



Environment

Prepared for:
Superfund Standby Program
NYSDEC
Albany, NY

Prepared by:
AECOM
Latham, NY
April 2012

Work Plan

Midtown Shopping Center
Site 546054
South Glens Falls, NY 12803
D007626.05

Prepared for:

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

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Work Plan


Midtown Shopping Center
Site 546054
South Glens Falls, NY 12803
D007626.05

Engineering Certification

I, Scott A. Underhill, certify that I am currently a NYS registered professional engineer and that this Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Respectfully submitted,

AECOM Technical Services Northeast, Inc.



Scott Underhill
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4-4-2012

Date

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1.0 Introduction

1.1 Purpose and Objective

AECOM has been issued Work Assignment #D007626-05 under the New York State Department of Environmental Conservation (NYSDEC) State Superfund Standby Program. The site under this work assignment is Midtown Shopping Center (Site #546054). The location of the site is shown on Figure 1.

The specific objective of this project is to conduct a Remedial Investigation and Feasibility Study (RI/FS) at the site to define the extent of previously identified soil and groundwater impacts resulting from activities at a dry cleaners business at the Site which is now closed.

AECOM has developed and submitted this Work Plan for NYSDEC's review and approval. It includes a summary of the project tasks to be completed based on the Scope of Work outlined in the work assignment (WA) letter issued by the Department on December 16, 2011 and as modified based on initial site visit and a scoping session conducted on January 26, 2012. Also included are a staffing plan (Figure 2) and a proposed schedule.

1.2 Site Description

Information on the location, previous investigations, and site geology are provided in the subsections below.

1.2.1 General/Location

The Midtown Plaza site is located in a suburban area of Saratoga County, NY. The site address is 112-114 Main Street, South Glens Falls, located at the intersection of Saratoga Avenue and Main Street. The site is approximately 5 acres and consists of a parking lot and a strip mall constructed in 1967. The site use is commercial retail including a restaurant.

1.2.2 Previous Investigations

A third party investigation of vapor, soil, and groundwater was conducted by Malcolm Pirnie at the site on the behalf of the owner(s)/manager(s) in 1998/1999 that resulted in the discovery of site contamination (Malcolm Pirnie, 1999). The results of the passive gas sampling indicated the presence of tetrachloroethene (PCE) and its degradation products in the soil gas beneath the concrete slab of the building and an asphalt area to the rear of the building. Soil gas concentrations from beneath the slab within the building were an order of magnitude higher than those detected from outside the building; however, these concentrations were not provided in the letter report for this investigation (Malcolm Pirnie, 1999).

During the collection of these soil vapor samples, strong odors of dry cleaning solvents were detected in the floor drain adjacent to the dry cleaning machines in the rear of the facility. As summarized in the letter report (Malcolm Pirnie, 1999), this floor drain presumably is connected to a sewer lateral beneath the slab of the facility. In turn, the sewer lateral presumably is connected to the sewer located to the rear of the Midtown Shopping Center. A sewer manhole is present on the west side of the shopping center. To better evaluate the layout of the sewer lines at the shopping center, Malcolm

Pirnie inquired about the existence of design drawings with the South Glens Falls Building Department and was informed that the plans were no longer available. As a result, the construction of the floor drain and sewers is currently unknown (Malcolm Pirnie, 1999).

As part of this investigation, six soil borings were advanced in order to characterize soil and groundwater quality in the area of the facility (Malcolm Pirnie, 1999). Each boring was advanced to a depth of 12 feet below ground surface (bgs). Three of the borings were located inside of the facility, and three borings were located in the paved area behind the building. Groundwater samples were collected from four of these soil boring locations approximately four feet into the groundwater.

The analytical results for PCE from the shallow soil samples (between 0.4 and 4 ft) collected from within the building exceeded the New York State Technical and Administrative Guidance Memorandum (TAGM) 4046 Recommended Soil Cleanup Objective of 1,400 µg/kg (Malcolm Pirnie, 1999). The actual concentrations are not legible in the report obtained for review. One deep soil sample (11 to 12 ft) was collected from within the interior of the building where all VOCs were below detection limits. Detected concentrations for the other VOCs in the interior borings ranged from 2.6 to 110 µg/kg, all detected from a single boring. One of the exterior borings had detectable VOC concentrations ranging from 2.9 to 9.4 µg/kg.

PCE was detected in all of the four groundwater samples at concentrations exceeding the New York State Class GA groundwater standard of 5 µg/L (Malcolm Pirnie, 1999). The actual concentrations are not legible in the report obtained for review. However, it is noted that the highest detection of PCE was 80,000 µg/L from an exterior groundwater sample adjacent to a sewer manhole.

Another third party investigation was a Remedial Investigation conducted by Northeastern Environmental Technologies in 2008 that included a soil boring program with monitoring well installation and a vapor intrusion testing program. During this investigation, eight soil borings were advanced, seven monitoring wells were installed, and one soil vapor extraction well was installed.

Soil samples were collected for field volatile organic compound analysis. Results from this field screening were used to choose two samples, both east of the facility, for laboratory analysis. It was determined that these samples were not impacted by the dry cleaning chemicals.

Also based on this investigation, groundwater samples collected to the north and east of the dry cleaning facility were not impacted. Samples collected adjacent to and west of the facility were found to have PCE and degradation products at concentrations exceeding DEC's 6NYCRR Part 703 water quality standards (Northeastern environmental Technologies Corp., 2008).

In February 2008, a soil vapor extraction (SVE) pilot test was conducted that determined the use of shallow vapor extraction wells would be a viable remedial alternative to remediate the VOC contamination at the Site. Based on information provided by NYSDEC, AECOM understands that a sub-slab depressurization system (SSDS) is in operation at the former dry cleaner facility.

1.2.3 Site Geology and Hydrogeology

According to previous investigations (Malcolm Pirnie, 1999), the soils beneath the site are composed of fine to medium sand with trace amounts of silt and gravel. During the 1998/1999 investigation, groundwater was encountered at approximately 16 feet bgs. Based on the local topography, the direction of groundwater flow in the area is expected to be to the west-northwest, towards the Hudson River which is a regional discharge area.

1.3 Work Plan Organization

This report, the Work Plan, provides the background information and administrative information including subcontracting, staffing, and schedule. Additional project plans which are integral components of the project documents are provided as attachments to this Work Plan and include:

- Field Activities Plan – Attachment A;
- Quality Assurance Project Plan – Attachment B;
- Health and Safety Plan – Attachment C; and
- Community Air Monitoring Plan – Attachment D

The scope and content of each of these plans is summarized in Section 2 of this Work Plan.

2.0 Scope of Work

The following scope of work, divided into five tasks, has been developed in accordance with the NYSDEC direction.

- Task 1 – Preliminary Activities;
- Task 2 – Phase I RI;
- Task 3 – Phase II RI;
- Task 4 – Remedial Investigation Report; and
- Task 5 – Feasibility Study Report.

2.1 Task 1 – Preliminary Activities

Task 1 will include the following:

- A NYSDEC file review;
- One trip to the site by the project team;
- Development of project scope and project schedule;
- Determination of project specific requirements and the scope of work;
- Obtaining and review of Environmental Data Review (EDR) Report; and
- Preparation of this Work Plan as well as preparing a site specific Field Activities Plan (FAP), a site specific Quality Assurance Project Plan (QAPP), and a site specific Health and Safety Plan.

2.2 Task 2 – Phase I RI

Task 2 will include the following:

- Utility locating and geophysical survey;
- A site survey;
- Soil vapor sampling;
- Advancement of 16 soil borings;
- Survey the condition and redevelop existing monitoring wells;
- Installation of up to five new monitoring wells; and,
- Conduct one round of groundwater sampling.

Details of the field activities to be completed during Task 2 are provided in the Field Activities Plan (FAP) as Attachment A.

2.3 Task 3 – Phase II RI

Task 3 will include the following:

- Utility locating and geophysical survey; and

- Installation of four monitoring wells and groundwater sampling.

Details of the field activities to be completed during Task 3 are provided in the FAP as Attachment A.

2.4 Task 4 – Remedial Investigation Report

Once all phases of RI data acquisition are completed, AECOM will prepare a comprehensive Remedial Investigation Report (RIR) in accordance with DER-10 Section 3.14. AECOM's subcontracted data validator will review all laboratory analytical data packages and document the validation findings in a Data Usability Summary Report (DUSR). Field data will be reviewed to determine limitations, if any, and to assure that the procedures employed were effective and that the data generated provides sufficient information to achieve the project objectives. All final documents (including Category B laboratory deliverables) will be submitted in electronic format on compact computer discs. In addition, all validated laboratory data will be submitted to NYSDEC in the required Electronic Data Deliverable (EDD) format. AECOM will submit the initial draft RIR in a searchable Portable Document Format (PDF) file. The final version of the RIR will be submitted in hard copy. NYSDEC will require two hard copies of the RI and FS reports. In addition to hard copies, one copy of the final reports will be submitted as a searchable PDF on a compact disc (CD).

2.5 Task 5 – Feasibility Study Report

The FS Report will be prepared in accordance with DER-10 Section 4. Potential alternatives to be evaluated will be no action, partial soil/source removal, in situ treatment of groundwater, and vapor intrusion mitigation systems. AECOM will submit the draft FS Report electronically as searchable PDF documents. The final version of the report will be submitted in hard copy. NYSDEC will require two hard copies FS report. In addition to hard copies, one copy of the final report will be submitted as a searchable PDF on a CD.

3.0 Staffing Plan and Schedule

A tentative schedule for this assignment is presented below:

Scope of Work Item	Completion Date
Preliminary Activities	4/6/12
Utilities Locate/GPR	4/6/12
Preliminary Site Survey	4/6/12
Phase I Soil Vapor Sampling	4/13/12
Phase I RI Drilling and MW Installation	4/13/12
Phase I RI Groundwater Sampling	5/11/12
Data Provided By Lab	6/8/12
Phase I Data Compilation/Review	7/6/12
Phase II GPR	7/13/12
Phase II MW Installation	7/20/12
Phase II Groundwater Sampling	8/10/12
Data Provided By Lab	9/7/12
All RI Data Validated	9/28/12
Submit Draft RIR	11/2/12
Submit Draft FS	11/23/12
Receive Comments on RIR	11/16/12
Receive Comments on FS	12/7/12
RIR Final	12/21/12
FS Final	1/30/13

An organizational chart is presented on Figure 2.

4.0 Green and Sustainable Remediation

The work completed as part of this work assignment will comply with all NYSDEC guidance documents including DER-31: Green Remediation (2010b). NYSDEC expects that the BMPs identified below will be implemented at sites unless a site-specific evaluation demonstrates impracticability or favors an alternative green approach:

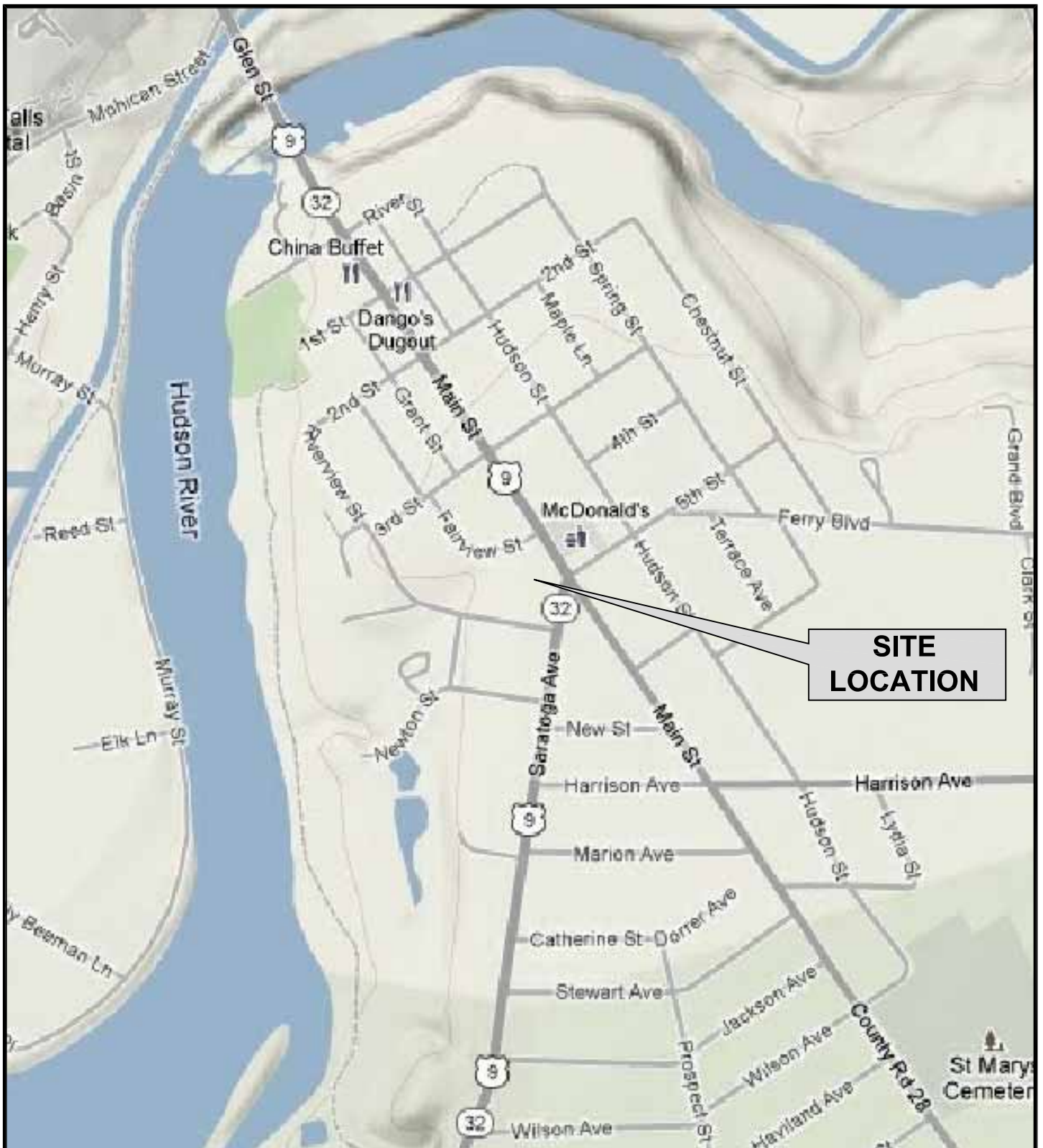
- Use renewable energy where possible or purchase Renewable Energy Credits (RECs). This BMP is not relevant to work being performed at the Site under this Work Assignment.
- Use of remediation technologies with an intermittent energy supply (i.e., energy use during peak energy generation only). This BMP is not relevant to work being performed at the Site under this Work Assignment.
- Incorporate green building design. Construction is not part of this Work Assignment; therefore, this BMP is not relevant to work being defined in this Work Plan.
- Reuse existing buildings and infrastructure to reduce waste. Construction is not part of this Work Assignment; therefore, this BMP is not relevant to work being defined in this Work Plan.
- Reuse and Recycle construction and demolition (C&D) debris and other materials (i.e., grind waste wood and other organics for on-site use). Construction and demolition are not part of this Work Assignment; therefore, this BMP is not relevant to work being defined in this Work Plan.
- Design cover systems to be usable (i.e., habitat or recreation). The work discussed in this Work Plan does not include a cover system; therefore, this BMP is not relevant to this Work Assignment.
- Reduce vehicle idling. Unnecessary idling of work trucks or drilling equipment will be kept to a minimum on the Site.
- Use of Low Sulfur Diesel Fuel (LSDF) or alternate fuels (i.e., biodiesel or E85). Where possible, this BMP will be implemented as part of this Work Assignment.
- Sequence work to minimize double-handling of materials. This BMP is not relevant to work being performed at the Site under this Work Assignment.
- Use energy efficient systems and office equipment in the job trailer. This BMP is not relevant to the work being performed at the Site under this Work Assignment. No systems will be run, and due to the relatively short duration of the field work, a trailer will not be used.

5.0 References

Malcolm Pirnie, 1999. Letter Report Re: Midtown Shopping Center, Phase II Investigation, South Glens Falls, New York. May 27, 1999.

Northeastern Environmental Technologies Corp, 2008. Remedial Investigation for Midtown Shopping Plaza, 112 Main Street, South Glens Falls, New York. NETC Project 07.1118075. May 2, 2008.

Figures



PLAN

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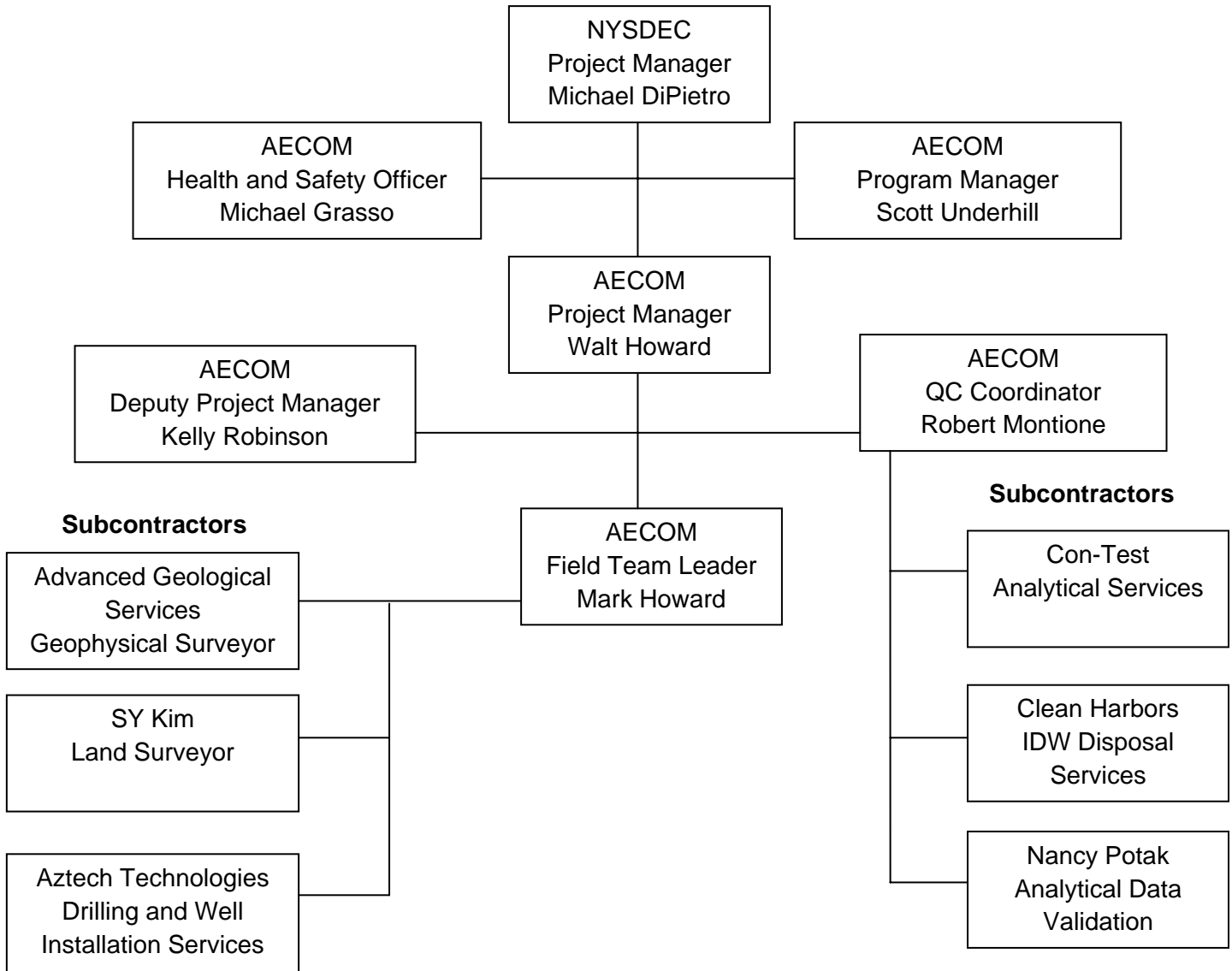
AECOM

**FIGURE 1
SITE LOCATION
MAP**

MIDTOWN SHOPPING CENTER
SOUTH GLENS FALLS, NYEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
60241403-SITE-LOC.dwg	—	60241403	3/2012	1

Figure 2
Project Organization Chart
Midtown Shopping Center
Work Assignment No. D007626-05



Appendices

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Field Activities Plan

Attachment B

Quality Assurance Project Plan

Attachment C

Health and Safety Plan

Attachment C

Community Air Monitoring Plan



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Field Activities Plan (FAP)

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D007626.05

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1.0 Introduction

This Field Activities Plan (FAP) describes field activities to be conducted by AECOM Technical Services Northeast, Inc (AECOM) under New York State Department of Environmental Conservation (NYSDEC) Standby Contract D007626.

1.1 Work Assignment Objectives

AECOM has been issued Work Assignment #D007626-05 under the New York State Department of Environmental Conservation (NYSDEC) State Superfund Standby Program. The site under this work assignment is Midtown Shopping Center (Site #546054).

The specific objective of this project is to conduct a Remedial Investigation and Feasibility Study (RI/FS) at the site to define the extent of previously identified soil and groundwater impacts resulting from activities at a dry cleaners business at the Site which is now closed.

Field activities are planned and conducted in general accordance with NYSDEC DER-10, Technical Guidance for Site Investigation and Remediation (NYSDEC, 2010), the United States Environmental Protection Agency (USEPA) Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (USEPA, 1988), and New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH, 2006).

1.2 Site Description and Background Information

Available site information is presented in the Site-specific Work Plan including the following:

- Site Description
- Site Location
- Site History
- Previous Investigations, Remedial Actions, and Reports
- Current Site Conditions
- Local and Regional Geology and Hydrogeology

2.0 General and Preparatory Field Activities

2.1 Mobilization

Following authorization to proceed with the field investigation from NYSDEC, AECOM and its subcontractors will mobilize necessary materials and equipment to the site. The subcontractor performing the intrusive work will be responsible for placing a call to DigSafely New York. Utility clearance is detailed in Section 2.3.

The Work Plan for this work assignment describes the provisions made for providing all necessary facilities and material, independent of the site owners/occupants. The necessary material will be mobilized to the site and stored in a vehicle (e.g., cargo van) for the duration of the field work. At the initiation of field activities, a temporary decontamination pad will be constructed that will remain in place during the field effort. Additionally, a drum storage area will be established for the temporary storage of investigation derived waste, including soil cuttings, monitoring well development water, decontamination fluids and purge water from groundwater sampling. Soil cuttings will be temporarily stored in drums.

A project kick-off meeting will be held prior to initiating field work to orient field team members and subcontractors with the site and to familiarize all site workers with site background, potential dangers, health and safety requirements and emergency contingencies and other field procedures.

2.2 Health and Safety

It is anticipated that the work will be performed in Level D personal protection with the potential to upgrade to Level C. Field workers will be instructed to keep Level C equipment available should it be needed. Should health and safety monitoring during field activities indicate a threat to field personnel or warrant an upgrade beyond Level C protection, work will stop and site conditions will be re-evaluated by NYSDEC and AECOM. An upgrade to Level B protection will require modification of the HASP and review by AECOM's district safety manager.

The site-specific HASP is included with this submittal as Attachment C.

2.3 Utility Clearance

Intrusive activities that will be conducted during this work assignment include soil borings, monitoring well installations, and soil vapor sampling. Prior to the start of intrusive activities, a call will be placed to New York DIG SAFE CALL CENTER at Dig Safely New York, 811 or 1-800 272-4480 for utility markouts to minimize the risk of encountering subsurface utilities. Site personnel will be contacted to determine if detailed utility plans are available for the Site. Soft dig technologies, such as an air knife, may also be used for utility clearance. In the event that the markouts indicate that utilities are close to

a proposed drilling location, the location will be moved to avoid utilities at the discretion of the field personnel and the drilling subcontractor.

2.4 Geophysical Surveys

Geophysical surveys will be conducted at the site using ground-penetrating radar (GPR). GPR utilizes high frequency radio waves to acquire subsurface information. From a small antenna, which is moved slowly across the ground surface, energy is radiated downward into the subsurface. This energy is then reflected back to the receiving antenna, where variations in the return signal are continuously recorded. This produces a continuous cross-section of the shallow subsurface conditions. Radar responds well to the different electrical properties between rock units, soils, groundwater, and most importantly for this application, buried pipes, utilities, and foundations.

During Phase I of the RI, AECOM will subcontract Advanced Geological Services (AGS) to conduct an interior and exterior survey of the investigation area. AGS will conduct a GPR survey of the site in attempt to locate possible dry wells, a suspected underground storage tank (UST), and underground utility lines, and to clear locations for test borings. AGS will also attempt to determine the location/alignment of a subsurface drain pipe that is presumed to extend from a floor drain inside the facility to an exterior sewer manhole.

During Phase II of the RI, AGS will clear the proposed Phase II well locations of utilities using GPR methods discussed above.

2.5 Community Air Monitoring

Community air monitoring will be performed as outlined in the Attachment D of the Work Plan, Community Air Monitoring Plan.

2.6 Site Survey

As part of the remedial investigation, AECOM will utilize available existing site maps and aerial photography to develop a site plan depicting general (existing) site features (e.g., buildings, roadways, etc.) within the vicinity of the site. The site plan will be used to depict planned investigation points. Following (or during, as needed) the field data acquisition phase of work, the locations of all sample points (soil borings, monitoring wells, surface water or sediment samples, etc.) will be surveyed by a (NYS-licensed professional land surveyor). The horizontal will be tied in to the North American Datum 1983 and UTM Zone 18N coordinate system. The vertical positions will be tied to the North American Vertical Datum 1988 (NAVD88). The measuring point associated with the existing monitoring wells or other site reference features will be recorded to a vertical accuracy of 0.01 ft. The final survey will be supplied in a digital CAD format (i.e., .dwg or .dxf files in the cited coordinate systems).

AECOM will subcontract SY Kim Land Surveyor to prepare a site topographic base map. The surveyor will conduct a preliminary survey of all physical features of the Midtown Plaza property, including property boundaries for adjoining commercial and residential properties between the Plaza

property and Hamilton Street to the south. As part of this work, the locations of underground utilities as identified from the Dig Safe call out and geophysical survey will be surveyed as marked out on the ground surface. Additional 'as-built' surveying of soil borings and monitoring wells will be conducted after Phase I and Phase II RI field work is completed.

2.7 Green and Sustainable Remediation

The work completed as part of this work assignment will comply with all NYSDEC guidance documents including DER-31: Green Remediation (2010b). To ensure compliance with DER-31 the work will be completed using the best practices and techniques (BMPs) described below. In addition to the items discussed in Section 6 – Field Records and Documentation, specific reporting methods relative to DER-31 are further described in the following subsection.

2.7.1 Best Practices and Techniques

DER-31 provides some examples of BMPs that could be applied during all phases of remediation (see Attachment 1 of the DER-31 policy). Additional resources to identify potential BMPs and techniques applicable to this work include:

- United States Environmental Protection Agency CLU-IN Green Remediation (www.clu-in.org/greenremediation/);
- Interstate Technology & Regulatory Council Green and Sustainable Remediation (www.itrcweb.org/teampublic_GSR.asp);
- NAVFAC Green and Sustainable Remediation (www.ert2.org/t2gsrportal/);
- Air Force Center for Engineering and the Environment Sustainable Remediation (www.afcee.af.mil/resources/technologytransfer/programsandinitiatives/sustainableremediation/index.asp); and
- Sustainable Remediation Forum (www.sustainableremediation.org).

Lastly, NYSDEC expects that the BMPs identified below will be implemented at sites unless a site-specific evaluation demonstrates impracticability or favors an alternative green approach:

- Use renewable energy where possible or purchase Renewable Energy Credits (RECs);
- Use of remediation technologies with an intermittent energy supply (i.e., energy use during peak energy generation only);
- Incorporate green building design;
- Reuse existing buildings and infrastructure to reduce waste;
- Reuse and Recycle construction and demolition (C&D) debris and other materials (i.e., grind waste wood and other organics for on-site use);
- Design cover systems to be usable (i.e., habitat or recreation);
- Reduce vehicle idling;
- Use of Low Sulfur Diesel Fuel (LSDF) or alternate fuels (i.e., biodiesel or E85);

- Sequence work to minimize double-handling of materials; and
- Use energy efficient systems and office equipment in the job trailer.

Prior to initiating any field work the Project Manager will identify applicable BMPs to be used for this work assignment. At a minimum, each BMP identified above will be included in the site-specific work plan with a discussion of how each practice or technique will be implemented or why a practice or technique is not appropriate to the work anticipated at the site.

2.7.2 Reporting

All Green and Sustainable BMPs employed during field activities will be discussed within the field log books described in Section 6.0 – Field Records and Documentation. Specifically, the field log books will acknowledge that the practices and techniques identified for the site work were taken each day (if applicable). In addition, the following information will be recorded within the field log books at the close of each day:

- The estimated quantity of fuel consumed by onsite vehicles and equipment;
- The estimated distance traveled by trucks and equipment delivering goods or removing waste; and
- The estimated water use during onsite activities.

The information will be compiled and presented to NYSDEC in a form suitable to the site-specific work completed.

3.0 RI Field Activities

3.1 RI Phase I

The Phase I RI will be performed to attempt to delineate the extent of subsurface site-related contamination within the shallow overburden geologic unit (glacial lacustrine sand overlying silty clay). The Phase I RI will include the following activities.

3.1.1 Soil Vapor Sampling

This work assignment includes a Soil Vapor Intrusion (SVI) study to evaluate the sub-slab soil vapor, indoor air, soil vapor quality around the exterior perimeter of the former dry cleaner facility and Midtown Plaza building, and outdoor air at the project site.

Soil vapor samples are collected from locations which are not beneath the foundation or slab of a building. Sub-slab soil vapor samples are collected from immediately beneath the slabs of the selected buildings. The indoor air samples will be collected from the floor of the building. The outdoor air samples are collected to characterize site-specific background (ambient) outdoor air conditions (i.e., from upwind of the structures at a breathing zone height).

Details of the typical field activities associated with SVI studies are presented in this section of the FAP.

Based on information provided by NYSDEC, AECOM understands that a sub-slab depressurization system (SSDS) is in operation at the former dry cleaner facility. A preliminary soil vapor/indoor air sampling event will be conducted at the start of the Phase I RI to assess current baseline conditions. A total of eleven (11) samples for EPA Method TO-15 analysis are planned for collection as follows:

- Sub-slab soil vapor samples from two locations within the dry cleaners facility;
- One sub-slab soil vapor sample from a sampling port located in the adjacent restaurant (if the sampling port is still present);
- One sub-slab soil vapor sample from a sampling port located in the adjacent retail store west of the former dry cleaners (if the sampling port is still present);
- One indoor air sample from within the dry cleaners facility;
- One soil vapor sample from five soil vapor sample points installed outside the dry cleaners (Figure 3); and,
- One background, outdoor air sample.

The soil vapor sampling will be performed in accordance with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, Final, October 2006. All samples will be collected in individually certified Summa canisters provided by the laboratory. To the extent possible, soil vapor points will be installed with curb box covers to allow them to be resampled.

3.1.1.1 SVI Study Objectives

The objective of the Soil Vapor Intrusion study is to evaluate whether vapor intrusion of compounds related to the site or suspected source is occurring in the structures within the Study Area and whether vapor hazards as a result of the soil or groundwater contamination may exist for receptors associated with the existing structures in the Study Area. The SVI study results may be used to identify the structures within the study area that require further investigation or mitigation/remediation.

The following tasks will typically be performed:

- Task 1 – Procurement of Access Agreements;
- Task 2 – Location Mark-Out and Utility Clearance Activity;
- Task 3 – Building Survey and Product Inventory in accordance with NYSDOH Guidelines;
- Task 4 – Sample Collection and Analysis; and
- Task 5 – Data Evaluation and Report Preparation

3.1.1.2 Access Agreements

A representative from the NYSDEC will contact the owner and tenants of each of the proposed sampling location sites within the Study Area to obtain permission to perform the work. AECOM will explain the scope of work and the proposed work schedule to the owner/tenant of each site within the Study Area.

3.1.1.3 Location Markout and Utility Clearance Activity

Prior to commencement of the sub-slab soil vapor sampling, AECOM's drilling subcontractor will notify the New York State One Call Utility for utility clearance. However, utility clearance from One Call Utility does not cover private property. Therefore, AECOM will engage a geophysical subcontractor (see section 2.4) who will delineate potential subsurface utilities at the structures using electromagnetic utility locating instruments. Utility markouts by the local one-call center and any information provided by the building occupants will be considered when locating the soil vapor and sub-slab soil vapor locations in the field.

3.1.1.4 Building Survey and Product Inventory

As required by the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York (SVI Guidance; NYSDOH, 2006), a building survey will be performed to identify and minimize conditions that may interfere with the proposed testing prior to collecting samples at each structure. The building survey will evaluate the type of building structure, floor layout, air-flow patterns (e.g., using smoke tubes), and the physical condition of the buildings being studied. Information obtained during the building survey, including information on sources of potential indoor air contamination, will be identified on the NYSDOH Indoor Air Quality Questionnaire and Building Inventory Form

(NYSDOH, 2006; Appendix B). As shown in NYSDOH Appendix B, specific information to be evaluated and noted during the building survey includes the following:

1. Occupant name(s) and address;
2. Owner or landlord information;
3. Building characteristics (e.g., commercial/industrial, number of units/tenants, number of floors, building age, etc.);
4. Construction characteristics, including foundation cracks and utility penetrations, ceiling construction and firewall separations, or other openings that may serve as preferential pathways for vapor intrusion;
5. Heating, ventilation, and air conditioning systems, including the type of heating system(s), type of fuel used, presence of a boiler/furnace, presence of aboveground or underground storage tanks, type(s) of air conditioning, and the presence of air distribution ducts;
6. Occupancy and the general use of each floor;
7. Factors that may influence indoor air quality, including attached garages, separate heating units in the garage, petroleum-powered machines stored in the garage, workshop or craft area, smoking in the building, exhaust fans in the kitchen or bathrooms, new carpets, fresh paints, etc.; and,
8. Type of water supply and sewage disposal.

A product inventory will also be conducted throughout each floor and the basement of each structure to identify chemicals and products that may bias sampling results. Product names and chemical ingredients listed on container labels will be recorded. If the ingredients are not listed on the label, the product's exact and full name, and manufacturer information will be recorded. Chemicals or products that are noted as being stored in a questionable manner (e.g., in an open container) that emit odor or yield positive field screening results will need to be controlled during the indoor air quality sampling to reduce potential interferences. Control options will be discussed with the building occupant and will include removal of the container (preferred option) or tightly sealing the containers.

The presence and description of odors and portable vapor monitoring equipment readings (e.g., PID readings) will be noted. Photographs will also be taken as appropriate during the building survey. Floor plans will be sketched to indicate sub-slab soil vapor and indoor air sampling locations, possible indoor air pollution sources, and PID meter readings. The PID meter will have a detection limit of 1 part per million (ppm).

The building superintendent/facility manager will also be questioned to provide information regarding the location of any potential utilities in the locations that are to be sampled.

Figure 3 indicates the general sample locations for the SVI; however, the exact location of the sub-slab soil vapor, indoor air, and outdoor air samples will be determined during the implementation of the study.

3.1.1.5 Soil Vapor and Air Sample Collection and Analysis

Procedures for collection of soil vapor, sub-slab soil vapor, and indoor and outdoor air samples are provided below.

Soil Vapor Sampling

Soil vapor probe installations may be permanent, semi-permanent or temporary. In general, permanent or semi-permanent installations are preferred for data consistency reasons and to ensure outdoor air infiltration does not occur. Temporary probes should only be used if measures are taken to ensure that an adequate surface seal is created to prevent outdoor air infiltration and if tracer gas is used at every sampling location. Soil vapor implants or probes should be constructed in the same manner at all sampling locations to minimize possible discrepancies. The following procedures should be included in any permanent construction protocol:

1. Implants should be installed using an appropriate method based on site conditions (e.g., direct push, manually driven, auger if necessary to attain the desired depth);
2. At a depth comparable to the depth of foundation footings (determined on a building-specific or site-specific basis) or at least 1 ft above the water table in areas where the groundwater table is less than 6 ft below grade;
3. Porous, inert backfill material (e.g., glass beads, washed #1 crushed stone, etc.) should be used to create a 1 to 2 ft long sampling zone;
4. Implants should be fitted with inert tubing (e.g., polyethylene, stainless steel, nylon, Teflon, etc.) of the appropriate size (typically 1/8 inch to 1/4 inch diameter) and of laboratory or food grade quality to the surface;
5. Soil vapor probes should be sealed above the sampling zone with a bentonite slurry for a minimum distance of 3 ft to prevent outdoor air infiltration and the remainder of the borehole backfilled with clean material;
6. For multiple probe depths, the borehole should be grouted with bentonite between probes to create discrete sampling zones, or separate nested probes should be installed; and
7. Steps should be taken to minimize infiltration of water or outdoor air and to prevent accidental damage (e.g., setting a protective casing around the top of the probe tubing and grouting in place to the top of bentonite, sloping the ground surface to direct water away from the borehole like a groundwater monitoring well).

To obtain representative samples and to minimize possible discrepancies, soil vapor samples should be collected in the following manner at all locations:

1. At least 24 hours after the installation of permanent probes and shortly after the installation of temporary probes, one to three implant volumes (i.e., the volume of the sample probe and tube) should be purged prior to collecting the samples;
2. Flow rates for both purging and collecting should not exceed 200 mL/min to minimize outdoor air infiltration during sampling;
3. Samples should be collected using conventional sampling methods, in an appropriate container, one which
 - Meets the objectives of the sampling (e.g., investigation of areas where low or high concentrations of volatile chemicals are expected; to minimize losses of volatile chemicals that are susceptible to photodegradation),
 - Is consistent with the sampling and analytical methods (e.g., low flow rate; Summa canisters if analyzing by using EPA Method TO-15), and
 - Is certified clean by the laboratory;
4. Sample size depends upon the volume of that will achieve minimum reporting limits; and
5. A tracer gas (e.g., helium) should be used when collecting soil vapor samples to verify that adequate sampling techniques are being implemented (i.e., to verify infiltration of outdoor air is not occurring).

In some cases, weather conditions may present certain limitations on soil vapor sampling. For example, condensation in the sample tubing may be encountered during winter sampling due to low outdoor air temperatures. Devices, such as tube warmers, may be used to address these conditions. AECOM will discuss anticipated limitations to the sampling with NYSDEC prior to the sampling event. When soil vapor samples are collected, the following actions should be taken to document local conditions during sampling that may influence interpretation of the results:

- If sampling near a commercial or industrial building, uses of volatile chemicals during normal operations of the facility should be identified;
- Outdoor plot sketches should be drawn that include the site, area streets, neighboring commercial or industrial facilities (with estimated distance to the site), outdoor air sampling locations (if applicable), and compass orientation (north);
- Weather conditions (e.g., precipitation and outdoor temperature) should be noted for the past 24 to 48 hours; and
- Any pertinent observations should be recorded, such as odors and readings from field instrumentation.

Additional information that could be gathered to assist in the interpretation of the results includes barometric pressure, wind speed, and wind direction. The field sampling team should maintain a sample log sheet summarizing the following:

- sample identification,
- date and time of sample collection,
- sampling depth,
- identity of samplers,
- sampling methods and devices,
- purge volumes,
- volume of soil vapor extracted,
- if Summa canisters are used, note the vacuum before and after samples were collected,
 - The February 2008 update to the 2005 NYSDEC ASP (NYSDEC, 2008) specifies allowable pressures (vacuum) for canisters. The initial canister vacuum must be 28 inches Hg \pm 2 inch Hg. The final canister pressure vacuum should be 5 inches Hg \pm 1 inch Hg. If final canister pressures are not within this range, contact the NYSDEC project manager before instructing the laboratory to analyze the canisters.
- apparent moisture content (dry, moist, saturated, etc.) of the sampling zone, and;
- Chain of custody protocols and records used to track samples from sampling point to analysis.

Sub-Slab Soil Vapor Sampling

Sub-slab soil gas samples will be collected from the buildings or other locations as described in this FAP.

In accordance with NYSDOH SVI Guidance (October 2006), a temporary sample point will be advanced to collect sub-slab soil gas sample at pre-selected locations. If possible, the heating/cooling system at each of the structures will be operated continuously to maintain a normal temperature (i.e., 65° to 75° F) for at least 24 hours prior to and during the scheduled sampling time. The samples will be collected from a depth of approximately 2 to 6 inches below the floor slab.

The following steps will be taken to collect samples:

1. A 3/8-inch diameter or maximum 1-inch diameter hole will be drilled through the building floor at the proposed sub-slab soil vapor location with a hammer drill;
2. Upon the confirmation of slab thickness, the drill bit will be advanced approximately 3 inches into the sub-slab material to create an open cavity;
3. The vapor probe will then be installed and set flush with the top of the ground surface. The annular space will be sealed using either modeling clay, beeswax, or other non-volatile emitting material and non-shrinking product;

4. Teflon-lined tubing will be connected to a pre-evacuated 6-Liter (L) summa canister with a 24-hour regulator;
5. Sufficient time will be provided for the sealing material to set prior to connecting the vapor probe to a Teflon tube;
6. Prior to collection of samples, the temporary vapor probe will be purged by drawing three volumes through the probe using a 60 mL syringe;
7. Upon completion of the purging, the Summa canister will be connected to the probe by Teflon-lined tubing. The flow rate will be regulated using a flow regulator to maintain a flow rate during of about 4 mL/min; and,
8. Upon completion of the 24-hour period, the Summa canister will be retrieved. Prior to disconnecting the Teflon tubing connections, the Summa canister valve will be closed.

During the sampling, the initial and final vacuum readings of each canister will be noted on a Field Form. In addition, smoke tubes will be used during the sub-slab sampling to confirm pressure relationships and airflow patterns, especially between floor levels and sub-slab. Upon completion of the sample collection and screening steps, each penetration hole advanced through the slab will be patched with cement or will be repaired to restore pre-sampling conditions.

Indoor and Outdoor Air Sampling

Indoor air samples are proposed to be collected within the basements, if present, and the first floors of each of the structures. In addition, an outdoor ambient air sample will be collected concurrently with the indoor air samples to determine the extent to which outdoor sources may be influencing indoor air quality within the sampling area.

As specified in the SVI Guidance (NYSDOH, 2006), to reduce the potential for interference and dilution effects, the occupants of the buildings to be sampled will be requested to refrain from the activities listed below for the 24-hour period prior to and during the ambient air sampling collection:

- Opening any windows, fireplace dampers, openings or vents;
- Operating any ventilation fans unless special arrangements are made;
- Smoking in the building;
- Painting;
- Using a wood stove, fireplace, or other auxiliary heating equipment (e.g., kerosene heater);
- Operating or storing an automobile in the building or an attached garage;
- Allowing containers of gasoline or oil to remain within the building or garage area, except for fuel oil tanks;

- Cleaning, waxing or polishing furniture, floors or other woodwork with petroleum or oil-based products;
- Using air fresheners, scented candles or odor eliminators;
- Engaging in any hobbies that use materials containing volatile chemicals;
- Using cosmetics including hairspray, nail polish, nail polish removers, perfume/cologne, etc.;
- Lawn mowing, paving with asphalt, or snow blowing;
- Applying pesticides; and,
- Using building repair or maintenance products, such as caulk or roofing tar.

Indoor air and outdoor air samples will be collected concurrently with the sub-slab soil vapor sampling. The indoor and outdoor air samples will be collected from the breathing zone height (i.e., 4 to 6 ft above the floor). The indoor air and outdoor air samples will be collected using 6-L Summa canisters over a 24-hour period. A section of disposable Teflon-lined tubing will be extended from the Summa canister to collect the indoor and outdoor air samples from the breathing zone in accordance with the SVI Guidance (NYSDOH, 2006).

The field sampling team will maintain a sample log sheet summarizing the sample identification, date and time of sample collection, identification of samplers, sampling methods and devices utilized, vacuum of canisters before and after samples are collected, and sample analyses.

Soil Vapor Sample Identification

Samples will be assigned a unique identification using the sample location or other sample-specific identifier. The general sample identification format below will be followed.

SS-XX

BS-XX

FF-XX

OA-XX

TB-XX

Where:

SS = Sub-slab Soil Vapor Location identifier

BS = Basement Indoor Air Sample Location identifier

FF = First Floor Indoor Air Sample Location identifier

OA = Outdoor Ambient Air Sample Location identifier

TB = Trip Blank (not typically used for canister sampling; will be submitted on a case by case basis as requested by NYSDEC).

XX = Numerical sample identifier (2 characters). This will ordinarily be an arbitrary, sequential number and will correspond to sample location information and numbering.

Trip blanks will be numbered sequentially (e.g., TB-01 will be the first trip blank submitted). Field duplicates will be submitted 'blind' by adding 50 to the sample number (e.g., sample BS-62 would be the field duplicate of sample BS-12).

Site Restoration

If necessary, upon completion of soil vapor or sub-slab soil vapor sampling, an AECOM subcontractor will repair the carpet/floor tile to restore the work area to its previous conditions. The nature and extent of site restoration that will be required upon completion of the SVI sampling will be determined on a case-by-case basis.

Soil Vapor Sample Analytical Requirements

AECOM will use a NYSDOH Wadsworth Environmental Laboratory Accreditation Program (ELAP) laboratory certified for the air and emissions category. The Summa canisters will be certified clean (batch certification) by the laboratory. Air samples are typically analyzed for VOCs by USEPA Method TO-15.

For indoor air samples and outdoor air samples, the required detection limit for trichloroethene (TCE), carbon tetrachloride, and vinyl chloride (the three "Matrix 1" compounds) is 0.25 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$). For the remaining compounds, the reporting limit will be 1.0 $\mu\text{g}/\text{m}^3$ (sub-slab soil vapor, indoor air and outdoor air samples). The laboratory-specific detection limits and quantitation limits for TO-15 analytes are included in the QAPP.

Decontamination Procedures

Only dedicated equipment (canisters, tubing, etc.) will be used during sampling. All non-dedicated equipment (i.e. flow meters, etc.) will be purged with air prior to sampling. As such, no field decontamination is necessary for air sampling. Summa canisters will be decontaminated by the analytical laboratory and certification of cleanliness will be included in the analytical data report.

3.1.2 Existing Monitoring Well Condition Survey

NYSDEC has provided AECOM previous reports by the property owner indicating that as many as thirteen groundwater monitoring wells may have been installed during previous investigations at the site (Figure 3). An assessment of the condition of existing monitoring wells will be conducted to determine how many of the previously installed wells are still available and suitable for sampling. The following will be part of this survey.

- Utilize available information to locate the well. If the well is found, and in a location where acceptable to the site owner, an identifying marker will be placed adjacent to the well (e.g., if in pavement, spray-paint well number; if lawn or unimproved area, place pin flag or lathe).
- Record the approximate location using field GPS (the exact location will be surveyed later).
- Record surface completion and integrity, condition/attitude of casing, and presence of lock.
- Inspect the well cover or cap for evidence of biological hazards such as wasp nests or spider webs; record if present.
- Prior to opening the well, screen around the well cover or cap for organic vapors (using MultiRAE photoionization detector (PID) or similar instrument). If safe, carefully open the well and repeat the screen. Record all data.
- After opening the well, record, as a minimum, the following information
 - Evidence of depth measurement reference point (e.g., notch in casing)
 - If a reference point does not exist, and it is likely that the well will be suitable for use in the investigation, establish a reference point on the casing.
 - Well diameter
 - Material of construction
 - Depth to water (0.01 ft)
 - Total depth of well (0.1 ft)
- Secure the well cover and decontaminate water level monitoring probe.

The information obtained will be recorded on a well condition survey form (example provided in Appendix A). The information from the well condition survey will be used to refine, and if necessary modify, the list of wells to be sampled or the number or location of new wells to be installed as part of the subsequent field activities.

3.1.3 Soil Borings

Sixteen (16) soil borings will be advanced during Phase I of the RI, using direct-push technology. Thirteen of the borings will be located inside the facility, and three located outside the facility. Soil boring locations will be chosen based on the results of the utility locating/GPR surveys. At each boring, soil will be continually sampled from ground surface to a depth necessary to define the vertical extent of contamination (based on visual/olfactory/photoionization detector (PID) screening evidence), or until drilling refusal is encountered, whichever is shallower. Based on soil boring logs from previous investigations provided to AECOM by NYSDEC, borings are not expected to exceed depths of 20 feet.

Ten (10) soil samples from the borings will be submitted to the analytical laboratory for analysis of TCL VOCs +10 (EPA 8260B), TCL SVOCs +20 (EPA 8270C), TCL Pesticides (EPA 8081A), TCL

PCBs (EPA 8082), TAL Metals including mercury (EPA 6010B and 7471A) and Cyanide (EPA 9010B). The 10 samples to be analyzed for these parameters will include:

- One surface soil sample (six-inch soil interval beneath pavement and sub-base) from each of the three exterior soil borings;
- Samples with highest PID readings from six of the interior soil borings; and,
- One sample collected from the exterior soil boring drilled adjacent to the sewer manhole.

At each soil boring, a total of up to two samples will be collected for analysis of TCL VOCs +10 (to be inclusive of the 'full-suite' samples listed above). Collection of these samples will be based on PID screening results. Where borings encounter elevated PID readings, the sample with the highest PID reading will be submitted for analysis. The boring will be advanced until PID readings indicate the vertical extent of impact has been reached at which depth the second sample will be collected. In borings where no visual/olfactory/PID evidence indicates VOC impact, only one sample will be collected at the base of the boring for lab analysis.

The direct push drilling procedures will follow ASTM D6282-98 (Standard Guide for Direct Push Sampling for Environmental Site Characterization). Liners will be new and unused. The retrieved sampler will be opened as soon after retrieval as possible. The soil retained in the sampler will be visually evaluated, and will also be screened with a PID.

Samples for VOC analysis will be collected prior to sample homogenization. The soil will be placed directly in a field-decontaminated stainless steel bowl for homogenization. Homogenization will be accomplished using a decontaminated stainless-steel spoon or spatula. If possible, sufficient pre-cleaned equipment will be brought to the site. If this is not practical, stainless-steel bowls, spoons, and spatulas will be field-decontaminated prior to use and between uses, as described in Section 4.1. Homogenization will involve the thorough mixing of the selected six-inch interval in order to provide a well mixed, representative sample to the laboratory. Once homogenized, the soil sample will be transferred directly to the appropriate sample containers, slightly tamped-down, filled to near the top of the container, and sealed with the appropriate cap. Sample containers and preservation techniques are listed in the QAPP.

The process will be repeated for each interval of borehole penetration where samples are required. Decontamination of direct push technology (DPT) sampling equipment used in soil sampling will follow the decontamination procedures in Section 4.

3.1.3.1 Subsurface Soil Logging

Subsurface soil logging will be conducted for borings advanced by direct push methods or by hollow stem augers (HSAs). Soil boring logs will be prepared in the field by a qualified, experienced geologist or engineer, as borings are drilled. Boring logs will be prepared on a standard drilling log form, an example of which is provided in Appendix A. The final logs will be typed into an Excel spreadsheet.

Soil borings will be logged, with each type of material encountered being described on the log form. All relevant information in the log heading and body will be completed. If surveyed horizontal control is not available at the time of drilling, location sketches referenced by distances to permanent surface features will be shown on or attached to the log.

Each material type encountered will be described on the log form. Descriptions of unconsolidated materials will include Unified Soil Classification System (USCS) in accordance with ASTM D-2487-00, consistency of cohesive materials or apparent density of non-cohesive materials, moisture content assessment, color, other descriptive features such as bedding characteristics, organic materials, macrostructure of fine-grained soils, and depositional type. A Summary Sheet will accompany the logger for easy reference to the USCS Soil Classification System; a copy of is provided in Appendix A.

Depth information will be from direct measurements accurate to ± 0.1 ft. Stratigraphic/lithologic changes will be identified by a solid horizontal line at the appropriate scale depth on the log that corresponds to changes at the measured borehole depth. Gradational changes identified from cuttings will be identified by a horizontal dashed line at the appropriate scale depth based on the best judgment of the logger. Lines will be drawn with a straight edge. Boring logs will clearly show the depth interval from which all samples are obtained. Logs will also indicate the presence or absence of water in boreholes, the depth at which water is first encountered, the depth to water at the completion of drilling, the stabilized water depth, and the time allowed for the levels to stabilize.

Boring logs will show drilling detail, including borehole and sample diameters, the depth at which changes occur in drilling or sampling methods or equipment, and the total depth of penetration and sampling. The bottom of the borehole will be identified by "Bottom of Borehole" clearly on the log. Any drilling or sampling problems will be noted on the logs, including descriptions of resolutions. Logs will include other information relevant to the investigation, including odors, field screening and test results, and any evidence of contamination of samples, cuttings, or drilling fluids. Boring logs will be submitted in the draft and final reports.

3.1.4 Monitoring Well Installation

Five shallow monitoring wells will be installed during the Phase I RI using direct-push technology in order to supplement the existing wells in defining the extent of Site contamination. One of the monitoring wells will be installed inside the former dry cleaner facility. The remaining four wells will be located outside the building. The wells will be constructed of 1-inch PVC threaded riser pipe with 5 or 10 feet of pre-packed slotted well screen, depending on the depth to the water table and the total boring depth. The wells will be a maximum of 20 feet deep. The borehole annulus of all wells will be sealed with bentonite grout and the well head will be secured with a curb box protective casing. AECOM has assumed, with the NYSDEC Project Manager concurrence, that existing shallow direct-push wells installed during a previous investigation will be available during the RI.

One soil sample will be collected from each of the four soil borings that will be drilled for installation of the shallow monitoring wells located outside the building. These samples will be collected from

immediately above the water table. These samples will be submitted to the laboratory for analysis of TCL VOCs +10 (EPA 8260B).

3.1.4.1 Monitoring Well Surface Completions

Monitoring wells will be completed with either a flushmount protective casing or a steel stickup protective casing depending on Site conditions. For stickup completions, the PVC or steel well casing will extend approximately 2.5 ft above the ground surface. A steel protective casing will be placed over the well riser. A 2-ft by 2-ft by 4-inch concrete pad will be constructed around the casing. For flushmount completions, a flushmount lid will be set over the well riser and set in a concrete collar.

3.1.4.2 Well Development

Each new (and if necessary, existing) monitoring well will be developed to remove fine grained soils introduced during the drilling process and to improve hydraulic connection between the formation and the well screen. A suitable pump will be selected for development at each well. Pump selection will depend upon monitoring well casing diameter, depth to water, anticipated drawdown, volume of water required to be removed, and access well or electric power supply. Typical pumps include electric submersible, bladder, and peristaltic. If necessary, other options include bailers and hand-operated, positive displacement pumps (e.g., Waterra).

Each well will be developed until the purge water is clear. During development, the field supervisor will record development information on the Well Development form. Periodic readings (every 0.5 to 1 well volume) will include depth to water, pumping rate, temperature, pH, conductivity and turbidity. The goal of development will be to remove at least several casing volumes of water and achieve a turbidity reading of 50 nephelometric units (NTU) or less. If these development goals have not been achieved after two hours of development, the field supervisor will contact the AECOM Project Manager who will contact the NYSDEC Project Manager for further instructions.

3.1.5 Groundwater Sampling

Water level measurements and groundwater sampling will be conducted at the newly installed and pre-existing monitoring wells, including a total of up to seventeen wells. One round of groundwater samples will be collected from the monitoring wells during the Phase I RI. All samples will be submitted to the laboratory for analysis of VOCs (EPA 8260B), SVOCs +20 (EPA 8270C) and TAL Inorganics (6010B). In addition, samples from four wells will be submitted for analysis of monitored natural attenuation (MNA) parameters (two wells in the immediate vicinity of the presumed source area, one adjacent to the site, and one downgradient of the site).

3.1.5.1 Low Flow Sampling Technique

Groundwater sampling will be done in accordance with *Groundwater Sampling Guidelines for Superfund and RCRA Project Managers* (USEPA OSWER 542-S-02-001). The default groundwater sampling method will be in accordance with EPA's low stress (often referred to as low flow) sampling technique (EPA, 1998).

A bladder pump (or similar submersible pump) will be used to purge the wells. The pump intake will be set at the midpoint of the screened interval. The pump will be operated at a flow rate of 300 to 500 milliliters per minute (mL/m). Dedicated Teflon or Teflon-lined tubing will be used for groundwater sample collection. Field parameters will be recorded on the Well Sampling Form (see Appendix A) every five minutes during purging and will include:

- flow rate (mL/min)
- depth to water (0.01 ft)
- temperature (degrees Celsius)
- pH (dim)
- specific conductance (millisiemens per centimeter [ms/cm])
- DO (milligrams per liter [mg/L])
- ORP (millivolts [mV])
- turbidity (NTU)

A flow-through cell will be used to obtain temperature, pH, specific conductance, DO, ORP, and turbidity. Purging will be considered complete when the indicator parameters have stabilized over three consecutive readings. Stabilization parameters are:

- purge rate: between 300 and 500 mL/m;
- depth to water: less than 0.3 ft drawdown during purging;
- pH: ± 0.1
- conductivity: $\pm 3\%$
- DO: $\pm 10\%$ (mg/L)
- ORP: ± 10 mV and
- Turbidity: less than 50 NTU.

If stabilization is not achieved after two hours of purging, the field team leader will notify the AECOM Project Manager who will contact the NYSDEC Project Manager for further instruction (unless default contingencies are established in advance).

During sample collection, the flow-through cell will be disconnected and the sample tubing discharge will be directed into the laboratory supplied sample containers. The flow rate will be decreased to approximately 100 mL/m during sample collection for volatile organic compounds (VOCs) analysis. Groundwater samples will be packaged in accordance with Section 6 and submitted to the laboratory for analysis.

3.2 RI Phase II

The Phase II RI will be conducted following the compilation and review of the Phase I results by AECOM and NYSDEC. The scope of work for the Phase II presented below generally follows that requested in the NYSDEC's Work Assignment authorization, but may be modified based on the Phase I findings.

3.2.1 Utility Locating and Geophysical Survey

AECOM will have the geophysical Standby Subcontractor clear proposed Phase II well locations of utilities using GPR methods.

3.2.2 Monitoring Well Installation

Four deep groundwater monitoring wells are planned for installation as part of the Phase II RI using truck-mounted rotary drilling techniques. Borings will be advanced to a depth of 40 feet below grade or the bedrock if it is shallower than 40 feet. The borings will be advanced using 4.25" I.D. hollow stem augers (HSA). Soil will be continuously sampled using a 2-inch O.D. split-spoon sampler. In the event that bedrock is present at a depth of less than 30 feet below grade, the borings may be advanced into bedrock for installation of shallow bedrock wells. This determination will be made in the field after consultation with and approval by the NYSDEC Project Manager. Bedrock drilling would proceed with nominal 4-inch diameter wash rotary or HQ coring methods to a maximum depth of 15 feet into bedrock.

A 2-inch diameter PVC monitoring well will be installed in each of the four borings, whether completed in overburden or bedrock. The monitoring wells will be completed with well screen sand pack, bentonite pellet seal, and cement-bentonite grout to surface. A locking curb box will be installed at each well.

The monitoring wells will be developed after installation by bailing or pumping. All purge water and decon water generated from the well installation and development will be containerized in drums and sampled for waste characterization analysis, and subsequently disposed off-site.

3.2.3 Groundwater Sampling

A second round of water level measurements and groundwater sampling will be conducted during Phase II. All the wells sampled in Phase I and the four wells installed in Phase II will be sampled. Samples will be submitted to the laboratory for analysis of VOCs (EPA 8260B).

3.2.4 Investigation Derived Waste (IDW)

Investigation derived waste (IDW) will be containerized in drums or other appropriate vessels and disposed off-site. An estimated ten drums of soil and four drums of water will require off-site disposal from the Phase II RI. One composite sample of drummed soil will be submitted to the laboratory for RCRA waste characterization analysis.

3.3 Monitoring Well Decommissioning and Borehole Abandonment

Monitoring well decommissioning will be performed if/when necessary in accordance with NYSDEC Policy CP-43 (NYSDEC, 2009). Several methods are available such as grouting in place, casing perforation/grouting in place or over-drilling. The best method is dependent on the type of well and construction details.

The preferred method for borehole abandonment will be to containerize all cuttings for proper disposal as detailed in Section 4.0 and grout the borehole upon completion of sampling activities.

4.0 Decontamination and Management of Investigation Derived Waste

4.1 Equipment Decontamination

To avoid cross contamination, sampling equipment (defined as any piece of equipment which may contact a sample) will be decontaminated according to the following procedures. Field equipment rinsate blanks are generated and analyzed to monitor the effective of field decontamination procedures.

Cross contamination is minimized by the use of vendor-decontaminated, dedicated, disposable equipment to the extent practical.

4.1.1 Decontamination Procedures

As indicated in the FAP, a decontamination pad may be constructed on the site. The pad will be sized to be large enough to handle the equipment used on site (e.g., drill rig). Additionally, the pad will be used for small equipment decontamination as well as personnel decontamination.

4.1.2 Small Equipment Decontamination

Small equipment decontamination for non-disposable equipment such as Geoprobe® HydroPunch® samplers, transducer probes and cables, will be accomplished using the following procedures:

- Alconox (or equivalent) and potable water wash;
- Potable water rinse;
- Distilled/deionized water rinse;

Solvents will not be used in the field decontamination of such equipment. Decontamination will include scrubbing/washing with a laboratory grade detergent (e.g. Alconox) to remove visible contamination, followed by potable (tap) water and analyte-free water rinses. Tap water may be used from any treated municipal water system; the use of an untreated potable water supply is not an acceptable substitute.

Equipment should be allowed to dry prior to use. Steam cleaning or high pressure hot water cleaning may be used in the initial removal of gross, visible contamination.

Electric submersible pumps (such as a Grundfos Redi-Flow II) will be decontaminated using the above steps followed by running a large volume (several gallons) of potable water through the pump, followed by an analyte-free water rinse. Tubing will not be re-used (new tubing will be used for each well). Submersible pumps and supporting lines and cables will be placed in a plastic bucket filled with

Liquinox and potable water and then run for several minutes (to decontaminate both exterior and interior parts). The process will be repeated with potable water. Submersible pumps will also be given a final analyte-free water rinse of both interior and exterior parts.

If bladder pumps are used, the pump will be disassembled and cleaned after each use. A new bladder will be used for each sample. Small parts, such as screens and gaskets will be replaced after each use. Dedicated air line tubing and Teflon sample tubing will be used at each monitoring well. The pump will be cleaned using the following steps:

- Alconox (or equivalent) and potable water wash;
- Potable water rinse;
- Distilled/deionized water rinse;
- Solvent (reagent or pesticide grade) rinse if samples are collected for organic analysis;
- Dilute (10%) nitric acid rinse if samples are collected for metals analysis;
- Distilled/deionized rinse, air dry.

4.1.3 Heavy Equipment Decontamination

Drilling equipment will be decontaminated before the first use, between boreholes and prior to demobilization using high-pressure steam. Decontamination will be conducted at a dedicated decontamination pad constructed for the project. Decontamination fluids will be containerized (drummed) for subsequent characterization or disposal.

4.1.4 Personnel Decontamination

Wash buckets and potable water will be set up at the decontamination pad. This includes washing hands and a boot wash. Details of the personnel decontamination procedures will be provided in the HASP.

4.2 Management of Investigation Derived Waste

IDW management will be in accordance with section 3.3(3e) of DER-10 (NYSDEC, 2010). The sampling methods and equipment will be selected to limit both the need for decontamination and the volume of investigation-derived waste (IDW). Personal protective equipment and disposable sampling equipment will be placed in plastic garbage bags for disposal as a solid waste. Types of IDW typically generated include: soil cuttings from soil borings and monitoring well installation; development and purge water from the wells; and decontamination water from the drill rigs, Geoprobe rigs and equipment. Monitoring well purge water, and decontamination water will be containerized for characterization and subsequent disposal.

Drill cuttings and other soil generated on-site during an investigation will be considered contaminated. Cuttings may be placed back in the borehole if free product or grossly contaminated soils are not

present in accordance with the provisions specified in DER-10 Section 3.3(e)1. All other soils will be containerized in either new or reconditioned drums and stored within the designated IDW staging area. Drummed material will be characterized and disposed of in accordance with all applicable State and Federal regulations.

Off-site soil cuttings will generally not be considered contaminated unless screening indicates the presence of hazardous constituents. Cuttings will be returned to the borehole following the provisions of DER-10 or placed in drums and transported to the staging area for characterization and proper disposal.

Well development water and purge water from sampling will be containerized and handled in accordance with the provisions of DER-10. Waste water containing non-aqueous phase liquids (NAPL), sheens, olfactory or visible evidence of contamination will be characterized for proper disposal. If testing indicates that the liquids are not hazardous, the water may be recharged to unpaved ground with the permission of NYSDEC.

5.0 Field Records and Documentation

The objective of this subsection is to provide consistent procedures and formats by which field records will be kept and activities documented, and a methodology by which field records will be managed. Field records and documentation to be used during field activities include Field Log Books and Standard Forms. Standard Forms include chain-of-custody (COC) forms, Drilling Logs, Well Installation Diagrams, Well Development Forms, Well Sampling Forms, Well Condition Forms, and investigation derived waste (IDW) Log Sheets. Example forms are provided in Appendix A.

5.1 Field Log Books

Field log books will be prepared and maintained throughout the course of the investigation. Only bound, weatherproof field log books will be used by personnel working on NYSDEC projects. The log books will be turned in for copying/filing/tracking when complete.

Each log book will be labeled on the front cover in indelible ink with the following designation: "Site Name/Project Type, NYSDEC Work Assignment D007626-xx, AECOM Project Number zzzzzz."

Log book entries will be recorded in indelible, waterproof ink. If errors are made in any field log book, field record (form), Chain-of-Custody Record, or any other field record document, corrections will be made by crossing a single line through the error, entering the correct information, and initialing and dating the correction.

Entries will be made in the following format. Documentation and reporting of events and activities will be made in chronological order on the right page of an open log book. The left page of the log book will be used for extemporaneous reporting, such as sketches, tables, providing details or comments on events reported sequentially, or interpretations, and notes identifying use of any other field documentation such as COCs and Standard Forms.

Standard Forms have been adopted in this FAP to facilitate the collection of consistent data (See Appendix A). This will preclude detailed documentation of, for example, lithologic descriptions in the Field Log Book. A reference, however, to use of each specific form must be made in the log book.

The date will be placed at the top of every page in the left-hand corner of the right page. The time of entry recordings will be in columnar form down the left-hand side of the right page. If an entry is made in a non-dedicated log book, then the date, project name, and project number will be entered left to right, respectively, along the top of the right page. Entries should be dated, and time of entry recorded. At the beginning of each day, the first two entries will be

“Personnel/Contractors On Site” and “Weather.” At the end of each day's entry or particular event, if appropriate, the person entering the field notes should draw a diagonal line originating from the bottom left corner of the page to the conclusion of the entry and sign along the line indicating the conclusion of the entry or the day's activity.

Entries in field log books will be legible (printing is preferable) and will contain accurate and inclusive documentation of project activities (investigation, monitoring remediation, closure, maintenance, etc.). Information pertaining to health and safety aspects, personnel on site, visitor's names, association, and time of arrival/departure, etc., should also be recorded. Language should be objective, factual, and free of personal feelings or other terminology that might prove inappropriate, since field records are the basis for later written reports. Once completed, these field log books become accountable documents and must be maintained as part of the project files.

Sample collection and handling activities, as well as visual observations, will be documented in the field log books. The sample collection equipment (where appropriate), field analytical equipment, and equipment used to make physical measurements will be identified in the field log books. Calculations, results, and calibration data for field sampling, field analytical, and field physical measurement equipment will also be recorded in the field log books, except where these are referenced as being recorded on approved field forms. Field analyses and measurements must be traceable to the specific piece of field equipment utilized and to the field investigator collecting the sample, making the measurement, or conducting analyses. Log books will be updated as field work progresses.

When an individual log book is full, the log book will be submitted to the AECOM project manager for final cataloging and filing. The log books will be stored in the Project File. Copies of specific sections will be made available to personnel upon request.

5.2 Standard Forms

All non-bound field records (e.g., drilling logs, well construction forms, sampling records, COCs, aquifer testing forms) will be completed the day the associated activity occurs. Field data collected using electronic data loggers or computer entry forms, will be downloaded as soon as practical onto CDs or uploaded to office servers. If possible, the person collecting the data will download electronic data on a daily basis. This person will be responsible for verifying that the data collected are adequately represented in electronic media and in the file. A hard copy of the data, and any graphical representation produced by logging software, will also be printed out and duplicated. Examples of forms typically used are provided in Attachment A of this FAP.

5.3 Sample Identification

During this project, a unique sample identifier will designate each sample collected. The following system may be used to assign unique sample identification numbers; however, modifications

should be made as needed to clearly and appropriately identify samples for each site or project. Each sample will be identified by an alphanumeric character identifier, as described below.

The following codes will be used for identifying other sample types:

<u>CODE</u>	<u>Sample Type</u>
MW	Monitoring well
SB	Soil boring
SW	Surface water
SD	Sediment
IA	Indoor air
OA (or AA)	Outdoor (or ambient) air
SV	Soil vapor
FB	Field (Rinsate) Blank
N + 50	Field Duplicate (e.g., field duplicate of MW-3S will be MW-53S)
TB	Trip Blank
MS/MSD	Matrix Spike/ Matrix Spike Duplicate

Field blanks and trip blanks will be labeled for the day of collection. For MS/MSD samples, the MS/MSD will be added to the sample ID and included on the COC as a note.

An example of the sample numbering system is provided below.

<u>Sample Identifier</u>	<u>Description</u>
MW-1S	Shallow well MW-1S
MW-101D	Deep monitoring well MW-101D
SB-02-0406	Soil sample from 4 to 6 ft interval from boring SB-02.
SS-01	Surface soil sample from location SS-01.
FBW110502	Field blank associated with water samples collected on 5/2/11
TB110503	Trip blank associated with samples shipped 5/3/11.

5.4 Sample Labeling

A non-removable label will be affixed to each sample container. Labels will be marked with permanent marker pens. The following information will be contained on each label:

Project name;
Sample identifier;
Company (AECOM);
Sample date and time;
Sampler's initials;
Sample preservation; and
Analysis required.

5.5 Sample Chain of Custody

At the time of the sampling, a field team member will record the sample information in the field log book, well sampling form or drilling log, and on a COC form. The sample information recorded in the log books will be at least as detailed as that recorded on labels, and should indicate the type of sample (e.g., groundwater, soil), sample preservation, and sampling location, in sufficient detail as to allow re-sampling at the same location. Errors on forms or logbook entries will be stricken with a single line and corrected, with the date and initials of the person making the correction.

After samples are collected, the field team member will immediately place the filled containers in coolers and iced to 4 degrees Celsius ($^{\circ}\text{C}$). Samples will be preserved as required and specified in the QAPP. The field team will maintain custody of the samples until they are shipped to the laboratory. The entries on the COC form will correspond to the field log book, standard forms, and sample labels.

Original white copies of COCs will be forwarded to the laboratory. Yellow copies and associated shipping air bills will be maintained by the Field Supervisor with all other documentation until provided to the Project Manager. COCs will be copied to the field file weekly. Yellow copies will be filed by the Project Manager or designated representative on a weekly basis (at a minimum) in the Project File for permanent storage.

5.6 Sample Packaging and Shipping

Samples collected for laboratory analysis will be shipped by a commercial overnight delivery service to the laboratory on the day of collection (if possible; otherwise samples will be shipped on the day after collection), following proper identification, chain-of-custody, preservation, and packaging procedures. Samples which require maintenance at 4°C (essentially all aqueous and non-aqueous samples submitted for chemical analysis) which are collected and shipped on a Friday must be delivered to, and accepted by, the laboratory on Saturday; note that it may be necessary to arrange this in advance.

Sample packaging and shipping procedures are summarized as follows:

A properly completed chain-of-custody form will accompany each sample shipment. The sample identifiers will be listed on the chain-of-custody form. When transferring the possession of samples, the individuals relinquishing and receiving will sign, date, and note the time on the record. This record documents transfer of custody of samples from the sampler to another person, to the laboratory, or to/from a secure storage area.

Samples will be properly packaged to avoid breakage, stored on ice at 4° C for shipment and dispatched to the appropriate laboratory for analysis. (In the event that samples must be held overnight prior to shipment, the temperature of the cooler and presence of sufficient ice will be checked and new ice added prior to shipment.) A signed COC form will be enclosed and secured to the inside top of each sample box or cooler. The COC (white copy), a cooler receipt form (if applicable), and any additional documentation will be placed in a plastic bag to prevent them from getting wet, and one copy will be retained by the field team leader.

Shipping containers will be secured with strapping tape and custody seals for shipment to the laboratory. Signed custody seals will be covered with clear plastic tape. The cooler will be taped shut with strapping tape in at least two locations.

Samples will be transported to the laboratory by a commercial overnight carrier (e.g., FedEx) unless other arrangements are made on a project-specific basis (e.g., laboratory courier sample pickup; or hand delivery of samples to the laboratory by AECOM personnel).

6.0 References

- New York State Department of Environmental Conservation (NYSDEC), 2008. NYSDEC Modifications to EPA Region 9 TO-15 QA/QC Criteria. February 2008.
- NYSDEC, 2009. CP-43 Groundwater Monitoring Well Decommissioning Policy. November 3, 2009.
- NYSDEC, 2010a. DER-10 Technical Guidance for Site Investigation and Remediation. May 3, 2010.
- NYSDEC, 2010b. DER-31 Green Remediation. August 11, 2010.
- NYSDEC, 2010c. CP-51 Soil Cleanup Guidance. October 21, 2010.
- NYSDOH, 2000. Generic Community Air Monitoring Plan. June 2000.
- New York State Department of Health (NYSDOH), 2006. Guidance for Evaluating Soil Vapor Intrusion in the State of New York. Final. October, 2006.
- United States Environmental Protection Agency (USEPA), 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final. USEPA Office of Emergency and Remedial Response. EPA/540/G-89/004. October.
- USEPA, 1996. Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures. USEPA Office of Solid Waste and Emergency Response (OSWER), Office of Research and Development. Robert Puls and Michael Barcelona. EPA/540/S-95/504. April, 1996.
- USEPA, 1998. Region II Sampling SOP - Ground Water Sampling Procedure Low Stress (Low Flow) Purging and Sampling. March 16, 1998.
- USEPA, 2002. Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers. OSWER. Douglas Yeskis and Bernard Zavala. EPA 542-S-02-001. May, 2002.

Tables

Table 1. Summary of Field Sampling Activity

	Number of Locations	Number of Samples	Analyses/Methods
RI Phase I			
Soil Vapor Intrusion			
Sub Slab Samples	4	4	VOCs (TO-15 SIM)
Indoor Air Samples	1	1	
Outdoor Soil Vapor Samples	5	5	
Outdoor Background Sample	1	1	
Soil Borings			
Inside Facility (13); Outside Facility (3)	16	10 ¹ Up to 32 total, inclusive of full suite list above ²	TCL VOCs+10 (8260B); TCL SVOCs+20 (8270C); TCL Pesticides (8081A); TCL PCBs (8082); TAL Metals including Mercury (6010B) TCL VOCs+10 (8260B)
Outside Facility for Monitoring Well Installation	4	4 ³	TCL VOCs+10 (8260B)
Groundwater			
Existing Wells (13); New Wells (5)	18	18 4 ⁴	VOCs (EPA 8260B), SVOCs +20 (EPA 8270C) and TAL Inorganics (6010B) Monitored Natural Attenuation Parameters ⁵
RI Phase II			
Existing Wells (18); New Wells (4)	22	22	TCL VOCs+10 (8260B)

Notes

1. One surface soil sample (six-inch interval beneath pavement and sub-base) from each of the three exterior borings; samples with the highest PID readings from six of the interior soil borings; and one sample collected from the exterior soil boring drilled adjacent to the sewer manhole.

2. Samples chosen based on PID screening results. Where borings encounter elevated PID readings, the sample with the highest PID reading will be submitted for analysis. The boring will be advanced until PID readings indicate the vertical extent of impact has been reached at which depth the second sample will be collected. In borings where no visual/olfactory/PID evidence indicates VOC impact, only one sample will be collected at the base of the boring for lab analysis.

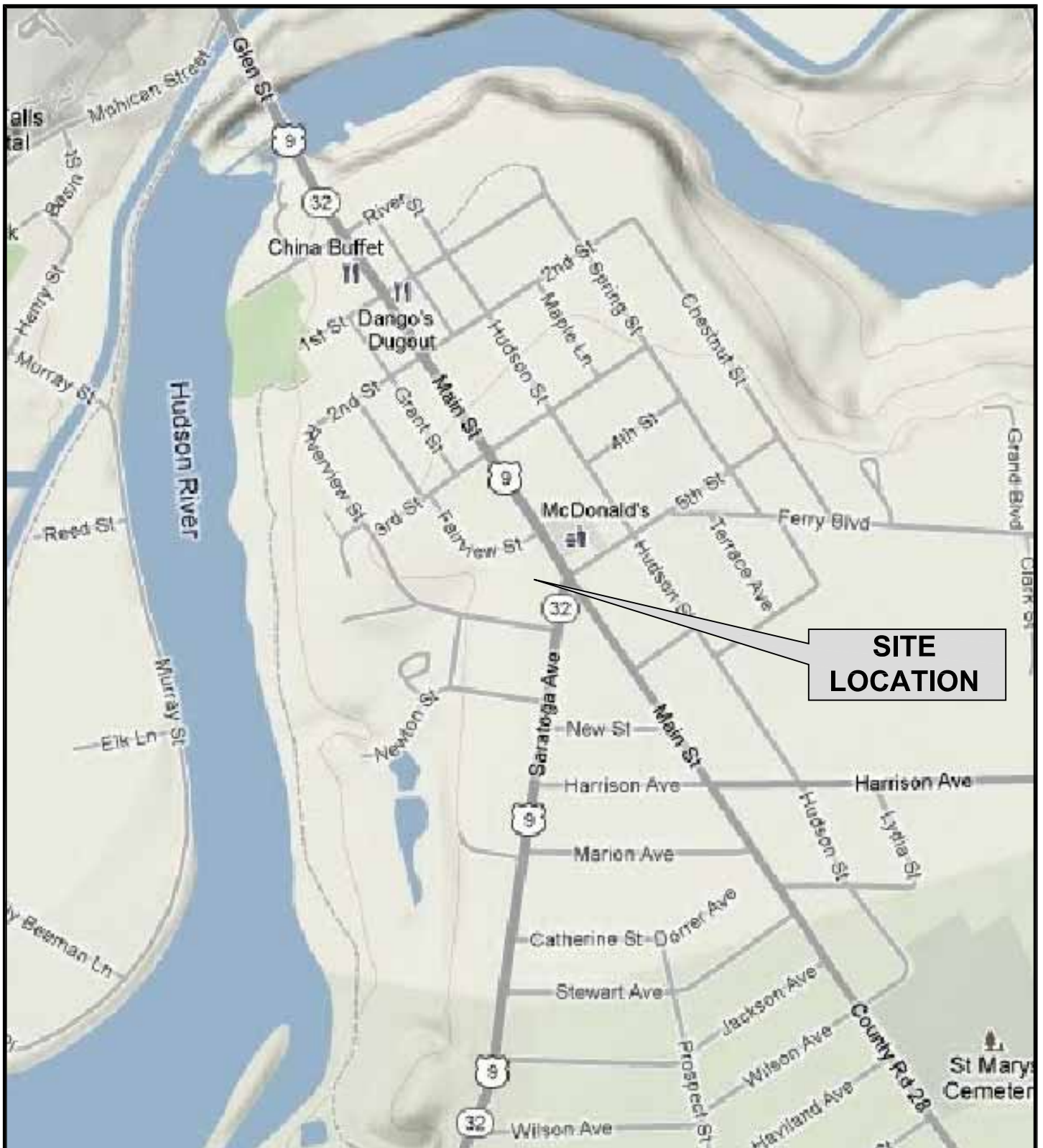
3. Samples to be collected immediately above the water table.

4. Samples to be collected from two wells in the immediate vicinity of the presumed source area, one adjacent to the site, and one down gradient of the site.

5. MNR parameters include:

Ammonia 350.1
Total organic carbon 415.1
Alkalinity SM2320B
Chloride SM 4500-Cl
Total Kjeldahl Nitrogen 351.2
Nitrate SM 4500-NO₃, 300.0
Nitrite SM 4500-NO₂, 300.0
BOD SM 5210B (groundwater)
COD SM 5220D, 410.3, 410.4
Sulfate 375.2, 300.0
Phosphorous 365.1, 365.3
Sulfide SM 4500-S₂
Gases

Figures



PLAN

NOT TO SCALE

AECOM

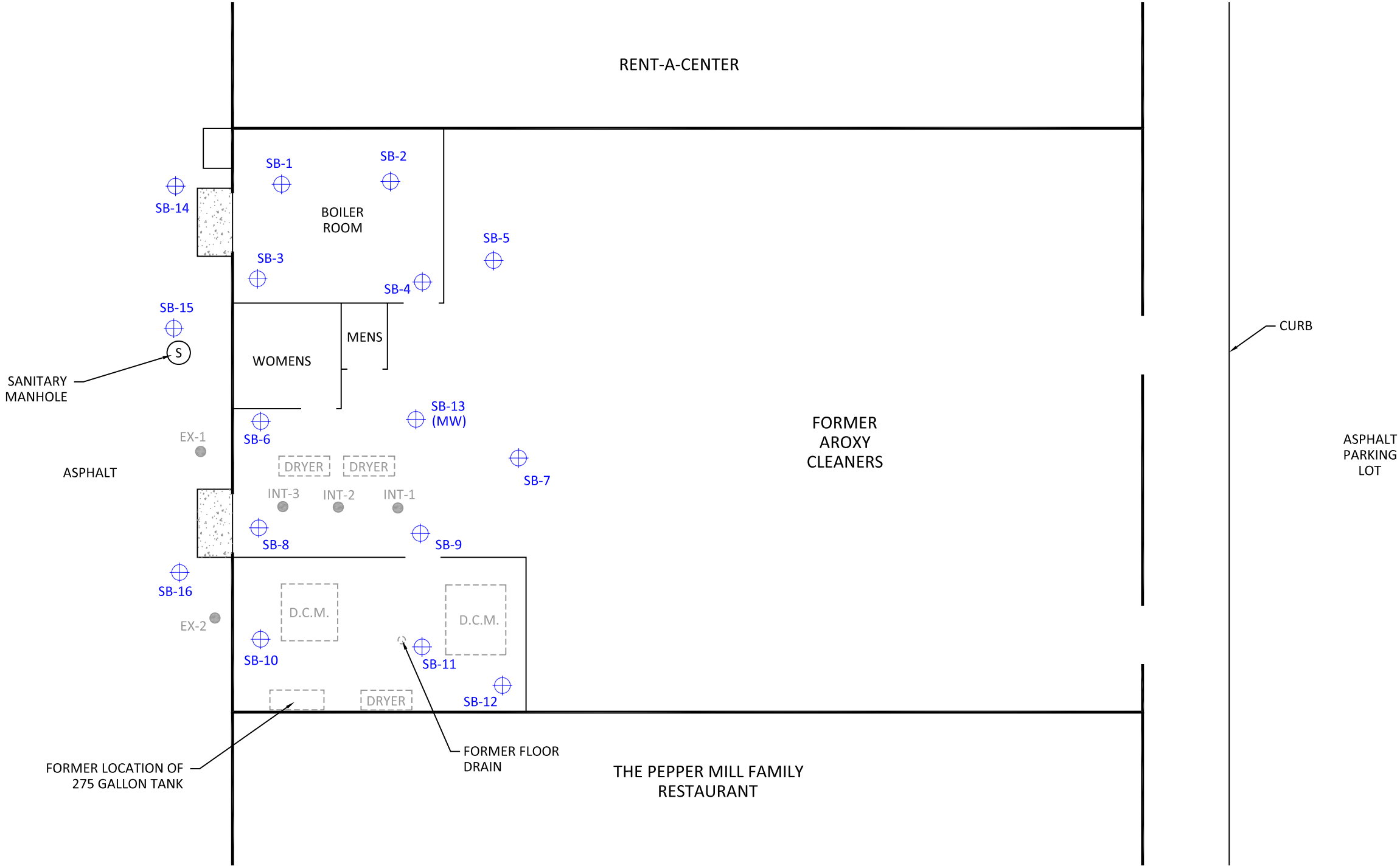
**FIGURE 1
SITE LOCATION
MAP**

MIDTOWN SHOPPING CENTER
SOUTH GLENS FALLS, NYEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
60241403-SITE-LOC.dwg	—	60241403	3/2012	1

Plotted By: meisterk
Layout-Street Name: INT
Plot File Date Created: Apr/03/2012 2:15 PM

Filename: H:\BASKET\MID-TOWN_S-GLENS_FALLS\MID-TOWN.DWG



LEGEND

- EX-1 / INT-1 HISTORICAL SOIL BORING (1999)
- ⊕ SB-9 PROPOSED SOIL BORING
- FORMER DRY CLEANING EQUIPMENT

PLAN

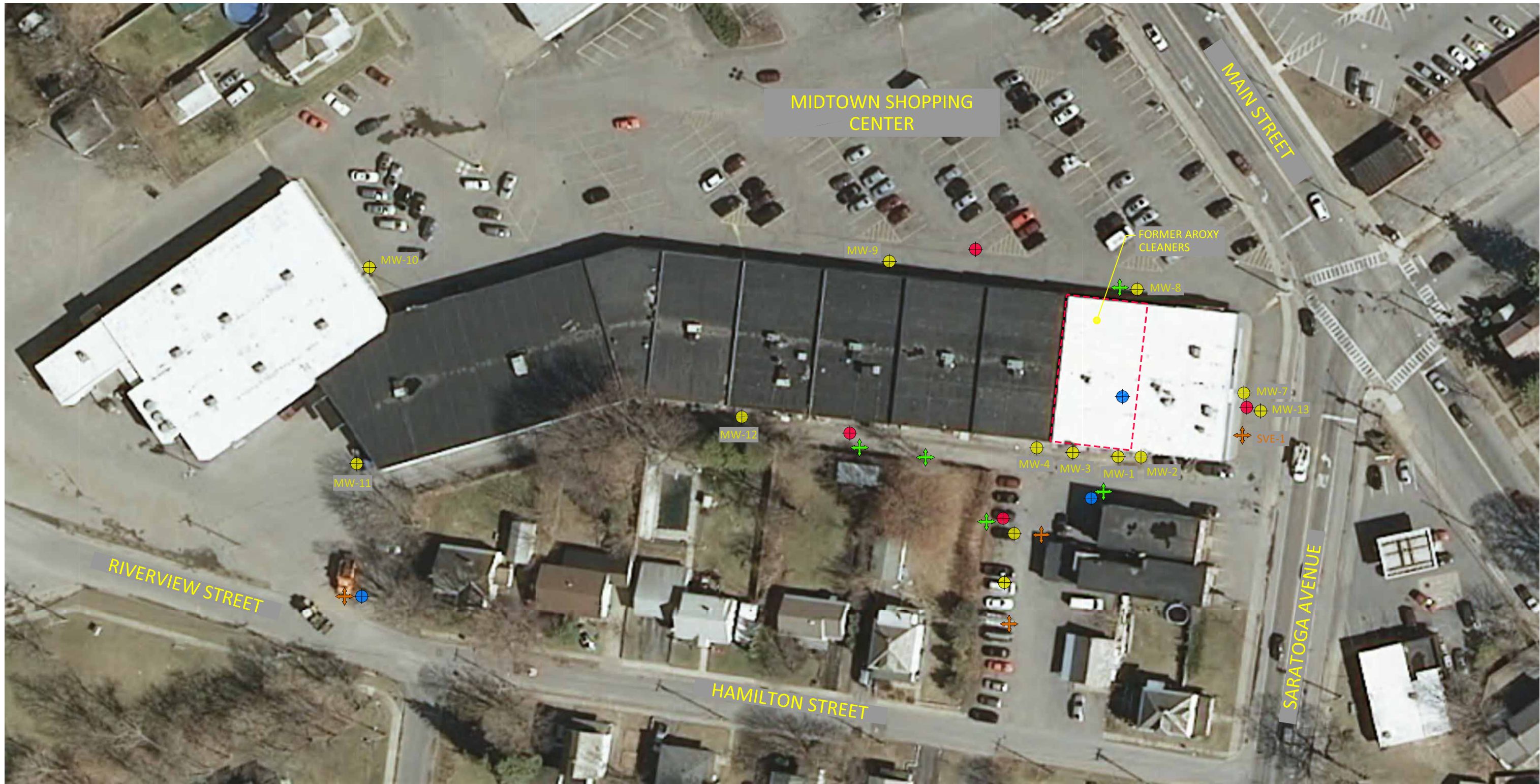
NOT TO SCALE

AECOM

PROPOSED PHASE 1 REMEDIAL INVESTIGATION SOIL BORING LOCATIONS

MIDTOWN SHOPPING CENTER
SOUTH GLENS FALLS, NEW YORK

FILE NAME: MID-TOWN.dwg	DRN ---	PROJECT NO. 60241403	DATE 4/2012	FIGURE NO. 2
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LEGEND

- EXISTING MONITORING WELL
- EXISTING SOIL VAPOR SAMPLING POINT
- PROPOSED SHALLOW DIRECT PUSH MONITORING WELL (PHASE I)
- PROPOSED DEEP OVERBURDEN OR BEDROCK MONITORING WELL (PHASE II)
- PROPOSED SOIL VAPOR SAMPLING POINT

AECOM

EXISTING AND PROPOSED
SOIL VAPOR POINTS AND
MONITORING WELL LOCATIONS

MIDTOWN SHOPPING CENTER
SOUTH GLENS FALLS, NEW YORK

FILE NAME: MID-TOWN.dwg	DRN ---	PROJECT NO. 60241403	DATE 4/2012	FIGURE NO. 3
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Appendix A

Standard Forms



BORING LOG

Boring No.: (MW-)

PROJECT:				CONTRACTOR:				PAGE 1 OF 4			
PROJECT No.:				LOCATION:				DATE:			
SURFACE ELEVATION:				DATUM:				DRILLER:			
AECOM REP.:											
WATER LEVELS				DRILLING AND SAMPLING							
DATE	TIME	DEPTH		CASING	SAMPLER	CORE	TUBE				
				TYPE	Steel	split spoon					
				I.D.	6-inch	1 3/8 inch					
				WT./Fall	--	140 lbs.					
Depth (ft)	Sample Number & Time	Blows per/6"	Rec. (feet)	PID Readings (ppm)	SAMPLE DESCRIPTION, REMARKS, AND STRATUM CHANGES						
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

UNIFIED SOIL CLASSIFICATION SYSTEM
SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYM	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN No. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS MORE THAN 50% OF COARSE FRACTION <u>RETAINED ON No.4 SIEVE</u>	CLEAN GRAVELS (LITTLE OR NO FINES)	GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SAND AND SANDY SOILS MORE THAN 50% OF COARSE FRACTION <u>PASSING No.4 SIEVE</u>	CLEAN SAND (LITTLE OR NO FINES)	SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY-GRADED SANDS GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN 50% OF MATERIAL IS SMALLER THAN No. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS, SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
	HIGHLY ORGANIC SOILS		PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

SITE NAME: _____

SITE ID.: _____

INSPECTOR: _____

MONITORING WELL FIELD INSPECTION LOG

DATE/TIME: _____

WELL ID.: _____

WELL VISIBLE? (If not, provide directions below) _____

YES	NO
<input type="checkbox"/>	<input type="checkbox"/>

WELL COORDINATES? NYTM X _____ NYTM Y _____ See Report

PDOP Reading from Trimble pathfinder: _____ Satelites: _____

GPS Method (circle) Trimble And/Or Magellan

WELL I.D. VISIBLE? _____

YES	NO
<input type="checkbox"/>	<input type="checkbox"/>

WELL LOCATION MATCH SITE MAP? (if not, sketch actual location on back) _____

WELL I.D. AS IT APPEARS ON PROTECTIVE CASING OR WELL: _____

SURFACE SEAL PRESENT? _____

YES	NO
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

SURFACE SEAL COMPETENT? (If cracked, heaved etc., describe below) _____

PROTECTIVE CASING IN GOOD CONDITION? (If damaged, describe below) _____

Cap does not close properly. Lid is not flush with casing.

HEADSPACE READING (ppm) AND INSTRUMENT USED _____

TYPE OF PROTECTIVE CASING AND HEIGHT OF STICKUP IN FEET (If applicable) _____

PROTECTIVE CASING MATERIAL TYPE: _____

MEASURE PROTECTIVE CASING INSIDE DIAMETER (Inches): _____

LOCK PRESENT? _____

LOCK FUNCTIONAL? _____

DID YOU REPLACE THE LOCK? _____

IS THERE EVIDENCE THAT THE WELL IS DOUBLE CASED? (If yes, describe below) _____

WELL MEASURING POINT VISIBLE? _____

YES	NO
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>

MEASURE WELL DEPTH FROM MEASURING POINT (Feet): _____

MEASURE DEPTH TO WATER FROM MEASURING POINT (Feet): _____

MEASURE WELL DIAMETER (Inches): _____

WELL CASING MATERIAL: _____

PHYSICAL CONDITION OF VISIBLE WELL CASING: _____

ATTACH ID MARKER (if well ID is confirmed) and IDENTIFY MARKER TYPE _____

PROXIMITY TO UNDERGROUND OR OVERHEAD UTILITIES _____

DESCRIBE ACCESS TO WELL: (Include accessibility to truck mounted rig, natural obstructions, overhead power lines, proximity to permanent structures, etc.); ADD SKETCH OF LOCATION ON BACK, IF NECESSARY.

DESCRIBE WELL SETTING (For example, located in a field, in a playground, on pavement, in a garden, etc.) AND ASSESS THE TYPE OF RESTORATION REQUIRED.

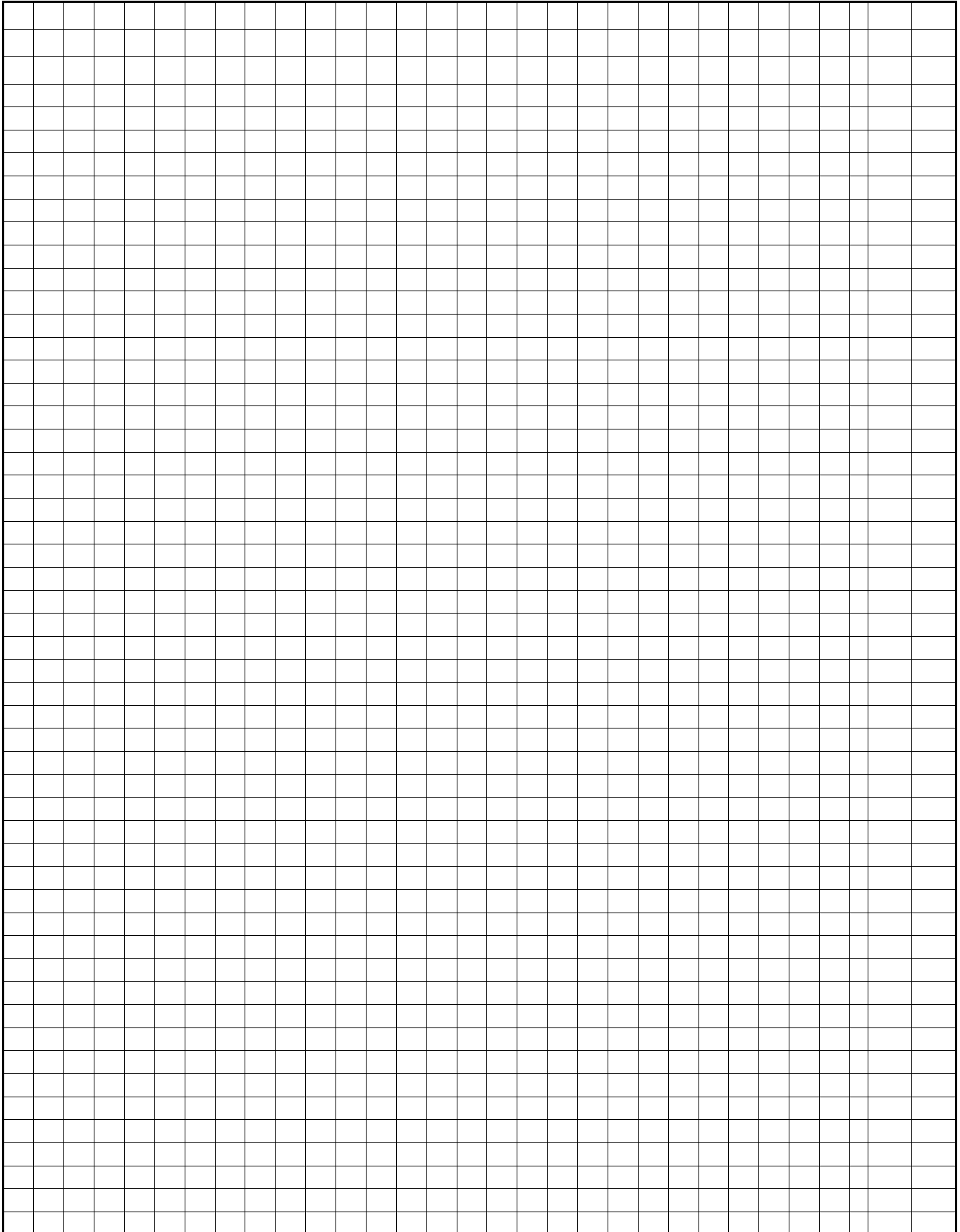
IDENTIFY ANY NEARBY POTENTIAL SOURCES OF CONTAMINATION, IF PRESENT

(e.g. Gas station, salt pile, etc.):

REMARKS:

MONITORING WELL INSPECTION LOG

SKETCH



Project:

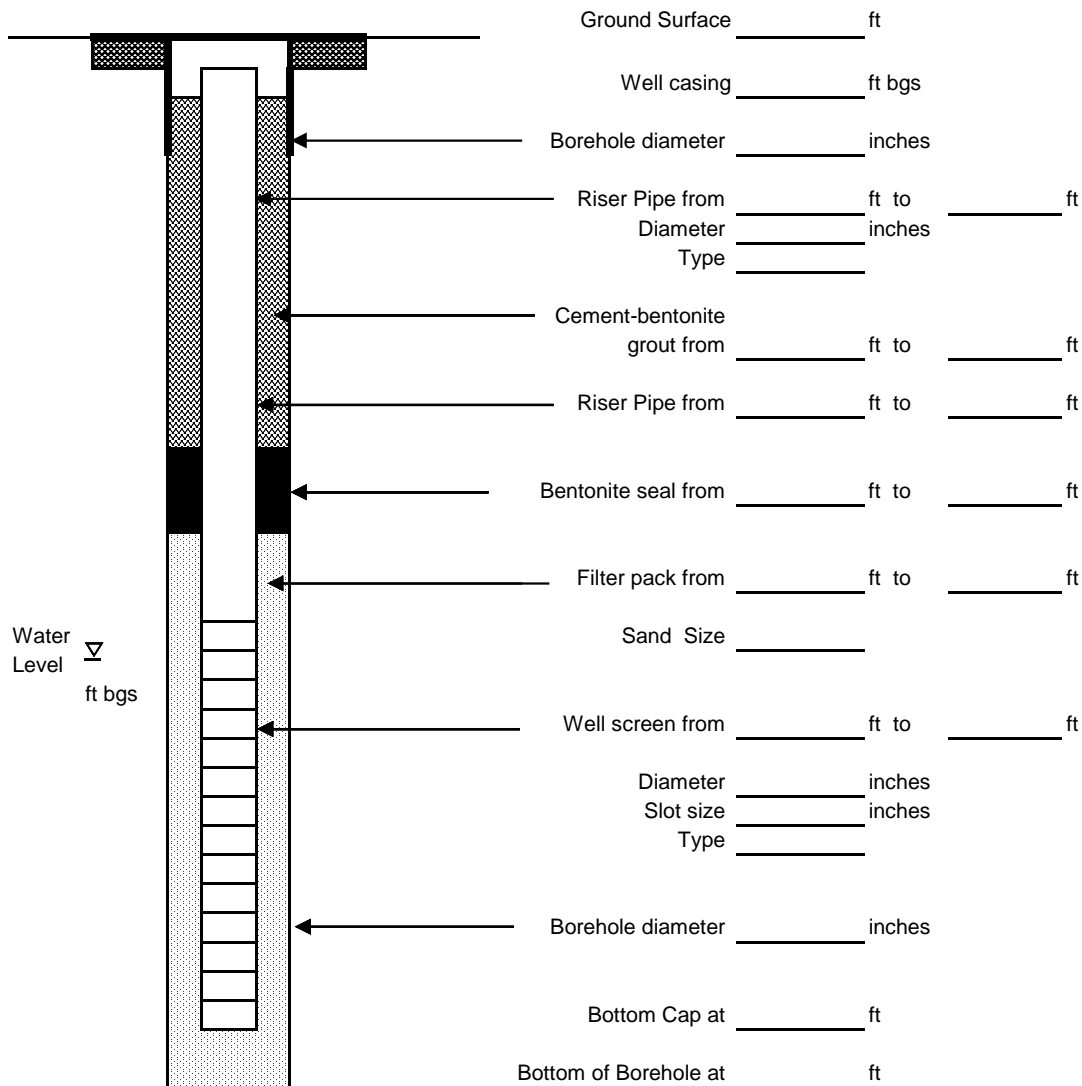
<div>DAILY FIELD MEETING RECORD</div> <div>General Information</div>			
Project:		Location:	
Project Number:		Client:	
Date:		Weather:	
Team Members / Subcontractor Personnel / Visitors Present:			
Topics Discussed:			
	YES	NO	
Are all team members/subcontractors present?			
Have the team members read and understood the applicable sections of the Work Plans?			
Have safety issues been discussed?			
Are there any outstanding issues that need to be addressed?			
Are there any unforeseen problems that may be encountered?			
Have underground utilities been marked out?			
Do the field teams have the necessary equipment and supplies to perform their tasks?			
Signature of attendees:			



AECOM well sampling form - 6 parameters.xls field

Project:	Location:	Page 1 of 1		
AECOM Project No.:	Subcontractor:	Water Levels		
Surface Elevation: Ft	Driller:	Date	Time	Depth
Top of PVC	Well Permit No.:			
Casing Elevation: Ft	AECOM Rep.:			
Datum: NGVD 1988	Date of Completion:			

Locking protective flushmount with concrete pad



Note: All measurements based on ground surface at 0.0 feet. (+) above grade. (-) below grade.

(NOT TO SCALE)



Environment

Prepared for:
Superfund Standby Program
NYSDEC
Albany, NY

Prepared by:
AECOM
Latham, NY
April 2012

HEALTH AND SAFETY PLAN (HASP)

Midtown Shopping Center
Site 546054
South Glens Falls, NY 12803
D007626.05

Prepared for:

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

Prepared by:

AECOM Technical Services Northeast, Inc.
40 British American Boulevard
Latham, New York 12110

Health and Safety Plan Expiration Date: April 5, 2013

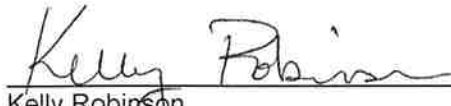
Project No: 60241403

Project Health and Safety Plan

This project Health and Safety Plan (HASP) was prepared for employees performing a specific, limited scope of work. It was prepared based on the best available information regarding the physical and chemical hazards known or suspected to be present on the project site. While it is not possible to discover, evaluate, and protect in advance against all possible hazards which may be encountered during the completion of this project, adherence to the requirements of the HASP will significantly reduce the potential for occupational injury.

By signing below, I acknowledge that I have reviewed and hereby approve the HASP for the Midtown Shopping Center Site. This HASP has been written for the exclusive use of AECOM, its employees, and subcontractors. The plan is written for specified Site conditions, dates, and personnel, and must be amended if these conditions change.

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Executive Summary

The purpose of this Health and Safety Plan (HASP) is to address health and safety concerns related to AECOM managed activities at the Midtown Shopping Center Site, located at 112-114 Main Street in South Glens Falls, NY. 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 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.

SUMMARY TABLE					
AECOM SOW		AECOM will be overseeing subcontractor soil boring and monitoring well installation, topographic surveys, and geophysical surveys. They will also be performing soil and groundwater sampling to support the Remedial Investigation effort on the Site.			
S.Y. Kim SOW (subcontractor)		S.Y. Kim will be providing surveying services at the Site.			
Advanced Geological Services SOW (subcontractor)		Advanced Geological Services will be performing a geophysical survey utilizing ground-penetrating radar (GPR) equipment at the interior and exterior investigation area.			
Aztech SOW (subcontractor)		Aztech will be providing drilling services to complete soil borings, monitoring well installation, and soil vapor monitoring point installation.			
PRIMARY PHYSICAL HAZARDS					
x	Underground Utilities	x	Traffic Control	x	Electrical Hazards
x	Overhead Utilities	x	Slips, Trips/Walking Surface		Excavation & Trenching
x	Drill Rig Operations	x	Manual Lifting		Working adjacent to Railway
CHEMICAL HAZARDS, MONITORING, ACTION LEVELS					
COC		MONITORING		ACTION LEVELS	
Chlorinated Solvents (Total by PID)		PID for VOCs with 10.6eV		>10 ppm	

All staff are bound by the provisions of this HASP and are required to participate in a preliminary project safety meeting to familiarize them with the anticipated hazards and respective onsite controls. The discussion will cover the entire HASP 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, identify new hazards and controls, incident reporting, review the results of inspections, and any lessons learned or concerns from the previous day.

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1 INTRODUCTION

This Health and Safety Plan (HASP) (including Appendices A through D) provides a general description of the levels of personal protection and safe operating guidelines expected of each employee or subcontractor associated with the environmental services being conducted at the Midtown Shopping Center Site, located at 112-114 Main Street in South Glens Falls, NY. This HASP also identifies chemical and physical hazards known to be associated with the AECOM-managed activities addressed in this document.

HASP Supplements will be generated as necessary to address any additional activities or changes in site conditions which may occur during field operations.

1.1 GENERAL

The provisions of this HASP are mandatory for all AECOM personnel engaged in fieldwork associated with the environmental services being conducted at the subject site. A copy of this HASP, any applicable HASP Supplements, and the AECOM's North America Safety, Health, and Environmental (SH&E) Procedures and Manual shall be accessible on site and available for review at all times. Record keeping will be maintained in accordance with this HASP and the applicable Standard Operating Procedures (SOPs). In the event of a conflict between this HASP, the SOPs, and federal, provincial, state, and local regulations, workers shall follow the most stringent/protective requirements. Concurrence with the provisions of this HASP is mandatory for all personnel at the site covered by this HASP and must be signed on the acknowledgement page.

1.2 PROJECT POLICY STATEMENT

AECOM is committed to protecting the safety and health of our employees and meeting our obligations with respect to the protection of others affected by our activities. We are also committed to protecting and preserving the natural environment in which we operate. The safety of persons and property is of vital importance to the success of this project and accident prevention measures shall be taken toward the avoidance of needless waste and loss. It shall be the policy of this project that all operations be conducted safely. Onsite supervisors are responsible for those they supervise by maintaining a safe and healthy working environment in their areas of responsibility, and by fairly and uniformly enforcing safety and health rules and requirements for all project personnel. Subcontractors shall comply with the requirements of this HASP, provisions contained within the contract document and all applicable rules, requirements and health, safety and environmental regulations. All practical measures shall be taken to promote safety and maintain a safe place to work. Contractors are wholly responsible for the prevention of accidents on work under their direction and shall be responsible for thorough safety and loss control programs and the execution of their own safety plans for the protection of workers.

1.3 REFERENCES

This HASP conforms to the regulatory requirements and guidelines established in the following documents:

- Title 29, Part 1910 of the Code of Federal Regulations (29 CFR 1910), *Occupational Safety and Health Standards* (with special attention to Section 120, *Hazardous Waste Operations and Emergency Response*).
- Title 29, Part 1926 of the Code of Federal Regulations (29 CFR 1926), *Safety and Health Regulations for Construction*.
- National Institute for Occupational Safety and Health (NIOSH)/OSHA/U.S. Coast Guard (USCG)/EPA, *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities*, Publication No. 85-115, 1985.

The requirements in this HASP also conform to AECOM's Corporate Safety Program requirements as specified in *AECOM's North America Safety, Health, and Environmental (SH&E) Procedures and Manual*, a copy of which will be maintained on site at all times.

2 SITE INFORMATION AND SCOPE OF WORK

AECOM will conduct environmental services at the Midtown Shopping Center Site. Work will be performed in accordance with the applicable Work Assignment and the associated Project Work Plan. Deviations from the listed Work Plan will require that a Safety Professional review all changes made to this HASP to ensure adequate protection of personnel and other property.

The following is a summary of relevant data concerning the project site and the work procedures to be performed. The Project Work Plan, prepared by AECOM as a companion document to this HASP, provides more detail concerning both site history and planned work operations.

2.1 SITE INFORMATION

This section provides a general description and historical information associated with the Site.

2.1.1 General Description

The Midtown Shopping Center Site is located at 112-114 Main Street, South Glens Falls, NY. The Site is approximately 5 acres and consists of a parking lot and a strip mall constructed in 1967. The Site use is commercial retail including a restaurant. Based on the local topography, the direction of groundwater flow in the area is expected to be to the west-northwest, towards the Hudson River which is a regional discharge area.

2.1.2 Site Background/History and Previous Investigations

A third party investigation of vapor, soil, and groundwater was conducted by Malcolm Pirnie at the Site on the behalf of the owner(s)/manager(s) in 1998/1999 that resulted in the discovery of Site contamination (Malcolm Pirnie, 1999). The results of the passive gas sampling indicated the presence of tetrachloroethene (PCE) and its degradation products in the soil gas beneath the concrete slab of the building and an asphalt area to the rear of the building. Soil gas concentrations from beneath the slab within the building were an order of magnitude higher than those detected from outside the building; however, these concentrations were not provided in the letter report for this investigation (Malcolm Pirnie, 1999).

During the collection of these soil vapor samples, strong odors of dry cleaning solvents were detected in the floor drain adjacent to the dry cleaning machines in the rear of the facility. As summarized in the letter report (Malcolm Pirnie, 1999), this floor drain presumably is connected to a sewer lateral beneath the slab of the facility. In turn, the sewer lateral presumably is connected to the sewer located to the rear of the Midtown Shopping Center. A sewer manhole is present on the west side of the shopping center. To better evaluate the layout of the sewer lines at the shopping center, Malcolm Pirnie inquired about the existence of design drawings with the South Glens Falls Building Department and was informed that the plans were no longer available. As a result, the construction of the floor drain and sewers is currently unknown (Malcolm Pirnie, 1999).

As part of this investigation, six soil borings were advanced in order to characterize soil and groundwater quality in the area of the facility (Malcolm Pirnie, 1999). Each boring was advanced to a depth of 12 feet below ground surface (bgs). Three of the borings were located inside of the facility, and three borings were located in the paved area behind the building. Groundwater samples were collected from four of these soil boring locations approximately four feet into the groundwater.

The analytical results for PCE from the shallow soil samples (between 0.4 and 4 ft) collected from within the building exceeded the New York State Technical and Administrative Guidance Memorandum (TAGM) 4046 Recommended Soil Cleanup Objective of 1,400µg/kg (Malcolm Pirnie, 1999). The actual concentrations are not legible in the report obtained for review. One deep soil sample (11 to 12 ft) was collected from within the interior of the building where all VOCs were below detection limits. Detected concentrations for the other VOCs in the interior borings ranged from 2.6 to 110µg/kg, all detected from a single boring. One of the exterior borings had detectable VOC concentrations ranging from 2.9 to 9.4µg/kg.

PCE was detected in all of the four groundwater samples at concentrations exceeding the New York State Class GA groundwater standard of 5µg/L (Malcolm Pirnie, 1999). The actual concentrations are not legible in the report obtained for review. However, it is noted that the highest detection of PCE was 80,000µg /L from an exterior groundwater sample adjacent to a sewer manhole.

Another third party investigation was a Remedial Investigation conducted by Northeastern Environmental Technologies in 2008 that included a soil boring program with monitoring well installation and a vapor intrusion

testing program. During this investigation, eight soil borings were advanced, seven monitoring wells were installed, and one soil vapor extraction well was installed.

Soil samples were collected for field volatile organic compound analysis. Results from this field screening were used to choose two samples, both east of the facility, for laboratory analysis. It was determined that these samples were not impacted by the dry cleaning chemicals.

Also based on this investigation, groundwater samples collected to the north and east of the dry cleaning facility were not impacted. Samples collected adjacent to and west of the facility were found to have PCE and degradation products at concentrations exceeding DEC's 6NYCRR Part 703 water quality standards (Northeastern environmental Technologies Corp., 2008).

In February 2008, a soil vapor extraction (SVE) pilot test was conducted that determined the use of shallow vapor extraction wells would be a viable remedial alternative to remediate the VOC contamination at the Site. Based on information provided by NYSDEC, AECOM understands that a sub-slab depressurization system (SSDS) is in operation at the former dry cleaner facility.

2.2 SCOPE OF WORK

The specific objective of this project is to conduct a Remedial Investigation and Feasibility Study (RI/FS) at the Site to define the extent of previously identified soil and groundwater impacts resulting from activities at a dry cleaners business at the Site which is now closed.

2.2.1 Task 2: Phase I RI

The Phase I RI will be performed to attempt to delineate the extent of subsurface site-related contamination within the shallow overburden geologic unit (glacialacustrine sand overlying silty clay). The Phase I RI will include the following activities:

Utility Locating and Geophysical Survey

AECOM will make a Dig Safe NY call out to have public utilities in the vicinity of the site marked out. As part of this task, AECOM will also contact the local building, sewer and highway departments in attempt to obtain as-built records for the Midtown Plaza that may yield information regarding the locations of sewer lines beneath the building. AECOM will then have its geophysical Standby Subcontractor conduct a survey of the investigation area(s) – interior and exterior. The Subcontractor will conduct a ground penetrating radar (GPR) survey of site in attempt to locate possible dry wells, a suspected underground storage tank (UST), and underground utility lines, and to clear locations for test borings. The Subcontractor will also attempt to determine the location/alignment of a subsurface drain pipe that is presumed to extend from a floor drain inside the facility to an exterior sewer manhole.

Site Survey

AECOM will subcontract a NYS Licensed Land Surveyor to prepare a site topographic base map. The surveyor will conduct a preliminary survey of all physical features of the Midtown Plaza property, including property boundaries for adjoining commercial and residential properties between the Plaza property and Hamilton Street to the south. As part of this work, the locations of underground utilities as identified from the Dig Safe call out and geophysical survey will be surveyed as marked out on the ground surface. Additional 'as-built' surveying of soil borings and monitoring wells will be conducted after Phase I and Phase II RI field work is completed.

Soil Vapor Sampling

Based on information provided by NYSDEC, AECOM understands that a sub-slab depressurization system (SSDS) is in operation at the former dry cleaner facility. A preliminary soil vapor/indoor air sampling event will be conducted at the start of the Phase I RI to assess current baseline conditions. A total of ten (10) samples for EPA Method TO-15 analysis are planned for collection as follows:

- Sub-slab soil vapor samples from two locations within the dry cleaners facility;

- One sub-slab soil vapor sample from a sampling port located in the adjacent restaurant (if the sampling port is still present);
- One indoor air sample from within the dry cleaners facility;
- One soil vapor samples from five soil vapor sample points installed outside the dry cleaners; and,
- One background, outdoor air sample.

The soil vapor sampling will be performed in accordance with the NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York, Final, October 2006. All samples will be collected in individually certified Summa canisters provided by the laboratory. To the extent possible, soil vapor points will be installed with curb box covers to allow them to be resampled.

Soil Borings

Sixteen (16) soil borings will be advanced during Phase I of the RI, using direct-push technology. Thirteen of the borings will be located inside the facility, and three located outside the facility. Soil boring locations will be chosen based on the results of the utility locating/GPR surveys. At each boring, soil will be continually sampled from ground surface to a depth necessary to define the vertical extent of contamination (based on visual/olfactory/photoionization detector (PID) screening evidence), or until drilling refusal is encountered, whichever is shallower. Based on soil borings logs from previous investigations provided to AECOM by NYSDEC, borings are not expected to exceed depths of 20 feet. Ten (10) soil samples from the borings will be submitted to the analytical laboratory for analysis of TCLVOCs +10 (EPA 8260B), TCL SVOCs +20 (EPA 8270C), TCL Pesticides (EPA 8081A), TCL PCBs (EPA 8082), TAL Metals including mercury (EPA 6010B and 7471A) and Cyanide (EPA 9010B). The 10 samples to be analyzed for these parameters will include: one surface soil sample (six-inch soil interval beneath pavement and sub-base) from each of the three exterior soil borings; samples with highest PID readings from six of the interior soil borings; and, one sample collected from the exterior soil boring drilled adjacent to the sewer manhole. At each soil boring, a total of up to two samples will be collected for analysis of TCL VOCs +10 (to be inclusive of the 'full-suite' samples listed above). Collection of these samples will be based on PID screening results. Where borings encounter elevated PID readings, the sample with the highest PID reading will be submitted for analysis. The boring will be advanced until PID readings indicate the vertical extent of impact has been reached at which depth the second sample will be collected. In borings where no visual/olfactory/PID evidence indicates VOC impact, only one sample will be collected at the base of the boring for lab analysis.

Monitoring Well Installation

Five shallow monitoring wells will be installed during the Phase I RI using direct-push technology. One of the monitoring wells will be installed inside the former dry cleaner facility. The remaining four wells will be located outside the building. The wells will be constructed of 1-inch PVC threaded riser pipe with 5 or 10 feet of pre-packed slotted well screen, depending on the depth to the water table and the total boring depth. The wells will be a maximum of 20 feet deep. The borehole annulus of all wells will be sealed with bentonite grout and the well head will be secured with a curb box protective casing. AECOM has assumed, with the NYSDEC Project Manager concurrence, that existing shallow direct-push wells installed during a previous investigation will be available during the RI.

One soil sample will be collected from each of the four soil borings that will be drilled for installation of the shallow monitoring wells located outside the building. These samples will be collected from immediately above the water table. These samples will be submitted to the laboratory for analysis of TCL VOCs +10(EPA 8260B).

Groundwater Sampling

Water level measurements and groundwater sampling will be conducted at the newly installed and preexisting monitoring wells, including a total of up to seventeen wells. One round of groundwater samples will be collected from the monitoring wells during the Phase I RI. All samples will be submitted to the laboratory for analysis of

VOCs (EPA 8260B), SVOCs +20 (EPA 8270C) and TAL Inorganics (6010B). In addition, samples from four wells will be submitted for analysis of monitored natural attenuation (MNA) parameters (two wells in the immediate vicinity of the presumed source area, one adjacent to the site, and one downgradient of the site).

Investigation Derived Waste (IDW)

Investigation derived waste (IDW) will be containerized in drums or other appropriate vessels and disposed off-site. IDW will be minimized through the use of direct-push drilling methods. An estimated five drums of soil and two drums of water will require off-site disposal from the Phase I RI. One composite soil sample will be collected from apparently impacted zones in soil borings and submitted to the laboratory for RCRA waste characterization analysis.

2.2.2 Task 3: Phase II RI

The Phase II RI will be conducted following the compilation and review by AECOM and NYSDEC of the Phase I results. The scope of work for the Phase II presented below generally follows that requested in the NYSDEC's Work Assignment authorization, but may be modified based on the Phase I findings.

Utility Locating and Geophysical Survey

AECOM will have the geophysical Standby Subcontractor clear proposed Phase II well locations of utilities using GPR methods

Monitoring Well Installation

Four deep groundwater monitoring wells are planned for installation as part of the Phase II RI using truck mounted rotary drilling techniques. Borings will be advanced to a depth of 40 feet below grade or the bedrock if it is shallower than 40 feet. The borings will be advanced using 4.25" I.D. hollow stem augers (HSA). Soil will be continuously sampled using a 2-inch O.D. split-spoon sampler. In the event that bedrock is present at a depth of less than 30 feet below grade, the borings may be advanced into bedrock for installation of shallow bedrock wells. This determination will be made in the field after consultation with and approval by the NYSDEC Project Manager. Bedrock drilling would proceed with nominal 4-inch diameter wash rotary or HQ coring methods to a maximum depth of 15 feet into bedrock. A 2-inch diameter PVC monitoring well will be installed in each of the four borings, whether completed in overburden or bedrock. The monitoring wells will be completed with well screen sand pack, bentonite pellet seal, and cement-bentonite grout to surface. A locking curb box will be installed at each well. The monitoring wells will be developed after installation by bailing or pumping. All purge water and decon water generated from the well installation and development will be containerized in drums and sampled for waste characterization analysis, and subsequently disposed off-site.

Groundwater Sampling

A second round of water level measurements and groundwater sampling will be conducted during Phase II. All the wells sampled in Phase I and the four wells installed in Phase II will be sampled. Samples will be submitted to the laboratory for analysis of VOCs (EPA 8260B).

Investigation Derived Waste (IDW)

Investigation derived waste (IDW) will be containerized in drums or other appropriate vessels and disposed off-site. An estimated ten drums of soil and four drums of water will require off-site disposal from the Phase II RI. One composite sample of drummed soil will be submitted to the laboratory for RCRA waste characterization analysis.

2.2.3 Task 4: Remedial Investigation Report

Once all phase of RI data acquisition is completed, AECOM will prepare a comprehensive RIR in accordance with DER-10 Section 3.14. AECOMs subcontracted data validator will review all laboratory analytical data packages and document the validation findings in a Data Usability Summary Report (DUSR). Field data will be reviewed to determine limitations, if any, and to assure that the procedures employed were effective and that the data generated provides sufficient information to achieve the project objectives. All final documents (including Category B laboratory deliverables) will be submitted in electronic format on compact computer discs. In addition, all validated laboratory data will be submitted to NYSDEC in the required Electronic Data Deliverable (EDD) format. AECOM will submit the initial draft RIR in a searchable Portable Document Format (PDF) file. The final version of the RIR will be submitted in hard copy. NYSDEC will require two hard copies of the RI and FS reports. In addition to hard copies, one copy of the final reports will be submitted as a searchable PDF on a compact disc (CD).

2.2.4 Task 5: Feasibility Study Report

The FS Report will be prepared in accordance with DER-10 Section 4. Potential alternatives to be evaluated will be no action, partial soil/source removal, in situ treatment of groundwater, and vapor intrusion mitigation systems. AECOM will submit the draft FS Report electronically as searchable PDF documents. The final version of the report will be submitted in hard copy. NYSDEC will require two hard copies FS report. In addition to hard copies, one copy of the final report will be submitted as a searchable PDF on a CD.

Operations at the site may require additional tasks not identified in this section or addressed in Appendix A, Task Hazard Analyses (THAs). Before performing any task not covered in this HASP a THA must be prepared and approved by the Safety Professional.

3 HAZARD ASSESSMENT (SAFETY)

3.1 PHYSICAL HAZARDS

The following physical hazards are anticipated to be present on the site. Additional hazards may be noted on the THA's developed for the individual tasks.

3.1.1 Slips, Trips, Falls, and Protruding Objects

A variety of conditions may exist that may result in injury from slips, trips, falls, and protruding objects. Slips and trips may occur as a result of wet, slippery, or uneven walking surfaces. To prevent injuries from slips and trips, always keep work areas clean; keep walkways free of objects and debris; and report/clean up liquid spills. Serious injuries may occur as a result of falls from elevated heights. Always wear fall protection while working at heights of 6 feet or greater above the next lower level. Protruding objects are any object that extends into the path of travel or working area that may cause injury when contacted by personnel. Always be aware of protruding objects and when feasible, remove or label the protruding object with an appropriate warning.

3.1.2 Housekeeping

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. Additional information on the requirements of housekeeping can be found in S3NA 307 PR, *Housekeeping, Worksite*.

3.1.3 Manual Lifting

Most materials associated with investigation and remedial activities are moved by hand. The human body is subject to severe damage in the forms of back injury, muscle strains, and hernia if caution is not observed in the handling process. Whenever possible, use mechanical assistance to lift or move materials and at a minimum, use at least two people to lift, or roll/lift with your arms as close to the body as possible. For additional requirements, refer to S3NA 308 PR, *Manual Lifting* and S3NA 308 WI, *Manual Lifting Safe Work Practices*.

3.1.4 Utilities

Various forms of underground/overhead utility lines or pipes may be encountered during site activities. Prior to the start of intrusive operations, utility clearance is mandated, as well as obtaining authorization from all concerned public utility department offices. If insufficient data are available to accurately determine the location of the utility lines, AECOM will hand clear to a depth of at least 5 feet below ground surface in the proposed areas of subsurface investigation. Should intrusive operations cause equipment to come into contact with utility lines, the SSO and an AECOM SH&E Professional will be notified immediately. Work will be suspended until the applicable utility agency is contacted and the appropriate actions for the particular situations can be taken. The phone number for the applicable state agency is provided in the Emergency Contacts list found in Section 8. For additional requirements, refer to S3NA 417 PR, *Utilities Underground*.

Ensure backhoe operator, truck drivers, etc. and signal person are aware of overhead power lines when working around overhead power lines. Overhead power and utility lines may be present on, or adjacent to, the site and represent a potential hazard during the move/demove of equipment and supplies. Maintain a minimum of 10 feet between overhead power lines and the bucket and/or arm of the backhoe bed/cab of trucks, etc. Any deviation must be approved by the Regional Health & Safety Manager. Additional information on working adjacent to overhead power and utility lines can be found in S3NA 406 PR, *Electrical Lines, Overhead*.

3.1.5 Electrical hazards

Electrical and powered equipment may be used during a variety of site activities. Injuries associated with electrical and powered equipment include electric shock, cuts/lacerations, eye damage (from flying debris), and burns. To reduce the potential of injury from the hazards associated with electrical and powered equipment, always comply with the following:

- Use ground fault circuit interrupters (GFCIs) when using electrical powered tools/equipment. GFCIs prevent electrical shock by detecting the loss of electricity from a power cord and/or electrical device.

- Ensure generators are properly grounded, including the use of a grounding rod, driven to a depth of 3-feet.
- Wear ANSI-approved (Z87.1) safety glasses. Face shields may be required to provide additional face protection from flying debris.
- Wear appropriate work gloves. Work gloves may reduce the severity of burns and cuts/lacerations.

All temporary electric installations (site trailer, subpanels) will comply with OSHA (29 CFR 1926, Subpart K, and 29 CFR 1910, Subpart S) guidelines. Only qualified and competent individuals (licensed electrician) will provide electrical service/servicing. Refer to S3NA 410 PR, *Hazardous Energy Control*, for additional requirements and information.

3.1.6 Heavy Equipment and Vehicle Operations

Heavy equipment and site vehicles present serious hazards to site personnel. Blind spots, failure to yield, and other situations may cause heavy equipment/vehicles to come into contact with personnel. To reduce the possibility of contact between equipment/traffic and personnel, always adhere to the following:

- Personnel must wear a high visibility, reflective safety vest at all times when working near heavy equipment and/or other vehicle traffic.
- Personnel must always yield to equipment/vehicle traffic and stay as far as possible from all equipment/vehicle traffic. Always maintain eye contact with operators.
- When feasible, place barriers between work areas and equipment/vehicle traffic.
- Always ensure reverse warning alarms are working and louder than surrounding noise. Personnel must report inoperative reverse warning alarms.
- Ensure Daily Equipment Safety Inspections are being performed and documentation filed at the site.

For additional requirements, refer to S3NA 309 PR, *Mobile or Heavy Equipment*.

3.1.7 Drilling Operations

Drilling operations, including hollow-stem, rotary and/or direct push drilling, present their own set of hazards. Several basic precautions that should be taken include, but are not limited to, confirming locations of underground and overhead utilities, wearing of appropriate PPE and the avoidance of loose clothing or jewelry, staying clear of moving parts, knowing the locations of emergency shut-off switches. Other operational safety precautions regarding moving the drilling equipment, raising and lowering the derrick (mast), and drilling can be found in S3NA 405 PR, *Drilling and Boring*.

3.1.8 Dust and Odor Control

Specific controls will be in place to prevent dust generation. If dust is observed reaching or approaching the site boundary, activities causing the dust will be immediately stopped. Dust control measures (water spray, soil covers, slower work pace, or change in work activities) will be deployed prior to resuming work. Corrective measures will be documented in the daily report.

Due to the nature of the contaminant at the site, odors are not anticipated to be of concern. In the event that an odor complaint is received, the SS and/or SSO will immediately assess site conditions and determine the probable cause or causes. Appropriate odor mitigation measures will be deployed. These measures may include covering sediment piles, deploying odor suppressing foam, implementation of air monitoring or discontinuing activities that are generating the odor. Corrective measures will be documented in the daily report.

3.1.9 Spill Prevention

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

- All hazardous material will be stored in appropriate containers
- Tops/lids will be placed back on containers after use.
- Containers of hazardous materials will be stored appropriately away from moving equipment.

At least one spill response kit, to include an appropriate empty container, materials to allow for booming or diking the area to minimize the size of the spill, and appropriate clean-up material (i.e. speedy dri) shall be available at each work site (more as needed).

- All hazardous commodities in use (i.e. fuels) shall be properly labeled.
- Containers shall only be lifted using equipment specifically manufactured for that purpose.
- For drums/containers, follow the procedures in S3NA 308 WI, *Manual Lifting Safe Work Practices*, to minimize spillage.

3.1.10 Noise Exposure Monitoring

The use of power equipment can expose the field team to noise levels that exceed the OSHA PEL of 85 dB for an 8-hour day. Since personal noise monitoring will not be conducted during the proposed activities, employees must follow this general rule of thumb: If the noise levels are such that you must shout at someone two (2) feet away from you, you need to be wearing hearing protection. Employees can wear either disposable earplugs or earmuffs but all hearing protection must have a minimum noise reduction rating (NRR) of 27 dB. Refer to S3NA 510 PR, Hearing Conservation Program, for additional information and requirements.

3.1.11 Traffic Control

During certain work tasks, the establishment of traffic control to adequately protect workers and the public may be required on-site. Site specific requirements will be determined by the site supervisor/SSO on a case-by-case basis. Only approved traffic control devices per accordance with the Manual of Uniform Traffic Control Devices (MUTCD) will be used on public road ways per accordance with the applicable State regulatory guidance.

General traffic control precautions include placing a work vehicle between your worksite and oncoming traffic whenever possible. Not only is it a large, visible warning sign, but also if an oncoming car should fail to yield or deviate, the parked vehicle rather than your body would absorb the first impact of a crash. Turn the vehicle wheels so that if it was struck, it would swing away from the worksite. When using cones or other devices to modify traffic flow, ensure use of the proper taper length and device spacing to provide adequate warning distance to on-coming motor vehicles. In addition, proper PPE is to be worn during traffic operations, to include hardhat and high-visibility vests. Refer to S3NA 306 PR, *Highway and Road Work*, for additional requirements.

3.2 BIOLOGICAL HAZARDS

The likelihood of biological hazards being present is judged to be minimal since all work will be performed indoors or in a paved commercial area. Below is a general discussion of the most common biological hazards found on project.

3.2.1 Small Mammals

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.

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).

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.

3.2.2 Venomous Animals

Some animals have the ability to inject venom. These include: rattlesnakes, black widow spiders, and scorpions. These all have limited distributions, so in most areas you are unlikely to encounter them. Other spiders possess venom, but they are not harmful to humans. Shrews have poisonous saliva, but the chance of being envenomated by them is extremely unlikely unless they are handled.

If bitten by any of these animals special care should be taken to treat the wound as it may lead to complications due to the toxin.

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.



3.2.3 Poisonous Plants

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. Staff 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 result in severe scarring, blindness or even death.

Plants that field staff should recognize and take precautions to avoid include: Poison Sumac, Poison Ivy (terrestrial and climbing), Poison Oak, Giant Hogweed (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.

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 not to eat any berries or plants that you are not absolutely sure of their identity. Examples of common poisonous or irritating plant species, common to the United States, are shown in Table 3-1.

Table 3-1 Hazardous Plant Identification

<p>Poison Ivy</p> <ul style="list-style-type: none"> • Grows in West, Midwest, Texas, East • Several forms – vine, trailing shrub, or shrub • Three leaflets (can vary 3-9) • Leaves green in summer, red in fall • Yellow or green flowers • White berries 	
<p>Poison Oak</p> <ul style="list-style-type: none"> • Grows in the East (NJ to Texas), Pacific Coast • 6-foot tall shrubs or long vines • Oak-like leaves, clusters of three • Yellow berries 	

3.2.4 Insects

Insects for which precautionary measures should be taken include: mosquitoes (potential carriers of disease aside from dermatitis), black flies, wasps, bees, ticks, and European Fire Ants.

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.

Ticks can be encountered when walking in tall grass or shrubs. They crawl up clothing searching for exposed skin where they will insert mouthparts to drink blood. The most serious concern is the possibility of contracting

Lyme disease which is spread by the Black-legged or Deer Tick. Occasionally a tick can cause Tick Paralysis if it is able to remain feeding for several days. Full recovery usually occurs shortly after the tick is removed.

The European Fire Ant is spreading in Southern Ontario and 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.

3.3 ULTRAVIOLET HAZARDS

The 2009 historical UV Index for the South Glens Falls area showed that worker's UV exposures were in the HIGH category beginning in March and lasting until November with worker's exposures in the EXTREME category from July through August. In 2009, South Glens Falls had 44 days in the HIGH category, 133 days in the VERY HIGH category, and 0 days in the EXTREME category. Workers performing field work outdoors may be susceptible to sunburn if not properly protected with sunscreen or protective clothing and hats. Skin can burn in minutes when the UV Index is VERY HIGH. Protective measures are advisable.

3.4 WEATHER HAZARDS

The Site Safety Officer will be attentive to daily weather forecasts for the project area each morning. Predicted weather conditions of potential field impact are to be included in safety briefings and the Task Hazard Analysis (THA) for that day. Weather changes should initiate a review and updates (THA) as necessary. 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.

Severe weather can occur with little warning. Employees will be vigilant for the potentials for storms, lightning, high winds, and flash flood events. 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:

- 1) If thunder is heard, all site personnel are to be alert of any visible lightning flashes. The SSO will observe the storm front and track the direction it is moving. The SSO will continue to observe the storm front until it passes or until the prevailing direction is determined to be away from the site.
- 2) If lightning is observed, the SS or SSO 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.
- 3) The following action guidelines shall be implemented once the "second" count is ≤ 30 seconds:
 - a) "second" count > 30 , the SS or SSO will continually observe the storm front. If the front is moving away, work will continue. If the front is moving towards the site, the SS will initially place workers on alert for potential evacuation.
 - b) "second" count ≤ 30 , the SS 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.
- 4) 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.

3.5 HAZARD ANALYSIS

Task Hazard Analyses (THAs) have been completed for all tasks identified in the Work Plan (Appendix A) and include the following:

- Direct Push Drilling/Macrocore Sampling/Grab groundwater sampling
- Drilling/Well Installation
- Geophysical Survey/Private Utility Clearance
- Groundwater Sampling and Well Development
- Soil Sampling

As a result of unanticipated work activities or changing conditions, additional THAs may be required. All additional THAs will be reviewed and approved by the SH&E Professional.

3.6 TASK SPECIFIC SH&E PROCEDURES

As discussed in Section 5.0, personnel may be exposed to a variety of chemical and physical hazards resulting from task or equipment-specific activities. The controls for many of these hazards are discussed in SOPs found in the **Series 300 to 500** Series of the AECOM North America SH&E SOPs.

Table 3-2 Applicable SOPs

	SOP#	TITLE		SOP#	TITLE
S3NA 300 Series—Field(Common)			S3NA 500 Series—Industrial Hygiene		
<input type="checkbox"/>	S3NA-301-PR	Confined Spaces	<input type="checkbox"/>	S3NA-501-PR	Asbestos
<input checked="" type="checkbox"/>	S3NA-302-PR	Electrical, General	<input type="checkbox"/>	S3NA-502-PR	Benzene
<input type="checkbox"/>	S3NA-303-PR	Excavation and Trenching	<input type="checkbox"/>	S3NA-503-PR	Blood borne Pathogen Program
<input type="checkbox"/>	S3NA-304-PR	Fall Protection	<input type="checkbox"/>	S3NA-504-PR	Cadmium
<input checked="" type="checkbox"/>	S3NA-305-PR	Hand and Power Tools	<input type="checkbox"/>	S3NA-505-PR	Cold Stress Prevention
<input checked="" type="checkbox"/>	S3NA-306-PR	Highway and Road Work	<input type="checkbox"/>	S3NA-506-PR	Compressed Gases
<input checked="" type="checkbox"/>	S3NA-307-PR	Housekeeping, Worksite	<input checked="" type="checkbox"/>	S3NA-507-PR	Hazardous Materials Communication / WHMIS
<input checked="" type="checkbox"/>	S3NA-308-PR	Manual Lifting, Field		S3NA-508-PR	Hazardous Materials Handling and Shipping
<input checked="" type="checkbox"/>	S3NA-309-PR	Mobile or Heavy Equipment	<input type="checkbox"/>	S3NA-509-PR	Hazardous Waste Operations and Emergency Response Activities
<input type="checkbox"/>	S3NA-310-PR	Rigging, Hoisting, Cranes and Lifting Devices	<input type="checkbox"/>	S3NA-510-PR	Hearing Conservation Program
<input type="checkbox"/>	S3NA-311-PR	Scaffolding	<input type="checkbox"/>	S3NA-511-PR	Heat Stress Prevention
<input type="checkbox"/>	S3NA-312-PR	Ladders and Stairways	<input type="checkbox"/>	S3NA-512-PR	Laboratory Safety
<input checked="" type="checkbox"/>	S3NA-313-PR	Wildlife, Plants and Insects	<input type="checkbox"/>	S3NA-513-PR	Lead
<input type="checkbox"/>	S3NA-314-PR	Working Alone & Remote Travel	<input type="checkbox"/>	S3NA-514-PR	Munitions and Explosives of Concern / Unexploded Ordnance (MEC-UXO)
<input type="checkbox"/>	S3NA-315-PR	Water, Working Around	<input type="checkbox"/>	S3NA-515-PR	Nanotechnology
			<input type="checkbox"/>	S3NA-516-PR	Radiation Safety Programs
S3NA 400 Series Field (Uncommon)			<input type="checkbox"/>	S3NA-517-PR	Radiation, Non-Ionizing
<input type="checkbox"/>	S3NA-401-PR	Aircraft Charters	<input type="checkbox"/>	S3NA-518-PR	Radiation, Gauge Source program
<input type="checkbox"/>	S3NA-402-PR	All Terrain Vehicles (ATVs)	<input type="checkbox"/>	S3NA-519-PR	Respiratory Protection Program
<input type="checkbox"/>	S3NA-403-PR	Avalanches	<input type="checkbox"/>	S3NA-520-PR	Spill Response, Incidental
<input checked="" type="checkbox"/>	S4NA(US)-404-PR	Commercial Motor Vehicles			
<input checked="" type="checkbox"/>	S3NA-405-PR	Drilling and Boring			
<input checked="" type="checkbox"/>	S3NA-406-PR	Electrical Lines, Overhead			
<input type="checkbox"/>	S3NA-407-PR	Electro-fishing			
<input type="checkbox"/>	S3NA-408-PR	Elevated Work Platforms and Aerial Lifts			
<input type="checkbox"/>	S3NA-409-PR	Forklifts (operation of)			

<input type="checkbox"/>	S3NA-410-PR	Hazardous Energy Control
<input type="checkbox"/>	S3NA-411-PR	Machine Guarding
<input type="checkbox"/>	S3NA-412-PR	Powder-Actuated Tools
<input type="checkbox"/>	S4NA(US)-413-PR1	Process Safety Management
<input type="checkbox"/>	S4NA(US)-414-PR	Railway Sites
<input type="checkbox"/>	S4NA(US)-415-PR	RCRA Regulated Facilities
<input type="checkbox"/>	S3NA-416-PR	Tunnel and Underground Work
<input type="checkbox"/>	S3NA-417-PR	Utilities, Underground
<input type="checkbox"/>	S3NA-418-PR	Welding, Cutting and Other Hot Work
<input type="checkbox"/>	S3NA-419-PR	Water, Marine Operations, Boating
<input type="checkbox"/>	S3-NA420-PR	Water, Underwater Diving

4 SH&E REQUIREMENTS (SAFETY)

4.1 HAZWOPER QUALIFICATIONS

Personnel performing work at the job site must be qualified as HAZWOPER workers (unless otherwise noted in specific THAs or by the SSO), and must meet the medical monitoring and training requirements specified in the AECOM's North America SH&E Standard Operating Procedures.

If site monitoring procedures indicate that a possible exposure has occurred above the OSHA permissible exposure limit (PEL), employees may be required to receive supplemental medical testing to document any symptoms that may be specific to the particular materials present.

4.2 SITE-SPECIFIC SAFETY TRAINING

All AECOM personnel performing activities at the site will be trained in accordance with *S3NA-003-PR 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. In addition to the general health and safety training programs, personnel will be required to complete any supplemental task specific training developed for the tasks to be performed. 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 in the project files.

4.3 TAILGATE MEETINGS

Prior to the commencement of daily project activities, a tailgate meeting will be conducted by the SSO to review the specific requirements of this HASP and applicable THAs. Attendance at the daily tailgate meeting is mandatory for all employees at the site covered by this HASP and must be documented on the attendance form. All safety training documentation is to be maintained in the project file by the SSO.

4.4 HAZARD COMMUNICATION

Hazardous materials that may be encountered as existing on-site environmental or physical/health contaminants during the work activities are addressed in this HASP and 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 onto this AECOM-controlled work site must first provide a copy of the item's Material Safety Data Sheet

(MSDS) to the SSO for review and filing (the SSO will maintain copies of all MSDS on site). MSDS may not be available for locally-obtained products, in which case some alternate form of product hazard documentation will be acceptable in accordance with the requirements of *S3NA-507-PR Hazardous Materials Communication/WHMIS*.

All personnel shall be briefed on the hazards of any chemical product they use, and shall be aware of and have access to all MSDS.

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.).

Appendix B provides copies of MSDS for those items planned to be brought on site at the time this HASP is prepared. This information will be updated as required during site operations.

4.5 CONFINED SPACE ENTRY

Confined space entry is not anticipated for this site. If confined spaces are identified, the SSO/site supervisor will inform all employees of the location of confined spaces and prevent unauthorized entry. Confined space entry procedures and training requirements are listed in *S3NA 301 PR, Confined Spaces*.

4.6 HAZARDOUS, SOLID, OR MUNICIPAL WASTE

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 Regional SH&E Manager for further guidance.

4.7 GENERAL SAFETY RULES

All site personnel shall conduct themselves in a safe manner and maintain a working environment that is free of additional hazards, in adherence to *S3NA-001-PR Safe Work Standards and Rules* and *S3NA-307-PR Housekeeping, Worksite*.

4.7.1 Housekeeping

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.

4.7.2 Smoking, Eating, or Drinking

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 an approved area.

4.7.3 Personal Hygiene

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 non-potable water sources.

Non-Potable Water - Non-potable water may be used for hand washing and cleaning activities. Non-potable water will not be used for drinking purposes. All containers of non-potable water will be marked with a label stating:

***Non-Potable 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.

4.7.4Buddy System

All field personnel will use the buddy system when working within any controlled work area. Personnel belonging to another organization on site can serve as "buddies" for AECOM personnel. Under no circumstances will any employee be present alone in a controlled work area. For areas not in controlled work areas, the procedures outlined in *S3NA-314-PR Working Alone and Remote Travel* will be followed at all times.

4.8 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 *S3NA-002-PR, 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.

Upon issuing the stop work order, the SSO 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 Safety Professional has concurred that workplace conditions meet acceptable safety standards.

4.9 CLIENT SPECIFIC SAFETY REQUIREMENTS

The client has specified no additional health and safety requirements.

5 EXPOSURE MONITORING PROCEDURES (HEALTH)

5.1 CONTAMINANT EXPOSURE HAZARDS

The following is a discussion of the hazards presented to worker personnel during this project from on-site chemical hazards known, suspected, or anticipated to be present on site.

Exposure symptoms and applicable first aid information for each suspected site contaminant identified in the Work Assignment are located in the following subsections.

5.1.1 Tetrachloroethylene (PCE)

PCE affects the central nervous system (CNS), causing loss of coordination, headache, vertigo (loss of balance), light narcosis, dizziness, and unconsciousness. Death may occur if exposed to extremely high concentrations of PCE. Various irritable effects have been attributed to PCE exposure, including eye, nose, and throat irritation, indications of nausea and intestinal gas, and possible changes to the liver and kidneys. PCE is not known to produce harmful effects in cases of skin exposure where the PCE was allowed to evaporate immediately after contact. However, in cases where skin was exposed to PCE frequently and for prolonged periods without evaporating, symptoms of dermatitis by defatting of the skin was evident. The National Toxicology Program (NTP) lists PCE as an anticipated human carcinogen. The OSHA PEL and the ACGIH (American Conference of Governmental Industrial Hygienists) TLV (Threshold Limit Value) are 25 part per million (ppm) with an ACGIH short-term exposure limit (STEL) of 100 ppm.

5.1.2 Trichloroethylene (TCE)

Moderate exposure to TCE causes symptoms similar to those of alcohol inebriation. Higher concentrations cause narcotic effects. Ventricular fibrillation has been cited as the cause of death following heavy exposures. TCE-induced hepatocellular carcinomas have been detected in mice during tests conducted by the National Cancer Institute. Organ systems affected by overexposure to TCE are the CNS (euphoria, analgesia, and anesthesia), degeneration of the liver and kidneys, the lungs (tachypnea), heart (arrhythmia) and skin (irritation, vesication, and paralysis of fingers when immersed in liquid TCE). Contact with the liquid defats the skin, causing topical dermatitis. Certain people appear to experience synergistic effects from TCE exposure concomitant with exposure to caffeine, alcohol, and other drugs. Other reported symptoms of TCE exposure include abnormal fatigue, headache, irritability, gastric disturbances, and intolerance to alcohol. Both the OSHA PEL and the ACGIH STEL are 100 ppm, and the ACGIH TLV is 50 ppm.

5.1.3 Cis-1,2- Dichloroethene

The most significant effects of 1,2-dichloroethene exposure are hematological and hepatic. At high levels of exposure, clinical symptoms that have been reported in humans exposed to 1,2 dichloroethene in air include nausea, drowsiness, fatigue, intracranial pressure and ocular irritation. One fatality has been reported. No information is available on oral toxicity for 1,2dichloroethene in humans. No information is available on the relative toxicities of the cis and trans isomers of 1,2dichloroethene in humans. The OSHA PEL and the ACGIH TLV are 200 part per million (ppm).

Table 5-1 Contaminant of Concern Summary

Material	OEL	IDLH	Warning	Signs & Symptoms	IP (eV)
Tetrachloroethylene	25 ppm	150 ppm	47 ppm	Irritated eyes, nose, throat, flushed face & neck, dizziness	9.32
Trichloroethylene	10 ppm	1000 ppm	82 ppm	Vertigo, visual disturbance, headache, drowsiness	9.45
1,2 Dichloroethylene	200 ppm	1000 ppm	1.1 ppm	.Irritated eyes, CNS depression	10.0

OEL – Occupational Exposure Level
ppm – Parts per million

IDLH – Immediately Dangerous to Life and Health
IP – ionization potential of photoionization detector (PID) eV electron volt

5.2 REAL-TIME EXPOSURE MEASUREMENT

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. Table 5-2 specifies the real-time monitoring equipment, which will be used for this project. [

Table 5-2 Monitoring Parameters and Equipment

INSTRUMENT	MANUFACTURER/MODEL*	SUBSTANCES DETECTED
Photo Ionization Detector (PID)	RAE Systems mini-RAE (min. 10.6 eV bulb)	Organic Solvents

Health and Safety Action Levels

An action level is a point at which increased protection is required due to the concentration of contaminants in the work area or other environmental conditions. The concentration level (above background level) and the ability of the PPE to protect against that specific contaminant determine each action level. The action levels are based on concentrations in the breathing zone.

If ambient levels are measured which exceed the action levels in areas accessible to unprotected personnel, necessary control measures (barricades, warning signs, and mitigative 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 SSO or the Safety Professional.

Reasons to upgrade:

- Known or suspected presence of dermal hazards.
- Occurrence or likely occurrence of gas, vapor, or dust emission.
- Change in work task that will increase the exposure or potential exposure to hazardous materials.

Reasons to downgrade:

- New information indicating that the situation is less hazardous than was originally suspected.
- Change in site conditions that decrease the potential hazard.
- Change in work task that will reduce exposure to hazardous materials.

5.3 MONITORING PROCEDURES

Table 5-3 Monitoring Procedures and Action Levels

PARAMETER	LOCATION AND INTERVAL	RESPONSE LEVEL (Meter units/ppm above background)	RESPONSE
Chlorinated Solvents (Total by PID)	Continuous in the worker's breathing zone or in the immediate work area for sustained reading of 15 minutes in duration.	< 10 ppm	Level D work and continue monitoring (not applicable for initial assessment of unknown drums or containers).
		≥ 10 ppm	Contact the RSHEM, Don Level C (organic cartridges or equivalent chemical cartridge combined with P100) and continue monitoring.

5.3.1 Monitoring Equipment Calibration

All instruments used will be calibrated at the beginning and end of each work shift, in accordance with the manufacturer's recommendations. If the owner's manual is not available, the personnel operating the equipment will contact the applicable office representative, rental agency or manufacturer for technical guidance for proper calibration. If equipment cannot be pre-calibrated to specifications, site operations requiring monitoring for worker exposure or off-site migration of contaminants will be postponed or temporarily ceased until this requirement is completed.

5.3.2 Personal Sampling

Should site activities warrant performing personal sampling (breathing zone) to better assess chemical exposures experienced by AECOM employees, the SSO, under the direction of a Certified Industrial Hygienist (CIH), Certified Safety Professional (CSP) will be responsible for specifying the monitoring required. Within five working days after the receipt of monitoring results, the CIH or CSP will notify each employee, in writing, of the results that represent that employee's exposure. Copies of air sampling results will be maintained in the SSO project files.

If the site activities warrant, the subcontractor will ensure its employees' exposures are quantified via the use of appropriate sampling techniques. The subcontractor shall notify the employees sampled in accordance with health and safety regulations, and provide the results to the SSO for use in determining the potential for other employees' exposure.

5.4 HEAT AND COLD STRESS

Heat and cold stress may vary based upon work activities, PPE/clothing selection, geographical locations, and weather conditions. To reduce the potential of developing heat/cold stress, be aware of the signs and symptoms of heat/cold stress and watch fellow employees for signs of heat/cold stress.

Heat stress can be a significant field site hazard, particularly for non-acclimated personnel operating in a hot, humid setting. Site personnel will be instructed in the identification of a heat stress victim, the first-aid treatment procedures for the victim and the prevention of heat stress casualties. Work-rest cycles will be determined and the appropriate measures taken to prevent heat stress as outlined in SH&E 616, *Heat Stress Prevention Program*.

5.4.1 Responding to Heat-Related Illness

The guidance below will be used in identifying and treating heat-related illness.

Table 5-4 Identification and Treatment of Heat-Related Illness

Type of Heat-Related Illness	Description	First Aid
Mild Heat Strain	The mildest form of heat-related illness. Victims exhibit irritability, lethargy, and significant sweating. The victim may complain of headache or nausea. This is the initial stage of overheating, and prompt action at this point may prevent more severe heat-related illness from occurring.	<ul style="list-style-type: none"> • Provide the victim with a work break during which he/she may relax, remove any excess protective clothing, and drink cool fluids. • If an air-conditioned spot is available, this is an ideal break location. • Once the victim shows improvement, he/she may resume working; however, the work pace should be moderated to prevent recurrence of the symptoms.
Heat Exhaustion	Usually begins with muscular weakness and cramping, dizziness, staggering gait, and nausea. The victim will have pale, clammy moist skin and may perspire profusely. The pulse is weak and fast and the victim may faint unless they lie down. The bowels may move involuntarily.	<ul style="list-style-type: none"> • Immediately remove the victim from the work area to a shady or cool area with good air circulation (<i>avoid drafts or sudden chilling</i>). • Remove all protective outerwear. • Call a physician. • Treat the victim for shock. (<i>Make the victim lie down, raise his or her feet 6–12 inches, and keep him/her cool by loosening all clothing</i>). • If the victim is conscious, it may be helpful to give him/ her sips of water. • Transport victim to a medical facility ASAP.
Heat Stroke	The most serious of heat illness, heat stroke represents the collapse of the body's cooling mechanisms. As a result, body temperature may rise to 104 degrees Fahrenheit or higher. As the victim progresses toward heat stroke, symptoms such as headache, dizziness, nausea can be noted, and the skin is observed to be dry, red, and hot. Sudden collapse and loss of consciousness follows quickly and death is imminent if exposure continues. Heat stroke can occur suddenly.	<ul style="list-style-type: none"> • Immediately evacuate the victim to a cool/shady area. • Remove all protective outerwear and as much personal clothing as decency permits. • Lay the victim on his/her back w/the feet slightly elevated. • Apply cold wet towels or ice bags to the head, armpits, and thighs. • Sponge off the bare skin with cool water. • The main objective is to cool without chilling the victim. • Give no stimulants or hot drinks. • Since heat stroke is a severe medical condition requiring professional medical attention, emergency medical help should be summoned immediately to provide onsite treatment of the victim and proper transport to a medical facility.

6 ENVIRONMENTAL PROGRAM (ENVIRONMENT)

6.1 ENVIRONMENTAL COMPLIANCE AND MANAGEMENT

This project and the individual tasks will comply with all federal, state, provincial, and local environmental requirements.

Project work will be conducted in general accordance with the NYSDEC DER-10, Technical Guidance for Site Investigation and Remediation (NYSDEC, 2010a), technical requirements in Contract D007626 between NYSDEC and AECOM (NYSDEC and AECOM, 2010), and United States Environmental Protection Agency (USEPA) Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (USEPA, 1988).

6.1.1 Air Emissions

There are no operations that are part of this Work Assignment that would be expected to result in air emissions that may negatively impact the surrounding environment.

6.1.2 Hazardous Waste Management

IDW will be collected and categorized as non-hazardous or hazardous. Potentially hazardous IDW purge water, decontamination fluids, and soil cuttings will be tested and disposed of within 90 calendar days of completing the field activities. Potentially hazardous IDW waste will be staged onsite then delivered to an IDW storage facility for processing.

6.1.3 Storm Water Pollution Prevention

There are no operations that are part of this Work Assignment that would be expected to generate/discharge stormwater from the project site.

6.1.4 Wetlands Protection

The Site is approximately 5 acres and consists of a parking lot and a strip mall constructed in 1967. The Site use is commercial retail including a restaurant. There are no wetlands on site.

6.1.5 Critical Habitat Protection

The Site is approximately 5 acres and consists of a parking lot and a strip mall constructed in 1967. The Site use is commercial retail including a restaurant. There are no critical habitats requiring protection on or near the Site.

6.1.6 Environmental Protection

Due to the nature of the Work Assignment and the location of the Site, no special actions are required to ensure environmental protection.

7 PERSONAL PROTECTIVE EQUIPMENT

7.1 PERSONAL PROTECTIVE EQUIPMENT

The purpose of personal protective equipment (PPE) is to provide a barrier which will shield or isolate individuals from the chemical and/or physical hazards that may be encountered during work activities. *S3/NA-208-PR Personal Protective Equipment Program* lists the general requirements for selection and usage of PPE. Table 7-1 lists 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 individual THAs.

By signing this HASP the employee agrees having been trained in the use, limitations, care, and maintenance of the protective equipment to be used by the employee at this project. If training has not been provided, request same of the PM/SSO for the proper training before signing.

It is anticipated that the work will be performed in Level D personal protection with the potential to upgrade to Level C. Field workers will be instructed to keep Level C equipment available should it be needed. Should health and safety monitoring during field activities indicate a threat to field personnel or warrant an upgrade beyond Level C protection, work will stop and site conditions will be re-evaluated by NYSDEC and AECOM. An upgrade to Level B protection will require modification of the HASP and review by AECOM's district safety manager.

Table 7-1: Personal Protective Equipment

<u>TYPE</u>	<u>MATERIAL</u>	<u>ADDITIONAL INFORMATION</u>
Minimum PPE		
Safety Vest	ANSI Type II high-visibility	Must have reflective tape/be visible from all sides
Boots	Leather	ANSI approved safety toe
Safety Glasses		ANSI Approved; ≥98% UV protection
Hard Hat		ANSI Approved; recommended wide-brim
Work Uniform		No shorts/cutoff jeans or sleeveless shirts
Additional PPE:		
Hearing Protection	Ear plugs and/ or muffs	In hazardous noise areas
Leather Gloves		If working with sharp objects or powered equipment.
Protective Chemical Gloves		When collecting environmental samples or potentially coming into contact with Site contaminants
Sunscreen	SPF 30 or higher	
Level C Respiratory Protection	Full Face or equivalent) equipped with organic vapor /P100	Should be available should it be needed

7.2 PPE DOFFING AND DONNING (UTILIZATION) INFORMATION

The following information is to provide field personnel with helpful hints that, when applied, make donning and doffing of PPE a more safe and manageable task:

- Never cut disposable booties from your feet with basic utility knives. This has resulted in workers cutting through the bootie and the underlying sturdy leather work boot, resulting in significant cuts to the

legs/ankles. Recommend using a pair of scissors or a package/letter opener (cut above and parallel with the work boot) to start a cut in the edge of the boot, then proceed by manually tearing the material down to the sole of the boot for easy removal.

- When applying duct tape to PPE interfaces (wrist, lower leg, around respirator, etc.) and zippers, leave approximately one inch at the end of the tape to fold over onto itself. This will make it much easier to remove the tape by providing a small handle to grab while still wearing gloves. Without this fold, trying to pull up the tape end with multiple gloves on may be difficult and result in premature tearing of the PPE.
- Have a “buddy” check your ensemble to ensure proper donning before entering controlled work areas. Without mirrors, the most obvious discrepancies can go unnoticed and may result in a potential exposure situation.
- Never perform personal decontamination with a pressure washer.

7.3 DECONTAMINATION

7.3.1 General Requirements

All possible and necessary steps shall be taken to reduce or minimize contact with chemicals and contaminated/impacted materials while performing field activities (e.g., avoid sitting or leaning on, walking through, dragging equipment through or over, tracking, or splashing potential or known contaminated/impacted materials, etc).

All personal decontamination activities shall be performed with an attendant (buddy) to provide assistance to personnel that are performing decontamination activities. Depending on specific site hazards, attendants may be required to wear a level of protection that is equal to the required level in the Exclusion Zone (EZ).

All persons and equipment entering the EZ shall be considered contaminated, and thus, must be properly decontaminated prior to entering the SZ.

Decontamination procedures may vary based on site conditions and nature of the contaminant(s). If chemicals or decontamination solutions are used, care should be taken to minimize reactions between the solutions and contaminated materials. In addition, personnel must assess the potential exposures created by the decontamination chemical(s) or solutions. The applicable Material Safety Data Sheet (MSDS) must be reviewed, implemented, and filed by personnel contacting the chemicals/solutions.

All contaminated PPE and decontamination materials shall be contained, stored, and disposed of in accordance with site-specific requirements determined by site management.

7.3.2 Decontamination Equipment

The equipment required to perform decontamination may vary based on site-specific conditions and the nature of the contaminant(s). The following equipment is commonly used for decontamination purposes:

- Soft-bristle scrub brushes or long-handled brushes to remove contaminants;
- Hoses, buckets of water or garden sprayers for rinsing;
- Large plastic/galvanized wash tubs or children's wading pools for washing and rinsing solutions;
- Large plastic garbage cans or similar containers lined with plastic bags for the storage of contaminated clothing and equipment;
- Metal or plastic cans or drums for the temporary storage of contaminated liquids; and
- Paper or cloth towels for drying protective clothing and equipment.

7.3.3 Personal/Equipment Decontamination

All equipment leaving the EZ shall be considered contaminated and must be properly decontaminated to minimize the potential for exposure and off-site migration of impacted materials. Such equipment may include, but is not limited to: sampling tools, heavy equipment, vehicles, PPE, support devices (e.g., hoses, cylinders, etc.), and various handheld tools.

All employees performing equipment decontamination shall 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. Following equipment decontamination, employees may be required to follow the proper personal decontamination procedures above.

Personnel decontamination should consist of the following glove removal procedure:

- Grasp the cuff of the dominant hand and pull glove over the bulk of the hand, leaving the fingers inside the glove.
- Use the dominant hand to grasp the cuff of the non-dominant hand and pull the glove completely off (inside-out) and place inside of the dominant hand glove.
- Once removed, employee should only touch the inside material of the dominant hand glove.
- Thoroughly wash hands.

For larger equipment, a high-pressure washer may need to be used. Some contaminants require the use of a detergent or chemical solution and scrub brushes to ensure proper decontamination. Before heavy equipment and trucks are taken offsite, the SS and/or SSO will visually inspect them for signs of contamination. If contamination is present, the equipment must be decontaminated

For smaller equipment, use the following steps for decontamination:

1. Remove majority of visible gross contamination in EZ.
2. Wash equipment in decontamination solution with a scrub brush and/or power wash heavy equipment.
3. Rinse equipment.
4. Visually inspect for remaining contamination.
5. Follow appropriate personal decontamination steps outlined above.

All decontaminated equipment shall be visually inspected for contamination prior to leaving the Contaminant Reduction Zone (CRZ). Signs of visible contamination may include an oily sheen, residue or contaminated soils left on the equipment. All equipment with visible signs of contamination shall be discarded or re-decontaminated until clean. Depending on the nature of the contaminant, equipment may have to be analyzed using a wipe method or other means.

8 PROJECT HEALTH AND SAFETY ORGANIZATION

8.1 PROJECT MANAGER -- WALTER HOWARD

The Project Manager (PM) has overall management authority and responsibility for all site operations, including safety. The PM will provide the site supervisor with work plans, staff, and budgetary resources, which are appropriate to meet the safety needs of the project operations.

8.2 SITE SUPERVISOR -- MARK HOWARD

The site supervisor has the overall responsibility and authority to direct work operations at the job site according to the provided work plans. The PM may act as the site supervisor while on site.

8.2.1 Responsibilities

The site supervisor is responsible to:

- Discuss deviations from the work plan with the SSO and PM.
- Discuss safety issues with the PM, SSO, and field personnel.
- Assist the SSO with the development and implementation of corrective actions for site safety deficiencies.
- Assist the SSO with the implementation of this HASP and ensuring compliance.
- Assist the SSO with inspections of the site for compliance with this HASP and applicable SOPs.

8.2.2 Authority

The site supervisor has authority to:

- Verify that all operations are in compliance with the requirements of this HASP, and halt any activity that poses a potential hazard to personnel, property, or the environment.
- Temporarily suspend individuals from field activities for infractions against the HASP pending consideration by the SSO, the Safety Professional, and the PM.

8.2.3 Qualifications

In addition to being Hazardous Waste Operations and Emergency Response (HAZWOPER)-qualified (see Section 4.1), the Site Supervisor is required to have completed the 8-hour HAZWOPER Supervisor Training Course in accordance with 29 CFR 1910.120 (e)(4).

8.3 SITE SAFETY OFFICER -- MARK HOWARD

8.3.1 Responsibilities

The SSO is responsible to:

- Update the site-specific HASP to reflect changes in site conditions or the scope of work. HASP updates must be reviewed and approved by the Safety Professional.
- Be aware of changes in AECOM Safety Policy.
- Monitor the lost time incidence rate for this project and work toward improving it.
- Inspect the site for compliance with this HASP and the SOPs using the appropriate audit inspection checklist provided by an AECOM Safety Professional.
- Work with the site supervisor and PM to develop and implement corrective action plans to correct deficiencies discovered during site inspections. Deficiencies will be discussed with project management to determine appropriate corrective action(s).
- Contact the Safety Professional for technical advice regarding safety issues.
- Provide a means for employees to communicate safety issues to management in a discreet manner (i.e., suggestion box, etc.).
- Determine emergency evacuation routes, establishing and posting local emergency telephone numbers, and arranging emergency transportation.

- Check that all site personnel and visitors have received the proper training and medical clearance prior to entering the site.
- Establish any necessary controlled work areas (as designated in this HASP or other safety documentation).
- Present tailgate safety meetings and maintain attendance logs and records.
- Discuss potential health and safety hazards with the Site Supervisor, the Safety Professional, and the PM.
- Select an alternate SSO by name and inform him/her of their duties, in the event that the SSO must leave or is absent from the site. The alternate SSO must be approved by the PM.

8.3.2 Authority

The SSO has authority to:

- Verify that all operations are in compliance with the requirements of this HASP.
- Issue a "Stop Work Order" under the conditions set forth in this HASP.
- Temporarily suspend individuals from field activities for infractions against the HASP pending consideration by the Safety Professional and the PM.

8.3.3 Qualifications

In addition to being HAZWOPER-qualified, the SSO is required to have completed the 8-hour HAZWOPER Supervisor Training Course in accordance with 29 CFR 1910.120 (e)(4).

8.4 EMPLOYEES

8.4.1 Employee Responsibilities

Responsibilities of employees associated with this project include, but are not limited to:

- Understanding and abiding by the policies and procedures specified in the HASP and other applicable safety policies, and clarifying those areas where understanding is incomplete.
- Providing feedback to health and safety management relating to omissions and modifications in the HASP or other safety policies.
- Notifying the SSO, in writing, of unsafe conditions and acts.

8.4.2 Employee Authority

The health and safety 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 that 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 HASP or other safety policies are not being followed.
- The right to contact the SSO or the Safety Professional 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

8.5 SAFETY PROFESSIONAL -- MIKE GRASSO

The Safety Professional is the member of the AECOM Safety, Health and Environmental Department assigned to provide guidance and technical support for the project. Duties include the following:

- Approving this HASP and any required changes.
- Approving the designated Site Safety Officer (SSO).
- Reviewing all personal exposure monitoring results.
- Investigating any reported unsafe acts or conditions.

8.6 SUBCONTRACTORS

The requirements for subcontractor selection and subcontractor safety responsibilities are outlined in *S3/NA-213-PR Subcontractors*. 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 personnel protective equipment (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. Each subcontractor is expected to perform its operations in accordance with its own unique 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 onsite activities, if required.

Hazards not listed in this HASP but known to any subcontractor, or known to be associated with a subcontractor's services, must be identified and addressed to the AECOM PM or the Site Supervisor prior to beginning work operations. The Site Supervisor 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.

8.7 VISITORS

Authorized visitors (e.g., client representatives, regulators, AECOM management staff, etc.) requiring entry to any work location on the site will be briefed by the PM 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 HASP specifies the minimum acceptable qualifications, training and personal protective equipment which are required for entry to any controlled work area; visitors must comply with these requirements at all times.

8.7.1 Visitor Access

Visitors to any HAZWOPER controlled-work area must comply with the health and safety requirements of this HASP, and demonstrate an acceptable need for entry into the work area. All visitors desiring to enter any controlled work area must observe the following procedures:

1. A written confirmation must be received by AECOM documenting that each of the visitors has received the proper training and medical monitoring required by this HASP. Verbal confirmation can be considered acceptable provided such confirmation is made by an officer or other authorized representative of the visitor's organization.
2. Each visitor will be briefed on the hazards associated with the site activities being performed and acknowledge receipt of this briefing by signing the appropriate tailgate safety briefing form.
3. All visitors must be escorted by an AECOM employee.

If the site visitor requires entry to any EZ, but does not comply with the above requirements, all work activities within the EZ must be suspended. Until these requirements have been met, entry will not be permitted.

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

9 SITE CONTROL

9.1 GENERAL

The purpose of site control is to minimize potential contamination of workers, protect the public from site hazards, and prevent vandalism. The degree of site control necessary depends on the site characteristics, site size, and the surrounding community.

Controlled work areas will be established at each work location, and if required, will be established directly prior to the work being conducted. Diagrams designating specific controlled work areas will be drawn on site maps, posted in the support vehicle or trailer and discussed during the daily safety meetings. If the site layout changes, the new areas and their potential hazards will be discussed immediately after the changes are made. General examples of zone layouts have been developed for drilling and earth moving activities [(e.g., excavating, trenching, etc.)] –and are attached to this section.

9.2 CONTROLLED WORK AREAS

Each HAZWOPER controlled work area will consist of the following three zones:

- Exclusion Zone: Contaminated work area.
- Contamination Reduction Zone: Decontamination area.
- Support Zone: Uncontaminated or “clean area” where personnel should not be exposed to hazardous conditions.

Each zone will be periodically monitored in accordance with the air monitoring requirements established in this HASP. The Exclusion Zone and the Contamination Reduction Zone are considered work areas. The Support Zone is accessible to the public (e.g., vendors, inspectors).

9.2.1 Exclusion Zone

The Exclusion Zone is the area where primary activities occur, such as sampling, remediation operations, installation of wells, cleanup work, etc. This area must be clearly marked with hazard tape, barricades or cones, or enclosed by fences or ropes. Only personnel involved in work activities, and meeting the requirements specified in the applicable THA and this HASP will be allowed in an Exclusion Zone.

The extent of each area will be sufficient to ensure that personnel located at/beyond its boundaries will not be affected in any substantial way by hazards associated with sample collection activities.

- **Direct Push Drilling Activities.** A distance of 20 feet in all directions will be cleared from the rig. The cleared area will be sufficient to accommodate movement of necessary equipment and soil sampling supplies. Vehicles and other hard barriers should be used where applicable to protect employees and public.
- **HSA Drilling.** Determine the mast height of the drill rig. This height will be cleared, if practical, in all directions from the bore-hole location and designated as the exclusion zone. The cleared area will be sufficient to accommodate movement of necessary equipment and the stockpiling of spoils piles. Vehicles and other hard barriers should be used where applicable to protect employees and public.
- **Slab Cutting.** A distance of 10 feet in all directions from the cutting location will be cleared when using manual methods (i.e., chisel or equivalent) and 20 feet when using a concrete saw. The cleared area will be sufficient to accommodate movement of necessary equipment and the stockpiling of debris. Vehicles and other hard barriers should be used where applicable to protect employees and public.
- **Hand Augering.** A distance of 10 feet will be cleared in all directions from the sampling location in order to accommodate additional sampling equipment. Vehicles and other hard barriers should be used where applicable to protect employees and public.

All personnel should be alert to prevent unauthorized, accidental entrance into controlled-access areas (the EZ and CRZ). If such an entry should occur, the trespasser should be immediately escorted outside the area, or all HAZWOPER-related work must cease. All personnel, equipment, and supplies that enter controlled-access areas must be decontaminated or containerized as waste prior to leaving (through the CRZ only).

9.2.2 Contamination Reduction Zone

The Contamination Reduction Zone is the transition area between the contaminated area and the clean area. Decontamination is the main focus in this area. The decontamination of workers and equipment limits the physical transfer of hazardous substances into the clean area. This area must also be clearly marked with hazard tape and access limited to personnel involved in decontamination.

9.2.3 Support Zone

The Support Zone is an uncontaminated zone where administrative and other support functions, such as first aid, equipment supply, emergency information, etc., are located. The Support Zone shall have minimal potential for significant exposure to contaminants (i.e., background levels).

Employees will establish a Support Zone (if necessary) at the site before the commencement of site activities. The Support Zone would also serve as the entry point for controlling site access.

9.3 SITE ACCESS DOCUMENTATION

If implemented by the PM, all personnel entering the site shall complete the "Site Entry/Exit Log" located at the site trailer or primary site support vehicle.

9.4 SITE SECURITY

Site security is necessary to:

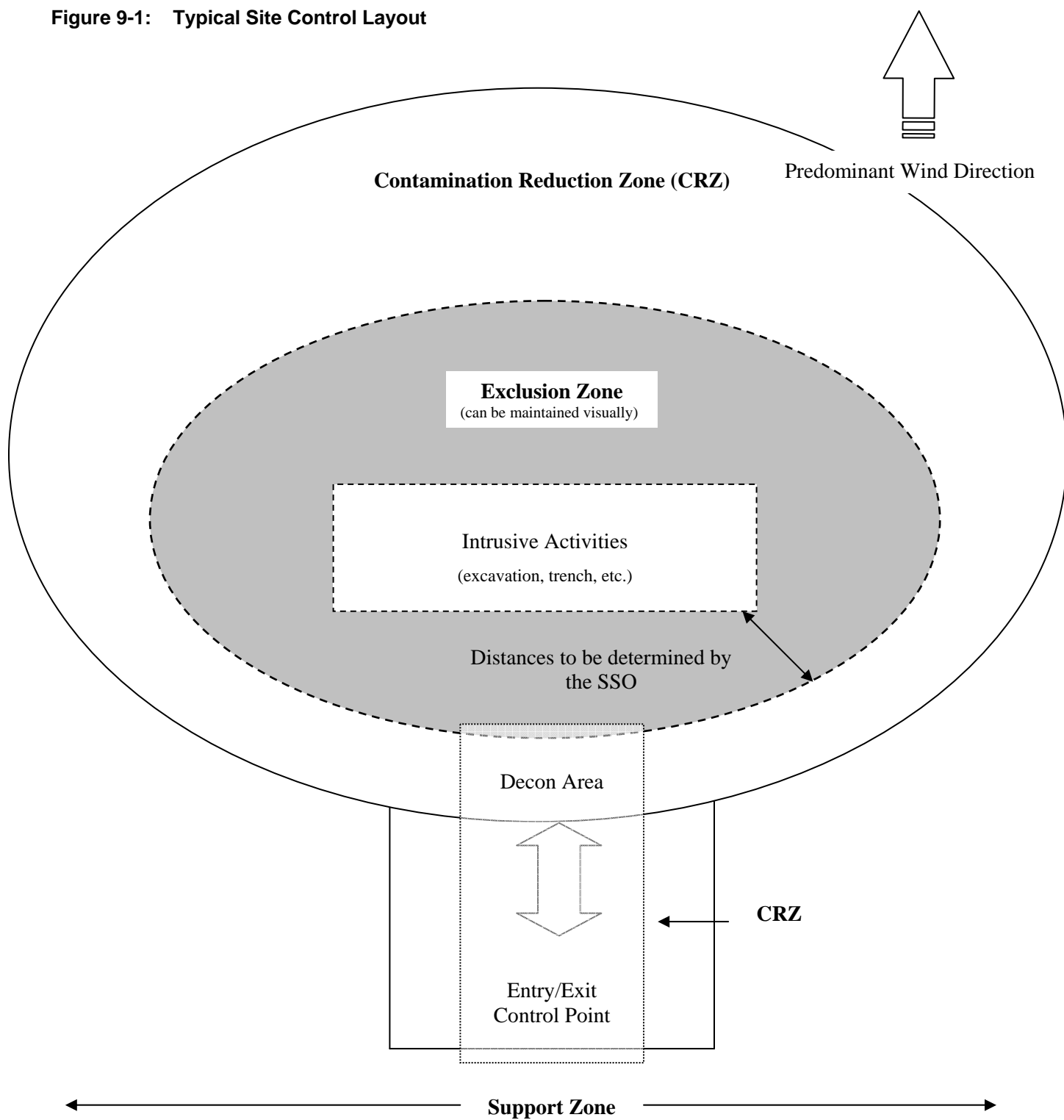
- Prevent the exposure of unauthorized, unprotected people to site hazards.
- Avoid the increased hazards from vandals or persons seeking to abandon other wastes on the site.
- Prevent theft.
- Avoid interference with safe working procedures.

To maintain site security during working hours:

1. Maintain security in the Support Zone and at access control points.
2. Establish an identification system to identify authorized persons and limitations to their approved activities.
3. Assign responsibility for enforcing authority for entry and exit requirements.
4. When feasible, install fencing or other physical barrier around the site.
5. If the site is not fenced, post signs around the perimeter and whenever possible, use guards to patrol the perimeter. Guards must be fully apprised of the hazards involved and trained in emergency procedures.
6. Have the PM approve all visitors to the site. Make sure they have valid purpose for entering the site. Have trained site personnel accompany visitors at all times and provide them with the appropriate protective equipment.

To maintain site security during off-duty hours:

1. If possible, assign trained, in-house technicians for site surveillance. They will be familiar with the site, the nature of the work, the site's hazards, and respiratory protection techniques.
2. If necessary, use security guards to patrol the site boundary. Such personnel may be less expensive than trained technicians, but will be more difficult to train in safety procedures and will be less confident in reacting to problems around hazardous substances.
3. Enlist public enforcement agencies, such as the local police department, if the site presents a significant risk to local health and safety.
4. Secure the equipment.

Figure 9-1: Typical Site Control Layout

10 EMERGENCY RESPONSE PLANNING

10.1 EMERGENCY ACTION PLAN

Although the potential for an emergency to occur is remote, an emergency action plan has been prepared for this project should such critical situations arise. The only significant type of onsite emergency that may occur is physical injury or illness to a member of the AECOM team. The Emergency Action Plan (EAP) will be reviewed by all personnel prior to the start of field activities. A test of the EAP will be performed within the first three (3) days of the project field operations. This test will be evaluated and documented in the project records.

Three major categories of emergencies could occur during site operations:

1. Illnesses and physical injuries (including injury-causing chemical exposure)
2. Catastrophic events (fire, explosion, earthquake, or chemical)
3. Workplace Violence, Bomb Threat
4. Safety equipment problems

10.1.1 Emergency Coordinator

The duties of the Emergency Coordinator (EC) include:

- Implement the EAP based on the identified emergency condition
- Notify the appropriate project and SH&E Department personnel of the emergency (Table 9-3)
- Verify emergency evacuation routes and muster points are accessible
- Conduct routine EAP drills and evaluate compliance with the EAP

10.1.2 Site-Specific Emergency Procedures

Prior to the start of site operations, the EC will complete Table 9-1 with any site-specific information regarding evacuations, muster points, communication, and other site-specific emergency procedures.

Table 10-1 Emergency Planning

Emergency	Evacuation Route	Muster Location
Chemical Spill	• Upwind	• Stewarts Shop
Fire/Explosion	• Upwind	• Stewarts Shop
Tornado/Severe Weather	•	• Hospital
Lightning	•	• Vehicle
Additional Information		
Communication Procedures	<p>Direct verbal communications, however; must be supplemented anytime voices cannot be clearly perceived above ambient noise levels (i.e., noise from heavy equipment; drilling rigs, backhoes, etc.) and anytime a clear line-of-sight cannot be easily maintained amongst all AECOM personnel because of distance, terrain or other obstructions.</p> <p>Verbal communications will be adequate to warn employees of hazards associated with the immediate work area. AECOM personnel will bring a mobile phone to the site to ensure that communications with local emergency responders is maintained, when necessary.</p>	
CPR/First Aid Trained Personnel	Mark Howard	

10.1.3 Spill Containment Procedure

Work activities may involve the use of hazardous materials (i.e. fuels, solvents) or work involving drums or other containers. State specific spill reporting procedures have been included in Appendix C. If anything beyond these procedures are required, a site specific spill reporting card/procedure must be developed for the site. Procedures outlined below will be used to prevent or contain spills:

- All hazardous material will be stored in appropriate containers
- Tops/lids will be placed back on containers after use.
- Containers of hazardous materials will be stored appropriately away from moving equipment.

At least one spill response kit, to include an appropriate empty container, materials to allow for booming or diking the area to minimize the size of the spill, and appropriate clean-up material (i.e. speedy drier) shall be available at each work site (more as needed).

- All hazardous commodities in use (i.e. fuels) shall be properly labeled.
- 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.

10.1.4 Safety Accident/Incident Reporting

All accidents and incidents that occur on-site during any field activity will be promptly reported to the SSO and the immediate supervisor.

If any AECOM employee is injured and requires medical treatment, the Site Supervisor will report the incident in accordance with AECOM's incident reporting procedures. A copy of the final Supervisor's Report of Incident will be provided to the SH&E Professional before the end of the following shift.

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 SSO within 24 hours after the accident has occurred.

All accidents/incidents will be investigated. Copies of all subcontractor accident investigations will be provided to the SSO within five (5) days of the accident/incident.

10.1.5 Environmental Spill/Release Reporting

All environmental spills or releases of hazardous materials (e.g., fuels, solvents, etc.), whether in excess of the Reportable Quantity or not, will be reported according to the sequence identified in the *Site-Specific Spill Reporting Card (if applicable)*. 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, your applicable regulatory permit, and/or client-specific reporting procedures. In order to support the Site Supervisor and expedite the decision to report to a state regulatory agency, a site-specific Spill Reporting Card will be developed (Appendix C). **If reporting to a US state or Federal regulatory agency is required, AECOM has 15 minutes from the time of the spill/release to officially report it.**

Chemical-specific Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Reportable Quantities for the known chemicals onsite are shown in Table 10-2.

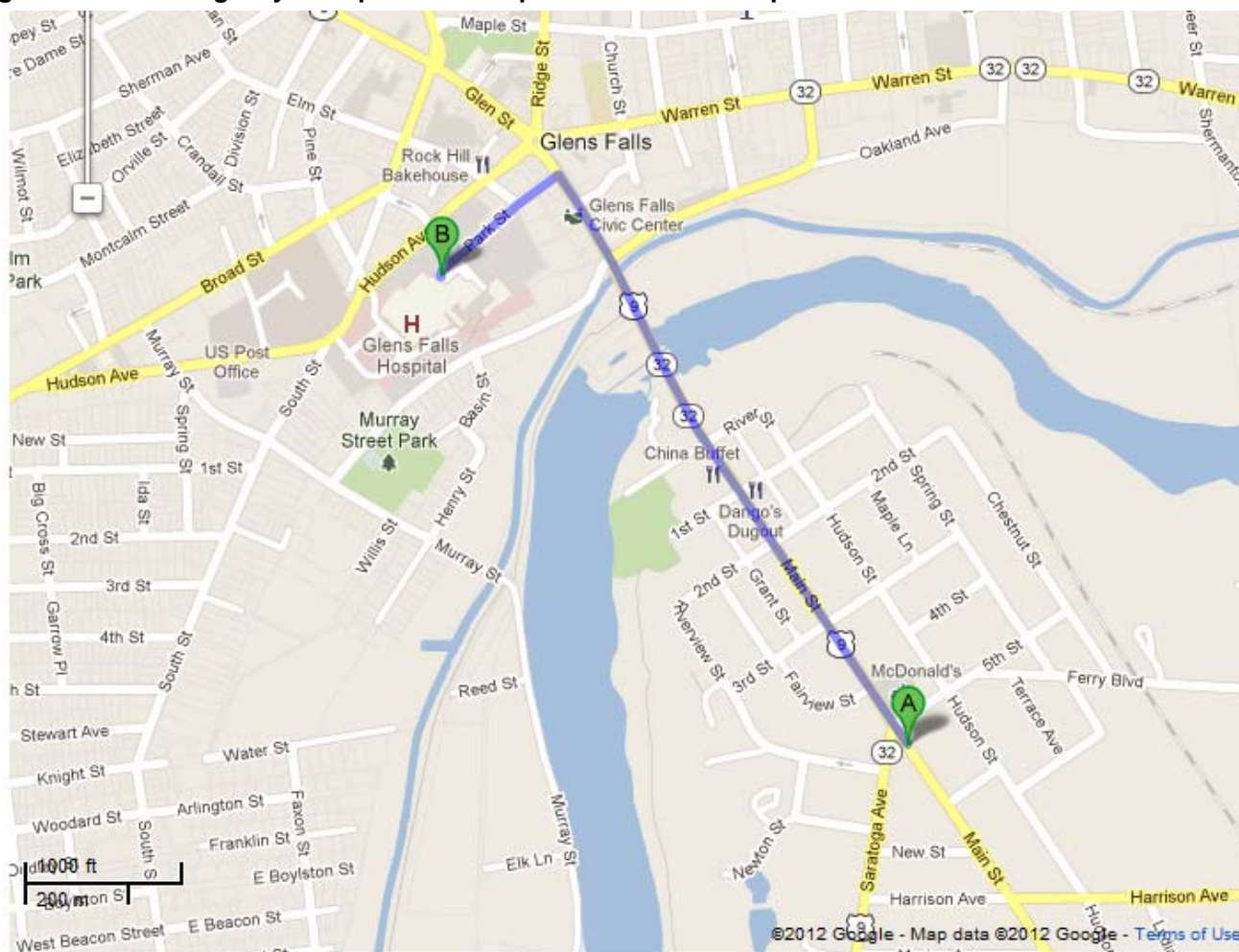
Table 10-2 CERCLA Reportable Quantities

Hazardous Substance	Regulatory Synonyms	Final RQ Pounds (Kg)
Methanol	N/A	1
Acetic Acid		1,000
Sodium Hydroxide		1,000

Table 10-3 Emergency Contacts

Emergency Coordinators / Key Personnel			
<u>Name</u>	<u>Title/Workstation</u>	<u>Telephone Number</u>	<u>Mobile Phone</u>
	Client Contact		
Michael DiPietro	NYSDEC – Project Manager	(518) 623-1200 Direct ext. 1236	(518) 424-3813
Walter Howard	Project Manager	(518) 951-2387	(518) 791-4234
Mark Howard	Site Supervisor	(518) 951-2301	(518) 698-6803
Mark Howard	Site Safety Officer	(518) 951-2301	(518) 698-6803
Phil Platcow	Regional SH&E Manager	(617) 371-4461	(617) 899-5403
Michael Grasso	District SH&E Manager	(315) 432-0506	(607) 282-0175
Incident Reporting	Incident Reporting Line	(800) 348-5046	
Organization / Agency			
<u>Name</u>			<u>Telephone Number</u>
Police Department (local)			911 or 518 761-3840
Fire Department (local)			911 or 518 792-1674
Ambulance Service (EMT will determine appropriate hospital for treatment)			911 or 518 792-1117
-Emergency Hospital (Use by site personnel is only for non-emergency cases)			(518) 926-1000
Glens Falls Hospital			
100 Park Street			
Glens Falls, NY 12801			
Emergency Hospital Route: See Figure 10-1			
WorkCare: 24-hr On-Call Occupational Nurse (Non-Emergency assistance only – Employees must notify SH&E prior to calling)			(800) 455-6155
Poison Control Center			(800) 222-1222
National Response Center			(800) 424-8802
NYS DEC 24 hr. Spill Hotline			(800)-457-7362

<p>Any such report shall include, but not be limited to:</p> <ul style="list-style-type: none">a. The location, the quantity, and the type of substance, material, or waste.b. The date and the cause of the discharge, spillage, uncontrolled loss, seepage, or filtration.c. The name and address of the owner of the ship, boat, barge, or other vessel, terminal, establishment, vehicle, trailer, or machine.d. The name and address of the person making the report and relationship to the owner	
Public Utilities	
<u>Name</u>	<u>Telephone Number</u>
Dig Safely New York	811

Figure 10-1: -Emergency Occupational Hospital Route/Detail Map

A 112 Main St, South Glens Falls, NY 12803

1. Head **northwest** on **County Rd 28/Main St** toward **5th St**
Continue to follow Main St
About 1 min

go 0.6 mi
total 0.6 mi

- 32** 2. Continue onto **NY-32 N/U.S. 9 N/Glen St**

go 0.3 mi
total 0.8 mi



3. Turn left onto **Park St**
Destination will be on the right
About 2 mins

go 0.2 mi
total 1.0 mi



Glens Falls Hospital

Park Street, Glens Falls, New York 12801 - (518) 926-1000

By signing below, the undersigned acknowledges that he/she has read and reviewed the AECOM Health and Safety Plan for the Midtown Shopping Center site. 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]

Appendix A

Task Hazard Analyses



Groundwater Sampling & Well Development

Identified Potential Hazards:

Slips/Trips/Falls, Vehicular traffic, Biological, Weather, Exposure, Hand injuries, Back injuries, Eye injuries

PPE Requirements:

Safety glasses, Steel toe boots, Leather gloves, Nitrile gloves, Safety colors, Long pants, Shirt with sleeves

Equipment Requirements:

First aid kit, Eye wash

Job Step	Hazards	Mitigation
Mobilize/Traverse Site	<ul style="list-style-type: none">-Slips/Trips/Falls-Vehicular Traffic-Biological-Weather	<ul style="list-style-type: none">-Set up work Area barricade-Use truck yellow flashers-Use signage-Identify tripping hazards and remove or mark them-Inspect routes for holes and obstacles-Maintain clear paths around/thru work area-Ensure all equipment is secure before moving truck-Wear proper PPE according to weather (rain gear, winter weather protection)-Be aware of local wildlife and scour for poisonous plants-Do not work out doors when thunder and lightning is observed.
Set Up	<ul style="list-style-type: none">-Eye injuries-Hand injuries-Back injuries	<ul style="list-style-type: none">-Wear leather gloves when handling equipment-Lift objects by squatting, pulling object to chest and lift with legs-Use two persons to lift object if it is over 49 pounds or is awkward
Take Sample	<ul style="list-style-type: none">-Eye injuries-Exposure	<ul style="list-style-type: none">-Wear safety glasses at all times during sampling activity.-Wear nitrile gloves when handling samples and contaminated equipment.



Geophysical Survey/Private Utility Clearance

Identified Potential Hazards:

Slips/Trips/Falls, Vehicular traffic, Biological, Weather, Exposure, Hand injuries, Back injuries

PPE Requirements:

Safety glasses, Steel toed boots, Leather gloves, Nitrile gloves, Safety colors, Long pants, Shirt with sleeves

Equipment Requirements:

First aid kit

Job Step	Hazards	Mitigation
Mobilize/Traverse Site	<ul style="list-style-type: none">-Slips/Trips/Falls-Vehicular Traffic-Biological-Weather-Hand injuries-Back injuries	<ul style="list-style-type: none">-Use truck yellow flashers-Use signage-Use work area barricades as appropriate-Identify tripping hazards and remove or mark them-Inspect routes for holes and obstacles-Maintain clear paths around/thru work area-Ensure all equipment is secure before moving truck-Be aware of local wildlife and scour for poisonous plants-Do not work out doors when thunder and lightning is observed.-Wear leather gloves when handling equipment-Lift objects by squatting, pulling object to chest and lift with legs-Use two persons to lift object if it is over 49 pounds or is awkward



**Task Hazard Analysis
Midtown Shopping Center
Revised April 2012**

Drilling/Well Installation

Identified Potential Hazards:

Pinch/Crush/Mangle points, Slips/Trips/Falls, Vehicular traffic, Biological, Weather, Contact with utilities, Exposure, Hand injuries, Back injuries, Hearing loss, Eye injuries, Fire/Explosion (contaminant related)

PPE Requirements:

Hard hat, Safety glasses, Hearing protection, Steel toe boots, Leather gloves, Nitrile gloves, Safety colors, Long pants, Shirt with sleeves

Equipment Requirements:

Fire extinguisher, First aid kit, Eye wash

Job Step	Hazards	Mitigation
Mobilize/Traverse Site	<ul style="list-style-type: none">-Pinch/Crush/Mangle Points-Slips/Trips/Falls-Vehicular Traffic-Biological-Weather-Contact with Utilities	<ul style="list-style-type: none">-Set up work Area barricade-Use signage-Conduct utility location survey at each well location.-Identify tripping hazards and remove or mark them-Inspect route for holes and obstacles before moving rig-Maintain clear paths around/thru work area-Always put rig mast down prior to moving rig-Use spotters whenever rig is in motion-Secure all equipment prior to moving-Be aware of local wildlife and scour for poisonous plants-Do not work outdoors if thunder and lightning is observed
Raise Mast	<ul style="list-style-type: none">-Pinch/Crush/Mangle Points-Contact with Utilities-Weather	<ul style="list-style-type: none">-Never use rig/raise mast when there is signs of thunder and lightning-Do not raise mast and/or begin drilling until rig is secured and leveled with jacks-Identify and mitigate any overhead lines prior to start of event-Keep 10 foot clearance from all overhead lines-Be aware of the effects wind may have on utility contact
Drill	<ul style="list-style-type: none">-Pinch/Crush/Mangle Points-Contact with Utilities-Exposure-Hand Injuries-Back Injuries-Hearing Loss-Eye Injuries-Fire/Explosion (Contaminant related)	<ul style="list-style-type: none">-Identify any overhead and underground utilities/structures prior to start of event-Rig should be inspected prior to use, using appropriate form.-Test safety shut offs-Keep body parts away from moving parts-Do not wear loose clothing or accessories-Long hair should be secured up-Drill operators should use "show me your hands" method before handling moving parts such as the auger.-Use PID and/or LEL to monitor as appropriate for contaminant-Wear leather gloves when handling equipment-Wear Nitrile gloves to handle contaminated material/equip.-Lift objects by squatting, pulling object to chest and lift with legs-Use two persons to lift object if it is over 49 pounds or is awkward



**Task Hazard Analysis
Midtown Shopping Center
Revised April 2012**

**Direct Push Drilling/Macrocore Sampling/
Grab Groundwater Sampling**

Identified Potential Hazards:

Pinch/Crush/Mangle points, Slips/Trips/Falls, Vehicular traffic, Biological, Weather, Contact with utilities, Exposure, Hand injuries, Back injuries, Hearing loss, Eye injuries, Fire/Explosion (contaminant related)

PPE Requirements:

Hard hat, Safety glasses, Hearing protection, Steel toe boots, Leather gloves, Nitrile gloves, Safety colors, Long pants, Shirt with sleeves

Equipment Requirements:

Fire extinguisher, First aid kit, Eye wash

Job Step	Hazards	Mitigation
Mobilize/Traverse Site	-Pinch/Crush/Mangle Points -Slips/Trips/Falls -Vehicular Traffic -Biological -Weather -Contact with Utilities	-Set up work Area barricade -Use signage -Identify tripping hazards and remove or mark them -Inspect route for holes and obstacles before moving rig -Maintain clear paths around/thru work area -Always put rig mast down prior to moving rig -Use spotters whenever rig is in motion -Secure all equipment prior to moving -Be aware of local wildlife and scour for poisonous plants -Do not work outdoors when thunder and lightning is observed
Raise Mast	-Pinch/Crush/Mangle Points -Contact with Utilities -Weather	-Never use rig/raise mast when there is signs of thunder and lightning -Do not raise mast and/or begin drilling until rig is secured and leveled with jacks -Identify and mitigate any overhead lines prior to start of event -Keep 10 foot clearance from all overhead lines -Be aware of the effects wind may have on utility contact
Drill	-Pinch/Crush/Mangle Points -Contact with Utilities -Exposure -Hand Injuries -Back Injuries -Hearing Loss -Eye Injuries -Fire/Explosion (Contaminant related)	-Identify any overhead and underground utilities/structures prior to start of event -Rig should be inspected prior to use, using appropriate form -Test safety shut offs -Keep body parts away from moving parts -Do not wear loose clothing or accessories -Long hair should be secured up -Drill operators should use "show me your hands" method before handling moving parts such as the hammer -Use PID and/or LEL to monitor as appropriate for contaminant -Wear leather gloves when handling equipment -Wear Nitrile gloves to handle contaminated material/equip. -Lift objects by squatting, pulling object to chest and lift with legs -Use two persons to lift object if it is over 49 pounds or is awkward
Taking Sample	-Exposure -Hand Injuries	-Wear Nitrile Gloves when handling the soil and associated equipment. -Use a SAFETY utility blade and cut away from the body and bystanders.



Surface Sediment, Surface Water, Sediment Pore Space Sampling

Identified Potential Hazards:

Slips/Trips/Falls, Vehicular traffic, Biological, Weather, Exposure, Hand injuries, Back injuries, Eye injuries

PPE Requirements:

Safety glasses, Steel toe boots, Leather gloves, Nitrile gloves, Safety colors, Long pants, Shirt with sleeves

Equipment Requirements:

First aid kit, Eye wash

Job Step	Hazards	Mitigation
Mobilize/Traverse Site	<ul style="list-style-type: none">-Slips/Trips/Falls-Vehicular Traffic-Biological-Weather	<ul style="list-style-type: none">- Identify tripping hazards and remove or mark them-Cross road at cross walks-Inspect routes for holes and obstacles-Maintain clear paths around/thru work area-Ensure all equipment is secure before moving truck-Be aware of local wildlife and scour for poisonous plants-Do not work out doors when thunder and lightning is observed.-Wear appropriate foot gear for working in marshy environments.-Take samples near water edge rather than in deeper water.-Make sure you have footing before proceeding with sampling effort-Have a two-person team for safety purposes
Set Up	<ul style="list-style-type: none">-Eye injuries-Hand injuries	<ul style="list-style-type: none">-Wear leather gloves when handling equipment-Lift objects by squatting, pulling object to chest and lift with legs-Do not carry too many things in hands for better balance; share load
Take Sample	<ul style="list-style-type: none">-Eye injuries-Exposure	<ul style="list-style-type: none">-Wear safety glasses at all times during sampling activity.-Wear Nitrile gloves when handling samples and contaminated equipment.

Appendix B

Material Safety Data Sheets

MATERIAL SAFETY DATA SHEET

ALCONOX®

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



SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

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

SECTION 2 - HAZARDS IDENTIFICATION

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

US DOT SYMBOLS

Non-Regulated

CANADA (WHMIS) SYMBOLS



EUROPEAN and (GHS) Hazard Symbols



Signal Word: **Warning!**

EU LABELING AND CLASSIFICATION:

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

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

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

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

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

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

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

GHS Hazard Classification(s):

Eye Irritant Category 2A

Hazard Statement(s):

H319: Causes serious eye irritation

Precautionary Statement(s):

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

P264: Wash hands thoroughly after handling

P271: Use only in well ventilated area.

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

Hazard Symbol(s):

[Xi] Irritant

MATERIAL SAFETY DATA SHEET

ALCONOX®

Risk Phrases:

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

Safety Phrases:

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

HEALTH HAZARDS OR RISKS FROM EXPOSURE:

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

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

TARGET ORGANS:

ACUTE: Eye, respiratory System, Skin

CHRONIC: None Known

SECTION 3 - COMPOSITION and INFORMATION ON INGREDIENTS

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

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

SECTION 4 - FIRST-AID MEASURES

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

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

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

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

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

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

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

MATERIAL SAFETY DATA SHEET

ALCONOX®

SECTION 5 - FIRE-FIGHTING MEASURES

FLASH POINT:

Not Flammable

AUTOIGNITION TEMPERATURE:

Not Applicable

FLAMMABLE LIMITS (in air by volume, %):

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

FIRE EXTINGUISHING MATERIALS:

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

UNUSUAL FIRE AND EXPLOSION HAZARDS:

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

Explosion Sensitivity to Mechanical Impact:

Not Sensitive.

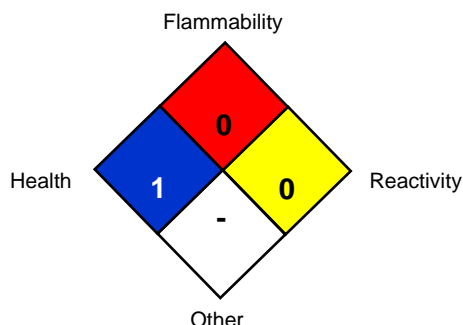
Explosion Sensitivity to Static Discharge:

Not Sensitive



SPECIAL FIRE-FIGHTING PROCEDURES:

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

NFPA RATING SYSTEM



HMIS RATING SYSTEM

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

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

SECTION 6 - ACCIDENTAL RELEASE MEASURES

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

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

SECTION 7 - HANDLING and STORAGE

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

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

MATERIAL SAFETY DATA SHEET

ALCONOX®

SECTION 8 - EXPOSURE CONTROLS - PERSONAL PROTECTION

EXPOSURE LIMITS/GUIDELINES:

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

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

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

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

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

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

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

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

SECTION 9 - PHYSICAL and CHEMICAL PROPERTIES

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

MATERIAL SAFETY DATA SHEET

ALCONOX®

SECTION 10 - STABILITY and REACTIVITY

STABILITY: Product is stable

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

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

HAZARDOUS POLYMERIZATION: Will not occur.

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

SECTION 11 - TOXICOLOGICAL INFORMATION

TOXICITY DATA: Toxicity data is available for mixture:

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

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

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

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

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

SECTION 12 - ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: No Data available at this time.

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

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

SECTION 13 - DISPOSAL CONSIDERATIONS

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

SECTION 14 - TRANSPORTATION INFORMATION

US DOT; IATA; IMO; ADR:

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

PROPER SHIPPING NAME: Non-Regulated Material

HAZARD CLASS NUMBER and DESCRIPTION: Not Applicable

UN IDENTIFICATION NUMBER: Not Applicable

PACKING GROUP: Not Applicable.

DOT LABEL(S) REQUIRED: Not Applicable

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

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

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

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

TRANSPORT CANADA, TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:

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

INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA):

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

INTERNATIONAL MARITIME ORGANIZATION (IMO) DESIGNATION:

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

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

MATERIAL SAFETY DATA SHEET

ALCONOX®

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

SECTION 15 - REGULATORY INFORMATION

UNITED STATES REGULATIONS

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

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

SARA 311/312:

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

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

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

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

CANADIAN REGULATIONS:

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

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

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

EUROPEAN ECONOMIC COMMUNITY INFORMATION:

EU LABELING AND CLASSIFICATION:

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

AUSTRALIAN INFORMATION FOR PRODUCT:

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

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

JAPANESE INFORMATION FOR PRODUCT:

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

INTERNATIONAL CHEMICAL INVENTORIES:

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

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

SECTION 16 - OTHER INFORMATION

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

MATERIAL SAFETY DATA SHEET

ALCONOX®

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

ANNEX:

IDENTIFIED USES OF ALCONOX® AND DIRECTIONS FOR USE

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

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

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

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

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



MATERIAL SAFETY DATA SHEET - CALIBRATION CHECK GAS

PRODUCT NAME: ISOBUTYLENE (1 PPM – 0.9%) IN AIR

MSDS NO: 248

Version:3

Date: August, 2010

1. Chemical Product and Company Identification

Gasco Affiliates, LLC
320 Scarlett Blvd.
Oldsmar, FL 34677

TELEPHONE NUMBER: (800) 910-0051
FAX NUMBER: (866) 755-8920
E-MAIL: info@gascogas.com

24-HOUR EMERGENCY NUMBER: 1-800-424-9300

PRODUCT NAME: ISOBUTYLENE (1 PPM – 0.9%) IN AIR
CHEMICAL NAME: Isobutylene in air
COMMON NAMES/ SYNONYMS: None
TDG (Canada) CLASSIFICATION: 2.2
WHIMIS CLASSIFICATION: A

2. COMPOSITION/ INFORMATION ON INGREDIENTS

INGREDIENT	%VOLUME	PEL-OSHA	TLV-ACGIH	LD ₅₀ or LC ₅₀ Route/Species
Isobutylene FORMULA: C ₄ H ₈	0.0001-0.9	N/A	N/A	N/A
Air FORMULA: Mixture	99.0 to 99.9999	N/A	N/A	N/A

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Release of this product may produce oxygen-deficient atmospheres (especially in confined spaces or other poorly ventilated environments); individuals in such atmospheres may be asphyxiated. Isobutylene may cause drowsiness and other central nervous system effects in high concentrations; however, due to the low concentration of this gas mixture, this is unlikely to occur.

ROUTE OF ENTRY:

Skin Contact No	Skin Absorption No	Eye Contact No	Inhalation Yes	Ingestion No
HEALTH EFFECTS:				
Exposure Limits Yes	Irritant No	Sensitization No	Reproductive Hazard No	Mutagen No

Carcinogenicity: --NTP: No IARC: No OSHA: No

EYE EFFECTS:

N/A.

SKIN EFFECTS:

N/A.



MATERIAL SAFETY DATA SHEET - CALIBRATION CHECK GAS

PRODUCT NAME: ISOBUTYLENE (1 PPM – 0.9%) IN AIR

INGESTION EFFECTS:

Ingestion unlikely. Gas at room temperature.

INHALATION EFFECTS:

Due to the small size of this cylinder, no unusual health effects from over-exposure are anticipated under normal routine use.

NFPA HAZARD CODES

Health: 1
Flammability: 0
Reactivity: 0

HMIS HAZARD CODES

Health: 1
Flammability: 0
Reactivity: 0

RATING SYSTEM

0= No Hazard
1= Slight Hazard
2= Moderate Hazard
3= Serious Hazard
4= Severe Hazard

4. FIRST AID MEASURES

EYES:

N/A

SKIN:

N/A

INGESTION:

Not required

INHALATION:

PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH THE SELF-CONTAINED BREATHING APPARATUS. Victims should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. If breathing has stopped administer artificial resuscitation and supplemental oxygen. Further treatment should be symptomatic and supportive.

5. FIRE-FIGHTING MEASURES

These containers hold gas under pressure, with no liquid phase. If involved in a major fire, they should be sprayed with water to avoid pressure increases, otherwise pressures will rise and ultimately they may distort or burst to release the contents. The gases will not add significantly to the fire, but containers or fragments may be projected considerable distances - thereby hampering fire fighting efforts.

6. ACCIDENTAL RELEASE MEASURES

In terms of weight, these containers hold very little contents, such that any accidental release by puncturing etc. will be of no practical concern.

7. HANDLING AND STORAGE

Suck back of water into the container must be prevented. Do not allow backfeed into the container. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Use only in well-ventilated areas. Do not heat cylinder by any means to increase rate of product from the cylinder. Do not allow the temperature where cylinders are stored to exceed 130°F (54°C).

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Use adequate ventilation for extended use of gas.



MATERIAL SAFETY DATA SHEET - CALIBRATION CHECK GAS

PRODUCT NAME: ISOBUTYLENE (1 PPM – 0.9%) IN AIR

9. PHYSICAL AND CHEMICAL PROPERTIES

PARAMETER:	VALUE:
Physical state	: Gas
Evaporation point	: N/A
pH	: N/A
Odor and appearance	: Colorless, odorless gas

10. STABILITY AND REACTIVITY

Stable under normal conditions. Expected shelf life 48 months.

11. TOXICOLOGICAL INFORMATION

No toxicological damage caused by this product.

12. ECOLOGICAL INFORMATION

No ecological damage caused by this product.

13. DISPOSAL INFORMATION

Do not discharge into any place where its accumulation could be dangerous. Used containers are acceptable for disposal in the normal waste stream as long as the cylinder is empty and valve removed or cylinder wall is punctured; but GASCO encourages the consumer to return cylinders.

14. TRANSPORT INFORMATION

	<u>United States DOT</u>	<u>Canada TDG</u>
PROPER SHIPPING NAME:	Compressed Gas N.O.S. (Isobutylene in Air)	Compressed Gas N.O.S. (Isobutylene in Air)
HAZARD CLASS:	2.2	2.2
IDENTIFICATION NUMBER:	UN1956	UN1956
SHIPPING LABEL:	NONFLAMMABLE GAS	NONFLAMMABLE GAS

15. REGULATORY INFORMATION

Isobutylene is listed under the accident prevention provisions of section 112(r) of the Clean Air Act (CAA) with a threshold quantity (TQ) of 10,000 pounds.

16. OTHER INFORMATION

This MSDS has been prepared in accordance with the Chemicals (Hazard Information and Packaging for Supply (Amendment) Regulation 1996. The information is based on the best knowledge of GASCO, and its advisors and is given in good faith, but we cannot guarantee its accuracy, reliability or completeness and therefore disclaim any liability for loss or damage arising out of use of this data. Since conditions of use are outside the control of the Company and its advisors we disclaim any liability for loss or damage when the product is used for other purposes than it is intended.

MSDS/S010/248/ August, 2010

Appendix C

State Spill Reporting Procedures

1.0 Excess Air Emissions

Report excess emissions to the appropriate regional office of the New York State Department of Environmental Conservation, Division of Air, as soon as possible during normal working hours, but not later than 2 working days after onset of the event. (See **New York DEC Listing**.) A written report may be requested by the DEC, to be submitted within 30 days, describing:

1. Why the malfunction was unavoidable.
2. The nature, cause, time, and duration of the problem.
3. Corrective action taken.
4. Identification of air contaminants and emissions rates.
5. Maximum ground level concentration of each air contaminant emitted and the effect of such emissions.

Citation: New York Codes, Rules, and Regulations, Title 6, Chapter III, Subchapter A, Part 200, Section 201-1.4(b)

Excess emissions caused by an emergency condition must be reported as soon as possible, but no later than 2 working days of the time when emission limitations were exceeded due to the emergency. The notice must contain a description of the emergency, any steps taken to mitigate emissions, and corrective actions taken.

Citation: New York Codes, Rules, and Regulations, Title 6, Chapter III, Subchapter A, Part 201, Sections 201-1.5, 201-6.6(c)

Sources subject to federal Part V operating permits will be required to report permit deviations and incidences of noncompliance, stating the probable cause of such deviations and any corrective actions or preventive measures taken. Include the information as part of the semiannual emissions report required of the facility. If the violation was unavoidable or due to an emergency, the facility owner/operator will need to report the incident as required above.

Citation: New York Codes, Rules, and Regulations, Title 6, Chapter III, Subchapter A, Part 201, Section 201-6.5(c)(3)

In addition, sources subject to continuous emission monitoring are required to report quarterly on excess emissions. The operating permit for the facility will specify the types of emissions to be monitored and the measurements to be used in calculating excess emissions.

In addition, solid waste incineration facilities must report excess emissions or noncomplying operating parameters to the regional DEC office within 1 working day. The report must include a program for immediate correction of the conditions.

Citation: New York Codes, Rules, and Regulations, Title 6, Chapter III, Subchapter A, Part 219, Section 219-2.7(a), Part 223, Section 223.9(a), Part 224, Section 224.4

2.0 Hazardous Materials

Same as Oil.

All carriers and persons engaged in the transportation of hazardous materials shall report immediately any incident that occurs during the course of transportation (including loading, unloading, and temporary storage) as a direct result of hazardous materials. Report to:

**Local Fire or Police Department
911**

**New York Department of Environmental Conservation
Bureau of Spill Prevention and Response
(800) 457-7362 (24-hour, In-state)
(518) 457-7362 (24-hour, Outside New York)**

1. Report the following incidents:
 - a. A person is killed.
 - b. A person receives injuries requiring hospitalization.
 - c. Estimated carrier or other property damage exceeds \$50,000.
 - d. Fire, breakage, spillage, or suspected radioactive contamination occurs involving shipment of radioactive material.
 - e. Fire, breakage, spillage, or suspected contamination occurs involving shipment of etiologic agents.
 - f. A situation exists of such nature that in the judgment of the carrier a continuing danger to life or property exists at the scene of the incident.
2. Provide the following information:
 - a. Name of reporter.
 - b. Name and address of carrier represented by the reporter.
 - c. Telephone number where the reporter can be contacted.
 - d. Date, time, and location of incident.
 - e. The extent of injuries, if any.
 - f. Classification, name, and quantity of hazardous materials involved, if available.
 - g. Type of incident and nature of hazardous materials involved and whether a continuing danger to life exists at the scene.

3.0 Hazardous Substances

Report any release of a Reportable Quantity (see the Reportable Quantities section on ETConnect – US SH&E page/Resources page) of a hazardous substance within 2 hours to:

New York Department of Environmental Conservation**Spill Hotline****(800) 457-7362 (In-state)****(518) 457-7362 (Outside New York)****Local Emergency Planning Committee**

1. Persons required to report include:
 - h. An owner or operator.
 - i. Those who own or are in actual or constructive possession or control of a hazardous substance prior to its release.
 - j. Persons in a contractual relationship with the owner who inspects, tests, or repairs any portion of a hazardous substance storage facility.
 - k. Any employee, agent, or representative of the above.

Employees of storage facilities may report releases under a facility-specific centralized reporting protocol, if the protocol is in writing and has been incorporated into the facility's spill prevention report prepared under state regulations.

2. If the release of the hazardous substance is less than the Reportable Quantity, report anyway if:
 - a. Such release may result in a fire with potential off-site impacts.
 - b. Such release may cause an explosion.
 - c. Such release may cause a violation of air quality standards.
 - d. Such release may result in vapors, dust, and/or gases that may cause illness or injury to persons, not including persons in a building at the facility where a release originates.
 - e. Runoff from fire control or dilution waters may cause or contribute to a violation of water quality standards.
3. A spill or overfill to a secondary containment system does not have to be reported if:
 - a. The containment system meets state requirements.
 - b. Within 24 hours the spill or overfill is completely contained.
 - c. There is complete control over the spill or overfill, and
 - d. The total volume of the incident is recovered or accounted for.

However, spills or overfills that meet any of the conditions in Note 2 must be reported within 2 hours.

4. Report within 24 hours suspected releases of a hazardous substance from a storage facility if any of the following conditions are met:
 - a. Test, sampling, or monitoring results from a release detection method indicate a release may have occurred.
 - b. There are unusual operating conditions such as the erratic behavior of product dispensing equipment, the sudden loss of product from a storage tank, an unexpected presence of water in a tank, or the physical presence of a hazardous substance or an unusual level of vapors on a site that are of unknown origin.
 - c. There are impacts in the surrounding area, such as evidence of hazardous substances or resulting vapors in soils, basements, sewer or utility lines, and nearby surface waters.
 - d. There are any other conditions or indications of a suspected release.

If within 24 hours of the discovery of a suspected release it is confirmed that there was no release, then do not report the suspected incident.

5. Reporting is not required for a release that is continuous and stable in quantity and rate, provided that written notification that meets **Federal — Hazardous Substances** requirements has been provided to DEC.
6. Provide the following information in reporting a release that meets or exceeds the RQ for a substance:
 - a. Chemical name or identity of any substance involved in the release.
 - b. Indication of whether the substance is an extremely hazardous substance.
 - c. An estimate of the quantity released.
 - d. Time and duration of the release.
 - e. Medium or media into which the release occurred.
 - f. Known health risks associated with the emergency and, when appropriate, medical advice regarding medical attention for those exposed.
 - g. Proper precautions/actions that should be taken, including evacuation.
 - h. Names and telephone numbers of persons to be contacted for further information.
 - i. As soon as practicable after the release, provide the following information:
 - (1) Actions taken to respond to and contain the release.
 - (2) Health risks.
 - (3) Advice on medical attention for exposed individuals.

Citation: New York Codes, Rules, and Regulations, Title 6, Part 595, Section 595.3

4.0 Hazardous Wastes

If a release could threaten human health outside the facility or the generator knows the spill has reached surface water, notify:

National Response Center
(800) 424-8802

New York Department of Environmental Conservation
Division of Spills Management
(518) 457-7362 (24-hour, Outside New York)
(800) 457-7362 (24-hour, In-state)

The report, to be made immediately, should indicate:

1. Name and telephone number of the reporter.
2. Name and address of the facility.
3. Time and type of incident.
4. Name and quantity of materials involved, and the estimated quantity and disposition of recovered materials, if any.
5. The extent of injuries, if any.
6. Possible hazards to human health or the environment, outside the facility.

For large-quantity generators, within 15 days a written report must be submitted to:

New York Department of Environmental Conservation
Commissioner
625 Broadway
Albany, NY 12233
(518) 402-8540 (Central Office)
(518) 402-9016 (Fax)

Provide the above information and describe the quantity and disposition of any material recovered from the incident.

Citation: New York Codes, Rules, and Regulations, Title 6, Part 372, Section 372.2(a)(8)(iii)(e); Chapter 373, Section 373.3.4(g)(4)(ii)

5.0 Oil

Report within 2 hours all petroleum spills unless they meet all of the following criteria:

1. The spill is known to be less than 5 gallons.
2. The spill is contained and under the control of the spiller.
3. The spill has not and will not reach state waters or any land.
4. The spill is cleaned up within 2 hours of discovery.

Report spills (discharges) of any liquid likely to pollute waters of the state from any bulk storage of 1,100 gallons or more of any liquid to:

**New York Department of Environmental Conservation
Bureau of Spill Prevention and Response
(800) 457-7362 (24-hour, In-state)
(518) 457-7362 (24-hour, Outside New York)**

1. "Discharge" means any intentional or unintentional action or omission resulting in the releasing, spilling, leaking, pumping, pouring, emitting, emptying, or dumping of petroleum into the waters of the state or onto lands from which it might flow or drain into said waters, or into waters outside the jurisdiction of the state when damage may result to the lands, waters, or natural resources within the jurisdiction of the state.
2. Waters include oceans and their estuaries to the seaward limit of the state's jurisdiction, and surface and groundwaters.
3. The spill report shall include the following:
 - a. The name of the person making the report and his or her relationship (agent, employee, etc.) to any person (corporation, company, etc.) which might be responsible for causing such discharge and the reporter's telephone number.
 - b. Time and date of the discharge.
 - c. Probable source of the discharge.
 - d. Location, both geographic and water body.
 - e. Type of petroleum discharged.
 - f. Possible health or fire hazards.
 - g. Amount of petroleum discharged.
 - h. All actions being taken or that will be taken to clean up and remove the discharge.
 - i. Personnel presently on the scene.
 - j. Other government agencies which have been or will be notified.
4. As a general policy, the state exhibits a considerably greater enthusiasm in any legal action that it deems necessary, if and when a spiller neglects to notify the appropriate agencies.

5. Notifying the state does not relieve the spiller of the responsibility to notify the federal government, where applicable under federal law.
6. The New York Division of Mineral Resources currently has no reporting requirements. However, it has proposed reporting requirements for “nonroutine” incidents involving spills of 5 gallons or greater of oil. Such incidents would have to be immediately reported to:

New York Division of Mineral Resources
(518) 402-8056 (Bureau of Oil and Gas Regulation)
(518) 402-8076 (Central Office)
(518) 402-8060 (Fax, Albany Office)

Citation: New York Codes, Rules, and Regulations, Title 6, Chapter V, Part 613, Section 613.8;
Title 17, Chapter I, Part 32

6.0 SARA Title III

Report releases and submit written follow-up emergency notice(s) to:
Immediate notification:

**New York State Department of Environmental Conservation
Spill Hotline**

NYS Department of Environmental Conservation, Albany

Bureau of Spill Prevention and Response

(518) 457-7362 (24-hour, Outside New York)

(800) 457-7362 (24-hour, In-state)

Written follow-up notification:

**New York State Emergency Response Commission
c/o New York State Department of Environmental Conservation
Bureau of Spill Prevention and Response**

625 Broadway, 11th Floor

Albany, NY 12233-7020

(518) 402-9546

7.0 Tank Leaks

For tanks holding hazardous substances, see Hazardous Substances.

Evidence of a leaking underground petroleum storage tank must be reported under the same reporting requirements as an Oil spill. In addition, report within 2 hours the results of any inventory record, test, or inspection that shows a facility is leaking.

Citation: New York Codes, Rules, and Regulations, Title 6, Chapter V, Part 613, Section 613.8

8.0 Wastewater Excursions

Report excursions to the appropriate regional office of the New York State Department of Environmental Conservation, Division of Water. (See **New York DEC Listing**.)

Two-hour oral reporting is required for any bypass, upset, or other incident that would affect bathing areas during the bathing season, shellfishing, or public drinking water intakes, unless the discharge is in accordance with an NYDEC-approved plan for managing wastewater. Provide the following information in the verbal report:

1. A brief description of the bypass, upset, or other incident.
2. The location of the bypass, upset, or other incident including the receiving water affected by the incident.
3. The estimated volume and characteristics of the discharge at the time of the oral report.
4. A brief description of the measures taken to end the bypass, upset, or other incident.
5. An estimate of when the bypass, upset, or other incident will be over and the total expected volume of the discharge.

Twenty four-hour oral reporting is required for the following incidents, and the report should include the information listed above:

1. A discharge of untreated or partially treated sewage that would otherwise be treated, except a discharge in accordance with an NYDEC-approved wastewater management plan.
2. A discharge of untreated wastewater and/or stormwater that would otherwise be treated, except a discharge in accordance with an NYDEC-approved wastewater management plan.
3. A spill that may result in a discharge that may:
 - a. Violate permit limitations of pollutants limited in the state discharge permit.
 - b. Exceed an action level or more than 1 action level in the state discharge permit.
 - c. Cause discharges of pollutants not explicitly listed in the state discharge permit, in amounts in excess of normal effluent variability of the level of discharge that may reasonably be expected for the pollutant from information provided in the state permit application record.
 - d. Result in dilution in lieu of treatment of a discharge authorized by the state permit.
4. A spill to waters of the state of greater than the reportable quantity for releases to water.
5. A bypass, upset, or other incident that a reasonable practitioner in water pollution control would consider to be similar in severity and consequences to the incidents described above.

A written submission shall also be provided within 5 days of becoming aware of the noncompliance. See **New York DEC Listing** for address information, or contact:

New York State Department of Environmental Conservation
Division of Water
Bureau of Water Compliance Programs
Chief, Compliance Assurance Section
525 Broadway
Albany, NY 12233-3500
(518) 402-8173

The written submission shall include the following (see **New York Water Spill Form**):

1. A description of the noncompliance and its cause.
2. The period of noncompliance, including exact dates and times.
3. If the noncompliance has not been corrected, the anticipated time it is expected to continue.
4. Steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

Citation: New York Codes, Rules, and Regulations, Title 6, Chapter X, Part 750, Section 750-2.7(a)

9.0 Internet Resources

Agency

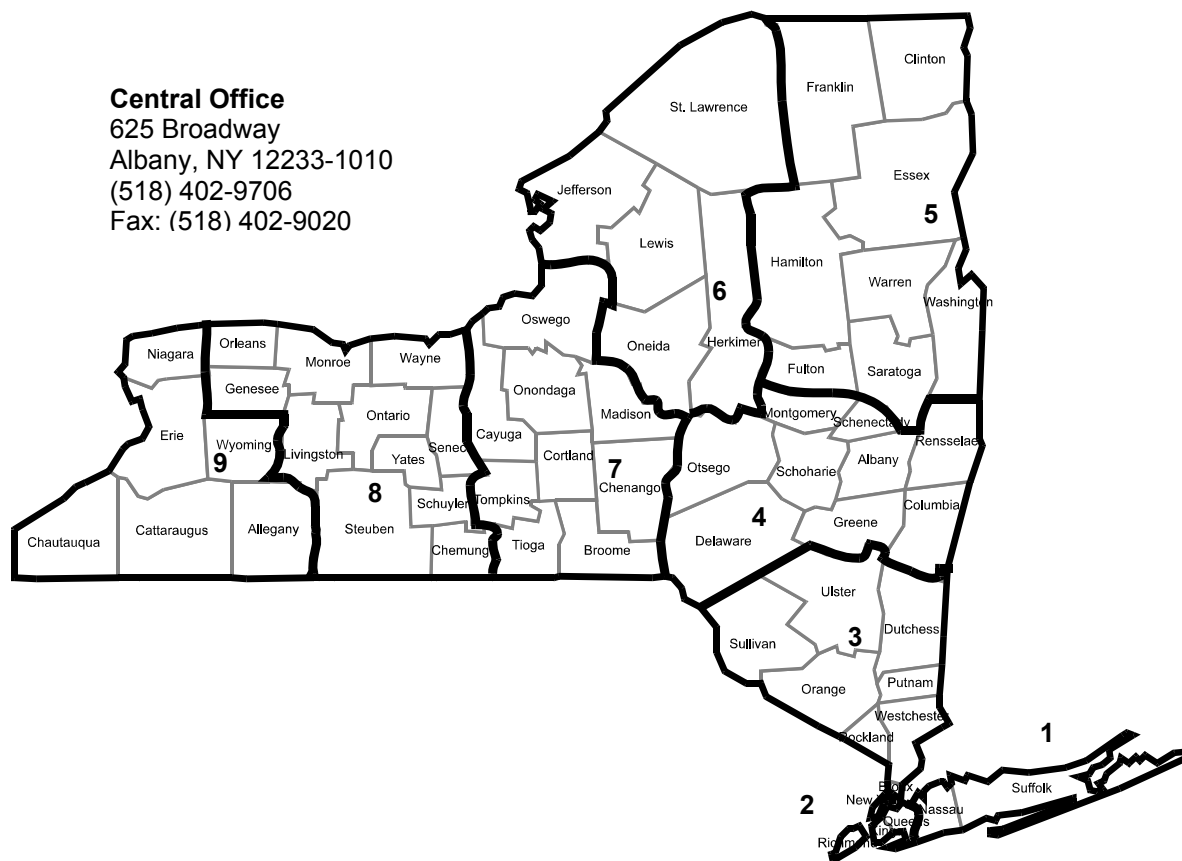
Department of Environmental Conservation
Division of Mineral Resources

Internet Address

www.dec.state.ny.us
www.dec.state.ny.us/website/dmn

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

REGIONAL OFFICES



Central Office
 625 Broadway
 Albany, NY 12233-1010
 (518) 402-9706
 Fax: (518) 402-9020

Region 1
 SUNY at Stony Brook
 50 Circle Road
 Stony Brook, NY 11790
 (631) 444-0345
 Fax: (631) 444-0349

Region 2
 1 Hunter's Point Plaza
 47-40 21st Street
 Long Island City, NY 11101
 (718) 482-4949

Region 3
 21 South Putt Corners Road
 New Paltz, NY 12561-1696
 (845) 256-3003
 Fax: (845) 255-3042

Region 4
 1130 North Westcott Road
 Schenectady, NY 12306
 (518) 357-2068
 Fax: (518) 357-2087

Region 5
 1115 NYS Route 86
 P.O. Box 296
 Ray Brook, NY 12977
 (518) 897-1200

Region 6
 State Office Building
 317 Washington Street
 Watertown, NY 13601-3787
 (315) 785-2239
 Fax: (315) 785-2242

Region 7
 615 Erie Boulevard West
 Syracuse, NY 13204-2400
 (315) 426-7403
 Fax: (315) 426-7408

Region 8
 6274 East Avon-Lima Road
 Avon, NY 14414-9519
 (585) 226-2466
 Fax: (585) 226-9485

Region 9
 270 Michigan Avenue
 Buffalo, NY 14203-2999
 (716) 851-7000

1.0 Hazardous Substances

Report any release equal to or exceeding the Reportable Quantity in any 24-hour period into the environment to:

National Response Center
(800) 424-8802 (24-hour)
(202) 267-2675 (24-hour)

1. Release means any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment, but excludes:
 - a. Any release which results in exposure to persons solely within a workplace, with respect to a claim which such persons may assert against the employer of such persons.
 - b. Emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel, or pipeline pumping station engine.
 - c. Release of source, byproduct, or special nuclear material from a nuclear incident, as those terms are defined in the Atomic Energy Act of 1954, if such release is subject to requirements with respect to financial protection established by the Nuclear Regulatory Commission under Section 170 of such act, or, for the purpose of Section 104 of CERCLA or any other response action, any release of source, byproduct, or special nuclear material from any processing site designated under Section 102(a)(1) or 302(a) of the Uranium Mill Tailings Radiation Control Act of 1978.
 - d. The normal application of fertilizer.

For the purpose of this Guide, release also means substantial threat of release.

2. Environment means all surface and groundwater, land surface, or subsurface strata and ambient air within or under the jurisdiction of the United States.
3. Reportable Quantities of hazardous substances can be found in the Reportable Quantities section and at 40 CFR 302 (Table 302.4).
4. Releases of mixtures or solutions (including hazardous waste streams) of hazardous substances are subject to the following reporting requirements:
 - a. If the quantity of all of the hazardous constituent(s) of the mixture or solution is known, notification is required where a Reportable Quantity or more of any hazardous constituent is released; or if the quantity of 1 or more of the hazardous constituent(s) of the mixture or solution released equals or exceeds the Reportable Quantity for the hazardous constituent with the lowest RQ.
 - b. For waste streams K169, K170, K171, K172, K174, and K175, knowledge of the quantity of all of the hazardous constituent(s) may be assumed, based on the following maximum observed constituent concentrations identified by EPA:

Waste	Constituent	Max ppm
K174	2,3,7,8-TCDD	0.000039
	1,2,3,7,8-PeCDD	0.0000108
	1,2,3,4,7,8-HxCDD	0.0000241
	1,2,3,6,7,8-HxCDD	0.000083
	1,2,3,7,8,9-HxCDD	0.000062
	1,2,3,4,6,7,8-HpCDD	0.00123
	OCDD	0.0129
	2,3,7,8-TCDF	0.000145
	1,2,3,7,8-PeCDF	0.0000777
	2,3,4,7,8-PeCDF	0.000127
	1,2,3,4,7,8-HxCDF	0.001425
	1,2,3,6,7,8-HxCDF	0.000281
	1,2,3,7,8,9-HxCDF	0.00014
	2,3,4,6,7,8-HxCDF	0.000648
	1,2,3,4,6,7,8-HpCDF	0.0207
	1,2,3,4,7,8,9-HpCDF	0.0135
	OCDF	0.212
	Mercury	9200.0
K175		

5. Releases of mixtures or solutions containing radionuclides must be reported under the following circumstances:
 - a. If the identity and quantity (in curies) of each radionuclide in a released mixture of solution is known, the ratio between the quantity released (in curies) and the Reportable Quantity for the radionuclide must be determined for each radionuclide. The only such releases subject to these reporting requirements are those in which the sum of the ratios for the radionuclides in the mixture or solution released is equal to or greater than 1.
 - b. If the identity of each radionuclide in a released mixture or solution is known but the quantity released (in curies) of 1 or more of the radionuclides is unknown, the only such releases that must be reported are those in which the total quantity (in curies) of the mixture or solution released is equal to or greater than the lowest Reportable Quantity of any individual radionuclide in the mixture or solution.
 - c. If the identity of 1 or more radionuclides in a released mixture or solution is unknown (or if the identity of a radionuclide released by itself is unknown), the only such releases subject to reporting requirements are those in which the total quantity (in curies) released is equal to or greater than either 1 curie or the lowest Reportable Quantity of any known individual radionuclide in the mixture or solution, whichever is lower.
6. For releases of a hazardous substance that are continuous and stable in quantity and rate:
 - a. A release is continuous if it occurs without interruption or abatement or that is routine, anticipated, and intermittent and incidental to normal operations or treatment processes.
 - b. Provide initial notice to the National Response Center at the above numbers.
 - c. Written notice must also be provided to the appropriate EPA Regional Office (see **EPA Regional Offices listing**) within 30 days of the telephone notification to the NRC.
 - d. A follow-up notification should be submitted within 30 days of the first anniversary date of the initial written notice.

- e. Provide notice of a change in the composition or sources of the release or in any other information provided in prior written notifications.
 - f. Provide notice when an increase in the quantity of the hazardous substance being released during any 24-hour period represents a statistically significant increase.
7. The following categories of releases are **exempt** from the reporting requirements of this section:
- a. Releases of those radionuclides that occur naturally in the soil from land holdings such as parks, golf courses, or other large tracts of land.
 - b. Releases of naturally occurring radionuclides from land disturbance activities, including farming, construction, and land disturbance incidental to extraction during mining activities, except that which occurs at uranium, phosphate, tin, zircon, hafnium, vanadium, monazite, and rare earth mines. Land disturbance incidental to extraction includes: land clearing; overburden removal and stockpiling; excavating, handling, transporting, and storing ores and other raw (not beneficiated or processed) materials; and replacing materials in mined-out areas, coal ash, earthen materials generated from the exempted mining activities.
 - c. Releases of radionuclides from the dumping and transportation of coal and coal ash (including fly ash, bottom ash, and boiler slags), including the dumping and land spreading operations that occur during coal ash uses.
 - d. Releases of radionuclides from piles of coal and coal ash, including fly ash, bottom ash, and boiler slags.
8. Except for releases of radionuclides, notification of the release of a Reportable Quantity of solid particles of antimony, arsenic, beryllium, cadmium, chromium, copper, lead, nickel, selenium, silver, thallium, or zinc is not required if the mean diameter of the particles released is larger than 100 micrometers (0.004 inches).
9. The following releases are also **exempt** from the notification requirements of this section:
- a. Releases in amounts less than 1,000 pounds per 24 hours of nitrogen oxide to the air which are the result of combustion and combustion-related activities.
 - b. Releases in amounts less than 1,000 pounds per 24 hours of nitrogen dioxide to the air which are the result of combustion and combustion-related activities.
10. See also PCBs.

Citation: 33 CFR Part 153, Subpart B; 40 CFR 302.6

EPA Regional Offices

Region I	John F. Kennedy Federal Building 1 Congress Street, Suite 1100 Boston, MA 02114-2023 (617) 918-1111 (Outside New England) (888) 372-7341 (New England states)	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
Region II	290 Broadway, 26th Floor New York, NY 10007-1866 (212) 637-5000	New Jersey, New York, Puerto Rico, Virgin Islands
Region III	1650 Arch Street Philadelphia, PA 19103 (215) 814-5000	Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia
Region IV	Sam Nunn Atlanta Federal Center 61 Forsyth Street SW Atlanta, GA 30303 (404) 562-9900	Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee
Region V	77 West Jackson Boulevard Chicago, IL 60604 (312) 353-2000	Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin
Region VI	1445 Ross Avenue, Suite 1200 Dallas, TX 75202-2733 (214) 665-6444	Arkansas, Louisiana, New Mexico, Oklahoma, Texas
Region VII	901 North 5th Street Kansas City, KS 66101 (913) 551-7003	Iowa, Kansas, Missouri, Nebraska
Region VIII	1595 Wynkoop Street Denver, CO 80202-1129 (303) 312-6312	Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming
Region IX	75 Hawthorne Street San Francisco, CA 94105 (415) 947-8000	American Samoa, Arizona, California, Guam, Hawaii, Mariana Islands, Nevada, Northern Mariana Islands
Region X	1200 6th Avenue Seattle, WA 98101 (206) 553-1200	Alaska, Idaho, Oregon, Washington

Appendix B

SECTION 1



New York State Department of Environmental Conservation
Division of Water



Report of Noncompliance Event

To: DEC Water Contact _____ DEC Region: _____

Report Type: ☐ 5 Day ☐ Permit Violation ☐ Order Violation ☐ Anticipated Noncompliance ☐ Bypass/Overflow ☐ Other

SECTION 2

SPDES #: NY-_____ Facility: _____

Date of noncompliance: ____ / ____ / ____ Location (Outfall, Treatment Unit, or Pump Station): _____

Description of noncompliance(s) and cause(s): _____

Has event ceased? (Yes) (No) If so, when? _____ Was event due to plant upset? (Yes) (No) SPDES limits violated? (Yes) (No)

Start date, time of event: ____ / ____ / ____, ____ : ____ (AM) (PM) End date, time of event: ____ / ____ / ____, ____ : ____ (AM) (PM)

Date, time oral notification made to DEC? ____ / ____ / ____, ____ : ____ (AM) (PM) DEC Official contacted: _____

Immediate corrective actions: _____

Preventive (long term) corrective actions: _____

SECTION 3

Complete this section if event was a bypass:

Bypass amount: _____ Was prior DEC authorization received for this event? (Yes) (No)

DEC Official contacted: _____ Date of DEC approval: ____ / ____ / ____

Describe event in "Description of noncompliance and cause" area in Section 2. Detail the start and end dates and times in Section 2 also.

SECTION 4

Facility Representative: _____ Title: _____ Date: ____ / ____ / ____

Phone #: (____) _____ - _____ Fax #: (____) _____ - _____

I Certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

X

Signature of Principal Executive
Officer or Authorized Agent

INSTRUCTIONS

The Division of Water developed this standardized form to simplify the reporting of noncompliance events. The SPDES Permit General Conditions, require that certain discharges of untreated or partially treated sewage must be reported orally within either 2 hours¹ or 24 hours and also in writing within five (5) days as required by the appropriate regulation. All other permit noncompliance shall be reported as attachments to the Discharge Monitoring Report (DMR). This form should be used for these events as well as to report noncompliance relating to consent orders, scheduled events and bypass events.

All necessary information can readily be reported to DEC on this form. Additional information required to describe the event can be attached. **Please make additional copies of this form and use as needed.** Instructions are provided below. For questions on form use please contact the appropriate office listed below for the county where your permitted facility is located. Thank you for your cooperation.

Instructions to complete and submit Noncompliance Report

1. Provide facility information and all applicable event details in Sections 1 through 3. Dates should be completed in month/day/year format.
2. Provide your name, title, business phone number, and date report was completed in Section 4. Use additional sheets as needed to provide full detail of the event in Section 2.
3. For 5-day written reports, mail or fax the completed form to the appropriate DEC Regional Office listed below. Attach all other noncompliance reports to the DMR submittal (be sure to attach to each set of DMR copies) or mail separately if related to consent order/scheduled event noncompliance. After hours and weekend reporting of unusual discharge events of other noncompliance must be reported through the DEC Telephone Hotline, which is 1-800-457-7362.

DEC Regional Offices:

<u>REGION 1</u> Regional Water Engineer NYS SUNY , Bldg. 40 Loop Road Stony Brook, NY 11790-2356 Phone: 631-444-0405 Fax: 631-444-0373 Counties: Nassau Suffolk	<u>REGION 2</u> Regional Water Engineer One Hunters Point Plaza 47-40 21st St. Long Island City, NY 11101-5407 Phone: 718-482-4900 Fax: 718-482-6516 Counties: Queens Bronx New York Richmond Kings	<u>REGION 3 **</u> Regional Water Engineer 21 So. Putt Corners Rd New Paltz, NY 12561-1696 Phone: 845-256-3000 Fax: 845-255-0714 Counties: Sullivan Rockland Dutchess Putnam Orange Ulster Westchester
<u>REGION 4</u> Regional Water Engineer 1150 North Westcott Rd. Schenectady, NY 12306-2014 Phone: 518-357-2045 Fax: 518-357-2398 Counties: Montgomery Albany Otsego Rensselaer Columbia Delaware Schoharie Greene Schenectady	<u>REGION 5 **</u> Regional Water Engineer Route 86, P.O. Box 296 Ray Brook N.Y. 12977-0296 Phone: 518-897-1241 Fax: 518-897-1245 Counties: Clinton Hamilton Franklin Essex Saratoga Warren Fulton Washington	<u>REGION 6 **</u> Regional Water Engineer Region 6 Suboffice State Office Bldg. 207 Genesee St. Utica, NY 13500 Phone: 315-793-2554 Fax: 315-793-2748 Counties: Herkimer Lewis Jefferson Oneida St. Lawrence
<u>REGION 7</u> Regional Water Engineer 615 Erie Blvd West Syracuse, NY 13204-2400 Phone: 315-426-7506 Fax: 315-426-7402 Counties: Madison Cayuga Broome Onondaga Oswego Chenango Tioga Tompkins Cortland	<u>REGION 8</u> Regional Water Engineer 6274 East Avon-Lima Rd Avon, NY 14414-9519 Phone: 585-226-2466 Fax: 585-226-2830 Counties: Orleans Genesee Chemung Schuyler Seneca Livingston Steuben Ontario Monroe Wayne Yates	<u>REGION 9</u> Regional Water Engineer 270 Michigan Avenue Buffalo, NY 14203-2999 Phone: 716-851-7070 Fax: 716-851-7009 Counties: Cattaraugus Allegany Erie Niagara Wyoming Chautauqua

**** REGION 3 Suboffice**
Regional Water Staff
200 White Plains Rd., 5th Floor
Tarrytown, NY 10591-5805
Phone: 914-332-1835
Fax: 914-332-4670

REGION 5 Suboffice
Regional Water Staff
Box 220, Hudson St Extension
Warrensburg, NY 12885-0220
Phone: 518-623-1200
Fax: 518-623-4193

REGION 6 Suboffice
Regional Water Staff
317 Washington St.
Watertown, NY 13601-3787
Phone: 315-785-2513
Fax: 315-785-2422

¹ This requirement reflects proposed pending regulations.

Appendix D

Applicable SH&E SOPs

S3NA-302-PR Electrical, General

1.0 Purpose and Scope

- 1.1 To minimize and control electrical hazards in the workplace.
- 1.2 This procedure applies to all AECOM North America-based employees and operations.
- 1.3 As a general rule, AECOM employees should not work on exposed, energized systems with a potential greater than 50 volts. This work should be subcontracted to a qualified electrician. Should it be necessary for an AECOM employee to perform work on exposed, energized systems with a potential greater than 50 volts, the requirements of this procedure will be followed.

2.0 Terms and Definitions

- 2.1 **Arc Rating:** The maximum incident energy resistance demonstrated by a material prior to breakdown or at the onset of a second-degree skin burn (expressed in cal/cm²).
- 2.2 **Arc Flash:** A dangerous condition associated with the release of energy during an electrical arc.
- 2.3 **Arc Flash Analysis:** A mathematical determination of the energy released by an electric arc and the distance from the source that a flash hazard exists. The process for an Arc Flash Analysis is defined in NFPA 70E of the National Electric Code.
- 2.4 **Circuit Protective Device:** A load-rated switch, circuit breaker, or other device specifically designed as a disconnecting means for opening, reversing, or closing of live circuits.
- 2.5 **Energized Electrical Equipment:** Electrically connected to or having a source of voltage.
- 2.6 **Flash Hazard:** A dangerous situation associated with the release of energy caused by an electric arc.
- 2.7 **Ground Fault Circuit Interrupter (GFCI):** An electrical device that protects the users of all devices connected to it from electrical shock. The GFCI is part of the circuit or device in use and continuously measures the current in that circuit. If a leakage of current is detected, as in the case of an electrical short circuit, the circuit is opened at the GFCI and current cannot flow beyond the GFCI.
- 2.8 **Hazardous Atmospheres:** Areas that contain or may contain explosive or flammable atmospheres require specific electrical precautions. OSHA regulates the use of electrical devices in explosive atmospheres according to National Electrical Code criteria and classifications for hazardous atmospheres.
- 2.9 **Portable Electric Equipment:** Cord- and plug-connected equipment and extension cords.
- 2.10 **Qualified Persons:** Individuals who have specific and documented training to avoid the hazards of working on or near energized electrical equipment and have been specifically permitted to work on or near exposed energized and parts.
- 2.11 **Shock Hazard:** A dangerous situation associated with the possible release of energy caused by contact or approach to live parts.
- 2.12 **Unqualified Persons:** Individuals with little or no training to avoid the hazards of energized electrical parts or equipment.

3.0 Attachments

- 3.1 S3NA-302-FM Energized Electrical Work Permit
- 3.2 S3NA-302-ST Electrical Regulations
- 3.3 S3NA-302-WI1 Electrical Safe Work Practices
- 3.4 S3NA-302-WI2 Ground Fault Protection Safe Work Practices
- 3.5 S3NA-302-WI3 Generator Safety Card

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Project Manager (Field Task Manager, Supervisor)

- The **Manager** of any **employee** performing work on exposed, energized systems above a potential of 50 volts will be trained to the same level as a Qualified Person (1910.332).
- The AECOM **Project Manager, Field Task Manager, or Supervisor** is responsible for determining if AECOM employees are exposed to electrical hazards.
- The **Manager or Supervisor** will determine the appropriate safe guards to be put in place to protect employees.
- The **Manager or Supervisor** will confirm that only Qualified Persons are assigned duties that expose them or others to live electrical current above 50 volts.

4.1.2 Region\District SH&E Manager is responsible for the following:

- Approving all Energized Electrical Work Permits.
- Providing technical guidance in support of this procedure.

4.1.3 Site Safety Coordinator shall assist the site manager/supervisor in compliance with the requirements of this procedure.

4.1.4 Employees

- All AECOM **employees** engaged in project field activities shall follow these procedures.
- AECOM **employees** will stop work if workers, other than Qualified Persons, are exposed to live electrical systems at unknown voltages or potentials greater than 50 volts
- No staff shall open electrical panels unless they are a Qualified Person.

4.2 Training

4.2.1 Employees who have potential exposures to electrical hazards, Qualified Persons, shall be trained in and be familiar with the electrical safety-related work practices required by the applicable regulations.

4.2.2 All other on-site personnel, Unqualified Persons, will be advised of the electrical hazards and the procedures to mitigate their risk.

4.3 General Requirements for Use of Electricity

4.3.1 AECOM personnel who meet the requirements of a Qualified Person and have been specifically designated as such in the project health and safety plan may set up temporary circuits up to 240 volts. Maintenance or installation of circuits over 240 volts will require professionally trained personnel (i.e. professional electricians).

4.3.2 All electrical panels, lines, equipment, and facilities are to be considered energized unless confirmation that they are de-energized can be obtained from a Qualified Person or electrician.

4.3.3 All work on de-energized systems will be performed using established Hazardous Energy Control procedures. Lockout devices will be used to prevent the operation/energizing of equipment or circuits during maintenance or other work. Tagout devices will be used only where it is not feasible to use a lockout device.

4.3.4 Insulated tools and electrical handling equipment shall be inspected prior to use to confirm that their protective properties are not damaged. Damaged equipment will be tagged "DAMAGED" and removed from service.

4.3.5 S3NA-302-W11 *Electrical Work Safe Work Practices* outlines additional requirements for working on live electrical systems located on AECOM job sites. All work on exposed, energized electrical systems at potentials above 50 volts will be approved by the **Region or District Safety Manager**

4.4 General Requirements for Field/Worksite Use of Electricity

4.4.1 Electrical outlets utilized to supply power for electrical equipment during field operations shall be of the three-wire grounding type. Whenever possible, they should be tested for correct polarity and adequacy of the ground with a circuit analyzer. If it is determined that the outlet is incorrectly wired or inadequately grounded, it should not be used.

- 4.4.2 Ground Fault Circuit Interrupter (GFCI) devices will be in place between the equipment and power source for all temporary circuits unless protected by an assured equipment grounding program as defined in this procedure and *S3NA-302-WI2 Ground Fault Protection Safe Work Practices* (i.e., circuits that are not part of a permanently installed facility electrical system, such as on a construction site or temporary field installation).

4.5 **Distribution System Setup**

- 4.5.1 Only qualified personnel shall perform electrical wiring or connections.
- 4.5.2 Under no circumstances shall electrical lines be routed through doorways, hatches, windows, or other openings where lines could be crimped, bent, or cut.
- 4.5.3 Electric lines crossing work areas, personnel, or vehicular traffic areas shall be either fastened securely overhead (at a height that provides safe clearance for work operations), or protected by a cover capable of withstanding the imposed loads without creating a trip hazard.
- 4.5.4 Circuit breakers shall be labeled to indicate their use.
- 4.5.5 All circuit breaker panels shall be kept covered when not in use.
- 4.5.6 A fuse puller shall be used to remove cartridge fuses where one or more energized circuits are present.
- 4.5.7 All live parts of electrical equipment operating at 50 volts or more shall be properly guarded against accidental contact, which includes:
- Limit access to the equipment to qualified employees only.
 - Unqualified Persons shall remain at least one meter (three feet) from exposed, energized systems managed by AECOM Qualified Persons. This distance shall be nine meters (10 feet) for systems with a potential greater than 240 volts.
 - Label using the proper accident prevention sign, stating DANGER as well as the voltage of the equipment.
 - Provide a conductor of the ampacity of not less than the rating of the circuit breaker or fuses protecting that circuit.
 - Confirm that a bare conductor or earth return is not used for any temporary circuit.
 - Confirm that all electrical wiring is protected from physical damage by covering and by not placing it in a location where it can be crimped or cut, etc.
- 4.5.8 **Extension Cord Use**
- Extension cords and electrical connections on handheld and other power tools will be inspected prior to use for cuts, kinks, frayed wires, etc. If any deficiency is noted, the equipment will be tagged "DAMAGED" and removed from service. Manufacturer-installed insulated electrical cords will not be repaired or spliced.
 - Extension cords are to be kept clean, free of kinks, and protected from oil, hot or sharp surfaces, and chemicals. Extension cords are not to be placed across aisles, through doors, through holes in a wall, or in areas where the cord may be damaged or create a tripping hazard. Extension cords will be appropriate for the specific task and environment.
 - Extension cord sets for use in field operations should be of the three-wire grounding type and should be designed for hard or extra-hard use. This type of cord will typically utilize insulated wires within an outer insulated sleeve. Examples of such cord include the type marked S, ST, SO, STO, SJ, SJO, or SJTO. Molded wire (flat) cord sets should not be used in field situations. The cord will minimally be rated for the intended current (e.g., heavy duty extension cords are often available in both 15 and 20 amp versions).
 - Use of extension cords is allowed only for temporary installations not to exceed 90 days (e.g., decorations).
 - Extension cords shall be provided with a plug cap that is either molded to the cord or equipped with a cord clamp to prevent strain on the terminal screws.
 - Extension cords shall not be fastened with staples or otherwise hung in a manner that could damage the outer jacket or insulation.

- Extension cords shall be inspected prior to each use to confirm that there is no damage or defects. Defective cords shall not be used.
- Extension cords used with grounding-type equipment (e.g., three-prong plug) shall contain a grounding-type conductor (have three prongs to accept the ground plug).
- Ground fault circuit interrupters shall be used for all nonpermanent wiring needed for construction purposes or when working in wet or moist areas or onboard ships.
- Extension cords used in highly conductive work locations (e.g., wet areas) shall be of the type approved for such locations.
- Grounding-type equipment (e.g., three-prong plugs) shall not be modified to mate to incompatible outlets (e.g., cut off grounding prong to fit two prong outlets).

4.5.9 Temporary Lights/Task Lights

- A temporary light shall not be suspended by the cord unless the cord and light are designed for suspension.
- Temporary lights shall be equipped with bulb protectors unless they are installed at least 7 or more feet overhead.

4.6 Working on or Near Energized Parts

4.6.1 Working on Energized Circuits

Working on or near energized parts covers either potential direct physical contact or contact by means of tools or equipment and working close enough to the energized part to draw an arc. Any AECOM **employee** (Qualified Person) assigned to work on exposed, live electrical systems above 50 volts shall have a person knowledgeable about the task to be performed and emergency response procedures assigned to observe the Qualified Person during the task with the potential exposure. This observer shall have no other assignments during the potential exposure.

- Prior to performing any work near exposed, energized systems, the Qualified Person shall:
 - Perform a Shock Hazard Analysis.
 - Perform an Arc Flash Analysis.
 - Establish emergency contacts.
 - Complete and have approved the Energized Electrical Work Permit.
 - Have all required personal protective equipment (PPE), insulated tools, and test equipment tested and ready to use.
 - Know and understand the procedures to be followed.
 - Ensure that adequate lighting and clearance space is available.
 - Remove all conductive clothing and jewelry.

4.6.2 Working Near Overhead Power Lines

- Personnel working in the vicinity of overhead power lines, either on the ground or elevated, shall comply with *S3NA-406-PR Electrical Lines, Overhead*.
- All workers and equipment including cranes and drill rigs shall maintain a clearance distance of at least 50 feet from overhead power lines unless a detailed assessment demonstrating that a smaller clearance distance provides protection has been completed.

4.7 Grounding

4.7.1 The path to ground from circuits, equipment, and enclosures will be permanent and continuous.

4.7.2 Electrical installations at project sites will be protected by either an equipment grounding conductor program or GFCIs. The two options are:

- All 120-volt, single-phase, 15- and 20-amp receptacles that are not part of permanent wiring will be protected by GFCIs.
- The equipment grounding conductor program will cover extension cords, receptacles, and cord- and plug-connected equipment. The program will include the following elements:

- A written description of the program.
- At least one competent person to implement the program.
- Daily visual inspections of extension cords and cord- and plug-connected equipment for defects. Equipment found damaged or defective shall be removed from use and not used until repaired.
- Continuity tests of the equipment grounding conductors or receptacles, extension cords, and cord- and plug-connected equipment every three months.
- Compliance with the requirements for grounding of systems, circuits, and equipment (see 1926.404 in the US).

4.7.3 If the equipment grounding conductor program option is chosen, the designated competent person at the site shall maintain inspection records.

4.8 **Assured Grounding**

4.8.1 Where AECOM Operations is responsible, projects will have in place a program for the testing and inspection of all temporary electrical supply systems.

4.8.2 Assured grounding is applicable to all cord sets, receptacles that are not a part of the permanent wiring of a building or structure, and all equipment and tools connected by cord or plug.

4.8.3 All cord sets and receptacles will be visually inspected for damage before use.

4.8.4 All items covered by this procedure shall have their grounding conductor tested for continuity and all cord attachments and receptacles shall be tested for polarity to be sure the ground conductor is connected to the proper terminal.

4.8.5 Testing will be done on the following intervals:

- Before first use of any item.
- After repairs and before placing back into service.
- After every incident that might reasonably be suspected of causing damage.
- At intervals not to exceed 3 months.\
- Any tool, cord, or service that does not pass the required tests may not be made available to employees. Such equipment shall be tagged out of service and delivered to the supervisor or competent person for repair or replacement.
- Only a qualified employee (electrician) designated as the competent person may test electrical devices and will:
 - Prior to testing any item, remove any and all of the old color-coding tape or zip strips.
 - Perform the required ground conductor testing and polarity verifications.
 - After passing the necessary tests, the items will be marked by putting a wrap of the color coding tape or zip strip (of the appropriate color) around the cord close to the male and female ends of the electrical cord or by the male end on tools. Receptacle outlets will be marked in the most practical manner.

4.9 **Personal Protective Equipment/Work Practices**

4.9.1 PPE requirements shall be determined based on the results of each of the following: Task Hazard Analysis, Shock Hazard Analysis, and Arc Flash Analysis.

4.9.2 Nonconductive hardhats shall be worn when there is danger of head injury from electric shock or burns due to exposure to energized parts.

4.9.3 Jewelry shall not be worn when working around or with energized parts.

4.9.4 Insulated tools shall be used to work with energized parts. Tools that have insulation that might be damaged (e.g., rubber handles) shall be inspected prior to each use to confirm the insulation is not damaged.

4.9.5 Eye protection with side shields shall be worn when working with energized parts.

- 4.9.6 Rubber mats, non-conductive shields, or protective barriers shall be used as needed to protect employees from electrical hazards.
- 4.9.7 Appropriate insulating gloves shall be worn to pick up or unplug connections that are in highly conductive areas, such as in water.
- 4.9.8 Do not plug in or unplug electric equipment with wet hands.
- 4.10 **Portable Electrical Equipment**
- 4.10.1 Double-insulated, portable, industrial-type electrical tools meeting the requirements of the National Electrical Code (NEC) are authorized for use (ground wire not required). Where this type of tool is used, the equipment will be distinctly marked.
- 4.10.2 Portable electrical tools not provided with special insulating or grounding protection are not for use in damp, wet, or conductive locations (e.g., by persons standing on the ground or on metal floors).
- 4.10.3 All portable electrical appliances and equipment with non-current-carrying metal parts to which personnel may be exposed shall be grounded by a continuous conductor of adequate capacity from the device to a grounded receptacle. The Site Safety Officer shall resolve any question of whether or not a particular appliance should be grounded.
- 4.10.4 Manufacturer-installed guards shall not be tampered with, modified, or removed. These guards will be in place and utilized during operation of equipment.
- 4.10.5 The dimension of the working space in the direction of access to energized parts in switchboards, control panels, fused switches, circuit breakers, panel boards, motor controllers, and similar equipment that requires examination, adjustment, servicing, or maintenance while energized shall not be less than 36 inches deep and 30 inches wide or the width of the equipment, whichever is greater.
- 4.10.6 Portable electrical equipment shall be handled in a manner that will not cause physical damage to the equipment.
- 4.10.7 Portable electrical equipment shall not be carried by the cord.
- 4.10.8 Cords shall not be used to raise or lower equipment.
- 4.10.9 Extension cords shall not be fastened with staples, nails, wire, or otherwise hung in such a fashion that could damage the outer jacket or insulation.
- 4.10.10 Electrical cords shall not be removed from a receptacle by pulling on the cord line.
- 4.10.11 Employees' hands shall not be wet when plugging and unplugging cord and plug connected equipment and extension cords.
- 4.10.12 Disconnect portable electric equipment when not in use, before servicing, and when changing accessories such as blades, bits, and cutters.
- 4.10.13 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.).
- 4.10.14 Portable electric equipment and extension cords used in areas exposed to gases, fumes, vapors, liquids, or other agents having a deteriorating effect shall be approved for use in those locations.
- 4.10.15 Portable electric equipment and extension cords used in areas in which hazardous concentrations of flammable gases or vapors exist shall be approved for use in those locations.
- 4.10.16 If an adapter is used to accommodate a three-wire cord to a two-hole receptacle, the adapter wire will be attached to a known ground. The third prong shall never be removed from the plug.
- 4.10.17 After a circuit is de-energized by a circuit protective device, the circuit may not be manually reenergized until it has been determined that the equipment and circuit can be safely energized.
- 4.10.18 The outlet box for portable extension cords for outdoor use shall be weatherproof and shall be maintained in good condition.

5.0 Records

- 5.1 The Shock Hazard Analysis and the Arc Flash Analysis forms shall be retained in the project file.
- 5.2 The completed *S3NA-302-FM Energized Electrical Work Permit* shall be retained in the project file.

6.0 References

- 6.1 S3NA-406-PR Electrical Lines, Overhead
- 6.2 S3NA-410-PR Hazardous Energy Control

S3NA-302-FM Energized Electrical Work Permit

PART 1: To be completed by the requester

Job Work Number

- (1) Description of circuit/equipment/job location:
- (2) Description of work to be done:
- (3) Justification of why the circuit/equipment cannot be de-energized or the work cannot be deferred until the next scheduled outage:

Requester/Title

Date

Time

PART II: To be completed by the electrically qualified persons *doing* the work:

Check When
Complete

- | | |
|---|--------------------------|
| (1) Detailed job description procedure to be used in performing the above detailed work: | <input type="checkbox"/> |
| (2) Description of the Safe Work Practices to be employed: | <input type="checkbox"/> |
| (3) Results of the Shock Hazard Analysis: | <input type="checkbox"/> |
| (4) Determination of Shock Protection Boundaries: | <input type="checkbox"/> |
| (5) Results of Flash Hazard Analysis: | <input type="checkbox"/> |
| (6) Determination of the Flash Protection Boundary: | <input type="checkbox"/> |
| (7) Necessary personal protective equipment to safely perform the job: | <input type="checkbox"/> |
| (8) Means employed to restrict the access of unqualified persons from the work area: | <input type="checkbox"/> |
| (9) Evidence of completion of a Job Briefing including discussion of any job-related hazards: | <input type="checkbox"/> |

(10) Do you agree that the above described work can be done safely?
(If *no*, return to requester)

☐ Yes ☐ No

Electrically Qualified Person(s) Date/Time Electrically Qualified Person(s) Date/Time

Electrically Qualified Person(s) Date/Time Electrically Qualified Person(s) Date/Time

Authorized by:

Authorized Supervisor

Date/Time

Notes:

S3NA-302-ST Electrical Regulations

1.0 Regulations

Jurisdiction Regulation	
United States	
OSHA	National Fire Protection Association (NFPA) Publication 70, National Electrical Code Occupational Health and Safety Administration 29 CFR 1910, Subpart S Electrical Occupational Health and Safety Administration 29 CFR 1926, Subpart K Electrical
Canada	
Alberta	OHS Code (2009) Sect 225 – 227, Schedule 4 Alberta Electrical and Communication Utility Code (2002)
British Columbia	OHS Regulation (1997) Sect 19.1 – 19.40 Electrical Safety Act
Manitoba	Workplace Health and Safety Regulation (217/2006) Sect 25.0 – 25.8, 26.45, 38.1 – 38.17
New Brunswick	OHS Regulation (91-191) Sect 286 – 298
Newfoundland/Labrador	OHS Regulation (C.N.L.R. 1165/96) Sect 84 – 87
Nova Scotia	OHS Regulation (N.S. Reg. 44/99) Sect 120 – 128
NWT/NU Territories	General Safety Regulations (R.R.N.W.T. 1990, c. S-1), Safety Act (SI-013-92) Sect 96
Ontario	Reg. 213/91 Sect 181 – 195.3 Reg. 851 Sect 41, 60
Prince Edward Island	OHS Regulations (EC180/87) Sect 36.1 – 36.44
Quebec	OHS Regulation (R.R.Q., c. S-2.1, r.19.01 O.C. 885-2001) Sect 331 Safety Code for the Construction Industry (R.R.Q. 1981, c. S-2.1, r. 6) Sect 2.11.1 – 2.11.6, 5.1.1 – 5.3.1, Schedule 7
Saskatchewan	OHS Regulation (R.R.S., c. O-1, r. 1) Sect 450 – 466, Schedule Table 22
Yukon Territory	OHS Regulations (O.I.C. 2006/178) Sect 9.18 – 9.20

2.0 Standards

Canadian Standards Association	C22.1-98, Canadian Electrical Code - Part I

S3NA-302-WI1 Electrical Safe Work Practices

1.0 Purpose

The purpose of this guideline is to confirm that all live electrical work conducted under the control of AECOM personnel is carried out in accordance with recognized best practices in order to provide adequate protection to workers from the hazards of potential arc flash and/or electrical shock.

2.0 Associated AECOM Policies

In addition to this guideline, AECOM will also follow all Federal and State/Provincial Regulations, in particular NFPA-70E and 29CFR part 1910 as well as relevant AECOM SH&E procedures, including *S3NA-302-PR Electrical, General* and *S3NA-410-PR Hazardous Energy Control*.

3.0 Responsibilities

3.1 AECOM's Project Manager

- 3.1.1 Be familiar with all precautions and Federal and State/Provincial regulations and Best Practices, including NFPA-70E.
- 3.1.2 Provide training on this Best Management Practice to authorized employees covering:
 - Nature and control of known shock and arc flash hazards.
 - Means of eliminating and controlling shock and arc flash hazards.
 - Special electrical personal protective equipment (PPE) requirements (task-specific).
 - Procedure for reporting any deviations to this Best Practice.
- 3.1.3 Control access to energized electrical equipment with potential of shock or arc flash to authorized personnel only.
- 3.1.4 Confirm availability of proper tools for the operation and maintenance of electrical equipment.
- 3.1.5 Proper identification and guarding of potentially hazardous electrical equipment.
- 3.1.6 Providing available electrical one-line diagrams.
- 3.1.7 Confirm proper housekeeping around energized electrical equipment at all times.
- 3.1.8 Provide proper working conditions, including adequate lighting, to facilitate work in a safe environment.
- 3.1.9 Proper supervision of employees.
- 3.1.10 Maintaining a list of authorized electrical supervisor, authorized electrical worker, and attendant.
- 3.1.11 Implementation and ongoing evaluation of this Best Management Practice.
- 3.1.12 Terminate the work and cancel the permit when live work has been completed or any new electrical hazard arises.
- 3.1.13 Verify that communication modes are available and have been tested.
- 3.1.14 Remove unauthorized individuals who enter or who attempt to enter the approach boundaries during live work.
- 3.1.15 Confirm that live work remains consistent with terms of the live work permit and that acceptable working conditions are maintained.

- 3.1.16 Withdraw the live work permit and stop all work if unsafe conditions are reported during any live work (e.g. sparking, smoldering etc.). Do not permit work on that equipment until the cause of any unsafe condition is thoroughly investigated and the live work procedure has been reviewed to prevent reoccurrence.

3.2 **Authorized Electrical Attendant**

- 3.2.1 Practice all precautions and federal and state/provincial regulations and Best Practices including NFPA-70E.
- 3.2.2 Understand the hazards that may be faced during live work, including the potential for arc flash, shock hazard, and other related hazards.
- 3.2.3 Be aware of the potential of arc flash or shock possible to the authorized worker.
- 3.2.4 Maintain an accurate count of authorized workers working near the live equipment or inside approach boundaries.
- 3.2.5 Remain near the approach boundary until relieved by another authorized electrical attendant.
- 3.2.6 Communicate with authorized workers as necessary to confirm maintenance of safe conditions at all times.
- 3.2.7 Monitor activities inside and outside the approach zone to determine if it is safe for the worker to continue to remain in the approach zone. Order the authorized worker to stop live work under any of the following conditions:
- The attendant detects a problem;
 - The attendant detects the signs of short-circuiting, such as electrical sparking, smoldering, or any other abnormality;
 - The attendant detects a situation outside the approach zone that could endanger the worker; and
 - If the attendant cannot effectively and safely perform all assigned duties.
- 3.2.8 Perform no other duties that might interfere with the attendant's primary duty to monitor and protect the authorized worker.

3.3 **Authorized Electrical Worker**

- 3.3.1 Practice all precautions and federal and state/provincial regulations and Best Practices including NFPA-70E.
- 3.3.2 Be continuously alert, focused, and aware of the hazards of performing the task.
- 3.3.3 Understand AECOM Safety, Health and Environmental policies and standards as well as site-specific electrical safe work practices.
- 3.3.4 Examine and understand all the documents provided by AECOM and manufacturers, including all specific hazards, advisories, cautions, etc.
- 3.3.5 Perform all work in accordance with applicable federal and state/provincial regulations, AECOM policies, safe work practices, and this Best Management Practice.
- 3.3.6 Be knowledgeable of the use and selection of the proper tools to safely perform the electrical task safely.
- 3.3.7 Complete a Safe Work Plan prior to the start of a task and during work, if conditions change.
- 3.3.8 Maintain good housekeeping around work areas. Remove all debris, materials, etc., at the completion of tasks.
- 3.3.9 Report any hazardous (uncontrolled) conditions to AECOM's authorized supervisor.
- 3.3.10 Understand the hazards that may be faced during live work, including arc flash, shock, or other electrical hazards.

- 3.3.11 Properly use required PPE and electrical tools as specified in this best practice.
- 3.3.12 Communicate with the attendant as necessary.
- 3.3.13 Alert the attendant whenever any abnormality occurs (e.g., sparking, minor shock, burning smell, etc.) or symptoms of unsafe conditions are observed.
- 3.3.14 Stop all work and exit from the approach zone whenever:
 - An order to evacuate is given by the authorized attendant or the authorized supervisor; or
 - When the worker observes any warning sign or symptom of short circuiting or a dangerous situation; or
 - When the supervisor gives an order to stop work.

4.0 Multi-employer Live Electrical Work Coordination

- 4.1 **AECOM's Requirements:** When using another employer to perform work involving live electrical work, AECOM will:
 - 4.1.1 Inform the contractor that the workplace contains shock and/or arc flash potential and that live work is allowed only through compliance with a live work permit program meeting the requirements of NFPA-70E.
 - 4.1.2 Appraise the contractor of the elements of the work, including the hazards identified and all past experiences with the live work that make the live work hazardous.
 - 4.1.3 Appraise the contractor of any precautions or procedures that have been implemented for the protection of employees in the approach zone where contractor personnel will be working.
 - 4.1.4 Coordinate live work operations with the contractor when both AECOM employees and contractor employees will be working in or near approach zone, so that employees of AECOM and the contractor do not endanger each other.
 - 4.1.5 Debrief the contractor at the conclusion of the live work operations.
- 4.2 **Contractor Requirements:** In addition to complying with the live work permit requirements, each contractor who is retained to perform live electrical work will:
 - 4.2.1 Obtain any available information regarding live work from the project manager.
 - 4.2.2 Coordinate live work operations with the project manager when both AECOM personnel and contractor personnel will be jointly working in or near the approach zone.
 - 4.2.3 Practice all precautions and federal and state/provincial regulations and Best Practices including NFPA-70E.
 - 4.2.4 Inform AECOM's project manager of the live work permit that the contractor will be using and of any hazards confronted or created during live work, either through debriefing or during live work.

5.0 Review and Update

This Best Management Practice will be reviewed and updated annually.

6.0 Definitions

- 6.1 **Arc Rating:** The maximum incident energy resistance demonstrated by a material prior to breakdown or at the onset of a second-degree skin burn (expressed in cal/cm²).
- 6.2 **Flash Hazard:** A dangerous situation associated with the release of energy caused by an electric arc.
- 6.3 **Energized Electrical Equipment:** Electrically connected to or having a source of voltage.
- 6.4 **Shock Hazard:** A dangerous situation associated with the possible release of energy caused by contact or approach to live parts.

7.0 Required Minimum Qualifications

- 7.1 All electrical work including instrumentation, installations, maintenance, troubleshooting, calibration, and operation of breakers will only be conducted by qualified, trained, and skilled personnel (this includes AECOM personnel and contractors/subcontractors). These personnel will meet all qualification requirements mandated by the federal/state regulations as well as applicable electrical associations and trade bodies.
- 7.2 The Project Manager, in consultation with SH&E Department, will determine the minimum qualifications requirements for any work with the potential for arc flash.

8.0 Working on or Near Electrical Conductors of Circuit Parts

- 8.1 Safe work practices shall be used to safeguard employees from injury when working on or near exposed electric conductors or circuit parts that can be energized.
 - 8.1.1 Live Parts – Safe Work Conditions: Live parts to which an employee might be exposed shall be put into an electrically safe work condition before an employee works on or near them.
 - 8.1.2 Live Parts – Unsafe Work Conditions: Only qualified persons shall be permitted to work on electrical conductors or circuit parts that have not been put into electrically safe conditions.
- 8.2 Working on or near exposed electrical conductors OR circuit parts that are, or might become, energized – Prior to working on or near exposed electrical conductors and circuit parts operating at 50 volts or more, lockout/tagout devices shall be applied in accordance with AECOM and site-specific policies.
- 8.3 Electrical Hazard Analysis – If the live parts operating at 50 volts or more are not placed in electrically safe condition, other safety-related work practices shall be used to protect employees who might be exposed to electrical hazards. Safe work practices mentioned below shall be established before any person approaches exposed live parts within limited approach boundary:
 - 8.3.1 Shock Hazard Analysis – A shock hazard analysis shall determine the voltage to which personnel will be exposed, boundary requirements, and the PPE necessary in order to minimize the possibility of electrical shock.
 - 8.3.2 Flash Hazard Analysis – A flash hazard analysis shall be done in order to protect personnel from the possibility of being injured by an arc flash. The analysis shall determine the flash protection boundary and the PPE that people within the flash protection boundary shall use.

9.0 Shock Hazard Analysis and Approach Boundaries

- 9.1 The National Fire Protection Association (NFPA) has determined that a comprehensive Shock Hazard Analysis Survey is the best method to:
 - 9.1.1 Systematically analyze shock hazards,
 - 9.1.2 Identify approach boundaries, and
 - 9.1.3 Identify appropriate PPE.
- 9.2 Before permitting live work on electrical equipment, each project site having electrical equipment operating at more than 50 volts is required to conduct Shock Hazard Analysis Survey. Upon completion of the survey, the applicable electrical areas/spaces will be labeled in accordance with survey results.
- 9.3 Shock hazard analysis for individual equipment is not required if a facility-wide shock hazard analysis has been conducted and if conditions (including labels and signage) are maintained at all times.

NOTE: Only authorized personnel are allowed to work within the approach boundaries.
- 9.4 No qualified person shall approach or take any conductive object closer to exposed live parts operating at 50 volts or more than the restricted approach boundary set forth in Appendix A-1 [Table 130.2 (C) of NFPA 70-E].
- 9.5 In the absence of facility-wide survey, a shock hazard analysis (including the identification of approach boundaries) shall be conducted in accordance with NFPA 70E Section 130.2 and Table 130.2 (C) (see Appendix A-1 of this Practice) for all electrical equipment operating at over 50 volts.
- 9.6 Results of both facility-wide as well as individual shock hazard survey shall be made available to all authorized employees. Additionally, any recommendations given by the survey generated from the survey shall be reviewed by the project manager and shall be addressed in a timely manner.

10.0 Arc Flash Hazard Analysis and Approach Boundaries

- 10.1 Arc flash safety requirements apply to all electrical equipment operating at 50 volts or more.
- 10.2 Similar to the shock hazard analysis, the NFPA has determined that a comprehensive Arc Flash Hazard Analysis Survey is the best method to:
 - 10.2.1 Systematically analyze the potential for arc flash,
 - 10.2.2 Identify the limits of the approach, and
 - 10.2.3 Identify appropriate PPE.
- 10.3 Once a comprehensive facility arc flash survey has been conducted and electrical work areas/spaces are labeled in accordance with survey results, an individual arc flash hazard analysis is not required, provided that qualified personnel confirm that the conditions, as indicated on the labels and signs, are maintained.

NOTE: Only authorized personnel are allowed to work within the limits of approach.
- 10.4 Please refer to Appendix A-1 for details.
- 10.5 Prior to performing any work on energized electrical systems, an arc flash hazard analysis [including the identification of approach boundaries] will be conducted in accordance Appendix F of this practice (taken from NFPA 70E Section 130.3)].

11.0 Required PPE Categorized by Exposure

The following specialized PPE requirements will be used while working on energized electrical systems:

- 11.1 PPE as prescribed by the shock hazard analysis and arc flash analysis; or
- 11.2 PPE requirements identified in Appendix A-2 of this practice (taken from NFPA 70E Sections 130.2 and 130.7).

12.0 Required Tools and Equipment

- 12.1 Only tools and testing or protective equipment approved by ANSI/ASTM for the relevant voltage rating [see Table 130.7(C)(8) or Canadian Standards Association for appropriate voltage rating] will be used when working on energized electrical systems. All tools and testing or protective equipment will be visually inspected prior to use to confirm that the protection systems associated with the tool or equipment are not damaged or impaired and that diagnostic meters and tools are configured properly. Any tool or testing or protective equipment suspected of being compromised will be immediately taken out of service and will be tagged for disposal.

13.0 Work on Energized Electrical Systems

- 13.1 It is the policy of AECOM that all electrical maintenance or troubleshooting will be done on de-energized circuits, to the extent practical. Work on energized circuits can only be done under special circumstances using a "Live Work Permit" issued by authorized electrical supervisor. This permit takes into consideration the voltage levels, known electrical hazards, communication requirements, and need for watch persons, etc. The following procedure will be observed for a live work permit:
 - 13.1.1 The person requesting the work (authorized worker) will complete the permit and will retain the original with him or her during the work. Copy of the permit will be displayed at a prominent location in the control room as a notice that live work has been authorized in certain part of the plant/project.
 - 13.1.2 Permit will be reviewed for correctness, proper safety precautions, and adequacy of controls by the authorized electrical supervisor. After satisfying all safety requirements, an authorized electrical supervisor will sign the permit and will give the original copy to the authorized electrical worker.
 - 13.1.3 Upon work completion, the authorized worker will note any observation on the permit and will return the original to the authorized supervisor.
 - 13.1.4 Authorized supervisor will keep both copies of the permit as a controlled record for a period of 12 months.
- 13.2 The following conditions will be met for live electrical work:
 - 13.2.1 If any equipment or instrumentation is to be disabled while other related components or systems are still functioning, the Live Work Permit should record how process safety of the remaining systems will be maintained.
 - 13.2.2 All electrical and instrumentation work conducted will be recorded in the applicable MCC log. The documentation will include a reference to the permit number where appropriate.
 - 13.2.3 The worker will inform the operations supervisor that he or she intends to de-energize a circuit. He or she will also inform the operations supervisor when the work is complete and that the system can be returned to service.
- 13.3 See *S3NA-302-FM Energized Electrical Work Permit* for a suggested template for a "Live Work Permit."

14.0 Lockout/Tagout Policy and Procedures

- 14.1 All equipment will be locked out prior to any work commencing in accordance with AECOM's policy *S3NA-410-PR Hazardous Energy Control* and applicable site specific lockout/tagout program.

15.0 Troubleshooting Procedure

- 15.1 The troubleshooting of electrical equipment often requires working with live circuits. Where possible, work will be done on de-energized circuits following the relevant AECOM and site-specific lockout/tagout policy. However, troubleshooting may require limited work on live circuits; if such work is required it will be done using the "Live Work Permit" and site-specific Troubleshooting Guidelines.

16.0 Housekeeping

- 16.1 All areas containing electrical equipment will:
- 16.1.1 Be maintained and kept clean.
 - 16.1.2 Be well illuminated.
 - 16.1.3 Not be used for storage of supplies.
 - 16.1.4 Not be used for the storage of any flammable materials.
 - 16.1.5 Be assessed for safety hazards.
 - 16.1.6 Be suitably ventilated to control dust, temperature, and humidity.

17.0 Communication

- 17.1 Personnel working in or around equipment with electrical hazards will employ a suitable means of communication to confirm their safety.
- 17.2 The means of communication may include:
- 17.2.1 Authorized attendant (required for ALL live work conducted on 600 volts and above) (CFR 29 1910.335(b)(3) in the United States).
 - 17.2.2 Permits.
 - 17.2.3 Two-way radios.

18.0 Signage and Labels

- 18.1 MCCs, ECRs, battery rooms, and electrical panels are required to have the following labeling to identify arc flash and shock hazards. The information on the label will include:
- 18.1.1 Flash Hazard Boundary (Arc Flash Current).
 - 18.1.2 Flash Hazard at 18 inches in cal/cm² or joules.
 - 18.1.3 Hazard Risk Categories (PPE requirements).
 - 18.1.4 Shock Hazards.
 - 18.1.5 Limited Approach Boundaries.
 - 18.1.6 Restricted Approach.
 - 18.1.7 Prohibited Approach.
 - 18.1.8 Log book to record all electrically related activities.
- 18.2 All doorways to buildings and enclosures containing energized electrical equipment will be signed to indicate that:
- 18.2.1 Access is restricted to authorized personnel only.
 - 18.2.2 Electrical hazards exist beyond this (boundary, door, etc.).

19.0 Management of Change

- 19.1 Any changes to electrical and/or project instrumentation will be conducted following the prescribed management of change policy.

APPENDIX A-1

Table 130.2(C) Approach Boundaries to Live Parts for Shock Protection

(All dimensions are distance from live part to employee.)

Nominal Voltage Range (Phase to Phase)	Limited Approach Boundary	Exposed Fixed Circuit Parts	Restricted Approach Boundary; includes inadvertent movement adder	Prohibited Approach Boundary
	Exposed Moveable Conductor			
Up to 50 Volts	Not Specified	Not Specified	Not Specified	Not Specified
50-300	10 ft	3.5 ft	Avoid Contact	Avoid Contact
300-750	10 ft	3.5 ft	1 ft	1 inch
More than 750 volts	Consult NACO's Master Electrician or other authorized electrician.			

APPENDIX A-2

Table 130.7(C)(10) Protective Clothing and Personal Protective Equipment (PPE) Matrix

Table 130.7(C)(11) Protective Clothing Characteristics

Hazard/Risk Category	Clothing Description (Typical number of clothing layers is given in parentheses)	Required Minimum Arc Rating of PPE [(J/cm ² (cal/cm ²)]
0	Non-melting, flammable materials (i.e., untreated cotton, wool, rayon, or silk, or blends of these materials) with a fabric weight at least 4.5 oz/yd ² (1)	N/A
1	FR shirt and FR pants or FR coverall (1)	16.74 (4)
2	Cotton underwear – conventional short sleeve and brief/shorts, plus FR shirt and FR pants (1 or 2)	33.47 (8)
3	Cotton underwear plus FR shirt and FR pants plus FR coverall, or cotton underwear plus two FR coveralls (2 or 3)	104.6 (25)
4	Cotton underwear plus FR shirt and FR pants plus multilayer flash suit (3 or more)	167.36 (40)
<p>NOTE:</p> <p>Arc rating: Arc rating is defined in Article 100 and can be either ATPV or E_{BT}.</p> <p>ATPV: ATPV is defined in ASTM F 1959-99 as the incident energy on a fabric or material that results in sufficient heat transfer through the fabric or material to cause the onset of a second-degree burn based on the Stoll curve.</p> <p>E_{BT}: E_{BT} is defined in ASTM F 1959-99 as the average of the five highest incident energy exposure values below the Stoll curve where the specimens do not exhibit breakopen. E_{BT} is reported when ATPV cannot be measured due to FR fabric breakopen.</p>		

APPENDIX B

Protective Clothing and Equipment	Protective Systems for Hazard/Risk Category					
Hazard/Risk Category Number	-1 (Note 3)	0	1	2	3	4
Non-melting (according to ASTM F 1506-00) or Untreated Natural Fiber						
a. T-shirt (short-sleeve)	X			X	X	X
b. Shirt (long-sleeve)		X				
c. Pants (long)	X	X	X (Note 4)	X (Note 6)	X	X
FR Clothing (Note 1)						
a. Long-sleeve shirt			X	X	X (Note 9)	X
b. Pants			X (Note 4)	X (Note 6)	X (Note 9)	X
c. Coverall			(Note 5)	(Note 7)	X (Note 9)	(Note 5)
d. Jacket, parka, or rainwear			AN	AN	AN	AN
FR Protective Equipment						
a. Flash suit jacket (multilayer)						X
b. Flash suit pants (multilayer)						X
c. Head protection						
1. Hard hat			X	X	X	X
2. FR hard hat liner					AR	AR
d. Eye protection		—	—	—	—	—
1. Safety glasses	X	X	X	AL	AL	AL
2. Safety goggles				AL	AL	AL
e. Face and head area protection		—	—	—	—	—
1. Arc-rated face shield, or flash suit hood				X (Note 8)		
2. Flash suit hood					X	X
3. Hearing protection (ear canal inserts)				X (Note 8)	X	X
f. Hand protection			—	—	—	—
Leather gloves (Note 2)			AN	X	X	X
g. Foot protection						
Leather work shoes			AN	X	X	X
AN = As needed AL = Select one in group AR = As required X = Minimum required						
NOTES: 1. See Table 2. Arc rating for a garment is expressed in cal/cm ² . 2. If voltage-rated gloves are required, the leather protectors worn external to the rubber gloves satisfy this requirement. 3. Hazard/Risk Category Number "-1" is only defined if determined by Notes 3 or 6 of Table 130.7(C)(9)(a). 4. Regular weight (minimum 12 oz/yd ² fabric weight), untreated, denim cotton blue jeans are acceptable in lieu of FR pants. The FR pants used for Hazard/Risk Category 1 shall have a minimum arc rating of 4. 5. Alternate is to use FR coveralls (minimum arc rating of 4) instead of FR shirt and FR pants. 6. If the FR pants have a minimum arc rating of 8, long pants of non-melting or untreated natural fiber are not required beneath the FR pants. 7. Alternate is to use FR coveralls (minimum arc rating of 4) over non-melting or untreated natural fiber pants and T-shirt. 8. A face shield with a minimum arc rating of 8, with wrap-around guarding to protect not only the face, but also the forehead, ears, and neck (or, alternately, a flash suit hood), is required. 9. Alternate is to use two sets of FR coveralls (the inner with a minimum arc rating of 4 and outer coverall with a minimum arc rating of 5) over non-melting or untreated natural fiber clothing, instead of FR coveralls over FR shirt and FR pants over non-melting or untreated natural fiber clothing.						

Table 2: Protective Clothing Characteristics

Hazard/Risk Category	Clothing Description (Typical number of clothing layers is given in parentheses)	Required Minimum Arc Rating of PPE [(J/cm2 (cal/cm2)]
0	Non-melting, flammable materials (i.e., untreated cotton, wool, rayon, or silk, or blends of these materials) with a fabric weight at least 4.5 oz/yd ² (1)	N/A
1	FR shirt and FR pants or FR coverall (1)	16.74 (4)
2	Cotton underwear – conventional short sleeve and brief/shorts, plus FR shirt and FR pants (1 or 2)	33.47 (8)
3	Cotton underwear plus FR shirt and FR pants plus FR coverall, or cotton underwear plus two FR coveralls (2 or 3)	104.6 (25)
4	Cotton underwear plus FR shirt and FR pants plus multilayer flash suit (3 or more)	167.36 (40)
<p>NOTE:</p> <p>Arc rating is defined in Article 100 and can be either ATPV or E_{BT}. ATPV is defined in ASTM F 1959-99 as the incident energy on a fabric or material that results in sufficient heat transfer through the fabric or material to cause the onset of a second-degree burn based on the Stoll curve. E_{BT} is defined in ASTM F 1959-99 as the average of the five highest incident energy exposure values below the Stoll curve where the specimens do not exhibit breakopen. E_{BT} is reported when ATPV cannot be measured due to FR fabric breakopen.</p>		

APPENDIX C

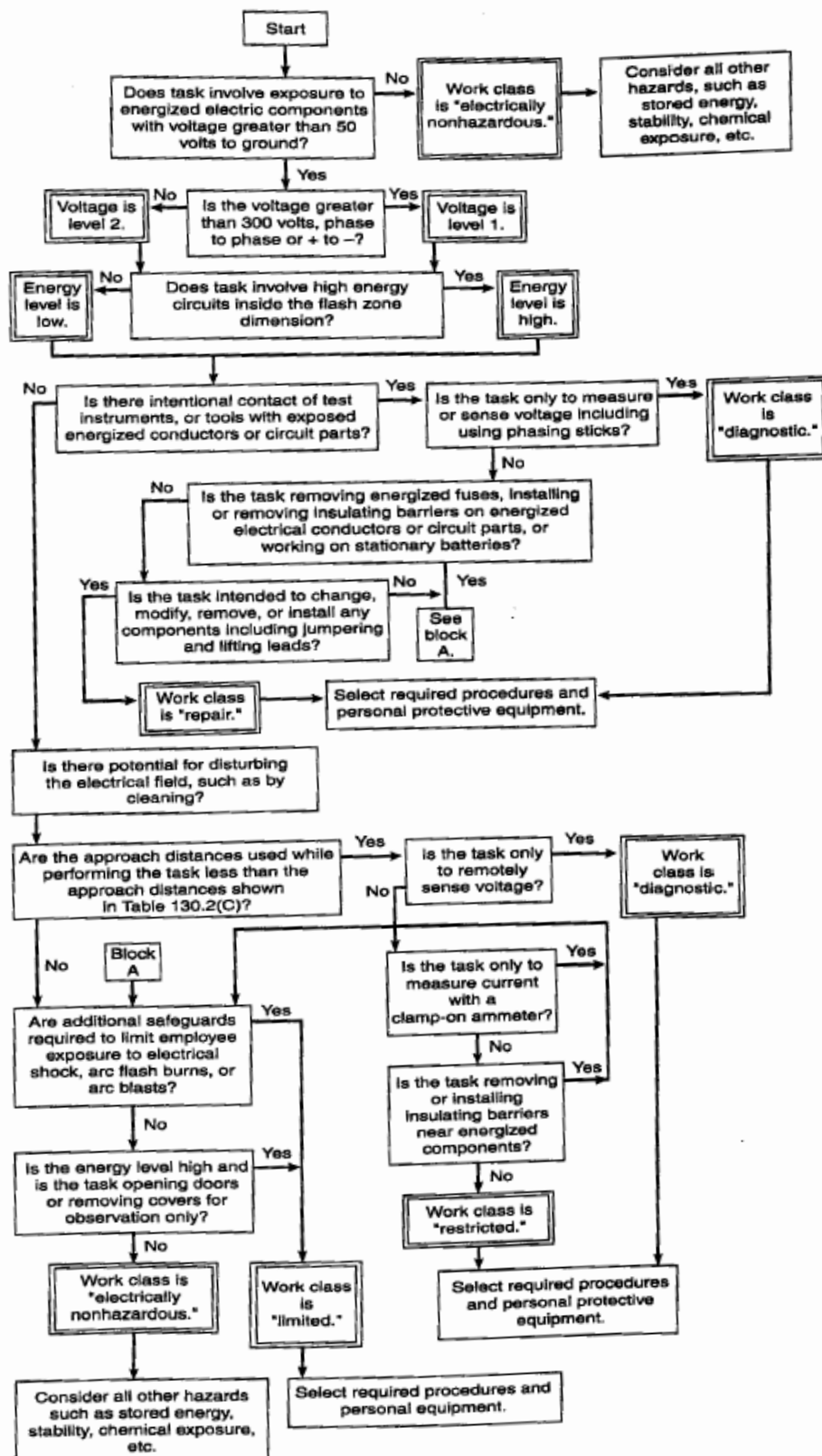


Figure F.1 Hazard/Risk Analysis Evaluation Procedure Flow Chart.

APPENDIX E**Flash Protection Boundary**

For system that are above 600 volts or less, the Flash Protection Boundary shall be 4.0 ft., based on the product of clearing time of 6 cycles (0.1 second) and the available bolted fault current of 50 kA, or any combination not exceeding 300 kA cycles (5,000 ampere seconds).

For clearing times and bolted fault currents other than 300kA cycles, or under engineering supervision, the Flash Protection Boundary shall alternatively permitted to be calculated in accordance with the following general formula:

$$D_c = [2.65 \times MVA_{bf} \times t]^{1/2}$$

or

$$D_c = [53 \times MVA \times t]^{1/2}$$

where:

D_c = distance in feet from an arc source for a second-degree burn

MVA_{bf} = bolted fault capacity available at point involved (in mega volt-amps)

MVA = capacity rating of transformer (mega volt-amp). For transformer with an MVA rating below 0.75 MVA, multiply the transformer MVA rating by 1.25

t = time of arc exposure (in seconds)

At voltage levels above 600 volts, the Flash Protection Boundary is the distance at which the incident energy equals 5 J/cm² (1.2 cal/cm²). For situations in which fault-clearing time is 0.1 second (or faster), the Flash Protection Boundary is the distance at which the incident energy equals 6.24 J/cm² (1.5 cal/cm²).

S3NA-302-WI2 Ground Fault Protection Safe Work Practices

1.0 Background

- 1.1 OSHA standard 1926.404(b)(1) requires “ground fault protection” on construction sites. The standard allows two different approaches to providing the required protection for employees from electrical ground faults. Either “ground fault circuit interrupters” (GFCI) are to be used with temporary receptacles, or an “assured equipment grounding conductor program” is to be established in which plug-connected electrical equipment, extension cords, and temporary receptacles are tested on a periodic basis.

2.0 Ground Fault Circuit Interrupters

- 2.1 A GFCI is an electrical device that is designed to prevent electrocution from electrical leakage. It is designed to measure the difference in amperage between the “hot” wire and the “neutral” wire in a circuit. Under ideal conditions, the amperage should be the same in both wires. If there is electrical leakage (a ground-fault), the amperages will be different. If the difference is more than a predetermined amount, the GFCI “trips” and stops the flow of electricity.
- 2.2 GFCIs may trip from many causes:
- 2.2.1 Electrical leakage in the tool from internal defects.
- Electrical leakage in the extension cord from damaged insulation or from normal leakage in long runs of cords.
- 2.2.2 Moisture in the air or cords lying in water or on moist dirt.
- 2.2.3 Too many tools on one GFCI circuit.
- Electromagnetic interference from two-way radios or from power transmission lines.
- 2.2.4 Faulty wiring of the GFCI into the circuit.
- 2.2.5 Defective GFCI.
- 2.2.6 Any such tripping will require the problem to be corrected before the protected circuit can be re-set.
- 2.3 All 120-volt, single phase, 15 and 20 ampere temporary receptacles shall be protected with “approved” GFCIs. “Approved” means listed by Underwriters Laboratories.
- 2.4 There are several types of GFCIs.
- 2.4.1 A combination circuit breaker and GFCI that is installed in place of the ordinary circuit breaker.
- 2.4.2 A receptacle containing a built-in GFCI.
- 2.4.3 A portable GFCI that plugs into a receptacle and allows the extension cord or tool to be plugged into the GFCI.
- 2.4.4 A portable unit containing several GFCI protected receptacles.
- 2.5 GFCIs contain a test button and a reset button. Each GFCI needs to be tested prior to use and on a periodic basis depending upon the manufacturer's recommendations (at a minimum monthly).

3.0 Assured Equipment Grounding Conductor Program

- 3.1 If an assured equipment grounding conductor program is to be used instead of GFCIs to provide ground fault protection, the program shall be governed by the following requirements.

- 3.1.1 Temporary receptacles shall be electrically grounded in accordance with the temporary wiring requirements of the National Electrical Code.
- 3.1.2 Extension cords shall be three-wire cords containing an equipment grounding conductor (ground wire).
- 3.1.3 Electrical equipment that is plugged into a receptacle or extension cord (portable electrical tools, bench grinders, electric heaters, etc.) shall have a ground wire properly attached to the non-current-carrying metal parts of the equipment. (Double-insulated tools have no ground wire and are therefore exempt from these testing and recording requirements but still need to be inspected for defects.)
- 3.1.4 The Worksite Manager and/or Supervisor are required to designate one or more competent persons to administer this testing and recording program.
- 3.1.5 Periodic testing of all plug-connected equipment, all extension cords, and all temporary receptacles is to be conducted at the following times:
- Before a new item (equipment, cord, or receptacle) is put into use.
 - After any repairs to the item.
 - After any incident in which the item may have been damaged.
 - Within 3 months of the last test. (An exception is allowed in the Standard in which extension cords, and temporary receptacles, which are fixed in place and are not exposed to damage, may be tested every 6 months.)
- 3.1.6 The purpose of the test is to determine the following:
- Temporary receptacles—to be sure that the receptacle is grounded.
 - Extension Cords—to be sure that the ground wire is connected to the proper terminal at each end and that the ground wire is continuous throughout the length of the cord.
 - Plug Connected Equipment—to be sure that the ground wire is connected to the proper terminal and to the non-current carrying metal parts of the equipment and that the ground wire is continuous from the equipment to the plug.
- 3.1.7 The tests may be conducted using the following instruments:
- A receptacle tester may be used to test receptacles and to test extension cords when plugged into a receptacle.
 - A continuity tester, or a volt-ohm meter, may be used to test equipment and to test extension cords when not plugged into a receptacle.
- 3.1.8 Records must be kept to show which items have passed the test and when the test was conducted. These records may be either written inspection logs, a color coding system using colored tape attached to the item, or some other effective means.
- 3.1.9 Color coding shall be used in the following manner:
- After a plug-connected piece of equipment or an extension cord has passed the test, colored tape is to be placed around the cord near the plug. After a temporary receptacle has passed the test, colored tape is to be placed on the cover plate.
 - Any set of colors may be used, with the exception of white, black, or silver.
 - If there has been no overall site requirements established by the general contractor, use the following colors for the test periods.

January, February, March	Red
April, May, June	Blue
July, August, September	Orange
October, November, December	Green

- 3.1.10 The tests administered every three months are to begin on the first working day of each quarter. Testing and color coding are to be continued until all items covered by this program have been tested. The test administered every six months, for those receptacles and extension cords needing only semi-annual testing, are to be color coded using the quarterly color current at the time of the semi-annual test.
- 3.1.11 A visual inspection of plug-connected equipment, extension cords, and temporary receptacles is to be made by the user before each use. The purpose of the visual inspection is to look for damage or defects that could affect the safe use of the item. (Exception: extension cords and temporary receptacles that are fixed in place and not exposed to damage are not required to be give a daily visual inspection, but it is a good idea to do the daily visual inspection anyway.)
- 3.1.12 Equipment, cords, or receptacles showing damage or defects that could affect its safe operation are not to be used. This applies not only to the visual inspection before each use but also applies to any evidence of damage observed any time during use. Damaged items are to be taken out of service and are not to be used until properly repaired and retested.
- 3.1.13 Equipment covered by this program is not to be used until the equipment has been tested and color coded according to the requirements of this program.
- 3.1.14 A copy of this program is to be kept at the worksite.

S3NA-302-WI3 Generator Safety Card

1.0 Objective/Overview

- 1.1 Portable generators should be used with extreme caution in order to prevent personal injury. When using a portable generator it is important to follow the manufacturer's instructions to avoid injuring someone or damaging your generator or appliances. Allow only trained, authorized personnel to operate the generator. Along with training, other safety measures include proper maintenance of equipment and personal protective equipment (PPE). Remember muscle strains are the most common injury associated with portable generators.



2.0 Safe Operating Guidelines:

- 2.1 Follow manufacturer's recommended operating instructions; every generator is not the same. Maintain adequate ventilation. Generators emit carbon monoxide (CO). Never operate a generator in an enclosed building without proper ventilation. Turn the generator off to refuel. Gasoline and its vapors may ignite if they come into contact with hot components or an electrical spark, so store fuel in a properly designed container in a secure location. To avoid a shock, make sure that your hands are dry and that you are standing in a dry place whenever you operate the generator. Turn off equipment and lights supplied by the generator until it is running. Use the right extension cord. Use only UL-listed, three-prong extension cords. Be sure the extension cord is the proper size (wire-gauge) to handle the electric load that will be plugged into it. Make sure the generator is properly grounded prior to each use. Using a portable generator to tie into the wiring of an existing structure shall be done only by a licensed electrician.

2.1.1 Potential Hazards:

- Lifting, carrying, and pulling starter cords.
- Burns from contact with the hot muffler or engine.
- Shocks/electrocution.
- Noise exposure.
- Inhaling exhaust gases, CO.

2.1.2 Training Requirements:

- Review of Applicable SOPs.
- Back Injury Prevention.
- Demonstrated knowledge on the use of a generator.
- Review of manufacturers operating guidelines.

2.1.3 Personal Protective Equipment (Level D PPE):

- Leather Gloves.
- Hearing Protection.
- Long Sleeve Shirt (i.e., to shield from burns, etc.).

2.1.4 Other Safety Tips:

- Have a Class A:B:C fire extinguisher readily available at all times.

S3NA-305-PR Hand and Power Tools

1.0 Purpose and Scope

- 1.1 Provides the AECOM requirements for all manually-operated hand and power tools and equipment use, handling and storage.
- 1.2 This procedure applies to all AECOM North America based employees and operations.

2.0 Terms and Definitions

- 2.1 None

3.0 Attachments

- 3.1 S3NA-305-GL Hand and Power Tools Guide
- 3.2 S3NA-305-WI1 Chainsaw Safety Card
- 3.3 S3NA-305-WI2 Circular Saw Safety Card
- 3.4 S3NA-305-WI3 Cut Off Saw Safety Card
- 3.5 S3NA-305-WI4 Hand-held Grinder Safety Card
- 3.6 S3NA-305-WI5 Impact Wrench Safety Card
- 3.7 S3NA-305-WI6 Nail Gun Safety Card
- 3.8 S3NA-305-WI7 Pentak Vacuum Safety Card
- 3.9 S3NA-305-WI8 Power Drill Safety Card
- 3.10 S3NA-305-WI9 Pressure Washer Safety Card
- 3.11 S3NA-305-WI10 Reciprocating Saw Safety Card
- 3.12 S3NA-305-WI11 Sander Safety Card
- 3.13 S3NA-305-WI12 Utility Knife Safety Card
- 3.14 S3NA-305-WI13 Wood Chipper Safety Card
- 3.15 S3NA-305-WI14 Clearing and Grubbing Equipment Safety Card
- 3.16 S3NA-305-WI15 Pneumatic Tools Safety Card
- 3.17 S3NA-305-WI16 Manual Hand Tools Safety Card
- 3.18 S3NA-305-WI17 Small Engines Safety Card
- 3.19 S3NA-305-WI18 Electric and Battery Powered Hand Tools Safety Card

4.0 Procedure

4.1 Roles and Responsibilities

- 4.1.1 **Project Managers/Field Task Managers/Supervisors.** Each **Manager/Supervisor** must 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 this work instruction section of this SOP, appropriate guidelines shall be established prior to work associated with that equipment, including following manufacturer's recommendations.
- 4.1.2 **Region SH&E Manager** provides technical guidance and support as to this procedure.
- 4.1.3 **Employees.** **Employees** shall not work with any tool that they are not familiar with without first obtaining training associated with that equipment. In addition, **employees** must following manufacturer's recommendations for its use and must not modify the equipment without first obtaining authorization from the manufacturer.

4.2 **Restrictions**

- 4.2.1 No **employee** shall use any hand tool, unless they are familiar with the use and operation of the equipment or have received specific instruction on its use and operation.
- 4.2.2 All tools will be used in accordance with manufacturer's specifications.

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.

4.4 **Personal Protective Equipment**

- 4.4.1 Lockout devices (padlocks, multiple lock hasps, tags), gloves appropriate to the task, safety-toed boots, as required, hard hats and eye & face protection, as required.

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 or identified as such. Tagged tools will be returned to your supervisor for repair or replacement. Tagged tools will be immediately removed from service.
- 4.5.2 All tools must be inspected to manufacture's specifications according to tool rests and guard adjustment tolerances. All tools will be inspected to ascertain that all safety devices are present and functioning properly.

5.0 **Records**

- 5.1 None

6.0 **References**

- 6.1 S3NA-208-PR Personal Protective Equipment Program
- 6.2 S3NA-302-PR Electrical, General
- 6.3 S3NA-305-GL1 Hand and Power Tools
- 6.4 S3NA-410-PR Hazardous Energy Control
- 6.5 S3NA-510-PR Hearing Conservation Program

S3NA-305-GL Hand and Power Tools

1.0 Exposure

- 1.1 Employees who use hand and power tools and are exposed to the hazards of falling, flying, abrasive, and splashing objects, or to harmful dusts, fumes, mists, vapors, or gases must be provided with the appropriate personal protective equipment.

2.0 Basic Safety rules

- 2.1 Keep all tools in good condition with regular maintenance.
- 2.2 Use the right tool for the job.
- 2.3 Examine each tool for damage before use and do not use damaged tools.
- 2.4 Operate tools according to the manufacturers' instructions.
- 2.5 Provide and use properly the right personal protective equipment.
- 2.6 All electrical connections for these tools must be suitable for the type of tool and the working conditions (wet, dusty, flammable vapors).
- 2.7 When a temporary power source is used for construction a ground-fault circuit interrupter should be used
- 2.8 Eye protection is required, and head and face protection is recommended for employees working with pneumatic tools.
- 2.9 Screens must also be set up to protect nearby workers from being struck by flying fragments around chippers, riveting guns, staplers, or air drills.
- 2.10 Compressed air guns should never be pointed toward anyone.
- 2.11 Workers should never "dead-end" them against themselves or anyone else.
- 2.12 A chip guard must be used when compressed air is used for cleaning.
- 2.13 Use of heavy jackhammers can cause fatigue and strains. Heavy rubber grips reduce these effects by providing a secure handhold.
- 2.14 Workers operating a jackhammer must wear safety glasses and safety shoes that protect them against injury if the jackhammer slips or falls. A face shield also should be used.
- 2.15 Noise hazard associated with pneumatic tools. Working with noisy tools such as jackhammers requires proper, effective use of appropriate hearing protection.

3.0 Hazard Prevention Sharp Objects

- 3.1 Employees, when using saw blades, knives, or other tools, should direct the tools away from aisle areas and away from other employees working in close proximity.
- 3.2 Knives and scissors must be sharp; dull tools can cause more hazards than sharp ones.
- 3.3 Cracked saw blades must be removed from service.
- 3.4 Wrenches must not be used when jaws are sprung to the point that slippage occurs.
- 3.5 Impact tools such as drift pins, wedges, and chisels must be kept free of mushroomed heads.
- 3.6 The wooden handles of tools must not be splintered.
- 3.7 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 should be used where flammable gases, highly volatile liquids, and other explosive substances are stored or used.

4.0 Hazard Prevention of Power tools

4.1 Precautions

- 4.1.1 Never carry a tool by the cord or hose.
- 4.1.2 Never yank the cord or the hose to disconnect it from the receptacle.
- 4.1.3 Keep cords and hoses away from heat, oil, and sharp edges.
- 4.1.4 Disconnect tools when not using them, before servicing and cleaning them, and when changing accessories such as blades, bits, and cutters.
- 4.1.5 Keep all people not involved with the work at a safe distance from the work area.
- 4.1.6 Secure work with clamps or a vise, freeing both hands to operate the tool.
- 4.1.7 Avoid accidental starting. Do not hold fingers on the switch button while carrying a plugged-in tool.
- 4.1.8 Maintain tools with care; keep them sharp and clean for best performance.
- 4.1.9 Follow instructions in the user's manual for lubricating and changing accessories.
- 4.1.10 Be sure to keep good footing and maintain good balance when operating power tools.
- 4.1.11 Wear proper apparel for the task. Loose clothing, ties, or jewelry can become caught in moving parts.
- 4.1.12 Remove all damaged portable electric tools from use and tag them: "Do Not Use."

4.2 Guards

- 4.2.1 The exposed moving parts of power tools need to be safeguarded. Belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains, or other reciprocating, rotating, or moving parts of equipment must be guarded.
- 4.2.2 Machine guards, as appropriate, must be provided to protect the operator and others from the following:
 - Point of operation.
 - In-running nip points.
 - Rotating parts.
 - Flying chips and sparks.
- 4.2.3 Safety guards must never be removed when a tool is being used. Portable circular saws having a blade greater than 2 inches (5.08 centimeters) in diameter must be equipped at all times with guards.
- 4.2.4 An upper guard must cover the entire blade of the saw.
- 4.2.5 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.

5.0 Operating Controls and Switches

- 5.1 The following hand-held power tools must be equipped with a constant-pressure switch or control that shuts off the power when pressure is released: drills; tappers; fastener drivers; horizontal, vertical, and angle grinders with wheels more than 2 inches (5.08 centimeters) in diameter; disc sanders with discs greater than inches (5.08 centimeters); belt sanders; reciprocating saws; saber saws, scroll saws, and jigsaws with blade shanks greater than 1/4-inch (0.63 centimeters) wide; and other similar tools.
- 5.2 These tools also may be equipped with a "lock-on" control, if it allows the worker to also shut off the control in a single motion using the same finger or fingers.
- 5.3 The following hand-held power tools must be equipped with either a positive "on-off" control switch, a constant pressure switch, or a "lock-on" control:
 - 5.3.1 Disc sanders with discs 2 inches (5.08 centimeters) or less in diameter.
 - 5.3.2 Grinders with wheels 2 inches (5.08 centimeters) or less in diameter.

- 5.3.3 Platen sanders, routers, planers, laminate trimmers, nibblers, shears, and scroll saws; and jigsaws, saber and scroll saws with blade shanks a nominal 1/4-inch (6.35 millimeters) or less in diameter.
- 5.3.4 It is recommended that the constant-pressure control switch be regarded as the preferred device.
- 5.3.5 Other hand-held power tools such as circular saws having a blade diameter greater than 2 inches (5.08 centimeters), chain saws, and percussion tools with no means of holding accessories securely must be equipped with a constant-pressure switch.

6.0 Electrical Shock Caution

- 6.1 Electrical shocks, which can lead to injuries such as heart failure and burns, are among the major hazards associated with electricpowered tools. Under certain conditions, even a small amount of electric current can result in fibrillation of the heart and death.
- 6.2 An electric shock also can cause the user to fall off a ladder or other elevated work surface and be injured due to the fall.
- 6.3 To protect the user 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 lowvoltage isolation transformer.
- 6.4 Three-wire cords contain two currentcarrying 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.
- 6.5 The third prong must never be removed from the plug.
- 6.6 Double-insulated tools are available that provide protection against electrical shock without third-wire grounding. On doubleinsulated tools, an internal layer of protective insulation completely isolates the external housing of the tool.

7.0 Electric Tools General Practice

- 7.1 Operate electric tools within their design limitations.
- 7.2 Use gloves and appropriate safety footwear when using electric tools.
- 7.3 Store electric tools in a dry place when not in use.
- 7.4 Do not use electric tools in damp or wet locations unless they are approved for that purpose.
- 7.5 Keep work areas well lighted when operating electric tools. Ensure that cords from electric tools do not present a tripping hazard.
- 7.6 In the construction industry, employees who use electric tools must be protected by ground-fault circuit interrupters or an assured equipment-grounding conductor program.

8.0 Pneumatic Tools (powered by compressed air)

- 8.1 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.
- 8.2 Pneumatic tools must be checked to see that the tools are fastened securely to the air hose to prevent them from becoming disconnected.
- 8.3 A short wire or positive locking device attaching the air hose to the tool must also be used and will serve as an added safeguard.
- 8.4 If an air hose is more than 1/2-inch (12.7 millimeters) 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.
- 8.5 In general, the same precautions should be taken with an air hose that are recommended for electric cords, because the hose is subject to the same kind of damage or accidental striking, and because it also presents tripping hazards.
- 8.6 When using pneumatic tools, a safety clip or retainer must be installed to prevent attachments such as chisels on a chipping hammer from being ejected during tool operation.

- 8.7 Pneumatic tools 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 special device to keep fasteners from being ejected, unless the muzzle is pressed against the work surface.
- 8.8 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.

9.0 Liquid Fuel Tools (operated with gasoline)

- 9.1 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.
- 9.2 Before refilling a fuel-powered tool tank, the user must shut down the engine and allow it to cool to prevent accidental ignition of hazardous vapors.
- 9.3 When a fuel-powered tool is used inside a closed area, effective ventilation and/or proper respirators such as atmosphere-supplying respirators must be utilized to avoid breathing carbon monoxide.
- 9.4 Noise hazards associated with gasoline engines must be mitigated by proper hearing protection utilization. Ear Plugs, ear muffs or a combination of the two must be used to protect workers from excessive noise levels.
- 9.5 Fire extinguishers must also be available in the area.

10.0 Hydraulic Power Tools (fluid run)

- 10.1 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.
- 10.2 The manufacturer's recommended safe operating pressure for hoses, valves, pipes, filters, and other fittings must not be exceeded.
- 10.3 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. Also, the manufacturer's load limit must be permanently marked in a prominent place on the jack, and the load limit must not be exceeded.
- 10.4 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.
- 10.5 To set up a jack, make certain of the following:
 - 10.5.1 The base of the jack rests on a firm, level surface;
 - 10.5.2 The jack is correctly centered;
 - 10.5.3 The jack head bears against a level surface; and
 - 10.5.4 The lift force is applied evenly.
- 10.6 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:
 - 10.6.1 For jacks used continuously or intermittently at one site—inspected at least once every 6 months;
 - 10.6.2 For jacks sent out of the shop for special work—inspected when sent out and inspected when returned; and
 - 10.6.3 For jacks subjected to abnormal loads or shock—inspected before use and immediately thereafter.

S3NA-305-WI1 Chainsaw Safety Card

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 begins with training.
- 1.3 Additional safety measures include proper training, good body mechanics and felling technique, well-maintained equipment, and protective clothing.



2.0 Safe Operating Guidelines

- 2.1 A sharp chainsaw is safer than a dull one. Keep the saw clean, lubricated, and adjusted. Before starting work inspect and test the chain brake, chain catch, throttle lock, handles and guards, all nuts and bolts, spark arrestor, and muffler and air filter. The chain tension should be properly adjusted and the carburetor tuned. Never "drop start" the saw.
- 2.2 A chainsaw is not only dangerous to the operator but to those around him. Keep the saw close to the body. Bend from the knees, not the waist. Improper lifting techniques and poor posture contribute to injuries.

3.0 Potential Hazards

- 3.1 Kickback – Sudden and violent reverse movement of the saw
- 3.2 Hand / arm vibration syndrome
- 3.3 Flying / falling debris
- 3.4 Severe cuts

4.0 Training Requirements

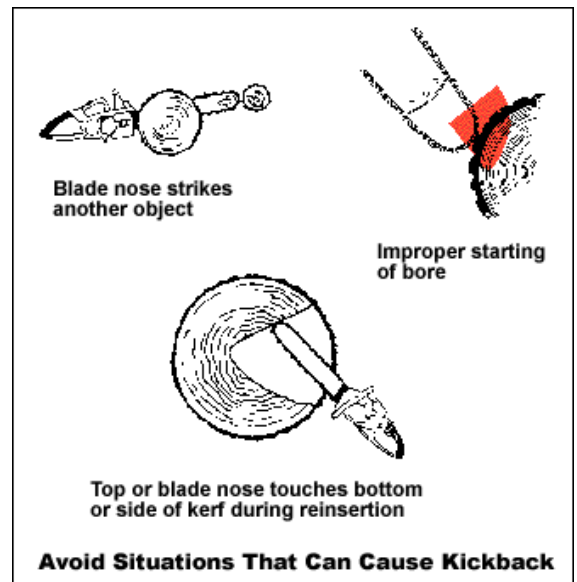
- 4.1 Review of Applicable SOPs
- 4.2 Demonstrated knowledge on the use of a chainsaw
- 4.3 Review of manufacturers operating guidelines

5.0 Personal Protective Equipment (Level D PPE)

- 5.1 Debris Shield
- 5.2 Chainsaw Chaps
- 5.3 Leather Gloves
- 5.4 Hearing Protection

6.0 Other Safety Tips

- 6.1 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.
- 6.2 Determine where the tree/limb will fall prior to cutting. Always ensure that personnel and equipment are not in the path the falling tree/log, and that you have time to move away. If necessary, flag/or fence off the area to prevent entry.



- 6.3 Always stand to one side of the limb you are to cut, never straddle it.
- 6.4 Always keep in mind where the chain will go if it breaks, never position yourself or other people in line with the chain.
- 6.5 Keep the chain out of the dirt, debris will fly, the teeth will be dulled and the chain life shortened.

S3NA-305-WI2 Circular Saw Safety Card

1.0 Objective / Overview

- 1.1 Among professionals, the circular saw is probably the most commonly used powered saw and perhaps the most commonly abused. Familiarity should not breed carelessness.
- 1.2 Safe measures include proper training, good body mechanics and felling technique, well-maintained equipment, and protective equipment.
- 1.3 The circular saw is used in cutting wood products (i.e., plywood, construction lumber, etc.).



2.0 Safe Operating Guidelines

- 2.1 Use sharp blades. Dull blades cause binding, stalling and possible kickback.
- 2.2 Use the correct blade for the application and check for proper operation before each cut.
- 2.3 Check often to ensure that guards return to their normal position quickly. Never defeat the guard to expose the blade.
- 2.4 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.
- 2.5 For maximum control, hold the saw firmly with both hands after securing the work piece.
- 2.6 Check frequently to be sure clamps remain secure.
- 2.7 Avoid cutting small pieces that can't be properly secured and material on which the saw shoe can't properly rest.
- 2.8 When you start the saw, allow the blade to reach full speed before contacting the work piece.

3.0 Potential Hazards

- 3.1 Kickback – Sudden and violent reverse movement of the saw
- 3.2 Hearing loss
- 3.3 Flying debris
- 3.4 Severe cuts

4.0 Training Requirements

- 4.1 Review of Applicable SOPs.
- 4.2 Demonstrated knowledge on the use of a circular saw.
- 4.3 Review and follow manufacturer's operating guidelines.



5.0 Personal Protective Equipment (Level D PPE)

5.1 Leather Gloves

5.2 Hearing Protection

6.0 Other Safety Tips

6.1 Circular saws are designed for right-hand operation; left-handed operation will demand more care to operate safely.

6.2 Disconnect power supply before adjusting or changing the blade.

6.3 Do not place hand under or in front of the shoe or guard of the saw when operating.

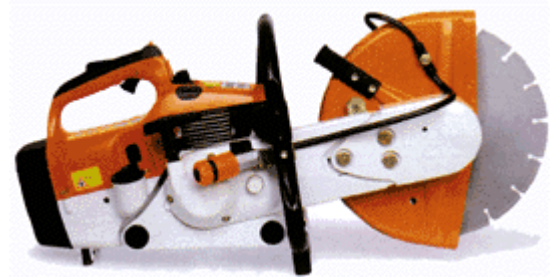
6.4 Cut at the proper depth ($\frac{1}{4}$ in.) below work surface (see picture).

6.5 Circular saw must be double-insulated or protected by a GFCI.

S3NA-305-WI3 Cut Off Saw Safety Card

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, PPE 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 Safe Operating Guidelines

- 2.1 **Starting** - Start the saw on firm ground or other solid surface in an open area. Never attempt to drop-start the engine. Clear the working area. Avoid operating the saw if the terrain is wet and/or frozen.
- 2.2 **Handling** - 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*. Carry the saw with engine stopped, muffler away from your body, while protecting the cutting wheel from striking the ground or other objects.
- 2.3 **Cutting** - Begin cutting at full throttle and continue at full throttle until the cut is finished. Avoid standing in a direct line with the cutting wheel. Use only downward pressure on the saw, as lateral pressure may cause the blade to break and shatter. Do not change the direction of the cut once started, as this can also cause the blade to break and shatter. Do not use abrasive-type wheels for rough grinding. Do not cut above shoulder height.
- 2.4 **Maintenance** - Shut off the engine and remove the spark plug wire before adjusting or working on the saw.
- 2.5 Hearing loss
- 2.6 Flying debris
- 2.7 Severe cuts
- 2.8 Burns from engine
- 2.9 Fire Hazard from sparks and gasoline
- 2.10 Hand / arm vibration syndrome

3.0 Potential Hazards

- 3.1 Kickback – Sudden and violent reverse movement of the saw

4.0 Training Requirements

- 4.1 Review of Applicable SOPs
- 4.2 Demonstrated knowledge on the use of a cut off saw
- 4.3 Review and follow manufacturers operating guidelines



302BA058 KN

Never drop-start saw

5.0 Personal Protective Equipment (Level D PPE)

- 5.1 Face shield
- 5.2 Chainsaw Chaps
- 5.3 Leather gloves
- 5.4 Hearing protection: earplugs and/or earmuffs

5.5 Respirator if required (concrete operations)

6.0 Other Safety Tips

6.1 Keep flammable and combustible materials away from saw while cutting metal.

6.2 Make sure the fuel cap is properly secured.

6.3 Inspect the abrasive wheel for cracks and chips. If cracked or chip replace wheel before use.

6.4 Ensure guard is positioned properly prior to start-up (*S3NA-411-PR Machine Guarding*).

6.5 Never try to drop-start the engine (see picture).

S3NA-305-WI4 Hand-Held Grinder Safety Card

1.0 Objective / Overview

- 1.1 Hand held 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 Flying debris.
- 2.3 Severe cuts.
- 2.4 Fire Hazard from sparks igniting nearby debris or objects.
- 2.5 Hand / arm vibration syndrome.



3.0 Safe Operating Guidelines

- 3.1 Basic safety rules can help prevent hazards associated with the use of hand-held grinders:
 - 3.1.1 Never carry the tool by the cord (or the hose for pneumatic tools).
 - 3.1.2 Never yank the cord or the hose to disconnect the tool from the receptacle.
 - 3.1.3 Keep cords and hoses away from heat, oil, and sharp edges.
 - 3.1.4 Denergize tools when not in use, before servicing, and when changing accessories such as blades/bits/cutters.
 - 3.1.5 All observers should be kept at a safe distance from the work area.
 - 3.1.6 Always secure work with clamps or a vise, freeing both hands to operate the tool.
 - 3.1.7 Avoid accidental starting; do not hold a finger on the trigger/switch while carrying a powered tool.
 - 3.1.8 Tools should 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.
 - 3.1.9 Be sure to keep your footing and maintain proper balance.
 - 3.1.10 The proper apparel should be worn. Loose clothing or jewelry can become caught in moving parts.
 - 3.1.11 Inspect the tool before every use. Damaged tools must be removed from use and tagged "DO NOT USE".

4.0 Training Requirements

- 4.1 Review applicable SOPs.
- 4.2 Demonstrated knowledge on the use of a hand-held grinder.
- 4.3 Follow manufacturers operating guidelines, especially for proper grinding wheel attachment.

5.0 Personal Protective Equipment

- 5.1 Leather gloves
- 5.2 Safety glasses with sideshields
- 5.3 Hearing protection: earplugs and/or earmuffs
- 5.4 Other PPE as necessary for the worksite/activity

6.0 Other Safety Tips

- 6.1 Keep flammable and combustible materials away from the grinder.
- 6.2 Have a fire extinguisher on hand while using grinder.
- 6.3 Inspect the abrasive wheel for cracks and chips. If cracked or chipped replace wheel before use.
- 6.4 Ensure safety guard(s) is positioned properly prior to start-up.
- 6.5 Never clamp a hand held grinder in a vice.

S3NA-305-WI5 Impact Wrench Safety Card

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 Safe Operating Guidelines

- 2.1 Drain water from air compressor tank and condensation from air lines.
- 2.2 Disconnect the tool from the air supply before lubricating or changing sockets. Impact wrench sockets and accessories must be used with this tool.
- 2.3 Do not use hand sockets and accessories. Select the required impact socket.
- 2.4 Connect tool to air hose of recommended size. The use of a quick connect set makes connecting easier.
- 2.5 Never use a wire, soft pin, or nail to hold the socket onto the square spindle of the impact wrench.
- 2.6 If the proper retaining device on the tool is broken, the tool should be repaired.
- 2.7 On applications where a low or critical level of torque is required, it is recommended that you impact each fastener lightly, and then perform the final tightening with a hand torque wrench.

3.0 Potential Hazards

- 3.1 Flying debris
- 3.2 Hearing loss
- 3.3 Cuts
- 3.4 Hand / arm vibration syndrome

4.0 Training Requirements

- 4.1 Review of Applicable SOPs.
- 4.2 Demonstrated knowledge on the use of a electric drill.
- 4.3 Review and follow manufacturers operating guidelines.

5.0 Personal Protective Equipment (Level D PPE)

- 5.1 Leather gloves/anti-vibration gloves
- 5.2 Hearing protection

6.0 Other Safety Tips

- 6.1 Be sure no one is below when using the tool in high locations.
- 6.2 The proper fastening torque may differ depending upon the kind or size of the bolt.
- 6.3 Check the torque with a torque wrench.

S3NA-305-WI6 Nail Gun Safety Card

1.0 Objective / Overview

- 1.1 Nail guns are useful tools, but must be handled with care, and 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 Safe Operating Guidelines

- 2.1 Watch out for other crewmembers working near you.
- 2.2 Never let an inexperienced crewmember use a nail gun without supervised training.
- 2.3 Never use bottled gas as a power source for pneumatic tools.
- 2.4 Disconnect a nail gun before you service it.
- 2.5 Hold your hand a good 12 inches back from the ends of studs or joists when you are nailing.
- 2.6 Keep the gun properly aligned with your work both vertically and horizontally.
- 2.7 Never nail with the gun pointed toward you or anyone else on the job.
- 2.8 Never try to nail beyond your reach.

3.0 Potential Hazards

- 3.1 Flying debris/nails
- 3.2 Imbedded object
- 3.3 Puncture wounds

4.0 Training Requirements

- 4.1 Review of Applicable SOPs.
- 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 Leather gloves
- 5.2 Hearing protection

6.0 Other Safety Tips

- 6.1 When you are moving about the work area - keep your finger off the trigger until you are ready to fire. Make sure you have only placed the nose guard against the material you are going to nail together.
- 6.2 Never rest the gun against any part of your body, or try to climb a ladder with the gun cradled against your body.
- 6.3 Be aware of what is located behind the nailing surface. Never place hands or other body parts directly behind the nailing surface.
- 6.4 Use only for intended work.
- 6.5 Avoid nailing into knots as nail can splinter wood.
- 6.6 Never disable safety tip on gun.



S3NA-305-WI7 Pentak Vacuum Safety Card

1.0 Objective / Overview

- 1.1 Pentek's dustless decontamination system 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, PCBs, 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 kW generator and an air compressor (minimum 350 ft³ capacity), as well as a drum grapple for drum handling activities.



Worker is using the roto-peen (scabblers) attachment; VAC-PAC collection system shown with 55 gal drum.

2.0 Safe Operating Guidelines

- 2.1 Prior to use, a pre-operation inspection must be completed to determine if the unit is in safe working condition.
- 2.2 The vacuum unit should be placed a minimum of 50 feet away from the work area.
- 2.3 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.
- 2.4 Two workers should be used to maneuver the unit into place.
- 2.5 A minimum 10 ft clearance will be established around the unit while in operation.
- 2.6 Workers should be aware of their position in relation to the hoses and cable to minimize tripping hazards.
- 2.7 A competent person will train each worker in the operation of the unit.
- 2.8 Maintenance in excess of preventive maintenance activities (e.g., lubrication) will be performed by manufacturer personnel ONLY.

3.0 Potential Hazards

- 3.1 Hazardous noise
- 3.2 Vibration
- 3.3 Tripping hazard from cables and hoses
- 3.4 Hot surfaces (vacuum unit)
- 3.5 Electrical (high voltage)
- 3.6 Pinch hazard
- 3.7 Back strain
- 3.8 High pressure air

4.0 Personal Protective Equipment (Level D ensemble)

- 4.1 Leather gloves (maintenance)

- 4.2 Tyvek suit (with hood)
- 4.3 Vibration gloves (operation)
- 4.4 Hearing protection (plugs or muffs)

5.0 Other Safety Tips

- 5.1 Always know where the emergency stop is located.
- 5.2 Operators of a motorized drum grapppler must be trained IAW the powered industrial truck standard.
- 5.3 Review *S3NA-302-PR Electrical, General* prior to refueling the electrical generator and/or compressor.

S3NA-305-WI8 Power Drill Safety Card

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'll need to carefully check your drill's capacity limitations and accessory recommendations.

2.0 Safe Operating Guidelines

- 2.1 Check carefully for loose power cord connections and frays or damage to the cord.
- 2.2 Replace damaged tool and extension cords immediately.
- 2.3 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.
- 2.4 The chuck key must be removed from the chuck before starting the drill.
- 2.5 A flying key can be an injury-inflicting missile.
- 2.6 Check auxiliary handles, if part of the tool. Be sure they are securely installed.
- 2.7 Always use the auxiliary drill handle when provided. It gives you more control of the drill, especially if stalled conditions occur.
- 2.8 Grasp the drill firmly by insulated surfaces.
- 2.9 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.
- 2.10 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.

3.0 Potential Hazards

- 3.1 Electrical shock
- 3.2 Leaving chuck wrench in tool
- 3.3 Puncture wounds
- 3.4 Flying debris
- 3.5 Severe cuts
- 3.6 Fire
- 3.7 Burns (hot bits)
- 3.8 Sprains/strains (wrist)



4.0 Training Requirements

- 4.1 Review of Applicable SOPs.
- 4.2 Demonstrated knowledge on the use of a power drill.
- 4.3 Review and follow manufacturers operating guidelines.

5.0 Personal Protective Equipment (Level D PPE)

5.1 Leather Gloves

6.0 Other Safety Tips

6.1 Electric drills must be double-insulated or plugged into a GFCI outlet.

6.2 Never carry tool by cord or yank it to disconnect from receptacle.

6.3 Keep cord away from sharp edges.

S3NA-305-WI9 Pressure Washer Safety Card

1.0 Objective / Overview

- 1.1 High pressure washers can operate up to pressures of 5,000 psi and come in a variety of types ranging from gas operated to electrical. If not used correctly and safely, pressure washers can be dangerous piece of work equipment.
- 1.2 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 Safe Operating Guidelines

- 2.1 The gun valve must always be pointed at the work area, NEVER point the gun valve at yourself or another person.
- 2.2 High pressure washers shall be used to clean or decontaminate equipment, surfaces or structures only.
- 2.3 High pressure washers WILL NOT be used to clean or decontaminate workers or personal protective equipment while it is being worn.
- 2.4 Always set the tripper safety lock when the gun valve is not in use.

3.0 Training Requirements

- 3.1 Review of Applicable SOPs
- 3.2 Demonstrated knowledge on the use of a pressure washer
- 3.3 Review of manufacturers operating guidelines

4.0 Potential Hazards

- 4.1 Kickback – Sudden and violent reverse movement of the gun
- 4.2 Flying debris
- 4.3 Slips and trips on wet surfaces and hoses
- 4.4 Exhaust fumes/carbon monoxide (CO) in enclosed spaces
- 4.5 Severe cuts



5.0 Personal Protective Equipment (Level D PPE)

- 5.1 Hard hat with faceshield
- 5.2 Heavy gloves
- 5.3 Hearing protection
- 5.4 PVC (or equivalent) rain suit

6.0 Other Safety Tips

- 6.1 Never fill a pressure washer fuel tank with fuel while the engine is running or if the engine is still hot.
- 6.2 Non-operators must remain a minimum of 25 feet from the operator.
- 6.3 High pressure washing equipment should be cleaned often to avoid dirt buildup, especially around the trigger and guard area.

- 6.4 Always set the trigger safety lock when the gun valve is not in use.
- 6.5 Relieve the pressure in the system before coupling and uncoupling hoses.
- 6.6 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.

S3NA-305-WI10 Reciprocating Saw Safety Card

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 Safe Operating Guidelines

- 2.1 Use sharp blades. Dull blades can produce excessive heat, make sawing difficult, result in forcing the tool, and possibly cause an accident.
- 2.2 Position yourself to maintain full control of the tool, and avoid cutting above shoulder height.
- 2.3 To minimize blade flexing and provide a smooth cut, use the shortest blade that will do the job.
- 2.4 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.
- 2.5 Maintain firm contact between the saw's shoe and the material being cut.
- 2.6 When making a "blind" cut (you can't see behind what is being cut), be sure that hidden electrical wiring, or water pipes are not in the path of the cut.
- 2.7 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.
- 2.8 Water pipes must be drained and capped.
- 2.9 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.
- 2.10 Different work surfaces demand different blades.

3.0 Potential Hazards

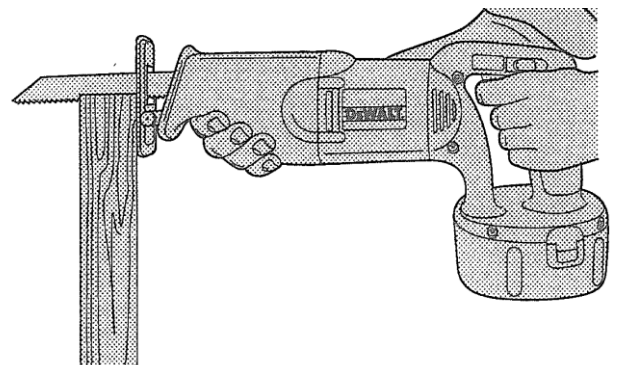
- 3.1 Flying debris
- 3.2 Hearing loss
- 3.3 Cuts
- 3.4 Hand / arm vibration syndrome

4.0 Training Requirements

- 4.1 Review of Applicable SOPs
- 4.2 Demonstrated knowledge on the use of a reciprocating saw
- 4.3 Review and follow manufacturers operating guidelines

5.0 Personal Protective Equipment (Level D PPE)

- 5.1 Leather Gloves/anti-vibration gloves
- 5.2 Hearing protection



The correct way to hold the reciprocating saw while operating.

6.0 Other Safety Tips

- 6.1 Do not operate reciprocating saw in explosive atmospheres.
- 6.2 Do not overreach. Keep proper footing and balance at all times.
- 6.3 Do not use tool if switch is not operating correctly.
- 6.4 Check for misalignment or binding of moving parts, breakage or parts and any other condition that may affect the tool's operation.
- 6.5 Always use two hands to operate saw (see picture).

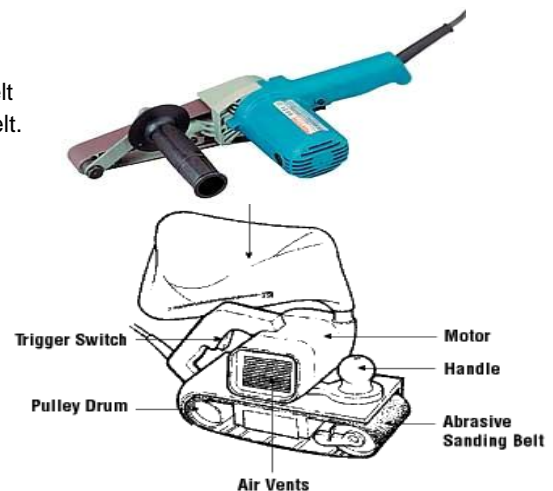
S3NA-305-WI11 Sander Safety Card

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 PPE selection.

2.0 Safe Operating Guidelines

- 2.1 Make sure the sander is switched "OFF" before connecting the power supply. Disconnect power supply before changing a sanding belt, making adjustments, or emptying dust collector. Inspect sanding belts before using them.
- 2.2 Replace those belts that are worn or frayed. Install sanding belts that are the same widths as the pulley drum.
- 2.3 Adjust sanding belt tension to keep the belt running true and at the same speed as pulley drum.
- 2.4 Secure the sanding belt in the direction shown on the belt and the machine. Keep hands away from the sanding belt.
- 2.5 Use two hands to operate sanders – one on the trigger and the other on the front handle knob.
- 2.6 Clean dust from the motor and vents on a regular basis.
- 2.7 Do not use a sander without an exhaust system or dust collector present that is in good working order.
- 2.8 Empty the collector when $\frac{1}{4}$ full.
- 2.9 Do not exert excessive pressure on a moving sander. The weight of the sander provides adequate pressure for the job.
- 2.10 Do not work on unsecured stock unless it is heavy enough to stay in place.
- 2.11 Do not overreach. Always keep proper footing and balance.
- 2.12 Do not cover air vents of the sander.
- 2.13 Check often to ensure that guards are in their normal position.
- 2.14 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 GFCI.



3.0 Potential Hazards

- 3.1 Kickback – Sudden and violent reverse of the sander
- 3.2 Hearing loss
- 3.3 Flying debris
- 3.4 Severe abrasive cuts
- 3.5 Electrocutation
- 3.6 Explosion/fire hazard from the dust

4.0 Training Requirements

- 4.1 Review of Applicable SOPs.
- 4.2 Review and follow manufacturers operating guidelines.

5.0 Personal Protective Equipment (Level D PPE)

- 5.1 Hearing protection
- 5.2 Leather gloves

S3NA-305-WI12 Utility Knife Safety Card

1.0 Objective / Overview

- 1.1 Utility knives serve a variety of purposes at worksites, and can be a useful tool, when used safely and correctly.
- 1.2 Learning proper positioning and correctly using a utility knife will drastically reduce the potential of cut related injuries.

2.0 Safe Operating Guidelines

- 2.1 Always be sure that knives are sharp and not dull. A dull blade will require more force to cut, increasing the likelihood of slipping.
- 2.2 Be sure to blade is seated in the frame of the knife correctly, closed, and fastened together properly.
- 2.3 Always keep body parts away from the cut line, (e.g., fingers), and ensure that the material being cut is on firm ground and not against a body part (e.g. cutting rope against your leg).
- 2.4 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).
- 2.5 Always retract the blade when not in use.

3.0 Potential Hazards

- 3.1 Lacerations from direct contact with the blade
- 3.2 Lacerations from blade breaking or shattering
- 3.3 Ergonomics



4.0 Training Requirements

- 4.1 Review of Applicable SOPs.
- 4.2 Review of client specific requirements.
- 4.3 Demonstrated knowledge on the safe use of a utility knives.
- 4.4 Review and follow manufacturers operating guidelines for specialized or unusual knives.

5.0 Personal Protective Equipment (Level D PPE)

- 5.1 Cut resistant gloves (Kevlar, thick leather, etc.).

6.0 Other Safety Tips

- 6.1 Purchase safety equipped utility knives with guarding or automatically retracting blades.
- 6.2 Replace dull blades – When knife begins to tear rather than cut, it is a good indicator the blade is dull.
- 6.3 Always wear a cut resistant glove on your free hand.
- 6.4 Always use the right tool for the job – NEVER use the blade as a screwdriver or prying tool.
- 6.5 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.
- 6.6 When changing blades, always handle from the non-sharp side. Cover blade with duct tape and dispose.
- 6.7 Use an alternate tool when possible (scissors, wire cutters, etc.).



Utility Knives with Guarding

S3NA-305-WI13 Wood Chipper Safety Card

1.0 Objective / Overview

- 1.1 Wood chippers should be used with extreme caution in order to prevent personal injury, as the wood chipper is open to receive tree branches and other wooden material.
- 1.2 AECOM only allows trained, authorized personnel to operate the wood chipper.
- 1.3 Along with training, other safety measures include: reviewing the manufacturers instructional booklet, proper maintenance of equipment, and personal protective equipment.

2.0 Safe Operating Guidelines

- 2.1 The operator must be completely familiar with the controls and proper use of the equipment.
- 2.2 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 braches feeding into the machine.
- 2.3 Prior to use, make sure all safety devices and controls, such as emergency shut-off devices, are tested and verified to be functioning properly.
- 2.4 Make sure two workers (buddy system) are in close contact with each other when operating the chipper.

3.0 Potential Hazards

- 3.1 Burns from contact with the hot muffler or engine
- 3.2 Flying debris
- 3.3 Noise exposure
- 3.4 Inhaling exhaust fumes
- 3.5 Entanglement in limbs and contact with chipper blades



4.0 Training Requirements

- 4.1 Review of Applicable SOPs.
- 4.2 Demonstrated knowledge on the use of a wood chipper.
- 4.3 Review of manufacturers operating guidelines.

5.0 Personal Protective Equipment (Level D PPE)

- 5.1 Leather gloves
- 5.2 Hearing protection
- 5.3 Debris shield
- 5.4 Long sleeve shirt (e.g. working near poison ivy, poison oak, etc.)

6.0 Other Safety Tips

- 6.1 Stand to the side of the chipper while inserting limbs into chipper, never stand directly in front.
- 6.2 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.

- 6.3 Bystanders should be kept at least 25 feet away when in operation.
- 6.4 Keep the area around the wood chipper free of tripping hazards.
- 6.5 Never wear loose clothing that may get caught on feed material or moving parts.
- 6.6 Always set the trigger safety lock when the gun valve is not in use.
- 6.7 Never fill the fuel tank while the engine is running or if the engine is still hot.

S3NA-305-WI14 Clearing and Grubbing Equipment Safety Card

In accordance with 29 CFR 1910.266, the following safety precautions will be followed during site clearing and tree felling:

1.0 Hand Tools

- 1.1 All hand tools shall be in safe condition. Tools shall be inspected by the user daily.
- 1.2 Handles shall be sound, straight and tight-fitting.
- 1.3 Driven tools shall be dressed to remove any mushrooming.
- 1.4 Cutting tools shall be kept sharp and properly shaped.
- 1.5 All clearing activities shall terminate during electrical storms and periods of high winds.
- 1.6 Dead, broken or rotted limbs or trees (widow makers) shall be felled first.
- 1.7 Always wear the appropriate Personal Protective Equipment (PPE) when using hand tools, particularly eye and hand protection.
- 1.8 Use the right tool that is being used for the job to reduce chance of unexpected occurrences. Do not submit or use makeshift tools.
- 1.9 Defective tools shall not be used. They shall be taken out of service until repaired or replaced.
- 1.10 Check tools for damage or wear prior to each use to reduce chance of unexpected occurrences.
- 1.11 Replace cracked or broken handles on files, hammers, screwdrivers, or sledges.
- 1.12 Replace worn jaws on wrenches, pipe tools, and pliers
- 1.13 Redress burred or mushroomed heads on striking tools.
- 1.14 Sharpen cutting tools frequently to reduce chance of unexpected occurrences.
- 1.15 Store hand tools properly after each use.
- 1.16 Tools shall be clean and dry to avoid slippage when in use.
- 1.17 Never leave tools on ladders, scaffolds, or overhead work areas when they are not in use (a high number of injuries occur from objects/tools falling from overhead work areas in construction).
- 1.18 Always keep tools being used in overhead work areas in containers that will prevent them from falling.
- 1.19 Carry tools using a heavy belt or apron and hang tools at your sides.
- 1.20 Never carry tools in your pockets or hanging behind your back.
- 1.21 Avoid muscle strain and fatigue by doing the following:
 - Avoid using hand tools with your wrist bent.
 - Choose tools that allow you to keep your wrist straight when using them.
 - Always PULL on wrenches and pliers. Never push unless you hold the tool with your palm open.
 - Always cut away from yourself when using cutting tools.
- 1.22 Establish balance and stable footing when using a bar for prying. Pry bars can slip or break without warning.
- 1.23 Be aware of the presence of other personnel when using any tool, especially picks or axes.

2.0 Machete Use

- 2.1 A machete will only be used for its designated purpose; do not carelessly swing the machete when it is not needed.
- 2.2 To prevent lacerations, employees will wear Kevlar gloves and Kevlar chain saw chaps.

- 2.3 Machetes 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 leather gloves 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 Hand Protection (leather gloves)
- 4.2 Eye Protection
- 4.3 Hearing Protection
- 4.4 Long sleeves and pants; no loose clothing
- 4.5 Chaps (full protection) or pants with full front protection as well as all around protection below the knee
- 4.6 As per manufacturer's instructions
- 4.7 The chainsaw shall:
- 4.7.1 Be in safe operating condition;
- 4.7.2 Have a chain that minimizes the possibility of a kickback; and
- 4.7.3 Have a device which will effectively stop the chain in the event of a kickback or when the engine is at idle.
- 4.8 Operate the chainsaw in accordance with manufacturer's instructions.
- 4.9 Hold the chainsaw firmly with two hands during operation.
- 4.10 Hold the chainsaw firmly when starting.
- 4.11 Have the chain stopped when not actually cutting.
- 4.12 Be sure that the chain brake is functioning properly and adequately stops the chain.
- 4.13 Check that the chain is sharp, has the correct tension and is adequately lubricated.
- 4.14 Start, hold, carry or store and use of the saw as directed by the manufacturer.
- 4.15 Do not use the chain saw for cutting above shoulder height.
- 4.16 Add fuel in a well-ventilated area and not while the saw is running or hot.
- 4.17 Use an approved safety container to contain the fuel used along with a proper spout or funnel for pouring.

- 4.18 Carry and transport the chain saw with the bar guard in place, the chain bar toward the back and the motor shut off.
- 4.19 Chain saws shall be inspected daily to assure that all handles and guards are in place and tight, that all controls function properly and that the muffler is operative.
- 4.20 Start the saw only on the ground or when otherwise firmly supported.
- 4.21 Clear brush which might interfere with clear footing before starting to cut.
- 4.22 Shut off the saw when carrying it for a distance greater than from tree to tree or when surface is slippery or heavy with underbrush. The saw shall be at idle speed when carried short distances.
- 4.23 Do not use the saw to cut directly overhead or a distance at which the operator no longer has a safe grip on the saw. Always use two hands to operate the saw.
- 4.24 Safety glasses with permanently attached side shields will be worn underneath a steel mesh face shield which will attach to standard hard hats. The brush shield is designed to protect the head and face from debris created by using a chain saw. Employees will wear Kevlar gloves and Kevlar chain saw chaps. Appropriate ear protection shall also be worn.

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 Access covers and doors shall not be opened until the drum or disk is at a complete stop.
- 6.2 Infeed and discharge ports shall be designed to prevent employee contact with disc, knives and blower blades.

7.0 Cutting Tools

- 7.1 Wear safety glasses and protective gloves when using cutters.
- 7.2 Choose the proper cutter for the job. Cutters are designed for a specific type, hardness, and size of material.
- 7.3 Inspect the tool for proper working condition.
- 7.4 If tool is designed to have a guard, make sure guards are in place.
- 7.5 Cut materials straight across - keep the material being cut at right angles to the cutting edges of jaws.
- 7.6 Warn those in the area to take precautionary measures to avoid possible injury from flying metal pieces.
- 7.7 Keep cutting tools in good repair.
- 7.8 Adjust and lubricate cutter and moving parts daily if heavily used.
- 7.9 Sharpen jaws according to manufacturer's instructions.
- 7.10 Do not use a cutting tool until you are trained in its proper and safe use.
- 7.11 Do not use cushion grip handles for jobs requiring electrically-insulated handles. Cushion grips are for comfort primarily and do not protect against electric shock.
- 7.12 Do not use cutters which are cracked, broken or loose.
- 7.13 Do not exceed the recommended capacity of a tool.
- 7.14 Do not cut diagonally.
- 7.15 Do not rock cutters from side to side when cutting wire.

- 7.16 Do not pry or twist with tool when cutting.
- 7.17 Do not hammer on cutting tools or extend the handle length to achieve greater cutting power.
- 7.18 Do not expose cutters to excessive heat.

8.0 Selection and Use

- 8.1 Select tools that can be used without bending the wrist. Hand tools should allow the operator to grasp, hold, and use the tool with the wrist held straight.
- 8.2 Select the tool with the workplace layout and job design in mind. Sometimes a tool is correct for one operation and incorrect for another.
- 8.3 Use the right tool for the job. Confirm it is the right size and has sufficient power to do the job safely. When there is a choice, select a tool of a low weight.
- 8.4 Select low-vibrating tools, or choose tools with vibration-absorbing handles, like those covered with cork, rubber, plastic or plastic bonded to steel, to reduce hand-arm vibration.
- 8.5 Choose hand tools that have the center of gravity within or close to the handle.
- 8.6 Select tools with rounded and smooth handles that you can grip easily.
- 8.7 If they are available, choose hand tools with double handles to permit easier holding and better manipulation of the tool.
- 8.8 Select tools with a trigger strip, rather than a trigger button. This strip will allow you to exert more force over a greater area of the hand that, in turn, will reduce muscle fatigue.
- 8.9 Confirm that the trigger works easily to reduce the effort needed to operate it.
- 8.10 Confirm that your tool is well maintained and in good repair.
- 8.11 Frequently used tools that weigh more than 1 pound should be counter-balanced.
- 8.12 Hold the tool close to the body. Do not overreach.
- 8.13 Keep good balance and proper footing at all times. This will help operators to control the tool better, especially in response to unexpected situations.
- 8.14 Rest your hands by putting the tool down when you are not using it.
- 8.15 Reduce power to the lowest setting that can complete the job safely. This action reduces tool vibration at the source.
- 8.16 Confirm that cutting tools, drill bits, etc., are kept sharp, clean, and well maintained.
- 8.17 Do not wear gloves, loose clothing or jewelry while using revolving power tools. Tie back long hair or wear appropriate hair protection to prevent hair from getting caught in moving parts of equipment (manufacturer's operating manual for recommended PPE and/or safety issues/concerns).
- 8.18 Do not use a tool unless you have been trained to use it safely and know its limitations and hazards.

9.0 Storage and Handling

- 9.1 All tools shall be stored in a manner to prevent damage and injury. Store tools in a dry, secure location when they are not being used.
- 9.2 Tools shall be properly put away after each use.
- 9.3 Sharp or pointed tools shall be handled only if the sharp/pointed edge is covered, carried in a tool box or other device designed for that purpose, or the sharp/pointed edge is pointed downward, away from the body.

S3NA-305-WI15 Pneumatic Tools Safety Card

1.0 General Requirements

- 1.1 Wear safety glasses.
- 1.2 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.
- 1.3 Keep tools clean and lubricated, and maintain them according to the manufacturers' instructions.
- 1.4 Use only the attachments that the manufacturer recommends for the tools you are using.
- 1.5 Be careful to prevent hands, feet, or body from injury in case the machine slips or the tool breaks.
- 1.6 Reduce physical fatigue by supporting heavy tools with a counter-balance wherever possible.
- 1.7 Use the proper hose and fittings of the correct diameter.
- 1.8 Use hoses specifically designed to resist abrasion, cutting, crushing and failure from continuous flexing.
- 1.9 Choose air-supply hoses that have a minimum working pressure rating of 150 psig or 150% of the maximum pressure produced in the system, whichever is higher.
- 1.10 Check hoses regularly for cuts, bulges and abrasions. Tag and replace, if defective.
- 1.11 Blow out the air line before connecting a tool. Hold hose firmly and blow away from yourself and others.
- 1.12 Make sure that hose connections fit properly and are equipped with a mechanical means of securing the connection (e.g., chain, wire, or positive locking device).
- 1.13 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.
- 1.14 Do not operate the tool at a pressure above the manufacturer's rating.
- 1.15 Turn off the air pressure to the hose when not in use or when changing power tools.
- 1.16 Do not carry a pneumatic tool by its hose.
- 1.17 Avoid creating trip hazards caused by hoses laid across walkways or curled underfoot.
- 1.18 Do not use compressed air to blow debris or to clean dirt from clothes.

2.0 Pneumatic Nailing and Stapling Tools

- 2.1 Permit only experienced and trained persons to operate pneumatic nailing and stapling tools.
- 2.2 Wear safety glasses or face a shield and, where necessary, use hearing protection.
- 2.3 Inspect a tool before connecting it to air supply:
 - 2.3.1 Check tool safety mechanisms if applicable.
 - 2.3.2 Tighten securely all screws and cylinder caps.
- 2.4 Check correct air supply and pressure before connecting a tool.
- 2.5 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.
- 2.6 Always handle a tool as if it loaded with fasteners (nails, staples, etc.).
- 2.7 Equip tools with a work-contacting element that limits the contact area to one that is as small as practical.
- 2.8 Make sure that the mechanical linkage between the work-contacting element and trigger is enclosed.

- 2.9 Disconnect a tool from the air supply when the tool is unattended and during cleaning or adjustment. Before clearing a blockage, be sure that depressing the trigger exhausts all air from the tool.
- 2.10 Use only fasteners recommended by the manufacturer.
- 2.11 Permit only properly trained people to carry out tool maintenance.
- 2.12 Do not depress the trigger unless the nosepiece of tool is directed onto a safe work surface.
- 2.13 Do not carry a tool with the trigger depressed.
- 2.14 Do not load a tool with fasteners while the trigger is depressed.
- 2.15 Do not overreach. Keep proper footing and balance.

S3NA-305-WI16 Manual Hand Tools Safety Card

1.0 Hammers

- 1.1 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.
- 1.2 Choose a hammer with a striking face diameter approximately ½ inch larger than the face of the tool being struck (e.g., chisels, punches, wedges, etc.).
- 1.3 Ensure that the head of the hammer is firmly attached to the handle.
- 1.4 Replace loose, cracked or splintered handles.
- 1.5 Discard any hammer with mushroomed or chipped face or with cracks in the claw or eye sections.
- 1.6 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).
- 1.7 Look behind and above you before swinging the hammer.
- 1.8 Watch the object you are hitting.
- 1.9 Hold the hammer with your wrist straight and your hand firmly wrapped around the handle.
- 1.10 Do not use a hammer with a loose or damaged handle.
- 1.11 Do not use handles that are rough, cracked, broken, splintered, sharp-edged or loosely attached to the head.
- 1.12 Do not use any hammer head with dents, cracks, chips, mushrooming, or excessive wear.
- 1.13 Do not use a hammer for any purpose for which it was not designed or intended.
- 1.14 Do not use one hammer to strike another hammer, other hard metal objects, stones or concrete.
- 1.15 Do not redress, grind, weld or reheat-treat a hammer head.
- 1.16 Do not strike with the side or cheek of the hammer.
- 1.17 Inspect pipe wrenches periodically for worn or unsafe parts and replace them (e.g., check for worn threads on the adjustment ring and movable jaw).
- 1.18 Keep pipe wrench teeth clean and sharp.
- 1.19 Face a pipe wrench forward. Turn wrench so pressure is against heel jaw.
- 1.20 Pull, rather than push on the pipe wrench handle. Maintain a proper stance with feet firmly placed to hold your balance.
- 1.21 Do not use a pipe wrench as a hammer, or strike a pipe wrench with a hammer.
- 1.22 Do not use pipe wrenches on nuts and bolts.
- 1.23 Do not use a pipe extender for extra leverage. Get a larger pipe wrench.
- 1.24 Replace pipe cutter wheels which are nicked or otherwise damaged.
- 1.25 Use a 3- or 4-wheeled cutter, if there is not enough space to swing the single wheel pipe cutter completely around the pipe.
- 1.26 Choose a cutting wheel suitable for cutting the type of pipe material required:
 - 1.26.1 Thin wheel for cutting ordinary steel pipe.
 - 1.26.2 Stout wheel for cutting cast iron.
 - 1.26.3 Other wheels for cutting stainless steel, plastic and other materials.

- 1.27 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% as deep as the thread on the tap.
- 1.28 Use a proper tap wrench (with a "T" handle) for turning a tap.
- 1.29 Use lubricant or machine cutting fluid with metals other than cast iron.
- 1.30 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.
- 1.31 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.
- 1.32 Do not attempt to thread hardened steel. This can chip or damage the die.
- 1.33 Do not thread any rod or other cylindrical object that is larger in diameter than the major diameter of the die thread.
- 1.34 Do not use a spiral reamer on a rotating pipe. The reamer may snag and cause serious injury.

2.0 Pliers and Wire Cutters

- 2.1 Pliers are made in various shapes and sizes and for many uses. Use the correct pliers or wire cutters for the job.
- 2.2 Choose pliers or wire cutters that have a grip span of 2½ – 3½ inches to prevent your palm or fingers from being pinched when the tools are closed.
- 2.3 Use adjustable pliers that allow you to grip the work piece firmly while maintaining a comfortable handgrip (i.e., hand grasp is not too wide).
- 2.4 Use tools only if they are in good condition.
- 2.5 Make sure that the cutting edges are sharp. Dull and worn-down cutting edges require many times more force for cutting.
- 2.6 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.
- 2.7 Oil pliers and wire cutters regularly. A drop of oil on the hinge will make the tools easier to use.
- 2.8 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.
- 2.9 Cut at right angles. Never rock the cutting tool from side to side or bend wire back and forth against the cutting edges.
- 2.10 Do not cut hardened wire unless the pliers or wire cutters are specifically manufactured for this purpose.
- 2.11 Do not expose pliers or wire cutters to excessive heat.
- 2.12 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.
- 2.13 Do not use pliers as a hammer.
- 2.14 Do not hammer on pliers or wire cutters to cut wires or bolts.
- 2.15 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.
- 2.16 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.
- 2.17 Do not use pliers on nuts and bolts; use a wrench.

3.0 Screwdrivers

- 3.1 Screwdrivers are made in various shapes and sizes and for many uses. Use the correct screwdriver for the job.
- 3.2 Choose contoured handles that fit the shank tightly, with a flange to keep the hand from slipping off the tool.
- 3.3 Use a slot screwdriver with a blade tip width that is the same as the width of the slotted screw head.
- 3.4 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 Pozi-driv screwdriver.
- 3.5 Use a vise or clamp to hold the stock if the piece is small or moves easily.
- 3.6 Keep the screwdriver handle clean. A greasy handle could cause an injury or damage from unexpected slippage.
- 3.7 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.
- 3.8 Use non-magnetic tools when working near strong magnets (e.g., in some laboratories).
- 3.9 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.
- 3.10 Use an offset screwdriver in close quarters where a conventional screwdriver cannot be used.
- 3.11 Use a screwdriver that incorporates the following features when continuous work is needed:
 - 3.11.1 A pistol grip to provide for a straighter wrist and better leverage.
 - 3.11.2 A "Yankee drill" mechanism (spiral ratchet screwdriver or push screwdriver) which rotates the blade when the tool is pushed forward.
 - 3.11.3 A ratchet device to drive hard-to-move screws efficiently, or use a powered screwdriver.
- 3.12 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.
- 3.13 Store screwdrivers in a rack or partitioned pouch so that the proper screwdriver can be selected quickly.
- 3.14 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.
- 3.15 Do not hold the stock in one hand while using the screwdriver with the other. If the screwdriver slips out of the slot you may cut your hand.
- 3.16 Do not hammer screws that cannot be turned.
- 3.17 Do not grind the tip to fit another size screw head.
- 3.18 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).
- 3.19 Do not use defective screwdrivers (e.g., ones with rounded or damaged edges or tips; split or broken handles; or bent shafts).
- 3.20 Do not use a screwdriver for prying, punching, chiseling, scoring, scraping or stirring paint.
- 3.21 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.
- 3.22 Do not expose a screwdriver blade to excessive heat. Heat can affect the temper of the metal and weaken the tool.
- 3.23 Do not use a screwdriver to check if an electrical circuit is live. Use a suitable meter or other circuit testing device.
- 3.24 Do not carry screwdrivers in your pockets.

4.0 Snips

- 4.1 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.
- 4.2 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.
- 4.3 Universal snips can cut in both straight and wide curves.
- 4.4 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.
- 4.5 Hawk's bill snips (with crescent-shaped jaws) are used for cutting tight circles.
- 4.6 Aviation snips have compound leverage that reduces the effort required for cutting.
- 4.7 Offset snips have jaws that are set at an angle from the handle.
- 4.8 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).
- 4.9 Use only snips that are sharp and in good condition.
- 4.10 Use snips for cutting soft metal only. Hard or hardened metal should be cut with tools designed for that purpose.
- 4.11 Use ordinary hand pressure for cutting. If extra force is needed, use a larger tool.
- 4.12 Cut so that the waste is on the right if you are right-handed or on the left if you are left-handed.
- 4.13 Avoid springing the blades. This results from trying to cut metal that is too thick or heavy for the snips you are using.
- 4.14 Keep the nut and the pivot bolt properly adjusted at all times.
- 4.15 Oil the pivot bolt on the snips occasionally.
- 4.16 Do not try to cut sharp curves with straight cut snips.
- 4.17 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.
- 4.18 Do not hammer or use your foot to exert extra pressure on the cutting edges.
- 4.19 Do not use cushion grip handles for tasks requiring insulated handles. They are for comfort primarily and not for protection against electric shocks.
- 4.20 Do not attempt to re-sharpen snips in a sharpening device designed for scissors, garden tools, or cutlery.

5.0 Wood Chisels

- 5.1 Wear safety glasses.
- 5.2 Wood chisels are made in various shapes and sizes and for many uses. Use the correct chisel for the job.
- 5.3 Use the right size of chisel for the job.
- 5.4 Choose smooth, rectangular handles that have no sharp edges and are attached firmly to the chisel.
- 5.5 Ensure that the cutting edge is sharp. Dull chisels can be difficult to control and require more effort to do the job.
- 5.6 Check stock thoroughly for knots, staples, nails, screws, or other foreign objects before chiseling.
- 5.7 Clamp stock so it cannot move.

- 5.8 Adjust your stance so that you do not lose your balance if the tool slips.
- 5.9 Chip or cut away from yourself.
- 5.10 Keep your hands and body behind the cutting edge.
- 5.11 Use a wooden or plastic mallet with a large striking face on all chisels. Only heavy-duty or framing chisels are made of a solid or molded handle that can be struck with a steel hammer.
- 5.12 Make finishing or paring cuts with hand pressure alone.
- 5.13 Place chisels safely within the plastic protective caps to cover cutting edges when not in use.
- 5.14 Replace any chisel that is bent or shows dents, cracks, chips, or excessive wear.
- 5.15 Store chisels in a "storage roll," a cloth or plastic bag with slots for each chisel, and keep them in a drawer or tray.
- 5.16 Replace broken or splintered handles.
- 5.17 Sharpen cutting edges as often as necessary.
- 5.18 Do not use a wood chisel as a pry or a wedge.
- 5.19 Do not use a wood chisel on metal.
- 5.20 Do not use an all-steel chisel with a mushroomed face or a chipped edge. Redress with a file or whetstone.
- 5.21 Do not use a grinder to redress heat-treated tools. Use a whetstone.
- 5.22 Do not use a dull chisel.

6.0 Wrenches

- 6.1 Use the correct wrench for the job - pipe wrenches for pipes and plumbing fittings, and general-use wrenches for nuts and bolts.
- 6.2 Discard any damaged wrenches (e.g., open-ended wrenches with spread jaws or box wrenches with broken or damaged points).
- 6.3 Select the correct jaw size to avoid slippage.
- 6.4 Position your body in a way that will prevent you from losing balance and hurting yourself if the wrench slips or something (e.g., a bolt) suddenly breaks.
- 6.5 Use a box or socket wrench with a straight handle, rather than an off-set handle, when possible.
- 6.6 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.
- 6.7 Face an adjustable wrench "forward," adjust tightly and turn the wrench so pressure is against the permanent or fixed jaw.
- 6.8 Ensure that the teeth of a pipe wrench are sharp and free of oil and debris and that the pipe or fitting is clean to prevent unexpected slippage and possible injuries.
- 6.9 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.
- 6.10 Support the head of the ratchet wrench when socket extensions are used.
- 6.11 Pull on a wrench using a slow, steady pull; do not use fast, jerky movements.
- 6.12 Stand aside when work is done with wrenches overhead.
- 6.13 Make sure adjustable wrenches do not "slide" open during use.
- 6.14 Keep tools well maintained (cleaned and oiled).
- 6.15 Clean and place tools and wrenches in a tool box, rack or tool belt after use.
- 6.16 Do not push on a wrench - losing your balance is more likely if the wrench slips.
- 6.17 Do not use a wrench that is bent or damaged.

- 6.18 Do not use worn adjustable wrenches. Inspect the knurl, jaw and pin for wear.
- 6.19 Do not pull on an adjustable wrench that is loosely adjusted.
- 6.20 Do not use pipe wrenches on nuts or bolts.
- 6.21 Do not use pipe wrenches for lifting or bending pipes.
- 6.22 Do not use a wrench on moving machinery.
- 6.23 Do not use the wrong tools for the job. For example, never use pliers instead of a wrench or a wrench as a hammer.
- 6.24 Do not use a makeshift wrench.
- 6.25 Do not insert a shim in a wrench for better fit.
- 6.26 Do not strike a wrench (except a "strike face" wrench) with a hammer or similar object to gain more force.
- 6.27 Do not increase the leverage by adding sleeved additions (e.g., a pipe) to increase tool handle length.
- 6.28 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.

7.0 Files/Rasps

- 7.1 Personnel will not use a file as a pry bar, hammer, screwdriver, or chisel.
- 7.2 When using a file or a rasp, grasp the handle in one hand and the toe of the file in the other.
- 7.3 Personnel will not hammer on a file.

8.0 Chisels

- 8.1 Personnel will not use a chisel that has a dull cutting edge.
- 8.2 Personnel will not use chisels that have "mushroomed" striking heads.
- 8.3 Hold a chisel by using a tool holder if possible.
- 8.4 Clamp small work pieces in the vise and chip towards the stationary jaw when working with a chisel.

9.0 Vises

- 9.1 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.
- 9.2 Position the work piece in the vise so that the entire face of the jaw supports the work piece.
- 9.3 Personnel will not use a vise that has worn or broken jaw inserts, or has cracks or fractures in the body of the vise.
- 9.4 Personnel will not slip a pipe over the handle of a vise to gain extra leverage.

10.0 Clamps

- 10.1 Personnel will not use the C-clamp for hoisting materials.
- 10.2 Personnel will not use the C-clamp as a permanent fastening device.

11.0 Jacks

- 11.1 Personnel will not exceed the jack's rated lifting capacity as noted on the label of the jack.
- 11.2 Clear all tools, equipment and any other obstructions from under the vehicle before lowering the jack.

S3NA-305-WI17 Small Engine Safety Card

1.0 Objective / Overview

- 1.1 Operate small-engine machines, such as push mowers, weed trimmers, and leaf blowers, in a safe manner.
- 1.2 You should know how to operate and maintain them in a safe manner.
- 1.3 If possible, read the operator's manual. It will contain detailed information on the safe operation and maintenance of the machine. If you do not have a manual, ask if one can be ordered from the manufacturer.

2.0 Safe Operating Guidelines

- 2.1 Do not wear loose or baggy clothing around tools with rotating parts.
- 2.2 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.
- 2.3 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.
- 2.4 Never remove fuel cap or add fuel when engine is running.
- 2.5 Never start or operate the engine with the fuel fill cap removed.
- 2.6 Refuelling: allow engine to cool; fill in well-ventilated area; and do not smoke while re-fuelling.
- 2.7 Use only properly labelled, CSA approved red gasoline containers to store and dispense fuel.
- 2.8 Do not pour fuel from engine or siphon fuel by mouth.
- 2.9 Never leave the engine unattended while it is running.
- 2.10 Never operate the engine with an unguarded engine shaft.
- 2.11 Do not modify the engine or tamper with the factory setting of the engine governor.
- 2.12 Never operate the engine without a muffler guard in place and avoid touching hot areas of the engine.
- 2.13 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.
- 2.14 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.
- 2.15 Always wear hearing protection when operating an engine.

3.0 Training Requirements

- 3.1 Review of Applicable SOPs.
- 3.2 Demonstrated knowledge on the use of small engine equipment.
- 3.3 Review and follow manufacturers operating guidelines.

4.0 Personal Protective Equipment (Level D PPE)

- 4.1 Always wear safety goggles with shields
- 4.2 Leather or cotton gloves
- 4.3 Long pants and long sleeve shirt
- 4.4 Safety toe work boots

4.5 Hearing protection (earmuffs or earplugs)

5.0 Potential Hazards

5.1 Flying debris

5.2 Hearing loss

5.3 Cuts

5.4 Burns

S3NA-305-WI18 Electric and Battery Hand Tools Safety Card

All electrical tools and equipment must be operated in accordance with the requirements of *S3NA-302-PR Electrical, General*.

1.0 Safe Work Practices

- 1.1 Maintain all electrical tools and cords in good condition and not overloaded.
- 1.2 Do not wear loose or baggy clothing around tools with rotating parts.
- 1.3 The switch on the tool must be in the OFF position before connecting it to a power source.
- 1.4 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.
- 1.5 The tool must have an approved three-wire cord with a three-prong plug so that it can be used only in a properly grounded three-hole receptacle, unless the tool is double insulated to protect the operator from electrical shock.
- 1.6 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.
- 1.7 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.
- 1.8 Maintain electrical cords and appliances in good working order.
 - 1.8.1 Cords and appliances must be CSA approved.
 - 1.8.2 Never carry an electric tool by the cord or disconnect the plug by pulling or jerking on the cord (can damage, loosen, or separate connections).
 - 1.8.3 Check cords frequently for such damage such as kinks, cuts, and cracked or broken outer jackets (any cord that feels more than comfortably warm to the touch should be checked by an electrician for overloading).
- 1.9 Store electrical cords in a clean, dry area off the ground to prevent damage to cord.
- 1.10 Equipment must have proper guards or shields and they must remain in place. 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.
- 1.11 Do not modify, remove, or disable any machine guards.
- 1.12 Stand to one side when engaging or disengaging an electrical circuit breaker to avoid electrical flash backs.
- 1.13 It's strongly advisable to use GFCI with all portable electric tools at any time.
- 1.14 A cord should not be pulled or dragged over nails, hooks, or other sharp objects that may cause cuts in the insulation. In addition, cords should never be placed on radiators, steam pipes, walls, and windows. Particular attention should be placed on connections behind furniture, since files and bookcases may be pushed tightly against electrical outlets, severely bending the cord at the plug.
- 1.15 Disconnect electrical equipment before cleaning, adjusting, or applying flammable solutions. If a guard is removed to clean or repair parts, replace it before testing the equipment and returning the machine to service.
- 1.16 Only authorized persons are permitted to activate, de-activate or lockout electrical equipment.
- 1.17 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.

- 1.17.1 Switch off all appropriate devices (MCC, Distribution Panel, Disconnect).
- 1.17.2 Lock and tag Electrical Supply devices in the "OFF" position.
- 1.17.3 Test to be sure the equipment cannot be operated at the STOP-START switch.
- 1.17.4 Test to be sure electrical equipment is de-energized.
- 1.17.5 After completion of task, remove padlocks and destroy tags.

2.0 Inspection

- 2.1 Inspect tools for any damage prior to each use.
- 2.2 Ensure that the power tool has the correct guard, shield or other attachment that the manufacturer recommends.
- 2.3 Ensure that the tools are properly grounded using a 3-prong plug, 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.
- 2.4 Check electric tools to ensure that a tool with a 3-prong plug has an approved 3-wire cord and is grounded. The 3-prong plug should be plugged in a properly grounded 3-pole outlet. If an adapter must be used to accommodate a 2-hole receptacle, the adapter wire must be attached to a known, functioning ground. Never remove the third, grounding prong from a plug.
- 2.5 Check the handle and body casing of the tool for cracks or other damage.
- 2.6 If the tool has auxiliary or double handles, check to see that they installed securely.
- 2.7 Inspect cords for defects: check the power cord for cracking, fraying, and other signs of wear or faults in the cord insulation.
- 2.8 Any tool with a spring-operated trigger switch shall be fully functional.
- 2.9 Check for damaged switches and ones with faulty trigger locks.
- 2.10 Inspect the plug for cracks and for missing, loose or faulty prongs.
- 2.11 If a tool is defective, remove it from service, and tag it clearly "Out of service for repair." Replace damaged equipment immediately – do not use defective tools "temporarily." DO NOT ATTEMPT FIELD REPAIRS.

3.0 Battery Powered Tools

- 3.1 Use only the kind of battery that the tool manufacturer specifies for the battery-powered tool that you are using.
- 3.2 Recharge a battery-powered tool only with a charger that is specifically intended for the battery in that tool.
- 3.3 Remove the battery from the tool or ensure that the tool is switched off or locked off before changing accessories, making adjustments, or storing the tool.
- 3.4 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.

4.0 Using Electric Tools

- 4.1 Switch off the tools before connecting them to a power supply.
- 4.2 If a power cord feels more than comfortably warm or if a tool is sparking excessively, have it checked by an electrician or other qualified person.
- 4.3 Disconnect the power supply before making adjustments or changing accessories.
- 4.4 Remove any wrenches and adjusting tools before turning on a tool.

- 4.5 Inspect the cord for fraying or damage before each use. Tag defective tools clearly with an "Out of Service" tag and replace immediately with a tool in good running order.
- 4.6 During use, keep power cords clear of tools and the path that the tool will take.
- 4.7 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.
- 4.8 Use only approved extension cords that have the proper wire size for the length of cord and power requirements of the electric tool that you are using. This will prevent the cord from overheating.
- 4.9 For outdoor work, use outdoor extension cords marked "W-A" or "W."
- 4.10 Suspend power cords over aisles or work areas to eliminate stumbling or tripping hazards.
- 4.11 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.
- 4.12 Pull the plug not the cord when unplugging a tool. Pulling the cord causes wear and may adversely affect the wiring to the plug - an electrical shock to the operator may result.
- 4.13 Keep power cords away from heat, water, oil, sharp edges and moving parts. They can damage the insulation and cause a shock.
- 4.14 Avoid accidental starting by ensuring the tool is turned off before you plug it in. Also do not walk around with a plugged-in tool with your finger touching the switch.
- 4.15 Do not bypass the ON/OFF switch and operate the tools by connecting and disconnecting the power cord.
- 4.16 Do not disconnect the power supply of the tool by pulling or jerking the cord from the outlet.
- 4.17 Do not leave a running tool unattended. Do not leave it until it has been turned off, has stopped running completely, and has been unplugged.
- 4.18 Do not use electric tools in wet conditions or damp locations unless tool is connected to a ground fault circuit interrupter (GFCI).
- 4.19 Do not expose electric power tools to rain or wet conditions; wet tools increase the likelihood of getting an electric shock.
- 4.20 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.
- 4.21 Do not plug several power cords into one outlet by using single-to-multiple outlet adapters or converters ("cube taps").
- 4.22 Do not use light duty power cords.
- 4.23 Do not connect or splice extension cords together to make a longer connection: the resulting extension cord may not be able to provide sufficient current or power safely.
- 4.24 Do not carry electrical tools by the power cord.
- 4.25 Do not tie power cords in knots. Knots can cause short circuits and shocks. Loop the cords or use a twist lock plug.
- 4.26 Never break off the third prong on a plug: replace broken 3-prong plugs and make sure the third prong is properly grounded.
- 4.27 Never use extension cords as permanent wiring; use extension cords only as a temporary power supply to an area that does not have a power outlet.
- 4.28 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.
- 4.29 Do not brush away sawdust, shavings or turnings while the tool is running. Never use compressed air for cleaning surfaces or removing sawdust, metal turnings, etc.
- 4.30 Do not operate tools in an area containing explosive vapors or gases.
- 4.31 Do not clean tools with flammable or toxic solvents.

- 4.32 Do not surprise or touch anyone who is operating a tool. Startling a tool operator could end up causing an accident or injury.

5.0 Belt Sanders

- 5.1 Wear safety glasses.
- 5.2 Make sure the sander is switched "OFF" before connecting the power supply.
- 5.3 Disconnect power supply before changing a sanding belt, making adjustments, or emptying dust collector.
- 5.4 Inspect sanding belts before using them. Replace those belts that are worn or frayed.
- 5.5 Install sanding belts that are the same widths as the pulley drum.
- 5.6 Adjust sanding belt tension to keep the belt running true and at the same speed as pulley drum.
- 5.7 Secure the sanding belt in the direction shown on the belt and the machine.
- 5.8 Keep hands away from a sanding belt.
- 5.9 Use two hands to operate sanders – one on a trigger switch and the other on a front handle knob.
- 5.10 Keep all cords clear of sanding area during use.
- 5.11 Clean dust from a motor and vents at regular intervals.
- 5.12 Do not use a sander without an exhaust system or a dust collector present that is in good working order. Empty the collector when 1/4 full. The dust created when sanding can be a fire and explosion hazard. Proper ventilation is essential.
- 5.13 Do not exert excessive pressure on a moving sander. The weight of the sander supplies adequate pressure for the job.
- 5.14 Do not work on unsecured stock unless it is heavy enough to stay in place. Clamp the stock into place or use a "stop block" to prevent movement.
- 5.15 Do not overreach. Always keep proper footing and balance.
- 5.16 Do not cover the air vents of the sander.

6.0 Drills

- 6.1 Wear safety glasses.
- 6.2 Keep drill air vents clear to maintain adequate ventilation.
- 6.3 Always keep drill bits sharp.
- 6.4 Keep all cords clear of the cutting area during use. Inspect for frays or damage before each use.
- 6.5 Disconnect power supply before changing or adjusting bit or attachments.
- 6.6 Tighten the chuck securely. Remove chuck key before starting drill.
- 6.7 Secure workpiece being drilled to prevent movement.
- 6.8 Slow the rate of feed just before breaking through the surface.
- 6.9 Drill a small "pilot" hole before drilling large holes.
- 6.10 For small pieces, clamp stock so work will not twist or spin. Do not drill with one hand while holding the material with the other.
- 6.11 Do not use a bent drill bit.
- 6.12 Do not exceed the manufacturer's recommended maximum drilling capacities.
- 6.13 Do not use a hole saw cutter without the pilot drill.
- 6.14 Do not use high speed steel (HSS) bits without cooling or using lubrication.
- 6.15 Do not attempt to free a jammed bit by starting and stopping the drill. Unplug the drill and then remove the bit from the work piece.

- 6.16 Do not reach under or around stock being drilled.
- 6.17 Do not overreach. Always keep proper footing and balance.
- 6.18 Do not raise or lower the drill by its power cord.

7.0 Planers

- 7.1 Wear safety glasses.
- 7.2 Disconnect the planer from the power supply before making any adjustments to the cutter head or blades.
- 7.3 Use blades of the same weight and set at the same height.
- 7.4 Ensure that the blade-locking screws are tight.
- 7.5 Remove adjusting keys and wrenches before turning on power.
- 7.6 Support the material (stock) in a comfortable position that will allow the job to be done safely and accurately.
- 7.7 Check stock thoroughly for staples, nails, screws, or other foreign objects before using a planer.
- 7.8 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.
- 7.9 Use two hands to operate a planer - one hand on the trigger switch and the other on a front handle.
- 7.10 Do not put your finger or any object in a deflector to clean out chips while a planer is running.
- 7.11 Disconnect the power supply when stopping to dump out chips.
- 7.12 Do not set a planer down until blades have stopped turning.
- 7.13 Keep all cords clear of cutting area.

8.0 Routers

- 8.1 Wear safety glasses.
- 8.2 Disconnect the power supply before making any adjustments or changing bits.
- 8.3 Ensure that the bit is securely mounted in the chuck and the base is tight.
- 8.4 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.
- 8.5 Secure stock. Never rely on yourself or a second person to support or hold the material. Sudden torque or kickback from the router can cause damage and injury.
- 8.6 Before using a router, check stock thoroughly for staples, nails, screws or other foreign objects.
- 8.7 Keep all cords clear of cutting area.
- 8.8 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.
- 8.9 Do not overreach. Keep proper footing and balance.
- 8.10 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.
- 8.11 When routing outside edges, guide the router counter clockwise around the work.
- 8.12 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.
- 8.13 Feed the router bit into the material at a firm, controlled speed.
- 8.14 With softwood, you can sometimes move the router as fast as it can go. With hardwood, knotty and twisted wood, or with larger bits, cutting may be very slow.

- 8.15 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.
- 8.16 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.
- 8.17 To decide the depth of cut and how many passes to make, test the router on scrap lumber similar to the work.

9.0 Circular Saws

- 9.1 Wear safety glasses and hearing protection.
- 9.2 Check the retracting lower blade guard to make certain it works freely.
- 9.3 Ensure that the blade that you have selected is sharp enough to do the job. Sharp blades work better and are safer.
- 9.4 Check the saw for proper blade rotation.
- 9.5 Set the depth of the blade, while the saw is unplugged, and lock it at a depth so that the lowest tooth does not extend more than about 1/8 inch beneath the wood.
- 9.6 Keep all cords clear of cutting area.
- 9.7 Circular saws are designed for right-hand operation; left-handed operation will demand more care to operate safely.
- 9.8 Check the retracting lower blade guard frequently to make certain it works freely. It should enclose the teeth as completely as possible, and cover the unused portion of the blade when cutting.
- 9.9 Check that the retracting lower blade guard has returned to its starting position before laying down the saw.
- 9.10 Keep upper and retracting lower blade guard clean and free of sawdust.
- 9.11 Disconnect power supply before adjusting or changing the blade.
- 9.12 Allow the saw to reach full power before starting to cut.
- 9.13 Use two hands to operate saws - one on a trigger switch and the other on a front knob handle.
- 9.14 Keep the motor free from accumulation of dust and chips.
- 9.15 Select the correct blade for stock being cut and allow it to cut steadily. Do not force it.
- 9.16 Secure work being cut to avoid movement.
- 9.17 Do not hold or force the retracting lower guard in the open position.
- 9.18 Do not place your hand under the shoe or guard of the saw.
- 9.19 Do not over tighten the blade-locking nut.
- 9.20 Do not twist the saw to change, cut or check alignment.
- 9.21 Do not use a saw that vibrates or appears unsafe in any way.
- 9.22 Do not force the saw during cutting.
- 9.23 Do not cut materials without first checking for obstructions or other objects such as nails and screws.
- 9.24 Do not carry the saw with a finger on the trigger switch.
- 9.25 Do not overreach. Keep proper footing and balance.
- 9.26 Do not rip stock without using a wedge or guide clamped or nailed to the stock.

10.0 Other Saws

- 10.1 Wear safety glasses.
- 10.2 Disconnect power supply before changing or adjusting blades.

- 10.3 Use lubricants when cutting metals.
- 10.4 Keep all cords clear of cutting area.
- 10.5 Position the saw beside the material before cutting and avoid entering the cut with a moving blade.
- 10.6 Make sure guards, if present, are installed and are working properly.
- 10.7 Remember sabre saws cut on the upstroke.
- 10.8 Secure and support stock as close as possible to the cutting line to avoid vibration.
- 10.9 Keeps the base or shoe of the saw in firm contact with the stock being cut.
- 10.10 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.
- 10.11 Set the blade to go no further than 1/8 to 1/4 inch deeper than the material being cut.
- 10.12 Do not start cutting until the saw reaches its full power.
- 10.13 Do not force a saw along or around a curve. Allow the machine to turn with ease.
- 10.14 Do not insert a blade into or withdraw a blade from a cut or lead hole while the blade is moving.
- 10.15 Do not put down a saw until the motor has stopped.
- 10.16 Do not reach under or around the stock being cut.
- 10.17 Maintain control of the saw always. Avoid cutting above shoulder height.
- 10.18 **External Cuts**
- 10.18.1 Make sure that the blade is not in contact with the material or the saw will stall when the motor starts.
- 10.18.2 Hold the saw firmly down against the material and switch the saw on.
- 10.18.3 Feed the blade slowly into the stock, maintaining an even forward pressure.
- 10.19 **Internal Cuts**
- 10.19.1 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.
- 10.19.2 Do not let the blade touch the stock until the saw has been switched on.

S3NA-306-PR Highway and Road Work

1.0 Purpose and Scope

- 1.1 To address potential hazards that may occur during highway construction and during work within the right of way of a public or private roadway.
- 1.2 This procedure applies to all AECOM North America-based employees and operations.

2.0 Terms and Definitions

- 2.1 **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.
- 2.2 **Traffic areas:** Any work area where workers are located within 20 feet of moving traffic, existing or anticipated.
- 2.3 **Traffic Control Plan:** A written document containing drawings and text that describes the physical controls to be established to isolate workers from moving vehicles.
- 2.4 **WOF:** Workers on foot.

3.0 Attachments

- 3.1 S3NA-306-FM Equipment Checklist

4.0 Procedure

4.1 Roles and Responsibilities

- 4.1.1 **Project/Lead Manager or Resident Engineer** is responsible for administering the procedure and for determining 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 within the contract. The Lead Manager will also see that employees assigned to work in traffic areas are trained in the use of traffic control systems and PPE.
- 4.1.2 **Site Safety Coordinator** is responsible to the lead manager for the implementation of safety and the internal traffic control plan within a highway construction/demolition worksite. The Site Safety Coordinator will
 - Be responsible for traffic safety coordination on office projects.
 - Be appointed by each office that has any field work involving AECOM staff working in or near traffic. This is not a dedicated role and may be a committee member.
 - Receive training in the requirements of the governing transportation authority and the applicable OH&S legislation through training sanctioned by the respective authorities.
 - Be involved in conducting hazard assessments, developing the mitigating strategies and Safe Job Procedures, and reviewing their implementation for any project where traffic is identified as a hazard to our team members.

4.2 Personal Protective Equipment

- 4.2.1 High visibility safety vest /apparel
- 4.2.2 Retro-reflective stripes (for night work)
- 4.2.3 Protective headwear (hard hat)
- 4.2.4 Two-way radio or other means of effective communication
- 4.2.5 Traffic Accommodation equipment, as required by the traffic protection plan:

- A rooftop beacon light for the vehicle, where required
- Pylons, Glo-posts, flags, barricades and/or flagging tape, warning lights, flashing light boards
- Signage
- Flagging equipment, as required:
 - Daytime:
 - Flag person's "Stop and Slow" paddle
 - A blaze orange flag person's vest over white coveralls
 - Safety head protection (hard hat)
 - Drinking water
 - Bug repellent and/or sun screen as conditions warrant
 - Optional radio communication (if required)
 - Night time (additional requirements):
 - A retro-reflective "Stop and Slow" paddle
 - A flashlight fitted with a red signaling baton
 - Flashing yellow beacons set up in advance of the flag person

4.3 **Restrictions**

- 4.3.1 Applicable legislated requirements governing all aspects of traffic safety, including directing traffic, signage, PPE, traffic control devices in temporary construction, maintenance and utility work zones, will be reviewed in preparation for the site-specific traffic accommodation.
- 4.3.2 No personnel will be allowed onto the site without first reviewing the project-specific traffic protection plan.

4.4 **Training**

- 4.4.1 All staff will receive on-site orientation to the hazards and controls.
- 4.4.2 Only staff with appropriate flag person training will act as a flag person.

4.5 **Traffic Control Plan**

- 4.5.1 Transportation incidents and workers struck by vehicles or mobile equipment account for many fatal construction work injuries. Workers in highway construction activities including flagging, demolition, surveying, utility, clean-up, emergency responders, and others in areas where traffic exists are exposed to being struck by moving vehicles. Work zones are used to move traffic in an approved direction and are typically identified by signs, cones, barrels, and barriers.
- 4.5.2 The procedures appropriate for work in traffic areas will vary depending on the work environment. Very simple procedures are needed in an inactive parking lot, and more complex procedures are needed when working in a construction zone on a highway. Each AECOM project team shall prepare a project HASP or SWP addressing traffic controls and worker protection appropriate for the team's project and exposures. Plans shall address the following if applicable:
- Attenuator vehicles
 - Closures within a closure
 - Communications
 - Driving: seatbelts and rollover protection should be used on equipment and vehicles as stated by the manufacturer
 - Night operations and work within traffic controls
 - PPE
 - Sanitation

- Traffic control plans and permits
 - Training
 - Work zone protections: various styles of concrete, water, sand, collapsible barriers, crash cushions, and truck mounted attenuators are available to limit motorist intrusions into the construction work zone
 - Worker: heavy equipment interface
- 4.5.3 A Traffic Control Plan will be completed for the movement of vehicles in areas where workers are conducting other tasks.
- 4.5.4 Drivers, workers on foot (WOF), and pedestrians will be able to see and understand the routes they are to follow.
- 4.5.5 Where there are several projects, coordinated vehicle routes and communication between contractors will reduce vehicular struck-by incidents.
- 4.5.6 Hazard identification and plan development shall be performed in accordance with this procedure. The plans shall include the identification of the responsibility for personnel and implementation of the safety program under highway construction activities.
- 4.5.7 Other requirements for supporting activities such as excavations, heavy equipment usage, personal protective equipment, etc. shall be applicable and addressed in accordance with other Standard Operating Procedures.
- A traffic protection plan will be an integral part of the Health and Safety Plan (HASP) or Safe Work Plan (SWP) whenever staff will be exposed to the hazards of vehicular traffic during project work (this may include surveys, drilling and soils inspections, bridge or overpass inspections, inspection of roadway construction projects).
 - Work duration, road width, and traffic volume are some of the key considerations to be contemplated when designing a traffic protection plan. The traffic protection plan will address the specific vehicular hazards and describe the measures that will be implemented to protect employees.
 - Traffic accommodation plans will be developed in consultation with a qualified supervisor or manager experienced in traffic control. In addition, a supervisor will be designated to oversee the implementation of the protection plan until work is completed.
 - OH&S regulations and associated standards or guidebooks provide instruction on the use of traffic control devices in temporary construction, maintenance, and utility work zones for worker and motorist safety and to minimize the disruption of traffic flow.
 - Schedule work to avoid periods of heavy traffic.
 - Alert traffic of work ahead, by placing signs or cones well ahead of the work area.
 - If the work area is being managed under a Traffic Control Plan or Traffic Accommodation Plan, obtain copies of these plans before commencing work.
 - Traffic accommodation that is adequate in good weather conditions and daylight may not be adequate under adverse weather conditions and/or hours of darkness. Reassess the accommodation based on conditions.
 - Traffic accommodation will be planned to provide safe conditions for the protection and safe passage of motorists, pedestrians, and employees at all work sites. It will include all areas located within the traveled portion of a roadway including shoulders, ditches, and boulevards.
- 4.6 **Short-Term Traffic Protection**
- 4.6.1 Always wear the appropriate PPE to maintain your visibility to vehicular traffic. Wear a tear-away fluorescent reflective vest (and retro-reflective stripes on the arms and legs for night work or during periods of limited visibility) at all times.
- 4.6.2 Pull your vehicles off as far to the right of the traveled portion of the road as possible. Confirm that the shoulder of the highway or street where you will park your vehicle is wide enough to allow for safe access to and egress from the vehicle.
- 4.6.3 Always park your vehicle at least 30 metres from the flag person station. The vehicle should be positioned between the flag person and the work crew.

- 4.6.4 Activate the four-way flashers for your vehicle prior to exiting the vehicle.
- 4.6.5 Plan an escape route prior to exiting the vehicle.
- 4.6.6 Load and unload materials or equipment from the passenger side of the vehicle.
- 4.6.7 Avoid turning your back to oncoming traffic.
- 4.6.8 Be aware of mobile equipment that may be operating in the work area.
- 4.6.9 Do not enter onto the traveled portion of the road except to cross the road. Road crossings should be made at a 90 degree angle to the direction of the road.
- 4.7 **Long-Term Traffic Protection**
- 4.7.1 Traffic accommodation will be provided BEFORE the work starts and will be maintained until the work is completed. This may mean 24 hours a day, 7 days a week.
- 4.7.2 Generally, for long-term duration work activities that are performed at construction projects, the Constructor for the project is required to develop a traffic protection plan.
- 4.7.3 If AECOM has assumed the role of Constructor for the project, the traffic protection plan will be developed and implemented prior to the commencement of work activities at the project.
- 4.7.4 If AECOM is not the Constructor for the project, the traffic protection plan for the project will be developed by our Client or a Constructor designated by the Client.
- 4.7.5 The traffic protection plan should be reviewed with AECOM employees during orientation to the Project. If the traffic protection plan is not discussed at the project-specific orientation, employees should discuss the issue with the Site Supervisor or Client contact for the Project.
- 4.8 **Signage**
- 4.8.1 Standard highway signs for information, speed limits, and work zones will assist drivers in identifying designated traffic paths.
- 4.8.2 Provide appropriate instructional signage such as: EVACUATION ROUTE; DO NOT ENTER; REDUCED SPEED AHEAD; ROAD CLOSED; and NO OUTLET.
- 4.8.3 Using standard highway signs for internal construction worksite traffic control will assist workers in recognizing the route they are to use at the construction site.
- 4.8.4 Traffic Signs
- Signage will be of acceptable standards, in good condition, clean, legible, and suited to the purpose.
 - Signage will be secured or weighted.
 - Routinely inspect signage for placement, cleanliness, and physical damage.
 - Cover road traffic control signage when no activity is present.
- 4.9 **Traffic Control Devices**
- 4.9.1 Standard traffic control devices, signals, and message boards will instruct drivers to follow a path away from where work is being done.
- 4.9.2 The authority in charge will determine the approved traffic control devices such as cones, barrels, barricades, and delineator posts that will be used as part of the traffic control plan.
- 4.9.3 These standard devices should also be used inside the work zone.
- 4.10 **Work Zone Protections**
- 4.10.1 Various styles of concrete, water, sand, collapsible barriers, crash cushions, and truck-mounted attenuators shall be used to limit motorist intrusions into the construction work zone, as appropriate.
- 4.10.2 All AECOM staff shall be made aware of controls established by the Contractor.
- 4.10.3 AECOM staff shall wear the required safety equipment at all times including a hard hat, work boots, eye protection, and a high-visibility safety vest as a minimum and shall observe all project rules and requirements.

4.10.4 In the absence of a contractor, when AECOM staff are in the field alone—e.g., investigations, surveys—all appropriate DOT traffic control standards and devices shall be observed and placed in position.

4.10.5 The work zone shall be made safe by its separation from traffic.

4.11 **Flagging**

4.11.1 Flaggers and others providing temporary traffic control will wear high visibility clothing with a background of fluorescent yellow-green or orange-red and white, silver, yellow-green, orange, or yellow retro-reflective material.

4.11.2 In areas of traffic movement, PPE will make the worker visible for at least 1,000 feet so that the worker can be seen from any direction and will make the worker stand out from the background. Check the label or packaging to confirm that the garments are performance Class 2 or 3 (class requirement may be project-specific).

4.11.3 Drivers should be warned in advance with signs that there will be a flagger ahead.

4.11.4 Flaggers should use STOP/SLOW paddles, paddles with lights, or flags (flags should be used only in emergencies.). The STOP sign should be octagonal with a red background and white letters and border. The SLOW sign should be octagonal with an orange background and black letters and a border.

4.11.5 **Flag Persons**

- A traffic control person (flag person) will stand in a safe position, preferably on the driver's side of the lane under control, be clearly visible, have an unobstructed view of approaching traffic, and be positioned at least 25 m (80 ft) away from the work area unless circumstances or space requirements, such as working at or near an intersection, dictate otherwise.
- Flag persons will be trained and competent and will use appropriate PPE.
- Flag persons will be instructed in traffic control and flagging procedures, will be provided with sufficient breaks, and will not be permitted to work alone for extended periods as per local regulations.
- Flag persons will not get involved in needless conversation and will stay alert at their points of duty until relieved.
- Except for brief flagging operations, or in an emergency, "Flag Person Ahead" signs will be posted in advance of each flag person's station. Such signs will be removed promptly when the flagging operation terminates.

4.12 **Lighting**

4.12.1 Flagger stations should be illuminated. Lighting for workers on foot and equipment operators is to be at least 5 foot-candles or greater.

4.12.2 Where available lighting is not sufficient, flares or chemical lighting should be used.

4.12.3 Glare affecting workers and motorists should be controlled or eliminated.

4.13 **Training**

4.13.1 Flaggers should be trained/certified and will use the signaling methods required by the authority in charge.

4.13.2 WOF, equipment operators, and drivers in internal work zones need to know the routes that construction vehicles will use.

4.13.3 Equipment operators and signal persons need to know the hand signals used on the worksite.

4.13.4 Operators and WOF need to know the visibility limits and the "blind spots" for each vehicle on site.

4.13.5 WOF should wear high visibility safety garments designated as Class 1, 2 or 3.

4.13.6 Workers should be made aware of the ways in which shift work and night work may affect their performance.

4.14 Driving

- 4.14.1 Seatbelts and rollover protection will be used on equipment and vehicles as stated by the manufacturer.
- 4.14.2 When pulling off to the side of the road, AECOM personnel will park their vehicles at minimum of 20 feet or the width of two traffic lanes from moving traffic.

4.15 Night Operations and Work Within Traffic Controls

- 4.15.1 Night work on roadways should not be done unless absolutely necessary and unless the work area is adequately lit.
- 4.15.2 Operations with night activities will have a written plan that addresses the safety issues of working at night. The plan will address, but is not limited to:
- **Reflectivity**
 - All equipment used in the work zone shall have DOT-approved reflective material placed to increase the visibility of the equipment.
 - All reflective surfaces shall be cleaned as required so that the reflectivity of the material is not degraded. Any areas of reflective surface that is damaged or obscured will be replaced.
 - Personnel working at night will have reflective tape on their hardhats and will wear retro-reflective vests at a minimum. The reflective bands on vests will be vertical and horizontal around the entire upper body.
 - Additional measures such as white disposable coveralls, reflective bands, and personal battery-operated strobe lights may be used when practical.
 - **Illumination**
 - Whenever feasible and practical, light plants will be used to illuminate the work area.
 - On mobile operations, additional lighting on equipment may be used to illuminate the work area.
 - All equipment shall, at a minimum, have working strobe or warning beacon lights.
 - All equipment shall have working lights confirmed through daily visuals.
 - All flag persons will be placed in illuminated areas only.
 - All lighting is to be checked after setup to confirm that it is not blinding approaching traffic or other equipment in the work zone.
 - **Hazard Analysis and Communication**
 - Prior to the start of any night operation, a detailed Hazard Analysis will be made addressing the possible hazards of night work. The Hazard Analysis will be reviewed with the crews and updated as needed. At the start of each shift, the Daily Safety Reminder will be used to reaffirm the provisions of the night work requirements as found in the hazard analysis and this policy.
 - The hazard analysis should also provide for:
 - The selection of a competent person responsible for maintaining surveillance on the work area to alert other workers of vehicles encroaching on the work zone.
 - A method to signal workers when vehicles encroach on the work zone.
 - A system to account for workers at all times, which may include a buddy system.
 - Emergency communication or warning signals used by a worker such as a radio, signal horn, or whistle, which will be used to call for help.

4.16 Attenuator Vehicles

- 4.16.1 Although not required, it is good construction practice to place an attenuator truck or pick-up truck (minimum) immediately ahead of workers in a work zone.
- 4.16.2 The vehicle of choice should be placed to provide the best protection for workers.
- 4.16.3 The tires should be placed so that when struck the vehicle will turn away from workers.

4.17 Closures within a Closure

4.17.1 On occasion, satellite operations may be performed under full freeway traffic closures. For this type of work, special precautions referred to as a "closure within a closure" is to be implemented in accordance with the following:

- Posted speed limits within closures should be set at 15 miles per hour.
- Signs are to be installed approximately 250 feet in advance of and behind the work zone to alert drivers who may approach from either direction of the upcoming work zone.
- The work area is to be completely delineated with Type 1 barricades (candlesticks).
- Any vehicle used for AECOM field work shall be equipped with a functioning rotating beacon placed on the roof of the vehicle.

5.0 Records

5.1 Traffic Protection Plans and completed Equipment Checklists will be maintained in project files.

6.0 References

6.1 The following standards apply to traffic accommodation equipment.

Association	Standard
Transportation Association of Canada	Manual of Uniform Traffic Control Devices for Canada (1998)

S3NA-306-FM Equipment Checklist

Name of Contractor:

Location:

Project #:

Date:

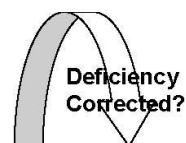
Time:

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
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 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 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? (MUTCD)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

COMMENTS:

S3NA-307-PR Housekeeping, Worksite

1.0 Purpose and Scope

- 1.1 This procedure provides AECOM's work practices as well as personal hygiene and work site sanitation standards for housekeeping.
- 1.2 Applies to all AECOM North America-based staff and field worksites.

2.0 Terms and Definitions

- 2.1 None

3.0 Attachments

- 3.1 None

4.0 Procedure

4.1 Roles and Responsibilities

- 4.1.1 **Project Manager (Field Task Manager, Supervisor)** is responsible for the procedure's implementation and the details of addressing housekeeping policy within the construction/demolition worksite.
- 4.1.2 **SH&E Department** personnel will monitor, assess, and report on project housekeeping when visiting locations.
- 4.1.3 **Employees** are responsible for reporting any areas of concern to the Site Supervisor for prompt resolution as well as for maintaining worksites that are free from debris, clutter, and slipping or tripping hazards.

4.2 Smoking, Eating, and Drinking

- 4.2.1 Eating and drinking will be permitted in designated areas at AECOM project sites and as specified on client sites. Smoking will be permitted only in areas designated in compliance with applicable local laws, regulations, legislation, and ordinances, by the Field Supervisor and situated in locations that are not in the immediate vicinity of activities associated with work site activities. Additionally, Field Supervisor will designate each smoking area giving primary consideration to those personnel who do not smoke.
- 4.2.2 Personnel 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).
- 4.2.3 Site personnel will first wash hands and face after completing work activities and prior to eating or drinking.

4.3 Water Supply

- 4.3.1 Water supplies will be available for use on site and will comply with the following requirements:
- 4.3.2 **Potable Water:** An adequate supply of drinking water will be available for site personnel consumption. Potable water can be provided in the form of approved well or city water, bottled water, 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.
- 4.3.3 **Nonpotable Water:** Nonpotable water will not be used for drinking purposes. Nonpotable 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 nonpotable water used will be properly identified and labeled as such.

4.4 Toilet Facilities

- 4.4.1 Toilet facilities will be available for site personnel and visitors. Should subcontractor personnel be located on-site for extended periods, it may become necessary to obtain temporary toilet facilities.

Exceptions to this requirement will apply to mobile crews where work activities and locations permit transportation to nearby toilet facilities.

- 4.4.2 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 on site. For mobile crews where work activities and locations permit use of nearby toilet facilities (e.g., gas station, or rest stop), on-site facilities are not required.

4.4.3 Washing Facilities

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

- 4.4.5 Personal Cleaning Supplies: Cleaning supplies at AECOM project sites will consist of soap, water, and disposable paper towels or items of equal use/application (e.g., anti-bacterial gels, wipes, etc.).

4.5 **Clothing and Personal Protective Equipment (PPE)**

- 4.5.1 All PPE will be kept clean at all times and maintained in accordance with the manufacturer's, AECOM's, and applicable regulatory, legislative, or provincial requirements.

4.5.2 General Work Areas

- 4.5.3 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 emptied regularly.

4.5.4 Break Areas and Lunchrooms

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

- 4.5.5 All food and drink items will be properly stored when not in use.
- 4.5.6 Food items will not be stored in personal lockers for extended periods in order to prevent the potential for vermin infestation.
- 4.5.7 Perishable foods will be refrigerated whenever possible.
- 4.5.8 All waste food containers will be discarded in trash receptacles.
- 4.5.9 All tables, chairs, counters, sinks, and similar surfaces will be kept clean and free of dirt, waste food, and food containers at all times.
- 4.5.10 Refrigerators used to store food items will be maintained at 45 degrees Fahrenheit and emptied of all unclaimed food items weekly. Refrigerators used to store food will be labeled as such so that only food and drinks are stored within the refrigerator.
- 4.5.11 Routine cleaning of refrigerators will also be performed on a regular basis.

4.6 **Vermin Control**

- 4.6.1 Every enclosed workplace shall be constructed, equipped, and maintained, so far as reasonably practicable, to prevent the entrance or harborage of rodents, insects, and other vermin.
- 4.6.2 A continuing and effective extermination program shall be instituted where the presence of rodents, insects, or other vermin is detected.

4.7 **General Housekeeping**

- 4.7.1 All work areas shall be kept clean to the extent that the nature of the work allows.
- 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 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.
- 4.7.4 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.
- 4.7.5 At no time will debris or trash be intermingled with waste PPE or contaminated materials.

- 4.7.6 Material and equipment must be placed, stacked, or stored in a stable and secure manner. Stacked material or containers must be stabilized as necessary by interlocking, strapping, or other effective means of restraint to protect the safety of workers.
- 4.7.7 An area in which material may be dropped, dumped, or spilled must be guarded to prevent inadvertent entry by workers or protected by adequate covers and guarding.
- 4.7.8 Floors, platforms, ramps, stairs, and walkways available for use by workers must be maintained in a state of good repair and kept free of slipping and tripping hazards. If such areas are taken out of service, the employer must take reasonable means for preventing entry or use.
- 4.7.9 Hazardous areas not intended to be accessible to workers must be secured by locked doors or equivalent means of security and must not be entered unless safe work procedures are developed and followed.

4.8 **Worksite Offices and Trailers**

Worksite offices and trailers will be maintained in accordance with *S3NA-103-PR Housekeeping, Office*.

5.0 **Records**

- 5.1 None

6.0 **References**

- 6.1 None

S3NA-308-PR Manual Lifting, Field

1.0 Purpose and Scope

- 1.1 This procedure provides the requirements for use when performing manual materials handling activities (e.g., lifting/handling of items or materials).
- 1.2 This procedure applies to all field staff for AECOM North America-based operations.

2.0 Terms and Definitions

- 2.1 **Manual Materials Handling:** 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 Attachments

- 3.1 S3NA-308-WI Manual Lifting Safe Work Practices

4.0 Procedure

4.1 Roles and Responsibilities

- 4.1.1 The **Project Manager** will effectively implement the procedure, providing resources as required, and providing direction on proper lifting/handling techniques.
- 4.1.2 The **Region SH&E Manager** will assist in identifying activities with a high potential for lifting/handling strains/injuries as well as the associated mitigation strategies and training on proper lifting/manual materials handling techniques.
- 4.1.3 **Employees** are responsible for reviewing and following *S3NA-308-WI Manual Lifting Safe Work Practices*.

4.2 Mechanical Controls

- 4.2.1 Mechanical equipment or assistance such as dollies, carts, come-alongs, or rollers are preferable to be used whenever possible rather than the employee physically moving materials.
- 4.2.2 Mechanical assistance will be of proper size, have wheels sized for the terrain, and be designed to prevent pinching or undue stress on wrists.
- 4.2.3 Objects to be moved will be secured to prevent falling and properly balanced to prevent tipping.

4.3 Administrative Controls

- 4.4 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.
- 4.5 Rotation is not simply performing a different job but instead is performing a job that utilizes a completely different muscle group from the ones that have been overexerted.

5.0 Records

- 5.1 None

6.0 References

- 6.1 OSHA Technical Manual: http://www.osha.gov/dts/osta/otm/otm_vii/otm_vii_1.html
- 6.2 National Safety Council: www.nsc.org

S3NA-308-WI Manual Lifting Safe Work Practices

1.0 General

1.1 Before Performing a Lift:

- 1.1.1 Check to see if mechanical aids such as hoists, lift trucks/dollies, or wheelbarrows are available.
- 1.1.2 Do not lift if you are not sure that you can handle the load safely.
- 1.1.3 Confirm that, based on your own physical capabilities and medical limitations, you can lift the load without overexertion. Get help with heavy or awkward loads.
- 1.1.4 Confirm that the load is “free” to move.
- 1.1.5 Check that the planned destination of the load is free of obstacles and debris.
- 1.1.6 Confirm that the path to the planned destination of the load is clear. Grease, oil, water, litter, and debris can cause slips and falls.
- 1.1.7 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 Section 2.0 for additional guidance.

1.2 General Tips for Lifting

- 1.2.1 Prepare for the lift by warming up the muscles.
- 1.2.2 Make certain that your balance is good. Feet should be shoulder width apart, with one foot beside and the other foot behind the object that is to be lifted.
- 1.2.3 Bend the knees; do not stoop. Keep the back straight, but not vertical. There is a difference. Tucking in the chin straightens the back.
- 1.2.4 Grip the load with the palms of your hands and your fingers. The palm grip is much more secure. Tuck in the chin again to make certain your back is straight before starting to lift.
- 1.2.5 Use your body weight to start the load moving, then lift by pushing up with the legs. This makes full use of the strongest set of muscles.
- 1.2.6 Keep the arms and elbows close to the body while lifting.
- 1.2.7 Carry the load close to the body. Do not twist your body while carrying the load. To change direction, shift your foot position and turn your whole body.
- 1.2.8 Watch where you are going!
- 1.2.9 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.

1.3 Engineering Controls:

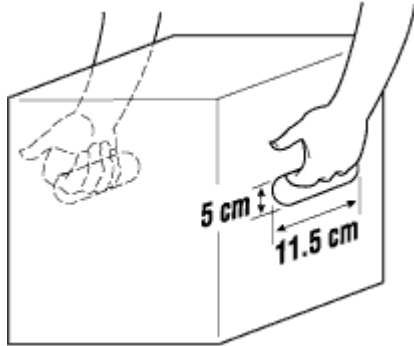
- 1.3.1 Material handling tasks should be designed to minimize the weight, range of motion, and frequency of the activity.
- 1.3.2 Alter the task to eliminate the hazardous motion and/or change the position of the object in relation to the employee's body—such as adjusting the height of a pallet or shelf.
- 1.3.3 Work methods and stations should be designed to minimize the distance between the person and the object being handled.
- 1.3.4 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.
- 1.3.5 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.

- 1.3.6 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.

- 1.3.7 Store heavy objects at waist level.

- 1.4 Whenever possible, utilize hand holds or other lifting attachments on objects being handled:**



- 1.4.1 Use the “hook grip” on loads with cut-out handholds.
- 1.4.2 Curl your fingers around the edge.
- 1.4.3 Do not hold the load with your fingertips.
- 1.4.4 Use containers with handles located more than halfway up the side of the container.
- 1.4.5 Use the “ledge grip” to handle regularly shaped objects without handles.



- 1.4.6 Use vacuum lifters to handle sheet materials or plates.
- 1.4.7 Hold the object with hands placed diagonally.
- 1.4.8 Wear gloves where practical.

2.0 Specific Handling Techniques

The following guidance will be used when performing manual materials handling for various types of materials.

2.1 Square or Rectangular Objects

- 2.1.1 Place one foot slightly in front of the other.
- 2.1.2 Squat as close to the object as possible.
- 2.1.3 Grasp one of the top corners away from the body and the opposite bottom corner closest to the body.
- 2.1.4 Tilt the object slightly away from the body, tilt forward at the hips, keep the back straight, and tuck in the chin.
- 2.1.5 Test to confirm that the object is loose from floor and will lift without snagging.
- 2.1.6 Straighten the legs, keeping the backbone straight, pull the object into the body, and stand up slowly and evenly without jerking or twisting.

2.1.7 If turning or change of direction is required, turn with feet without twisting the torso and step in the direction of travel.

2.1.8 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.

2.2 Cylindrical Objects

2.2.1 When lifting/moving round or cylindrical objects, the objects should be rolled wherever possible. 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.

2.2.2 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.

2.2.3 Use carts or tracks to transport cylinders. Make sure that two people transport a cylinder if carts cannot be used, use lifting straps to improve grip.

- Technique for one person lifting a cylinder onto a platform:
 - Roll the cylinder to within 3 feet of the platform.
 - Position the forward foot around the cylinder, the back foot about 1 foot behind the cylinder.
 - Bend knees slightly.
 - Place one hand on the valve protective cap, the other hand underneath the cylinder about 1 foot from the ground.
 - Tilt the cylinder onto the thigh of the back leg.
 - Balance the cylinder on the thigh by pressing down with the back hand while lifting the cylinder with the forward hand.
 - Extend both knees to initiate forward movement of the cylinder and continue by pushing up and forward with the arms until the cylinder is located on the platform.
 - Climb on the platform.
 - Straddle the cylinder at the valve end.
 - Grasp the valve protective cap of the cylinder with both hands between the thighs.
 - Lean forward and straighten the knees to set the cylinder upright.

2.3 Bags and Sacks

2.3.1 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.
- 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 under it.
- 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.
- 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.
- 2.3.2 Avoid unloading a bag from the shoulder directly to floor level. Use an intermediate platform or get help from a coworker.
- 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.
- 2.3.3 Bulkier sacks are easier to carry on your back. Lift the sack onto your back from a platform:
- Move the sack to the edge of the platform.
 - Put your 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.
 - Keep the back straight.
 - Stand up and straighten the hips and knees.
 - Stabilize the sack.
 - Move away without bending sideways.
- 2.3.4 Two-person handling of a sack:
- Position one person on either side of the sack.
 - Squat with one foot balancing behind the sack.
 - Keep back straight.
 - Grasp with the outer hand on the upper corner, 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 stack.
 - Put the sack on the stack.
- 2.4 Sheet Materials**
- 2.4.1 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 your other hand and put your 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.

- Whenever moving sheet materials, be cognizant of wind conditions.

2.4.2 To carry sheets:

- Use drywall carts 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.

2.4.3 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.
- Select team members of similar height and strength.
- 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.

2.5 **Material Storage**

2.5.1 When storing materials on site:

- Store materials at a convenient height.
- Leave the lowest shelf unused if necessary.
- Use vertically mobile shelves to avoid bending and overhead reaching.
- Use bin racks for storing small items.
- Store heavy and frequently used materials at waist height.
- Do not store materials at floor level.
- Use hand trucks with elevating devices in storage and loading areas.
- Use trucks with a tilting device to avoid bending.
- Use elevating platforms to avoid overhead reaching.

S3NA-309-PR Mobile or Heavy Equipment

1.0 Purpose and Scope

- 1.1 Outline the safe working requirements for working with and near mobile equipment and heavy equipment operation.
- 1.2 This procedure applies to all AECOM North America based employees and operations.

2.0 Terms and Definitions

- 2.1 **Heavy equipment:** All excavating equipment include scrapers, loaders, crawler or wheel tractors, excavators, backhoes, bulldozers, off-highway trucks, graders, agricultural and industrial tractors, and similar equipment.
- 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 Attachments

- 3.1 S3NA-309-FM1 Certification of Machinery and Mechanized Equipment
- 3.2 S3NA-309-FM2 Heavy Machinery Pre-Operation Checklist
- 3.3 S3NA-309-WI Brokk180 Safety Card

4.0 Procedure

- 4.1 For work under AECOM's control, Project Managers are responsible for ensuring all equipment is in good working order and all equipment operators are qualified on the piece of machinery they are assigned.
- 4.2 Staff will confirm that all rented equipment arrives in proper working order with the manufacturer's operating manual before acceptance from the supplier.
- 4.3 The operator of mobile equipment is the only worker permitted to ride the equipment unless the equipment is a worker transportation vehicle.
- 4.4 A person will not operate mobile equipment unless the person has received adequate instruction and training in the safe use of the equipment, has demonstrated to a qualified supervisor or instructor competency in operating the equipment.
- 4.5 The operator of mobile equipment will operate the equipment safely, maintain full control of the equipment, and comply with the laws governing the operation of the equipment

4.6 Communication

- 4.6.1 Communication between site supervisors/managers, heavy equipment operators, and other site personnel is a key method of preventing serious injury or death during heavy equipment operations.
- 4.6.2 The following outline the communication requirements during heavy equipment operations:
 - Site supervisors/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 onsite 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.
 - 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 (i.e., 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 guide shall use a standard set of hand signals to provide directions. Flags or other high visibility devices may be used to highlight these signals.

4.7 **Ground Personnel**

4.7.1 Ground clearance around heavy equipment may significantly reduce hazards posed during heavy equipment operations.

4.7.2 The following 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 job-specific hazard analysis that identifies any special precautions shall be completed and communicated to all AECOM personnel.
- 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 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.
- 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 heavy equipment or other objects (i.e., steel support beams, trees, buildings, etc.).
- Ground personnel shall never stand directly below heavy equipment located on higher ground.
- If working near heavy equipment, ground personnel shall stay out of the travel and swing areas (excavators, all-terrain forklifts, hoists, etc.) of all heavy equipment.
- Ground personnel shall never work near heavy equipment.
- Personnel shall keep all extremities, hair, tools, and loose clothing away from pinch points and other moving parts on heavy equipment.
- Personnel shall not talk on a cell phone while standing or walking on a roadway or other mobile equipment path.

4.7.3 At a minimum, all ground personnel and operators outside of heavy equipment shall wear the following:

- High visibility, reflective (Class 2) safety vest that is visible from all angles and made of fluorescent material and orange, white, or yellow reflective material (confirm that vest is not faded or covered with outer garments, dirt, etc.).
- Retro-reflective striping for arms and legs (night work)
- ANSI-CSA approved hard hat
- ANSI-CSA approved safety glasses with side shields
- ANSI-CSA approved work boots (unless project requirements are more stringent)
- ANSI-CSA approved hearing protection as needed
- Appropriate work clothes (i.e., full length jeans/trousers and a sleeved shirt; no tank, crew tops or other loose clothing permitted).

4.8 Prior to work commencing

- 4.8.1 All mobile equipment will be regularly inspected pre-shift and then regularly as required with the details of the inspection recorded in a log book.
- 4.8.2 The operator will report defects and conditions affecting the safe operation of the equipment to the supervisor or employer. Any repair or adjustment necessary for the safe operation of the equipment will be made before the equipment is used.
- 4.8.3 Exposed moving parts on mobile equipment which are a hazard to the operator or to other workers will be guarded and 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.
- 4.8.4 An approved Underwriter's Laboratories (UL) 4A40BC fire extinguisher should be present on all mobile equipment.
- 4.8.5 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, mobile equipment has the 'right of way'.
- 4.8.6 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.
- 4.8.7 Mobile equipment in which the operator cannot directly or by mirror or other effective device see immediately behind the machine will have an automatic audible warning device which activates whenever the equipment controls are positioned to move the equipment in reverse, and if practicable, is audible above the ambient noise level.

4.9 Operation

- 4.9.1 The operator of mobile equipment will operate the equipment safely, maintain full control of the equipment, and comply with the laws governing the operation of the equipment.
- 4.9.2 A supervisor will not knowingly operate or permit a worker to operate mobile equipment which is, or could create, an undue hazard to the health or safety of any person.
- 4.9.3 The operator of mobile equipment will not leave the controls unattended unless the equipment has been secured against inadvertent movement such as by setting the parking brake, placing the transmission in the manufacturer's specified park position, and by chocking wheels where necessary.
- 4.9.4 The operator will maintain the cab, floor and deck of mobile 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.
- 4.9.5 If mobile 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.
- 4.9.6 When approaching or crossing the intended path of travel of mobile equipment, establish eye contact with the operator of the mobile equipment and confirm that it is safe to proceed.
- 4.9.7 Have vehicle headlights on at all times when driving in the area.
- 4.9.8 Park motor vehicles off the haul roads, or away from the work areas.
- 4.9.9 Do not wear loose clothing where there is a danger of entanglement in rotating equipment.
- 4.9.10 Do not enter the swing area of machines such as cranes, mobile drill rigs, or excavators, without first making eye contact with the operator, and receiving permission to do so.
- 4.9.11 Stay out of the blind areas around mobile equipment and never assume that the equipment operators have seen them or are aware of their presence.
- 4.9.12 Maintain a distance of 60 cm (2 ft.) between the counterweight of swing machines and the nearest obstacle. If this distance cannot be maintained, the area will be barricaded or guarded to prevent access.
- 4.9.13 Vibration from moving traffic or mobile equipment can cause excavations or spoil piles to become unstable. Be aware of the risk and keep clear.
- 4.9.14 All heavy equipment shall be operated in a safe manner that will not endanger persons or property.
- 4.9.15 All heavy equipment shall be operated at safe speeds.

- 4.9.16 Always move heavy equipment up and down the face of a slope. Never move equipment across the face of a slope.
- 4.9.17 Slow down and stay as far away as possible while operating near steep slopes, shoulders, ditches, cuts, or excavations.
- 4.9.18 When feasible, operators shall travel with the "load trailing", if the load obstructs the forward view of the operator.
- 4.9.19 Slow down and sound horn when approaching a blind curve or intersection. Flagmen equipped with 2-way radio communications may be required to adequately control traffic.
- 4.9.20 Operators shall remain in cab while heavy equipment is being loaded.
- 4.9.21 Equipment shall be shut down prior to and during fueling. Do not smoke or use electrical devices while fueling. Fuel shall not be carried in or on heavy equipment, except in permanent fuel tanks or approved safety cans.
- 4.9.22 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. Heavy equipment parked on slopes shall have the wheels chocked.
- 4.9.23 Never jump on to or off of a piece of heavy equipment, always maintain 3-points of contact at a minimum.
- 4.9.24 Never exit heavy equipment while it is in motion.
- 4.9.25 Passengers shall only ride in heavy equipment designed for occupancy of passengers.
- 4.9.26 Never ride on the outside of a piece of heavy equipment (e.g., tailgates, buckets, steps, etc.).
- 4.9.27 Site vehicles will be parked in a designated parking location away from heavy equipment.
- 4.9.28 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.
- 4.9.29 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.
- 4.9.30 Equipment left unattended at night adjacent to traveled 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 (or the regulatory requirement for the work location) to the active roadway.
- 4.9.31 Pneumatic-tired earthmoving haulage equipment, with a maximum speed exceeding 15 miles per hour, shall be equipped with fenders on all wheels.
- 4.9.32 Lift trucks shall have the rated capacity clearly posted on the vehicle, and the ratings are not exceeded.
- 4.9.33 Steering or spinner knobs shall not be attached to steering wheels.
- 4.9.34 High lift rider industrial trucks shall be equipped with overhead guards.
- 4.9.35 When ascending or descending grades in excess of 5%, loaded trucks shall be driven with the load upgrade.
- 4.9.36 All belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains, or other reciprocating, rotating or moving parts of equipment shall be guarded when exposed to contact by persons or when they otherwise create a hazard.
- 4.9.37 All hot surfaces of equipment, including exhaust pipes or other lines, shall be guarded or insulated to prevent injury and fire.
- 4.9.38 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.
- 4.9.39 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.
- 4.9.40 Substantial overhead protection shall be provided for the operators of fork lifts and similar equipment.
- 4.10 **Utilities**

- 4.10.1 When contacted by heavy equipment, aboveground and underground utilities may cause severe injuries or death as a result of electrocution, explosion, etc.
- 4.10.2 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 (i.e., dump trailers, loaders, excavators, etc.) is lowered prior to moving underneath of 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.

4.11 **Training**

- 4.11.1 The operator or other qualified supervisor will provide all on-site personnel with an orientation to the mobile equipment and its associated hazards and controls.
- 4.11.2 Only designated, qualified personnel shall operate heavy equipment.
- 4.11.3 Operators shall have all appropriate local, state, or federal licenses or training to operate a designated piece of heavy equipment.
- 4.11.4 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 needed. Operators shall be knowledgeable and competent in the operation of a designated piece of heavy equipment.

4.12 **Inspection and Maintenance**

- 4.12.1 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 during work hours.
- 4.12.2 Maintenance records will be maintained on the site or project for mobile equipment.
- 4.12.3 Servicing, maintenance and repair of mobile equipment will not be done when the equipment is operating, unless continued operation is essential to the process and a safe means is provided.
- 4.12.4 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 certified to be in safe operating condition (certification form attached) by a competent individual seven days prior to on-site operation, and is valid for one year.
- 4.12.5 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 site supervisor/manager immediately. Inspection records shall be maintained at the site. If a manufacturer's or company-specific inspection checklist is not provided, use the Heavy Equipment Pre-Operation Inspection Checklist (attached).
- 4.12.6 Defective heavy equipment shall be immediately taken out of service until repaired.

4.13 **Fueling and batteries**

- 4.13.1 A well-ventilated area shall be used for refueling.
- 4.13.2 Only the type and quality of fuel recommended by the engine manufacturer shall be used.
- 4.13.3 Fuel tanks shall not be filled while the engine is running. All electrical switches shall be turned off.
- 4.13.4 No one shall spill fuel on hot surfaces. Any spillage should be cleaned before starting an engine.
- 4.13.5 Spilled fuel shall be cleaned with cotton rags or cloths; do not use wool or metallic cloth.
- 4.13.6 Open flames, lighted smoking materials, or sparking equipment shall remain well away from the fueling area.
- 4.13.7 Heaters in carrier cabs shall be turned off when refueling the carrier or the drill rig.
- 4.13.8 Portable fuel containers shall not be filled completely to allow expansion of the fuel during temperature changes.

- 4.13.9 The fuel nozzle shall be kept in contact with the tank being filled to prevent static sparks from igniting the fuel.
- 4.13.10 Portable fuel containers shall not travel in the vehicle or carrier cab with personnel.
- 4.13.11 Fuel containers and transfer hoses shall be kept in contact with a metal surface during travel to prevent buildup of a static charge.
- 4.13.12 Batteries shall be serviced in a ventilated area while wearing appropriate PPE.
- 4.13.13 When a battery is removed from a vehicle or service unit, the battery shall be disconnected ground post first.
- 4.13.14 When installing a battery, the battery shall be connected ground post last.
- 4.13.15 When charging a battery, cell caps shall be loosened prior to charging to permit gas to escape.
- 4.13.16 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.
- 4.13.17 Spilled battery acid shall be immediately flushed off the skin with a continuous supply of water.
- 4.13.18 Should battery acid get into the eyes, the eyes shall be flushed immediately with copious amounts of water and medical attention sought immediately.
- 4.13.19 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 battery by shorting across a battery terminal. Lighted smoking materials and flames shall be kept at least 25 feet away from battery-charging stations.

5.0 Records

- 5.1 Inspection records shall be maintained with the equipment.

6.0 References

- 6.1 S3NA-205-PR Equipment Inspections & Maintenance

S3NA-309-FM1 Certification of Machinery and Mechanized Equipment

1.0 General Guidelines

- 1.1 Subcontractor equipment shall comply with all applicable requirements for motor vehicles and material handling heavy equipment contained in 29 CFR 1926 Subpart O. 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 certified to be in safe operating condition (using the attached form) by a competent individual seven days prior to onsite operation. This certification is valid for one year.
- 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 Exhaustive preventive maintenance shall be conducted for all equipment according to manufacturer recommendations and/or the subcontractor's internal policies, schedules, and equipment SOPs.
- 2.1.6 Only designated qualified persons shall operate 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 taken out of service and its use shall be prohibited until safe conditions have been corrected.
- 2.1.9 All equipment shall be kept in the exclusion zone until work or the shift has been completed. Equipment will be 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 Location:

1. This form provides certification 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 certification of machinery and mechanized equipment, as required by AECOM, has been made prior to but within seven calendar days in advance of use on the project site. Recertification will be required for equipment that is used on the project 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 above, and is CERTIFIED 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:

S3NA-309- FM2 Heavy Equipment Pre-Operation Checklist

Project Name/Location:																
Number/Name:									Make/Model:							
Hour meter reading:																
Check the following as appropriate	Operator Name/Date			Operator Name/Date			Operator Name/Date			Operator Name/Date			Operator Name/Date			
	SAT	UNSAT	N/A	SAT	UNSAT	N/A	SAT	UNSAT	N/A	SAT	UNSAT	N/A	SAT	UNSAT	N/A	
1. Operator qualified																
2. Overhead guard (ROPS)																
3. Horn																
4. Lights																
5. Parking brake																
6. Service brakes																
7. Steering																
8. Oil level																
9. Hydraulic oil level																
10. Radiator fluid level																
11. Major fluid leaks																
12. Windows																
13. Backup alarm																
14. Tires (visual)																

15. Seat belts															
16. Fuel leaks															
17. Fire extinguisher															
18. Fuel lines secure															
19. Electrical lines															
20. Exhaust components															
Comments/Remarks:															

S3NA-309-WI Brokk180 Safety Card

1.0 Objective/Overview

The Brokk 180 is an electric-powered 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 Safe Operating Guidelines

- 2.1 Prior to use, complete a pre-operation inspection to determine if the unit is in safe working condition.
- 2.2 Position the unit to safely perform the intended task, then deploy the outriggers to stabilize the unit.
- 2.3 Confirm that the operator knows what the lifting capacity is; do not exceed the lifting capacity.
- 2.4 Complete a subsurface utility clearance prior to excavating.
- 2.5 Establish a minimum 15-foot clearance around the unit.
- 2.6 Do not allow debris to build-up around the unit. Maintain good housekeeping practices.
- 2.7 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.
- 2.8 Personnel operating the unit with the remote control device will be properly trained and certified by a competent person.
- 2.9 The operator will be able to maintain line of sight visual contact with the unit at all times to assess hazards and site security.
- 2.10 Maintenance in excess of preventive maintenance activities (e.g., lubrication, replenishing fluids, etc.) will be performed by manufacturer personnel ONLY.
- 2.11 All operations will comply with the manufacturer's recommended policies.

3.0 Potential Hazards

- 3.1 Flying debris.
- 3.2 Crush/impact/pinch from extendable boom, tracks, and tipping over.
- 3.3 Electrocution from subsurface utilities (when excavating).
- 3.4 Hearing loss.

4.0 Training Requirements

- 4.1 Review of applicable SOPs.
- 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 (Level D ensemble)

- 5.1 Reflective traffic safety vest.
- 5.2 Hearing protection (ear plugs and/or ear muffs).
- 5.3 Leather gloves.

6.0 Other Safety Tips

- 6.1 Never stand under a raised boom.
- 6.2 Maintain a clearance of 15 feet around the unit while operating.
- 6.3 Pay close attention to power cords for potential tripping hazard and equipment entanglement.
- 6.4 Maintain line of sight visual contact with unit at all times (especially when operating from a distance).

S3NA(US)-404-PR Commercial Motor Vehicle

1.0 Purpose and Scope

- 1.1 AECOM's Commercial Motor Vehicle (CMV) Program provides guidance to facilitate compliance with the U.S Department of Transportation (DOT) Federal Motor Carrier Safety Regulations (FMCSR) 49 Code of Federal Regulations (CFR), Transportation; Federal Motor Carrier Safety Administration.
- 1.2 This procedure is only applicable to AECOM personnel operating CMVs within the United States. It establishes minimum compliance criteria and guidelines for AECOM employees licensed within the United States that operate CMVs as part of their job description.
- 1.3 Major objectives of the CMV Program:
 - 1.3.1 Identify accountability, responsibility, and authority pertaining to compliance with FMCSR.
 - 1.3.2 Establish minimum criteria for drivers required to operate CMVs in accordance with USDOT and FMCSA regulatory requirements.
 - 1.3.3 Define documentation and corresponding retention requirements.
 - 1.3.4 Provide guidelines and reporting mechanism to ensure driving records and histories are current.

2.0 Terms and Definitions

- 2.1 **Commercial Motor Vehicle (CMV):** For AECOM operations, a CMV is defined as any vehicle used for AECOM business that:
 - 2.1.1 $\geq 10,001$ lbs gross vehicle weight rating (GVWR); and/or
 - 2.1.2 Carries a quantity of hazardous material (quantities ≥ 1001 lbs. combined total weight) at any time beyond the criteria in 49 CFR 173.6 (Materials of Trade).
 - 2.1.3 FMCSR also defines any vehicle that carries hazardous material in quantities ≥ 1001 lbs. combined total weight at any time (49 CFR 173.6) as a CMV. No AECOM vehicle will be used to, nor will any AECOM employee, transport hazardous material in quantities ≥ 1001 lbs.
 - 2.2 **CMVs:** CMVs are also those property-carrying vehicles that meet any of the following criteria:
 - 2.2.1 Group A (Combination Vehicle): Any combination of vehicles with a GVWR of 26,001 lbs or more, provided the GVWR of the vehicle(s) being towed is in excess of 10,001 lbs.
 - 2.2.2 Group B (Heavy Straight Vehicle): Any single vehicle with a GVWR of 26,001 lbs. or more, or any such vehicle towing a vehicle not in excess of 10,000 lbs. GVWR.
 - 2.2.3 Group C (Small Vehicle): Any single vehicle, or combination of vehicles, that meets neither the definition of Group A or Group B, but that is either designed to transport 16 or more passengers including the driver; or weighs more than 10,000 lbs., or has a GVWR greater than 10,000 lbs.; or is used to transport *hazardous materials* as defined under 49 CFR 171.8 and 173.6. Vehicles transporting hazardous materials ≥ 1001 lbs (total combined weight) qualify as CMVs regardless of vehicle weight.
- Notes:**
- **Weight rating** is the maximum load-limit that a vehicle or combination vehicle (e.g., truck plus trailer) has been given by the manufacturer. Compliance with applicable regulations is based on the weight rating: what the **manufacturer** has rated the vehicle or combination vehicle to carry. The regulatory guidelines apply whether the cargo is loaded or not. Vehicles may not be modified to carry more weight than designed by the manufacturer or as currently registered.
 - Some states may designate vehicles that are $< 10,001$ lbs as CMVs based on use. For example, Florida designates vehicles $> 8,000$ lbs GVWR as a CMV. The Regional SH&E Manager will provide support in states that have requirements that differ from the FMSCA.

- 2.3 A comprehensive list of definitions has been provided in *S3NA(US)-404-WI1 Definitions*.
- 2.4 Please reference this attachment as it will assist in implementation of this program.

3.0 Attachments

- 3.1 S3NA(US)-404-FM1 Motor Vehicle Driver's Certification of Violations
- 3.2 S3NA(US)-404-FM2 CMV Employee Release of Information
- 3.3 S3NA(US)-404-FM3 Employer Contact Documentation
- 3.4 S3NA(US)-404-FM4 Human Resource Confirmation of Background Check/Inquiry
- 3.5 S3NA(US)-404-FM5 Annual Review of Driving Record
- 3.6 S3NA(US)-404-FM6 Record of Road Test
- 3.7 S3NA(US)-404-FM7 Pre-Trip Inspection Checklist
- 3.8 S3NA(US)-404-FM8 Inspection of Cargo, Cargo Securement Devices and Systems
- 3.9 S3NA(US)-404-FM9 Post-Trip Inspection Checklist
- 3.10 S3NA(US)-404-WI1 Definitions
- 3.11 S3NA(US)-404-WI2 Initial Hire Documentation Requirements
- 3.12 S3NA(US)-404-WI3 Required Emergency Equipment
- 3.13 S3NA(US)-404-W4 Commercial Motor Vehicle Area of Responsibility
- 3.14 S3NA(US) 404-WI5 Commercial Motor Vehicle New Hire Work Flow

4.0 Procedure

Please see *S3NA-404-WI4-Commercial Motor Vehicle Areas of Responsibility* for areas of responsibility concerning the AECOM Commercial Motor Vehicle Program.

4.1 Roles and Responsibilities

4.1.1 Operational Managers

- **Operational management** is responsible for management and implementation of the Commercial Motor Vehicle Program in accordance with the requirements of this procedure.
- Compliance with regional state, local, business unit, and section specific requirements are to be addressed in additional guidance documents that are to be generated by the business unit to facilitate compliance with regional, state, and/or local requirements.

4.1.2 Region Manager

- Each **Region Manager** is responsible for systems that are in place to implement and enforce the requirements of this program. This includes allocation of resources (budget, training staff, etc.) that will support their operation's effective implementation, tracking and maintenance of the CMV Program.

4.1.3 District/Office Managers

- **District/Office Managers** are responsible for ensuring that all applicable employees and vehicles within their office/section are compliant with the CMV Program requirements. This will include:
 - Implementation and enforcement of the CMV program to ensure appropriate driving licenses and endorsements are current and consistent with the class/category CMV the employees will operate.
 - Designating an office/section support person (CMV Contact) who will serve as an office/section point of contact as discussed in this program.
 - Ensure an initial and annual review of driving records and history is performed. This process will be performed with support from the **Human Resources (HR) Department**.
 - Ensure employee driving status is communicated to **office/section HR contact** and CMV Contact prior to the initiation of the hiring process or when an employee is re-assigned to a CMV position.

- Ensure all documentation specified in this program is submitted to the appropriate regional HR and CMV contact.
- Perform an annual review of employees' job requirements/description to ensure appropriate driving designation.
- Ensure employees are evaluated for CMV operations and, for those without CDLs, and are given a Certified Road Test. See *S3NA-404-FM6 Record of Road Test*.
- Confirm CMV compliance with regulatory requirements in whatever states employees operate a CMV.
- Track employee driving status to ensure FMCSA and/or state regulation violations that would affect employee's ability to operate a CMV are identified.
- Ensure all CMVs meet FMCSA design, maintenance, and operational criteria.
- Maintain Office/Section archives for all paper work and documentation in accordance with the CMV program and FMCSA requirements.

4.1.4 Human Resources (HR) Department

- Once the **District/Office Managers** or their designees identify to **Human Resources (HR)** the employees that are subject to these DOT and FMCSR, **HR** will be responsible for the following regarding compliance with the CMV program:
 - Collecting the information and documentation that is required for an individual to maintain their driving status. Specific documentation requirements are provided in Attachments.
 - Performing employee background checks regarding employment history, driving history, driving records, CMV/CDL violations, etc. See *S3NA-404-WI5 Commercial Motor Vehicle Areas New Hire Work Flow*.
 - Oversight and maintenance of the DOT drug and alcohol program (DAP). The DAP support includes coordinating testing and contacting supervisors/employees regarding scheduling results.
 - Submittal of required driver management documentation to the appropriate Federal and state agencies. Examples of reporting to a federal and state agency would be AECOM reporting failures of previous employers to respond to a background check, contacting state agencies regarding driving status, etc. Additional information/direction is provided in the subsequent sections and attachments.

4.1.5 Safety, Health and Environmental (SH&E) Department

- The **SH&E Department** is responsible for:
 - Monitor training and medical surveillance anniversary dates. This would include oversight of documentation management for covered employees.
 - Establishing requirements regarding compliance with FMCSA and state safety regulations and communicating these requirements to each business unit.
 - Providing a resource to maintain employee certification and training dates (e.g., Driver Management On-line through J.J. Keller).
 - Auditing to determine compliance with program requirements.
 - Providing technical assistance/support as requested by the business unit. This is key in states that have additional regulatory requirements above the FMCSA safety requirements.
 - Filing the MCS-150 form/update on the schedule discussed in Motor Carrier Identification Report on a yearly basis.
 - CMV and hazardous material transportation related vehicle incident reporting, investigation and management.
 - Roadside inspection report (MCS-63) responses shall follow *S3NA- 211-PR Regulatory Inspections*.

4.1.6 Employee Requirements

- Employees required to maintain a Commercial Drivers License (CDL) are responsible for maintaining their license(s) and ensuring compliance with FMCSA and state regulatory requirements in accordance with FMCSA – 49 CFR, Part 383: Commercial Driver's License Standards; Requirements and Penalties. This includes those employees who operate Group A and Group B vehicles. Those AECOM employees who drive Group C vehicles are not required under FMCSA to have a CDL.

- All employees who drive CMVs are responsible for:
 - Providing a 10-year employment history when completing the employment application.
 - Current employees are to provide this information subtracting their current AECOM employment period from the 10-year history (e.g., if the individual has been employed by AECOM for 3 years [or a legacy AECOM operating company], they would provide their work history for 7 years prior to working for AECOM).
 - Minimum work history information requirements are provided in *S3NA(US)-404-WI2 Initial Hire Documentation Requirements*.
 - Tracking driver's license expiration date and updating license prior to expiration.
 - Tracking medical surveillance test dates to ensure they are compliant with FMCSA and state requirements.
 - Immediately reporting to their supervisor, regardless if the event occurred on-duty or off-duty, any of the violations/offenses listed below:
 - Has had more than one license within a 2-year period.
 - Has had their license suspended, revoked, or cancelled.
 - Has received any citation, warning, or notification of violation of any states' motor vehicle code/regulation. The employee's supervisor is to be provided a copy of the citation, notification or warning.
 - Has had any convictions in any type of motor vehicle for major disqualifying offenses.
 - Has had more than one conviction for any type of motor vehicle for serious traffic violations.
 - Has had any violation of State or local law relating to motor vehicle traffic control arising in connection with any traffic accident.
 - Has an accident.
- If any of the events listed above have occurred, the employee is to complete the forms provided in: S3NA(US)-404-FM1 Motor Vehicle Driver's Certification of Violations (form is required within 24 hours of the event). Once the forms are completed, the employee is to submit the forms to the appropriate agency as indicated on the forms. The forms are also to be submitted to the employee's supervisor. The supervisor is to submit the original to their **HR** contact and a copy to the **Region SH&E Manager**.
- Completing and submitting all paperwork and documentation as required in this program (49 CFR 395).
- When operating a CMV, the employee is required to keep on their person a current CDL.
- When operating a CMV, the employee is to maintain on their person a current copy of the physician certification/statement that they are qualified to operate a CMV in accordance with FMCSA guidelines.
- Must comply with the AECOM DOT DAP.

4.2 Minimum Employee Qualifications

4.2.1 General

Provided in this section are the minimum requirements for employees that operate a CMV. If an employee does not meet these requirements, they are unqualified to operate the designated vehicle class. Any further action will be in accordance with the AECOM employment policy and at the sole discretion of the **Supervisor** and **HR Department**.

4.2.2 Employee Driver Requirements

Employees operating any CMV must meet the following minimum requirements:

- Is at least 21 years old if they are to drive in an interstate situation.
- Reads and speaks the English language sufficiently to converse with the general public, to understand highway traffic signs and signals in the English language, to respond to official inquiries, and to make entries on reports and records.
- **Office/section manager** (or their designee) and the employee's immediate supervisor have authorized operation of the CMV. This process shall be documented to provide evidence in case of unauthorized personnel operating a CMV.
- Has been issued a written medical certification/clearance in accordance with this program.

- Has completed entry level driver training (49 CFR 380.503).
- Has a current and valid license appropriate for the CMV to be driven that is issued only by one state or jurisdiction.
- Has provided their immediate supervisor with the list of all motor vehicle violations for the last three years, see *S3NA(US)-404-FM1 Motor Vehicle Driver's Certification of Violations*.
- Has not been disqualified from driving CMVs.
- Has successfully passed a Certified Road Test or has a CDL.
- Has completed a comprehensive FMCSA Safety and Security, and a USDOT Hazardous Material Regulations (HMR) Training Program (Materials of Trade at minimum) in the past three years. This training can be coordinated with the local SH&E representative.

4.2.3 Employee Background Check/Inquiry

All employees authorized to operate any CMV will have their driving records and driving history checked by the **HR Department**. If this is a new employee, this is done prior to hire. If an existing employee has not had this check, it must be done prior to operating any CMV. In order to perform the background check a signed release, see *S3NA(US)-404-FM2 CMV Employee Release of Information*, is to be obtained from the employee by the **HR Department** prior to any background check. The background check may consist of any of the following:

- Personal interviews,
- Telephone interviews,
- Letters,
- Any other method that the **HR Department** deems appropriate.
 - The **HR Department** will document the results (see *S3NA(US)-404-FM3 Employer Contact Documentation*) and/or good faith effort (see *S3NA(US)-404-FM4 Human Resource Confirmation of Background Check/Inquiry*) to make contact with previous employers and place the results into the employee's driver qualification file. The minimum information that is to be collected during the background check is reviewed (*S3NA(US)-404-WI2 Initial Hire Documentation Requirements*).

The employee must not have any violations that would preclude them from operating a CMV. The information that is to be collected as part of the background check will include the following:

- Employee driving record during the preceding three years of employment from the appropriate agency of every state in which the driver held a motor vehicle operator's license or permit during those three years.
- Any driving record information collected as part of the state background check is to be placed into the employee driver qualification file within 30 days of employment or for existing employees within 30 days of the background check initiation date. (Note: If an employee has no violations this is to be included in the driving record file).
- Drug and alcohol test results for the past three years.
- A background check of the employee's driver safety performance during the preceding three years.
- Any driver safety performance history collected as part of the employment check is to be placed into the individuals driver qualification file within 30 days of employment or for existing employees within 30 days of the check initiation date.
- If the employee's previous employers cannot be contacted, a memo will be generated and placed into the employee's driver qualification file stating that a good faith effort was made to collect the required information.

AECOM will report failures of previous employers to respond to a background check to the FMCSA following procedures specified in 49 CFR 386.12.

4.2.4 Annual Inquiry and Review of Driving Record

- AECOM's **HR Department**, in conjunction with a representative from **SH&E**, will investigate and evaluate the driving record of all employees authorized to operate any CMV on an annual basis (no less than every 12 months) to ensure the CMV employee has not been disqualified as a CMV operator in any of the States in which the employee holds an operator's license or permit or has violated AECOM policies regarding the operation of a CMV.

- Any employee that has been disqualified will not be permitted to operate a CMV and may be subject to other AECOM employment policies.
- The annual evaluation will be documented on the form provided in S3NA(US)-404-FM5 Annual Review of Driving Record. This form will be completed, supporting documentation attached, and used to determine driving qualifications. Failure to pass all criteria as listed in 49 CFR 383.5, Disqualification of Drivers (for employees who operate Group A and B vehicles) and 49 CFR 391.15, Disqualification of Drivers (for employees who operate Group C vehicles) will disqualify the employee from driving a CMV for AECOM for no less than one year. A copy of the evaluation will be maintained in the employee's driver qualification file.

4.2.5 Road Test Certification

- In place of, and as equivalent to, a road test, a person who drives a CMV may present a valid CDL or a copy of a valid certificate of a driver's road test issued to him/her within the preceding three years. A copy of the CDL must be placed in the driver's file.
- For persons without CDLs or road tests issued within the preceding three years, AECOM will require a person to complete a road test. The S3NA(US)-404-FM6 Record of Road Test is to be issued by an AECOM supervisor who has been identified as competent, by the **Office/Section Manager**, to evaluate the employee's skills adhering to the following criteria:
 - The competent person will evaluate the skill of the employee when operating the assigned CMV. The minimum skills sets while operating the CMV are as follows:
 - Successfully execute S3NA(US)-404-FM7 Pre-Trip Inspection Checklist.
 - Demonstrate coupling and uncoupling of combination units (only required if employee will operate equipment that includes combination units).
 - Initiate operation/start-up.
 - Demonstrate successful use of controls and emergency equipment.
 - Operate in traffic typical of normal operating conditions.
 - Pass other motor vehicles.
 - Execute left and right turns.
 - Braking.
 - Reducing speed by means other than braking.
 - Backing up at least two full lengths of the CMV.
 - Parking.
- A checklist, see *S3NA(US)-404-FM6 Record of Road Test*, must be completed by the competent person evaluating the employee. The employee must successfully demonstrate all skills to receive the Certification of Road Test.
- A copy of the Certification of Road Test is to be given to the employee.
- The original copy of the Certification of Road Test is to be maintained in the driver qualification file.
- The employee's immediate supervisor is to ensure the Certification of Road Test is entered into the appropriate AECOM online tracking database.

4.2.6 Physical Qualifications of Drivers

- Prior to operating a CMV, all employees are required to pass a medical examination or review of medical records in accordance with 49 CFR Subpart E, Physical Qualifications and Examinations. The examining physician is to be knowledgeable of FMCSA requirements and operation requirements of the CMVs the employee will operate. The examining physician is to issue a written certification that shall include the following information:
 - Physician's name and license number.
 - Physician's address and telephone number.
 - Date of examination.
 - Employees name.
 - Date of exam expiration.
- The examining physician is to provide a signed certificate in accordance with 49 CFR 391.43(h). The following statement is to appear on the certification referencing the employee: "physically fit or not fit to operate a CMV in accordance with 49 CFR 391.41-391.49." The certificate is to

identify, in accordance with 49 CFR 391.43(h), any limitations that would affect the employee's ability to operate a CMV.

4.2.7 Medical Certification Maintenance

- Access and maintenance of the physician's medical certification is as follows:
 - The employee is to ensure AECOM is provided a copy of the physician's written certification that they are fit to operate a CMV. A copy of the certification will be provided to:
 - **SH&E contact**
 - **HR contact**
 - **Employee**
 - When operating a CMV, all employees are required to keep on their person a current copy of the physician certification/statement that they are physically qualified to operate a CMV in accordance with FMCSA guidelines. This requirement is to be considered part of the individual's job performance expectations.

4.2.8 Frequency of Medical Examination/Evaluation

- The immediate supervisor of the **employee** operating a CMV is responsible for notifying the CMV Contact and the local **HR contact** of the following:
 - That a potential new hire has been designated a CMV employee.
 - When an employee has been reassigned into a position that requires a CMV.
 - Submitting this notification in writing or electronically (see AECOM SH&E SOP 401: Medical Surveillance Program).
- The CMV Contact responsibilities include confirming the employee's medical surveillance anniversary dates are posted in Driver Management Online. This includes forwarding the information to AECOM's medical provider and **HR contact**.
- **AECOM's medical surveillance provider** will be responsible for examining and evaluating the employee upon initial hire or when reassigned.
- The medical surveillance provider will issue a medical clearance/certification indicating whether or not an employee is medically qualified to operate a CMV.
- After the initial examination/evaluation the employee is to participate in a biennial examination, unless they are regulated under 49 CFR 391.64, in which case an annual examination will be required. **AECOM's medical provider** will classify employee's biennial or annual evaluation based on the results of the medical examination and/or evaluation.

4.3 Drug and Alcohol Program (DAP)

4.3.1 All Employees who operate Group A and/or Group B CMVs are subject to the AECOM DOT Drug and Alcohol Program (DAP). These employees must meet requirements of the DOT DAP in order to operate a CMV. Minimum DOT DAP requirements are provided below. For additional detail reference the DOT DAP.

- All employees who operate Group A and/or Group B CMVs are required to have a pre-employment DOT substance abuse test performed prior to driving a CMV. The employee is subject to all guidelines and disciplinary actions as defined in the DOT DAP.
- All employees who operate Group A and/or Group B CMVs are subject to post-accident testing in accordance with DOT DAP.
- All employees who operate Group A and/or Group B CMVs are subject to reasonable suspicion testing in accordance with the DOT DAP.
- Employees who operate a CMV with a gross combination vehicle rating or gross vehicle rating \geq 26,001 lbs. (Group A and/or Group B CMVs) are subject to random testing. Reference the DOT DAP for additional detail.
- Employees who operate a CMV with a gross combination vehicle rating or gross vehicle rating \geq 10,001 but $<$ 26,000 lbs. (Group C vehicles) are subject to the AECOM Drug-Free Workplace policy.

4.4 Marking of Commercial Motor Vehicles

4.4.1 The exterior of all CMVs used for AECOM business are to be marked on both sides of the CMV as follows:

- AECOM's Logo:



Note: AECOM has multiple legal names please check with your business line to confirm the current legal name your business line is operating under.

- The USDOT motor carrier identification number issued by the FMCSA must immediately follow the AECOM Label:

USDOT XXXXXXX

- Size, shape, location, and color of marking are to be as follows:
 - Signage is to appear on both sides of the CMV.
 - Letters are to sharply contrast in color with the background on which the letters are placed.
 - The letters are to be readily legible, during daylight hours, from a distance of 50 feet (15.24 meters) while the CMV is stationary.
 - The letters are to be maintained in a manner that retains the legibility as required in 5.3, 3, c.
 - The signage may be painted on or may consist of a removable device.
- CMVs rented or leased for less than 30 days shall meet the following criteria:
 - Signage appears on the CMV as discussed above; or
 - The legal name or a single trade name of the leaser/rental company is displayed in accordance with as listed above.
 - The leaser's or rental company's identification number preceded by the letters "USDOT" is displayed in accordance as listed above.
 - The lease/rental agreement contains the following information:
 - The name and complete physical address of the AECOM office renting the CMV.
 - The identification number issued to AECOM by the FMCSA, preceded by the letters "USDOT." In lieu of the identification number required in this paragraph, the following may be shown in the rental agreement.
 - Information which indicates whether the AECOM will be engaged in "interstate" or "intrastate" commerce.
 - Information which indicates whether AECOM is transporting hazardous materials in the rented CMV.
 - The sentence: "This (the rental/leasing company's name) cooperates with all Federal, State, and local law enforcement officials nationwide to provide the identity of customers who operate this rental CMV".
 - The rental/lease agreement entered into by the Rental/Leasing Company and AECOM is carried in the rental CMV during the full term of the rental agreement.

4.5 Motor Carrier Identification Report

4.5.1 AECOM must file a Motor Carrier Identification Report, Form MCS-150, with the FMCSA. The form with complete filing instructions are on the FMCSA website: www.usdotnumberregistration.com. The filing is to occur at the following frequency:

- Prior to interstate travel occurring.
- After the initial filing an update, resubmit the MCS-150 form, is required every 24 months based on the following schedule:
 - The last USDOT number dictates the filing month.

USDOT Number Ends With:	Must file report by the last day of:
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
0	October

- The last digit [1] of AECOM's USDOT Number (XXXXXXX) stipulates that MCS-150 is to be filed by January 31 of the filing year.
 - The next-to-last USDOT Number dictates the filing year. The MCS-150 Report is to be filed in odd years if the number is odd and even years if the number is even.
- The Regional SH&E manager for a business unit in which CMVs are operated will ensure the Motor Carrier Identification Report is maintained for that business unit.

4.6 Commercial Motor Vehicle Operation

4.6.1 Pre-trip Inspection Requirements

- Employees are required to perform a documented pre-trip inspection prior to the operation of a CMV. The employee will perform the following inspection to ensure equipment is functional prior to each work shift and/or operating the CMV:
 - Service brakes, including trailer brake connections
 - Parking (hand) brake
 - Steering mechanism
 - Lighting devices and reflectors
 - Tires
 - Horn
 - Windshield wiper or wipers
 - Rear-vision mirror or mirrors
 - Coupling devices
 - Fire extinguisher that is approved for the CMV operated
 - Stopped vehicle-warning devices (e.g., reflective triangles)
 - Load is secure and evenly distributed
 - Load meets all requirements of USDOT Materials of Trade, including paperwork
- An example of a checklist that may be used to complete the inspection is provided in *S3NA(US)-404-FM7 Pre-Trip Inspection Checklist*.

4.6.2 Inspection of Cargo, Cargo Securement Devices and Systems

- Employees are required to inspect loads and ensure the CMV's cargo is properly distributed and adequately secured. A Cargo securement checklist has been provided in *S3NA(US)-404-FM8 Inspection of Cargo, Cargo Securement Devices and Systems*. The employee must document that the cargo has been inspected and meets minimum requirements as discussed on the checklist prior to operating the CMV.

4.6.3 Required Emergency Equipment

- The minimum emergency equipment that is to be maintained in a CMV at all times has been listed in *S3NA(US)-404-WI3 Required Emergency Equipment*. This equipment is to be maintained in functional condition at all times. The employee will ensure the emergency equipment is in place and functional prior to each work shift and/or operation of the CMV.

4.6.4 Post-Inspection Report

- Every employee that operates a CMV is required to complete a post-trip inspection report at the end of each day's work on each CMV operated. An example of a post-trip inspection report is provided in *S3NA(US)-404-FM9 Post-Trip Inspection Checklist*.

4.7 Training Program Management

- 4.7.1 Each **office/section manager** is to ensure training vendors, internet training, or any other outside training programs comply with applicable regulatory guidelines and AECOM Safety Program requirements. The **SH&E Department** will provide technical support in assessing qualifications. The business unit Regional SH&E manager's approval is required prior to using an outside training vendor or service or for individuals providing in-house training.

4.8 Maintenance of Records and Documents

4.8.1 General Information

- Maintenance (e.g., updating, tracking, storage) of all CMV documentation and records are the responsibility of each business unit. The **section manager's/location manager's HR contact** and **SH&E professional** will provide guidance and support regarding record maintenance. Documentation regarding vehicle maintenance will be maintained at a location designated by the office/business line manager. All records are to be accessible and copies provided to authorized recipients within 48 working hours of their request. Copies of training records are to be maintained at the office/section where the employee reports for their CMV operation activity.

4.8.2 Employee Responsibility

- It is the responsibility of the employee, with oversight from their immediate supervisor, to:
 - Maintain personal copies of training certifications, license, and medical surveillance certifications.
 - Ensure all required personal documentation and records that are generated in compliance with this program are copied to the **office/section CMV contact** and originals sent to **HR contact**.
 - Any information that is considered confidential in nature will be maintained solely by the **office/section HR contact**.

4.8.3 Human Resources

- The **HR Department** will be responsible for archiving, storage, and maintenance of documentation that is related to the individual (e.g., driving history, employment history, violations, DAP history, etc.). Guidelines for maintenance and storage are provided as follows.

4.8.4 Employee Driver Qualification Files

- The HR Department will maintain an employee driver qualification file that will contain the following:
 - The employee's job application.
 - The certificate of driver's road test as discussed in Road Test Certification
 - (Documentation for items 3 through 8 may be purged 3 years from execution date).
 - A copy of the response from each State agency concerning an employee's driving record as discussed in Section 4.2.3, Employee Background Check/Inquiry.
 - Documentation of the annual review of the driver's driving record.
 - A list or certificate relating to violations of motor vehicle laws and ordinances.
 - The medical surveillance certificate and DOT DAP documentation.
 - Copy of current CDL for those employees required to have one.
 - Copy of current driver's license (drivers of Group C vehicles).

4.8.5 CMV Contact – Documentation Support

- The CMV Contact is required to provide the following support service regarding maintenance and storage of non-confidential documentation/records:
 - Create an electronic file (hard copy when electronic file is not available) for each covered employee within their office/section.
 - Employees' files are to contain the following:
 - Current CMV medical certification.
 - DOT DAP documentation of compliance from AECOM's medical surveillance provider. AECOM's medical provider will maintain all substance abuse results information. The HR Department will be primary contact for accessing substance abuse testing information.

- Current copy of Driver's CDL or Road Test Certification, if road test was completed.
- The CMV Contact is to forward original copies of all documentation/records referenced in (a) through (c) to the HR contact that supports the employee.

4.9 **Commercial Motor Vehicle Documentation**

- The **office/section manager** will designate an individual who will be responsible for maintaining the documentation regarding vehicle service and maintenance. This individual will maintain the following documentation on each motor vehicle for 1 year and, for 6 months after the motor vehicle is sold or leaves AECOM's control:
 - All vehicle registration documentation includes current and historical information.
 - Vehicle inspection information includes state inspections, federal inspections, etc.
 - Hard copies of all maintenance history. Documentation is to maintained as follows:
 - An identification of the vehicle including: company number; make; serial number; year; and tire size, and the name of the person furnishing the vehicle if not owned by the carrier.
 - A means to indicate the nature and the due date of the various inspection and maintenance operations to be performed.
 - A record of inspection, repair and maintenance indicating their date and nature.
 - Post-trip inspections.

4.10 **Hours of Operation**

4.10.1 Daily Operation

- When operating a CMV, the CMV operator:
 - Is not permitted to drive more than 11 consecutive hours.
 - Is required to have 10 hours off work (duty) prior to the 11-hour shift.
 - Is required to have 10 hours off work (duty) prior to 14 hours of non-consecutive driving time (i.e. the employee takes breaks, meals, rest periods, etc. during their driving shift).

4.10.2 Weekly Operation

- Employees are not permitted to operate a CMV after operating (on-duty) a CMV for 60 hours within a 7 consecutive day period. Any period of seven consecutive days may end with the beginning of any off-duty period of 34 or more consecutive hours (49 CFR Part 395.3).
- In the instance of employees operating CMVs used primarily in the transportation of groundwater well drilling operations, and construction materials and equipment, any period of seven consecutive days may end with the beginning of any off-duty period of 24 or more consecutive hours [49 CFR Part 395.1 (l) and (m)].

4.11 **Driver's Record of Duty Status**

4.11.1 Exemptions for 100-air mile/short haul drivers (CDL Drivers)

- Employees are not required to maintain a standard log when they operate a CMV under short haul status. The following conditions must be met.
- The employee:
 - Operates the CMV within a 100-air-mile radius of the normal work reporting location (employee's home office).
 - Returns to the work reporting location and is released from work within 12 consecutive hours on-duty.
 - Is required to have 10 hours off work (duty) separating each 12-hour shift.
 - Does not exceed 11 hours maximum driving time following 10 consecutive hours off-duty;
 - Required documentation for exemptions status:
 - The duty time seven days prior to the first day of a work shift.
 - The time the driver reports for duty each day.
 - The total number of hours the driver is on duty each day.
 - The time the driver is released from duty each day.
 - Documentation is maintained for six months by the driver's supervisor.

4.11.2 Exemptions for 150-air-mile/employee (Not required to have a CDL)

- Those employees that operate a CMV, but are not required to have a CDL, are not required to maintain a standard log under the following conditions:
 - Operates the CMV within a 150-air-mile radius of the normal work reporting location (AECOM home office).
 - Returns to the work reporting location and is released from work within 11 consecutive or 14 non-consecutive hours driving time.
 - Is required to have 10 hours off work (duty) separating each 11 consecutive hours or 14 non-consecutive hours shift.
 - Driver does not operate a CMV more than five days per seven day period. Any seven consecutive day period ends with 34 consecutive hours off duty.
- Drivers who use this exception are ineligible to use the 100-air-mile radius exception.

4.11.3 Non-Exempt CMV Documentation Requirements

- When operating a CMV or on-duty for operation of a CMV all employees are required to record their duty status for each 24-hour period. The requirements for recording the duty status are as follows:
 - The duty status is to be recorded on a self-duplicating graph grid.
 - The graph grid is to be submitted to the employee's immediate supervisor who will review the logs and forward to the HR contact at the end of each week.

4.11.4 Minimum Information Required for Duty Status

- The minimum information and guidelines that are to be recorded for the employee duty status is as follows:
- "Off duty" or "OFF."
- "Sleeper berth" or "SB" (only if a sleeper berth used).
- "Driving" or "D."
- "On-duty not driving" or "ON."
- For each change of duty status (e.g., the place of reporting for work, starting to drive, on-duty not driving and where released from work).
 - City, town, or village
 - State abbreviation

Note: If a change of duty status occurs at a location other than a city, town, or village, show one of the following:

- The highway number and nearest milepost followed by the name of the nearest city, town, or village and State abbreviation.
- The highway number and the name of the service plaza followed by the name of the nearest city, town, or village and State abbreviation.
- The highway numbers of the nearest two intersecting roadways followed by the name of the nearest city, town, or village and State abbreviation.
- Date (month, day and year for the beginning of each 24-hour period)
- Total driving miles during each 24-hour period
- Truck or tractor and trailer number
- Name of carrier
- Driver's signature/certification
- 24-hour period starting time (e.g., midnight, 9:00 a.m., noon, 3:00 p.m.)
- Main office address
- Remarks
- Name of co-driver
- Total hours
- Shipping document number(s), or name of shipper and commodity
- Drivers shall keep their records of duty status current to the time shown for the last change of duty status. Entries are to only be made by the driver.
- All entries relating to driver's duty status must be legible and in the driver's own handwriting.

- The 24-hour period starting time must be identified on the duty status record.
- One-hour increments must appear on the graph, be identified (labelled), and pre-printed.
- The words "Midnight" and "Noon" must appear above or beside the appropriate one-hour increment.
- Recording days off duty.
- Two or more consecutive 24-hour periods off duty may be recorded on one duty status record if they occur in the same month.
- The graph grid is to be completed as follows:
 - A continuous line shall be drawn between the appropriate time markers for each of the following events:
 - Off duty
 - Sleeper berth resting period
 - Driving
 - On duty not driving

4.11.5 Filing Driver's Record of Duty Status

- The employee is to submit or forward by mail the original driver's record of duty status to their immediate supervisor within 7 days following the completion of the form. The supervisor is to review the information for compliance with program and submit approved originals to their local **HR** contact.
- Employees operating CMVs for the first time or intermittently are required to submit a signed statement giving the total time on-duty during the preceding 7 days and the time at which the driver was last relieved from duty prior to beginning work.

4.11.6 Retention of Driver's Record of Duty Status

- Original records of duty status, as discussed in Section 4.11.4, are to be submitted to the **section HR department contact**. The records of duty status and all supporting documents are to be maintained for a period of six months from the date of receipt.
- The employee is required to retain a copy of each record of duty status for the previous seven consecutive days which is to be in their possession and available for inspection while on duty.

4.12 CMV Inspection, Repair, and Maintenance

- All CMVs owned and/or operated by AECOM must meet FMCSA requirements. Compliance with inspection, repair, and maintenance of AECOM CMVs is managed through a business group management program that tracks inspection, repair and maintenance. Documentation for inspection, repair and maintenance that ensure compliance with FMCSA requirements must be maintained at the office where the vehicle is operated.
- Inspection, repair and maintenance records are retained for a period of one year from the inspection, repair and/or maintenance date. Once a CMV is taken out of service the CMV inspection, repair and maintenance records are to be maintained for six months.

5.0 Records

5.1 None

6.0 References

- 6.1 Federal Motor Carrier Safety Administration
- 6.2 USDOT Hazardous Materials Regulations (HMR)

S3NA(US)-404-FM1 Motor Vehicle Driver's Certification of Violations

I (print name) certify that the following is a true:

Section A. Employee has had motor vehicle violations

I have provided a complete list of traffic violations (other than parking violations) for which I have been convicted or forfeited bond or collateral during the past 12 months (insert N/A into first line if there are no violations; do not leave blank):

Date of conviction:	Offense:	Location:	Type of motor vehicle operated:

Section B. Employee has had no motor vehicle violations

If N/A appears in the table in Section A., I certify that I have not been convicted or forfeited bond or collateral on account of any violation required to be listed during the past 12 months.

Section C. Employee Certification Signature of Review/Acknowledgement

My signature below confirms that I have reviewed the information above, that I have disclosed all required information, and that is true and accurate:

Driver's Printed name:	Driver's Signature:	Date: dd/mm/yyyy

Supervisor's Printed Name	Supervisor's Signature:	Date: dd/mm/yyyy

Once this form has been completed, the supervisor is to submit the original of this form to Human Resources for incorporation into the driver qualification file.

S3NA(US)-404-FM2 CMV Employee Release of Information

This form is required for any individual operating a vehicle that has a GVWR of 10,001 or more.

I _____ (employee's printed name) authorize AECOM's Human Resource Representative to investigate my driving history regarding the operation of commercial motor vehicles.

I understand that as part of the background check, AECOM will contact previous employers as listed in my work history to obtain the following information:

1. General driver identification
2. Employment verification
3. A list of accidents that includes the following:
 - a. Date of accident
 - b. City or town in which or most near where the accident occurred
 - c. State in which the accident occurred
 - d. Driver name
 - e. Number of injuries
 - f. Number of fatalities
 - g. Whether hazardous materials, other than fuel spilled from the fuel tanks of motor vehicles involved in the accident, were released.
 - h. Copies of all accident reports required by state or other governmental entities or insurers
4. Driving safety history/performance
5. Violations the alcohol and controlled substances prohibitions
6. Failure to undertake or complete a substance abuse rehabilitation program if required.
7. Successful completion of a substance abuse program
8. Alcohol and substance abuse violations:
 - a. Alcohol tests with a result of 0.04 or higher alcohol concentration
 - b. Verified positive drug tests
 - c. Refusals to be tested (including verified adulterated or substituted drug test results)

I grant AECOM permission to contact any states in which I have/had a driver's license. I understand that AECOM will continue to contact states in which I operate a commercial motor vehicle on an annual basis to confirm my driving record/history.

I understand that if I do not permit AECOM to collect this information that I will not be permitted to operate a commercial motor vehicle and subject to other actions under AECOM's employment policies.

My signature below acknowledges that I understand the background check process and grant AECOM permission to collect the information as stated above:

Employee Signature

Date

The CMV Employee (driver operating a vehicle with a GVWR of 10,001 lbs) has the right to

1. *Review information provided by previous employers. A written request from the employee to AECOM is required to review information provided by a previous employer.*
2. *Have errors in the information corrected by the previous employer and for that previous employer to re-send the corrected information to AECOM.*
3. *Have a rebuttal statement attached to the alleged erroneous information, if the previous employer and the driver cannot agree on the accuracy of the information.*

S3NA(US)-404-FM3 Employer Contact Documentation

Contact Date or Attempt	Employer Name	Address	Contact Name	Phone	Mode of Contact	Background Check Information (Background Check Criteria provided in Section II)

S3NA(US)-404-FM4 Human Resource Confirmation of Background Check/Inquiry

I, _____ (HR Department representative printed name), have made a good faith effort to contact all states, in accordance with their protocols and previous employers as provided on _____ (employee's printed name) Employment Application. Any information provided by the state and/or employer has been inserted into the employee's personnel file.

The states and employers listed below have not provided any records on the employee or their driving history (N/A indicates that all states and/or employers provided the required information):

State/Company Name	Address	Contact Name	Telephone Number

Human Resources Department Representative
Signature

Date

S3NA(US)-404-FM5 Annual Review of Driving Record

1. Employee Name:
2. License Number:
3. Evaluation Period (month/day/year): to
4. Name of Evaluator:
5. Date of Evaluation:

Evaluation questions:	Yes*	No
1) Has the employee violated any Federal Motor Carrier Safety Administration FMCSA regulations that would cause a disqualification under 49 CFR?		
2) Has the employee received any violations that warrant corrective actions in accordance with SH&E 116-Driver and Vehicle Safety Program?		
3) Has the employee operated a commercial motor vehicle (CMV) while under the influence of alcohol or any controlled substance?		
Results: Any yes indication disqualifies the employee from driving a CMV for a period of no less than one (1) year or longer as mandated by other AECOM policies (e.g., SH&E 116). Additionally, the employee may be subject to other disciplinary policies as mandated by AECOM employment policy.		

* Any yes response requires all supporting documentation to be attached and included in the employee's CMV file.

Evaluator Signature**Date**

S3NA(US)-404-FM6 Record of Road Test

Form A — Certification of Road Test (Road test evaluation performed by AECOM supervisor)					
Department Name		Project Name			
Driver's Full Name (printed)		Social Security Number		License Number (CDL Employee, CDL Number) State	
Power Unit/CMV			Type of Trailer		
<p>This is to certify that the above-named driver was evaluated in accordance with Federal Motor Carrier Safety Administration criteria for "road test" under the direct supervision of _____ on _____, 20____, for a distance of approximately _____ driving miles.</p> <p>It is my considered opinion that the above-named driver possesses sufficient driving skills to operate safely the type of commercial motor vehicle listed above.</p>					
Printed Name of Examiner		Signature of Examiner		Date	
Name					
Title					
Office/Project Address			Location Test Conducted		
<p align="center">Evaluator is to use the criteria below to assess driver. Each criterion is to be marked pass or fail. All criteria must be passed to issue certification of road test.</p>					
	Pass	Fail		Pass	Fail
a. Successfully execute a pre-trip inspection.			f. Pass other motor vehicles.		
b. Demonstrate coupling and uncoupling of combination units (only required if CMV that employee will operate includes combination units).			g. Execute left and right turns.		
c. Initiate operation/start-up.			h. Brake CMV properly.		
d. Demonstrate successful use of controls and emergency equipment.			i. Reduce speed by means other than braking.		
e. Operate in traffic typical of normal operating conditions.			j. Properly back up at least two full CMV lengths.		
			k. Successfully park.		

S3NA(US)-404-FM7 Pre-Trip Inspection Checklist

PRE-TRIP INSPECTION							
Commercial Motor Vehicle (CMV) Inspection Safety Inspection Checklist							
<i>(This pre-trip checklist is to be completed by the CMV employee prior to operation of the CMV.)</i>							
Office/ Project Name:		Project/ Location Number					
Driver's Full Name (printed)	License Number	State	Date: Time of Inspection				
			dd/mm/yyyy	xx:xx am/pm			
Power Unit/CMV	License Number	State	Expiration Date	Registration/Inspection	Expiration		
Type of Trailer	License Number	State	Expiration Date	Registration/Inspection	Expiration		
Insurance Provider	Policy Number	State	Expiration Date	Provider Contact Information			
INSPECTION ITEMS				N/A	YES	NO	DATE CORRECTED
Has this equipment been properly inspected by a CMV competent person and ensured to be in a safe operating condition?							
Are seat belts readily available and operational?							
Is the horn in working condition?							
Is the steering mechanism operational?							
Are all required mirrors present, clean, and adjusted for the CMV operator?							
Do tires meet manufacturer's operational criteria (pressure, tread, etc.)?							
Are back-up alarms installed as required and operational?							
Are service brakes, including trailer brake connections, and parking (hand) brake functional?							
Are turn signals visible and operational?							
Are headlights (low/high beam) operational?							
Are brake lights visible and operable?							
Is all cab glass intact and free of distortion? Are wipers, including wiper fluid, operational?							
Have all fluids been checked and comply with operations manual criteria?							
Is there an accessible fire extinguisher?							
Are there at least three stopped vehicle warning devices?							
If load lines/straps are in use have they been inspected?							
a. Used in accordance with manufacturers operational guidelines?							
b. Rated and approved for this type of load?							
Have all coupling devices been inspected and secured?							
Insurance card, CMV registration, CMV employee medical certificate, CDL, etc. immediately accessible.							
Driver's Signature/ Inspection Date:							

S3NA(US)-404-FM8 Inspection of Cargo, Cargo Securement Devices and Systems

INSPECTION OF CARGO, CARGO SECUREMENT DEVICES AND SYSTEMS								
Commercial Motor Vehicle (CMV) Inspection Cargo Inspection Checklist								
(The cargo inspection checklist, items 14 are to be completed by the CMV employee prior to CMV operation.)								
Office/ Project Name:		Project/ Location Number:						
Driver's Full Name (Printed)		License Number		State	Date: Time of Inspection dd/mm/yyyy xx:xx am/pm			
Power Unit/CMV	License Number	State	Expiration Date	Registration/Inspection		Expiration		
Type of Trailer	License Number	State	Expiration Date	Registration/Inspection		Expiration		
INSPECTION ITEMS						N/A	YES	NO
1. Cargo is loaded and secured to prevent								
a. Loss of load								
b. Leaking								
c. Spilling								
d. Blowing off								
e. Falling								
2. Cargo is immobilized or secured to prevent shifting upon or within the vehicle to such an extent that the vehicle's stability or maneuverability is not adversely affected.								
3. The following are secure:								
a. Tailgate								
b. Tailboard								
c. Doors								
d. Tarpaulins								
e. Spare tire								
f. Any other devices used to secure the cargo/load								
4. The cargo or any other object does not								
a. Obscure the driver's view ahead or to the right or left								
b. Interfere with the free movement of the driver's arms or legs								
c. Prevent ready access to accessories required for emergencies								
d. Prevent the free and ready exit of any person from the CMV								
5. Inspect and resecure as necessary the cargo and the devices used to secure the cargo within the first 50 miles after beginning a trip.								
6. Re-examine and resecure the cargo:								
a. When the driver makes a change of duty status								
b. The CMV has been driven for 3 hours								
c. The CMV has been driven for 150 miles (for b or c, it is whichever comes first)								
d. These inspection requirements do not apply								
i. If the container/trailer is sealed and the driver has been provided written direction not to open it to inspect the cargo								
ii. The cargo has been loaded in a manner that makes inspection of its cargo impracticable.								

S3NA(US)-404-FM9 Post-Trip Inspection Checklist

POST-TRIP INSPECTION							
Commercial Motor Vehicle (CMV) Inspection Safety Inspection Checklist							
<i>(This post-trip inspection is to be completed by the CMV employee at the end of each shift and/or change in CMV drivers.)</i>							
Office/ Project Name:		Project/ Location Number:					
Driver's Full Name (printed)	License Number	State	Date: Time of Inspection				
			dd/mm/yyyy	xx:xx am/pm			
Power Unit/CMV	License Number	State	Expiration Date	Registration/Inspection		Expiration	
Type of Trailer	License Number	State	Expiration Date	Registration/Inspection		Expiration	
INSPECTION ITEMS				N/A	YES	NO	DATE CORRECTED
Has this equipment been properly inspected by the CMV driver operating the CMV?							
Are seat belts readily available and operational?							
Is the horn in working condition?							
Is the steering mechanism operational?							
Are all required mirrors present, clean, and adjusted for the CMV operator?							
Do tires meet manufacturer's operational criteria (pressure, tread, etc.)?							
Are back-up alarms installed as required and operational?							
Are service brakes, including trailer brake connections, and parking (hand) brake functional?							
Are turn signals visible and operational?							
Are headlights (low/high beam) operational?							
Are brake lights visible and operable?							
Is all cab glass intact and free of distortion? Are wipers, including wiper fluid, operational?							
Have all fluids been checked and comply with operations manual criteria?							
Is there an accessible fire extinguisher?							
Are there at least 3 stopped vehicle warning devices?							
If load lines/straps are in use have they been inspected?							
a. Used in accordance with manufacturers operational guidelines?							
b. Rated and approved for this type of load?							
Have all coupling devices been inspected and secured?							
Insurance card, CMV registration, CMV employee medical certificate, CDL, etc. immediately accessible.							
Driver's Signature/ Inspection Date:							

S3NA(US)-404-WI1 Definitions

1.0 Department of Transportation (DOT) Recordable Accident

- 1.1 An occurrence involving a commercial motor vehicle operating on a highway in interstate or intrastate commerce that results in:
 - 1.1.1 A fatality;
 - 1.1.2 Bodily injury to a person who, as a result of the injury, immediately receives medical treatment away from the scene of the accident; or
 - 1.1.3 One or more motor vehicles incurring disabling damage as a result of the accident, requiring the motor vehicle(s) to be transported away from the scene by a tow truck or other motor vehicle.
- 1.2 The term accident does not include:
 - 1.2.1 An occurrence involving only boarding and alighting from a stationary motor vehicle; or
 - 1.2.2 An occurrence involving only the loading or unloading of cargo.

2.0 Administrator

- 2.1 The Federal Motor Carrier Safety Administrator (FMCSA), the chief executive of the FMCSA, an agency within the DOT.

3.0 Adverse driving conditions

- 3.1 Snow, sleet, fog, other adverse weather conditions, a highway covered with snow or ice, or unusual road and traffic conditions, none of which were apparent on the basis of information known to the person dispatching the run at the time it was begun.

4.0 Alcohol or alcoholic beverage:

- 4.1 See DOT SAP for definition.

5.0 Alcohol concentration (AC)

- 5.1 The concentration of alcohol in a person's blood or breath. When expressed as a percentage, AC means grams of alcohol per 100 milliliters of blood or grams of alcohol per 210 liters of breath.

6.0 Commercial driver's license (CDL)

- 6.1 A license that is issued to an individual by a state or other jurisdiction in accordance with the standards contained in 49 CFR 383 and that authorizes the individual to operate a class of a commercial motor vehicle (CMV)

7.0 Commercial Driver's License Information System (CDLIS)

- 7.1 The CDLIS established by FMCSA pursuant to section 12007 of the Commercial Motor Vehicle Safety Act of 1986.

8.0 Commercial motor vehicle

- 8.1 CMV that does not require an operator to have a CDL.
- 8.2 Any self-propelled or towed motor vehicle used on a highway in interstate commerce to transport passengers or property when the vehicle:

- 8.2.1 Has a gross vehicle weight rating or gross combination weight rating, or gross vehicle weight or gross combination weight, of $\geq 4,536$ kg (10,001 pounds) and $<11,794$ kilograms (26,001) or
- Is designed or used to transport more than eight passengers, including the driver, for compensation; or
 - Is designed or used to transport more than 15 passengers, including the driver, and is not used to transport passengers for compensation; or
 - Is used in transporting material found by the Secretary of Transportation to be hazardous under 49 U.S.C. 5103 and is transported in a quantity requiring placarding under regulations prescribed by the Secretary under 49 CFR, subtitle B, chapter I, subchapter C.
- 8.3 CMV that requires a CDL operator is a motor vehicle or combination of motor vehicles used in commerce to transport passengers or property if the motor vehicle –
- 8.3.1 Has a gross combination weight rating of 11,794 kilograms or more (26,001 pounds or more) inclusive of a towed unit(s) with a gross vehicle weight rating of more than 4,536 kilograms (10,000 pounds); or
- 8.3.2 Has a gross vehicle weight rating of 11,794 or more kilograms (26,001 pounds or more); or
- Is designed to transport 16 or more passengers, including the driver; or
 - Is of any size and is used in the transportation of *hazardous materials* as defined in this section.

9.0 Conviction

- 9.1 An unvacated adjudication of guilt, or a determination that a person has violated or failed to comply with the law in a court of original jurisdiction or by an authorized administrative tribunal; an unvacated forfeiture of bail or collateral deposited to secure the person's appearance in court; a plea of guilty or *nolo contendere* accepted by the court; the payment of a fine or court cost; or a violation of a condition of release without bail, regardless of whether or not the penalty is rebated, suspended, or probated.

10.0 Direct assistance

- 10.1 Transportation and other relief services provided by a motor carrier or its driver(s) incident to the immediate restoration of essential services (such as electricity, medical care, sewer, water, telecommunications, and telecommunication transmissions) or essential supplies (such as food and fuel). Direct assistance does not include transportation related to the long-term rehabilitation of damaged physical infrastructure or routine commercial deliveries after the initial threat to life and property has passed.

11.0 Direct compensation

- 11.1 Payment made to the motor carrier by the passengers or a person acting on behalf of the passengers for the transportation services provided and not included in a total package charge or other assessment for highway transportation services.

12.0 Disabling damage

- 12.1 Damage that precludes the departure of a motor vehicle from the scene of an accident in its usual manner in daylight after simple repairs.
- Inclusions— Damage to motor vehicles that could have been driven but would have been further damaged if so driven.
 - Exclusions
 - Damage that can be remedied temporarily at the scene of the accident without special tools or parts.
 - Tire disablement without other damage even if no spare tire is available.
 - Headlamp or taillight damage.
 - Damage to turn signals, horn, or windshield wipers that makes them inoperative.

13.0 Disqualification

13.1 Any of the following three actions:

- The suspension, revocation, or cancellation of a CDL by the state or jurisdiction of issuance.
- Any withdrawal of a person's privileges to drive a CMV by a state or other jurisdiction as the result of a violation of state or local law relating to motor vehicle traffic control (other than parking, vehicle weight, or vehicle defect violations).
- A determination by the FMCSA that a person is not qualified to operate a CMV under Parts 391 and 383 of this chapter.

14.0 Driver applicant (under Part 383)

14.1 An individual who applies to a state to obtain, transfer, upgrade, or renew a CDL.

15.0 Driver's license

15.1 A license that is issued to an individual by a state or other jurisdiction and that authorizes the individual to operate a motor vehicle on the highways.

16.0 Driver

16.1 Any person who operates any CMV.

17.0 Driving time

17.1 All time spent at the driving controls of a CMV in operation.

18.0 Driving a commercial motor vehicle while under the influence of alcohol

18.1 Committing any one or more of the following acts in a CMV:

- Driving a CMV while the person's alcohol concentration is 0.04 or higher;
- Driving under the influence of alcohol, as defined by state law;
- Refusal to undergo such testing as is required by any state or jurisdiction.

19.0 Emergency

19.1 Any hurricane, tornado, storm (e.g. thunderstorm, snowstorm, ice storm, blizzard, sandstorm, etc.), high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, mud slide, drought, forest fire, explosion, blackout or other occurrence, natural or man-made, that interrupts the delivery of essential services (such as electricity, medical care, sewer, water, telecommunications, and telecommunication transmissions) or essential supplies (such as food and fuel) or otherwise immediately threatens human life or public welfare, provided such hurricane, tornado, or other event results in:

- A declaration of an emergency by the President of the United States, the governor of a state, or their authorized representatives having authority to declare emergencies; by the FMCSA Field Administrator for the geographical area in which the occurrence happens; or by other federal, state or local government officials having authority to declare emergencies; or
- A request by a police officer for tow trucks to move wrecked or disabled motor vehicles.

19.2 Emergency relief

- An operation in which a motor carrier or driver of a commercial motor vehicle is providing direct assistance to supplement state and local efforts and capabilities to save lives or property or to protect public health and safety as a result of an emergency as defined in this section.

20.0 Employee

20.1 Any individual, other than an employer, who is employed by an employer and who in the course of his or her employment directly affects commercial motor vehicle safety. Such term includes a driver of a

commercial motor vehicle (including an independent contractor while in the course of operating a commercial motor vehicle), a mechanic, and a freight handler. Such term does not include an employee of the United States, any state, any political subdivision of a state, or any agency established under a compact between States and approved by the Congress of the United States who is acting within the course of such employment.

21.0 Employer

- 21.1 Any person engaged in a business affecting interstate commerce who owns or leases a commercial motor vehicle in connection with that business, or assigns employees to operate it, but such term does not include the United States, any State, any political subdivision of a State, or an agency established under a compact between States approved by the Congress of the United States.

22.0 Endorsement

- 22.1 An authorization to an individual's CDL required to permit the individual to operate certain types of commercial motor vehicles.

23.0 Fatality

- 23.1 Any injury that results in the death of a person at the time of the motor vehicle accident or within 30 days of the accident.

24.0 Federal Motor Carrier Safety Administrator (FMCSA)

- 24.1 The chief executive of the Federal Motor Carrier Safety Administration, an agency within the Department of Transportation.

25.0 Gross combination weight rating (GCWR)

- 25.1 The value specified by the manufacturer as the loaded weight of a combination (articulated) motor vehicle. In the absence of a value specified by the manufacturer, GCWR will be determined by adding the gross vehicle weight rating (GVWR) of the power unit and the total weight of the towed unit and any load thereon.

26.0 Gross vehicle weight rating (GVWR)

- 26.1 The value specified by the manufacturer as the loaded weight of a single motor vehicle.

27.0 Groundwater well drilling rig

- 27.1 Any vehicle, machine, tractor, trailer, semi-trailer, or specialized mobile equipment propelled or drawn by mechanical power and used on highways to transport water well field operating equipment, including water well drilling and pump service rigs equipped to access groundwater.

28.0 Hazardous material

- 28.1 A substance or material which has been determined by the Secretary of Transportation to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce, and which has been so designated.

29.0 Hazardous waste

- 29.1 Any material that is subject to the hazardous waste manifest requirements of the EPA specified in 40 CFR part 262 or would be subject to these requirements absent an interim authorization to a state under 40 CFR part 123, subpart F.

30.0 Highway

- 30.1 Any road, street, or way, whether on public or private property, open to public travel. "Open to public travel" means that the road section is available, except during scheduled periods, extreme weather or emergency conditions, passable by four-wheel standard passenger cars, and open to the general

public for use without restrictive gates, prohibitive signs, or regulation other than restrictions based on size, weight, or class of registration. Toll plazas of public toll roads are not considered restrictive gates.

31.0 Imminent hazard

- 31.1 The existence of a condition that presents a substantial likelihood that death, serious illness, severe personal injury, or a substantial endangerment to health, property, or the environment may occur before the reasonably foreseeable completion date of a formal proceeding begun to lessen the risk of that death, illness, injury or endangerment.

32.0 Interstate commerce

- 32.1 Trade, traffic, or transportation in the United States --

- Between a place in a State and a place outside of such State (including a place outside of the United States);
- Between two places in a State through another State or a place outside of the United States; or
- Between two places in a State as part of trade, traffic, or transportation originating or terminating outside the State or the United States.

33.0 Intrastate commerce

- 33.1 Any trade, traffic, or transportation in any State which is not described in the term "interstate commerce."

34.0 Materials and amounts.

- 34.1 A material of trade is limited to the following:

- 34.1.1 A Class 3, 8, 9, Division 4.1, 5.1, 5.2, 6.1, or ORM-D material contained in a packaging having a gross mass or capacity not over --

- 0.5 kg (1 pound) or 0.5 L (1 pint) for a Packing Group I material;
- 30 kg (66 pounds) or 30 L (8 gallons) for a Packing Group II, Packing Group III, or ORM-D material;
- 1500 L (400 gallons) for a diluted mixture, not to exceed 2 percent concentration, of a Class 9 material.

- 34.1.2 A Division 2.1 or 2.2 material in a cylinder with a gross weight not over 100 kg (220 pounds), or a permanently mounted tank manufactured to ASME standards of not more than 70 gallon water capacity for a non-liquefied Division 2.2 material with no subsidiary hazard.

- 34.1.3 A Division 4.3 material in Packing Group II or III contained in a packaging having a gross capacity not exceeding 30 mL (1 ounce).

- 34.1.4 This section does not apply to a hazardous material that is self-reactive (see § 173.124), poisonous by inhalation (see § 173.133), or a hazardous waste.

35.0 Medical examiner

- 35.1 A person who is licensed, certified, and/or registered, in accordance with applicable State laws and regulations, to perform physical examinations. The term includes but is not limited to, doctors of medicine, doctors of osteopathy, physician assistants, advanced practice nurses, and doctors of chiropractic.

36.0 Motor carrier

- 36.1 A for-hire motor carrier or a private motor carrier. The term includes a motor carrier's agents, officers and representatives as well as employees responsible for hiring, supervising, training, assigning, or dispatching of drivers and employees concerned with the installation, inspection, and maintenance of motor vehicle equipment and/or accessories.

37.0 Motor vehicle

- 37.1 Any vehicle, machine, tractor, trailer, or semi-trailer propelled or drawn by mechanical power and used upon the highways in the transportation of passengers or property, or any combination thereof determined by the Federal Motor Carrier Safety Administration, but does not include any vehicle, locomotive, or car operated exclusively on a rail or rails, or a trolley bus operated by electric power derived from a fixed overhead wire, furnishing local passenger transportation similar to street-railway service.

38.0 Multiple-employer driver

- 38.1 A driver, who in any period of 7 consecutive days, is employed or used as a driver by more than one motor carrier.

39.0 Multiple stops

- 39.1 All stops made in any one village, town, or city may be computed as one.

40.0 On duty time

- 40.1 All time from the time a driver begins to work or is required to be in readiness to work until the time the driver is relieved from work and all responsibility for performing work. On duty time shall include:
- All time at a plant, terminal, facility, or other property of a motor carrier or shipper, or on any public property, waiting to be dispatched, unless the driver has been relieved from duty by the motor carrier;
 - All time inspecting, servicing, or conditioning any commercial motor vehicle at any time;
 - All driving time as defined in the term driving time;
 - All time, other than driving time, in or upon any commercial motor vehicle except time spent resting in a sleeper berth;
 - All time loading or unloading a commercial motor vehicle, supervising, or assisting in the loading or unloading, attending a commercial motor vehicle being loaded or unloaded, remaining in readiness to operate the commercial motor vehicle, or in giving or receiving receipts for shipments loaded or unloaded;
 - All time repairing, obtaining assistance, or remaining in attendance upon a disabled commercial motor vehicle;
 - All time spent providing a breath sample or urine specimen, including travel time to and from the collection site, in order to comply with the random, reasonable suspicion, post-accident, or follow-up testing when directed by a motor carrier;
 - Performing any other work in the capacity, employ, or service of a motor carrier; and
 - Performing any compensated work for a person who is not a motor carrier.

41.0 Operator -- See driver.**42.0 Out-of-service order**

- 42.1 A declaration by an authorized enforcement officer of a Federal, State, Canadian, Mexican, or local jurisdiction that a driver, a commercial motor vehicle, or a motor carrier operation, is out-of-service.

43.0 Previous employer

- 43.1 Any DOT regulated person who employed the driver in the preceding 3 years, including any possible current employer.

44.0 Private motor carrier

- 44.1 A person who provides transportation of property or passengers, by commercial motor vehicle, and is not a for-hire motor carrier.

45.0 Representative vehicle

- 45.1 A motor vehicle which represents the type of motor vehicle that a driver applicant operates or expects to operate.

46.0 Secretary - The Secretary of Transportation

47.0 Serious traffic violation (under Part 383)

- 47.1 Conviction of any of the following offenses when operating a CMV, except weight, defect and parking violations:
- Excessive speeding, involving any single offense for any speed of 15 miles per hour or more above the posted speed limit;
 - Reckless driving, as defined by State or local law or regulation, including but not limited to offenses of driving a CMV in willful or wanton disregard for the safety of persons or property;
 - Improper or erratic traffic lane changes;
 - Following the vehicle ahead too closely;
 - A violation, arising in connection with a fatal accident, of State or local law relating to motor vehicle traffic control;
 - Driving a CMV without obtaining a CDL;
 - Driving a CMV without a CDL in the driver's possession. Any individual who provides proof to the enforcement authority that issued the citation, by the date the individual must appear in court or pay any fine for such a violation, that the individual held a valid CDL on the date the citation was issued, shall not be guilty of this offense; or
 - Driving a CMV without the proper class of CDL and/or endorsements for the specific vehicle group being operated or for the passengers or type of cargo being transported.

48.0 Tank vehicle

- 48.1 Any commercial motor vehicle that is designed to transport any liquid or gaseous materials within a tank that is either permanently or temporarily attached to the vehicle or the chassis. Such vehicles include, but are not limited to, cargo tanks and portable tanks, as defined in part 171 of this title. However, this definition does not include portable tanks having a rated capacity under 1,000 gallons.

49.0 Trailer

- 49.1 **Full trailer:** Any motor vehicle other than a pole trailer which is designed to be drawn by another motor vehicle and so constructed that no part of its weight, except for the towing device, rests upon the self-propelled towing motor vehicle. A semi-trailer equipped with an auxiliary front axle (converter dolly) shall be considered a full trailer.
- 49.2 **Pole trailer:** Any motor vehicle which is designed to be drawn by another motor vehicle and attached to the towing motor vehicle by means of a "reach" or "pole," or by being "boomed" or otherwise secured to the towing motor vehicle, for transporting long or irregularly shaped loads such as poles, pipes, or structural members, which generally are capable of sustaining themselves as beams between the supporting connections.
- 49.3 **Semi-trailer:** Any motor vehicle, other than a pole trailer, which is designed to be drawn by another motor vehicle and is constructed so that some part of its weight rests upon the self-propelled towing motor vehicle.

50.0 Transportation of construction materials and equipment

- 50.1 The transportation of construction and pavement materials, construction equipment, and construction maintenance vehicles, by a driver to or from an active construction site (a construction site between mobilization of equipment and materials to the site to the final completion of the construction project) within a 50 air mile radius of the normal work reporting location of the driver. This paragraph does not apply to the transportation of material found by the Secretary to be hazardous under 49 U.S.C. 5103 in a quantity requiring placarding under regulations issued to carry out such section.

51.0 Truck

- 51.1 Any self-propelled commercial motor vehicle except a truck tractor designed and/or used for the transportation of property.

52.0 Truck tractor

52.1 A self-propelled commercial motor vehicle designed and/or used primarily for drawing other vehicles.

53.0 Utility service vehicle**53.1 Any commercial motor vehicle:**

- Used in the furtherance of repairing, maintaining, or operating any structures or any other physical facilities necessary for the delivery of public utility services, including the furnishing of electric, gas, water, sanitary sewer, telephone, and television cable or community antenna service;
- While engaged in any activity necessarily related to the ultimate delivery of such public utility services to consumers, including travel or movement to, from, upon, or between activity sites (including occasional travel or movement outside the service area necessitated by any utility emergency as determined by the utility provider); and
- Except for any occasional emergency use, operated primarily within the service area of a utility's subscribers or consumers, without regard to whether the vehicle is owned, leased, or rented by the utility.

54.0 Vehicle

54.1 A motor vehicle unless otherwise specified.

55.0 Vehicle group

55.1 A class or type of vehicle with certain operating characteristics

S3NA(US)-404-WI2 Initial Hire Documentation Requirements

MINIMUM CMV EMPLOYEE INFORMATION

Employees who are required to operate a Commercial Motor Vehicle (CMV—defined as a vehicle with a GVWR of 10,001 lbs. or more) as a condition of their employment or reassignment to a new job function must provide the information listed below. The Human Resource Department will collect this information as part of a standardized form, AECOM employment application, and will maintain this information as part of each CMV employee's personnel file:

1. CMV employee potential hire (applicant) must complete and sign an AECOM job application.
2. The applicant's name, address, date of birth, and Social Security number.
3. The addresses at which the applicant has resided during the three years preceding the date on which the application is submitted.
4. Application submittal date.
5. The issuing state, number, and expiration date of each unexpired driver's license or permit that has been issued to the applicant.
6. The issuing state, number, and expiration date of each unexpired CMV operator's license or permit that has been issued to the applicant.
7. The nature and extent of the applicant's experience in the operation of motor vehicles, including the type of equipment (such as buses, trucks, truck tractors, semi-trailers, full-trailers, and pole-trailers) that he/she has operated.
8. A list of all motor vehicle accidents in which the applicant was involved during the three years preceding the date on which the application is submitted, specifying the date and nature of each accident and any fatalities or personal injuries it caused.
9. A list of all violations of motor vehicle laws or ordinances (other than violations involving only parking) of which the applicant was convicted or forfeited bond or collateral during the five years preceding the date on which the application is submitted. Attachment 2 is to be completed by all initial hires to document no violations.
10. A statement setting forth in detail the facts and circumstances of any denial, revocation, or suspension of any license, permit, or privilege to operate a motor vehicle that has been issued to the applicant, or a statement that no such denial, revocation, or suspension has occurred.
11. A list of the names and addresses of the applicant's employers during the three years preceding the date on which the application is submitted.
12. Employment dates.
13. The reason for leaving the employment of each employer.
14. If the applicant was subject to the FMCSRs while employed by that previous employer:
15. If the applicant's prior position(s) was (were) designated safety sensitive functions in any DOT-regulated mode subject to alcohol and controlled substances testing requirements as required by 49 CFR 40.
 - a. A signature line stating the following must appear at the end of the application:
 - b. The signature certifies that the CMV employee completed this application and that all entries on it and information in it are true and complete to the best of my knowledge.
(Date) (Applicant's signature)
16. HR creates a "Driver Qualification File."

CDL Employees Only

17. Applicants who operate a CMV of 26,001 lbs. or more will be required to provide a 10- year employment history.

S3NA(US)-404-WI3 Required Emergency Equipment**REQUIRED EMERGENCY EQUIPMENT****1. Fire extinguisher:**

- a. Inspected prior to operating CMV to ensure that it is fully charged.
- b. Located so that it is readily accessible.
- c. Securely mounted on the vehicle.
- d. The extinguishing agent is to be freeze resistant.
- e. The extinguishing agent should not pose an inhalation hazard as specified under Underwriters' Laboratories criteria.
- f. CMVs used to transport hazardous materials require a fire extinguisher that has an Underwriters' Laboratories rating 2 of 10 B:C or more.
- g. CMVs that are not used to transport hazardous materials require a fire extinguisher:
 - i. A fire extinguisher having an Underwriters' Laboratories rating 2 of 5 B:C or more; or
 - ii. Two fire extinguishers, each of which has an Underwriters' Laboratories rating 2 of 4 B:C or more.
- h. Each fire extinguisher must be labeled or marked with its Underwriters' Laboratories rating.

2. Spare fuses

- a. At least one spare fuse or other overload protective device, if the devices used are not of a reset type, for each kind and size used.

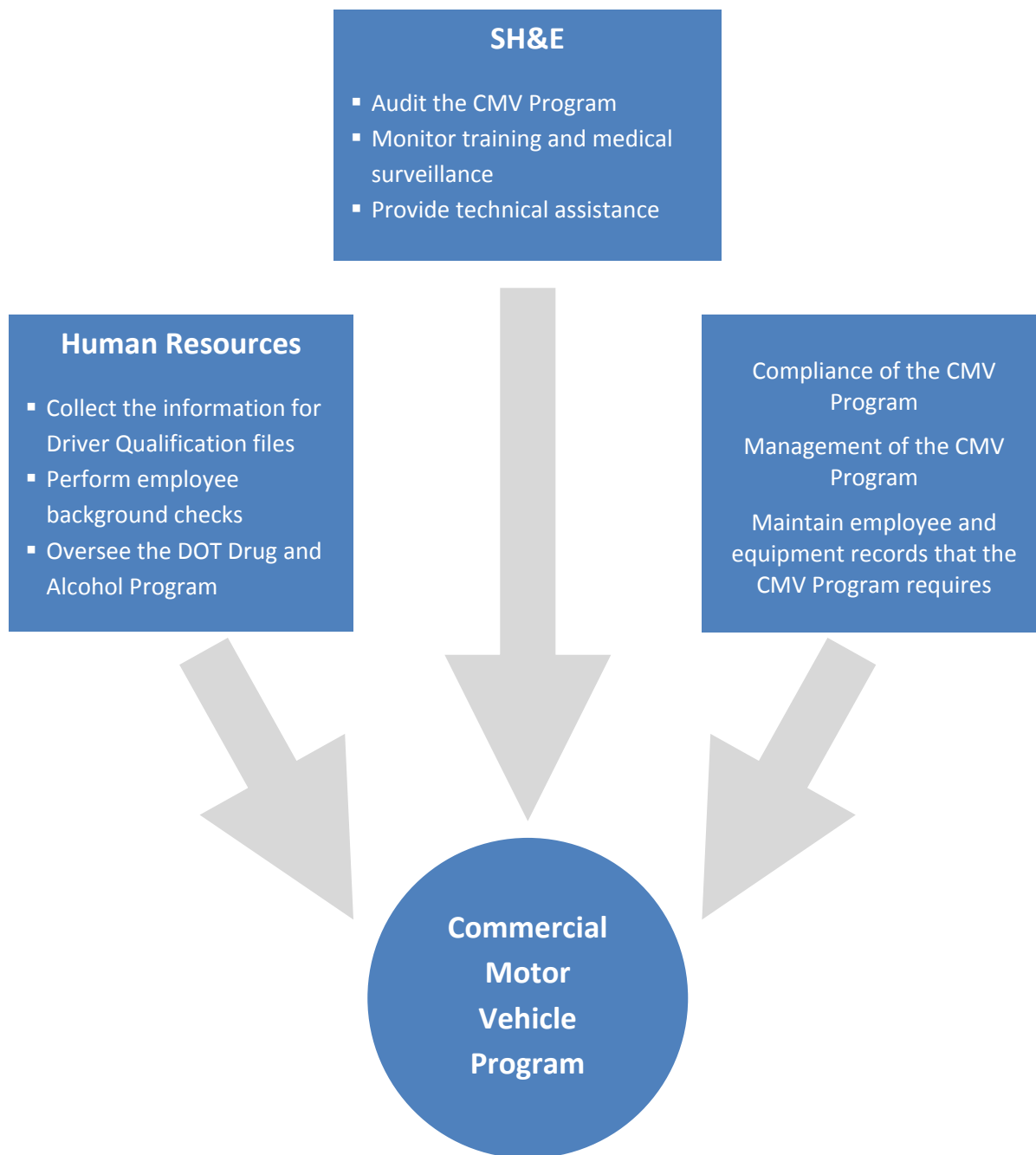
3. Warning devices for stopped vehicles:

- a. Three (3) bidirectional emergency reflective triangles that conform to the requirements of Federal Motor Vehicle Safety Standard No. 125.
 - i. The triangles shall be maintained in a protective container that is always readily accessible.

4. First Aid Kit (Check with Wheels to confirm content)

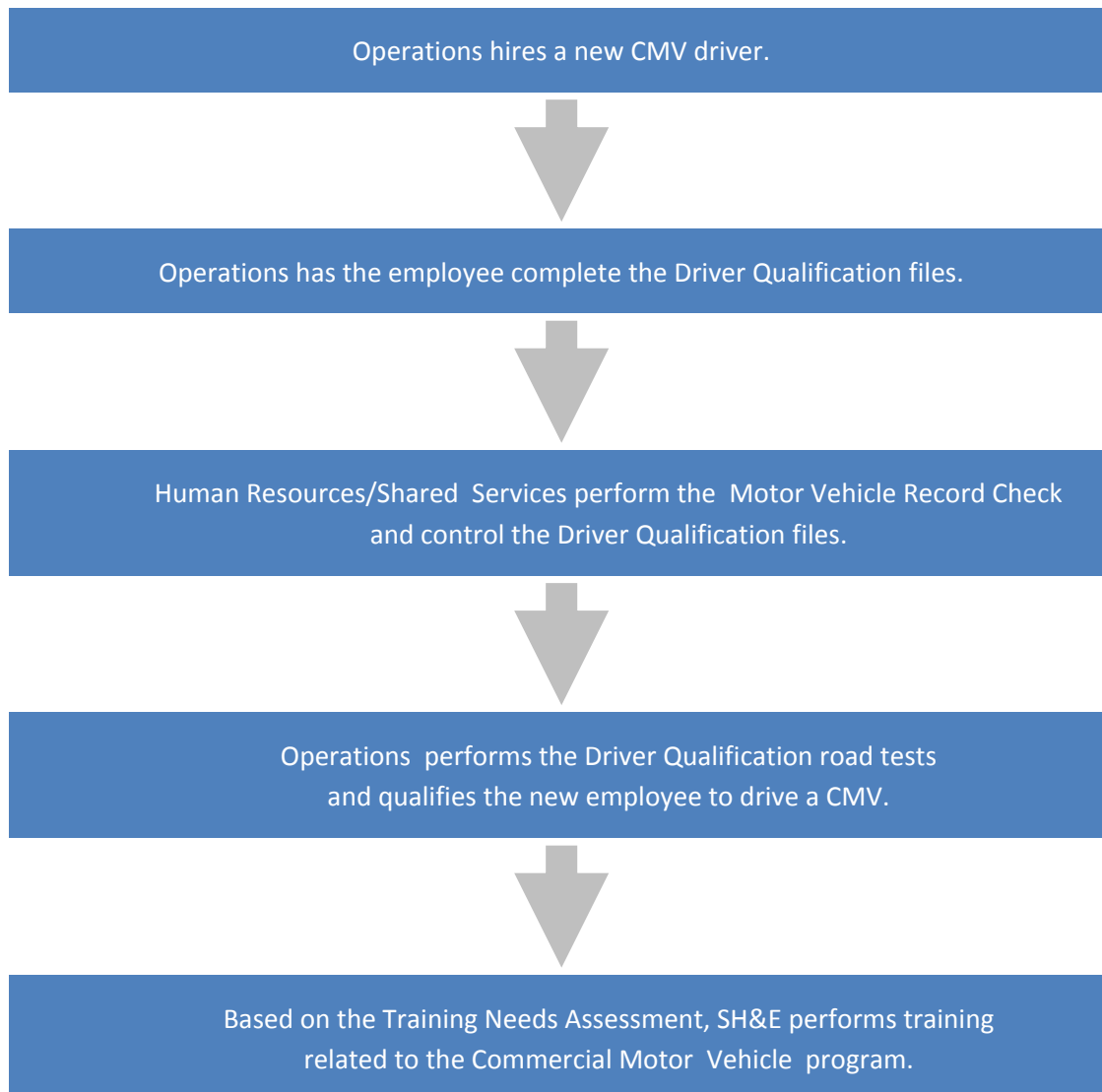
S3NA-404-WI4 Commercial Motor Vehicle Areas of Responsibility

This work instruction explains the areas of responsibility of the AECOM Commercial Motor Vehicle Program.



S3NA(US)-404-WI5 Commercial Motor Vehicle New Hire Work Flow

This work instruction explains the work flow that occurs when a new CMV driver is hired in AECOM.



S3NA-405-PR Drilling, Boring, and Direct Push Probing

1.0 Purpose and Scope

- 1.1 Provides the minimum requirements to be followed when drilling and boring work are performed.
- 1.2 This procedure applies to all AECOM North America-based employees and operations.

2.0 Terms and Definitions

- 2.1 None

3.0 Attachments

- 3.1 S3NA-405-FM1 Drill Rig Inspection
- 3.2 S3NA-405-FM2 Subsurface Investigation Checklist
- 3.3 S3NA-405-ST Drilling and Boring
- 3.4 S3NA-405-WI Core Drilling Machine Safety Card

4.0 Procedure

- 4.1 All client on-site safety procedures shall be understood and adhered to.
- 4.2 Be aware of the provincial/territorial regulations that govern drill rig operations and exposed moving parts.
- 4.3 **Roles and Responsibilities**
 - 4.3.1 **Project Manager or Resident Engineer** is responsible for ensuring that sound principles of safety, training, inspection, maintenance, and operation consistent with all resource data available from the manufacturer, OSHA, and ANSI is provided to the operator and users by the Contractor or operating entity.
 - 4.3.2 **Site Safety Coordinator (SSC)** shall assist the **Project Manager** in compliance with the requirements of this procedure.
 - 4.3.3 The **SH&E Department** shall assist site management with guidance about this procedure.
 - 4.3.4 **AECOM employees** engaged in project field activities shall be cognizant of contractor activities that may affect their safety and shall follow these procedures.
 - 4.3.5 **AECOM Equipment Operator**
 - In cases where AECOM owns and operates drilling, boring, or probing equipment, the lead equipment operator is responsible for the maintenance and safe operation of equipment under their control consistent with those responsibilities of a Contractor.
 - Operations will be terminated during an electrical storm, and all crew members will move away from the rig. If lightning is observed, shut down all rig operations immediately.
 - 4.3.6 **Contractors**
 - **Contractors** have direct control over the application and operation of all drilling, boring, and probing equipment owned by their organization.
 - It is the **Equipment Contractor** operator's responsibility to implement safe work practices provided by the **Contractor's** project management or supervisory staff supplemented by good judgment, safe control, and caution whenever operating drilling, boring, and probing equipment.
 - 4.3.7 **Safety Representative:** Unless the **Contractor** has a designated **Safety Representative**, the **Contractor's** responsible person for safety for the drill crew will be the drill rig operator. The safety person's responsibilities are to
 - Consider the "responsibility" for safety and the "authority" to enforce safety to be a matter of first importance.

- Be the leader in using proper personal protective equipment (PPE) and set an example in following the rules that are being enforced on others. See section 4.5 for PPE required by this SOP.
- Enforce the use of proper safety equipment and take appropriate corrective action when proper PPE is not being used.
- Understand that the proper maintenance of tools and equipment and general housekeeping on the drill rig will provide an environment that promotes and enforces safety. See Sections 4.7 and 4.9 for housekeeping and maintenance requirements of this SOP.
- Ensure that the operator has had adequate training and is thoroughly familiar with the rig, its controls, and its capabilities prior to commencement of drilling activities.
- Inspect the rig at least daily for structural damage, loose bolts and nuts, proper tension in chain drives, loose or missing guards or protective covers, fluid leaks, damaged hoses, and/or damaged pressure gauges and pressure relief valves. A Rig Inspection Form has been provided in S3NA-405-FM1 Drill Rig Inspection for use in performing inspections when the Contractor does not have their own.
- Check and test all safety devices such as emergency shutdown switches at least daily and preferably at the start of a work shift. Rig operation should not be permitted until all emergency shutdown and warning systems are working correctly. Wiring around, bypassing, or removing an emergency device is not permitted.
- Check that all gauges, warning lights, and control levers are functioning properly, and listen for unusual sounds on each starting of an engine.
- Ensure that all new rig workers are informed of safe operating practices on and around the rig. Provide each new rig worker with a copy of the organization's drilling operations safety procedures and, when appropriate, the rig manufacturer's operations and maintenance manual. The safety person should ensure that each new employee reads and understands the safety procedures.
- Ensure that a first aid kit and fire extinguishers are available and properly maintained on each rig and on each additional vehicle.
- Be well trained and capable of using a first aid kit, a fire extinguisher, and all other safety devices and equipment.
- Maintain a list of addresses and telephone numbers of emergency assistance units (ambulance services, police, hospitals, etc.), and inform other members of the drill crew of its location.
- See that new workers are instructed in rig safety, and observe the new worker's progress toward understanding safe operating practices.
- Observe the mental, emotional, and physical capability of workers to perform the assigned work in a proper and safe manner. Dismiss from the job site any worker whose mental and physical capabilities might cause injury to the worker or coworkers.
- Rig Crew and Other Field Personnel (Those employees involved in fieldwork): All personnel engaged in site activities are required to become thoroughly familiar with, and to conform to, the provisions of AECOM's safety plan, procedures, and such other safety directives as may be considered appropriate by **Project Managers, Safety Officers, and Supervisors**.
- Rig Workers: Personnel are encouraged to offer ideas, suggestions, or recommendations regarding any operational condition, procedure, or practice that may enhance the safety of site personnel or the public. Their primary responsibilities will be:
 - Perform all required work safely.
 - Familiarize themselves with and understand the plan, including proper use of personal protective equipment.
 - Report any unsafe conditions to supervisory personnel.
 - Be aware of signs and symptoms of thermal stress.

4.4 Training

4.4.1 All staff shall be provided with on-site orientation to the rig and its operator.

4.4.2 All operators and assistants shall have industry-standard safety training and be versed in the equipment to be utilized. This may include, but is not limited to, HAZWOPER, Petroleum Safety Training (or Construction Safety Training), and H2S Alive as appropriate.

4.5 **Personal Protective Equipment**

4.6 For most geotechnical, mineral, and/or groundwater drilling projects, PPE should include

- Hard hat: Hard hats shall be worn by everyone working at a drilling/boring site. Hats should meet the requirements of ANSI Z89 and be kept clean and in good repair with the headband and crown straps properly adjusted for the employee.
- Safety shoes: Safety shoes or boots shall be worn by all drilling personnel and all visitors to the site who observe operations within close proximity of the rig. Safety shoes or boots should meet the requirements of ANSI Z4 1.1.
- Safety glasses: All rig personnel shall wear safety glasses meeting the requirements of ANSI Z87.1.
- High Visibility Class II Safety Vest shall be worn by all **AECOM employees**. All rig personnel should attempt to wear high-visibility clothing that should be close fitting and not have large cuffs or loose material that can catch on rotating or translating components of the rig.
- Close fitting gloves and clothing: All rig personnel should wear gloves for hand protection against cuts and abrasions that could occur while handling wire rope or cable and from contact with sharp edges and burrs on drill rods and other drilling or sampling tools. Gloves should be close fitting and not have large cuffs or loose ties which can catch on rotating or translating components of the rig.
- Other protective equipment: For some operations, the project may dictate use of other protective equipment. The management of the contractor and its safety person shall determine the requirements. Such equipment might include face or ear protection or reflective clothing. The design and composition of the protective equipment and clothing should be determined as a joint effort of management and the client.
- Each worker should wear noise reducing ear protectors around operating equipment or during elevated noise levels.
- When drilling, boring, or probing is performed in chemically or radiological contaminated ground, special protective equipment and clothing will probably be required.
- The clothing of the individual rig worker is not generally considered protective equipment; however, clothing should be close fitting and comfortable without loose ends, straps, draw strings or belts or otherwise unfastened parts that might catch on some rotating or translating component of the rig. Rings and jewelry should not be worn during a work shift.

4.7 **Housekeeping**

4.7.1 A key requirement for safe field operations is that the Contractor safety person understands and fulfills the responsibility for maintenance and “housekeeping” on and around the drill rig, including the following:

- Suitable storage locations should be provided for all tools, materials, and supplies so that tools, materials, and supplies can be conveniently and safely handled without hitting or falling on a member of the crew or a visitor.
- Storage or transporting tools, materials, or supplies within or on the mast (derrick) of the rig should be avoided.
- Pipe, drill rods, probe rods, casing augers, and similar tooling should be orderly stacked on racks or sills to prevent spreading, rolling, or sliding.
- Penetration or other driving hammers should be placed at a safe location on the ground or be secured to prevent movement when not in use.
- Work areas, platforms, walkways, scaffolding and other accesses should be kept free of materials, debris and obstructions and substances such as ice, grease, or oil that could cause a surface to become slick or otherwise hazardous.
- All controls, control linkages, warning and operation lights, and lenses should be kept free of oil, grease, and/or ice.
- Do not store gasoline in any portable container other than a non-sparking, red safety container with a flame arrester in the fill spout and having the word “gasoline” easily visible.

4.8 Traffic Control

4.8.1 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 passerby pedestrians.

4.8.2 All traffic control devices shall be installed, placed, and maintained in accordance with the Traffic Control Plan, client specifications, and/or the Manual of Uniform Traffic Control Devices (MUTCD). 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.

4.9 Maintenance & Inspection

4.9.1 Good maintenance and thorough inspection will make operations safer. Maintenance tasks should be done safely by a qualified maintenance person. Inspection and maintenance tasks include but are not limited to the following requirements:

- Inspections shall be completed at the beginning of each day by the equipment operator and in the presence of an AECOM employee when the equipment is not owned and operated by AECOM. A Rig Inspection Form is provided in S3NA-405-FM1 Drill Rig Inspection for use in performing inspections.
- Safety glasses should be worn when performing maintenance on a rig or on drilling or probing tools.
- The drill rig engine should be shut down to make repairs or adjustments to a drill rig or to lubricate fittings (except repairs or adjustments that can only be made with the engine running).
- Precautions should be taken to prevent accidental starting of an engine during maintenance by removing or tagging the ignition key.
- Wheels or the lowering of leveling jacks or both should be blocked ("zero energy state") and hand brakes set before working under a drill rig.
- When possible and appropriate, all pressure on the hydraulic systems should be released as well as the drilling fluid system and the air pressure systems of the drill rig prior to performing maintenance. In other words, reduce the drill rig and operating systems to a "zero energy state" before performing maintenance. Use extreme caution when opening drain plugs and radiator caps and other pressurized plugs and caps.
- Personnel shall not touch an engine or the exhaust system of an engine following its operation until the engine and exhaust system have adequate time to cool.
- Welding and cutting shall not occur on or near a fuel tank.
- Wire rope safety factors shall be in accordance with American National Standards Institute B 30.5-1968 or SAE J959-1966.
- Gasoline or other volatile or flammable liquids shall not be used as a cleaning agent on or around an I rig.
- The manufacturer's recommendations should be followed for applying the proper quantity and quality of lubricants, hydraulic oils, and/or coolants.
- All caps, filler plugs, protective guards, panels, high-pressure hose clamps, chains, or cables that have been removed for maintenance should be replaced.

4.10 Hand Tools

4.10.1 A large number of hand tools can be used on or around a drill or probe rig and in repair shops and more than an equal number of instructions for proper use exist. "Use the tool for its intended purpose" is the most important rule. Additionally, equipment operators and assistants should not use their hand in place of the proper tool; work shall be stopped until the correct tool can be found. The following are a few specific and some general suggestions that apply to the safe use of several hand tools that are often used on and around rigs:

- When a tool becomes damaged, either repair it before using it again or get rid of it.
- When using a hammer, any kind of hammer for any purpose, wear safety glasses and require all others around you to wear safety glasses.

- When using a chisel, any kind of chisel, for any purpose, wear safety glasses and require all others around you to wear safety glasses.
- Keep all tools cleaned and orderly stored when not in use.
- Use wrenches on nuts; don't use pliers on nuts.
- Use screwdrivers with blades that fit the screw slot.
- When using a wrench on a tight nut, first use some penetrating oil, use the largest wrench available that fits the nut, when possible pull on the wrench handle rather than pushing, and apply force to the wrench with both hands when possible and with both feet firmly placed. Don't push or pull with one or both feet on the drill rig or the side of a mud pit or some other blocking-off device. Always assume that you may lose your footing – check the place where you may fall for sharp objects.
- Keep all pipe wrenches clean and in good repair. The jaws of pipe wrenches should be wire brushed frequently to prevent an accumulation of dirt and grease which would otherwise build up and cause wrenches to slip. Replace hook and heel jaws when they become visibly worn.
- Avoid the use pipe wrenches in place of a rod-holding device whenever possible.
- When breaking tool joints on the ground or on a drilling platform, position your hands so that your fingers will not be smashed between the wrench handle and the ground or the platform, should the wrench slip or the joint suddenly let go.

4.11 Clearing Work Areas

4.11.1 Prior to set up, adequate site clearing and leveling should be performed to accommodate the rig and supplies and provide a safe working area. Clearing the site includes clearing the intended drilling area of underground utilities in accordance with *S3NA-417-PR Utilities, Underground*. Drilling or probing should not be commenced when tree limbs, unstable ground or site obstructions cause unsafe tool handling conditions.

4.11.2 Start-Up

- All rig personnel and visitors should be instructed to "stand clear" of the rig immediately prior to and during starting of an engine.
- Make sure all gear boxes are in neutral, all hoist levers are disengaged, all hydraulic levers are in the neutral-actuating positions, and the cathead rope is not on the cathead before starting a drill rig engine.
- Start all engines according to the manufacturer's manual.

4.12 Drilling and Probing Operations

4.12.1 The following safety measures shall be taken during drilling and 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 and hearing protection shall be worn in the presence of a rig.
- Services shall be cleared prior to drilling or probing.
- Hands shall be kept away from moving parts (augers).
- The emergency shut-off switch on the rig should be identified to site personnel and tested on a regular basis by the operator.
- Unauthorized personnel shall be kept clear of the rig.

4.12.2 Safety requires the attention and cooperation of every worker and site visitor.

- 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 *S3NA-417-PR Utilities, Underground* and *S3NA-406-PR Electrical Lines, Overhead*.
- 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 leveled and stabilized with leveling jacks and/or solid cribbing. The drill rig should be releveled if it settles after initial set up. Lower the mast (derrick) only when the leveling jacks are down, and do not raise the leveling jack pads until the mast (derrick) is lowered completely.

- Before starting drilling operations, secure and/or lock the mast (derrick) if required according to the drill manufacturer's recommendations.
- The operator of a rig should only operate a drill rig from the position of the controls. If the operator of the rig shall leave the area of the controls, the operator should shift the transmission controlling the rotary drive into neutral and place the feed control lever in neutral. The operator should shut down the drill engine before leaving the vicinity of the drill.
- Throwing or dropping tools will not be permitted. All tools should be carefully passed by hand between personnel or a hoist line should be used.
- Do not consume alcoholic beverages or other depressants or chemical stimulants prior to starting work on a rig or while on the job.
- 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.
- Clean mud and grease from your 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 air and water lines and pumps should be drained when not in use if freezing weather is expected.
- 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 should be covered, protected, or backfilled adequately and according to local or state regulations on completion of the drilling project.
- "Horsing around" within the vicinity of the drill rig and tool and supply storage areas should never be allowed, even when the rig is shut down.
- When using a ladder on a rig, face the ladder and grasp either the side rails or the rungs with both hands while ascending or descending. Always use adequate fall protection and a full body harness when climbing above six feet 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.

4.13 **Elevated Derrick Platforms**

4.13.1 The following precautions should be used:

- When a rig worker first arrives at a derrick platform, the platform should immediately be inspected for broken members, loose connections, and loose tools or other loose materials.
- A derrick platform over 4 feet (1.2 m) above ground surface should have toe boards and safety railings that are in good condition.
- When climbing to a derrick platform that is higher than 6 feet (am), a fall arresting device shall be used. The fall arresting device should consist of a full body harness and fall protection. The harness should fit snugly but comfortably. The lifeline when attached to the derrick should be less than 6 feet (2 m) long and attached to a fall arrester. The harness and lifeline should be strong enough to withstand the dynamic force of a 250-pound (115 kg) weight (contained within the belt) falling 6 feet (2 m).
- When a rig worker is on a derrick platform, the lifeline should be fastened to the derrick just above the derrick platform and to a structural member that is not attached to the platform or to other lines or cables supporting the platform.
- Tools should be securely attached to the platform with safety lines. Do not attach a tool to a line attached to your wrist or any other part of your body.
- When you are working on a derrick platform, do not guide drill rods or pipe into racks or other supports by taking hold of a moving hoist line or a traveling block.
- Loose tools and similar items should not be left on the derrick platform or on structural members of the derrick.
- Workers on the ground or the drilling floor should avoid being under rig workers on elevated platforms whenever possible.

4.14 Lifting Heavy Objects

- 4.14.1 Before lifting any object without using a hoist, make sure that the load is within your personal lifting capacity. If it is too heavy, ask for assistance.
- 4.14.2 Before lifting a relatively heavy object, approach the object by bending at the knees, keeping your back vertical and unarched while obtaining a firm footing. Grasp the object firmly with both hands and stand slowly and squarely while keeping your back vertical and unarched. In other words, perform the lifting with the muscles in your legs, not with the muscles in your lower back.
- 4.14.3 If a heavy object shall be moved some distance without the aid of machinery, keep your back straight and unarched. Change directions by moving your feet, not by twisting your body.
- 4.14.4 Move heavy objects with the aid of handcarts or lifting devices whenever possible.

4.15 Use of Wire Line Hoists, Wire Rope, and Hoisting Hardware

- 4.15.1 The use of wire line hoists, wire rope, and hoisting hardware should be as stipulated by the American Iron Steel Institute, Wire Rope Users Manual.
 - All wire ropes and fittings should be visually inspected during use and thoroughly inspected at least once a week for abrasion, broken wires, wear, reduction in rope diameter, reduction in wire diameter, fatigue, corrosion, damage from heat, improper revving, jamming, crushing, bird caging, kinking, core protrusion, and damage to lifting hardware. Wire ropes should be replaced when inspection indicates excessive damage according to the Wire Rope Users Manual. All wire ropes that have not been used for a period of a month or more should be thoroughly inspected before being returned to service.
 - End fittings and connections consist of spliced eyes and various manufactured devices. All manufactured end fittings and connections should be installed according to the manufacturer's instructions and loaded according to the manufacturer's specifications.
 - If a ball-bearing type hoisting swivel is used to hoist drill rods, swivel bearings should be inspected and lubricated daily to ensure that the swivel freely rotates under load.
 - If a rod-slipping device is used to hoist drill or probe rods, do not drill through or rotate drill rods through the slipping device; do not hoist more than 1 foot (.3 m) of the rod column above the top of the mast (derrick); and do not hoist a rod column with loose tool joints while the rod column is being supported by a rod slipping device. If rods should slip back into the hole, do not attempt to break the fall of the rods with your hands or by applying tension to the slipping device.
 - Most sheaves on exploration drill rigs are stationary with a single part line. The number of parts of line should never be increased without first consulting with the manufacturer of the drill rig.
 - Wire ropes shall be properly matched with each sheave. If the rope is too large, the sheave will pinch the wire rope; if the rope is too small, it will groove the sheave. Once the sheave is grooved, it will severely pinch and damage larger-sized wire ropes and therefore shall be replaced.
- 4.15.2 The following procedures and precautions shall be understood and implemented for safe use of wire ropes and rigging hardware.
 - Use tool-handling hoists only for vertical lifting of tools (except when angle hole drilling). Do not use tool-handling hoists to pull on objects always from the rig; however, drills may be moved using the main hoist if the wire rope is spooled through proper sheaves according to the manufacturer's recommendations.
 - When struck tools or similar loads cannot be raised with a hoist, disconnect the hoist line and connect the stuck tools directly to the feed mechanism of the drill. Do not use hydraulic leveling jacks for added pull to the hoist line or the feed mechanism of the drill.
 - When attempting to pull out a mired down vehicle or drill rig carrier, only use a winch on the front or rear of the vehicle and stay as far as possible away from the wire rope. Do not attempt to use tool hoists to pull out a mired down vehicle or drill rig carrier.
 - Minimize shock loading of a wire rope. Apply loads smoothly and steadily. Avoid sudden loading in cold weather.
 - Never use frozen ropes.
 - Protect wire rope from sharp corners or edges.
 - Replace faulty guides and rollers.

- Replace damaged safety latches on safety hooks before using.
- Know the safe working load of the equipment and tackle being used. Never exceed this limit.
- Clutches and brakes of hoists should be periodically inspected and tested.
- Know and do not exceed the rated capacity of hooks, rings, links, swivels, shackles, and other lifting aids.
- Always wear gloves when handling wire ropes.
- Do not guide wire rope on hoist drums with your hands.
- Following the installation of a new wire rope, first lift a light load to allow the wire rope to adjust.
- Never carry out any hoisting operations when the weather conditions are such that hazards to personnel, the public, or property are created.
- Never leave a load suspended in the air when the hoist is unattended.
- Keep your hands away from hoists, wire rope, hoisting hooks, sheaves, and pinch points while slack is being taken up and when the load is being hoisted.
- Never hoist the load over the head, body, or feet of any personnel. Never use a hoist line to "ride" up the mast (derrick) of a drill rig.
- Replacement wire ropes should conform to the drill rig manufacturer's specifications.

4.16 **Use of Cathead and Rope Hoists**

4.16.1 The following safety procedures should be employed when using a cathead hoist:

- Keep the cathead clean and free of rust and oil and/or grease. The cathead should be cleaned with a wire brush if it becomes rusty.
- Check the cathead periodically, when the engine is not running, for rope wear grooves. If a rope groove forms to a depth greater than 1/8 inches (3 mm), the cathead should be replaced.
- Always use a clean, dry, sound rope. A wet or oily rope may "grab" the cathead and cause drill tools or other items to be rapidly hoisted to the top of the mast.
- Should the rope "grab" the cathead or otherwise become tangled in the drum, release the rope and sound an appropriate alarm for all personnel to rapidly back away and stay clear. The operator should also back away and stay clear. If the rope "grabs" the cathead, and tools are hoisted to the sheaves at the top of the mast, the rope will often break, releasing the tools. If the rope does not break, stay clear of the drill rig until the operator cautiously returns to turn off the drill rig engine and appropriate action is taken to release the tools. The operator should keep careful watch on the suspended tools and should quickly back away after turning off the engine.
- The rope should always be protected from contact with all chemicals. Chemicals can cause deterioration of the rope that may not be visibly detectable.
- Never wrap the rope from the cathead (or any other rope, wire rope or cable on the drill rig) around a hand, wrist, arm, foot, ankle, leg or any other part of your body.
- Always maintain a minimum of 18 inches of clearance between the operating hand and the cathead drum when driving samplers, casing or other tools with the cathead and rope method. Be aware that the rope advances toward the cathead with each hammer blow as the sampler or other drilling tool advances into the ground.
- Never operate a cathead (or perform any other task around a drill rig) with loose unbuttoned or otherwise unfastened clothing or when wearing gloves with large cuffs or loose straps or laces.
- Do not use a rope that is any longer than necessary. A rope that is too long can form a ground loop or otherwise become entangled with the operator's legs.
- Do not use more rope wraps than are required to hoist a load.
- Do not leave a cathead unattended with the rope wrapped on the drum. Position all other hoist lines to prevent contact with the operating cathead rope.
- When using the cathead and rope for driving or back driving, make sure that all threaded connections are tight and stay as far away as possible from the hammer impact point.
- The cathead operator shall be able to operate the cathead standing on a level surface with good, firm footing conditions without distraction or disturbance.

4.17 Use of Augers

4.17.1 The following general procedures should be used when starting a boring with continuous flight of hollow-stem augers:

- Prepare to start an auger boring with the drill rig level, the clutch or hydraulic rotation control disengaged, the transmission in low gear, and the engine running at low RPM.
- Apply an adequate amount of down pressure prior to rotation to seat the auger head below the ground surface.
- Look at the auger head while slowly engaging the clutch or rotation control and starting rotation. Stay clear of the auger.
- Slowly rotate the auger and auger head while continuing to apply down pressure. Keep one hand on the clutch or the rotation control at all times until the auger has penetrated about one foot or more below ground surface.
- If the auger head slides out of alignment, disengage the clutch or hydraulic rotation control and repeat the hole starting process.
- An auger guide can facilitate the starting of a straight hole through hard ground or a pavement.
- The operator and tool handler should establish a system of responsibility for the series of various activities required for auger drilling, such as connecting and disconnection auger sections, and inserting and removing the auger fork. The operator shall ensure that the tool handler is well away from the auger column and that the auger fork is removed before starting rotation.
- Only use the manufacturer's recommended method of securing the auger to the power coupling. Do not touch the coupling or the auger with your hands, a wrench, or any other tools during rotation.
- Whenever possible, use tool hoists to handle auger sections.
- Never place hands or fingers under the bottom of an auger section when hoisting the auger 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 rotating augers, 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 the auger. Never use your hands or feet to move cuttings away from the 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.

4.18 Rotary and Core Drilling

4.18.1 Rotary drilling tools should be safety checked prior to drilling:

- Water swivels and hoisting plugs should be lubricated and checked for "frozen" bearings before use.
- Drill rod chuck jaws should be checked periodically and replaced when necessary.
- The capacities of hoists and sheaves should be checked against the anticipated weight to the drill rod string plus other expected hoisting loads.

4.18.2 Special precautions that should be taken for safe rotary or core drilling involve chucking, joint break, hoisting, and lowering of drill rods:

- Only the operator of the drill rig should brake or set a manual chuck so that rotation of the chuck will not occur prior to removing the wrench from the chuck.
- 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.
- In the event of a plugged bit or other circulation blockage, the high pressure in the piping and hose between the pump and the obstruction should be relieved or bled down before breaking the first tool joint.
- 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 your 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 **Site Movement of Equipment**

4.19.1 The individual who transports a rig on and off a drilling site should:

- Be properly licensed and should only operate the vehicle according to federal, state, and local regulations.
- Know the traveling height (overhead clearance), width, length and weight of the rig with carrier and know highway and bridge load, width and overhead limits, making sure these limits are not exceeded with an adequate margin.
- Never move a rig unless the vehicle brakes are in sound working order.
- Allow for mast overhang when cornering or approaching other vehicles or structures.
- Be aware that the canopies of service stations and motels are often too low for a drill rig mast to clear with the mast in the travel position.
- Watch for low hanging electrical lines, particularly at the entrances to drilling sites or restaurants, motels, other commercial sites.
- Never travel on a street, road, or highway with the mast (derrick) of the rig in the raised or partially raised position.
- Remove all ignition keys if rig is left unattended.

4.19.2 Loading and Unloading

- Use ramps of adequate design that are solid and substantial enough to bear the weight of the rig with carrier, including tools.
- Load and unload on level ground.
- Use the assistance of someone on the ground as a guide.
- Check the brakes on the rig carrier before approaching loading ramps.
- 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 high of the pulling vehicle. Refer to the trailer manufacturer's weight distribution recommendations.
- The rig and tools should be secured to the hauling vehicle with ties, chains, and/or load binders of adequate capacity.

4.19.3 Off-Road Movement

The following safety suggestions relate to off-road movement:

- Before moving a drill rig, first walk the route of travel, inspecting for depressions, stumps, gullies, ruts, and similar obstacles.
- Always check the brakes of a drill rig carrier before traveling, particularly on rough, uneven, or hilly ground.
- Check the complete drive train of a carrier at least weekly for loose or damaged bolts, nuts, studs, shafts, and mountings.
- Discharge all passengers before moving a drill rig on rough or hilly terrain.
- Engage the front axle (for 4 x 4, 6 x 6, etc. vehicles or carriers) when traveling off highway on hilly terrain.
- Use caution when traveling side-hill. Conservatively evaluate side-hill capability of drill rigs, because the arbitrary addition of drilling tools may raise the center of mass. When possible, travel directly uphill or downhill. Increase tire pressures before traveling in hilly terrain (do not exceed rated tire pressure).
- Attempt to cross obstacles such as small logs and small erosion channels or ditches squarely, not at an angle.
- Use the assistance of someone on the ground as a guide when lateral or overhead clearance is close.

- After the drill has been moved to a new drilling site, set all brakes and/or locks. Always block/chock the wheels.

4.20 **Tires, Batteries, and Fuel**

4.20.1 Tires on the rig shall be checked daily for safety and during extended travel for loss of air and they shall be maintained and/or repaired in a safe manner. If tires are deflated to reduce ground pressure for movement on soft ground, the tires should be inflated to normal pressures before movement on firm or hilly ground or on streets, roads and highways. Under-inflated tires are not as stable on firm ground as properly inflated tires. Air pressures should be maintained for travel on streets, roads, and highways according to the manufacturer's recommendations. During air pressure checks, inspect for:

- Missing or loose wheel lugs.
- Objects wedged between dual or embedded in the tire casing. Damaged or poorly fitting rims or rim flanges.
- Abnormal wear, cuts, breaks, or tears in the casing.
- The repair of truck and off-highway tires should only be made with required special tools and following the recommendations of a tire manufacturer's repair manual.

4.20.2 Batteries contain strong acid. Use extreme caution when servicing batteries.

- Batteries should only be serviced in a ventilated area while wearing safety glasses.
- When a battery is removed from a vehicle or service unit, disconnect the battery ground clamp first.
- When installing a battery, connect the battery ground clamp last.
- When charging a battery with a battery charger, turn off the power source to the battery before either connecting or disconnecting charger leads to the battery posts. Cell caps should be loosened prior to charging to permit the escape of gas.
- Spilled battery acid can burn your skin and damage your eyes. Spilled battery acid should be immediately flushed off of your skin with lots of water. Should battery acid get into someone's eyes, flush immediately with large amounts of water and see a physician at once.
- To avoid battery explosions, keep the cells filled with electrolyte; use a flashlight (not an open flame) to check electrolyte levels and avoid creating sparks around the battery by shorting across a battery terminal. Keep lighted smoking materials and flames away from batteries.

4.20.3 Special precautions shall be taken for handling fuel and refueling the rig or carrier. Only use the type and quality of fuel recommended by the engine manufacturer.

- Refuel in a well-ventilated area.
- Do not fill fuel tanks while the engine is running. Turn off all electrical switches. Do not spill fuel on hot surfaces. Clean any spillage before starting an engine. Wipe up spilled fuel with cotton rags or cloths. Do not use wool or metallic cloth.
- Keep open lights, lighted smoking materials, and flames or sparking equipment well away from the fueling area.
- Turn off heaters in carrier cabs when refueling the carrier or the drill rig.
- Do not fill portable fuel containers completely full to allow expansion of the fuel during temperature changes.
- Keep the fuel nozzle in contact with the tank being filled to prevent static sparks from igniting the fuel.
- Do not transport portable fuel containers in the vehicle or carrier cab with personnel.
- Fuel containers and hoses should remain in contact with a metal surface during travel to prevent the buildup of static charge.

4.21 **First Aid (see S3NA-207-PR Medical Services and First Aid)**

4.21.1 At least one member of the crew (and if only one, preferably the drilling and safety supervisor) should be trained to perform first aid. First aid is taught on a person-to-person basis, not by providing or reading a manual. Manuals should only provide continuing reminders and be used for reference. It is suggested that courses provided or sponsored by the American Red Cross or a similar organization would best satisfy the requirements of first aid training for drill crews.

4.21.2 For drilling and probing operations it is particularly important that the individual responsible for first aid should be able to recognize the symptoms and be able to provide first aid for electrical shock, heart

attack, stroke, broken bones, eye injury, snake bite, and cuts or abrasions to the skin. Again, first aid for these situations is best taught to drill crewmembers by instructors qualified by an agency such as the American Red Cross.

- 4.21.3 A first aid kit should be available and well maintained on each drill site. The contents of the first aid kit shall be placed in a weatherproof container with individual sealed packages for each type of item.

4.22 **Rig Utilization**

- 4.22.1 Do not attempt to exceed manufacturers' ratings of speed, force, torque, pressure, flow, etc.

- 4.22.2 Only use the drill rig and tools for the purposes that they are intended and designed.

4.23 **Rig Alterations**

- 4.23.1 Alterations to a rig or drilling or probing tools should only be made by qualified personnel and only after consultation with the manufacturer.

5.0 Records

- 5.1 None

6.0 References

- 6.1 None

S3NA-405-FM1 Drill Rig Inspection

Project Name:

Project Number:

Date:

Subcontractor Inspected:

Site Manager:

General Safety		
Safety Officer Designated for Job:	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Name:		
Safety Meeting Performed (Daily)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Personal Protective Equipment (PPE)		
Hard Hats	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Safety Glasses	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Steel-toed Boots	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Hearing Protection	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Work Gloves	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Orange Work Vests	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Traffic Cones and Signs	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Other	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Disposal of PPE in Proper Waste Containers (if applicable)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Comments:		
Daily Inspections of Drill Rig		
Structural Damage, Loose Bolts	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Proper Tension in Chain Drives	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Loose or Missing Guards, Fluid Leaks	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Damaged Hoses and/or Damaged Pressure	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Gauges and Pressure Relief Valves	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Comments:		

Check and test all safety devices such as:		
Emergency shutdown switches, at least daily	<input type="checkbox"/> Yes	<input type="checkbox"/> No
All gauges and warning lights, and ensure control levers are functioning properly	<input type="checkbox"/> Yes	<input type="checkbox"/> No
First aid and fire extinguishers on drill rig	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Back up alarm functioning properly	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Comments:		
Drill Crew Training Requirements		
40-hour OSHA Training	<input type="checkbox"/> Yes	<input type="checkbox"/> No
8-hour Annual Refresher Training	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Drill Rig Training/Safe Operating Practices	<input type="checkbox"/> Yes	<input type="checkbox"/> No
First Aid/CPR	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Emergency Procedures	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Emergency Phone Numbers Posted	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Site Orientation	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Health and Safety Plan Review	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Comments:		
Housekeeping		
Suitable storage for tools, materials, and supplies	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Pipes, drill rods, casing, and augers stacked on racks to prevent rolling and sliding	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Platforms and other work areas free of debris materials and obstructions	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Comments:		

Hand Tools		
Tools in good condition	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Broken tools discarded and replaced	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Right tool used for the right job	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Comments:		
Drilling Operations		
Mast or derrick down when moving rig	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Overhead obstructions identified before mast is raised	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Drill rig stabilized using leveling jacks or solid cribbing	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Secure and lock derrick	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Comments:		
Overhead and Buried Utilities		
Buried utilities identified and marked	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Safe distance of drill rig from overhead power lines	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Comments:		
Wire Line Hoists, Wire Rope, and Hardware		
Inspection for broken wires where reduction in rope diameter, wire diameter, fatigue, corrosion, damage from gear jamming, crushing, bird caging, kinking	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Inspect and lubricate parts daily	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Comments:		

Auger Operations—what to look for:

- A system of responsibility between the operator and the tool handler when connecting and disconnecting auger sections and inserting and removing auger fork.
- During connecting and disconnecting auger sections and inserting auger for the tool, handler should position himself away from the auger column while it is rotating.
- When securing the auger to the power coupling, pin should be inserted and tapped into place using a hammer or other similar device.
- Tool hoist should be used to lower second section of auger into place.
- Both operators should be clear of auger as it is being lifted into place.
- Long-handled shovel should be used to move dirt away from auger.

Overall Summary:

S3NA-405-FM2 Subsurface Investigation Checklist

Name of Contractor:

Location:

Project #:

Date:

Time:

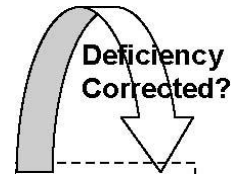
Weather:

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
1. Do on-site personnel have required-level PPE (steel-toe boots, safety vests, hard hats, safety glasses, and gloves)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Is there a copy of HASP and EAP available at each drill rig location?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Are there a PID, multi-gas meter, and a colorimetric pump available at each drill rig location?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Has the field screening equipment been calibrated in the morning?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Are calibration gases available at the site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Are drilling fluids contained in the mud tub?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6a. Does mud tub setup provide adequate splash guards to protect the public?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6b. Does setup present five (5) feet of walk space for the public?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6c. Will the mud tub be emptied at end of day?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6d. Explain how the mud tub will be covered to prevent an accident.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6e. Are adequate containment practices being implemented to prevent mud tub liquids from being released onto pedestrian walkways?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Is the drill rig properly grounded?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Is there a DOT permit available on site at each drill rig location?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8a. Are operations in compliance with DOT permit?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Is there an orange snow fence with appropriate warning signage erected as a site barrier around the drill rig to keep pedestrians out of the work area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Are hydrant water hoses out of the pedestrian sidewalk?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Are smoking and eating prohibited in the immediate work area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Does each drill rig have a fire extinguisher, absorbent materials to cleanup a spill, and a first aid kit?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Is the waste from the mud tub properly contained in 55-gallon drums?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13a. Are drums properly labeled?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Are proper housekeeping procedures followed to avoid slips, trips, and falls?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Are decontamination/hand washing facilities available at the site?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

COMMENTS:

S3NA-405-ST Drilling and Boring

Jurisdiction	Regulation
United States	
OSHA	29CFR 1910.212
Canada	
Alberta	OHS Code (2009) Sect 310, 362
British Columbia	OHS Regulation (1997) Sect 8.10, 16.27, 16.28
Manitoba	Workplace Health and Safety Regulation (217/2006) Sect 16.5, 22.5
New Brunswick	OHS Regulation (91-191) Sect 237, 241, 242
Newfoundland/Labrador	OHS Regulation (C.N.L.R. 1165/96) Sect 52, 61, 68, 71, 73
Nova Scotia	OHS Regulation (N.S. Reg. 44/99) Sect 87, 88
NWT/NU Territories	General Safety Regulations (R.R.N.W.T. 1990, c. S-1), Safety Act (SI-013-92) Sect 39, 97, 141, 220
Ontario	O. Reg. 851 Sect 24
Prince Edward Island	OHS Regulations (EC180/87) Sect 30.2, 30.8
Quebec	OHS Regulation (R.R.Q., c. S-2.1, r.19.01 O.C. 885-2001) Sect 340 Safety Code for the Construction Industry (R.R.Q. 1981, c. S-2.1, r. 6) Sect 2.10.2, 3.10.13
Saskatchewan	OHS Regulation (R.R.S., c. O-1, r. 1) Sect 135
Yukon Territory	OHS Regulations (O.I.C. 2006/178) Sect 1.12, 7.19

S3NA-405-WI Core Drilling Machine Safety Card

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.

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 Avoid tilting the blade when cutting.
- 2.4 Use only the machines that have an approved safety guard.
- 2.5 Remove the diamond blade from the machine during transit to prevent accidental damage.
- 2.6 Inspect the blades frequently to detect cracks or undercutting of the steel center.
- 2.7 Don't let excessive heat be generated at the cutting edge of the blade.
- 2.8 Use adequate water supply to both sides of the blade.
- 2.9 Follow the manufacturers recommended pulley sizes and operating speeds for specific blade diameters.
- 2.10 Make sure to tighten drive belts to ensure full available power.
- 2.11 Don't force the blade on the blade shaft or mount blade on an undersized spindle.



3.0 Potential Hazards

- 3.1 Electrical shock.
- 3.2 Flying debris.
- 3.3 Severe cuts.
- 3.4 Hearing loss.
- 3.5 Breathing fumes or dust.
- 3.6 Binding/biting – torque control.

4.0 Training Requirements

- 4.1 Review of Applicable SOPs (e.g., *S3NA-305-PR Hand and Power Tools*; *S3NA-302-PR Electrical, General*).
- 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 Leather gloves.
- 5.2 Face shield.
- 5.3 Steel-toed/composite-toed boots.
- 5.4 Hearing protection.

5.5 Respirator or dust mask.

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 should be performed prior to initiating drilling operations.

6.4 Stand firmly and apply body weight at anchored side of guarded platform.

S3NA-406-PR Electrical Lines, Overhead

1.0 Purpose and Scope

- 1.1 Provides the safe work requirements to be observed where overhead power lines are present on a job site.
- 1.2 This procedure applies to all AECOM North America-based employees and operations.

2.0 Terms and Definitions

- 2.1 Types of overhead lines:
 - 2.1.1 Overhead power lines
 - 2.1.2 Structural cable supports
 - 2.1.3 Guy wires
 - 2.1.4 Cable television / communication lines

3.0 Attachments

- 3.1 S3NA-406-FM Overhead Electrical Lines Acknowledgement Form

4.0 Procedure

- 4.1 An appropriate distance must be kept between equipment and overhead utility lines.
- 4.2 **Employees** must contact the power line operator before work is done or before equipment is operated within 15.25 metres (50 feet) of an energized overhead power line, in order to:
 - 4.2.1 Determine the voltage of the power line, and
 - 4.2.2 Establish the appropriate safe limit of approach distance as identified by provincial/territorial regulations.
- 4.3 The safe limit of 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 4.15 metres (13.5 feet).
- 4.4 **Employers** or **Project Managers** must formally notify (using the *S3NA-406-FM Overhead Electrical Lines Acknowledgement form*) all subcontractors or equipment operators of an energized overhead power line before work is done or equipment is operated in the vicinity of the power line at distances less than the safe limit of approach distances and obtain the operator's assistance in protecting workers involved.
- 4.5 **Employees** must not place earth or other material under or beside an overhead power line if doing so reduces the safe clearance to less than the safe limit of approach distances.
- 4.6 To maintain minimum safe clearances:
 - 4.6.1 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).
 - 4.6.2 Install telescopic, nonconductive posts and flagging across right-of-way at the minimum allowable clearance as allowed by regulations for the line voltage.
 - 4.6.3 Position signs or other devices to determine the "Danger Zone."
 - 4.6.4 Inform all on-site staff with the on-site clearances required.
 - 4.6.5 Beware of atmospheric conditions, such as temperature, humidity, and wind, that may dictate more stringent safety procedures.
- 4.7 Operation of heavy equipment and cranes in areas with overhead power lines represents a significant hazard to all personnel on the job site. Accidental contact with an energized line or arcing between a

high power line and grounded equipment can cause electrocution of equipment operators or nearby ground personnel, and damage to power transmission and operating equipment. Although maintaining a safe distance from all energized lines is the preferred means for control of this hazard, site conditions may not always accommodate this. If work will (or may) occur within 50 feet of any energized line, the procedures outlined below will be observed.

- 4.8 Overhead power lines will be identified on each job site before the work commences. For each identified line, the **Project Manager** must determine whether it is energized (and the operating voltage for energized lines), and whether work operations will require that activities with heavy equipment (excavators, loaders, cranes, etc.) will occur within 50 feet (15.25 metres) of the line. Unless verified, it will be assumed that all lines are energized.
- 4.9 Safe working distance is the minimum distance that must be maintained between any energized electrical line and any part of the operating equipment to maintain adequate safety margins and is based on the line voltage of the power line. Figure 4-1 lists the line voltages in kilovolts and the Minimum Safe Work Distance in the United States and Figure 4-2 indicates the Nominal Phase to Phase voltage rating in kilovolts for Canada. The following safe working distance criteria will be applied for all AECOM operations:

Figure 4-1: United States Overhead Line Criteria

Line Voltage (Kilovolts)	Minimum Safe Working Distance
0 – 50	10 feet
>50 – 200	15 feet
>200 – 350	20 feet
>350 – 500	25 feet
>500 – 750	35 feet
>750 – 1,000	45 feet

Source: American National Standards Institute, Publication B30.5.

Figure 4-2: Canadian Overhead Line Criteria

Column 1	Column 2
Nominal phase-to-phase voltage rating	Minimum Distance
Over 425 to 12,000	3.0 metres
Over 12,000 to 22,000	3.0 metres
Over 22,000 to 50,000	3.0 metres
Over 50,000 to 90,000	4.5 metres
Over 90,000 to 120,000	4.5 metres
Over 120,000 to 150,000	6.0 metres
Over 150,000 to 250,000	6.0 metres
Over 250,000 to 300,000	7.5 metres
Over 300,000 to 350,000	7.5 metres
Over 350,000 to 400,000	9.0 metres

Source: Canada Occupational Health and Safety Regulations Electrical Safety- Subsection 8.5(6).

- 4.10 Under no circumstances will any object pass closer than 3 metres to any energized, uninsulated electrical line.
- 4.11 Formally notify all subcontractors of Overhead Power lines with the attached *S3NA-406-FM Overhead Electrical Lines Acknowledgement* form.
- 4.12 **Acceptable Safety Procedures**
- 4.12.1 Where any work task will not allow the minimum safe working distance to be maintained at all times, an alternate means of protection must be identified and approved by the **SH&E Department**. In order of preference, acceptable procedures are
- De-energize the power line(s)/lockout by local utility authorities
 - Install insulated sleeves on power lines
 - Assign line spotters to assist the equipment operator
- 4.12.2 De-energize Power Lines
- Elimination of electrical power provides the most acceptable means of ensuring safety of personnel. While temporary site power lines are 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 owner of the line (generally the local electrical utility). Therefore, de-energizing of a line requires advance coordination with the line owner; generally, at least one week advance notice should be provided.
- 4.12.3 Install Insulating Sleeves
- Insulating sleeves can be placed over power lines to provide a contact and arcing barrier if work must occur closer to the power lines than the accepted safe work distance. Although not as desirable as line de-energizing, the use of these sleeves can provide an acceptable alternative where electrical lines are required to remain in service.
 - As with de-energizing of distribution and transmission lines, placement of insulating sleeves can be performed only by the line owner. This requires advance coordination with the line owner; generally, at least one week advance notice should be provided. To install the sleeves, representatives of the line owner will require access to the job site.
- 4.12.4 Assign Line Spotters
- A line spotter is a person located at ground level who is assigned to observe equipment operations, with the specific duty of assisting the equipment operator to ensure that no part of the equipment gets too close to an energized, unprotected electrical line.
 - Persons assigned to act as line spotters must meet the following requirements:
 - While acting as a line spotter, no other duties may be performed (e.g., the line spotter cannot also act as the load spotter during a lifting operations).
 - The spotter will have a radio or other direct means of communicating with the equipment operator at all times.
 - The spotter will be positioned at a right angle to the equipment operator's line of sight to maximize the sight angles between the personnel.
- Under no circumstances will any portion of a piece of equipment pass closer than 10 feet to any energized, uninsulated electrical line.**
- 4.13 **Additional Safety Measures**
- 4.13.1 The following additional safety measures can 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 in Section 4.1.

4.13.2 If an electrical power line is hit or an electrical arc occurs:

- All ground personnel must evacuate IMMEDIATELY to a distance of at least 50 feet (15.25 metres). DO NOT attempt to rescue any injured person until the line can be de-energized.
- The operator should remain in the cab until the line can be de-energized and should carefully try to extricate the equipment from the power line. This may not be possible where melting of insulator material or metal has occurred.
- Contact the line owner to report the line contact and request that the line be de-energized immediately.
- Once the line has been confirmed to be de-energized, the operator can safely evacuate the cab and rescue can commence for any injured personnel.
- Contact the **SH&E Department** to report the incident and implement any instructions provided.
- If the operator must evacuate while the line is still energized (because of fire or other life-threatening condition) he/she should jump clear of the equipment (making sure to avoid touching the equipment and the ground simultaneously), and land upright and with feet together. Once on the ground, proceed in a direct line away from the equipment using a short, shuffling gait (feet touching, sliding each foot no more than 1 foot forward at a time) to minimize shock hazard from electrical energy being transmitted through the ground.

5.0 Records

5.1 None

6.0 References

6.1 None

S3NA-406-FM Overhead Electrical Lines Acknowledgement

Company information		
Name of Employer or Contracting Operation:		
Address:		
City:	Province:	Postal Code:
Telephone:	Fax:	
Project name:		
AECOM contact name:		
Acknowledgement		
I acknowledge that I have received a copy of the <i>S3NA-406-PR Electrical Lines, Overhead</i> , I understand that this project site may have Overhead Electrical Hazards, and I have discussed this procedure with all of our company staff who will be on this site.		
Name and Title (Print)	Signature	Date

S3NA-507-PR Hazardous Materials Communication / WHMIS

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, material safety data sheets (MSDS), and employee training.
- 1.2 This procedure applies to all AECOM North America based employees and operations.
- 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.

2.0 Terms and Definitions

Additional definitions can be found in the Hazardous Material Regulations (HMR), the Transportation of Dangerous Goods (TDG) Regulations, and the International Air Transport Association (IATA) Dangerous Goods Regulation (DGR).

- 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 Safety Operating Procedure (SOP) and Occupational Safety and Health Administration (OSHA) standard, pipes or piping systems, and engines, fuel tanks, or other operating systems in a vehicle are not considered to be containers.
- 2.9 **Establishment:** 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:

- **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;
- **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.
- **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.
- **Flammable Solid:** A solid, other than a blasting agent or explosive as defined in 8 CCR 5237(a), 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.
 - A chemical shall be considered to be a flammable solid if, when tested by the method described in 16 CFR 1500.44, it ignites and burns with a self-sustained flame at a rate greater than one-tenth of an inch per second along its major axis.

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 **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).

2.14 **Hazardous Substance:** A hazardous chemical or carcinogen, or a product or mixture containing a hazardous chemical or carcinogen provided that:

- 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
- The carcinogen is 0.1% or more of the mixture or product.
- Manufacturers, importers and distributors will be relied upon to perform the appropriate hazard determination for the substances they produce or sell.

2.15 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
 - Any drug in solid form used for direct administration to the patient (i.e., tablets or pills)
- 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 **MSDS:** A Material Safety Data Sheet prepared pursuant to state and federal regulations, OSHA Form 174 and Canada regulations (Controlled Products regulations, schedule 1).
- 2.19 **MSDS Administrator:** The individual or group designated by the Office Manager to maintain the establishment-specific inventory list or log and the MSDS binder required if that establishment uses or stores hazardous substances.
- 2.20 **NFPA:** A system of categories, colors and numbers was created to provide basic hazard information. 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.
- 2.21 **Mixture:** Any solution or intimate admixture of two or more substances which do not react chemically with each other.
- 2.22 **Reactivity:** A measure of the tendency of a substance to undergo chemical reaction with the release of energy.
- 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 material safety data sheets (MSDSs) and worker education and training programs.

3.0 Attachments

- 3.1 None

4.0 Procedure

4.1 Roles and Responsibilities

4.1.1 Region SH&E Managers will:

- Audit their regional offices to assure that they maintain an establishment-specific Hazardous Substance Inventory (HSI).
- Audit their regional offices to assure that if an establishment-specific HSI is required, that MSDSs are available for each substance listed on the HSI.
- Provide interpretation of MSDSs and hazard information for WHMIS labels/NFPA labels and other information to assist in training employees.
- Provide hazard communication training to AECOM employees and file documents of this training in the Corporate SH&E office.

- Review MSDS for adequacy of completion to meet the OSHA and Canadian standard and returning them to supplier, if necessary.

4.1.2 **Office Managers** will:

- 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, material safety data sheets, and employee information and training will be met.
- Appoint an MSDS administrator for their establishment if they store or use hazardous substances.
- Confirm, if required, that the MSDS Administrator maintains an HSI for their establishment.
- Confirm that MSDS are available for all substances listed on their establishment's HSI.
- Confirm that a copy of this Procedure and the site-specific MSDS are available to all employees. Employees shall be instructed in the location of this Procedure and the MSDS.
- Confirm that all employees in their office affected by the HAZCOM standard are provided with the appropriate training, including new employees.

4.1.3 **Project Managers (field task managers, supervisors)** will:

- Confirm that all employees under their supervision have received the initial and periodic training required by this SOP prior to assigning employees to tasks involve the use of, or potential exposure to, hazardous substances.
- Notify employees of hazardous substances covered by this SOP 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 an MSDS is available for each hazardous substance used, or potentially encountered, in the work areas or on the projects that are under their supervision.
- 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 MSDSs from all subcontractor organization for the relevant chemicals they bring onto an AECOM controlled site.

4.1.4 **Employees** will:

- Confirm that they have received appropriate hazard communication training prior to working with materials that fall under the standard.
- Only work with materials for which they have been instructed on how to find an MSDS and how to work with that material safely.
- Provide a copy of all MSDSs received to the MSDS Administrator at their facility.
- Verify that an MSDS is available in their work area for each hazardous substance that they use.
- Confirm that containers of hazardous substances that they use are properly labelled.

4.2 All employees have a right to, and should, know the properties and potential hazards of substances to which they may be exposed.

4.3 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.

4.4 **Hazardous Waste Exemption**

4.4.1 In the U.S., hazardous wastes are excluded from the state and federal Hazard Communication standards. However, AECOM employees who handle or are otherwise exposed to hazardous wastes are covered by the requirements of the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) standard at 29 CFR 1910.120 – Hazardous Waste Operations And Emergency Response. This standard requires that:

- Employees receive 40-hour initial and 8-hour annual SH&E training; and that
- Information on the hazards of hazardous wastes be documented in a site-specific Health and Safety Plan (HASP) and communicated to all employees in site-specific briefing on-site training required by the standard.

4.4.2 Therefore, AECOM HAZWOPER projects are not required to comply with the requirements of this SOP as they relate to the hazardous wastes that are present at those project sites.

4.4.3 AECOM's Health And Safety Plan (HASP) requirements are specified in *S3NA-509-PR Hazardous Waste Operations and Emergency Response*.

4.5 **Hazardous Substance Inventory**

4.5.1 Establishment-Specific Hazardous Substance Inventory or WHMIS Log

- If an AECOM establishment uses or stores additional hazardous substances, an establishment-specific HSI must be maintained at that establishment.
- If it is determined that an office-specific HSI is needed, the AECOM **Office Manager** shall assure that one is developed and maintained by someone appointed as the establishment's MSDS Administrator.
- The content of the office-specific written inventory shall be updated as new hazardous substances are procured for, or removed from, the establishment and shall be verified by the **Region SH&E Manager** through regular inspections of the establishment.
- In order to meet the 30-years-after-employment-termination record retention requirement, the office-specific HSIs shall be treated as a permanent record.

4.6 **Material Safety Data Sheets**

4.6.1 Establishment-Specific MSDS Inventory

- If it is determined that an AECOM establishment is required to maintain an establishment-specific inventory ,MSDSs for the specific hazardous substances must be maintained on file at that establishment.
- The **Region SH&E Manager** shall audit the local office program for MSDS request and maintenance and report deficiencies to the appropriate management level, as necessary, to assure compliance with this SOP.

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 MSDS from:
 - 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 MSDSs

- MSDSs should be maintained at the local establishment that uses that hazardous substance. Copies of the MSDS should be made available to the employee upon request to the office's MSDS Administrator.

4.6.4 Field Access to MSDSs

- When hazardous substances are brought into the field, the user must assure that a copy of the MSDS for that substance accompanies it and is available at the field location where it is to be used.

4.6.5 MSDSs for AECOM Products

- It is unlikely that AECOM activities would create a chemical for which a new MSDS were needed. If such a chemical were created, the Corporate SH&E Department shall work with the appropriate operations groups to draft, review, and publish the new MSDS.

4.6.6 Content of the Material Safety Data Sheet

- As a minimum, the MSDS must contain the following information:
 - The name, address, and telephone number of the source of the product or material, preferably those of the manufacturer
 - The trade name and synonyms of the product or material
 - Chemical names of hazardous ingredients, including, but not limited to, those in mixtures
 - An indication of the percentage, by weight or volume, which each ingredient of a mixture bears to the whole mixture
 - Physical data pertaining to the product or material, including boiling point (in °F); vapor pressure (in mm of mercury); vapour density of gas or vapour (air = 1); solubility in water (in percent by weight); specific gravity of material (water = 1); percentage volatile by volume (at 70 °F); evaporation rate for liquids (either butyl acetate or ether may be taken as 1); and appearance and odour
 - Fire and explosion hazard data pertaining to the product or material, including flash point (in °F); flammable limits (in percent by volume in air); suitable extinguishing media or agents; special fire fighting procedures; and unusual fire and explosion hazard information
 - Health hazard data pertaining to the product or material, including exposure limits, effects of overexposure and medical conditions aggravated by exposure, and emergency and first-aid procedures
 - Reactivity data, including stability, incompatibility, hazardous decomposition products, and hazardous polymerization
 - Procedures to be followed and precautions to be taken in cleaning up and disposing of materials leaked or spilled
 - Special protection information, including use of personal protective equipment, such as respirators, eye protection, and protective clothing, and ventilation or other control measures
 - Special precautionary information about handling and strong
 - Any other general precautionary information
- MSDSs 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 MSDSs is proprietary and not provide the information to AECOM.
- When MSDSs supplied to the AECOM Regional SH&E Manager indicate that proprietary information has been withheld, the Regional SH&E Manager will either obtain the necessary information to make a hazard assessment or reject the material for use within AECOM.

4.7 Labeling**4.7.1 Containers of hazardous substances used or stored in each AECOM establishment must be labeled, tagged or marked with the following information:**

- Identification of the hazardous substance(s)

- Appropriate hazard warnings
 - Name and address of the manufacturer, importer or other responsible parties
 - Safe Handling Instructions
 - Statement that an MSDS is available for the product
- 4.7.2 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.
- 4.7.3 Any failure to have the appropriate labeling information on a container at any time will be cause to suspend use of the product until the container is properly labeled.
- 4.7.4 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. Those chemicals identified as being "known to be carcinogenic" by NTP must have carcinogen warnings on the label and information on the MSDSs.
- 4.7.5 Stationary Process Containers
- If there is stationary process equipment within a work area, signs, placards, 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.
- 4.7.6 Portable Containers
- Portable containers of hazardous substances need not be labelled when the substance is transferred from labelled containers and is intended for immediate use of the employee who performs the transfer.
 - 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 in accordance with the National Fire Protection Association's (NFPA) 704M Hazard Identification System shall be attached.
- 4.8 **Chemical Storage**
- 4.8.1 Hazardous chemicals are to be stored in their original, labeled containers with the lids securely closed and taped if possible. Flammable and combustible materials must be stored in fire impervious cabinets in designated stockroom areas. Chemicals must be stored in compliance with instructions provided on their labels, MSDS, or the manufacturer's specifications.
- 4.8.2 All hazardous chemicals must be stored in a manner that prevents spillage and leakage from exposing people or the environment to the chemical.
- 4.8.3 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. If this general requirement is infeasible, contact the SH&E Department for guidance.
- 4.9.2 General exceptions to this rule are the following:
- Liquid paper
 - Toner
 - Cleaners
 - Isobutylene calibration gas
 - pH calibration solutions for instruments

4.10 Employee Information and Training

4.10.1 Each AECOM **employee** who handles or is exposed to hazardous substances must be provided information and training on hazardous substances in their work area.

- At the time of their initial assignment
- Whenever a new hazard is introduced into their work area

4.10.2 As a minimum, the training requirements apply to AECOM personnel in the following job categories:

- All personnel who perform field work that involves the use of, or potential exposure to, hazardous substances
- Laboratory Employees

4.11 Initial Training Content

4.11.1 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 (SOP), including an explanation of the labeling system and the MSDS, and how he/she can obtain and use appropriate hazard information.

4.11.2 The Initial Training will also inform the employee of the following:

- Any operations in their work area in which hazardous substances are present
- Location and availability of this written hazard communications program (SOP)
- 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
- Their 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

4.12 Periodic Training and Training for Non-Routine Tasks

4.12.1 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 revised MSDS is received, which indicates significantly increased risks to employee health as compared to those stated on the previous MSDS
- 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

4.12.2 Supervisors, in coordination with their **Region SH&E Manager**, shall provide such training through an explanation of the information on the contents of the MSDS for that substance.

4.12.3 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

- Emergency procedures for spills, fire, disposal, and first aid

4.12.4 For most projects involving field work, this periodic training requirement will be facilitated through the implementation of the site specific HASP that has been developed for the project.

4.13 **Documentation of Initial and Periodic Training**

4.13.1 All training required by this SOP shall be documented at the time it is performed by having the employee sign a copy of a training attendance sheet.

4.14 **Chemical Usage**

4.14.1 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 tasks to be performed and prescribe the Personal Protective Equipment (PPE) to be used.

4.15 **Office Specific Written Program**

4.15.1 Each office or location using or storing hazardous materials will develop a written office/ location-specific Hazard Communication/WHMIS Program. 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 department, document the changes, and communicate the differences to all affected employees.

4.15.2 For Canadian operations, all relevant MSDS must be current (no more than 3 years old) and readily available (in French and English) for all hazardous materials.

4.16 **Canada-specific**

4.16.1 Consumer products are exempt from supplier labels and MSDS requirements. Some cleaning solvents may be packaged as consumer products and these must be labeled in accordance with the Consumer Product Act requirements.

4.16.2 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 must be communicated to workers through training programs. It is very important for employees to be aware of and understand Client labelling requirements for these types of process systems.

5.0 **Records**

5.1 None

6.0 **References**

6.1 None



Environment

Prepared for:
Superfund Standby Program
NYSDEC
Albany, NY

Prepared by:
AECOM
Latham, NY
April 2012

Community Air Monitoring Program (CAMP)

Midtown Shopping Center
Site 546054
South Glens Falls, NY 12803
D007626.05

Prepared for:

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

Prepared by:

AECOM Technical Services Northeast, Inc.
40 British American Boulevard
Latham, New York 12110

Community Air Monitoring Program (CAMP)

Midtown Shopping Center
Site 546054
South Glens Falls, NY 12803
D007626.05

Engineering Certification

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1.0 Introduction

A Community Air Monitoring Plan (CAMP) is used to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities.

The protocols cited below are based on the NYSDOH Generic Community Air Monitoring Plan (May, 2010; Appendix 1A to DER-10 [NYSDEC, 2010]) which is typically utilized by NYSDEC as guidance for work conducted under these contracts.

2.0 Monitoring

Typically, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter and surrounding community of the work area may be necessary. Monitoring activities should consist of a combination of continuous and periodic monitoring, which will be performed dependent upon the type of activity being conducted at the site, as discussed below.

No significant airborne concentrations of contaminants are expected at the Midtown Shopping Center Site. Real-time air monitoring for VOCs in the work area will be limited to periodic instantaneous measurements.

2.1 Periodic Monitoring

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil or groundwater samples. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap, monitoring during well bailing/purging, and taking a reading prior to leaving a sample location.

VOCs will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) periodically. Upwind concentrations will be measured at the start of each workday to establish background conditions. The monitoring work will be performed using a photo-ionization detector (PID).

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring will continue. If the total

organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be stopped, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 ft downwind of the work zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less (but in no case less than 20 ft), is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, field activities will be shut down.
- All 15-minute readings will be recorded and be available for NYSDEC and NYSDOH personnel to review. Instantaneous readings (if any) used for decision purposes will also be recorded.