)	144 (56.7 in)

Table 2. Ice Strength for Stationary Loads (more than 2 hours) and Working on Ice

Permissible Load (kg)	Effective Ice Thickness (cm) (clear, blue ice)	
	Lake	River
1,000 (2,200 lbs), or less	20 (7.9 in)	23 (9.1 in)
2,000 (4,400 lbs)	30 (11.8 in)	35 (13.8 in)
4,000 (8,800 lbs)	45 (17.7 in)	52 (20.5 in)
8,000 (17,600 lbs)	60 (23.6 in)	69 (27.2 in)
25,000 (55,100 lbs)	110 (43.3 in)	127 (50.0 in)
45,000 (99,200 lbs)	150 (59.1 in)	173 (68.1 in)
70,000 (154,300 lbs)	180 (70.9 in)	207 (81.5 in)
110,000 (242,500 lbs)	230 (90.6 in)	265 (104.3 in)

4.0 Rescue

4.1 If someone falls through ice:

- Do not approach the hole.
- Call the emergency number prior to attempting a rescue.
- Throw a rope or line to the victim to pull them out.
- Get medical assistance for the victim.

4.2 If you fall through the ice:

- Remain calm and look towards the shore.
- Place your hands and arms on the unbroken surface of the ice using the ice picks if available.
- Work forward by kicking your feet.
- If the ice breaks maintain your position and slide forward again.
- Once on the surface of the ice, do not stand. Instead, roll away from the hole.
- Crawl back to shore along your original path.

1.0 Purpose and Scope

- 1.1 This procedure applies to all AECOM Americas based employees and operations and any other entity and its personnel contractually required to comply with this document's content where the potential for hand injuries is present.
- 1.2 This procedure is intended to protect employees from activities that may expose them to hand injury. This procedure provides information on recognizing those conditions that require personal protective equipment (PPE) or specific work practices to reduce the risk of hand injury.
- 1.3 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.

2.0 Terms and Definitions

- 2.1 None

3.0 References

- 3.1 S3AM-003-PR1 SH&E Training
- 3.2 S3AM-208-PR1 – Personal Protective Equipment
- 3.3 S3AM-209-PR1 – Risk Assessment & Management
- 3.4 S3AM-325-PR1 – Lockout Tagout

4.0 Procedure

- 4.1 Roles and Responsibilities

4.1.1 Manager / Supervisor

- Implementation of this standard for the applicable facility, site, or project location.
- Confirm employees are familiar with this procedure and have appropriate training.
- Confirm the appropriate hand protection is available on site as necessary.

4.1.2 Employees

- Recognize hazards to hands.
- Comply with this procedure as well as client or work location requirements.

4.1.3 SH&E Manager

- Advise supervisors and site personnel on matters relating to hand safety.
- Work with the manager / supervisor to confirm that sufficient PPE and equipment are available.
- Maintain contact with manager / supervisor to regularly evaluate site conditions and new information that might require modifications to this procedure.
- Conduct training or briefings, when necessary, and to explain the content of this procedure and site hazards to employees.

- Assist in investigation of incidents that resulted or could have resulted in an injury.

4.2 Hazard Assessment

4.2.1 Perform hazard assessments for those work activities likely to require Personal Protective Equipment (PPE).

- Use the Task Hazard Assessment (THA) to perform the hazard assessment (in accordance with *S3AM-209-PR1 Risk Assessment & Management*). The THA will accompany AECOM personnel at jobsites for use in the event of a job or task change, or
- Use the *Gloves Needs Assessment – S3AM-317-FM1* or equivalent to perform the assessment.
- Re-evaluate completed hazard assessments when the job or task changes.

4.2.2 The hierarchy of controls should be considered during the THA process to minimize or eliminate the need for hand protection PPE or material handling tools. Examples of controls are chemical substitution, machine guarding, and use of different tools.

4.2.3 Select PPE that will protect employees if hazards cannot be eliminated.

- Review Safety Data Sheets for project or task-specific chemicals to determine appropriate PPE. If needed, consult with a SH&E Manager for assistance.
- Review glove manufacturer recommendations for both physical and chemical protection.
- Obtain gloves of the correct size for the employees.
- 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 gloves or equivalent chemical resistant shall always be used for protection from hazardous fluids or non-corrosive chemicals.
- Do not wear metal or metal-reinforced gloves when working with electrical equipment or on electrical services. Proper leather and/or rubber gloves designed and tested for this purpose shall be used.
- Refer to *S3AM-208-PR1 – Personal Protective Equipment* for additional information.

4.2.4 Follow glove requirements in the applicable SH&E plan.

4.3 Guidelines for Working With and Around Equipment (Hand Tools, Portable Powered Equipment)

4.3.1 General

- As applicable, employees shall be trained in the use of all tools. Refer to *S3AM-003-PR1 SH&E Training*.
- Keep hand and power tools in good repair and use them only for the task for which they were designed.
- Inspect tools before use and remove damaged or defective tools from service.
- Operate tools in accordance with manufacturer's instructions.
- Do not remove or bypass a guarding device for any reason.
- Keep surfaces and handles clean and free of excess oil to prevent slipping.
- Do not carry sharp tools in pockets.
- Clean tools and return to the toolbox or storage area upon completion of a job.

- Confirm that the wrench is in full contact (fully seated, "flat", not tilted) with the nut or bolt before applying pressure.
 - Place the body in the proper position for optimal balance and bracing to prevent falls if the tool slips.
 - Make sure hands and fingers have sufficient clearance in the event the tool slips.
 - Whenever possible, pull on a wrench and avoid pushing.
- When working with tools overhead, place tools in a holding receptacle when not in use.
- Do not throw tools from place to place or from person to person, or drop tools from heights.
- Inspect all tools prior to start-up or use to identify any defects.
- Powered hand tools shall not be capable of being locked in the ON position.
- Require that all power-fastening devices be equipped with a safety interlock capable of activation only when in contact with the work surface.
- Do not allow loose clothing, long hair, loose jewelry, rings, and chains to be worn while working with power tools or rotating equipment.
- Do not increase the leverage by adding sleeved additions (e.g. a pipe or snipe) to increase tool handle length.
- Make provisions to prevent machines from restarting through proper lockout/tagout (refer to *S3AM-325-PR1 – Lockout Tagout*).

4.3.2 Cutting Tools

- Always use the specific tool designed for the task. 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 *S3AM-317-ATT1 Safe Alternative Tools*.
- Fixed open-blade knives (FOBK) are prohibited from use during the course of AECOM work.
 - Examples of fixed open-blade knives include pocket knives, multi-tools, hunting knives, and standard utility knives.
 - Any exception to this requirement shall require approval of the Manager / Supervisor and SH&E Manager.
- When utilizing cutting tools, personnel will observe the following precautions to the fullest extent possible:
 - Use the correct tool and correct size tool for the job.
 - Cut in a direction away from yourself and not toward other workers in the area.
 - 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.
 - Ensure that the tool is sharp and clean; dirty and dull tools typically cause poor cuts and more hazard than a sharp, clean cutting tool.
 - Store these tools correctly with covers in place or blades retracted, as provided by the manufacturer.
 - On tasks where cutting may be very frequent or last all day (e.g., liner samples), consider Kevlar® gloves in the PPE evaluation for the project.
 - Do not remove guards on paper cutters.
 - In office locations, paper cutters must always be kept in a locked position when not in use.

4.3.3 Moving/Rotating Equipment

- General Requirements for Rotating Equipment (feed augers, chippers, conveyors, etc.)

- Never place hands, fingers, or extremities near hoppers and operational areas of machinery.
- When the equipment is rotating, stay clear of the rotating components and only operate equipment with proper machine guarding in place.
- Never clean a jammed piece of equipment unless the transmission is in neutral and the power source or the engine is off, locked out, and the moving parts of the equipment have stopped rotating. Refer to *S3AM-325-PR1 – Lockout Tagout*.

4.3.4 Other Physical Hazards

- Activities such as drum handling, fencing, work near razor wire, manhole cover removal, and demolition also pose hazards to hands. Use tools instead of hands for high hazard tasks whenever possible.
- Plan work to avoid pinch points for hands when moving drums, moving manhole covers into position, and handling other heavy objects.
- Work handling scrap metal, glass or other sharp edges requires proper hand PPE (Kevlar® or leather gloves).
- Activities involving hoisting, lifting and landing of a load shall be done “hands-free” when possible. Refer to *S3AM-317-ATT2 – Safe Hands-Free Lifting Guidelines*.

4.4 Ergonomics – Hand and Wrist Care

- 4.4.1 Keep your wrist in neutral. Avoid using your wrist in a bent (flexed), extended, or twisted position for long periods of time. Instead try to maintain a neutral (straight) wrist position. Ergonomic tools may be needed for long-term work.
- 4.4.2 Watch your grip. Gripping, grasping, or lifting with the thumb and index finger can put stress on your wrist. When practical, use the whole hand and all the fingers to grasp an object.
- 4.4.3 Minimize repetition. Even simple, light tasks may eventually cause injury. If possible, avoid repetitive movements or holding an object in the same way for extended periods of time.
- 4.4.4 Reduce speed and force. Reducing the speed with which you do a forceful, repetitive movement gives your wrist time to recover from the effort. Using power tools helps reduce the force.
- 4.4.5 Rest your hands. Periodically give your hands a break by letting them rest briefly. Or you may be able to alternate easy and hard tasks, switch hands, or rotate work activities.
- 4.4.6 Consider low vibration or anti- vibration hand power tools when possible.

4.5 Cleaning Hands

- 4.5.1 Avoid contamination of hands by proper use of gloves when contact with physical, chemical, or biological hazards is possible.
- 4.5.2 Use soap and water for normal hand cleaning. Do not use solvents for cleaning as they remove essential oils in the skin and may cause dermatitis. Do not use pressure washers for hand cleaning.
- 4.5.3 If the hands contact a corrosive (e.g., nitric acid), wash the area with water for fifteen minutes and then seek medical attention.
- 4.5.4 Use antibiotic ointment and skin protection on minor breaks/scratches of the skin.
- 4.5.5 In some cases barrier creams may be used to provide limited protection for hands exposed to greases and oils.

4.6 Safe Hands Observation Tool

- 4.6.1 The *Safe Hand Task Review Card S3AM-317-FM2* may be used to supplement and reinforce safe work practices and the requirements of this procedure.

4.6.2 The observer's responsibilities include:

- Two-way conversation with the employees being observed.
- Completing the card and mark the applicable fields on the back of the card.
- Submitting the completed cards to the supervisor.

4.6.3 The supervisor's responsibilities include:

- Reviewing the completed cards.
- Identifying best work practices and any improvements.
- Communicating any changes back the employee(s).

5.0 Records

The following documentation will be maintained:

5.1 Hand tool training records, as applicable.

6.0 Attachments

- 6.1 [S3AM-317-FM1](#) [Glove Needs Assessment](#)
- 6.2 [S3AM-317-FM2](#) [Safe Hands Task Review Card](#)
- 6.3 [S3AM-317-ATT1](#) [Safe Alternative Tools](#)
- 6.4 [S3AM-317-ATT2](#) [Safe Hands-Free Lifting Guidelines](#)

Americas

Glove Needs Assessment

S3AM-317-FM1

Mgr. / Supervisor Name:

Work Area Name:

Task/Operation Being Evaluated:

Date:

1.0 Using the Protection and Performance Needs Assessment Table Below

- 1.1 Function and performance needs must be evaluated thoroughly. If employees have a strong need for dexterity, tactility, and/or grip this should be identified as a priority. Rank properties in the table below with 1 being the highest priority. Do not assign the same priority more than once. It is only necessary to rank the applicable properties. If all properties are ranked, the lowest priority would be ranked 12.

Protection and Performance Needs Assessment			
Category	Properties	Protection and Performance Needs	Priority (1=Top Priority)
Mechanical	Cut Resistance	Protection from sharp edges, blades, and other cutting hazards	
	Puncture Resistance	Protection from sharp objects like nails, pins, needles, wire	
	Abrasion Resistance	Durability and resistance to abrasive objects or materials	
	Shielding	Protection from impact, ricochet, small projectiles.	
Chemical	Degradation & Absorption Resistance	Durability and resistance to breaking down and/or permeating the glove from exposure to chemicals. Refer to the chemical's Safety Data Sheet for the appropriate glove choice.	
Thermal	Heat Resistance	Thermal protection from hot objects or materials	
	Cold Resistance	Thermal protection from cold weather, objects, or materials	
Vibration	Anti-Vibration	Vibration reduction from operating certain tools and equipment	
Electrical	Insulation	If performing work on electrical equipment, this must be the top priority	
Function	Dexterity	Ability to manipulate objects and control hands in the desired manner	
	Tactility	Ability to sense objects by touch	
	Grip	Ability to exert pressure on an object when holding it	

- 1.2 Identify a glove that meets the top protection and performance priorities.

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. The table below offers additional guidance on key considerations when selecting a glove for certain protection and performance properties.

Category	Properties	Key Considerations and Selection Criteria
Mechanical	Cut Resistance	Testing Standard: ASTM F1790 and ASTM F1970-05 There are 5 levels of cut resistance. 5 is the highest.
	Puncture Resistance	Testing Standard: EN 388:2003 This testing measures the force required to pierce the sample with a standard sized point.
	Abrasion Resistance	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	Some gloves offer thick padding or hard guards around the back of the hand or knuckles. These can offer good protection against impact.
Chemical	Degradation & Absorption Resistance	Identify products / chemicals that present potential exposures. Refer to the chemical's Safety Data Sheet and glove manufacturer's specifications for the appropriate glove choice.
Thermal	Heat Resistance	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	Testing Standard: EN 511:1994 (for ambient temperature) Testing Standard: ISO 5085:1989-1 (for cold surfaces) Choosing the right glove depends on whether protection is needed from cold weather or cold surfaces.
Vibration	Anti-Vibration	Testing Standard: ANSI S2.73-2002 (R2007) This testing method measures the vibration transmission of the glove.
Electrical	Insulation	Testing Standard: ASTM D120-09 Glove protection depends on the maximum voltage of energized components.
		50 – 480V Class 00 with Leather Protectors
		480 – 600V Class 0 with Leather Protectors
		600V and above Class 0 or higher (depending on maximum voltage) with Leather Protectors
Function	Dexterity	Testing Method: EN 420:2003 Ability to manipulate objects and control hands in the desired manner. 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 tip less for those two digits.
	Tactility	Ability to sense objects by touch. 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	Testing Standard: NFPA 1971 (Grip) Ability to exert pressure on an object when holding it.



Safe Hands Task Review Card

Task Being Performed: _____

Date: _____

Person Performing Task Review: _____

Pre-Job: Did Employees identify/discuss?

- Placement of hands
- Potential hazards to the hands (sharp edges, chemicals, etc.)
- Actions to eliminate exposure to hands
- Type of gloves or other PPE to protect hands

Safe Hands Task Review Card (S3AM-317-FM2)
Revision 0 March 1, 2016

Go To Back of Card



Safe Hands Task Review Card

Task Being Performed: _____

Date: _____

Person Performing Task Review: _____

Pre-Job: Did Employees identify/discuss?

- Placement of hands
- Potential hazards to the hands (sharp edges, chemicals, etc.)
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- Actions to eliminate exposure to hands
- Type of gloves or other PPE to protect hands

Safe Hands Task Review Card (S3AM-317-FM2)
Revision 0 March 1, 2016

Go To Back of Card

Task: _____

Are employees hands placed near hazard areas?

☐ Sharp Edges

☐ Crush Hazards

☐ Pinch Points

☐ Chemicals

Could other tools or controls be used to prevent hand from being in the hazard zone?

☐ Block Materials

☐ Cover Sharp Edges

☐ Are tools used to keep hands clear of pinch/crush hazards

Are the gloves being used appropriate for the task?

☐ Do they offer the right type of protection from the identified hazards?

☐ Do they have enough dexterity to complete the task while worn?

Is the off-hand placed away from the hazard zone?

☐ Yes

☐ No

Are there any other actions that could have been taken to keep hands safe?

Task: _____

Are employees hands placed near hazard areas?

☐ Sharp Edges

☐ Crush Hazards

☐ Pinch Points

☐ Chemicals

Could other tools or controls be used to prevent hand from being in the hazard zone?

☐ Block Materials

☐ Cover Sharp Edges

☐ Are tools used to keep hands clear of pinch/crush hazards

Are the gloves being used appropriate for the task?

☐ Do they offer the right type of protection from the identified hazards?

☐ Do they have enough dexterity to complete the task while worn?

Is the off-hand placed away from the hazard zone?

☐ Yes

☐ No

Are there any other actions that could have been taken to keep hands safe?

Task: _____

Are employees hands placed near hazard areas?

☐ Sharp Edges

☐ Crush Hazards

☐ Pinch Points

☐ Chemicals

Could other tools or controls be used to prevent hand from being in the hazard zone?

☐ Block Materials

☐ Cover Sharp Edges

☐ Are tools used to keep hands clear of pinch/crush hazards

Are the gloves being used appropriate for the task?

☐ Do they offer the right type of protection from the identified hazards?

☐ Do they have enough dexterity to complete the task while worn?

Is the off-hand placed away from the hazard zone?

☐ Yes

☐ No

Are there any other actions that could have been taken to keep hands safe?

Task: _____

Are employees hands placed near hazard areas?

☐ Sharp Edges

☐ Crush Hazards

☐ Pinch Points

☐ Chemicals

Could other tools or controls be used to prevent hand from being in the hazard zone?

☐ Block Materials

☐ Cover Sharp Edges

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Are the gloves being used appropriate for the task?

☐ Do they offer the right type of protection from the identified hazards?

☐ Do they have enough dexterity to complete the task while worn?

Is the off-hand placed away from the hazard zone?

☐ Yes

☐ No

Are there any other actions that could have been taken to keep hands safe?

1.0 Types of Safety Knives or Alternative Cutting Tools

1.1 Self-retracting utility knives (brands – OLFA, Martor, Allway Tools)



1.2 Guarded utility knives (brands – The Safety Knife Co., Martor)



1.3 Shears, snips, scissors (brands – Ridgid, Craftsman, Wolfcraft)



1.4 Concealed blade cutters (brands – The Safety Knife Co., Martor)



1.5 Pipe cutters (brands – Ridgid, Empire)



1.6 Specialty cutter (brand – Geoprobe)



1.0 What is Safe Hands Free Lifting?

The Task Hazard Assessment (THA) shall identify the measures taken to prevent injuries to hands, including methods to perform hands-free lifting as well as address proper glove selection. The most hazardous parts of a lifting operation are hoisting and landing of the load. Therefore at these critical stages, personnel must be as far away from the load as possible in case the load shifts or drops. To ensure this happens, it is essential to adopt a “hands-free” lifting guideline that is rigidly followed.

Once a load is properly rigged and connected to a mechanical lifting device, personnel should not handle or touch a load or rigging with any part of their body as the load is being lifted or before the load is properly set down, and all potential energy is released.

However, there will always be certain jobs which will require “hands-on” for final positioning. These should be treated as exceptions to the norm and fully addressed in the risk assessment process with special attention given to the risk of injury to fingers, hands, toes and feet.

2.0 Objective of Safe Hands Free Lifting

To eliminate the risk of injury to personnel from pinch points, caught between zones, entanglement hazards and a reduced field of vision.

3.0 What are the benefits of Safe Hands Free Lifting?

- Significantly reduces crush, entanglement and hand injuries.
- Clears you of the potential injury zone for dropped objects.
- Clears you of the potential swing area.
- Personnel can see more of the load zone.
- Better posture when pushing and pulling objects.
- Less strain on the lower back and neck area.
- Creates a strong safety culture for all project personnel.

4.0 Can every load be guided with Safe Hands Free Lifting?

- 4.1 MOSTLY, but there *may* be times when due to restricted work space, working from elevated work platforms, awkward angles and body posture, that hands will need to be used.
- 4.2 HOWEVER, every load must be assessed in real time as part of the Safe Work Planning process. Remember to document and communicate the process to be used with all involved employees.

5.0 How is Safe Hands Free Lifting Achieved?

- 5.1 The Correct Mindset

Changing the way we have done things for years always results in an element of “pushback” from people set in their ways. We have to persevere with fresh ideas or we will never change things for the better. It is a natural reaction to hold the rigging in place until the tension is taken up to make sure the load is properly slung and balanced. Nevertheless, how often have you heard of people getting hands, fingers and body pinched, trapped or crushed by the rigging?

5.2 Tag Lines

Tag lines must be attached to a load prior to lifting and provided at the appropriate length to allow employees to stay clear of the drop zone and any pinch/crush points the load may create.

Whether or not to use tag lines has always been a debatable point, but the consensus of opinion is that although their use can introduce additional hazards, their use generally increases the safety of the lift. Having said that, the advantages and disadvantages will be considered and their use determined during the risk assessment and documented.

5.3 Push / Pull Sticks

Push / Pull sticks are simply wooden or fiber glass poles with a boat hook at one end and a rubber or leather pad at the other. Ideally, these should be about 2 meters / 6 feet long. Their primary use is to retrieve tag lines hanging vertically down from the load so that personnel do not have to get too close to the suspended load. Their secondary use is to push and maneuver loads into the correct orientation / position for landing or guiding them into tight spaces while remaining hands-free / hands-off.

Achieving "hands-free" lifting is not difficult; it is an awareness of the hazards and planning the work and working the plan. If you do come up against jobs that appear to require "hands-on", think long and hard about how you can change that and if you think it needs special tools or equipment to achieve "hands-free".

6.0 What has to happen if you put your hands on the load?

- Safe Work Planning.
- Use proper gloves.
- Agree on the communication method within the lift group.
- Never touch the load with your arm higher than your shoulder level.
- Use hooks to pull tag lines away from the drop zone.
- Keep out of the drop zone.
- Look ahead for the pinch points and crush zones.

7.0 Mandatory Safe Hand Practices

- All personnel must have GLOVES in possession 100% of the time.
- 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.
- All Hoisted Loads should only be touched with a HANDS FREE TOOL.
- DO NOT place any part of your body under a suspended load.

8.0 Guidelines for Safe Hands-Free Lifting are in addition to any requirements of S3AM-317-PR1 Hand Safety

8.1 Safe Hands Free Lifting Tools



- Rubber dipped or vinyl coated tag lines prevent curling of rope.
- Eliminates trip and entanglement hazards.

- Example of aluminum boat hook modified for Safe Hands Free Lifting.
- One end rubberized for controlled pushing.
- Hook ideal for pulling tag lines to you and not walking into the drop zone.



- Other tool options for Safe Hands Free Lifting



8.2 Photo Examples



Drilling, Boring & Direct Push Probing

S3AM-321-PR1

1.0 Purpose and Scope

- 1.1 This document provides procedures designed to help prevent injuries to personnel working on the project and pedestrians, property damage, and adverse environmental impact as a result of potential hazards associated with drilling, boring and direct-push probing. These hazards include, but are not limited to, encountering underground utilities, subsurface installations, rotating equipment and potential overhead hazards.
- 1.2 This procedure provides the minimum requirements to be followed when drilling, boring, and probing work are performed.
- 1.3 This procedure applies to all Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.
- 1.4 The Manager is responsible for meeting all the requirements in this procedure.
- 1.5 AECOM's clients may have specific procedures which shall be followed to identify and map utility and subsurface structures on their properties or facilities. Provided the client's procedures meet or exceed those of AECOM, approval shall be obtained from the Manager and the SH&E Manager to follow the client's procedures.

2.0 Terms and Definitions

- 2.1 **Underground Utilities** – All utility systems located beneath grade level, including, but not limited to, gas, electrical, water, compressed air, sewage, signaling, and communications, etc.
- 2.2 **Ground Disturbance (GD)** – Any indentation, interruption, intrusion, excavation, construction, or other activity in the earth's surface as a result of work that results in the penetration of the ground.
- 2.3 **Intrusive Activities** – Examples: Excavation of soil borings, installations of monitoring wells, installation of soil gas sampling probes, excavation of test pits / trenches or other man-made cuts, cavity, trench, or depression in an earth surface formed by earth removal.
- 2.4 **Subsurface Installations** – Examples: Subterranean tunnels, underground parking garages, and other structures beneath the surface.

3.0 References

- 3.1 S3AM-003-PR1 SH&E Training
- 3.2 S3AM-118-PR1 Hearing Conservation
- 3.3 S3AM-208-PR1 Personal Protection Equipment
- 3.4 S3AM-209-PR1 Risk Assessment & Management
- 3.5 S3AM-213-PR1 Subcontractor Management
- 3.6 S3AM-305-PR1 Hand & Power Tools
- 3.7 S3AM-306-PR1 Highway and Road Work
- 3.8 S3AM-322-PR1 Overhead Lines
- 3.9 S3AM-322-FM1 Overhead Electrical Lines Acknowledgement
- 3.10 S3AM-325-PR1 Lockout Tagout
- 3.11 S3AM-326-PR1 Machine Guarding
- 3.12 S3AM-331-PR1 Underground Utilities

3.13 S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Manager

- Confirm the development of the project SH&E Plan and compliance with this procedure.
- Confirm the appropriate equipment and materials are available to conduct the drilling, boring or direct-push operations.
- Confirm compliance with *S3AM-331-PR1 Underground Utilities*.
- Review the *S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist* prior to authorizing work to proceed.
- Confirm that employees conducting drilling, boring or direct-push probing possess any required training, registrations or certifications.
- Confirm all employees involved and affected by the task review the SH&E Plan, *S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist* and Task Hazard Assessment (THA) prior to work commencing.
- Confirm an equipment maintenance inventory is maintained, schedules adhered to and appropriate inspections of equipment are conducted.
- Provide authorization (with the concurrence of the Site Supervisor and SH&E Manager) for work to resume if interrupted due to unexpected conditions or events.

4.1.2 Safety, Health & Environment (SH&E) Manager

- Assist AECOM management as needed by providing guidance and clarification as to issues that may arise.
- Review the project SH&E Plan to confirm compliance with jurisdictional regulations. Provide technical guidance as needed when a variance is pursued related to this procedure. Confirm variance process meets requirements identified in *S2-001-SM1 Global SH&E Management System Manual*.

4.1.3 Employees

- Maintain training as appropriate to the work to be completed (e.g., ground disturbance, lockout tagout, equipment operation, etc.). Refer to *S3AM-003-PR1 SH&E Training*.
- Review the SH&E Plan, *S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist* and Task Hazard Assessment (THA) prior to work commencing.
- As appropriate to the anticipated or encountered hazards and as addressed in the applicable planning documentation, utilize appropriate personal protective equipment (PPE) and applicable training, practices and operating procedures.
- Immediately notify the Manager of any unanticipated conditions or events. If assigned equipment, perform appropriate inspections and confirmations of maintenance and / or repairs.

4.2 Training

4.2.1 All on-site employees involved with drilling, boring, and direct-push probing shall be trained, at a minimum, in these procedures and in the procedures of *S3AM-331-PR1 Underground Utilities*.

4.2.2 All operators and assistants shall have the appropriate safety training based on the SH&E Training Matrix and any additional training assessments developed at the business group, and be versed in the equipment to be utilized.

- Refer to *S3AM-003-PR1 SH&E Training*.

- This training may include, but is not limited to, Excavation / Trenching (Ground Disturbance), HAZWOPER, Petroleum Safety Training (or Construction Safety Training), and H2S Alive as appropriate.
 - Only qualified personnel shall operate and inspect equipment.
- 4.2.3 All on-site Employees involved with drilling, boring, and direct-push probing activities shall be provided with on-site orientation of the drill rig and its operation.
- 4.2.4 All Employees involved with drilling, boring and direct-push probing activities at a client site shall receive the applicable client-required training.
- 4.3 Planning
 - 4.3.1 SH&E Plan – At a minimum, a SH&E plan that includes a pre-job hazard assessment shall be prepared and communicated to all involved personnel prior to any drilling, boring, and direct-push probing activities. Refer to *S3AM-209-PR1 Risk Assessment & Management*.
 - Assessment shall include both overhead and subsurface utilities and installations. Refer to *S3AM-322-PR1 Overhead Lines* and *S3AM-331-PR1 Underground Utilities*.
 - The SH&E Plan will address any required environmental monitoring including gas monitoring, dust, noise, metals, radiation or other monitoring as may be appropriate for site conditions.
 - All SH&E Plan requirements will be followed by the project team.
 - The location specific emergency response plan shall be in place, contain procedures applicable to the potential emergencies presented by the operations, and be reviewed with all personnel potentially affected.
 - 4.3.2 A Task Hazard Assessment (THA) shall be completed before every assigned task at the work location. The focus of the analysis shall be on the specific assigned task and the evaluation of risks and assignment of control measures based on actual work conditions.
 - 4.3.3 *S3AM-321- ATT2 Pre-Drilling, Boring & Direct-Push Probing Flow Chart* summarizes the key Pre-Drilling, Boring, and Direct-push probing requirements addressed in this procedure.
 - 4.3.4 Procedures and documentation as detailed in *S3AM-322-PR1 Overhead Lines* and *S3AM-331-PR1 Underground Utilities* shall be completed prior to any intrusive subsurface work.
 - The locations of subsurface and overhead utilities and subsurface installations will be investigated, documented, mapped on a site plan and evidenced with appropriate surface markings.
 - A site walk shall be conducted by the project team / site Manager and any other appropriate personnel, with the objectives of reviewing all planned intrusive activity locations, the locations of subsurface and overhead utilities and the potential for subsurface installations, to determine the appropriate utility clearance activities, and to observe other physical hazards.
 - All proposed subsurface activities will be reviewed in comparison to subsurface and overhead utilities and subsurface installations and adjustments made as necessary.
 - Appropriate clearance activities shall confirm location(s) of identified underground utilities and subsurface structures. Review the applicable completed *S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist*.
 - Site Walks should be repeated as necessary following the clearance of subsurface utilities and installations to confirm hazards are clearly identified.
 - 4.3.5 Confirm drilling location(s) and / or bore entry and bore exit points are adequately identified on the worksite to enable appropriate equipment positioning.
- 4.4 Permits, Notifications and Access Agreements

- 4.4.1 Any required notifications shall be provided within the appropriate timeframe to the applicable organization (e.g. owner, agency, governing body, etc.).
- 4.4.2 All applicable permits (e.g. client, government, working near rail road, etc.) will be identified, obtained, and adhered to.
- 4.4.3 Access agreements will be obtained and adhered to as necessary.
- 4.5 Pre-Qualifying and Re-Qualifying Drilling Subcontractors
 - 4.5.1 All drilling subcontractors will be properly pre-qualified in accordance with *S3AM-213-PR1 Subcontractor Management*.
 - 4.5.2 The qualifications of the drilling crew performing the work will be evaluated prior to each mobilization and each day by AECOM's on-site representative to assure that their safety performance, training, qualifications, equipment, processes, and approaches reflect AECOM standards for excellence.
 - 4.5.3 All drilling subcontractor equipment will be properly maintained and properly equipped, and the drilling subcontractor will verify their equipment is fully functional as a normal part of their daily and pre-work routine. Refer to *S3AM-321-FM1 Daily Drilling, Boring & Direct Push Equipment Inspection*.
- 4.6 General Health and Safety
 - 4.6.1 Personal Protective Equipment – Refer to the *S3AM-208-PR1 Personal Protection Equipment* for best practices. These requirements may be modified or expanded in the SH&E Plan. Clothing shall be close fitting and comfortable without loose ends, straps, draw strings, belts, or otherwise unfastened parts that might catch on some rotating or translating component of the rig.
 - Depending upon the hazards present, additional PPE may be required such as fire retardant clothing, specific hearing protection, respiratory protective equipment and chemical protective clothing.
 - If the location has potential for underground electrical utilities to be present, workers shall ensure footwear has additional protection of shock resistant soles required (white rectangle with omega symbol).
 - 4.6.2 Hearing Conservation – Hearing conservation program requirements may apply when working around operating equipment. Refer to *S3AM-118-PR1 Hearing Conservation*.
 - Each worker shall wear noise-reducing ear protectors around operating equipment or during elevated noise levels. Distance from the elevated noise level is the primary measure of control for non-essential drilling personnel.
- 4.7 Drilling, Boring and Direct Push Equipment Maintenance and Inspections
 - 4.7.1 All equipment will be inspected prior to the initiation of operations and daily during operations using the *S3AM-321-FM1 Daily Drilling, Boring & Direct-Push Equipment Inspection*. This inspection is the responsibility of the operator who will provide written documentation of the inspection prior to the start of drilling each day.
 - Equipment that is deemed defective will immediately be repaired by a qualified person, or, if repair is not practicable, tagged "Out of Service" and sent for repairs or discarded.
 - 4.7.2 Managers shall confirm an accurate inventory of the equipment within their operation requiring scheduled maintenance is developed. Using applicable regulations, industry standards, best practices, and manufacturer's recommendations, a maintenance schedule shall be developed with defined responsibility, required actions, and frequency. Refer to *S3AM-321-FM2 Drilling, Boring, & Direct-Push Equipment Maintenance Inventory*.
 - 4.7.3 The maintenance program for equipment shall:

- Adhere to applicable regulations, standards, and manufacturers' specifications;
- Provide for service by appropriately qualified maintenance personnel; and,
- Require maintenance schedules and records of maintenance.

4.7.4 Employees or operators who are assigned equipment are required to review maintenance schedules for that equipment and will confirm that required maintenance has occurred or see that it is undertaken.

4.8 General Requirements

4.8.1 Excluding geoprobe activities, set up any sample tables and general work areas for employees at a safe distance from the rig.

- The recommended safe distance is the height of the fully extended mast plus 5 feet (1.5 meters), and no less than 30 feet (9.1 meters) from the rig.
- An increase to this distance may be required due to noise exposure hazards. Refer to *S3AM-118-PR1Hearing Conservation*.

4.8.2 Operation of the drilling, boring or direct-push equipment shall be restricted to the designated operator except to activate the emergency shut-off as required.

- All rotary drilling equipment shall have an emergency shut off / kill switch. The location of the switch and operation should be reviewed with all involved Employees.

4.8.3 Sit-on direct push rigs are not permitted on AECOM worksites unless the rig has been modified (in accordance with manufacturer's requirements) to be operated by remote control or the rig has been manufactured with a rollover protection system and seat belt.

4.8.4 Consult jurisdictional regulations as use of J-hooks and cat-heads may be prohibited. Examples:

- 29 CFR 1926 requires derricks and cranes to use hooks with self-closing latches and permits the use of J-hooks only for a task unrelated to this procedure (setting trusses).
- British Columbia and Saskatchewan prohibit the use of friction cat-heads.

4.9 Identifying the Work Area

4.9.1 Ensure the work area is adequately identified:

- Including zone around the drilling, boring, or direct push equipment, as well as fluid equipment, entry point, exit point and any excavated areas.
- Utilize barricades, signage, pylons, snow fence, etc. as appropriate.
- Implement traffic control as necessary.
- Coordinate with concurrent operations to identify their associated hazards and controls, and communicate those associated with AECOM tasks.

4.9.2 When operating near public vehicular and pedestrian traffic, the on-site personnel shall take every precaution necessary to see that the work zone is properly established, identified, and isolated from both moving traffic and passer-by pedestrians (refer to *S3AM-306-PR1 Highway and Road Work*).

4.9.3 All traffic control devices shall be installed, placed, and maintained in accordance with a Traffic Control Plan, client specifications, and / or the Manual of Uniform Traffic Control Devices and Manual of Uniform Traffic Control Devices for Canada in Canada. Traffic control devices shall consist of and not be limited to

- Directional and informational signage;
- High visibility barricades, cones, or barrels;
- Lighting; and
- Other equipment and devices as required.

4.10 Clearing Work Areas

- 4.10.1 In addition to any minimum requirements the drilling subcontractor may have, prior to set up, adequate site clearing and leveling shall be performed to accommodate the rig and supplies and provide a safe working area.
- 4.10.2 Clearing the site includes clearing the intended drilling area obstacles and of underground utilities in accordance with *S3AM-331-PR1 Underground Utilities*.
- 4.10.3 Drilling or probing shall not commence when tree limbs, unstable ground, or site obstructions cause unsafe tool handling conditions.
 - The cleared / levelled area should be large enough to accommodate the rig and supplies.
 - If the rig is positioned on a steep grade and levelling of the ground is impossible or impractical, the wheel of the transport vehicle shall be blocked and other means employed of preventing the rig from moving or toppling over.
- 4.11 Drilling Activities
 - 4.11.1 Federal / State / Provincial / Territorial regulations that govern drill rig operations and exposed moving parts shall be adhered to.
 - 4.11.2 All applicable client on-site safety procedures shall be understood and adhered to.
 - 4.11.3 Minimum approach distances (MAD) from subsurface and overhead utilities and subsurface installations will 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 further depending on line voltage). These approach distances are a minimum; government regulations and utility requirements may dictate a greater set back distance and should be confirmed.
 - 4.11.4 Verify that equipment / energy is isolated when lockout is required:
 - Refer to operator's manual and *S3AM-325-PR1 Lockout Tagout*.
 - Ensure stop switch is activated.
 - Driller is out of the seat.
 - Test controls to ensure they do not engage.
 - 4.11.5 In addition to any identified minimum requirements (as applicable, client, drilling subcontractor), the following safety measures shall be taken during drilling, boring or probing operations on site:
 - The operator and helper shall be present during all active rig operations.
 - Site personnel shall remain within visual contact of the rig operator.
 - Hard hats, approved safety boots, safety glasses, and hearing protection shall be worn in the work zone (minimum, the radius around the rig equal to the height of the drill rig mast) of a rig.
 - Gas monitoring shall be conducted as appropriate.
 - Hands, feet and other body parts shall be kept away from moving parts, (e.g. hoisted, rotating, pushing, etc.) including augers, drill rods and reamers.
 - When observing drilling, stand upwind of the drill rig to prevent potential exposure to vapors that may be emitted from the borehole.
 - The emergency shut-off switch on the rig shall be identified to site personnel and tested on a daily basis by the operator.
 - Unauthorized personnel shall be kept outside of the established work zone.
 - Rig crew and other worksite personnel shall not use a cell phone while operating the drill rig or other equipment or within the rig work zone.
 - Do not drive the rig from hole to hole with the mast (derrick) in the raised position.
 - Before raising the mast (derrick) look up to check for overhead obstructions. Refer to *S3AM-322-PR1 Overhead Lines*.

- Before raising the mast (derrick), all rig personnel (with the exception of the operator) and visitors should be cleared from the areas immediately to the rear and the sides of the mast. All rig personnel and visitors should be informed that the mast is being raised prior to raising it.
- Before the mast (derrick) of a drill rig is raised and drilling is commenced, the drill rig shall be first levelled and stabilized with levelling jacks and / or solid cribbing.
 - The drill rig shall be releveled if it settles after initial set up.
 - Lower the mast (derrick) only when the levelling jacks are down, and do not raise the levelling jack pads until the mast (derrick) is lowered completely.
- After the rig has been positioned to begin drilling, all brakes and / or locks shall be set before drilling begins.
- The operator of a rig shall only operate a drill rig from the position of the controls. The rig shall not be in operation if the operator of the rig leaves the area of the controls.
- Throwing or dropping tools shall not be permitted. All tools shall be carefully passed by hand between personnel or a hoist line should be used.
- If it is necessary to operate the rig within an enclosed area, make certain that exhaust fumes are conducted out of the area.
 - Exhaust fumes can be toxic and some cannot be detected by smell.
 - Air monitoring and, as necessary, noise monitoring shall be conducted.
- Clean mud and grease from boots before mounting a rig platform and use hand holds and railings. Watch for slippery ground when dismounting from the platform.
- During freezing weather, do not touch any metal parts of the rig with exposed flesh. Freezing of moist skin to metal can occur almost instantaneously.
- All unattended bore holes shall be adequately covered or otherwise protected to prevent rig personnel, site visitors, or animals from stepping or falling into the hole. All open bore holes shall be covered, protected, or backfilled adequately and according to Federal / State / Provincial / Territorial or local regulations on completion of the drilling project.
- When using a ladder on a rig, face the ladder and grasp either the side rails or the rungs with both hands while ascending and descending. Always use adequate fall protection and a full body harness when climbing above 6 feet (1.8 meters) of the ground. Do not attempt to use one or both hands to carry a tool while on a ladder. Use a hoist line and a tool "bucket" or a safety hook to raise or lower hand tools.

4.12 Drilling Fluid

- 4.12.1 Ensure drilling fluid is appropriate to the soil type and conditions to be encountered to enable smooth drilling.
- 4.12.2 Drilling fluid used in the boring process shall be contained at the entry and, as applicable, exit locations until recycled or removed from the site.
- 4.12.3 Confirm drilling fluid does not enter roadways, streams, municipal storm or sanitary sewer lines, and / or any other drainage system or body of water.
- 4.12.4 Monitor drilling equipment and fluid equipment for any leakage or spills. Confirm appropriate containment is in place and adequate spill response supplies are available.
- 4.12.5 It is important to monitor fluid flow and pressure gauges when drilling with any tooling, but it is essential when drilling with a mud motor (pump placed in the drill string to provide additional power to the bit while drilling).

4.13 Unanticipated Concrete / Debris or Void

- 4.13.1 The presence of subsurface installations and utilities requires special care when obstructions / refusal and voids are encountered and when unexpected absence of soil recovery occurs during

drilling operations. Other indicators of subsurface installations and utilities are the presence of warning tape, pea gravel, sand, non-indigenous material, bentonite, red concrete (indicative of electrical duct banks) and any departure from native soil or backfill.

- 4.13.2 If unanticipated concrete / debris is encountered and / or if a void is encountered, drilling will be immediately discontinued and the Manager notified. Drilling may only proceed with Manager or SH&E Manager approval.

4.14 Use of Manual Slide Hammer

- 4.14.1 The following health and safety procedures should be followed when using a manual slide hammer to install shallow injection points, drive point piezometers, and drill tools:

- Only use a manual slide hammer that either attaches directly to the point / piezometer being driven or that incorporates a cap on the point / piezometer / drill tool that prevents the slide hammer from slipping off the point / piezometer / drill tool.
- Always grasp the manual slide hammer (handles if equipped with handles) with both hands while driving the point / piezometer / drill tool.
- Never allow hands or feet to get between the manual slide hammer and the drive plate or anvil.

4.15 Use of Augers

- 4.15.1 The following general health and safety procedures should be followed when supervising borings with continuous flight hollow-stem augers:

- Never place hands or fingers under the bottom of an auger section when it is being hoisted over the top of the auger section in the ground or other hard surfaces such as the drill rig platform.
- Never allow feet to get under the auger section that is being hoisted.
- When augers are rotating, stay clear of the rotating auger and other rotating components of the drill rig. Never reach behind or around a rotating auger for any reason.
- Use a long-handled shovel to move auger cuttings away from a rotating auger. Never use hands or feet to move cuttings away from a rotating auger.
- Do not attempt to remove earth from rotating augers. Augers should be cleaned only when the drill rig is in neutral and the augers are stopped from rotating.
- Loud noises may occur while driving split spoons. At minimum hearing protection shall be worn when driving split spoons.
- When pulling / lifting augers, a clevis pin or other closed device shall be used. Use of J-hooks is prohibited.

4.16 Attaching and Breaking Rods

- 4.16.1 Do not use manual tools (e.g., pipe wrenches) in combination with rotation of the drill stem. Manual tools are not designed for the load, and may break.

- The use of such tools creates a significant impact hazard for those in the work area, because they rotate with the drill stem. Manual tool use in combination with a rotating drill stem to attach or break rods is therefore prohibited.
- Manual tools may be used if the drill stem is isolated / positively disengaged.
- Mechanical means of rod separation that are permitted include:
 - Opposing hydraulic controls.
 - Rod locking devices or machine's power vice.
 - Hydraulic breakout tools.
 - Hydraulic foot clamps.

- 4.16.2 Rod box changes present severe crushing hazards. Operators shall ensure all crew members are clear of the machine and hoisting equipment while they are changing rod boxes.

4.17 Rotary, Sonic and Core Drilling

- 4.17.1 In addition to the health and safety procedures identified above, the following general health and safety procedures should be followed when supervising borings with rotary, sonic and core drilling:

- Drill rods should not be braked during lowering into the hole with drill rod chuck jaws. Drill rods should not be held or lowered into the hole with pipe wrenches.
- If a string of drill rods are accidentally or inadvertently released into the hole, do not attempt to grab the falling rods with your hands or a wrench.
- When drill rods are hoisted from the hole, they should be cleaned for safe handling with a rubber or other suitable rod wiper. Do not use hands to clean drilling fluids from drill rods.
- When drill rods are rotating, stay clear of the rotating components of the drill rig. Never reach behind or around a rotating drill rod for any reason.
- Use a long-handled shovel to move cuttings away from the top of the borehole. Never use hands or feet to move cuttings away from the borehole.
- If work shall progress over a portable drilling fluid (mud) pit, do not attempt to stand on narrow sides or cross members. The mud pit should be equipped with rough-surfaced, fitted cover panels of adequate strength to hold drill rig personnel.
- Keep away from area where drill rods are being moved or raised to the rig. Do not stand in the area where a drill rod will fall or slide if it should be dropped.
- Loud noises may occur during drilling. Hearing protection shall be worn.

4.18 Direct-push

- 4.18.1 The following general health and safety procedures should be followed when supervising drilling borings with direct-push drilling:

- Loud noise may occur during direct-push drilling. Appropriate hearing protection shall be worn.
- When drill rods are hoisted from the hole, they should be cleaned for safe handling with a suitable rod wiper. Do not use hands to clean drilling fluids from drill rods.
- If work shall progress over a portable drilling fluid (mud) pit, do not attempt to stand on narrow sides or cross members. The mud pit should be equipped with rough-surfaced, fitted cover panels of adequate strength to hold drill rig personnel.
- Drill rods should not be lifted and leaned unsecured against the mast. Either provide some method of securing the upper ends of the drill rod sections for safe vertical storage or lay the rods down.

4.19 Horizontal Directional Drilling

- 4.19.1 During surface to surface operations a 16.4' (5 meters) safe zone shall be established and identified at both the entry and exit locations; no personnel are permitted to be within this zone unless the drill is locked out and the operator is out of the seat.
- 4.19.2 Machine shall be locked out before entering an excavation, changing tools, adding or removing drill stem or doing any other work on tools or the drill stem at the exit end of the bore.
- 4.19.3 A tracking head shall be installed on the drill stem:
- 4.19.4 Assemble drill head using components appropriate to the soil conditions to be encountered (e.g. nozzle, bit, beacon housing, etc.).
- 4.19.5 Ensure all personnel are clear of the bore entry point (outside of identified work zone).

- 4.19.6 At all times two way communication will be maintained at entrance and exit points using two way radios or equally effective communication means. If at any time communication is lost, all work will be stopped until communication is re-established
- 4.19.7 Locate drill head with tracking device at least every half-length of pipe. Adjust direction as necessary to follow the intended bore path.
- 4.19.8 Any drilling fluid returning to the surface shall be cleaned up promptly.
- 4.19.9 Drill pipe should exit the bore at an angle of 5 to 10° from the ground surface.
- 4.19.10 Turn off fluid flow as soon as drill head emerges.
- 4.19.11 Lockout machine and remove drill head using appropriate breakout tools.
- 4.19.12 Select and attach a reamer that allows the return of drilling fluids and cuttings, to reduce frictional pullback forces, and to allow for bend radius of the pipe. Reamer shall be:
 - The smaller of 1.5 times the outside diameter (O.D.) or 12 inches (300mm) larger than the diameter of the product pipe.
 - A diameter less than 1.5 times the diameter of the product may be necessary in collapsing soil formations.
 - Reamed diameter may need to be increased by up to 25% if substantial swelling of the soil is expected to occur.
- 4.19.13 All personnel shall clear the trench or the designated surface zone (16.4 feet [5 meters]) once the reamer is attached. Operator shall only reverse lockout and commence pullback when communication is received from personnel on exit hole side and operator has confirmed the message.
- 4.19.14 Personnel on exit hole side shall ensure reamer is pulled the entire way back to the exit hole.
 - If rotation is started when drill rod and reamer are away from the exit hole, very fast sideways movement of the rod and reamer can occur.
 - Larger reamers and longer lengths of exposed drill rod increase the speed and distance of this movement.
- 4.19.15 If working with trailing drill stem, swivels shall be verified as lubricated and rotating freely by hand prior to use:
 - A freely moving swivel prevents trailing drill stem or product from rotating / whipping.
 - If the swivel does not move freely by hand it shall be removed from service and repaired or replaced.
 - Only use swivels with limited articulation to prevent whipping or cranking action between the reamer and trailing drill pipe or product.
- 4.19.16 It is important to clean and lubricate the tool and drill stem joint threads before each use.
- 4.19.17 Any individual drill pipes that are bent or damaged shall be immediately taken out of service.
- 4.19.18 Occasionally change the order of the lead drill pipe (i.e. move the lead pipe to the end of the stem, or other pipe rotation procedures) to extend drill stem life.
- 4.19.19 Operator should avoid stalling the pipe rotation to avoid stress damage from shock loading.
- 4.20 Drilling at Potential MEC / UXO Sites
 - 4.20.1 If the project site is suspected of containing munitions and explosives of concern (MEC) or unexploded ordnance (UXO), the UXO team will conduct a reconnaissance and MEC / UXO avoidance to provide clear access routes to each site before drilling crews enter the area. The following procedures will be implemented:

- Drilling operations on an MEC / UXO site will not be conducted until a complete plan for the site is prepared and approved by the AECOM UXO Safety Officer. MEC / UXO avoidance shall be conducted during drilling operations on known or suspect MEC / UXO sites.
- The UXO team will identify and distinctly mark the boundaries of a clear approach path for the drilling crews, vehicles, and equipment to enter the site. This path will be, at a minimum, twice the width of the widest vehicle. No personnel will be allowed outside any marked boundary.
- If MEC / UXO is encountered on the ground surface, the UXO team will clearly mark the area where it is found, report it to the proper authorities, and divert the approach path around it.
- The UXO team will conduct an access survey using the appropriate geophysical instrument over the approach path for avoidance of MEC / UXO that may be in the subsurface. If a magnetic anomaly is encountered, it will be assumed to be MEC / UXO, and the approach path will be diverted around the anomaly. UXO personnel only will operate the appropriate geophysical instrument and identify MEC / UXO.
- An incremental geophysical survey of the drill-hole location(s) will be initially accomplished by the UXO team using a hand auger to install a pilot hole. If MEC / UXO is encountered or an anomaly cannot be positively identified as inert material, Hazardous, Toxic, and Radioactive Waste (HTRW) sampling personnel will select a new drill-hole location.
- Once the surface of a drilling site has been cleared and a pilot hole established as described above, the drilling contractor will be notified that the site is available for subsurface drilling.

4.21 Movement and Transport of Drilling, Boring or Direct-Push Equipment

- 4.21.1 Personnel transporting equipment shall be properly licensed and shall operate the vehicle according to Federal / State / Provincial / Territorial, and local regulations. Refer to *S3AM-005-PR1 Driving* and *S3AM-320-PR1 Commercial Motor Vehicles*.
- 4.21.2 Confirm the traveling height (overhead clearance), width, length and weight of the equipment with the carrier. Identify highway and bridge load, width and overhead limits, to confirm these limits are not exceeded and with adequate margin.
- 4.21.3 Allow for overhang of any drilling, boring or direct-push equipment when cornering or approaching other vehicles or structures.
- 4.21.4 Be aware that the canopies of service stations and motels are often too low for equipment loaded on a trailer to clear
- 4.21.5 Watch for low hanging electrical lines, particularly at the entrances to drilling sites or restaurants, motels, other commercial sites.
- 4.21.6 Never travel on a street, road, or highway with any part of the drilling, boring or direct-push equipment in a raised or partially raised position.
- 4.21.7 Remove all ignition keys if rig is left unattended unless client requirements specify that the keys remain in the ignition switch at all times.
- 4.21.8 Before moving a rig on location, the operator shall do the following:
 - To the extent practical, walk the planned route of travel and inspect it for depressions, gullies, ruts, and other obstacles.
 - Check the brakes of the truck / carrier, especially if the terrain along the route of travel is rough or sloped.
 - Discharge all passengers before moving on rough or steep terrain.
- 4.21.9 Engage the front axle (on 4x4, 6x6, etc., vehicles) before traversing rough or steep terrain
- 4.21.10 Driving drill rigs along the sides of hills or embankments should be avoided; however, if side-hill travel becomes necessary, the operator shall conservatively evaluate the ability of the rig to remain upright while on the hill or embankment. The possibility shall be considered that the presence of

drilling tools on the rig may reduce the ability of the rig to remain upright (raises the center of mass of the rig).

- 4.21.11 Logs, ditches, road curbs, and other long and horizontal obstacles should be approached and driven over squarely, not at an angle.
- 4.21.12 When close lateral or overhead clearance is encountered, or when backing up, the driver of the rig shall be guided by another person on the ground.
- 4.21.13 Loads on the drill rig and truck shall be properly stored while the truck is moving, and the mast shall be in the fully lowered position.
- 4.22 Loading and Unloading
 - 4.22.1 Consult applicable manufacturer's recommendations for loading and unloading of the equipment.
 - 4.22.2 Use ramps of adequate design that are solid and substantial enough to bear the weight of the rig with carrier, including tools.
 - 4.22.3 Load and unload on level ground.
 - 4.22.4 Use the assistance of someone on the ground as a guide.
 - 4.22.5 Check the brakes on the rig carrier before approaching loading ramps.
 - 4.22.6 Distribute the weight of the rig, carrier, and tools on the trailer so that the center of weight is approximately on the centerline of the trailer and so that some of the trailer load is transferred to the height of the pulling vehicle. Refer to the trailer manufacturer's weight distribution recommendations.
 - 4.22.7 The rig and tools should be secured to the hauling vehicle with ties, chains, and / or load binders of adequate capacity.

5.0 Records

- 5.1 All employee training files shall be maintained in accordance with *S3AM-003PR1 SH&E Training*.
- 5.2 Completed inspections and maintenance inventories shall be maintained the site or project files.

6.0 Attachments

- 6.1 [S3AM-321-ATT1 Core Drilling Machine](#)
- 6.2 [S3AM-321-ATT2 Pre-Drilling, Boring, & Direct-Push Probing Flow Chart](#)
- 6.3 [S3AM-321-FM1 Daily Drilling, Boring & Direct-Push Equipment Inspection](#)
- 6.4 [S3AM-321-FM2 Drilling, Boring & Direct-Push Equipment Maintenance Inventory](#)

Americas

Core Drilling Machine

S3AM-321-ATT1

1.0 Objective / Overview

- 1.1 Core drilling machines are used on all types of jobs. They can be electrical or gas powered and come with a stand or can be hand held. Caution should be used when operating such a machine. It may look harmless and easy to run, but drilling machines have many hazards.
- 1.2 Prior to coring activities the location should be checked for buried utilities in accordance with S3AM-331-PR1 *Underground Utilities*.

2.0 Safe Operating Guidelines

- 2.1 Clean the flanges before mounting the blade.
- 2.2 Make sure the blade is correct for the material being cut and that the arrow on the blade corresponds with the direction of rotation of the machine spindle.
- 2.3 Use built-in vacuum or bolt-down anchors depending on the type of surface to be cored. Do not bypass anchoring system.
- 2.4 Properly manage power cable for electric units to prevent slips, trips or falls by the operator or those nearby.
- 2.5 Avoid tilting the blade when cutting.
- 2.6 Use only the machines that have an approved safety guard.
- 2.7 Remove the diamond blade from the machine during transit to prevent accidental damage.
- 2.8 Inspect the blades frequently to detect cracks or undercutting of the steel center.
- 2.9 Do not let excessive heat be generated at the cutting edge of the blade.
- 2.10 Use adequate water supply to both sides of the blade.
- 2.11 Follow the manufacturers recommended pulley sizes and operating speeds for specific blade diameters.
- 2.12 Make sure to tighten drive belts to ensure full available power.
- 2.13 Don't force the blade on the blade shaft or mount blade on an undersized spindle.

3.0 Potential Hazards

- 3.1 Utilities
- 3.2 Electricity
- 3.3 Flying debris
- 3.4 Noise exposure
- 3.5 Inadequate housekeeping
- 3.6 Fumes or dust
- 3.7 Pinch points
- 3.8 Binding/biting – torque control

**4.0 Training Requirements**

- 4.1 Review of applicable SOPs (e.g., S3AM-305-PR1 *Hand & Power Tools*; S3AM-302-PR1 *Electrical Safety*).

- 4.2 Demonstrated knowledge on the use of a coring machine.
- 4.3 Review and follow manufacturers' operating guidelines.

5.0 Personal Protective Equipment (Level D PPE)

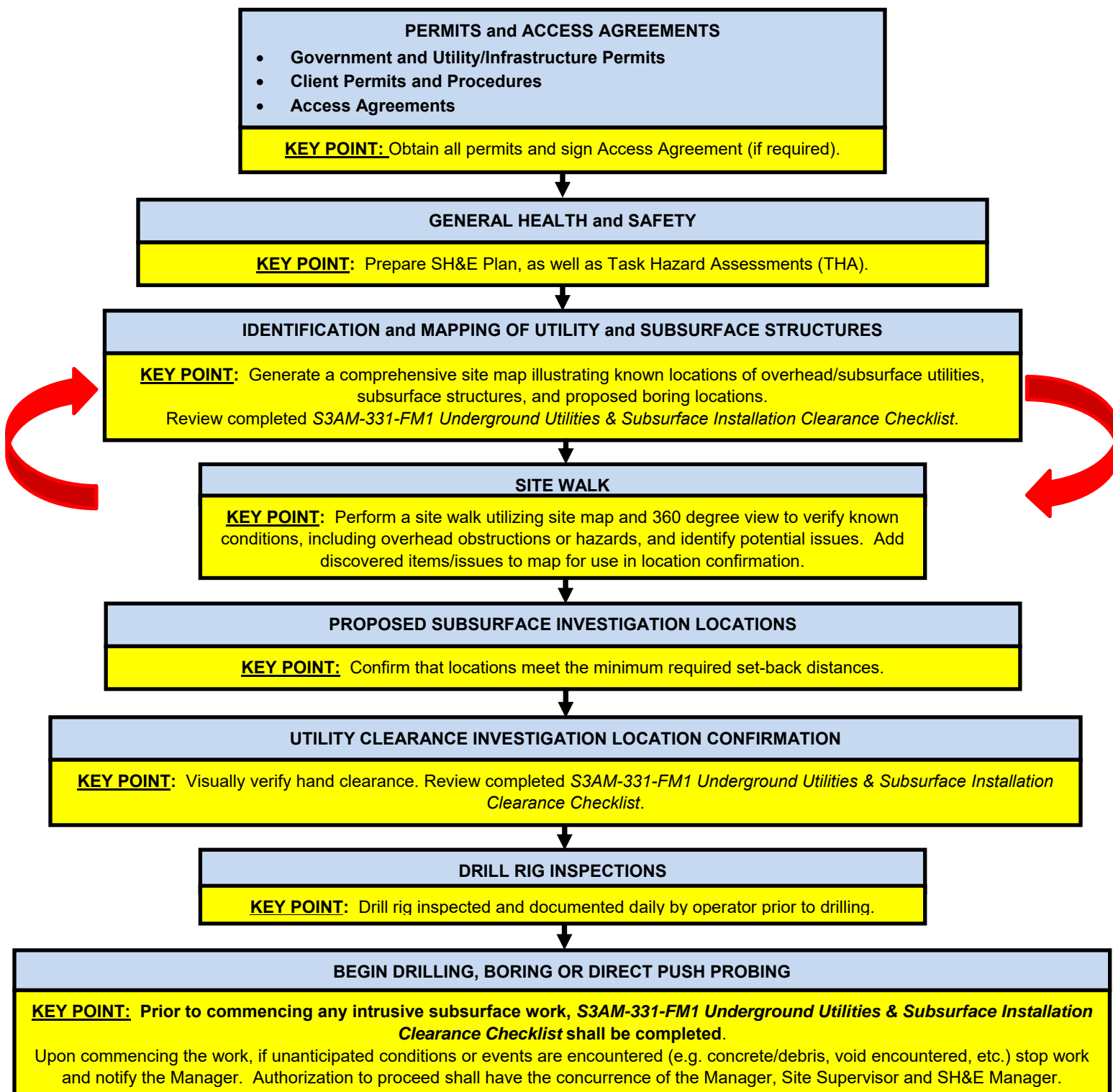
- 5.1 Hard hat
- 5.2 Safety Vest
- 5.3 Leather gloves
- 5.4 Face shield
- 5.5 Steel-toed/composite-toed boots
- 5.6 Hearing protection
- 5.7 Respirator or dust mask (as applicable to the respiratory hazards)

6.0 Other Safety Tips

- 6.1 Keep fingers and hands away from the cutting edge.
- 6.2 Hold handle firmly when operating.
- 6.3 A subsurface utility clearance shall be performed prior to initiating drilling operations.
- 6.4 Stand firmly and apply body weight at anchored side of guarded platform.

Pre-Drilling, Boring & Direct Push Probing Flow Chart

S3AM-321-ATT2

Before Any Drilling, Boring and Direct Push Probing Activities

Americas

Daily Drilling, Boring & Direct-Push Equipment Inspection

S3AM-321-FM1

Site / Project Name _____ Rig Inspector (Name/Company) _____

RIG INFORMATION:

Rig Type	Rotary/Auger Drilling Rig <input type="checkbox"/>	Direct Push Type (DPT) <input type="checkbox"/>
Owner	_____	VIN# _____
Year/Make	_____	Mileage _____
Model	_____	Drill Hrs _____

INSTRUCTIONS: Each shift shall inspect all applicable items. If an unsatisfactory condition (fail) is observed, suspend operation of the equipment and report the condition to the site supervisor immediately.

Emergency Equipment / Devices / Switches	
Kill switches are located and accessible to workers on both sides of the rotating stem. NOTE: Location and number of switches depend on the rig manufacturer; please refer to owner's manual (DPT typically has one switch on control panel).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Kill switches installed by the manufacturer, alarms and other devices (e.g. positive air shut-off valve) tested and in operable condition. All workers familiar with location and operation of devices. NEVER BYPASS, DISABLE, OR REMOVE KILL DEVICES.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
First aid kit adequate and on equipment / readily available.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Absorbent materials on equipment / readily available (spill response).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
A fire extinguisher of appropriate size is located on drill rig and readily available/accessible for drilling crew (recommended 20 lbs.).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Protective Guards	
Drive shafts, belts, chain drives, and universal joints are guarded to prevent accidental insertion of hands, fingers, or tools.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Cables	
Cables on drill rig free of kinks, frayed wires, birdcages, flat spots, grease, and worn or missing sections.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Cables are terminated at the working end with a proper eye splice; either swaged, coupled, or using cable clamps.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Cable clamps are installed with the saddle on the live or load side. Clamps are not alternated and are of the correct size and number for the cable size.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Wire ropes are not allowed to bend around sharp edges without cushion material.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Pulleys and Cable Winches	
Pulleys are not bent, cracked, or broken.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Pulleys operate smoothly and freely, without resistance.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Motor is mounted in correct location and tightly secured to drill rig.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Winch capable of being placed in the free spool (unwind smoothly) and locked position correctly, demonstrating that the cable is suitable for lifting during drilling operations.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Safety Latches	
Hooks installed on hoist cables are the safety type with a functional latch to prevent accidental separation.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Safety latches are functional and completely span the entire throat of the hook and have positive action to close the throat except when manually displaced for connecting or disconnecting a load.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Flights / Augers / Reamers	
Flights / Augers / Reamers are not bent, cracked, or broken. NOTE: Flights / Augers / Reamers failing inspection must be removed from jobsite.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A

Flights are blunt to prevent the risks of cuts.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Auger keys are not bent, cracked/fractured, excessively worn, or otherwise damaged.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Auger bolt holes and threads are not damaged.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Inspect flights/augers for metal burns. NOTE: Burrs must be filed to flat surface.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Augers / Reamers lying flat on the ground (avoid stacking).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Augers / Reamers over 50lbs (22.7kg) moved mechanically. (Avoid manual lifting).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Drill String	
Appropriate break out tool(s) available.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Rod box and power vice operating smoothly and freely.	
Drill string are not bent and do not have any cracks/fractures.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Drill string connections (e.g. pins, threads, couplers) are of the proper type, are not bent, have no cracks/fractures, and are not excessively worn.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Swivel connectors (for trailing horizontal drill stem) lubricated and freely rotating.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Mast	
Mast is free of bends, cracks, or broken sections.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
All mounting hardware (pins, bolts, etc.) in place.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
No moving of drill rig or maintenance/repairs while mast is in vertical position.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Hammering Device	
Hammer free of cracks, fatigue, or other signs of excessive wear.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Hammer connections are secure.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Leveling Devices	
Outriggers move in/out and up/down smoothly and freely while using controls on drill rig, with no hydraulics leaks.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Outriggers are extended prior to and whenever the mast is raised off its cradle. Outriggers must maintain pressure to continuously support and stabilize the drill rig (even while unattended).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Outriggers are properly supported on the ground surface to prevent setting into the soil (use of outrigger support pads).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Controls	
Controls are intact, properly labeled, have freedom of movement, and have no loose wiring or connections.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Controls are not blocked or locked into an operating position.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Installed lights, signals, gauges, and alarms operate properly.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Lifting Devices	
Slings, chokers, and lifting devices (straps, not chains) inspected before using and are in proper working order. NOTE: Damaged units are labeled and removed from jobsite.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Shackles/Clevises are in proper working order with pins/screws in place that is to be used while lifting.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Cables and lifting devices are not operated erratically or with a jerking action to overcome resistance.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Hydraulic System	
Hydraulic lines are secure, in good condition with no signs of excessive wear, and not leaking. NOTE: Check while pressurized.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Hydraulic lines are not in a bent or pinched position causing additional fluid restrictions/pressures.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Hydraulic oil reservoir has appropriate amount of oil and not leaking.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Documentation available to confirm that pressure relief valve was checked during shop maintenance activity and noted on maintenance log.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Pump Lines (water, grout, etc)	
Suction/Discharge hoses, pipes, valves, and fittings are secured and not leaking.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
High pressure hoses have a safety chain, cable, or strap at each end to prevent whipping in the event of a failure.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A

Ladders	
Drill rig has a permanently attached or proper portable ladder to be used for access to drilling platform.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Ladders and platforms not to be used for tool storage- keep ladders and operator platforms clear during drilling.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Tires / Tracks	
Tires / Tracks on rig are not excessively worn and free of any debris or foreign material.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
General	
General condition – exterior (no structural damage, no loose bolts, platform tidy, etc.)	
General condition – interior (cab clean, tidy)	
Drill rig meets regulations for transport on state/federal highways (inspection sticker, license plate, etc.).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Rig is of appropriate size to meet job requirements.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Maintenance log available for previous 3 months to confirm proper maintenance/inspection.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Exhaust	
Exhaust system is free from defect and routes engine exhaust away from drill rig workers.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Fuels	
Fuel stored in an approved and properly labeled container.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Fuel transfer lines free from signs of excessive wear and not leaking.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Refueling and transferring of fuel is performed in an approved area with sufficient containment to prevent spillage.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Exclusion/Work Zones	
The exclusion/work zone is centered over the borehole (and if applicable, bore exit point) and the radius equal to or greater than the height of the mast (measured from ground level).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
The exclusion/work zone is clear of tripping hazards or the hazards are documented with appropriate controls on the Task Hazard Assessment.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
The exclusion/work zone communicated to concurrent/adjacent operations to prevent overlap of work zones or line of fire.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Subsurface Utilities / Installations and Overhead Obstructions	
Subsurface utilities / installations have been confirmed as identified and cleared through site observation and review of the completed <i>S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist</i> .	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Except where electrical distribution and transmission lines have been de-energized and visibly grounded, drill rigs will be operated proximate to under, by, or near power lines in accordance with the Minimum Approach Distance (MAD).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Rig Repairs	
Repairs, when possible, are conducted offsite to reduce the risk of any onsite incidents.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
Specialized PPE	
When working at elevated heights, workers are to wear a fall restraining device attached in a manner to restrict falls to less than six feet (1.83 meters).	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A
When working in wet/slippery conditions, all workers have a lug-type sole or similar slip resistant sole, on their safety footwear to prevent slipping.	<input type="checkbox"/> Pass <input type="checkbox"/> Fail <input type="checkbox"/> N/A

Comments:

Signature of Inspector: _____

Date: _____

Americas

Drilling, Boring & Direct-Push Equipment Maintenance Inventory

S3AM-321-FM2

EQUIPMENT (MAKE, MODEL, SERIAL #)	EQUIPMENT OWNER	EQUIPMENT STATUS (<i>On Hire</i> , <i>ACTIVE</i> , <i>DECOMMISSIONED</i>)	FREQUENCY OF SERVICE	SERVICE TYPE	MANUFACTURER'S STANDARDS	INDUSTRY STANDARDS	LEGISLATED REQUIREMENTS	LOCATION OF EQUIPMENT

Overhead Lines & Obstructions

S3AM-322-PR1

1.0 Purpose and Scope

- 1.1 Provides the safe work requirements to be observed where overhead obstructions (e.g., cable trays, pipe racks, etc.), overhead utilities, or other lines are present at a work location, including, but not limited to electric power lines, electrical apparatus, or any energized (exposed or insulated) parts, communication wires, or any other overhead wire or cable.
- 1.2 This procedure applies to all AECOM Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.

2.0 Terms and Definitions

- 2.1 **Arc Flash Hazard** – A dangerous condition associated with the possible release of energy caused by and electric arc. Arc flash is the light and heat produced from an electric arc supplied with sufficient electrical energy to cause substantial damage, harm, fire, or injury.
- 2.2 **Electrical Hazard** – A dangerous condition such that contact or equipment failure can result in electric shock, arc flash burn, thermal burn, or blast.
- 2.3 **Minimum Approach Distance (MAD)** – The MAD is the closest distance any employee or any part of the operating equipment is permitted to approach an energized or a grounded object.
- 2.4 **Qualified Person (Electrical Transmission and Distribution)** – A person trained and knowledgeable in the construction and operation of electrical transmission and distribution equipment or a specific work method, and has been trained to recognize and avoid electrical hazards that might be present with respect to that equipment or work method.
- 2.5 **Types of Overhead Lines / Obstructions (examples):**
 - Overhead electric power lines
 - Structural cable supports
 - Guy wires
 - Cable television / communication lines
 - Cable Trays
 - Pipe Racks
 - Low Clearance Overpasses

3.0 References

- 3.1 S3AM-004 PR1 Incident Reporting, Notifications & Investigation
- 3.2 S3AM-010-PR1 Emergency Response Planning
- 3.3 S3AM-209-PR1 Risk Assessment & Management
- 3.4 S3AM-302-PR1 Electrical Safety
- 3.5 S3AM-303-PR1 Excavation

4.0 Procedure

4.1 Roles & Responsibilities

4.1.1 Manager

- Identify conditions where overhead electric power lines and other overhead obstructions may be present and outline what is required in the SH&E Plan and Task Hazard Assessments. Refer to the *S3AM-209-PR1 Risk Assessment & Management*.
- Confirm electrical and communication lines, and as appropriate other overhead obstructions, are identified on all site and project drawings.
- Coordinate and communicate with overhead electrical line owner or operator to identify and implement appropriate control measures.
 - Provide adequate advance notification to the Overhead Electrical Line Owner / Operator to allow for insulation or isolation and grounding of the line(s) if required.
 - Confirm the Overhead Electrical Line Owner / Operator(s) are fully informed as to when the operations are to begin, end and when any location changes are planned if applicable.
- Confirm Employees are trained as required for the scope of work and associated hazards.
- Coordinate and communicate with subcontractors or employees working around overhead electric power lines and as applicable, other overhead obstructions.
- Confirm the *S3AM-322-FM1 Overhead Electric power lines Acknowledgement* is completed by concurrent operations working around overhead electric power lines on the worksite.

4.1.2 Safety Health & Environment (SH&E) Manager

- Assist and support the Manager in planning and responding to concerns regarding the exposure to overhead electric power lines.

4.1.3 Employees

- Maintain current training required for the scope of work and associated hazards.
- Inform the Manager of location conditions that may expose risks to overhead electric power lines.
- Comply with established minimum approach distances.

4.2 Training

4.2.1 The Manager shall confirm all Employees are oriented to the SH&E Plan and Task Hazard Assessment (THA) process, in accordance with *S3AM-209-PR1 Risk Assessment & Management*.

4.2.2 Confirm training requirements were met prior to work starting.

-
- Employee orientation shall include the Location Specific Emergency Response Plan.
- Proof of training and orientation shall be documented and retained in the project files.

4.2.3 Managers shall confirm that each Employee has received training required for the scope of work and associated hazards in accordance with *S3AM-003-PR1 SH&E Training*.

4.2.4 Additional training requirements may include, but are not limited to:

- The limitations of an insulating link / device, proximity alarm, and range control (and similar) device, if used.

- Grounding and bonding procedures.
- Client specific requirements

4.3 General Requirements

- 4.3.1 The AECOM Manager or supervisor and employees shall perform a walk-thru of the work site and / or review of the work area / travel route to identify the overhead electric power lines and any other overhead obstructions that could be impacted by the work. Consider high profile equipment, equipment in transport, swing radius of equipment, potential for shifting loads, etc. AECOM personnel may be accompanied by other applicable personnel (e.g. client representatives, contractors operating concurrently, etc.).
- 4.3.2 The location or project specific SH&E Plan shall identify all overhead line hazards and provide suitable methods of elimination or control. All involved or affected workers shall review the SH&E Plan to confirm proper communication of the overhead line hazards and awareness of the control measures associated with their work.
- 4.3.3 Assess applicable factors such as, but not limited to:
 - Scope of work (e.g. hoisting materials, excavation, grubbing, etc.).
 - Transportation route.
 - Hoisting, excavating, or other equipment to be operated.
 - Height, placement, and reach of equipment.
 - Equipment or material loading / unloading.
 - Location(s) of electric power lines, communication lines, guy wires, etc.
 - Worker training and experience.
 - Soil or ground condition and environmental conditions.
 - Interruptions to electrical services.
 - Hazard to public.
 - Use of ladders.
 - Pipe and other conducting materials.
 - Notification of electric utility owner.
 - Changing conditions.
 - Communication of all hazards to all workers including contractors, sub-contractors, and concurrent operations.
- 4.3.4 Task Hazards Assessments (THAs) shall be completed to record the hazards and control measures specific to the task, including those related to overhead line and obstructions hazards, prior to undertaking assigned tasks. THAs shall be reviewed and signed by all workers involved in the specific task.
- 4.3.5 Should adverse weather conditions cause the work associated with overhead lines to be unsafe, the activities shall be discontinued.
- 4.3.6 Managers or designated employees shall formally notify all concurrent operations, or any others who may not have had reason to review and sign the related SH&E Plan or THAs, of work that is to be done in the vicinity of overhead lines at distances less than 50 feet (15.25 meters), and for non-electrical obstructions, at distances less than 10 feet (3.05 meters) if appropriate to the obstruction's potential hazards, and obtain the operator's assistance in protecting workers involved.

- Formal notification may be accomplished through a review of the SH&E Plan or THAs by the concurrent operator and associated personnel, as evidenced by signing the respective document's acknowledgement.
 - Alternately, the concurrent operations may acknowledge having reviewed AECOM's procedures with a separate acknowledgment form. *S3AM-322-FM1 Overhead Electric Power Lines Acknowledgement Form* or equivalent may be used.
 - Prior to equipment operation within 10 feet (3.05 meters) of non-electrical obstructions, as appropriate to potential hazards associated with the obstruction, the Owner/Operator should be contacted to obtain specific details regarding the obstruction such as piping or tray contents,
- 4.3.7 Overhead lines are presumed to be energized unless the Overhead Electrical Line Owner / Operator confirms that the overhead line has been, and continues to be de-energized and visibly grounded at the worksite.
- 4.3.8 Overhead lines are presumed to be uninsulated unless the Overhead Electrical Line Owner / Operator or a registered Professional Engineer who is a Qualified Person with respect to electrical power transmission and distribution confirms that a line is insulated.
- 4.3.9 Confirm accurate measurement of load heights, maximum equipment radius and height or reach of any other equipment that could potentially encroach on the safe limit of approach for the overhead electrical line, guy wires, or other applicable overhead obstructions.
- The height of all applicable overhead lines and obstructions that pose contact or encroachment potential shall be determined prior to work commencing.
 - The height of electric power lines may only be determined by the client, utility company professional, or by using an approved electronic measuring device.
 - Awareness shall be maintained for any elements that could affect clearance (e.g. snow pack, ice or snow weighing down lines, excessive heat causing sag, etc.).
 - Caution shall be exercised when working or travelling near overhead lines having long spans, since they tend to be more prone to lateral swing in response to the wind and can present a contact hazard.
 - All low hanging communication lines in close proximity to energized lines shall be clearly identified as *Encroaching on Energized Lines*.
- 4.3.10 Managers shall contact the overhead owner/operator (i.e. local utility company) if work is to be done or before equipment is operated within 50 feet (15.25 meters) of an energized overhead line, to determine the voltage of the overhead line and establish the appropriate MAD.
- All inquiries regarding electric utilities shall be made in writing and a written confirmation of the outage / isolation shall be received by the appropriate AECOM Manager prior to the start of the task that may impact the utility.
- 4.3.11 Until the voltage of the overhead electrical line is known and the MAD established, an exclusion zone shall be created at ground level beneath and 50 feet (15 meters) perpendicular to the overhead electric power lines on each side.
- The exclusion zone shall be demarcated with visual indicators (e.g., signage, flagging, paint, cones). No equipment shall enter the exclusion zone without approval from AECOM management.
 - Unqualified employees shall maintain a safe clearance distance in accordance with the established MAD when working in an elevated position near energized overhead lines. For additional information associated with Qualified Employees refer to *S3AM-302-PR1 Electrical Safety*.

- 4.3.12 The Minimum Approach Distance (MAD) as it relates to Voltage varies from jurisdiction to jurisdiction. The MAD or the regulatory minimum distance requirements, whichever is more stringent, shall be maintained. The below chart shows the Phase-to-Phase voltage rating voltages in kilovolts and the MADs applicable to all AECOM operations:

Minimum Approach Distances (MAD)

Voltage Range (Kilovolts) (Phase-to-Phase)	Minimum Approach Distance (MAD) in Feet (Meters)
Personnel shall allow for equipment movement and electrical line swaying when establishing a M.A.D.	
0 – 50 KV	10 (3)
Over 50 – 200 KV	15 (5)
Over 200 – 350 KV	20 (6)
Over 350 – 500 KV	25 (8)
Over 500 – 750 KV	35 (11)
Over 750 – 1,000 KV	45 (14)
Note: This requirement shall apply except where client, local, or governmental regulations are more stringent.	

Source: American National Standards Institute, Publication B30.5.

- 4.3.13 An appropriate distance shall be kept between equipment, its occupants, their tools and energized overhead lines, electrical apparatus, or any energized parts.
- 4.3.14 These minimum approach distances do not apply to a load, equipment, or building that is transported under energized overhead power lines if the total height, including equipment transporting it, is less than 13.5 feet (4.15 meters).
- If the travelling equipment, including load, is over 4.15m (13.62ft) a transportation permit shall be acquired from the appropriate jurisdiction to travel on any public road or highway.
 - Consult local jurisdiction as some US states may use heights of up to 4.45m (14.6ft).
 - Notification of appropriate utility companies may be required in conjunction with the transportation permit. Jurisdictional requirements shall be verified prior to transport.
 - Route shall be checked for clearance of overhead electrical and communication lines prior to transport.
 - A designated signaler will be utilized when the height of the equipment, buildings, tractor / trailers or any other transport equipment travelling under an overhead electrical line is greater than 4.15m (13.62ft).
- 4.3.15 Employees shall not place earth or other material under or beside an electrical overhead line if doing so reduces the safe clearance to less than 50 feet (15.25 meters) or, if appropriate to potential hazards associated with other types of overhead obstruction, less than 10 feet (3.05 meters). To maintain a safe distance:
- Install warning devices and signs (hang a sign from and mark all guy wires to warn traffic of low clearance; provide warning signage for all overhead services).
 - Install telescopic, nonconductive posts and flagging across right-of-way at the minimum allowable clearance as allowed by regulations for the line voltage.
 - Position signs or other devices to determine the "Danger Zone".

- Inform all job site personnel of the danger zone and the safe distances required.
 - Beware of atmospheric conditions, such as temperature, humidity, and wind that may dictate more stringent safety procedures.
- 4.3.16 If employees are to climb or perform work on poles or towers, the structures shall be confirmed as capable of withstanding the weight and activity without failure.
- 4.3.17 If holes are dug for poles or foundations for structures, appropriate measures shall be taken to prevent inadvertent entry by personnel or equipment. Refer to *S3AM-303-PR1 Excavation*.
- 4.3.18 Operation of heavy equipment and cranes in areas with overhead lines represents a significant arc flash and electrical hazard to all personnel on the job site.
- Accidental contact with an energized overhead line or arcing between a high power line and grounded equipment, can cause harm to nearby equipment operators or ground personnel and damage to power transmission systems and / or operating equipment.
 - Equipment will be repositioned and blocked so that no part, including cables, can come within the established minimum clearances.
- 4.3.19 Gravel trucks, cranes, boom trucks, etc. shall retract, stow and lower boxes, outriggers, booms, etc. to the travel position prior to entering municipal and client owned roads (e.g. leaving plant sites, work over rig sites, battery sites, and storage yards) and any time travel may put the equipment within the MAD of an electrical line.
- 4.3.20 When a signal person is required, the individual shall wear reflective striping (coveralls or vest) and carry an air horn or other appropriate means of emergency communication.
- 4.3.21 The signal person shall be aware of the potential electrical line hazards, be verified as competent by their supervisor and not have any other duties while acting as the signal person.
- 4.3.22 The signal person shall remain outside the MAD and in a position that allows for monitoring of equipment or loads to prevent encroachment on the MAD.
- 4.3.23 Signs, pylons, high visibility tape and / or signalers shall not be removed until the last piece of AECOM equipment has traveled under the overhead electrical line.
- 4.4 Minimum Approach Distance (MAD) Reduction
- 4.4.1 Where any work task will not allow the MAD to be maintained, an alternate means of protection shall be implemented by the Manager and approved by the SH&E Manager. In order of preference, acceptable procedures are:
- De-energize the overhead line(s) / lockout by local utility authorities; or
 - Implement alternative procedures as identified by the Overhead Electrical Line Owner / Operator or a registered professional engineer.
- 4.4.2 De-energize Overhead Lines
- Elimination of electrical power provides the most acceptable means of ensuring safety of personnel. While temporary site overhead lines are often under the control of the site manager (and can be de-energized locally), electrical distribution and transmission lines can be de-energized only by the Overhead Electrical Line Owner / Operator. De-energizing of an overhead line often requires advance coordination with the Overhead Electrical Line Owner / Operator. At least one week advance notice should be provided.
 - Managers shall confirm with the utility Overhead Electrical Line Owner / Operator that the overhead line has been de-energized and visibly grounded at the job site.
- 4.4.3 Alternative Procedures

- Managers may implement alternative procedures to prevent arc flash and electrical contact. These procedures shall be identified by the Overhead Electrical Line Owner / Operator or a registered Professional Engineer who is a Qualified Person with respect to electrical power transmission and distribution.
- A planning meeting with the Manager, SH&E Manager and the Overhead Electrical Line Owner / Operator (or registered Professional Engineer) shall be held to determine the most effective alternative procedures.
- Alternative procedures shall meet all client, local and governmental regulatory requirements.
- The work will be conducted by qualified and competent individuals, following the alternative written safe work procedures. All others are restricted from entering the MAD.
- Insulating Barriers shall be rated for the voltage line being guarded. These barriers may not be part of or attached to the equipment. The MAD shall only be reduced within the designed working dimensions of the insulating barrier. This determination shall be made by a Qualified Person in accordance with local or governmental requirements for work practices near energized equipment.
- Consult *S3AM-302-PR1 Electrical Safety* procedures to properly ground equipment and for limitations of grounding.
- Dedicated Line Spotters shall be trained to enable them to effectively perform their task, including training on the applicable local and governmental regulations.
- No work that encroaches on an energized power line will be completed outside of daylight hours.

4.5 Additional Safety Measures.

- 4.5.1 When equipment shall repeatedly travel beneath electric power lines, a route shall be plainly marked and “rider poles” of non-conductive material shall be erected on each side to confirm equipment structures are lowered into a safe position.
- 20" X 28" (50.8cm X 71.12cm) Danger Overhead Power Lines signs, which are highly visible, shall be erected at a height of 1.8 meters (6ft) on each side of the electrical line. A combination of pylons and high visibility tape shall be placed underneath the electrical line.
 - These signs shall be in plain view of equipment traveling in either direction, but no closer than the MAD.
 - If physical guards (i.e. goal posts, rider poles) are used, the guards shall be of non-conductive material and consist of a pole on each side of the approach connected by a rope.
 - The poles will be placed at the MAD from and on each side of the electrical line. The ropes will be set at a height, which will maintain the MAD from the electrical line.
- 4.5.2 Watch for uneven ground that may cause vehicles and equipment to weave, bob, or bounce.
- 4.5.3 The following additional safety measures shall be implemented as needed when working around energized power lines:
- Provide equipment with proximity warning devices. These provide an audible alarm if any part of the equipment gets too close to a line.
 - Install ground safety stops. These prevent vehicles from accidentally entering hazardous areas.
 - Equip cranes with a boom-cage guard. This prevents the boom from becoming energized if an electrical line is contacted.

- Utilize insulated links and polypropylene tag lines. These prevent the transmission of electricity to loads or tag line handlers if an electrical line is contacted.

NOTE: These additional safeguards are intended as supplemental protection. Use of these measures is not permissible as a substitute for maintaining the safe working distance or implementation of the procedures outlined in this document.

4.6 Emergency Planning

4.6.1 Managers shall complete a location specific emergency response plan as part of their location or project specific SH&E Plan for all operations during which equipment is operated within 50 feet (15.25 meters) of an energized overhead electrical line or conductor. Refer to *S3AM-010-PR1 Emergency Response Planning*. This plan shall identify the following information:

- The importance to the operator's safety of remaining inside the cab except where there is an imminent danger of fire, explosion, or other emergency that necessitates leaving the cab.
- The safest means of evacuating from equipment that may be energized.
- The potentially energized zone around the equipment.
- The need for crew in the area to avoid approaching or touching the equipment and the load.
- The means to de-energize the electrical line or live conductor.
- The contact information for the utility Overhead Electrical Line Owner / Operator and emergency services.

4.6.2 In the event of an incident, the Employee shall report it in accordance with *S3AM-004 PR1 Incident Reporting, Notifications & Investigation*.

4.6.3 All damaged utilities shall be repaired by a qualified and / or licensed professional.

5.0 Records

5.1 Retain the Overhead Electric power lines Acknowledgement forms and any document related to requests of and confirmation from the Overhead Electrical Line Owner / Operator in the project files. Documentation of employee training completed shall be retained in accordance with *S3AM-003-PR1 SH&E Training*.

6.0 Attachments

6.1 [S3AM-322-FM1 Overhead Electric Power Lines Acknowledgement Form](#)

Americas

Overhead Electrical Lines Acknowledgment

S3AM-322-FM1

Company Information		
Name of Employer or Contracting Operation:		
Address:		
City:	Province:	Postal Code:
Telephone:	Fax:	
Project / Location Name:		
AECOM Contact Name:		
Acknowledgement		
<p>I acknowledge that I have received a copy of <i>S3AM-322-PR1 Overhead Lines</i> and any other AECOM documentation related to the overhead electrical lines.</p> <p>List any additional documentation received:</p> <p>I understand that this worksite may have Overhead Electrical Hazards, and I have discussed the received documentation with all of our company staff who will be on this site.</p>		
Name & Title (Print)	Signature	Date

Underground Utilities

S3AM-331-PR1

1.0 Purpose and Scope

- 1.1 Provides procedures designed to help prevent injuries to personnel working on the location and pedestrians, property damage, and adverse environmental impact as a result of potential hazards associated with encountering underground utilities, subsurface installations, and potential overhead hazards.
- 1.2 Provides the minimum requirements to be followed for underground work (e.g., excavations, drilling, boring, and probing work) to ensure that underground installations, and subsurface structures, are identified properly before work commences.
- 1.3 This procedure applies to all Americas-based employees and operations and any other entity and its personnel contractually required to comply with this document's content.
- 1.4 The Manager is responsible for meeting all the requirements in this procedure.
- 1.5 AECOM's clients may have specific procedures which shall be followed to identify and map utility and subsurface structures on their properties or facilities. Provided the client's procedures meet or exceed those of AECOM, approval shall be obtained from the Manager and the SH&E Manager to follow the client's procedures.

2.0 Terms and Definitions

- 2.1 **Underground Utilities** – All utility systems located beneath grade level, including, but not limited to, gas, electrical, water, compressed air, sewage, signaling and communications, etc.
- 2.2 **Clearance** – includes the following:
 - The positive locating of underground utilities or subsurface installations in or near the work area.
 - 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.
- 2.3 **Ground Disturbance (GD)** – Any indentation, interruption, intrusion, excavation, construction, or other activity in the earth's surface as a result of work that results in the penetration of the ground.
- 2.4 **Hand Clearance / Tolerance Zone** – The area on either side of the locate marks of a utility that shall be maintained in order to expose the utility through the use of non-destructive ground disturbance techniques acceptable to the owner of the buried utility and applicable jurisdictional requirements. Visual exposure is required before mechanical excavation equipment may be used.
- 2.5 **Intrusive Activities** – Examples: Excavation of soil borings, installations of monitoring wells, installation of soil gas sampling probes, excavation of test pits/trenches or other man-made cuts, cavity, trench or depression in an earth surface formed by earth removal.
- 2.6 **Non-Destructive Ground Disturbance Technique** – A safe and acceptable 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:
 - Hand digging.
 - Use of non-conductive tools.
 - Hydro-vacuum.
- 2.7 **Subsurface Installation** – Examples: Subterranean tunnels, underground parking garages and other structures beneath the surface.
- 2.8 **Utility Strikes** – Unplanned contact with utilities resulting in damage to the utility or its protective coating.

3.0 References

- 3.1 S3AM-003-PR1 SH&E Training
- 3.2 S3AM-303-PR1 Excavation
- 3.3 S3AM-321-PR1 Drilling, Boring & Direct-Push Probing

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Manager

- Administer this procedure and the development of the SH&E Plan.
- Confirm the appropriate equipment and materials are available to conduct the underground utility and/or subsurface installation clearance.
- Confirm all employees involved and affected by the task review the SH&E Plan and Task Hazard Assessment (THA) prior to work commencing
- Authorize work to proceed using the *S3AM-331-FM1 Underground Utility & Subsurface Installation Clearance Checklist*.
- Confirm that employees conducting underground utilities and subsurface clearance processes possess all required training, registrations or certifications.
- Provide authorization (with the concurrence of the Site Supervisor and SH&E Manager) for work to resume if interrupted due to unexpected conditions or events.

4.1.2 Safety, Health & Environment (SH&E) Manager

- Assist AECOM management as needed by providing guidance and clarification as to issues that may arise.
- Review the SH&E Plan to confirm compliance with jurisdictional regulations. Provide technical guidance as needed when a variance is pursued related to this procedure.

4.1.3 Employees

- Maintain training as appropriate to the work to be completed (e.g. ground disturbance, lockout tagout, equipment operation, etc.). Refer to *S3AM-003-PR1 SH&E Training*.
- Review the SH&E Plan and Task Hazard Assessment (THA) prior to work commencing.
- As appropriate to the anticipated or encountered hazards and as addressed in the applicable planning documentation, utilize appropriate personal protective equipment (PPE) and applicable training, practices and operating procedures.
- Immediately notify the Manager of any unanticipated conditions or events. If assigned equipment, perform appropriate inspections and confirmations of maintenance and/or repairs.

4.2 Training

4.2.1 All on-site employees involved with the underground utility and subsurface identification and associated clearance process shall be trained, at a minimum, in these procedures.

4.2.2 Employees shall complete all required training associated with their tasks in accordance with the SH&E Training Matrix and any training assessments developed at the business group.

- Refer to *S3AM-003-PR1 SH&E Training*.
- This training may include, but is not limited to, Excavation / Trenching (Ground Disturbance), HAZWOPER, Petroleum Safety Training (or Construction Safety Training), and H2S Alive as appropriate.

4.2.3 As applicable, employees shall receive client-required training.

4.3 Planning

4.3.1 Health and Safety Plan – At a minimum, a SH&E Plan and task hazard assessments (THAs) shall be prepared prior to any underground utilities and subsurface installations clearance activities.

- The SH&E Plan will address any required environmental monitoring including gas monitoring, dust, noise, metals, radiation or other monitoring as may be appropriate for site conditions.
- Employees shall comply with all SH&E Plan requirements.
- The location specific emergency response plan shall be in place, contain procedures applicable to the potential emergencies presented by the operations, and be reviewed with all personnel potentially affected.

4.3.2 *S3AM-331-ATT2 Underground Utilities & Subsurface Installation Clearance Flow Chart* provides a summary of the key requirements addressed in this procedure.

4.3.3 Underground utilities and subsurface installations shall be investigated as being present, including the following, but not limited to:

- Steam, gas and electric.
- Sewer and water.
- Subterranean tunnels.
- Fibre optics (note: routine geophysical surveys will not identify fibre optic cables).
- Traffic control cables.

4.3.4 Location of underground utilities and subsurface installations will be confirmed by cross-referencing available information:

- Maps, as-built drawings and issued for construction (IFC) drawings.
- Plot plans, permits, crossing/encroachment agreements.
- One-Call information, locator and provided surveys.
- Private utility information, locator and provided surveys (e.g. ground penetrating radar (GPR), electromagnetic, etc.).
- Owner supplied documentation.
- Site walks.

4.3.5 As applicable, emergency shut-off locations of utilities shall be verified before work activities commence.

4.3.6 Jurisdictional, land owner, client and utility owner requirements shall be consulted to determine the minimum search zone dimensions and appropriate clearance distances.

4.3.7 As necessary and if possible, adjust locations of excavations or intrusive subsurface work away from subsurface utilities and installations

4.3.8 Prior to any excavation or intrusive subsurface work, the *S3AM-331-FM1 Underground Utility & Subsurface Installation Clearance Checklist* shall be completed. The form shall be reviewed and signed by the Manager.

- If the answer to any question in Part 1 of the checklist is “No” or “N/A”, no ground disturbance may take place without review by the Manager, in consultation with SH&E Manager, of the circumstances related to the particular item. The Manager shall initial beside each “No” or “N/A” item to indicate review and authorization.

4.4 Permits, Notifications and Access Agreements

- 4.4.1 Any required notifications shall be provided within the appropriate timeframe to the applicable organization (e.g. owner, utility company, agency, governing body, etc.).
- 4.4.2 All applicable permits (e.g. client, government, working near rail road, etc.) will be identified, obtained, and adhered to.
- 4.4.3 All access agreements will be obtained and adhered to.
- 4.5 Locating Underground Utilities and Subsurface Installations
 - 4.5.1 Utilize the appropriate call/click-before-you-dig provider. Refer to *S3AM-331-ATT1 One-Call System*.
 - 4.5.2 Federal/State/Provincial/Territorial and other “One Call” providers shall be contacted at least two working days and no more than ten working days prior to commencing the ground disturbance. Jurisdictional requirements shall be consulted to verify the appropriate advance notice. (e.g. 24 hours, two full working days, three to ten business days, etc.).
 - 4.5.3 If the location of proposed excavation or intrusive subsurface work cannot be clearly and adequately identified, the route and/or area of the proposed ground disturbance shall be identified using white flags, paint or stakes prior to the arrival of the locator. Consult jurisdictional requirements as white-lining may be a mandatory requirement on all ground disturbances.
 - 4.5.4 One Call providers shall appropriately identify and mark the subsurface utilities or installations, or otherwise provide written notification they do not have any facilities near the proposed subsurface/intrusive locations.
 - 4.5.5 Confirm all circuits were on during subsurface checks if the checks were for identifying energized lines (e.g. circuits on timers or light sensing switches).
 - 4.5.6 Areas that have a high density of sub-surface facilities may require a secondary locate by another independent locator to verify locations identified by the first locator.
- 4.6 Private Utility Locating
 - 4.6.1 One Call services may not be available in various non-urban locations. Private utility locating companies shall be utilized to identify and located any underground utilities or subsurface installations.
 - 4.6.2 Be aware urban areas (e.g. city or town) may have subsurface installations (e.g. underground garages) and utilities (e.g. public water, sewer, and gas pipelines) that are not covered by one-call systems.
 - These subsurface installations and utilities require additional investigation and diligence beyond the one-call system.
 - Additional investigation and diligence beyond the one-call system is also recommended for non-urban areas.
 - 4.6.3 In urban areas, private utility locating companies shall be called to identify and locate, through geophysical surveys and other means, the presence of private utilities installed by the property owner (e.g. irrigation systems) and to verify the presence of public utilities on the properties.
 - Hand clearance / tolerance zones shall be observed in urban areas and utilities exposed through the use of non-destructive techniques in accordance with requirements of the applicable jurisdiction and utility owner.
 - 4.6.4 Observance of hand clearance / tolerance zones and utility exposure using non-destructive techniques is also recommended for non-urban areas and may be required by the applicable jurisdiction.

- 4.6.5 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 the presence of subsurface installations and utilities.

4.7 Surface Markings

- 4.7.1 Once the underground installation has been identified, proper surface markings shall be made in accordance with the guidelines from the One-Call System (refer to S3AM-331-ATT1), guidance contained in this procedure or as contract-specified.
- 4.7.2 Color-coded surface marks (paints or similar coatings) shall be used to indicate the type, location, and route of buried installations. Additionally, to increase visibility, color-coded vertical markers (temporary stakes or flags) shall supplement surface marks.
- 4.7.3 All marks and markers shall indicate the name, initials, or logo of the company that owns or operates the installation and the width of the installation if it is greater than 2 inches.
- 4.7.4 If the surface over the buried installation is to be removed, supplemental offset marking shall be used. Offset markings shall be on a uniform alignment and shall clearly indicate that the actual installation is a specific distance away.
- 4.7.5 Locate marks shall be re-verified as per jurisdictional requirements or no later than 14 days after the previous locate was completed, whichever interval is shorter. These locate time intervals shall be maintained for the duration of the ground disturbance.
- If the work is interrupted during the determined lifespan or work does not commence during the applicable lifespan, a new locate shall be performed.
 - Jurisdictional provisions may allow for an extension to the lifespan of the locate marks, however certain conditions may need to be met. (e.g. activities uninterrupted)
 - If locate marks are moved or destroyed the location of the buried facilities shall be re-established.

4.8 Uniform Color Coding

- 4.8.1 The colors and corresponding installation type are as follows unless otherwise contract-specified:

AMERICAN PUBLIC WORKS ASSOCIATION – APWA
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)

Canadian Association of Geophysical Contractors



4.9 Identification and Mapping of Utility and Subsurface Structures

- 4.9.1 The locations of subsurface utilities and subsurface installations shall be investigated, documented, and shown on a site plan (a scaled site plan shall be used when feasible). Refer to *S3AM-331-FM1 Underground Utilities & Subsurface Installation Clearance Checklist*.
- 4.9.2 Documentation of utility and subsurface installation identification (calling one call, responses from utilities) along with the scaled site plan shall be available on the worksite at all times of intrusive activities.

4.10 Site Walk

- 4.10.1 A site walk shall be conducted by the AECOM Manager and any other appropriate personnel with the objectives of reviewing all planned intrusive activity locations, the locations 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.
 - Walk the area at least 50 feet (15.2 meters) from perimeter of the site to observe physical hazards.
 - Walk the area of at least 50 feet (15.2 meters) radius from each proposed subsurface intrusion location.
 - If possible, particularly at urban and industrial sites, the client/property owner or an individual knowledgeable about the site and site utilities will attend the site walk.
 - Add discovered items/issues to map for use in location confirmation.
- 4.10.2 The Site Walk further supplements the Identification and Mapping of Utility and Subsurface Structures procedure. Site Walks should be repeated as necessary following the Identification and Mapping of Utility and Subsurface Structures as visual verification of the hazards. Examples include:
 - Proposed location(s) does not lie on a line connecting two similar manhole covers (e.g. sanitary sewer or storm drain).
 - Proposed subsurface location(s) has not subsided, been excavated and patched, nor gives the appearance it may be covering a former trench (e.g. linear cracks, sagging curbs, linear re-pavements, etc.).
 - Proposed subsurface location(s) does not lie on a line with any water, gas, electrical meters, utility cleanouts, or other utility boxes in the surrounding areas.

4.11 Proposed Subsurface Investigation Locations

- 4.11.1 All proposed subsurface locations will be reviewed in comparison to subsurface and overhead utilities and subsurface installations and adjustments made as necessary.
- 4.11.2 Minimum set back distances from subsurface and overhead utilities and subsurface installations will 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 further depending on line voltage). These set back distances are a minimum; government regulations and utility requirements may dictate a greater set back distance.

4.12 Utility Clearance Investigation Location Confirmation

- 4.12.1 As applicable, all client on-site safety procedures shall be understood and adhered to.
- 4.12.2 Hand exposure or non-destructive ground disturbance techniques to expose an underground utility or subsurface installation are necessary to accurately determine size, location and alignment prior to mechanical excavation or intrusive subsurface work in the vicinity of that utility or installation.
- 4.12.3 Non-destructive ground disturbance techniques shall be acceptable to the owner of the buried utility (i.e. hydro-vacuum temperature or pressure).
- 4.12.4 Hydro-vacuum or air-knife require proper grounding equipment at sites where the subsurface may contain flammable gases, liquids, or vapors
- 4.12.5 Jurisdictional, land owner, client and utility owner requirements shall be consulted to determine the distance of the hand exposure zone, and what requirements, when met, may allow mechanical excavation within these zones.
- 4.12.6 At a minimum, all underground utilities and subsurface installations within a 5 feet (1.5 meter) radius of the work site shall be identified and physically located (seen) before use of mechanical excavation equipment is permitted. Jurisdictional, client, land owner and utility owner requirements shall be consulted as the required hand exposure radius may be larger.
- 4.12.7 In urban areas, proposed subsurface locations will be cleared by hand / non-destructive technique to 5 feet (1.5 meters) (soil borings and wells) or 12 inches (30 centimeters) (soil gas sampling probes) using non-mechanical methods.
 - In non-urban areas, clearing by hand / non-destructive technique should be conducted if possible and shall be conducted as required by the given jurisdiction.
 - Hand / non-destructive technique clearance should be extended if locations of deep utilities and structures are not known.
 - Hand exposure or non-destructive ground disturbance techniques should extend a minimum of 24 inches (60 centimeters) below the intended ground disturbance depth to minimize the hazard of mechanical equipment contact with any utility or installation.
- 4.12.8 Mechanical equipment and attachment dimensions shall be considered when establishing the zone in which all underground utilities and subsurface installations are physically located (seen) prior to the use of that equipment. The radius may require expanding to maintain safe distances when using large equipment.

4.13 Utility Strikes

- 4.13.1 Utility strikes shall be reported in accordance with *S3AM-004-PR1 Incident Reporting, Notifications & Investigation*.
- 4.13.2 All damaged utilities shall be repaired by a qualified and/or licensed professional.

5.0 Records

- 5.1 Retain completed *S3AM-331-FM1 Underground Utility & Subsurface Installation Clearance Checklist* and documents related the clearance process (e.g. Utility Owner communication, etc.) in the site or project files.
- 5.2 Documentation of employee training completed shall be retained in accordance with *S3AM-003-PR1 SH&E Training*.

6.0 Attachments

- 6.1 [S3AM-331-ATT1 One-Call System](#)
- 6.2 [S3AM-331-ATT2 Underground Utilities & Subsurface Installation Flow Chart](#)
- 6.3 [S3AM-331-FM1 Underground Utility & Subsurface Installation Clearance Checklist](#)

Americas

One-Call System

S3AM-331-ATT1

1.0 What Is It?

- 1.1 One-call systems are established across the Americas to provide one telephone number for excavating contractors and the general public to call for notification of their intent to use equipment for excavating, tunneling, demolition, or any other similar work. This one-call system provides the participating members an opportunity to identify and locate their underground facilities.
- 1.2 As described on their web site (<http://www.call811.com>), Common Ground Alliance (CGA) was “created specifically to work with all industry stakeholders in an effort to prevent damage to underground utility infrastructure and ensure public safety and environmental protection.” CGA also serves as an organization to continuously update best practices amongst the growing underground industry. The CGA web site provides current one-call information for all states and provinces.

2.0 Why Is It Needed?

- 2.1 Damage to underground facilities increased considerably following the building boom of the 1950s, 1960s, and early 1970s when the trend was to go underground with utilities. Thousands of miles of underground facilities are vulnerable to excavating machines such as backhoes, and the resulting damage can interrupt utility service and threaten life, health, and property.

3.0 How to Get It

- 3.1 In the United States 811 is the Federally-mandated national “Call Before Your Dig” number that connects directly to the local one-call center. Each state has different rules and regulations governing digging, some stricter than others. The CGA web site provides current contact information to find state-specific information as well as links to submit an online digging request where available. Canadian one-call numbers vary by jurisdiction. One-call services are not available in Canada’s Atlantic provinces (New Brunswick, Newfoundland, Nova Scotia) or in the three Northern Territories (Nunavut, Northwest Territories, Yukon).

4.0 Disclaimer

- 4.1 The purpose of this directory is to illustrate the extent of one-call service available. Some jurisdictions have a list of “Tier 1” subscriber utilities notified by 811, and a “Tier 2” list that the excavator/contractor is responsible for contacting directly. Users shall verify information is current including the extent and limit of service from local sources.

Province/State		One-Call Agency	Number
Canada		www.clickbeforeyoudig.com	
Alberta	Alberta One Call	www.albertaonecall.com	1.800.242.3447
British Columbia	BC One Call	www.bconeall.bc.ca	1.800.474.6886
Manitoba	Click Before You Dig	www.clickbeforeyoudigmb.com	Various – see website
Ontario	Ontario One Call	www.on1call.com	1.800.400.2255
Québec	Info Excavation	www.info-ex.com	1.800.663.9228
Saskatchewan	Sask 1 st Call	www.sask1stcall.com	1.866.828.4888

United States		www.call811.com	811
Alabama	Alabama 811		1.800.292.8525
Alaska	Alaska Digline, Inc.		1.800.478.3121
Arizona	Arizona 811		1.800.782.5348
Arkansas	Arkansas One Call		1.800.482.8998
California	(North & Central) USA North 811		1.800.227.2600
	(South) Dig Alert		1.800.227.2600
Colorado	Colorado 811		1.800.922.1987
Connecticut	Call Before You Dig		1.800.922.4455
Delaware	Miss Utility of Delmarva		1.800.282.8555
District of Columbia	District One Call		1.202.265.7177
Florida	Sunshine 811		1.800.432.4770
Georgia	Georgia 811		1.800.282.7411
Hawaii	Hawaii One Call		1.866.423.7287
Idaho	Dig Line, Inc.		1.800.342.1585
	(Bonner/Boundary) Pass Word		1.800.626.4950
	(Kootenai County) Pass Word		1.800.428.4950
	(Shoshone-Benewah) Pass Word		1.800.398.3285
Illinois	(Chicago) Digger -Chicago Utility Alert Network		312.744.7000
	(Outside of Chicago) JULIE		1.800.892.0123
Indiana	Indiana 811		1.800.382.5544
Iowa	Iowa One Call		1.800.292.8989
Kansas	Kansas 811		1.800.344.7233
Kentucky	Kentucky 811		1.800.752.6007
Louisiana	LA One Call		1.800.272.3020
Maine	Dig Safe		1.888.344.7233
Maryland	(West of Chesapeake Bay) Miss Utility of Maryland		1.800.257.7777
	(East of Chesapeake Bay) Miss Utility of Delmarva		1.800.282.8555
Massachusetts	Dig Safe System, Inc.		1.888.344.7233
Michigan	Miss Dig		1.800.482.7171
Minnesota	Gopher State One Call		1.800.252.1166
Mississippi	Mississippi 811		1.800.227.6477

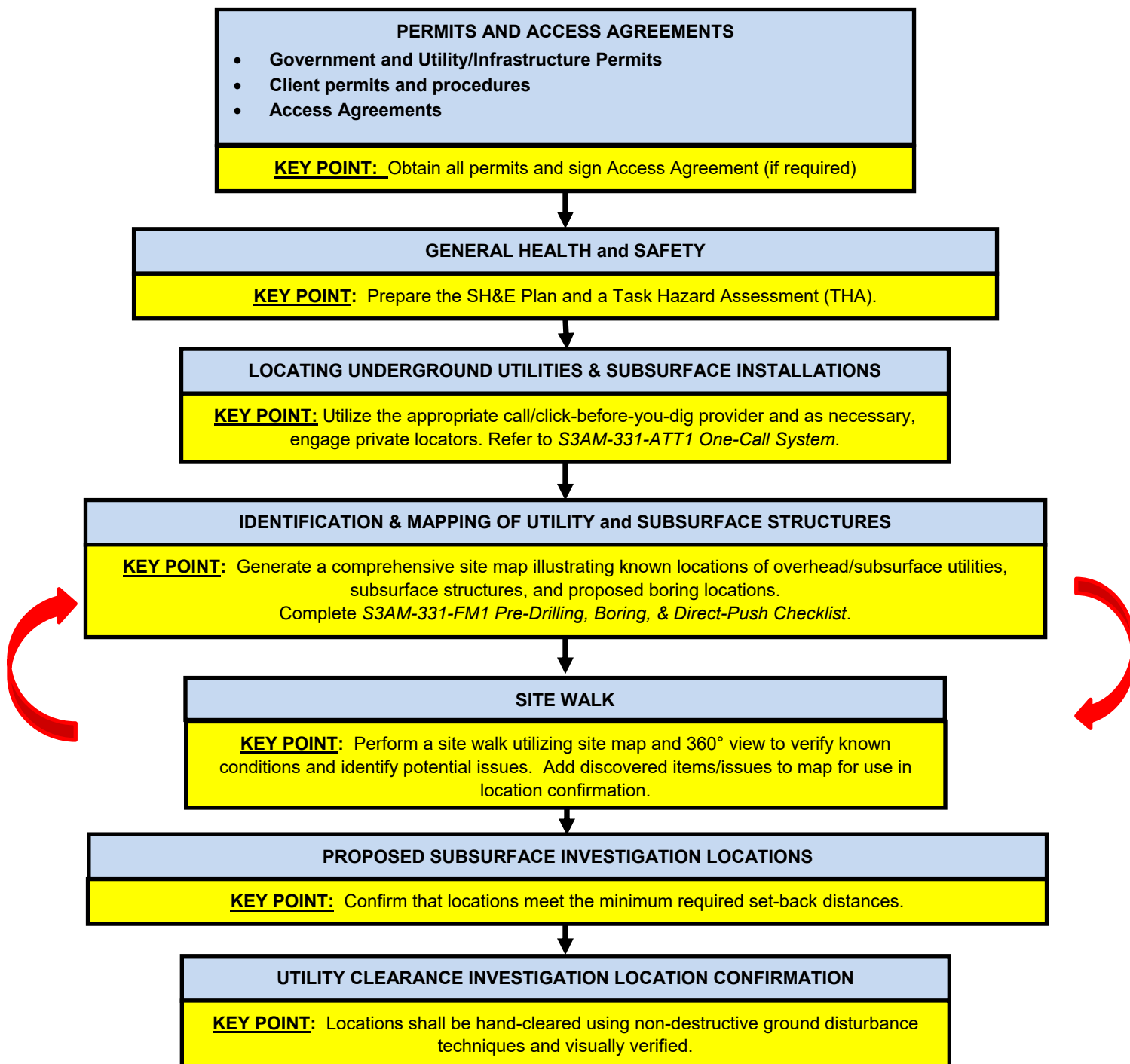
Missouri	Missouri One Call System	1.800.344.7483
Montana	Montana 811	1.800.424.5555
	(Flathead and Lincoln Counties) Montana One Call Center	1.800.551.8344
Nebraska	Nebraska 811	1.800.331.5666
Nevada	USA North 811	1.800.227.2600
New Hampshire	Dig Safe System, Inc.	1.888.344.7233
New Jersey	New Jersey One Call	1.800.272.1000
New Mexico	New Mexico 811	1.800.321.2537
New York	(North of 5 Boroughs) Dig Safely New York	1.800.962.7962
	(5 Boroughs and Long Island) New York 811, Inc.	1.800.272.4480
North Carolina	North Carolina 811	1.800.632.4949
North Dakota	North Dakota One Call	1.800.795.0555
Ohio	Ohio Utilities Protection Service	1.800.362.2764
Oklahoma	Call Okie	1.800.522.6543
Oregon	Oregon Utilities Notification Center	1.800.332.2344
Pennsylvania	Pennsylvania One Call System, Inc.	1.800.242.1776
Puerto Rico	Puerto Rico Public Service Commission 811	
Rhode Island	Dig Safe System, Inc.	1.888.344.7233
South Carolina	South Carolina 811	1.888.721.7877
South Dakota	South Dakota One Call	1.800.781.7474
Tennessee	Tennessee 811	1.800.351.1111
Texas	Texas 811	1.800.545.6005
	Lone Star 811	1.800.669.8344
Utah	Blue Stakes of Utah	1.800.662.4111
Vermont	Dig Safe System, Inc.	1.888.344.7233
Virginia	Virginia 811	1.800.552.7001
Washington	Utility Notification Center	1.800.424.5555
West Virginia	WV 811	1.800.245.4848
Wisconsin	Diggers Hotline	1.800.242.8511
Wyoming	One-Call Of Wyoming	1.800.849.2476

Americas

Underground Utilities & Subsurface Installation Clearance Flow Chart

S3AM-331-PR1

Before Any Underground Utilities and Subsurface Installation Clearance



Americas

Underground Utilities & Subsurface Installation Clearance Checklist

S3AM-331-FM1

Location:	Project #:	Date & Time:
Manager:	Contractor (if applicable):	Weather:
Client:	Inspector:	
Notes:		

Part 1

<p><i>Part 1 and Part 2 shall be completed prior to any intrusive subsurface work. DO NOT DISTURB GROUND if a "No" or "N/A" answer to any of the Part 1 questions has not been initialed as authorized by the AECOM Manager.</i></p> <p><i>Any variance from these procedures requires approval of the Vice President of the applicable business group.</i></p>			
	Yes	No	N/A
I. Permits and Access Agreements			
1. Have all appropriate permits and agreements been identified and obtained (e.g. client, drilling, encroachment, working near railroads, etc.)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Have all client requirements been identified and obtained?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. If working off-site is (are) site access agreement(s) executed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
II. General Health and Safety			
1. Has a Health and Safety Plan (HASP) been prepared for AECOM employees?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Do on-site personnel have required-level PPE?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Do on-site personnel have required-level of training?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Is appropriate monitoring equipment as specified in HASP/THAs available at each clearance location?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Has the field screening equipment been calibrated as required by the HASP?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Are calibration gases available at the site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
III. Identification and Mapping of Utility and Subsurface Structures			
1. Is a Site Plan showing proposed subsurface locations and utility locations attached to this check list?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Have above/below ground utilities & subsurface installations been investigated (Part 2 of this form)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Have all Federal/State/Provincial/Territorial and other "One Call" providers marked their facilities or otherwise notified they do not have any facilities near the proposed subsurface/intrusive locations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Have Federal/State/Provincial/Territorial or other "One Call" providers identified what utilities and underground structures are <u>not</u> included in their provider system (e.g. underground structures)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. As noted in the exception at the bottom of Section VI of this checklist, has a utility locating contractor performed geophysical and/or other surveys of the proposed subsurface/intrusive locations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Part 1 and Part 2 shall be completed prior to any intrusive subsurface work. DO NOT DISTURB GROUND if a "No" or "N/A" answer to any of the Part 1 questions has not been initialed as authorized by the AECOM Manager.

Any variance from these procedures requires approval of the Vice President of the applicable business group.

	Yes	No	N/A
6. Visual verification that each of the proposed locations does not lie on a line connecting two similar manhole covers (e.g. sanitary sewer or storm drain)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Visual verification that the ground in the vicinity of each of the proposed subsurface locations has not subsided, been excavated and patched, give 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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
IV. Site Walk			
1. Has a site walk been performed that includes the following:	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
a. Reviewing all planned intrusive locations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Adjusting locations away from subsurface utilities and installations?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Determining the appropriate utility clearance activities for each location?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Determining the presence and location of overhead utilities and obstructions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Walk around perimeter of the site to observe physical hazards?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Includes 50 feet (15.2 meters) from perimeter of the site to observe physical hazards and 50 feet (15.2 meters) radius from each proposed subsurface location?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
V. Proposed Subsurface Investigation Locations*			
1. Are all of the proposed subsurface locations at least 5 feet (1.5 meters) from any identified subsurface utility?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. 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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Are all of the proposed subsurface locations at least 5 feet (1.5 meters) from any subsurface utilities shown on the Public Right-of-Way street improvements?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>* These set back distances are a minimum; government regulations and utility requirements may dictate a greater set back distance.</i>			
VI. Utility Clearance Investigation Location Confirmation*			
1. 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.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
a. For soil borings/monitoring wells; excavated to a minimum of 5 feet (1.5 meters) below ground surface using non-mechanical methods?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. For soil gas sampling; excavated to 2 foot (0.6 meter) below grade or below the bottom of a concrete floor prior to the installation of soil gas sample probe points?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<i>* Exceptions to requirements of the utility clearance process, as permitted by the applicable jurisdiction, include the following:</i> <ul style="list-style-type: none"> <i>Sites where extensive utility mapping (e.g. geophysical survey) has been completed and/or where extensive activities have already been performed.</i> <i>Locations where facility layout is well documented and understood.</i> <i>Sites or portions of large sites where utilities are known not to exist currently or to not have ever existed throughout the life of the facility, property or site.</i> 			

Part 1 and Part 2 shall be completed prior to any intrusive subsurface work. DO NOT DISTURB GROUND if a "No" or "N/A" answer to any of the Part 1 questions has not been initialed as authorized by the AECOM Manager.

Any variance from these procedures requires approval of the Vice President of the applicable business group.

	Yes	No	N/A
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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 shall 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 (OneCall)			Prior Locate Ticket #	
Date Called:		Called By:		Valid Until:
Ticket Number:		Area Requested To Be Cleared:		
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:				
OneCall Utilities			Field Observation	
Utility	Notified by	Comments	Marked (mains & services)	
Electric (Red)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	
Gas/Petroleum Pipeline (Yellow)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Sewer/Drainage (Green)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Water (Blue)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Communications (Orange)	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	
Other	<input type="checkbox"/> OneCall <input type="checkbox"/> Other		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	
Were all circuits on during subsurface checks if the checks were for identifying energized lines (e.g., circuits on timers or light sensing switches)?			<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	
Utilities Not Identified By OneCall (Includes both Public and Private along with Regional and Site Utilities)			Field Observation	
Utility (Colors may vary)	Owner / Contact / Phone #	Notified	Marked	
Communications: (Orange) TV, computer, phone, cell towers, site communication, cameras, security, etc.		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	
Electricity: (Red) Mains / Supplies / Interior / Exterior (signs, fuel pumps, low voltage security perimeters, gates, property light posts, equipment, substations, etc.)		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	
Gas: (Yellow) Mains / Supplies / Equipment / Pipelines (Natural, Process, Oil, Crude, Refined (Gas, Diesel, Jet), etc.)		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	
Steam: (Yellow)		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above	

Structures: Possible horizontally installed facilities, vaults, basements, tunnels, sub-grade structures, foundations, overhead obstructions, etc.		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above
UST Systems (Tanks / piping / electric)		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Sewer: (Green) Sanitary, storm, combined, septic, drainage (parking, buildings, fields), irrigation		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Water: (Blue) Process, Plant, potable, well, cooling, return/makeup, fire, sprinkler, landscape irrigation, reclaim (Purple) other		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above
Other: Abandoned lines, invisible dog fences, shopping cart perimeter monitoring, traffic lights		<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Above

Manager:

Print

Sign

Date

Attachment 6 – Subcontractor Safety Documentation

Attachment 7 – COVID-19 Pandemic Safety

Attachment 7: COVID-19 Pandemic Safety

This Attachment to the Accident Prevention Plan (APP) for NBSFS provides safety information related to the coronavirus (COVID-19) pandemic.

1.0 Introduction

1.1 Background

Coronavirus (COVID-19) is the result of a virus identified as SARS-CoV-2. Coronaviruses are large family of viruses found in both animals and humans. Some infect people and are known to cause illness ranging from the common cold to more severe diseases, such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS), with symptoms such as fever, cough, and shortness of breath. There currently is no human vaccine available for this virus. Additional information is provided to employees in the AECOM Pandemic Procedure SR1-003-PR2¹.

The World Health Organization (WHO) coordinates health issues for the United Nations and provides leadership on global health matters. The WHO assists member nations with recommendations regarding global pandemics and declares global pandemic phases to help organizations to plan for the impacts. The WHO has declared a global pandemic due to the spread of COVID-19. The declaration of a global pandemic is Phase 6, the highest level. Phase 6 is characterized by community level outbreaks in at least one other country in a different WHO region in addition to the criteria defined in Phase 5. See the AECOM Pandemic Procedure SR1- of Phase 6 indicates that a global pandemic is under way.

1.2 Training

Employees will receive COVID-19 Level 1 Awareness Training.

2.0 Potential Exposure Pathways and Symptoms

2.1 Potential Exposure Pathways

COVID-19 is believed to spread mainly from person-to-person, between people who are in close contact with one another (within about 6 feet) and through inhalation respiratory droplets or aerosols produced when an infected person coughs or sneezes. According to the Center for Disease Control (CDC), people are thought to be most contagious when they are most symptomatic (the sickest). However, spread might be possible before people show symptoms.

2.1.1 Inhalation

COVID-19 may be a potential inhalation hazard if working near (within 6 feet) of other workers or clients that may be infected with COVID-19. Transmission may occur through respiratory droplets or aerosols produced when an infected person coughs or sneezes. These droplets or aerosols can land in the mouths or noses of people who are nearby or possibly be inhaled into the lungs.

¹ AECOM Pandemic Procedure SR1-003-PR2 is AECOM restricted and not circulated outside the company.

Air monitoring instrumentation is not available that can detect COVID-19. Protection can only be obtained by maintaining social distancing and the use of personal protective equipment (PPE).

2.1.2 Contact with Contaminated Surfaces of Objects

It may be possible that a person can get COVID-19 by touching a surface or object that has the virus on it and then touching their own mouth, nose, or possibly their eyes. Viruses, including COVID-19, can survive on hard non-porous surfaces for days; therefore, every hard non-porous surfaces (including phones, toilet handles, handrails, and doorknobs) can potentially be contaminated and harbor viruses. The most frequently touched objects are at a higher risk of being contaminated with COVID-19 and other viruses. Frequently touched surfaces and commonly shared items should be cleaned at least twice daily and when visibly soiled.

2.2 Symptom Monitoring

According to CDC and WHO, signs and symptoms of infection may include the below and usually display within 2 to 14 days after exposure, most commonly around five days.

If an employee has any of the following symptoms, the individual must discontinue work activities immediately:

- Fever
- Cough
- Shortness of Breath
- Bluish Lips of Face
- New Confusion or Inability to Arouse
- Persistent Pain or Pressure in the Chest

These symptoms are non-specific and may have another cause, such as a cold or seasonal influenza virus. Treating the symptoms is generally the same for these illnesses, unless there has been a confirmed case of COVID-19 or history of travel to an at-risk region, in which case, employees should notify their personal physician of the possible exposure and symptoms. Anyone experiencing shortness of breath, pressure in the chest, new confusion or inability to awaken, bluish lips, or face should seek urgent medical attention.

3.0 Housekeeping and Personal Hygiene

3.1 Personal Hygiene

The best way to prevent illness is to avoid being exposed to the virus. To prevent exposure, the following personal hygiene protocols should be followed:

- Wash hands often with soap and water for at least 20 seconds. Wash hands after sneezing, coughing, blowing your nose, or being in a public place. If soap and water are not readily available, use a hand sanitizer that contains at least 60% alcohol. Cover all surfaces of your hands and rub them together until they feel dry. Refer to AECOM Pandemic Procedure SR1-003-PR2 for a handwashing illustration.
- Avoid touching face, mouth, nose, and eyes with unwashed hands.

- Practice respiratory hygiene. When coughing and sneezing, cover mouth and nose with flexed elbow or tissue and discard tissue immediately into a closed bin and clean your hands with alcohol-based hand rub or soap and water.
- Wear N95 respirators if you will be around others (see Section 3.3 for additional details).
- Toss tissue in toilet (preferred) or trash; if using a trash can, a covered, foot-operated trash can is preferable.

3.2 Housekeeping and General Prevention Measures

Employees should stay aware of the latest information on the outbreak and protect themselves and others by adhering the following housekeeping and general prevention measures:

- Stay informed on the latest developments about Coronavirus, including latest hotspots (cities or local areas where Coronavirus is spreading widely) and follow advice given by your healthcare provider, your national and local public health authority or your employer on how to protect yourself and others from Coronavirus. If possible, avoid traveling to these “hotspots” – especially if you are an older person or have diabetes, heart or lung disease.
- Maintain social distancing – at least 2-meter (6 feet) distance between yourself and other people, particularly those who are coughing, sneezing and/or have a fever.
- Practice prevention cleaning: Clean and disinfect frequently-touched surfaces daily. When using wet wipes, allow additional contact time. Preferably use accelerated hydrogen peroxide. Use Oxiclean or similar product when washing clothes. Put chlorine tablets in toilets as directed by manufacturer.
- Ensure communal workspaces, like field trailers and storage rooms, are regularly cleaned. A supply of hand sanitizer should be available (or access to other hand washing facilities). Ensure there is a ready supply of hand wash in bathrooms and kitchen areas, if applicable.
- Where possible, improve the quality of airflow through opening windows and doors in trailers or indoor workspaces if conducting meetings, like tailgate health and safety meetings. If possible, conduct safety meetings outside in an area that has good circulation.
- Stay home if you feel unwell. If you have a fever, cough and difficulty breathing, seek medical attention and call in advance. Follow the directions of your local health authority.
- If you have recently visited (past 14 days) areas where Coronavirus is spreading, stay at home if you begin to feel unwell, even with mild symptoms such as headache and slight runny nose, until you recover.

3.3 Guidance on the Use of Masks

The WHO advises that, while wearing a medical mask can help limit the spread of some respiratory disease, using a mask alone is not guaranteed to stop infections and should be combined with other prevention measures, including regular washing or sanitizing hands, practicing good respiratory hygiene and avoiding close contact. Therefore, the WHO advises the use of masks only if an employee has respiratory symptoms (coughing or sneezing) or has suspected Coronavirus infection with mild symptoms. However, employ any staff displaying respiratory symptoms or cough should not to come to the field site and should discuss other arrangements with the Site Safety and Health Officer (SSHO), SI Task Manager, and their supervisor.

If an employee needs to enter an area with potential high risk of community transmission, it may be recommended that a mask or N95 respirator is used. When using masks, it is critical that basic steps are taken to ensure effectiveness and prevent spread of infection. The following recommendations should be followed on when and how to use masks:

- Before putting on a mask, clean hands with alcohol-based hand rub or soap and water.
- Cover mouth and nose with mask and make sure there are no gaps between your face and the mask.
- Avoid touching the mask while using it; if you do, clean your hands with alcohol-based hand rub or soap and water.
- Replace the mask with a new one as soon as it is damp and do not re-use single-use masks.
- To remove the mask, remove it from behind (do not touch the front of mask); discard immediately in a closed bin; clean hands with alcohol-based hand rub or soap and water.
- Cloth (e.g., cotton or gauze) masks are not recommended under any circumstance. Suitable surgical masks (e.g., 3-ply) are preferred choice for office-based work, though P2/N95 rated masks are also acceptable for infection control and may be more suitable to field work.

3.4 Disinfection Procedures

Viruses, including COVID-19, can survive on hard non-porous surfaces for days; therefore, every hard, non-porous surface can potentially be contaminated and harbor viruses. The most frequently touched objects are at a higher risk of being contaminated with COVID-19 and other viruses. Frequently touched surfaces and commonly shared items should be cleaned at least twice daily and when visibly soiled using an United States Environmental Protection Agency (USEPA)-registered cleaning agent with label claims that the product is effective in use against viruses.

If surfaces are dirty, use a detergent or soap and water before disinfection. For disinfection; the following are effective agents against viruses:

- Accelerated Hydrogen Peroxide (AHP)
- Quaternary Ammonia
- Diluted Household Bleach Solutions
- Alcohol Solutions with at Least 70% alcohol

For soft surfaces; remove visible contamination if present and clean with appropriate cleaners.

3.4.1 Light Touch verses Heavy Touch Surfaces

In making decisions related to biocide usage and other cleaning protocols, one consideration is the type and amount of hand contact. “Light touch surfaces” are those that are seldom touched and include most vertical wall surfaces potentially available to be touched. The exceptions are vertical surfaces associated with toilet stalls in restrooms. Due to the usual distance between the incoming door and the toilet, often touching the vertical walls of the stall must occur upon entry and exit. In addition, vertical surfaces in close proximity to toilets are often touched; especially if someone is ill. These surfaces then become “heavy hand touch surfaces.” The usual categories

of “heavy hand touch surfaces” are items that require hand operation to use. These surfaces require more frequent cleaning.

3.4.2 Recommended Biocides

Sterilization attempts to kill all biological contaminants while disinfection attempts to kill sufficient numbers in order to lessen the infective potential of contaminants. Decontamination and dilution within interior environments seek to lessen the numbers of biological contaminants to some defined limit. Consequently, the industrial hygiene goals should concentrate on disinfection and decontamination.

The following categories of decontamination solutions (chemicals that when applied assist in the removal of contaminants from surfaces) should be considered:

- Surfactant - such as soap that aids in washing the surfaces clean by increasing potential for material to ‘slide’ off these surfaces. All consumer products labeled as soap are in fact this type of surfactant decontamination solution. The differences in the soap products are primarily associated with added fragrance or color. Soaps have limited biocide properties and mainly function to remove biological contamination from surfaces. Some liquid soaps have added chemicals to enhance their bacterial biocide effect. Bar soaps should not be used on decontamination sites as without sufficient drying, the bar and surrounding liquids may harbor biological contaminants.
- Detergent - such as TriSodium Phosphate (TSP) that chemically bond contaminants and, thus, facilitate contaminant removal from surfaces.
- Desiccant (Alcohol) Decontamination Solution - contains alcohol that destroys bacteria and other types of cells by ‘drying them out’. These solutions evaporate quickly and have little residual property. The higher the percentage of alcohol in the solution, the greater the flammability risk during use. Common hand sanitizers, such as Purell, are an example of desiccant solutions.
- Biocide Decontamination Solution – includes a chemical that reduces the development of bacteria, other biologicals cells, and viruses.

Recommended Disinfectants					
Class of Disinfectant	Uses	Advantages	Disadvantages	Applicability to	Recommended Products
Alcohols	Used as skin antiseptic, also as a component of other product	Fast acting, no residue, non-staining	Volatile Inactivated by organic material. Evaporation may diminish effectiveness	Recommended as a skin antiseptic to supplement hand washing campaign	Purell or other commercially available hand sanitizing product.
Quaternary ammonia compounds	Cleans and disinfects hard surfaces.	Detergent properties, noncorrosive	Requires longer dwell time than AHP	Recommended for use on hard, non-porous surfaces	Virex II 256
Accelerated Hydrogen Peroxide (AHP)	Provides surface cleaning and disinfection	Strong oxidant, fast acting, breaks down into water and oxygen	Can be corrosive to aluminum, copper, brass and zinc.*	Recommended only for surfaces not containing uncoated metal.	Oxivir Tb
NON-Recommended Disinfectants					
Class of Disinfectant	Uses	Advantages	Disadvantages	Recommended Products	
Chlorines / bleach	Surface cleaning, Intermediate level disinfectant, added to laundry	Low cost, fast acting, readily available	Corrosive to metals, Inactivated by organic material, irritant to skin and mucous membranes, use in well-ventilated areas, shelf life shortens when diluted	Not recommended	
Phenolics	Cleans floors, walls and furnishings	Available with added detergents to provide one-step cleaning and disinfecting	May be absorbed through skin or by rubber, some synthetic flooring may become sticky with repetitive use.	Not recommended	
Formaldehyde	Limited use, gaseous form is used to decontaminate.	Active in presence of organic mater	Carcinogenic, toxic, strong irritant, pungent odor	Not recommended	
Glutaraldehydes	Limited use in retail	Noncorrosive, active in presence of organic material	Extremely irritating to skin and mucous membranes, high cost	Not recommended	
Iodophors	Low level disinfectant for some surfaces that do not touch mucous membranes	Rapid action, relatively free of toxicity and irritancy	Not suitable for use as hard surface disinfectant, may burn tissue, inactivated by organic material, may stain fabric and synthetic materials	Not recommended	

4.0 Subcontractors and Suppliers

This is a temporary requirement that may not be necessary depending upon the start date of the project.

AECOM workers, subcontractors, and visitors will be screened by the SSHO prior to be allowed on site. Using the script all visitors will be asked the following questions:

- Have you traveled to/from/through any affected country within the past 14 days?
- Do you know of any members of your household or visitors to your household who have traveled to/from/through any affected country within the past 14 days?
- Are you or do you have knowledge of anyone in your household or visitors to your household in the past 14 days experiencing flu like symptoms (fever, cough, shortness of breath, difficulty breathing)?

If the visitor answers “yes” to any of the questions above, they will not be allowed to enter the field office, staging area, or shared work space. The person that the visitor is there to see will be contacted and the situation explained to the employee. The employee will explain the situation to the visitor and make alternate means to conduct their business.

5.0 Precautions for Traveling

To reduce the potential of people being exposed to this public health emergency and to mitigate, AECOM employees are required to obtain approval for essential business travel by regional executives. Additionally, travel arrangements will be confirmed with the client prior to traveling to the Site, to ensure compliance to any client-specific or site-specific requirements.

Staff that have approval to complete essential business travel will follow the below precautions while travelling:

- When driving to a field site, staff should drive separately when possible and minimize number of people in one vehicle. Have antibacterial and wipes in vehicles and accessible at all times. Disinfectant should be used to wipe down all "touch point" surfaces in the vehicle at least twice daily, including door handles, steering wheel, controls on dash, and any other parts of the cab that are frequently touched. Staff should wash hands before and after driving. If rental vehicles are used, frequently-touched surfaces should be disinfected prior to using the vehicle.
- Gloves should be used when pumping gasoline at gas stations if possible. The gas pump handle should be wiped down with disinfecting wipes before used. Hands should be washed after refueling with soap and water for at least 20 seconds. If soap and water are not readily available, use a hand sanitizer that contains at least 60% alcohol.
- If possible, employees should plan on traveling home rather than staying in a hotel, if this can be done in accordance with AECOM's fatigue management plan. If a hotel is required, employees should wipe down all touch point surfaces in the hotel room with disinfectant or alcohol wipes. Additionally, "do not disturb" signs should be placed on door handles to prevent hotel staff from entering room to clean during the day. If possible, windows should be opened for circulation.
- If an employee needs to enter an area with potential high risk of community transmission, it may be recommended that a mask or N95 respirator is used. Refer to **Section 3.3** for additional details.

- If possible, employees are encouraged to pack meals and snacks as needed for the project duration and avoid visiting stores and restaurants. If necessary, modify the schedule to avoid restaurants and public restrooms during peak (i.e., crowded) periods to minimize contact with the public. Use drive-through service for food pick-up if available.

**Attachment 8 – Secretary of Defense Memorandum – Use of
Masks and Other Public Health Measures, February 4, 2021**



SECRETARY OF DEFENSE
1000 DEFENSE PENTAGON
WASHINGTON, DC 20301-1000

FEB - 4 2021

MEMORANDUM FOR SENIOR PENTAGON LEADERSHIP
COMMANDERS OF THE COMBATANT COMMANDS
DEFENSE AGENCY AND DOD FIELD ACTIVITY DIRECTORS

SUBJECT: Use of Masks and Other Public Health Measures

We must defeat the coronavirus disease 2019 (COVID-19) and defend the force against COVID-19 while protecting our Nation. In accordance with Executive Order 13991, "Protecting the Federal Workforce and Requiring Mask-Wearing," January 20, 2021, and Office of Management and Budget Memorandum, "COVID-19 Safe Federal Workplace: Agency Model Safety Principles," January 24, 2021, this memorandum rescinds Secretary of Defense Memorandum, "Department of Defense Guidance on Cloth Face Coverings," April 5, 2020, and provides updated guidance on the use of face coverings and masks, social distancing, and full compliance with health guidance provided by the Centers for Disease Control and Prevention (CDC).

Effective immediately, all individuals on military installations, as defined below, and all individuals performing official duties on behalf of the Department from any location other than the individual's home, including outdoor shared spaces, will wear masks in accordance with the most current CDC guidelines. Individuals must wear masks continuously while on military installations except: (1) when an individual is alone in an office with floor-to-ceiling walls with a closed door; (2) for brief periods of time when eating and drinking while maintaining distancing in accordance with CDC guidelines and instructions from commanders and supervisors; (3) when the mask is required to be lowered briefly for identification or security purposes; and (4) when necessary to reasonably accommodate an individual with a disability.

Individuals must consistently wear a mask that covers the nose and mouth and that comports with all current guidance from the CDC and the Occupational Safety and Health Administration. Locations where masks must be worn include any common areas or shared workspaces (including open floorplan office spaces, cubicle embankments, and conference rooms) and in outdoor shared spaces. Masks recommended by the CDC include non-medical disposable masks, masks made with breathable fabric (such as cotton), masks made with tightly woven fabric (i.e., fabrics that do not let light pass through when held up to a light source), masks with two or three layers, and masks with inner filter pockets. Novelty or non-protective masks, masks with ventilation valves, or face shields are not authorized as a substitute for masks. Masks must fit properly (i.e., snugly around the nose and chin with no large gaps around the sides of the face).

All individuals on military installations and all individuals performing official duties on behalf of the Department from any location other than the individual's home will follow CDC guidance and practice physical distancing, specifically by staying at least 6 feet (about 2 arm lengths) from other people who are not from an individual's household in both indoor and outdoor spaces. Social distancing should be practiced in combination with other everyday preventive actions to reduce the spread of COVID-19, including by wearing masks, avoiding



OSD000860-21/CMD001534-21

touching your face with unwashed hands, and frequently washing your hands with soap and water for at least 20 seconds.

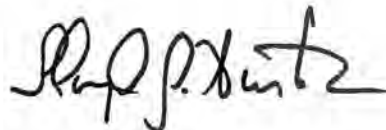
Categorical or case-by-case exceptions to these requirements for Service members and their families in environments other than office spaces that are necessary for military readiness, that are related to living on a military installation, or that are related to mask wearing by children (so long as such exceptions are consistent with CDC guidelines for mask wearing by children) may be granted in writing by DoD Component heads and should include appropriate alternative safeguards whenever feasible, such as additional physical distancing measures or additional testing consistent with DoD testing protocols. The authority to grant exceptions for all DoD Components located on the Pentagon Reservation is the Interim Director of Administration and Management. For all other situations outside of office settings when temporary unmasking is necessary for mission requirements, the authority to grant exceptions may be delegated in writing to officials at a level no lower than a general/flag officer in the grade of O-7, Senior Executive Service member (or equivalent), or, for installations that do not have officials at these levels, O-6 installation commanders.

For the purposes of this guidance, a military installation is a base, camp, post, station, yard, center, homeport facility for any ship, or other activity under the jurisdiction of the Secretary of a Military Department or the Secretary of Defense, including any leased facility, which is located within any State, the District of Columbia, the Commonwealth of Puerto Rico, American Samoa, the Virgin Islands, the Commonwealth of the Northern Mariana Islands, or Guam. In the case of an activity in a foreign country, a military installation is any area under the operational control of the Secretary of a Military Department or the Secretary of Defense, without regard to the duration of operational control.

DoD Components will comply with applicable labor relations obligations to the extent such obligations do not conflict with the agency's ability to conduct operations during this emergency.

COVID-19 is one of the deadliest threats our Nation has ever faced. As we have done throughout our history, the military will rise to this challenge. It is imperative that we do all we can to ensure the health and safety of our force, our families, and our communities so we can prevail in this fight.

Questions concerning this guidance may be directed to the Office of the Under Secretary of Defense for Personnel and Readiness.

A handwritten signature in black ink, appearing to read "Robert P. Hunter". The signature is fluid and cursive, with a large initial "R" and a stylized "H".

cc:

Assistant to the Secretary of Defense for Intelligence Oversight
Director of Administration and Management

Attachment 9 – MEC Procedures

Munitions and Explosives of Concern and Anomaly Avoidance Standard Operating Procedure

Feasibility Study

New Boston Space Force Station MU702, MU703A, MU703B, and
MU705 Munitions Response Sites
New Hampshire

Project Number: 60690269

April 2023

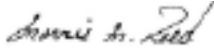
Quality Information

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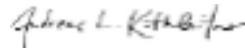
Mike Shoop
Munitions Response Technical
Advisor
AECOM Technical Services, Inc.

Checked by



Mac Reed
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Program Manager
AECOM Technical Services, Inc.

Approved by



Andreas Kothleitner
Munitions Response Program
Quality Director
AECOM Technical Services, Inc.

Revision History

Revision	Revision date	Details	Authorized	Name	Position

Distribution List

# Hard Copies	PDF Required	Association/Company Name

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Statement of Acknowledgment

The personnel indicated below acknowledge they have read this standard operating procedure in its entirety and understand the munitions and explosives of concern and anomaly avoidance procedures associated with field activities in support of the Feasibility Study New Boston Space Force Station MU702, MU703A, MU703B, and MU705 MRSs, New Hampshire.

Name (print)	Sign	Date

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Appendixes

- A Figures
- B Unexploded Ordnance Technician Certifications

Figures (included in Appendix A)

Figure 1-1: PFAS Phase I RI - Site Overview

Figure 1-2: Munitions Response Site Boundaries

Acronyms and Abbreviations

AECOM	AECOM Technical Services, Inc.
AFCEC	Air Force Civil Engineer Center
APP	Accident Prevention Plan
bgs	below ground surface
DDESB	Department of Defense Explosives Safety Board
DESR	Defense Explosive Safety Regulation
EM	Engineering Manual
MEC	munitions and explosives of concern
MPPEH	material potentially presenting an explosive hazard
MR	Munitions Response
MRS	Munitions Response Sites
PM	Project Manager
SOP	standard operating procedure
USACE	United States Army Corps of Engineers
UXO	unexploded ordnance
UXOQP	unexploded ordnance qualified personnel

1. Introduction

**MUNITIONS AND EXPLOSIVES OF CONCERN AND ANOMALY AVOIDANCE
STANDARD OPERATING PROCEDURE
Feasibility Study NBSFS MU702, MU703A, MU703B, and MU705 MRSs**

Project Number:	60690269	
AECOM Project Manager:	Josh Millard	978-424-8199
AECOM MR Safety Program Manager:	Morris (Mac) Reed	615-618-5272
AECOM MR Program Quality Director:	Andreas Kothleitner	619-607-1426
Preparation Date:	March 2023	
Expiration Date:	March 2024	

APPROVALS



3/21/2023

Morris (Mac) Reed
AECOM – Munitions Response Safety Program Manager

Date



3/21/2023

On behalf of Josh Millard
AECOM – Project Manager

Date



3/21/2023

Andreas Kothleitner
AECOM – Munitions Response Program Quality Director

Date

This munitions and explosives of concern (MEC) and anomaly avoidance standard operating procedure (SOP) is valid for this specific project only. It is not to be used for other projects or subsequent phases of this project without the written approval of the AECOM Technical Services, Inc. (AECOM) Munitions Response (MR) Safety Program Manager and MR Program Quality Director. A copy of this SOP is to be maintained at the site at all times during the performance of field activities.

1.1 Introduction and Scope of Work

This MEC and Anomaly Avoidance SOP describes procedures to be used while conducting field activities in support of the Feasibility Study New Boston Space Force Station (NBSFS) MU702, MU703A, MU703B, and MU705 Munitions Response Sites (MRSs), New Hampshire. “Anomaly avoidance” is the avoidance of suspect surface MEC and any subsurface anomalies where the specific activity can be moved to another location. Anomaly avoidance techniques are implemented for activities that include, but are not limited to, surveying and mapping, environmental and natural resource assessments, and soil sampling.

The MEC and anomaly avoidance procedures contained in this SOP were developed in accordance with the United States Army Corps of Engineers *EM 385-1-97, Explosives Safety and Health Requirements Manual, Change 1* (USACE 2013), and *Defense Explosives Safety Regulation 6055.09, Edition 1* (DDESB 2019). These procedures, along with the project activity hazard analyses (Attachment 2 of the Accident Prevention Plan [APP]), will be performed and adhered to by AECOM and subcontractor personnel while performing activities requiring MEC and anomaly avoidance. AECOM and its subcontractors will work to ensure a safe working environment and the equipment, supplies, and other resources needed to provide MEC and anomaly avoidance are present on-site.

The field activities that will require MEC and anomaly avoidance procedures consist of drilling, soil and sediment sampling at the Aqueous Film Forming Foam (AFFF) Sites shown on Figure 1-1 provided in Appendix A. These field activities are distributed among the MRSs as shown on Figure 1-2 provided in Appendix A. The project manager (PM) will organize a readiness call with unexploded ordnance qualified personnel (UXOQP) providing support and the project team at a minimum of one week prior to the project's mobilization date. The readiness call will include, at a minimum, an introduction of project personnel, site history and background, potential MEC on-site, reporting procedures, project communications, monitoring requirements, and logistics.

2. Unexploded Ordnance (UXO) Team Qualifications and Responsibilities

2.1 UXO Qualified Personnel

2.1.1 UXO Technician Qualifications

MEC and anomaly avoidance will be conducted by UXOQP who meet the requirements of Department of Defense Explosives Safety Board Technical Paper 18 (DDESB 2020) and AECOM's MR Program. MEC and anomaly avoidance will be conducted, at a minimum, by experienced UXO T-IIs that have been approved by the AECOM MR Safety Program Manager and Program Quality Director. UXOQP resumes and certifications must be provided to the MR Safety Program Manager and Program Quality Director for review a minimum of two weeks prior to the project mobilization date. UXO Technician certifications are provided in Appendix B.

2.1.2 Responsibilities

UXOQP will provide the appropriate level of on-site support in accordance with USACE EM 385-1-97 (USACE 2013) to include the following:

- Identify and avoid subsurface anomalies.
- Conduct MEC safety briefings for all site personnel and visitors.
- Identify and avoid suspect MEC and material potentially presenting an explosive hazard (MPPEH).
- Implement MEC and anomaly avoidance procedures as required.
- Initiate suspect MEC reporting procedures if necessary.

- Daily reporting (see details below).

The senior UXOQP is required to submit a daily site report to the Project Manager, the AECOM MR Safety Program Manager, and the AECOM MR Program Quality Director documenting the operational activities conducted on-site, if sample locations needed to be relocated due to the detection of subsurface anomalies, health and safety topics covered, if any suspect MEC and/or MPPEH was located, photographs of site activities, photographs of suspect MEC or MPPEH, and verification that operations are being conducted in compliance with safety and quality requirements.

2.1.3 Authority

UXOQP have final on-site authority on MEC-related matters. UXOQP will report to the PM and communicate directly with the AECOM MR Safety Program Manager, AECOM MR Program Quality Director, and AECOM MR Technical Advisor as necessary. The following are the project team roles and contact information:

- Josh Millard, AECOM PM (978-424-8199), joshua.millard@aecom.com
- Morris (Mac) Reed, AECOM MR Safety Program Manager (615-618-5272), mac.reed@aecom.com
- Andreas Kothleitner, AECOM MR Program Quality Director (619-607-1426), andreas.kothleitner@aecom.com
- Mike Shoop, AECOM MR Technical Advisor (307-349-7399), mike.shoop@aecom.com

3. MEC Safety

If suspected MEC or MPPEH is encountered during work activities, UXOQP will record the location, document the item(s) description, take photographs (include a known item for scale) and avoid the location. The UXOQP will immediately notify the AECOM MR Safety Program Manager, AECOM MR Program Quality Director, and the AECOM PM. If the item is confirmed to be suspect MEC or MPPEH by the AECOM MR Safety Program Manager or the AECOM MR Program Quality Director, the PM will notify the Air Force Civil Engineer Center (AFCEC) Remedial Project Manager, Brett Dubner (508-246-2275).

The following MEC safety protocols will be followed:

- The cardinal principle to be observed involving ordnance, explosives, ammunition, severe fire hazards, or toxic materials is to limit the exposure to a minimum number of personnel, for the minimum amount of time, to a minimum amount of hazardous material consistent with a safe and efficient operation.
- The age or condition of a suspect MEC or MPPEH item does not decrease the effectiveness. MEC that has been exposed to the elements for an extended period of time may become more sensitive.
- Consider suspect MEC or MPPEH that has been exposed to fire as extremely hazardous.
- DO NOT touch or move any suspect MEC and MPPEH items regardless of the markings or apparent condition.
- DO NOT drive vehicles into a suspected MEC and MPPEH area; use clearly marked lanes.
- Always assume suspect MEC or MPPEH items contain an explosive hazard.
- DO NOT be misled by markings on the suspect MEC or MPPEH item stating, “practice bomb,” “dummy,” or “inert” or the item could be marked incorrectly.

4. Project Equipment

All equipment will be inspected to ensure completeness and operational readiness. Any equipment found damaged or defective will be repaired or returned for replacement. All instruments and equipment that require routine maintenance will be inspected initially upon arrival and then periodically as required in the manufacturer's equipment manual. Equipment required for daily use shall be tested daily to verify functionality. If an equipment check indicates that any piece of equipment is not operating correctly and field repair cannot immediately be accomplished, the equipment will be removed from service until it can be repaired. Alternately, the equipment may be replaced with a like model or an approved substitute. Replacement equipment will meet the same specifications for accuracy and precision as the equipment removed from service.

4.1 Preferred Instruments

Geophysical instruments used on-site in support of MEC and anomaly avoidance for this project will consist of the following instruments:

- A hand-held all-metals detector (e.g., Minelab®, Whites®, or equivalent), or Schonstedt GA-52Cx magnetometer (or equivalent).
- The SubSurface Instruments Borehole Gradiometer or equivalent instrument may be utilized.

4.2 Daily Functionality Test

UXOQP will be responsible for performing tests on their instruments to verify that their detectors are in proper working condition each morning and also throughout the day to verify instrument functionality. The objective of the functionality test is to verify detectors are operating as designed by providing an audible response to the operator when passed over a known metallic item. Instruments that do not pass the functionality test will be removed from service, tagged as unserviceable, and replaced.

5. Procedures

5.1 On-Site Training

Prior to field activities, UXOQP will conduct MEC-specific training for all on-site personnel assigned to projects where MEC and anomaly avoidance support activities will be implemented.

UXOQP will conduct training on applicable MEC and anomaly avoidance support protocols. All site personnel must receive this training prior to conducting field operations. The Site Safety and Health Officer and/or applicable project personnel (if appropriate for the task being performed) may conduct additional training as appropriate. At a minimum, site-specific training will include the following topics:

- Field equipment operation, including safety precautions and safety equipment
- Procedures, guidelines, and requirements in relevant sections of the Site Safety and Health Plan as they relate to the task being performed (if applicable)
- Site- and task-specific hazards, including physical, biological, and chemical hazards
- Incremental monitoring procedures
- Emergency procedures and contact information

5.2 Underground Utilities

The PM is responsible for verifying that all necessary excavation permits are on-site prior to commencing operations. The PM is responsible for ensuring that the appropriate agencies or companies have marked

the location of all subsurface utilities in the investigation areas prior to commencing intrusive work to visually delineate their subsurface routing.

5.3 Soil Sampling

Prior to soil sampling, UXOQP will visually inspect each proposed soil sample location and use a hand-held detector to detect subsurface anomalies. If suspect surface MEC, MPPEH, or an anomaly is detected, a new location will be selected. Soil sample excavations will be incrementally monitored by the UXOQP every 12-inches. Soil sampling will be conducted implementing incremental anomaly avoidance procedures by a UXOQP in 12-inch intervals until the maximum depth of sampling is reached, bedrock is encountered, or 12 feet below ground surface is reached, whichever occurs first. During the detector subsurface anomaly checks at 12-inch intervals, all metallic equipment will be moved far enough away from the detection location or area so they don't interfere with the detector or mask any metallic subsurface anomalies. If an anomaly is detected, the excavation will be backfilled in accordance with project specific procedures and the field team will select a new location.

If suspect MEC or MPPEH is encountered, the location will be recorded and marked with flagging. The item will be photographed (including a known item for scale), and the field team will follow the direction of the UXOQP to avoid contact. Suspect MEC reporting procedures will be initiated in accordance with Section 3.

5.4 Sediment Sampling

Sediment samples will not exceed 12-inches in depth. Prior to the collection of sediment samples, UXOQP will visually inspect each proposed sediment sample location and use a hand-held detector to detect subsurface anomalies. If suspect surface MEC, MPPEH, or an anomaly is detected, a new location will be selected.

If suspect MEC or MPPEH is encountered, the location will be recorded and marked with flagging. The item will be photographed (including a known item for scale), and the field team will follow the direction of the UXOQP to avoid contact. Suspect MEC reporting procedures will be initiated in accordance with Section 3.

5.5 Drilling

Prior to drilling, UXOQP will conduct a survey of the proposed boring location using a hand-held detector. If suspect surface MEC, MPPEH, or an anomaly is detected, the location will be marked for avoidance and a new location will be selected. UXOQP must also complete a survey of the area around the proposed investigation site that is large enough to support all planned operations. The size of the surveyed area will be project-specific and will consider, for example, maneuverability of required equipment, and parking of support vehicles. At a minimum, the surveyed area should have a dimension in all directions equal to twice the length of the longest vehicle or piece of equipment to be brought on-site.

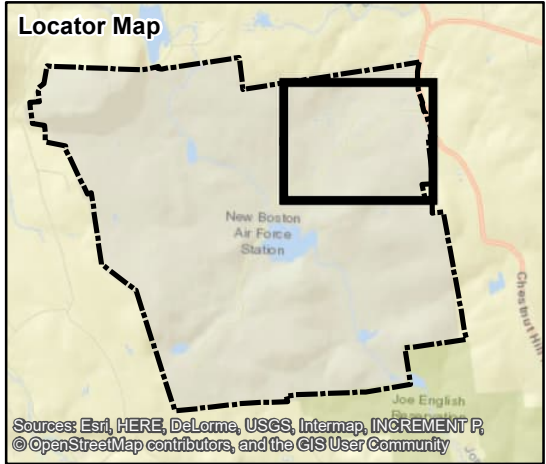
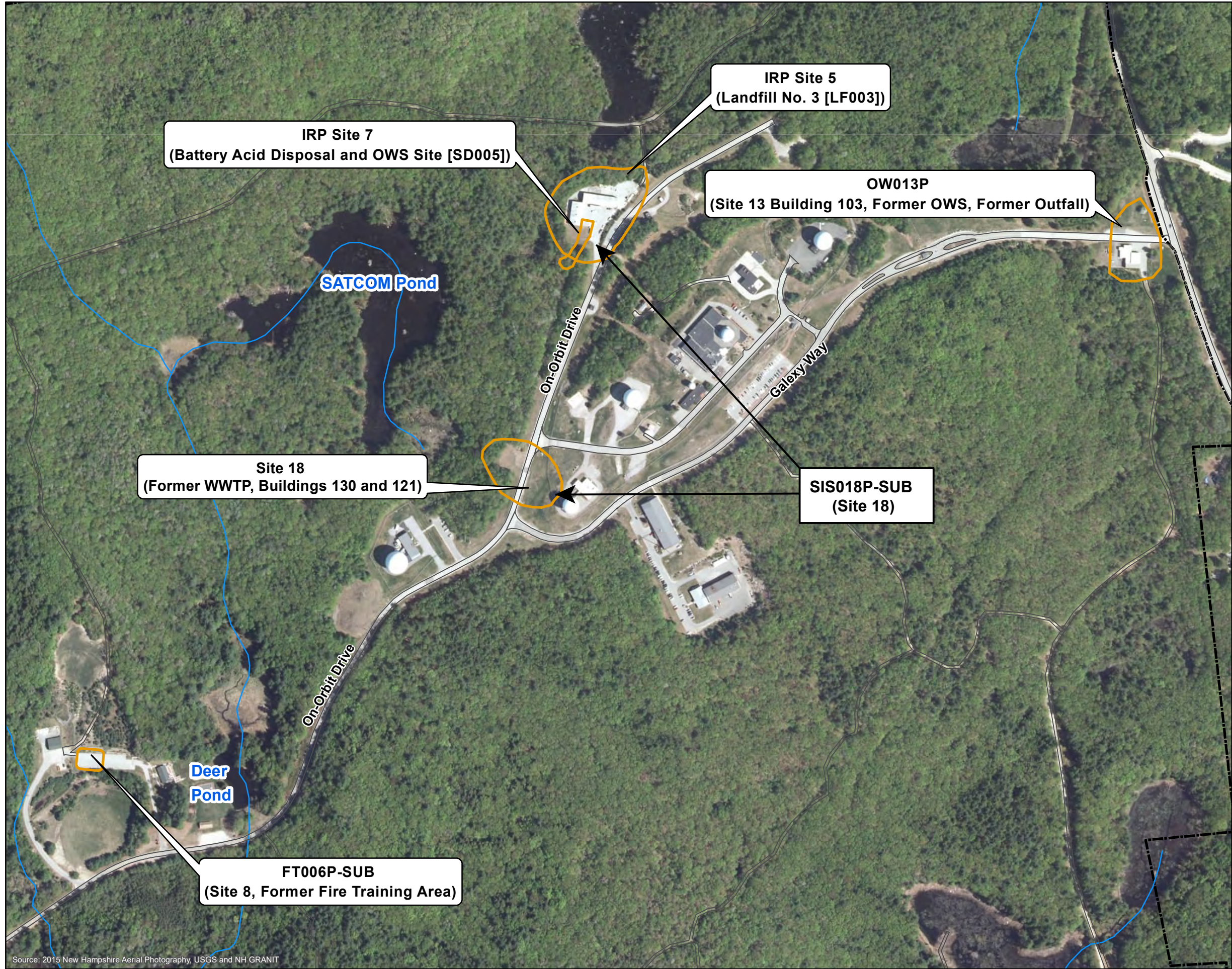
Drilling will be conducted implementing incremental anomaly avoidance procedures by a UXOQP in 12-inch intervals until the maximum depth of drilling reached, bedrock is encountered, or 12 feet below ground surface is reached, whichever occurs first. During the detector subsurface anomaly checks at 12-inch intervals, all metallic equipment will be moved far enough away from the detection location or area so they don't interfere with the detector or mask any metallic subsurface anomalies. If an anomaly is detected, the borehole will be backfilled in accordance with project-specific procedures, and the field team will select a new location.

If suspect MEC or MPPEH is encountered, the location will be recorded and marked with flagging. The item will be photographed (including a known item for scale), and the field team will follow the direction of the UXOQP to avoid contact. Suspect MEC reporting procedures will be initiated in accordance with Section 3.

6. References

- Department of Defense Explosives Safety Board (DDESB). 2019. *Defense Explosives Safety Regulation 6055.09, Edition 1*. DESR 6055.09, Edition 1. January 13.
- . 2020. *Minimum Qualifications for Personnel Conducting Munitions and Explosives of Concern-Related Activities*. Revision 1. Technical Paper 18 (DDESB TP 18). June 24.
- United States Army Corps of Engineers (USACE). 2013. *EM 385-1-97, Explosives Safety and Health Requirements Manual, Change 1*. April 12. (Errata 1 through 6 dated June and July 2009, July 2010 and April 2013).

Appendix A: Figures



- Legend**
- Installation Boundary
 - AFFF Sites
 - Road Area
 - Stream

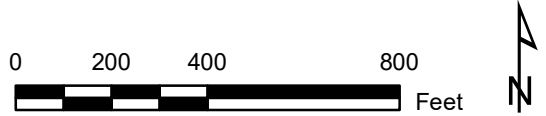


Figure 1-1

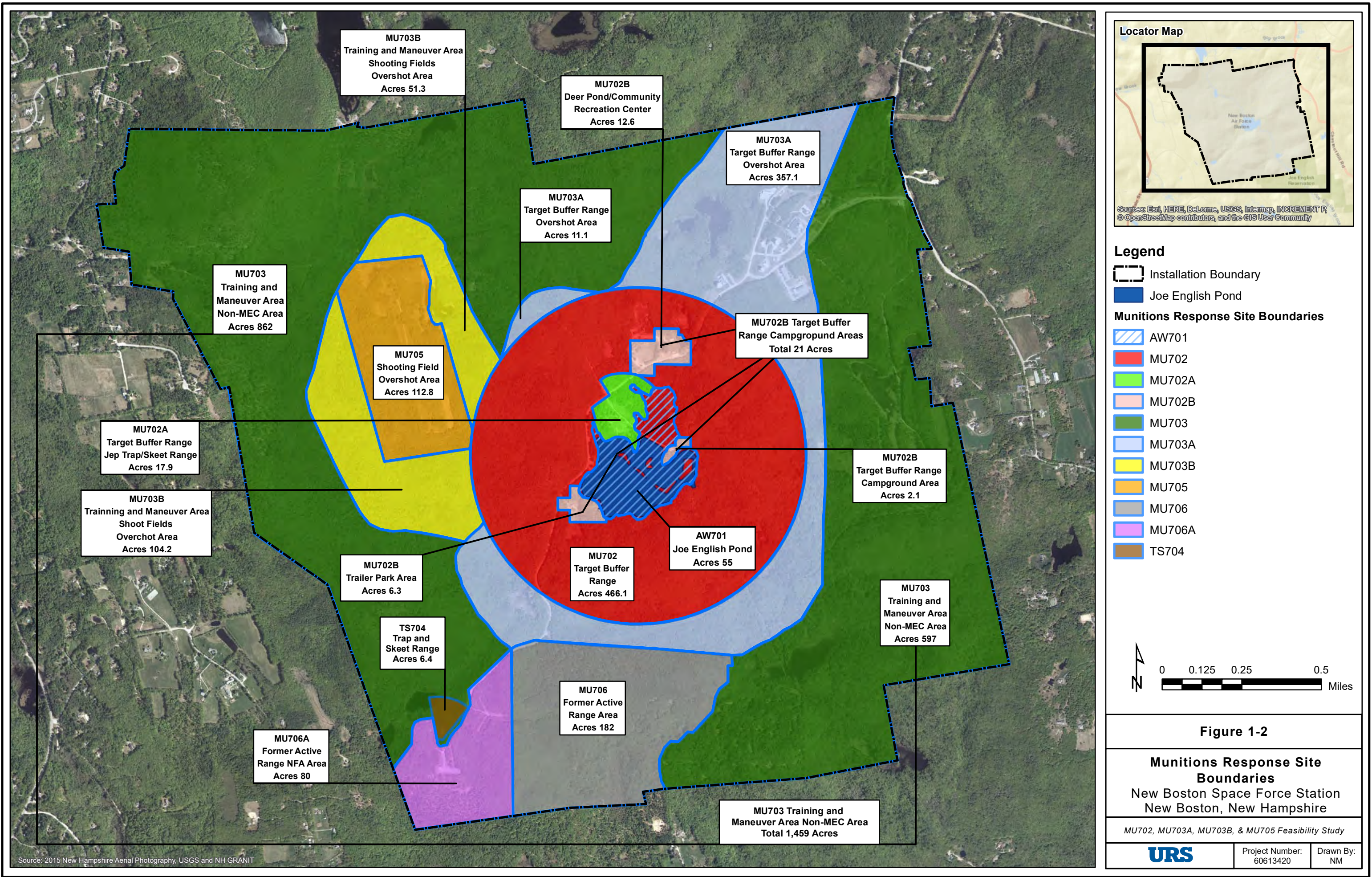
PFAS Phase I RI – Site Overview
FT006P-SUB, OW013P, and SIS018P-SUB
New Boston Space Force Station
New Boston, New Hampshire

Remedial Investigation for PFAS

AECOM

Project Number:
60692069

Drawn By:
NM



Appendix B:

Unexploded Ordnance Technician Certifications

Linnane, Shannon T

UXO Tech III # 2138

414 248 7263

Graduated UXO School: May 09
40 Hour HAZWOPER: Mar 09
30 Hour Construction Safety: Jan 19
8 Hour Refresher: AUG 22
8 Hour Supervisor: Apr 17
MPPEH certificate: Oct 2021

Civilian UXO Experience

May 09 – Jun 09	Tech I, EOTI. Job site, Ft. McCoy, WI. UXO subsurface clearance. 290 hrs.
Jun 09 – Sep 09	Tech I, EODT, job site Adak, Alaska. Surface and subsurface unexploded ordnance clearance. Trimble and Allegro training. 1256 hrs.
Oct 09 –Nov 09	Tech I, EOTI, Job site, Lake Erie. UXO surface clearance. 466 hrs.
Apr 10 –Nov 10	Tech I, EODT, Job site, Goodson's (Myrtle Beach, SC). UXO surface and subsurface clearance. 1416 hrs.
Apr 11 –May 11	Tech I, OER, Job site, Vandenburg AFB. UXO Surface sweep. 416 hrs.
Jun 11 –NOV 13	Tech I, BSE, Job site, Twentynine Palms. UXO clearance. Surface, subsurface. 5580 hrs.
Aug 15 –Dec 15	Tech II, Aerotek, Parsons Munitions Plant, Parsons, KS. UXO sub surface, ICM's. 1020 hrs.
May 16 –May 16	Tech II, EOTI, Fort Chaffee, Arkansas. Subsurface clearance. 286 hrs.
Jun 16 – Sep 16	Tech II, AECOM, Tobyhanna, PA. Subsurface clearance. 920 hrs.
Nov 16 – Dec 16	Tech II, Aerotek, Tinian MP. Surface sweep, transect escort. 210 hours.
Jan 17 –Mar 17	Tech II, AECOM, Kingsville TX. Survey support, Transect clearance, mag and dig. Mini Ex and Trimble. 426 hrs.
Mar 17 –Apr 17	Tech II, Aerotek, Concord CA. Survey support and surface clearance. 186 hrs.
May 17 –Sep 17	Tech II, AECOM, Stumpneck MD. Survey support. UXO Subsurface clearance. 896 hrs.

Oct 17 –Apr 18	Tech II, AECOM. Wash D.C. Subsurface avoidance. 413 hrs.
Apr 18 –Apr 18	Tech II, AECOM, Poznan Poland. CPT and Geo support. 158 hrs.
Jun 18 –Jun 18	Tech II, AECOM, Poznan Poland. CPT and geo soil sampling support 176 hrs.
Jul 18 – Aug 18	Tech II, Weston Solutions, Long Beach Island NJ. Beach replenishment and inspection for UXO anomalies. 218 hrs.
Sep 18 –Sep 18	Tech II, Arcadis, Picatinny arsenal NJ. Sampling escort. 96 hrs.
Sep 18 –Nov 18 hrs.	Tech II, Arcadis, Texarkana TX. UXO Surface clearance. 250 hrs.
Feb 19 –Feb 19	Tech II, AECOM, Poznan Poland. UXO Avoidance, CPT and Geo support, soil sampling. 172 hrs.
Apr 19 – May 19	Tech II, ECC, Guam. Construction support, backhoe operations. 76 hrs.
Jun 19 – Jun 19	Tech II, AECOM, Ford Island HI, Water Sampling escort, 56 hrs.
Jun 19 – Jun 19	Tech II, AECOM, UTTR, Utah. Water sampling support/escort and construction support. 90 hrs.
Jul 19 – Jul 19	Tech II, AECOM, Fallbrook, CA. Escort avoidance for project review team. 56 hrs.
Aug 19 – Aug 19	Tech II, AECOM, UTTR, Utah. Escort, anomaly avoidance. 32 hrs.
Aug 19 – Aug 19	Tech II, AECOM, Atlantic City, NJ. Escort, anomaly avoidance. 32hrs.
Sep 19 – Sep 19	Tech II, AECOM, Volk Field, WI. UXO subsurface clearance. 240 hrs.
Oct 19 – Oct 19	Tech II, AECOM, UTTR Utah. Escort, anomaly avoidance. 58 hrs.
Nov 19 –Nov 19	Tech II, AECOM, Naval Base Guam. Escort anomaly avoidance. 80 hrs.
Jan 20 – Feb 20	Tech II, AECOM, Fort Erwin CA. Surface and subsurface clearance. 226 hrs.
Mar 20 –Mar 20	Tech II, AECOM, Pearl Harbor. Water sampling Escort anomaly avoidance. 66 hrs.
Mar 20 – Mar 20	Tech II, AECOM, UTTR, Utah. Water sampling support/Escort, anomaly avoidance. 24 hrs.

Jun 20 –Jun 20	Tech II, AECOM, Camp Minden, Louisiana. Escort, anomaly avoidance. 46 hrs.
Jun 20 –Jun 20	Tech II, AECOM, Barksdale AFB, Louisiana. Escort, Soil sampling, anomaly avoidance. 41 hrs.
Jul 20 – Jul 20	Tech II, AECOM, Camp O’Ryan New York. Escort soil sampling escort support. 73 hrs.
Sept 20 –Sept 20	Tech II, AECOM, FNOD, Suffolk, VA. Sampling/Escort support field work. 56 hrs.
Sept 20 –Oct 20	Tech II, AECOM, UTTR, UT. Escort support field work. 40 hrs.
Dec 20 – Dec 20	Tech II, AECOM, Camp Hero, Montauk NY. Onsite construction support. 50 hrs.
Dec 20 –Dec 20	Tech II, AECOM, Mare Island Vallejo, CA. Sampling support, Construction support and avoidance. 80 hrs.
Jan 21– Jan 21	Tech II, AECOM, Naval Weapons Station Fallbrook, Fallbrook CA. Escort support. 48 hrs.
Jan 21 –Jan 21	Tech III, AECOM, Anderson AFB Guam. Escort support. 120 hrs.
Mar 21– Apr 21	Tech II, AECOM, Naval Weapons station Fallbrook, Fallbrook CA. Surface and subsurface UXO clearance. 250 hrs.
May 21– May 21	Tech II, AECOM, UTTR, Utah. Escort support field work. 16 hrs.
Jun 21–Jun 21	Tech III, AECOM, Fort Pickett, Virginia. UXO sampling/escort support. 36 hrs.
Aug 21–Aug 21	Tech III, AECOM, Anderson AFB, Guam. UXO escort, soil sampling. 80 hrs.
Nov 21–Nov 21	Tech II, USA Environmental, Kona, HI. MEC Surface sweep of transects. 56 hrs.
Jan 22– Feb 22	Tech II, AECOM, Mare Island. MEC Surface and Subsurface Removal. 120 hrs
Feb 22–Feb 22	Tech III, AECOM, Alameda, CA. Anomaly avoidance for ground surface and downhole drilling operations. 60 hrs.
Mar 22– May 22	Tech II, AECOM, AAFB Guam. Anomaly avoidance in support of soil sampling, drilling and trenching activities. 320 hrs.
Jun 22–Jun 22	Tech III, AECOM, New Boston Space Force. Anomaly avoidance in support of soil sampling. 40 hrs.
Jul 22–Jul 22	Tech III, AECOM, Naval Base Guam. Anomaly avoidance for the surface and downhole drilling operations. 10 hrs.

July 22–July 22	Tech III, AECOM, Waipio Pearl Harbor. Anomaly avoidance support during the placement and installation of blind seeds, DGM collection. 80 hrs.
Sep 22–Oct 22	Tech III, AECOM, AAFB Guam, Naval Base Guam. Anomaly avoidance supporting sign installation and anomaly avoidance site location recon. 240 hrs.
Nov 22–Nov 22	Tech III, AECOM, Fort Knox, KY. Construction support as needed for UXO avoidance. Phase 1 80 hrs.
Nov 22–Nov 22	Tech III, AECOM, Plymouth MA, Hingham burning ground. Construction support as needed for UXO avoidance. 60 hrs.
Dec 22–Dec 22	Tech III, AECOM, Fort Knox, KY. Construction support as needed for UXO avoidance. Phase 20hrs.

Total Civilian UXO experience: 17,909 hours

AMERICAN TECHNOLOGIES CENTER FOR UNEXPLODED
ORDNANCE (UXO) TRAINING
IN COOPERATION WITH THE UNIVERSITY OF TENNESSEE

CONFERS THIS CERTIFICATE TO

SHANNON T. LINNANE

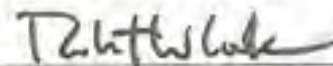
Having met the prescribed course of training for Unexploded Ordnance (UXO) Technician Level I is hereby declared a graduate and is certified as such.

IN RECOGNITION OF SUCCESSFULLY COMPLETING

UNEXPLODED ORDNANCE (UXO)
TECHNICIAN LEVEL I COURSE

TENNESSEE HIGHER EDUCATION COMMISSION CERTIFIED PROGRAM

DATE ISSUED: MAY 8, 2009



ROBERT COOK, DIRECTOR OF UXO TRAINING
AMERICAN TECHNOLOGIES INC. CENTER FOR
UNEXPLODED ORDNANCE TRAINING



Environmental, Safety & Health, Inc.

Be it known to all persons that

Shannon Linnane

Has attended and successfully completed the course entitled:

40-Hour Hazardous Waste Operations and Emergency Response Training

29 CFR 1910.120 (e)(3)(i)

*in Oak Ridge, Tennessee on the twenty-seventh day of March,
two thousand nine.*

Cherie Bradley

Cherie Bradley, Training Manager



AdvanceOnline Solutions Online Institute

Certificate of Completion

shannon linnane

has met the online course completion requirements for

OSHA 30-Hour Construction Safety

This student has completed the formal instruction for the 30-Hour Construction Outreach Program. Topics covered in this program were Introduction to OSHA, Managing Safety and Health, Struck-by and Caught-In or Between Hazards, Personal Protective Equipment, Hearing Conservation, Respiratory Protection, Lead and Crystalline Silica, Asbestos, GHS Hazard Communication, Electrical Safety, Hand and Power Tools, Fall Protection, Ladder Safety, Excavations, Scaffolds, Crane Safety, Heavy Equipment, Forklift Safety, Materials Handling, Permit-Required Confined Spaces, Fire Safety, Welding and Cutting, Concrete and Masonry, Steel Erection, and Ergonomics.

Course ID A0310
Certificate ID 6745_1602388
Instructor Rick Gleason

Date 1/24/2019 11:19:00 AM

Time Online 30:13:42

AdvanceOnline Solutions, Inc.

1811 Bering Drive, Suite 430

Houston, Texas 77057

www.advanceonline.com

(713) 621-1100

AdvanceOnline
S O L U T I O N S



AECOM

University Certificate of Completion

Certificate of Completion 8 Hour HAZWOPER Refresher

This certifies that

Shannon Linnane

Has completed Annual HAZWOPER 8-Hour Refresher Training,
required by 29 CFR 1910.120(e) and AECOM SH&E Tier III S3NA-117-PR1,
Hazardous Waste Operations

Completed on:
08/15/2022
MM/DD/YYYY

Sue Stephens
Specialist II, Safety, Health & Environment

Certificate of Completion

This certifies that

shannon linnane

Has Successfully completed

8 Hour HAZWOPER Supervisor Training

This certificate does not in itself indicate initial 24 or 40 Hour HAZWOPER Training

In Accordance With Federal OSHA Regulation 29 CFR 1910.120(e)(4)

And all State OSHA/EPA Regulations as well

This course is approved for 8 Contact Hours (0.8 CEUs) of continuing education per the California Department of Public Health for Registered Environmental Health Specialist (REHS) (Accreditation # 044)

Julius P. Griggs

Julius P. Griggs
Training Director

170424445428

Certificate Number

4/24/2017

Issue Date



UNLIMITED, Inc.

OSHA Compliant Safety Training Since 1993

2139 Tapo St., Suite 228 Simi Valley, CA 93063
888 309-SAFE (7233) or 805 306-8027 866-869-7097 (fax)
www.safetyunlimited.com

Annual Refresher Training NOT Required

Want to be sure this certificate is valid? Visit safetyunlimited.com/verification



American Red Cross
Training Services

Certificate of Completion

Shannon Thomas Linnane

has successfully completed requirements for

Adult and Pediatric First Aid/CPR/AED

Date Completed: 11/3/2021

Validity Period: 2 - Years

Conducted by: Heart Song Rescue Training

To verify certificate, scan code or visit redcross.org/digitalcertificate and enter ID.

Learn and be inspired at LifesavingAwards.org



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WORK STATUS REPORT

Employer Copy

TYPE OF EXAMINATION: AECOM-Annual Hazmat Exam
EXAM CLASSIFICATION: Periodic Examination

EMPLOYEE: Linnane, Shannon

ID:

DATE OF EXAM: 06/03/2022

EXPIRATION DATE: 06/03/2023

COMPANY: AECOM

POSITION: UXO Tech II

LOCATION: AECOM-Omaha - DCS

SITE: West

The following recommendations are based on a review of one or all of the following: a base history questionnaire, supporting diagnostic tests, physical examination, and the essential functions of the position applied for or occupied by the individual named above.

	Yes	No	Undecided
Has the employee any detected medical conditions that would increase his/her risk of material health impairment from occupational exposure in accordance with 29 CFR §1910.120 (Hazardous Materials)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Has the employee any contraindication for work in accordance with 29 CFR §1910.95(g)1926.52 (Hearing Conservation)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Has the employee any limitations in accordance with 29 CFR §1910.134 (Respirator)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

WORK STATUS

☒ **QUALIFIED**

The examination indicates no significant medical condition. Employee can be assigned any work consistent with skills and training.

☐ **QUALIFIED - WITH LIMITATIONS**

Pursuant to applicable OSHA regulations, the examination indicates that a medical condition currently exists which will require the following work assignment limitations:

☐ **NOT QUALIFIED**☐ **DEFERRED**

The examination indicated that additional information is necessary. The employee has been given the following instructions.

Comments:

I have reviewed the medical data of the above named employee, and informed the employee of the results of the medical examination and any medical conditions that require follow-up examination or treatment.

Name of Physician: Dr. Jeffrey Jacobs Date: 06/08/22

Signature: _____

Certificate of Completion

This is to certify that

Shannon Linnane

has successfully completed the following course

2021 PFAS Sampling Education and Training Session

02/08/2022

MM/DD/YYYY