March 2026
Syracuse Bread Factory
BCA Index No. C734155

Remedial Investigation Work Plan

Prepared for Syracuse Bread Factory LLC

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Remedial Investigation Work Plan

Prepared for
Syracuse Bread Factory LLC
444 S Salina Street #602
Syracuse, New York 13201

Prepared by
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Project Number: 212407-01.01
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I, Margaret Carrillo-Sheridan, certify that I am currently a NYS registered professional engineer and that this Remedial Investigation 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) and Green Remediation (DER-31).

Date: 03-31-2026

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ABBREVIATIONS

ASTM	ASTM International
BCA	Brownfield Site Cleanup Agreement
BCP	Brownfield Cleanup Program
bgs	below ground surface
CP-51	*Final Commissioner Policy, CP-51/Soil Cleanup Guidance*
DER-10	*DER-10: Technical Guidance for Site Investigation and Remediation*
DOT	U.S. Department of Transportation
ESA	Environmental Site Assessment
HASP	Health and Safety Plan
mg/kg	milligrams per kilogram
NYCRR	New York Codes, Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PID	Photoionization detector
PPE	personal protective equipment
ppm	parts per million
QAPP	Quality Assurance Project Plan
RECs	recognized environmental conditions
RI	Remedial Investigation
RI Work Plan	*Remedial Investigation Work Plan*
SCO	soil cleanup objective
SOP	Standard Operating Procedure
SVOC	semi volatile organic compound
Syracuse Bread Factory	Syracuse Bread Factory LLC
TCL	Target Compound List
TPH	total petroleum hydrocarbons
UCS	unconfined compressive strength
USEPA SW-846	U.S. Environmental Protection Agency *Test Methods for Evaluating Solid Waste*
UST	underground storage tank
VOC	volatile organic compound

1 Introduction

On behalf of Syracuse Bread Factory, LLC (Syracuse Bread Factory), Anchor QEA Engineering, PLLC (Anchor QEA), has prepared this *Remedial Investigation Work Plan* (RI Work Plan) for work to be conducted on the Syracuse Bread Factory site located at 200 Maple Street, Syracuse, New York (the Site; **Figure 1-1**, attached). In September 2021, Syracuse Bread Factory applied to enter the Brownfield Cleanup Program (BCP). On April 21, 2022, the Site was accepted into the New York State Department of Environmental Conservation's (NYSDEC's) BCP, and Syracuse Bread Factory entered into a Brownfield Site Cleanup Agreement (BCA) as a volunteer (BCA Index No. C734155-03-22).

This RI Work Plan was prepared in accordance with the requirements set forth in the executed BCA and in conformance with the guidelines outlined in NYSDEC *DER-10: Technical Guidance for Site Investigation and Remediation* (DER-10; NYSDEC 2010a). Attached to this work plan are the project Quality Assurance Project Plan (QAPP; **Appendix A**), Standard Operating Procedures (SOPs; **Appendix B)** and the Site-specific Health and Safety Plan (**Appendix C**).

1.1 RI Characterization Objectives

The overall objectives of the RI are as follows:

- Define the nature and extent of contamination in soil, surface water, groundwater and any other parts of the environment that may be affected
- Identify the source(s) of the contamination
- Assess the impact of the contamination on public health and the environment
- Provide information to support the development of a proposed remedy to address the contamination or the determination that cleanup is not necessary.

1.2 Current Site Conditions and Background

The Site consists of an approximately 0.75-acre parcel located in an urban setting in the City of Syracuse. The Site occupies a City of Syracuse tax lot designated as 31-14-04 and is currently owned by the Greater Syracuse Land Bank. Site visits were conducted by Anchor QEA as required by DER-10 (NYSDEC 2010a). The Site is occupied by a large vacant former industrial structure with some lawn areas on the northern and eastern sides of the structure as well as a pedestrian sidewalk along the east side of the Site.

As shown on attached **Figure 1-1**. the Site is bordered by East Washington Street to the north, Lombardi Avenue to the northeast, and Maple Street to the east. The south and west sides of the property are bounded by residential and commercial properties.

Immediately north of the Site are three vacant parcels which are not included in the BCA and consist of vegetation and a gravel parking area. The Site and these three vacant parcels are intended to be redeveloped by Syracuse Bread Factory as a mixed-use development consisting of commercial, retail and residential uses.

During the site visits, the former industrial structure was accessed to observe interior conditions and visible infrastructure. Several areas inside the structure were not accessible due to flooring or ceiling damage. In addition, much of the structure basement is not accessible due to accumulations of waste and debris. The following observations were noted during prior Site visits and interior walk throughs of the former factory building:

- The Site property line to the west and the south are immediately adjacent to residential properties. On the west and south property lines, the former building extends to the property line.
- A potential fill pipe was noted on the east side of the building (Maple Street), in the grassed area.
- A potential vent pipe was observed, adjacent to the south side of the building (on the property line.
- A process line, which appeared to have residual oils, within or on the exterior of the line. was observed exiting from a floor penetration in the basement floor slab and connecting to equipment in the former boiler room.
- A structure located in the basement, adjacent to Maple Street, may be an interior fuel storage tank, possibly associated with the fill pipe and/or vent pipe observed in the exterior. This basement structure is not currently accessible due to the presence of accumulated waste and debris, and its function has not been verified.

1.2.1 Site History

Based on a review of information included in the Phase I Environmental Site Assessment (ESA; Stantec 2020), the Site has had a range of uses and occupants over the past 200 years including residential, rail tunnel, and commercial bakery. Presented below is a summary of known Site occupants and commercial activities.

1.2.1.1 City Directory Review

The City Directory review included in the Phase I ESA indicates that the Site was occupied by J. Kidder in 1892 and that by 1924, the Site occupant was General Baking Company. **Table 1-1** below summarizes the Site occupancy through 2022.

Table 1-1
Site Occupancy

Past Operator Name	Estimated Dates of Occupancy	Use (if known)
Greater Syracuse Landbank[1]	12/12/2018 - Present	Maintaining property in current state
Baruch Zvi Holdings LLC	January 30, 2006 – 12/12/2018	Unknown
200 Maple Street Realty Company and Cooper Drapery Company	May 4, 2001 – January 30, 2006	Used for the manufacture and warehousing of decorations and drapery
Cooper Decoration Inc. and Cooper Drapery Company	Circa 1968 – May 4, 2001	
General Baking Company	1922 - 1968	Commercial baking
Syracuse Bread Company/General Baking Company	1912 - 1922	Commercial baking
J. Kidder (1892)	1892 - 1910	Vacant

1.2.1.2 Historical Mapping and Aerial Photographs Review

The earliest available map reviewed that depicted the Site was dated 1834 and the Site was encompassed by block 14, without additional subdivision (Leavenworth 1834). By 1874 this area of the city was beginning to be developed for both residential housing and a tube works manufacturing facility located nearby. **Exhibit 1-1**, below, presents a Birdseye View (Bailey 1874) of the site indicates residential development of lots adjacent to the Site as well as the tube works facility,

[1] The City of Syracuse and the Greater Syracuse Landbank acquired Parcel A vis tax foreclosure.

Exhibit 1-1
1874 Site Conditions

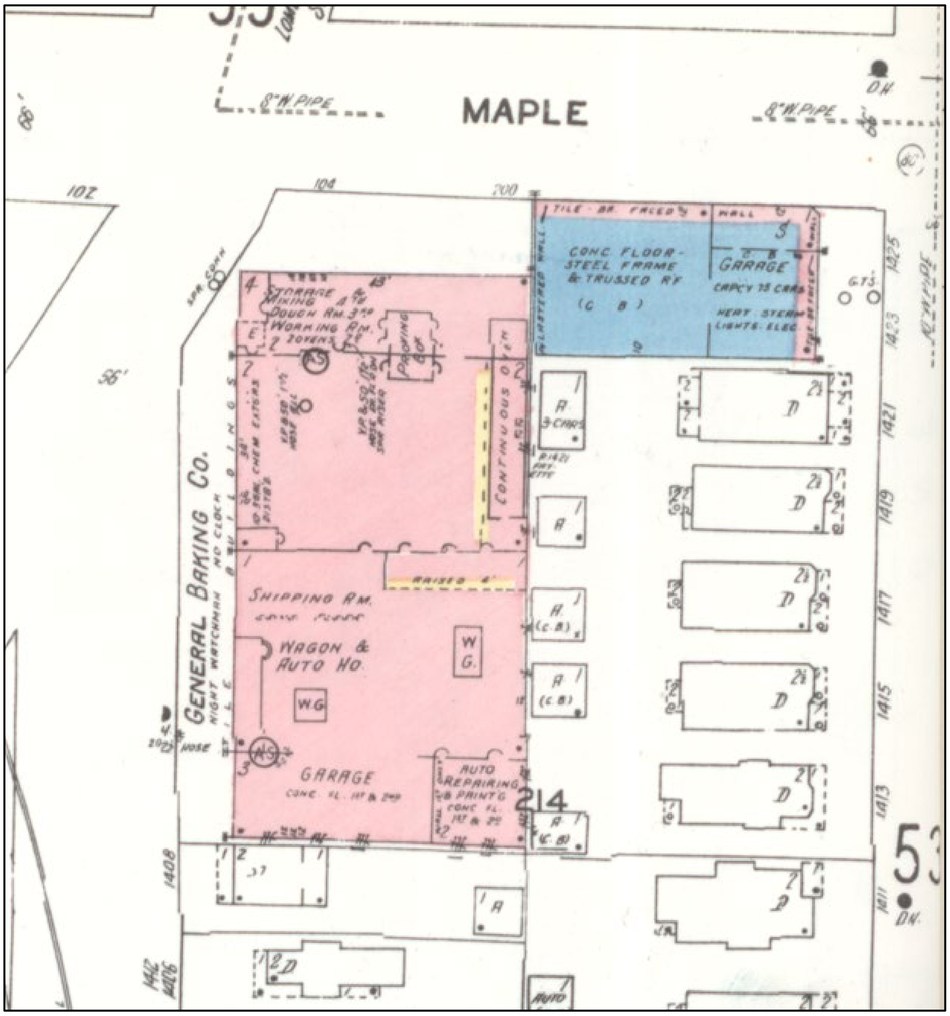
Notes:
1. Source: Bailey 1874.
3. Dashed white line represents the approximate location of the Site.

The 1892 and 1910 Sanborn Fire Insurance Maps also indicate the Site was not developed prior to 1910.

The earliest available aerial photograph (1938) included in the Phase I ESA shows the Site occupied by the former factory building by 1938.

A review of the 1953 Sanborn Map shows the layout of the former General Baking Company building as shown on **Exhibit 1-2**, below.

Exhibit 1-2
1953 Sanborn Fire Insurance Map



Notes:
1. Source: Sanborn 1953.

As shown on the 1953 Fire Insurance Map the former factory building included the following processes/infrastructure:

- Proving box and ovens (2) on the second floor
- Dough room on the third floor
- Storage and mixing room on the fourth floor
- Shipping room, wagon and auto house on the ground floor
- Two-story garage
- Auto repairing and painting (two stories)
- Automatic sprinkler system

- Chemical extinguishers

The Sanborn map did not indicate the presence of fuel storage tanks on the property. Review of the other Sanborn maps (from 1951. 1964, 1968, 1971 and 1990) did not present additional information or indicate the presence of fuel storage tanks on-site,

1.3 Regional Geology

According to the *Surficial Geology of Onondaga County, New York State* map (Pair 2016), surficial deposits in the vicinity of the site consist of:

- "Stratified Sand" which is a well sorted and stratified sand, deposited by fluvial, lacustrine or eolian processes.
- "Diamicton" which is an admixture of unsorted sediment ranging in size from clay to boulders.

1.4 Prior Investigations

As previously discussed, the Site has been the subject of both a Phase I ESA and a Phase II ESA. Based on the results of the Phase I ESA, a Phase II ESA was performed. In addition, between the Phase I and Phase II ESA, Anchor QEA performed a site visit to visually assess existing site conditions.

1.4.1 Phase I ESA

As part of the Phase I ESA, Stantec performed a site visit on January 15, 2020. Based on the Phase I ESA report, during that site visit, Stantec noted the presence of two out of service boilers in the basement along with extensive debris. In addition, the Phase I ESA report indicated that surface staining was not observed. A review of the building basement photographs confirms the absence of staining in the building basement.

The Phase I ESA identified the following recognized environmental conditions (RECs):

- The historical presence of motor vehicles in a "shipping room" in the western portion of the former factory building, with at least one floor drain which may have served as a potential entry point to the subsurface.
- The suspected storage and use of various hazardous materials and/or petroleum products in an auto repair shop that reportedly occupied the northwestern corner of the former factory building during the 1950's through at least 1990.
- The suspected presence of one or more underground storage tanks (USTs) on the Site with no record of UST removal, assessment, or cleanup.
- The presence of numerous fluorescent light fixtures and that may have contained polychlorinated biphenyls (PCBs) within the former factory building.

- The presence of numerous 55-gallon drums and smaller containers storing petroleum products and other hazardous materials throughout the former factory building.
- The presence of six approximately 55-gallon drums suspected of storing petroleum products located outside along the eastern edge of the former factory building.

1.4.2 Anchor QEA Visual Assessment

On October 20, 2020, Anchor QEA performed a site visit to visually assess the property as part of our initial scoping of work. During this site visit, Anchor QEA personnel entered the boiler room and observed accumulations of oil on the floor by an open pipe (see **Exhibit 1-3** below).

Exhibit 1-3
Accumulated Oil in Open Pipeline in Boiler Room

Notes:
1. Photograph by Anchor QEA personnel dated October 20, 2020.

1.4.3 Phase II ESA

Based on the RECs identified by the Phase I ESA, a Phase II ESA was completed by Stantec and consisted of the following investigation activities:

- Geophysical survey of proposed drilling locations, floor drains, and a suspected underground storage tank
- Waste characterization sampling of residual materials stored in drums on-Site

- Composite waste sampling of oily sludge located within a vault which appeared to collect materials from the mapped floor drains.
- Installation of 16 soil borings and collection of soil samples from the borings
- Installation of 9 temporary groundwater monitoring wells and collection of samples from 8 of the installed wells.
- Laboratory analysis of soil and groundwater samples.

The Phase II ESA investigated not only the Site, but also three vacant parcels located across Washington Street which comprise the Syracuse Bread Factory Project Area[2]. For the purposes of this summary, the following results discussion is focused on the Site with relevant off-site data included as appropriate. The Phase II ESA Report was previously provided to NYSDEC as part of the Brownfields program application documentation and included a detailed description of the Phase II ESA investigation activities and results. In addition, the Phase II ESA Report included Data Usability Summary Reports (DUSRs) for the analytical data generated during the investigation.

The Phase II ESA results are summarized below.

1.4.4 Soils

A review of the soil boring logs presented in the Phase II ESA indicates that the Site soil falls within the regional descriptions for surficial geology along with placement of historic fill as summarized below.

- *Historic fill materials consisting of a mixture of ash, cinders, brick and wood debris.* Historic fill was observed at or near the ground surface and extended to a maximum depth of 9 feet below ground surface (bgs) on Site.
- *Silty clay with sand and gravel.* These soils were observed from approximately 4 feet bgs and extending to the base of the soil borings within certain areas of the Site.

Soil sample results indicate the presence of inorganic and organic compounds in soil samples as described below. Attached **Figures 1-2** through **1-6** present the results of the Phase II ESA soil investigation.

1.4.4.1 Inorganics Results

Inorganics were detected in select soil samples at concentrations greater than unrestricted use soil cleanup objectives (SCOs) and/or restricted use SCOs as presented in Part 375 in Title 6 of the New York Codes Rules and Regulations (6 NYCRR 375). Inorganics detected in soil samples at concentrations greater than the restricted use SCOs consisted of lead and mercury. The maximum concentration of lead detected in a soil sample was 589 milligrams per kilogram (mg/kg), which was

[2] The three vacant parcels are not part of this BCP Site.

collected at a depth of 0.5 – 2 feet below ground surface (bgs) in soil boring DP-04. The maximum concentration of mercury detected in a soil sample was 1.53 mg/kg at a depth of 0.5 to 1 feet bgs also from soil boring DP-04.

Based on the soil boring descriptions including in the Phase II, the presence of inorganics in shallow soil samples at concentrations above the unrestricted residential SCO and generally below the restricted residential SCOs in both on-site and off-site locations are likely associated with historic fill materials placed prior to the start of operations in the former building.

1.4.4.2 Semi-Volatile Organic Compounds in Soil

Semi-volatile organic compounds (SVOCs) were detected in one on-Site shallow soil sample at concentrations above the unrestricted residential SCOs. The sample was collected at a depth of 0.5 – 2 feet below grade (below the building slab). SVOCs detected at concentrations above the SCOs were polycyclic aromatic hydrocarbons (specifically benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo (k) fluoranthene, chrysene, dibenzo(a,h) anthracene, and indeno (1,2,3-cd) pyrene. Other soil borings on Site did not report SVOCs at concentrations above the unrestricted residential SCOs.

Soil borings installed off-Site also reported PAHs at concentrations above the unrestricted residential SCOs in samples collected from shallow (0.5 – 2 feet below grade) and deeper locations (between 8.5 and 18.4 feet below grade). The off-Site soil boring locations appear to be located near the former rail tunnel, which, along with the Phase II soil boring descriptions, infer that the detections of PAHs in the shallow and deeper soil samples are likely associated with the presence of historic fill,

1.4.4.3 Volatile Organic Compounds in Soil

VOCs were detected in one subsurface soil sample collected from soil boring DP-04 at a depth of 8.9 – 9.2 feet bgs. The VOCs were detected at concentrations above the unrestricted use SCOs presented in 6 NYCRR 375. The VOCs detected in the soil sample at concentrations above the SCOs were benzene, ethylbenzene and xylenes. Acetone was also detected in a soil sample at a concentration above the SCOs, however this detection is presumed to be a laboratory contaminant and not related to the Site.

None of the other soil borings installed on-Site reported VOCs in soil samples at concentrations greater than unrestricted SCOs. However, two other soil borings installed within the building footprint and below the building slab reported total organic vapors based on photoionization detector (PID) screening results. PID results were reported at concentrations as high as 1,180 parts per million (ppm) in sample DP-06. In addition, soil descriptions of petroleum odors in soil boring intervals located between 9 and 12 feet below ground surface were recorded on the soil boring logs for DP03 and DP04.

The detection of VOCs in subsurface soil samples is presumed to be associated with historical uses of petroleum-based products (such as gasoline or heating oil) at or near the site.

1.4.5 Hydrogeology

During the Phase II ESA, groundwater was encountered between approximately 5 and 19 feet below ground surface in temporary wells installed on the Site. Based on the groundwater contour maps developed by Stantec and included in the Phase II ESA Report, a groundwater mound/highpoint appears to be present on the Site, along East Washington Street, with groundwater flowing predominately towards the south/southeast/southwest.

The Phase II groundwater elevation data indicates an elevation decrease from the high point of the mound (water elevation of 433.93 at temporary well TW-05) to the lowest detected water elevation (373.90 at temporary well TW-07). This elevation transition over a distance of less than 200 feet appears unlikely based on the current Site conditions. The water table elevations recorded in the exterior on-Site temporary wells may be associated with perched water, rather than the actual water table elevation.

Attached **Figure 1-11** presents the groundwater contour map developed by Stantec and is included in the Phase II ESA Report.

1.4.5.1 Groundwater Sample Results

Five temporary monitoring wells were installed on the Site. Both filtered and unfiltered groundwater samples were collected from the temporary wells and analyzed for inorganics, VOCs and SVOCs. Attached **Figures 1-7** and **1-8** present the results of the prior sampling events

Each of the groundwater samples collected from the temporary wells contained inorganics at concentrations above the standards or guidance values presented in Ambient Water Quality Standards and Guidance Values, Division of Water, Technical and Operational Guidance Series (TOGS 1.1.1). In addition, groundwater samples collected from monitoring wells TW-05 and TW-09 also contained SVOCs (specifically benzo(a) anthracene, benzo (a) pyrene, benzo (b) fluoranthene, benzo (k) fluoranthene, chrysene, and indeno (1,2,3-cd) pyrene) at concentrations above the standards and guidance values presented in TOGS 1.1.1.

1.4.6 Subsurface Structure Assessment

As detailed in the Phase II ESA report, the geophysical investigation outlined the location of a suspected underground storage tank (UST) in the northwestern portion of the former factory building. The vent pipe was observed on the northern exterior building wall and an apparent fill port located to the south of the interior ramp were utilized as a starting point for the GPR investigation. Based on GPR results, the suspect UST was situated in an east to west orientation and had dimensions of approximately 6 ft. by 12 ft. at an approximate depth of 4 ft. below the finished concrete floor. A nearby pipe/floor drain was “dipped” by Stantec and a trace amount of product appeared to remain within the bottom of the tank. The tank’s apparent product odor was similar to that of aged gasoline. A sample of the liquids in the drain was not collected as part of the Phase II ESA.

Exhibit 1-4, below, shows the location of the presumed interior UST based on the GPR survey.

Exhibit 1-4
Potential Interior UST

Notes:
1. Source: Stantec 2021

Immediately to the north of the suspected UST and the former Factory building’s exterior wall, a geophysical anomaly presumed to be the remnants of a fuel dispensing island with associated piping was located. However, this fuel dispensing island was not confirmed through intrusive investigation.

A floor vault was located and appeared to be the location to which floor drains on the western portion of the building drain. The vault is located immediately to the south of the location of the presumed UST and the Phase II report surmised that this vault may have served as an oil water separator. The drop outlet of the vault was clogged and unable to be cleaned to allow additional investigation with a camera. Based on the Phase II ESA report, the vault contained approximately 2 ft. of a dark gray /black oily-sludge and exhibited a strong weathered petroleum odor. Overlaying the sludge within the vault was approximately 1 ft. of standing water. The oily sludge was samples and analyzed for waste characteristics. The results of the waste characterization sludge sample indicated the presence of total PCBs at a concentration of 1.81 milligram per kilogram (mg/kg) along with petroleum-related VOCs and SVOCs.

1.4.6.1 Open Spill Report for Site

On October 30, 2020 (during the performance of the Phase II ESA), a gasoline spill was reported to NYS Department of Environmental Conservation (NYSDEC) for the Site. The spill location was described as "vacant facility" located at 200 Maple Street. Based on the date of the spill report (coinciding with the Phase II ESA), the spill report was presumed to have been made based on the field conditions encountered by the consultant during the Phase II investigation.

1.4.7 Phase II ESA Recommendations

The Phase II ESA presented the following recommendations for additional site characterization and remediation actions:

- Cleaning and removal or in-place closure of the UST with associated confirmation soil sampling
- Further investigation of the geophysical anomaly to the north of the UST
- Proper disposal of the drums and their contents
- Proper disposal of the floor vault contents followed by investigation of its integrity and outlet destination
- Delineation of VOC, polycyclic aromatic hydrocarbon (PAH) and metals impacts to soil and/or groundwater followed by remedial measures as needed.

1.4.8 Anchor QEA November 2025 Basement Review

On November 25, 2025, Anchor QEA personnel accessed the building basement to assess the existing infrastructure and conditions in preparation for conducting this RI Work Plan. During this assessment, the presence of a concrete encased fuel tank was observed in the southwest corner of the basement (see **Exhibit 1-5** below). This tank had an open top and the debris and building structure in the vicinity of the tank was oil coated and or stained.

Exhibit 1-5
Fuel Storage Tank in Basement

Notes:
1. Photographs dated November 25, 2025.

Further assessment of the basement noted the oil staining extended from the area of the storage tank to the boiler room area. **Exhibit 1-6** (below) presents a side-by-side comparison of the basement conditions observed during the Phase I ESA completed in 2020 and November 2025.

Exhibit 1-6
Comparison of Boiler Room Conditions from January 2020 to November 2025

Notes:
1. Photograph on left from Phase I ESA January 2020 Site visit does not indicate oil staining on wall. Photograph on right taken by Anchor QEA in November 2025 shows oil staining on the basement walls.

Based on a review of the Phase I ESA photographs and Anchor QEA's site visit records, the basement area may have been inundated due to flooding resulting in a release of oil from the storage tank at some point between January 2020 and October 2020.

1.5 Work Plan Organization

This RI Work Plan is organized as detailed in **Table 1-4**.

Table 1-4
Work Plan Organization

Section	Description
1 - Introduction	Presents the purpose and objectives of the RI Work Plan and summarizes the Site background and history.
2 – Investigation Scope of Work	Presents a summary description of the proposed investigation activities by media (soil, groundwater, air) and by area of interest.
3 – Reporting	Describes the anticipated content and format of the Remedial Investigation Report.
4 – Project Schedule	Provides a proposed schedule for RI Work Plan implementation,
5 - References	Identifies the references, including reports, guidance documents, and other literature, used in preparation of this RI Work Plan.

This work plan is supported by in-text and attached figures and tables as detailed in the table of contents and by the following appendices:

- Appendix A: Project Quality Assurance Project Plan (QAPP)
- Appendix B: Standard Operating Procedures (SOPs)
- Appendix C: Health and Safety Plan (HASP)

2 Remedial Investigation Scope of Work

Based on the results of the Phase II ESA, the following activities are proposed to define the nature and extent of contamination at the Site:

- Perform a geophysical survey to confirm the locations of the subsurface anomalies and to locate potential buried utilities
- Perform a soil gas survey to evaluate the potential presence of petroleum hydrocarbons in underlying vadose or saturated zones that may have been released to the subsurface from the basement. During the Phase II ESA, elevated PID readings (over 1,000 ppm) were reported in a soil boring under the existing building, indicating a potential source of volatile organic compounds that may need to be addressed as part of the remedial plan. The results of the soil gas survey will also be used to inform optimal locations for soil borings and groundwater monitoring wells.
- Conduct test pitting to evaluate the subsurface conditions in the area of the subsurface anomalies and confirm the presence or absence of fuel storage and/or dispensing equipment in the subsurface. Based on the results of the test pitting activities, collect additional soil and/or groundwater samples if needed to assess the potential for historical petroleum releases from the subsurface structures.
- If needed, based on the results of the geophysical and or soil vapor survey conduct test pitting on the eastern side of the Site to assess the potential presence of tank fill piping associated with the fuel storage tank located in the basement of the existing building,
- Install three soil borings for soil sample collection and conversion into permanent monitoring wells.
- Development and sampling of three permanent monitoring wells.

To complete the RI, several investigation activities will be completed. These individual investigation activities are summarized on Table 2-1 below, and described in the following sections and in Standard Operating Procedures (SOPs) included in **Appendix B**.

Table 2-1
Summary of Anticipated RI Investigation Activities

Work Activity	Description
Geophysical Survey/Utility Clearance	• Perform on property road frontage on both Maple and E. Washington Streets to assess for potential buried utilities • Confirm manholes are not utility-owned, open manholes to assess potential for piping in vicinity of suspect underground storage tank on E. Washington Street • Perform one-call/411
Soil Gas Survey	• Install seven soil vapor sampling points and collect samples for analysis. Three points will be installed in the portion of the building where there is no basement (western side of building along E. Washington Street) – Soil gas sample data will be used to inform optimal placement of soil borings and monitoring wells. The soil gas sample data is not intended to serve as vapor intrusion data representative of future (post construction) conditions.
Subsurface Soil Investigation	• Install test pits in grassed/asphalt areas adjacent to building along E. Washington Street and Maple Street (if warranted based on the results of the soil vapor and geophysical survey): – If UST or piping is uncovered during test pits, record information (diameter, estimated capacity, location of fill pipe) – Backfill test pits using excavated soils • Install three soil borings to support groundwater monitoring well installation – The final locations of soil borings and groundwater monitoring wells will be determined based on the results of the geophysical and soil vapor survey, and test pitting. • For both test pits and soil borings: – Screen soils using a PID and record observations of potential source materials (such as stained soil, odors, PID results) – Based on observations, collect soil samples for analysis
Groundwater Investigation	• Install three permanent groundwater monitoring wells – One well installed near the suspect UST along East Washington Street – One well will be installed near the area of stored drums adjacent to off-site garage area on Maple Street – One well is proposed for installation within the existing building, if drilling equipment can be readily mobilized to the proposed location, and the building conditions allow for safe entry and well installation. • Groundwater samples to be collected for Target Compound List (TCL) volatile and semi-volatile organic compounds, Target Analyte List inorganics, polychlorinated biphenyls, TCL pesticides, and emerging contaminants PFAS and 1,4-Dioxane.
Subsurface Structure Assessment	• Evaluate subsurface pits, drains and vaults within the existing building that are safely accessible per standard operating procedures in RI Work Plan.

2.1 Mobilization and Utility Clearance

Prior to initiating any fieldwork, all necessary permits and access agreements will be secured as part of the project mobilization. These will include access to the Site and access to public property as necessary to complete investigations.

Anchor QEA will subcontract an experienced environmental drilling and excavation contractor (drilling contractor) to complete these subsurface investigations. Anchor QEA will work with the subcontractor to mark the proposed subsurface investigation locations. The drilling contractor will then be responsible for initiating the utility notification for a utility mark out (Dig Safely New York or 811). The subcontractor will be responsible for verifying that all notified utilities respond and provide documentation to Anchor QEA for agreement that all public utilities were notified and responded prior to initiating any subsurface investigation.

2.1.1 Private Utility Locate

As identified during previous investigations, private utilities that connect to public infrastructure may be present in the subsurface. These may be sewer connections from the building to the public sewer main in the road. These utilities would not be marked out as part of the public utility notification.

A private utility location firm will be subcontracted to complete a geophysical survey for additional buried utilities on the Site using tools such as ground penetrating radar, a magnetometer, and pipe and cable locators. The firm will focus on the proposed investigation locations and to "clear" a 5-foot buffer around each proposed subsurface investigation location, allowing for adjustments by the drilling contractor in the field to ensure the test pits are advanced in an area clear of subsurface utilities.

2.2 Soil Gas Survey

Following completion of the utility locate, the soil vapor survey will be performed to assess the concentration of volatile organic compounds within the vadose zone at the approximate locations shown on attached **Figure 2-1**. Based on the site configuration, the soil gas survey points will be located on the building exterior (four locations) and below the slab in the western portion of the building. The vapor sampling points will be installed in conformance with *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (NYS Department of Health 2007) and the procedures in Appendix B – Standard Operating Procedures. Soil vapor samples will be submitted for laboratory analysis using U.S. Environmental Protection Agency *Test Methods for Evaluating Solid Waste* (USEPA SW-846) using Method TO-15.

2.3 Surface Soil Sample Collection

Surface soil samples will be collected from the following depth intervals per the procedures presented in Appendix B – Standard Operating Procedures:

- Up to 4 surface soil samples collected from vegetated/exposed soil areas on-site from the 0-2 inch-depth interval (located below any vegetation).
- A minimum of 4 samples will be collected from the 2-12-inch depth intervals that are co-located with soil boring and test pit locations as described below in Section 2.4.

2.4 Subsurface Soil Investigation

Subsurface soil investigation will be performed during the RI to supplement the subsurface soil data collected during the Phase II ESA. The subsurface soil investigation will be performed through a combination of exploratory test pitting and soil borings. As described in the following subsections, soil samples will be collected from the test pits and soil borings and submitted to an ELAP-certified analytical laboratory for the analyses presented below on **Table 2-2**.

Table 2-2
Proposed Analytical Parameters and Methods

Parameter	Method
Target Compound List (TCL) Volatile Organic Compounds (VOCs)	U.S. Environmental Protection Agency *Test Methods for Evaluating Solid Waste* (USEPA SW-846) Method 8260 (USEPA 2014)
TCL Semi-Volatile Organic Compounds (SVOCs)	USEPA SW-846 Method 8270D
TCL Pesticides	USEPA SW-846 Method 8270D
1,4 Dioxane	USEPA SW-846 Method 8270D
Per-and Polyfluoroalkyl Substances (PFAS)	Draft USEPA SW-846 Method 1633 (USEPA 2022)
Target Analyte List (TAL) Inorganics, Excluding Mercury	USEPA SW-846 Method 7474
Total PCBs	USEPA SW-846 Method 8082A

2.4.1 Exploratory Test Pits

Based on the results of Phase II ESA and the results of the soil gas survey, test pitting may be performed at both locations of suspected petroleum storage to further investigate the potential for residual petroleum products being stored in the subsurface or the presence of source materials in locations of suspected former petroleum product storage. Attached **Figure 2-1** shows the proposed exterior test pit locations. Additional test pits may be considered based on the results of the geophysical and soil gas surveys and further assessment of the interior suspect UST.

During the test pitting operations, excavated soil will be screened for organic vapors using a photoionization detector (PID) and for visible indications of contamination. Soil with visible contamination or elevated PID readings (more than 10 parts per million above background) will be placed in 55-gallon drums separate from the other excavated soils for characterization and disposal. Excavated soils without elevated PID readings or visible staining will be placed back in the test pit following completion of the test pit excavation. The waste will be managed as described in Section 2.5 (below) and the investigation-derived waste SOP in **Appendix B**.

2.4.1.1 Subsurface Soil Field Screening

Field screening tools and the data collected will allow the operator and Anchor QEA field staff to identify the depths where soil contamination starts and stops. Targeted samples will be collected based on the data to confirm depth of maximum impacts and the depths where those impacts decrease below soil cleanup guidance levels, thus completing delineation. Details on procedures to be followed while performing drilling and sampling are included in SOP 004 – Test Pit Excavation (**Appendix B**).

2.4.1.2 Subsurface Soil Analytical Testing

In addition to field screening soil samples, soil samples will be collected at select locations based on the PID readings, and subsurface features encountered. Soil samples will be collected to confirm delineation of the potential source area and to compare measured concentrations of specific SCOs. Soil samples will be analyzed for the list presented above on **Table 2-2**. The analytical methods, reporting limits, and other project analytical requirements are outlined in the QAPP (**Appendix A**).

If the test pitting indicates the release of contamination from the historical subsurface structure to the soils, excavation side wall samples will be collected and submitted for laboratory analysis. Soil samples will be collected from the following three intervals based upon field screening and visual results:

- One sample will be collected from the shallowest portion of the identified contamination.
- One sample will be collected from the center of the identified contamination.
- One sample will be collected from the base of the identified contamination.

The objective when identifying the intervals for analytical sampling is to measure chemical concentrations in the soil and ensure that the deepest interval sampled is targeting a "clean" interval to demonstrate contamination has been delineated vertically.

Soil samples will be collected following procedures outlined in SOP 004 – Test Pit Excavation in **Appendix B**.

2.4.2 Soil Boring Installation

Anchor QEA's drilling subcontractor will complete three soil borings at the proposed groundwater monitoring well locations shown on attached **Figure 2-1**. Based on the work performed during the Phase II ESA by Stantec, we have assumed that the borings will be installed using direct push drilling methods in accordance with the SOPs including in **Appendix B**. Each soil boring will be completed to depths that are at least 10 feet below the top of the water table and at least 5 feet below historic fill materials that may be encountered during drilling.

An Anchor QEA geologist will visually characterize the soil at each boring location and screen the samples using a photoionization detector. Visual observations will be recorded in a field notebook and photographic log. Additionally, up to three soil samples will be collected from each boring and submitted for laboratory analysis for the list presented above on **Table 2-2**.

Soil samples will be selected from boring intervals above the water table and submitted for analysis based on the following logic:

- One soil sample will be selected from the soil boring interval where visual or PID screening indicates the presence of gross contamination (e.g., staining, sheens, petroleum-like odors or elevated PID readings). If multiple intervals of potentially impacted soil are observed within a soil boring, this sample will be collected from the soil boring interval with highest concentration of organic vapors
- One sample will be collected from the first visually clean boring interval located below the boring exhibiting gross contamination.
- A third sample will be collected from the 6-inch depth interval immediately above the water table.
- If no organic vapors or other indications of gross contamination are observed in a soil boring, one sample will be collected from the 6-inch interval located above the top of the water table.

2.5 Groundwater Investigation

During the Phase II investigation at the Site, depth to groundwater was described as ranging from 5 to 19 feet below ground surface. However, during development and/or sampling, several wells went dry and could not be sampled using low-flow procedures. The results of the Phase II investigation also indicate a groundwater mound/highpoint appears to be present on the Site, along East Washington Street, with groundwater flowing towards the south, southeast, and southwest.

To confirm groundwater elevations, three monitoring wells are proposed to be installed as described in the following subsections.

2.5.1 Monitoring Well Installation

The three monitoring wells to be installed are anticipated to be shallow, water-table monitoring wells. Based on the Phase II report, the estimated depth to the water table is assumed to be 16 feet or greater.

As discussed above in Section 2.2, soil borings will be installed at the proposed monitoring well locations using direct push methods. The monitoring wells will then be installed as described in **Appendix B**. Generally, each monitoring well will be constructed of 2-inch diameter, schedule 40 PVC well screen, and casing. The monitoring well screens will be installed below the water table so potential contamination migrating with groundwater flow will be intercepted. Once installed, each well screen will have an appropriately sized filter sand placed around it to a height of 2-feet above the top of the screen. Above the filter sand will be a 1-foot bentonite seal followed by neat-cement grout to the surface. All monitoring wells installed will then be completed with a well-plug and flush mount well cover.

Each well will be allowed to sit for a period of at least 12 hours prior to well development. Each well will be developed to remove any material trapped within the well and filter pack during installation following procedures in **Appendix B**.

2.5.2 Groundwater Sampling

Following monitoring well installation and development, the monitoring wells will be sampled following a 2-week period to allow water table conditions to return to static or normal. Prior to collecting a groundwater sample, the static water level in each monitoring well will be measured and the total depth of the well sounded to ensure no foreign objects are present to potentially bias results.

Monitoring wells will be sampled following low-flow or low-stress procedures. These procedures allow for representative samples to be collected with minimally purged groundwater to then be managed and disposed of. Each monitoring well will be sampled following procedures outlined in the Low-Flow Groundwater Sampling SOP included in **Appendix B**. Samples collected will be submitted for analysis for the parameters listed above on **Table 2-2**.

The groundwater sample results will be compared to New York State groundwater standards in 6 New York Codes, Rules, and Regulations (NYCRR) Part 703. Additional information on analytical methods and reporting limits are included in the QAPP (**Appendix A**).

2.6 Subsurface Structure Evaluation

This evaluation will consist of assessing subsurface structures within the building footprint (that are not investigated via test pitting as previously discussed) to identify former process-related infrastructure that may serve as a source of contamination to underlying soils and/or groundwater. Site-related sanitary and storm sewers and their structures will not be investigated under this Work Plan.

Prior to evaluating each process-related subsurface structure, the cover will be removed and the air inside the structure will be monitored for volatile organic vapors, oxygen, combustible gases, carbon monoxide, and hydrogen sulfide. The subsurface structure evaluation will be performed from the ground surface only to determine the following information:

- Dimensions of each subsurface structure (e.g., size of the cover, depth from the rim to the bottom of the structure, interior dimensions of the structure, and depth of the rim to the inverts for process piping entering or leaving the structure)
- Size, orientation, and material of construction for process piping entering and exiting each subsurface structure (e.g., corrugated metal, concrete, vitrified clay)
- Material of construction (e.g., pre-cast concrete, steel, brick, and mortar) and overall condition of each subsurface structure
- The presence and depth of liquids (if any), the presence of sheens on the surface of the water, and the approximate flow rate of water discharging into or out of the structure (if any)
- The presence and depth of debris/sediment in each subsurface structure and piping connected to the subsurface structure

The results of the subsurface structure survey activities will be recorded on the field forms included in **Appendix B**. For each subsurface structure surveyed, field personnel will photograph the interior of the structure for inclusion in the RI Report. Samples of accumulated debris/sediment (if any) within the structures may be sampled based on the PID readings and ability to access the materials for sample collection from the ground surface.

In addition, the oily pipe previously observed in the basement of the Former Factory building will be traced using visual and geophysical methods to determine the pipe's origin (and connection to the suspect oil storage tank in the building basement) and determine the presence or absence of residual oils in the pipeline.

2.7 Soil Vapor Intrusion Investigation

Based on the current building conditions (including extensive debris covering the building slab), the vapor intrusion investigation is not proposed at this time. Following completion of the RI, and following removal of the accumulated debris, the vapor intrusion investigation (including subslab soil gas and indoor air sampling) will be performed as needed and in accordance with NYSDOH's *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (NYSDOH 2006).

2.8 Investigation Derived Waste Management

Liquid and solid wastes generated as part of the investigation. Liquid waste will be containerized in steel 55-gallon open-top U.S. Department of Transportation (DOT)-approved drums. Liquid waste will generally consist of purged groundwater and decontamination water generated while cleaning equipment. All liquid waste drums will be properly sealed and labeled to identify their contents.

Solid waste will consist of excess soil generated during soil boring activities and used personal protective equipment (PPE) such as gloves and plastic bags that have come into contact with potentially contaminated soil or water. The solid waste will be separated into soil and PPE wastes; both will be containerized in steel 55-gallon open-top DOT-approved drums. The drums will be properly sealed and labeled to identify their contents.

As drums are generated on the Site during these investigations, waste characterization samples will be collected. The results of the waste characterization will be used to properly manifest the waste for disposal. While awaiting disposal, drums will be stored on the Site within a secure area. SOP 003 - Investigation Derived Waste (**Appendix B**) provides additional details on management of investigation-derived wastes.

3 Data Usability

Following completion of fieldwork, all field measurements and observations will be tabulated. Analytical results provided by the project laboratory will be submitted for data validation and usability as described in the project QAPP (**Appendix A**). Validated analytical soil results will be compared to the soil criteria identified in 6 New York Codes, Rules and Regulations (NYCRR) Part 375-6 (NYSDEC 2006) and included in a RI Report to be provided to NYSDEC. The report will follow DER-10 guidance as well as provided as an electronic data submission following the most recent format requirements, including EQUIS data deliverables (NYSDEC 2018).

4 Reporting

Following completion of the RI activities and the receipt of analytical data, a Remedial Investigation Report will be prepared. The RI Report will present the following information:

- Description of the Site including the historical background, historic manufacturing operations, and current uses.
- Description of the RI activities.
- Observations recorded during the RI activities, including any modifications to or deviations from the planned activities.
- Tabulated analytical results for the RI sampling, along with a comparison to appropriate regulatory standards or other relevant comparison criteria.
- Figures presenting the sample locations and summaries of analytical results.
- Appendices containing field notes, soil boring and test pit logs, groundwater monitoring well construction summaries, completed subsurface structure investigation forms, and representative photographs from the investigation.
- Evaluation of the nature and extent of impacted materials at the Site.
- Recommendations for additional investigation activities, if warranted to develop remedial strategies.
- A proposed schedule for future investigation or remedial activities, as applicable.

5 Project Schedule

Syracuse Bread Factory is prepared to schedule the intrusive fieldwork outlined in this RI Work Plan following receipt of NYSDEC approval. It is anticipated that the field activities will take approximately 3 weeks to complete. Following the fieldwork, up to 12 weeks are anticipated to receive the analytical data and complete the RI Report. The schedule in **Table 5-1** is the approximate schedule following submission of the RI Work Plan to NYSDEC with the actual project starting date subject to NYSDEC review and approval of the RI Work Plan, as well as weather conditions.

Table 5-1
Project Schedule

<table>
<tr><th>Work Activity</th><th>Anticipated Start[1,2]</th><th>Anticipated Finish</th><th>Duration</th></tr>
<tr><td>Updated RI Work Plan Approval by NYSDEC</td><td>February 2026</td><td>February 2026</td><td>NA</td></tr>
<tr><td>GPR Survey/Utility Locate</td><td rowspan="3">March 2026</td><td rowspan="3">March 2026</td><td rowspan="3">1 month</td></tr>
<tr><td>Soil Gas Survey and Lab Analysis[3]</td></tr>
<tr><td>Review of Soil Gas Survey results and finalize soil and groundwater investigation locations for NYSDEC approval</td></tr>
<tr><td>Test Pit Installation</td><td rowspan="4">April 2026</td><td rowspan="4">April 2026</td><td rowspan="4">1 month</td></tr>
<tr><td>Soil boring and monitoring well installation</td></tr>
<tr><td>Monitoring Well Development</td></tr>
<tr><td>Groundwater Sampling</td></tr>
<tr><td>Data analysis, Usability Review and Reporting</td><td>March 2026</td><td>July 2026</td><td>20 weeks</td></tr>
<tr><td>Submit Draft RI Report to NYSDEC</td><td>July 2026</td><td>--</td><td>NA</td></tr>
<tr><td>Submit Final RI Report</td><td>3 weeks from receipt of NYSDEC comments on Draft Report</td><td>--</td><td>NA</td></tr>
</table>

Notes:

1. Schedule assumes NYSDEC and NYSDOH will approve this revised work plan during the month of February 2026.
2. The field investigation will be weather dependent and will not be performed during freezing weather conditions, or during periods of accumulated snow cover on ground surfaces.
3. Soil gas survey will not be performed in frozen ground and schedule assumes that the ground will be thawed by March 2026.

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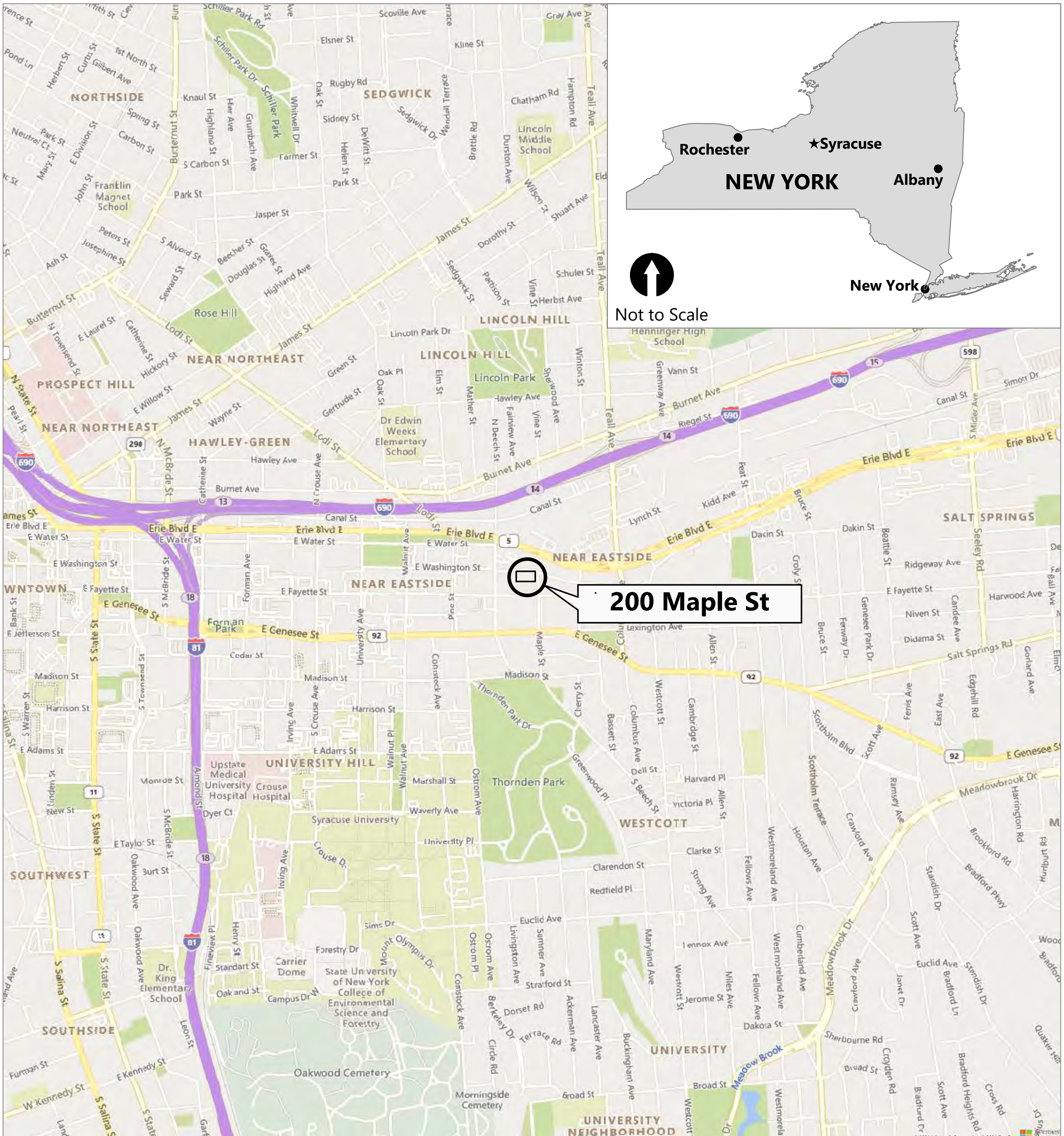
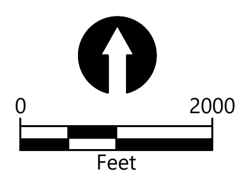
Figures



SOURCE: Aerial by Bing Imagery, August 2021.
HORIZONTAL DATUM: New York State Plane Central Zone, NSRS 2011, U.S. Survey Feet



Publish Date: 2022/05/17

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Figure 1-1
Site Location Map

Remedial Investigation Work Plan
Syracuse Bread Factory - BCA Index No. C734155
October 2022, Revised February 2026

Notes:
1. Drawing from *Phase II Environmental Site Assessment* dated January 25, 2021, prepared by Stantec.
2. Shallow soil samples collected from 0.5 – 2 feet below ground surface on October 27 – October 28, 2020 by Stantec.
3. All locations and scale are approximate.
4. Analytical data reported as milligrams per kilogram (mg/kg).
5. As: Arsenic; Pb: Lead; Hg: Mercury; Se: Selenium; Zn: Zinc.
6. Bold and Italicized Sample Results = Reported concentration is greater than the restricted residential soil cleanup objectives (SCOs) presented in 6 NYCRR Part 375.
7. Sample Results not bold or italicized = Reported concentration is greater than the unrestricted residential SCOs presented in 6 NYCRR PART 375.
8. Naturally occurring metals (aluminum, calcium, magnesium, and manganese also detected in shallow soil samples at concentrations above SCOs and consistent with typical background conditions in urban soils.

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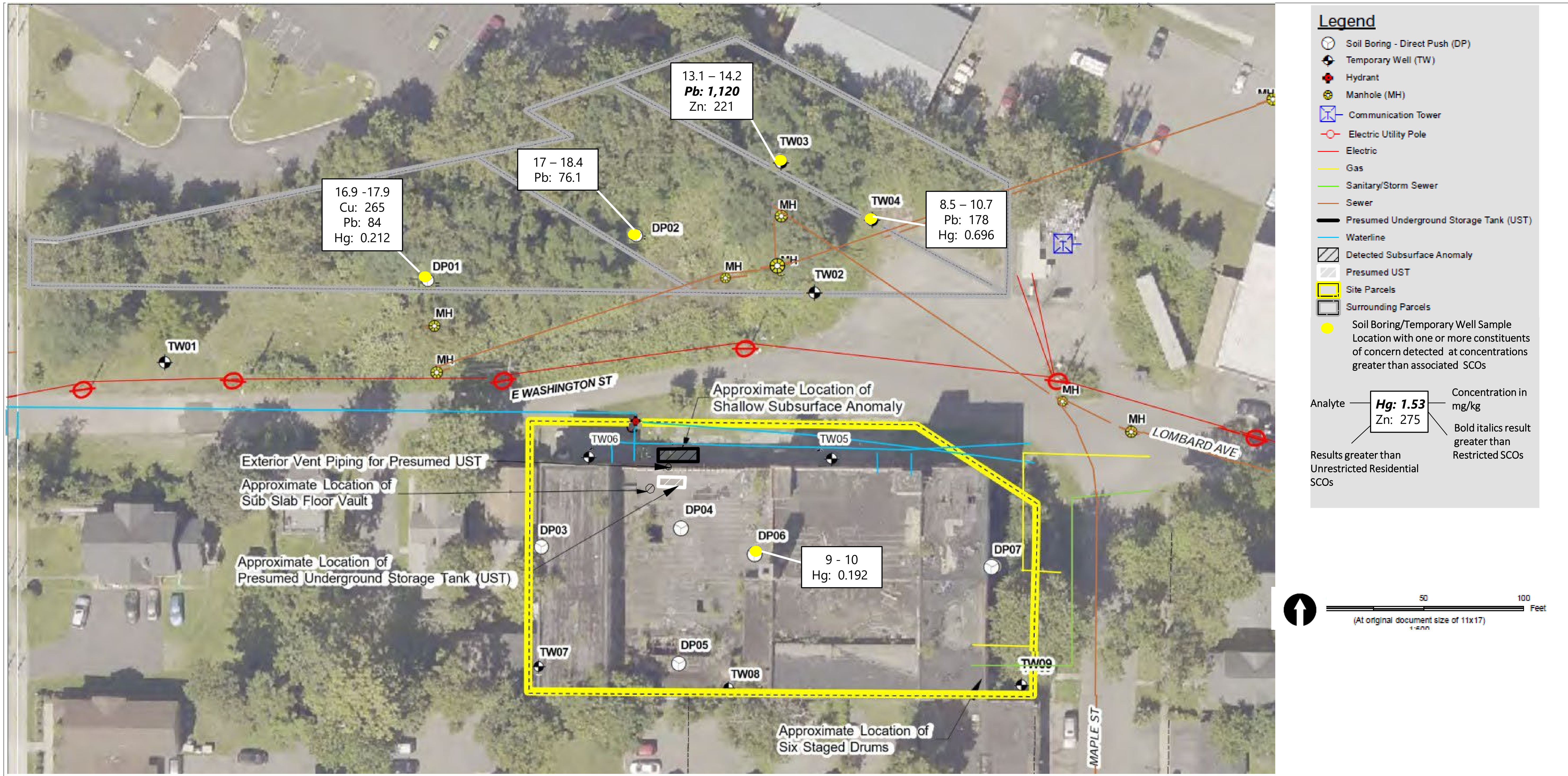
Figure 1-2
Phase II ESA Shallow Soil Samples –Metals Exceedances
Remedial Investigation Work Plan
Syracuse Bread Factory - BCA Index No. C734155
October 2022, Revised February 2026



Notes:
1. Drawing from *Phase II Environmental Site Assessment* dated January 25, 2021, prepared by Stantec.
2. Intermediate soil samples collected from 2 – 10 feet below ground surface and deep soil samples collected from depths greater than 10 feet below ground surface on October 27 – October 28, 2020 by Stantec.
3. All locations and scale are approximate.
4. Analytical data reported as milligrams per kilogram (mg/kg).
5. Cu: Copper; Pb: Lead; Hg: Mercury.
6. Bold and Italicized Sample Results = Reported concentration is greater than the restricted residential soil cleanup objectives (SCOs) presented in 6 NYCRR Part 375.
7. Sample Results not bold or italicized = Reported concentration is greater than the unrestricted residential SCOs presented in 6 NYCRR PART 375.
8. Naturally occurring metals (aluminum, calcium, magnesium, and manganese also detected in subsurface soil samples at concentrations above SCOs and consistent with typical background conditions in urban soils.

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Figure 1-3
Phase II ESA Intermediate and Deep Soil Samples – Metals Exceedances
Remedial Investigation Work Plan
Syracuse Bread Factory - BCA Index No. C734155
October 2022, Revised February 2026

Notes:
1. Drawing from *Phase II Environmental Site Assessment* dated January 25, 2021, prepared by Stantec.
2. Intermediate soil samples collected from 2 – 10 feet below ground surface and deep soil samples collected from depths greater than 10 feet below ground surface on October 27 – October 28, 2020 by Stantec.
3. All locations and scale are approximate.
4. Analytical data reported as milligrams per kilogram (mg/kg).
5. Bold and Italicized Sample Results = Reported concentration is greater than the restricted residential soil cleanup objectives (SCOs) presented in 6 NYCRR Part 375.
6. Sample Results not bold or italicized = Reported concentration is greater than the unrestricted residential SCOs presented in 6 NYCRR PART 375.

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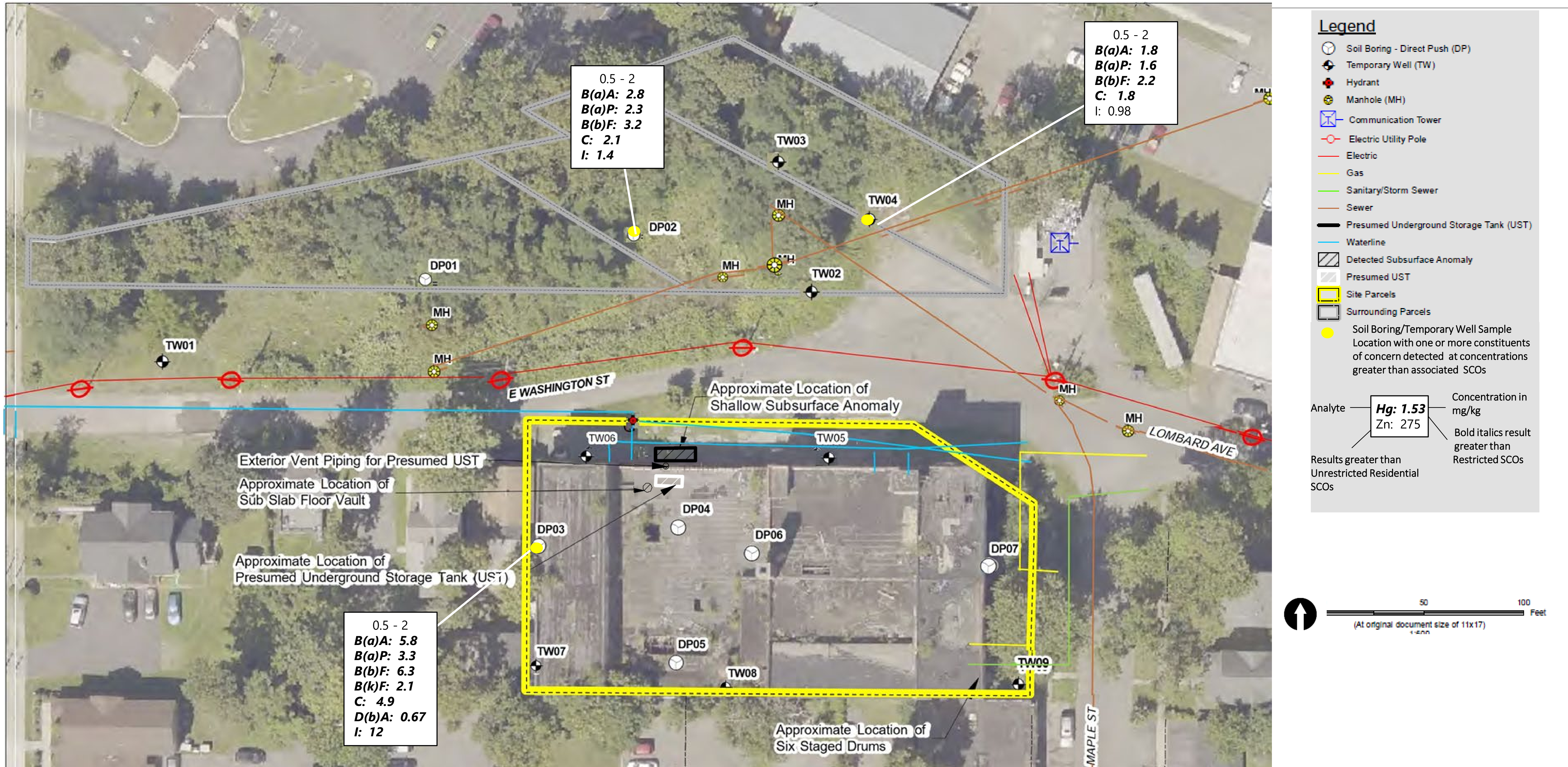
Figure 1-4
Phase II ESA Intermediate Soil Samples – Volatile Organic Compounds Exceedances
Remedial Investigation Work Plan
Syracuse Bread Factory - BCA Index No. C734155
October 2022, Revised February 2026



Notes:
1. Drawing from *Phase II Environmental Site Assessment* dated January 25, 2021, prepared by Stantec.
2. Shallow soil samples collected from 0.5 – 2 feet below ground surface on October 27 – October 28, 2020 by Stantec.
3. All locations and scale are approximate.
4. B(a)A: Benzo(a)Anthracene; B(a)P: Benzo(a)pyrene; B(b)F: Benzo(b)fluoranthene; B(k)F: Benzo(k)fluoranthene; C: Chrysene; D(b)A: Dibenzo(a,h)anthracene; I: Indeno(1,2,3-cd)pyrene
5. Analytical data reported as milligrams per kilogram (mg/kg).
6. Bold and Italicized Sample Results = Reported concentration is greater than the restricted residential soil cleanup objectives (SCOs) presented in 6 NYCRR Part 375.
7. Sample Results not bold or italicized = Reported concentration is greater than the unrestricted residential SCOs presented in 6 NYCRR PART 375.

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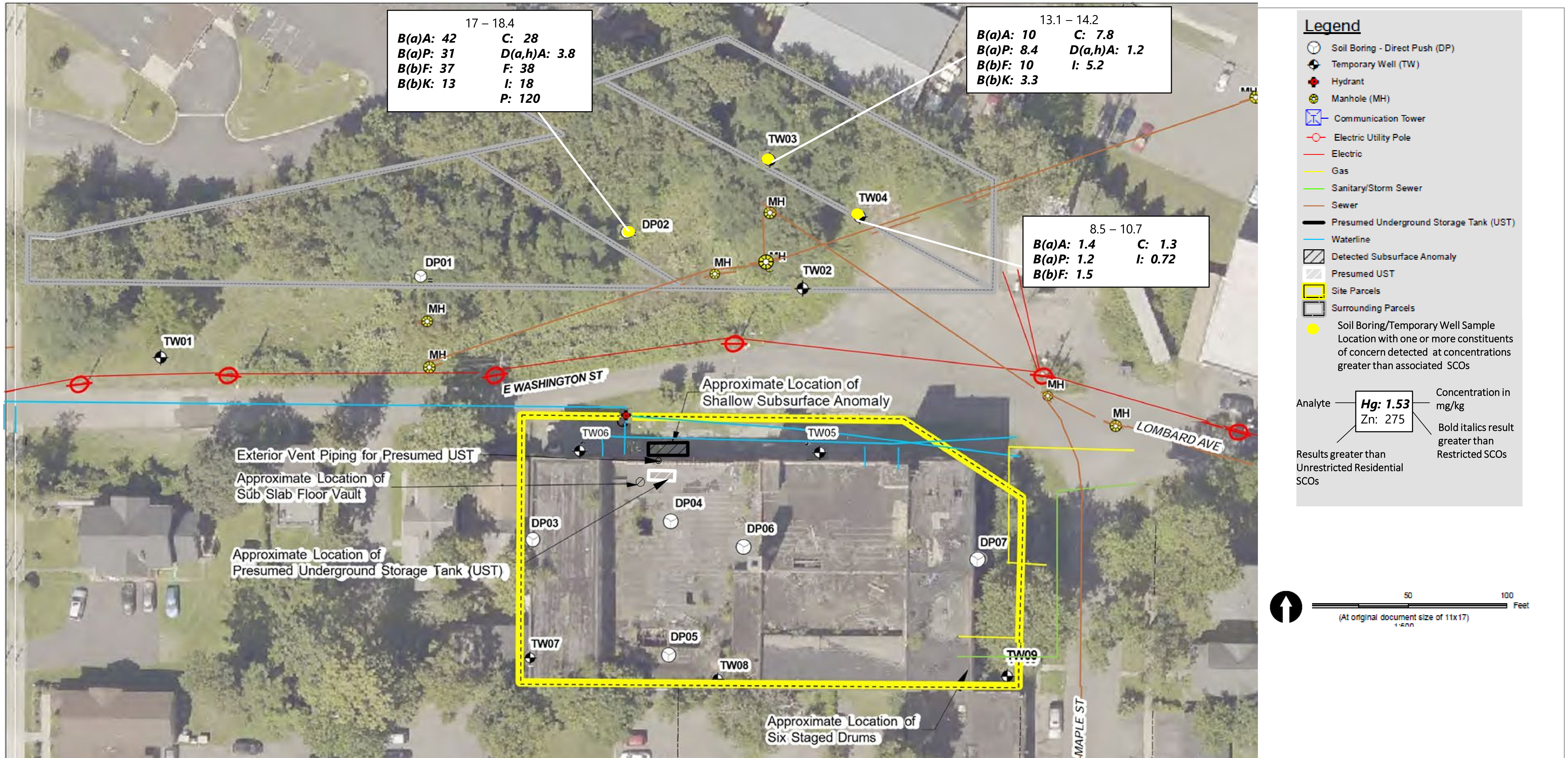
Figure 1-5
Phase II ESA Shallow Soil Samples – Semi-Volatile Organic Compounds Exceedances



Notes:
1. Drawing from *Phase II Environmental Site Assessment* dated January 25, 2021, prepared by Stantec.
2. Intermediate soil samples collected from 2 – 10 feet below ground surface and deep soil samples collected from depths greater than 10 feet below ground surface on October 27 – October 28, 2020 by Stantec.
3. All locations and scale are approximate.
4. B(a)A: Benzo(a)Anthracene; B(a)P: Benzo(a)pyrene; B(b)F: Benzo(b)fluoranthene; B(k)F: Benzo(k)fluoranthene; C: Chrysene; D(b)A: Dibenzo(a,h)anthracene; I: Indeno(1,2,3-cd)pyrene
5. Analytical data reported as milligrams per kilogram (mg/kg).
6. Bold and Italicized Sample Results = Reported concentration is greater than the restricted residential soil cleanup objectives (SCOs) presented in 6 NYCRR Part 375.
7. Sample Results not bold or italicized = Reported concentration is greater than the unrestricted residential SCOs presented in 6 NYCRR PART 375.

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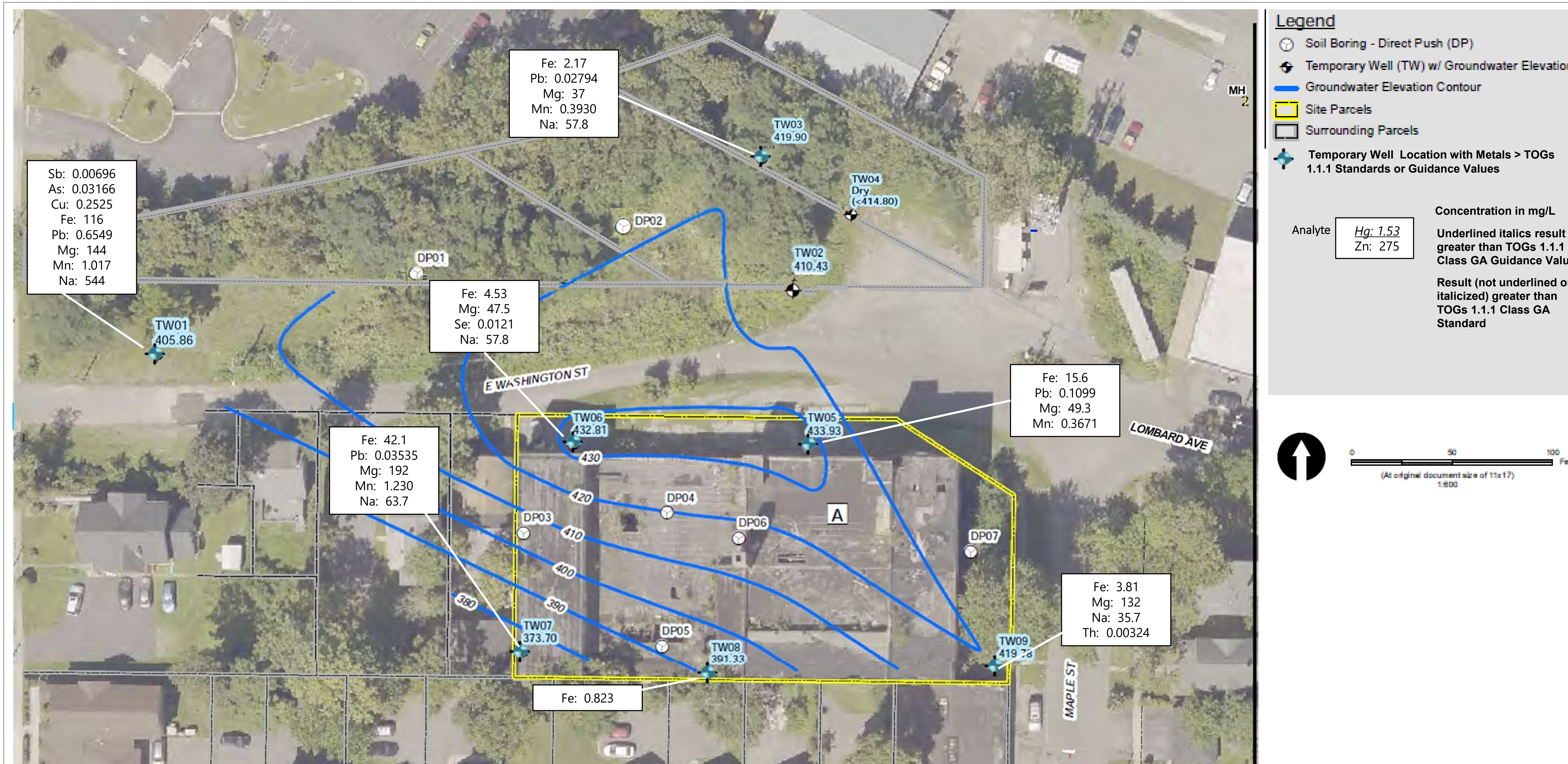
Figure 1-6
Phase II ESA Intermediate and Deep Soil Samples – Semi-Volatile Organic Compounds Exceedances
Remedial Investigation Work Plan
Syracuse Bread Factory - BCA Index No. C734155
October 2022, Revised February 2026



Notes:

1. Drawing from *Phase II Environmental Site Assessment* dated January 25, 2021, prepared by Stantec.
2. All locations and scale are approximate.
3. Groundwater elevations measured by Stantec on November 3, 2020.
4. Groundwater samples collected by Stantec on November 3 – November 6, 2020.
5. Sb: Antimony; As" Arsenic: Cu: Copper; Fe: Iron; Pb Lead; Hg: Mg: Magnesium; Mn: Manganese; Na: Sodium; Se: Selenium; Th: Thallium.
6. Analytical data reported as milligrams per Liter (mg/L).
7. Reported concentration exceed the standard or guidance value presented in NYSDEC TOGS 1.1.1 (Reissued June 1998 with errata in January 1999 and addenda in April 2000 and June 2004)

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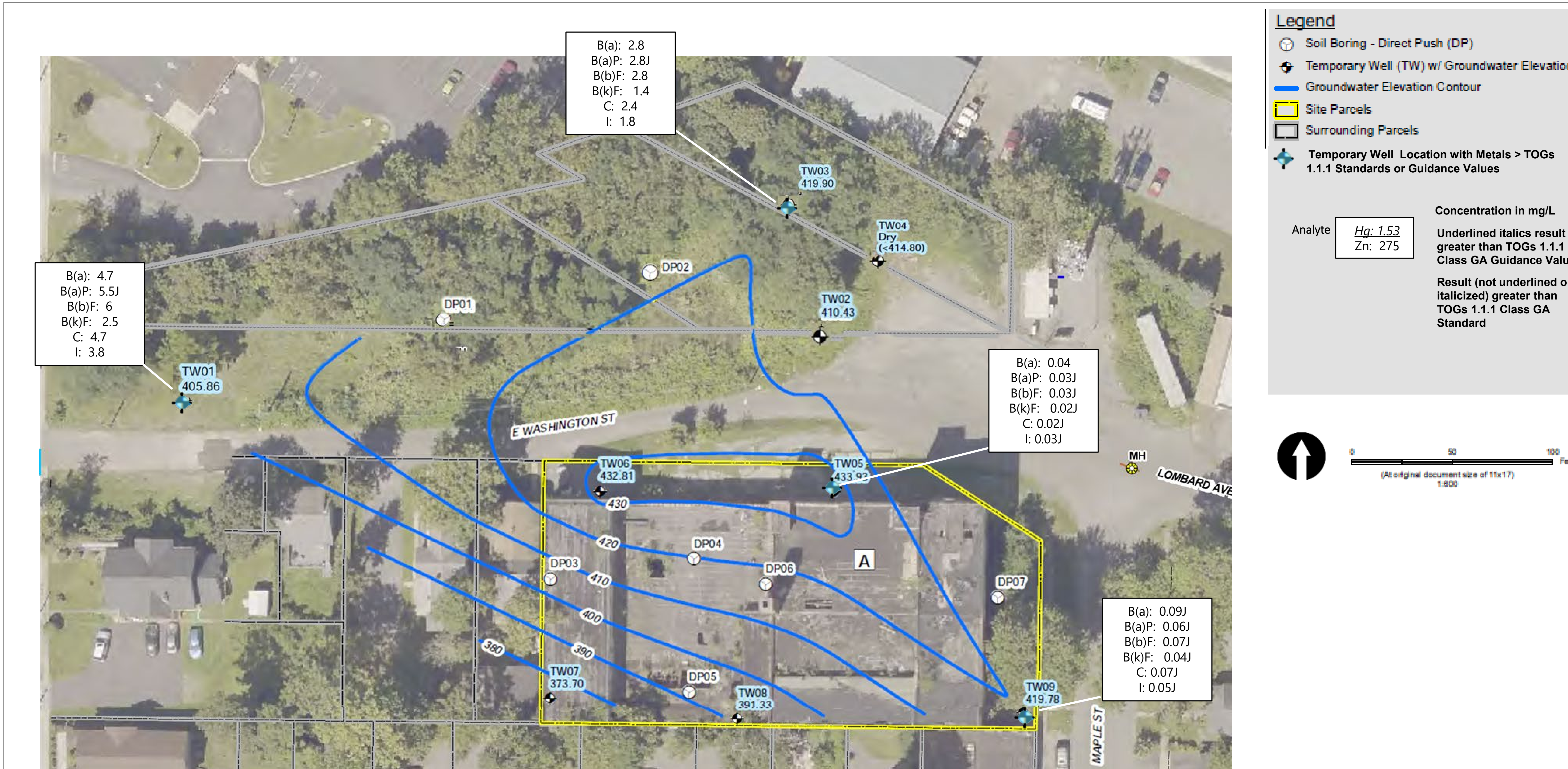
Figure 1-7
Phase II ESA Groundwater Data – Metals Exceedances

Remedial Investigation Work Plan
Syracuse Bread Factory - BCA Index No. C734155
October 2022, Revised February 2026



Notes:
1. Drawing from *Phase II Environmental Site Assessment* dated January 25, 2021, prepared by Stantec.
2. All locations and scale are approximate.
3. Groundwater elevations measured by Stantec on November 3, 2020.
4. Groundwater samples collected by Stantec on November 3 – November 6, 2020.
5. B(a)A: Benzo(a)Anthracene; B(a)P: Benzo(a)pyrene; B(b)F: Benzo(b)fluoranthene; B(k)F: Benzo(k)fluoranthene; C: Chrysene; D(b)A: Dibenzo(a,h)anthracene; I: Indeno(1,2,3-cd)pyrene
6. Analytical data reported as micrograms per Liter (ug/L). Results with a "J" after the numerical value indicate that the analyte was positively identified, and the associated numerical value is the approximate concentration of the analyte in the sample.
7. Reported concentration exceed the standard or guidance value presented in NYSDEC TOGS 1.1.1 (Reissued June 1998 with errata in January 1999 and addenda in April 2000 and June 2004).

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Figure 1-8
Phase II ESA Groundwater Data – Semi-Volatile Exceedances

Notes:
1. Source: Google Earth Pro. Imagery Date 09/17/2019
2. All locations are approximate
3. Other subsurface structures that are encountered during the RI will be investigated and mapped per this work plan, including but not limited to floor vaults, floor drains and pits.
4. Soil boring and monitoring well locations may be modified based on results of the geophysical survey or soil gas sampling results (to be conducted), equipment accessibility, potential presence of subsurface utilities, structural concerns with portions of the building interior, off-site access agreements and physical barriers/obstructions.
5. Test pit locations may be modified or eliminated based on the results of the soil gas investigation and confirmation that fuel storage was interior to the building.

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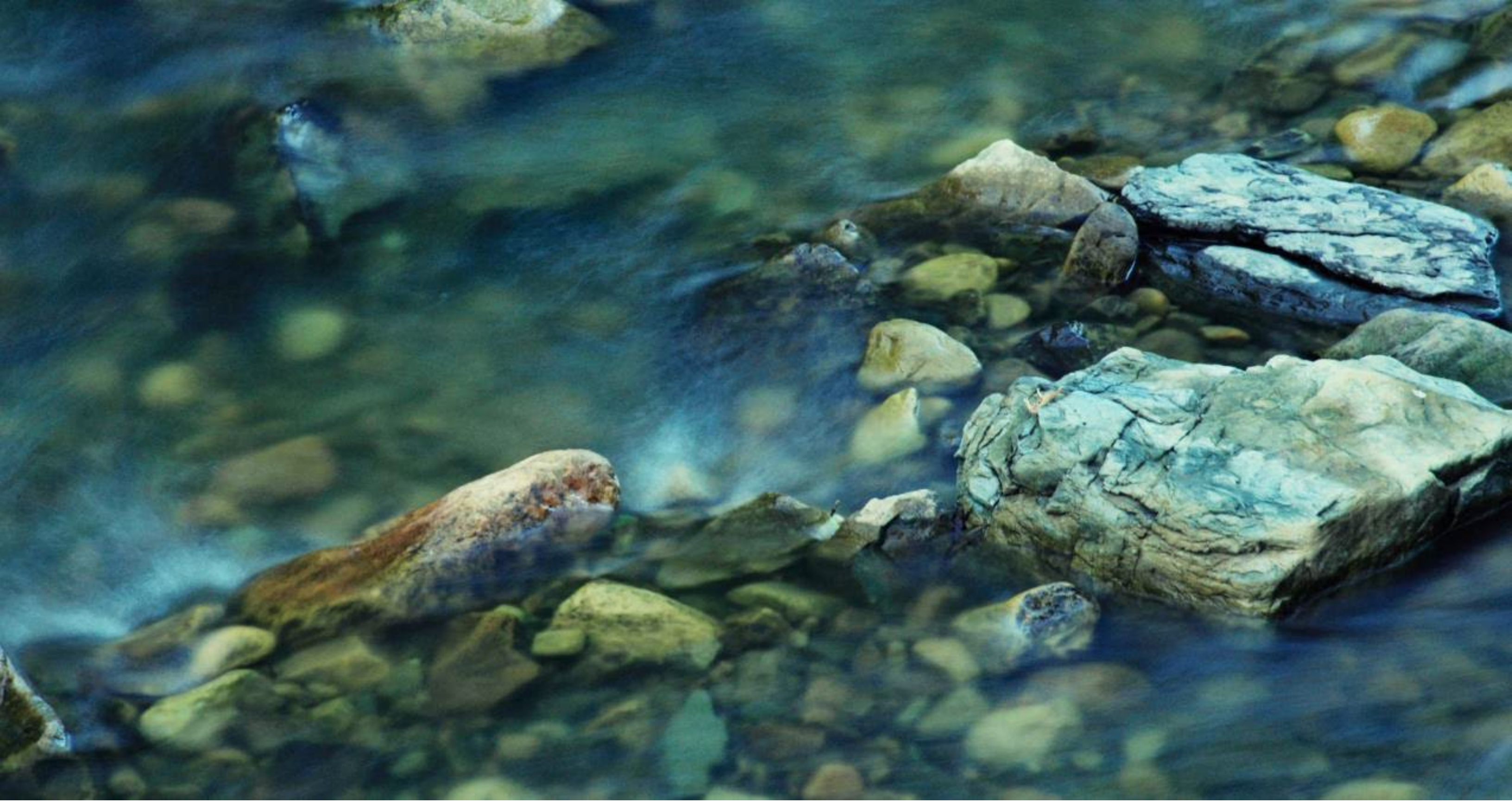
Figure 2-1
Proposed Investigation Locations

Remedial Investigation Work Plan
Syracuse Bread Factory - BCA Index No. C734155
October 2022, Revised February 2026

Appendices



June 2023
Syracuse Bread Factory

Quality Assurance Project Plan

Prepared for Syracuse Bread Factory, LLC

June 2023
Syracuse Bread Factory

Quality Assurance Project Plan

Prepared for
Syracuse Bread Factory, LLC
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Syracuse, NY 13201

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TABLE OF CONTENTS

TABLES

ABBREVIATIONS

ASTM	ASTM International
CCV	continuing calibration verification
CoC	chain-of-custody
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
FC	Field Coordinator
GC	gas chromatography
HASP	Health and Safety Plan
MD	matrix duplicate
MDL	method detection limit
MRL	method reporting limit
MS	matrix spike
MSD	matrix spike duplicate
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
NELAP	National Environmental Laboratory Association Program
NIST	National Institute of Standards and Technology
PM	Project Manager
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RL	reporting limit
RPD	relative percent difference
SDG	sample delivery group
Site	former Syracuse Bread Factory Syracuse, New York
SOP	Standard Operating Procedure
SVOC	semivolatile organic compound
VOC	volatile organic compound
PCB	Polychlorinated biphenyl

1 Introduction

1.1 Purpose

This Quality Assurance Project Plan (QAPP) has been prepared to specify recommended quality assurance (QA) procedures to be followed during remedial investigation (RI) fieldwork performed at the former Syracuse Bread Factory in Syracuse, New York (the Site).

1.2 Project Organization

This QAPP has been prepared by Anchor QEA Engineering, PLLC, on behalf of Syracuse Bread Factory, LLC. Anchor QEA is fully committed to implementing an effective QAPP program. The success of this program is based on the concept that implementation of this program is the responsibility of all project participants. Specific responsibilities have also been assigned to key project personnel for the implementation of this QAPP program.

Margaret Carrillo-Sheridan, PE, will serve as the Project Principal and engineer of record. She will be responsible for the overall technical direction and management of the project. Matt Cavas, PG will serve as the Project Manager (PM) responsible for allocation of technical and human resources and schedule management. The PM will provide the overall programmatic guidance to support staff and will verify that all documents, procedures, and project activities meet the objectives contained within this QAPP. The PM will also be responsible for resolving project concerns or conflicts related to technical matters with the Project Principal.

Mr. Cavas will be the Field Coordinator (FC) and will be responsible for day-to-day technical and QA/quality control (QC) oversight for sample collection activities. Mr. Cavas will verify that appropriate protocols for sample collection, preservation, and holding times are observed and will submit environmental samples to the designated laboratories for chemical and physical analyses.

Cindy Fields will act as the QA Manager and will provide QA oversight for both the field sampling and laboratory programs, verify that samples are documented appropriately, coordinate with the analytical laboratories, verify data quality, oversee data validation, and supervise project QA coordination and data validation. Ms. Fields will work with the Laboratory PM to resolve QC issues as they affect the viability of the project data, and she will work with the assigned data validators to verify that all analytical data are in conformance with the requirements of this QAPP.

Laurel Menoche will serve as the Data Manager and will compile field observations and analytical data into a database, review the data for completeness and consistency, append the database with qualifiers assigned by the data validator, and verify that the data obtained are in a format suitable for inclusion in the appropriate databases.

Meghan Pedro is the Laboratory PM with ALS Laboratory, Inc., which is National Environmental Laboratory Association Program (NELAP) certified. Ms. Pedro will oversee all laboratory operations associated with the receipt of the environmental samples, chemical/physical analyses, and laboratory report preparation for this project. The Laboratory PM will review all laboratory reports and prepare case narratives describing any anomalies and exceptions that occurred during analyses.

2 Investigation and Sampling Procedures

The scope of investigations presented in this QAPP include the following:

- Subsurface utility locating
- Monitoring well installation and groundwater sample collection
- Test pitting, soil boring and sample collection
- Indoor air sample collection

Investigations will be conducted in accordance with the project Health and Safety Plan (HASP). Samples will be analyzed according to the U.S. Environmental Protection Agency (EPA) promulgated Standard Method, or ASTM International (ASTM) methods. Regardless of the method used, all preparation and analytical holding times must meet the requirements for that analytical group and as outlined in Table 1. Holding times will be calculated from the sample collection date and time. The method detection limits (MDLs) and method reporting limits (MRLs) for the analytes are laboratory specified for the project based on its most recent MDL studies. Analyte lists for soil, groundwater and indoor air samples are listed in Tables 2 through 4. Analyte lists for waste characterization is listed in Table 5.

2.1 Utility Locating

Remedial investigation investigations will be performed on the Site. Prior to any subsurface intrusive work investigation, target locations will be mapped and private and public utilities will be located to identify potential conflicts. When fieldwork has been completed, actual locations completed will be surveyed.

2.1.1 Utility Locating

Prior to any intrusive fieldwork, utility location work will be completed to identify potential obstructions or conflicts with target locations. Remedial investigation target locations will be marked using white paint or flags using a handheld GPS. These markings will be visible during utility locators for public utilities notified as part of the New York Dig Safe program (811). Responses from the Dig Safe notification will be documented to ensure all public utilities have been marked.

Following public utility marking, a private utility location subcontractor will mobilize to the Site to complete a geophysical survey for additional buried utilities. Tools such as ground penetrating radar, magnetometer, and pipe and cable locators will be used. The firm will focus on the proposed locations and investigate to “clear” a 5-foot buffer around each proposed subsurface investigation location, allowing for adjustments by the contractor in the field to ensure the work is completed in an area clear of subsurface utilities.

2.2 Investigations and Sample Collection

The following sections describe procedures to be followed in the field for soil investigations and soil and groundwater sample collection as applicable.

2.2.1 Sampling Equipment

The following is a general list of equipment that may be necessary for soil investigations and soil and indoor air sample collection:

- Appropriate sample bottles (kept closed and in the laboratory-shipped coolers until the samples are collected) provided by the laboratory
- Chain-of-custody (CoC), labels, tags, seals, and record forms
- Logbook, field sampling records, and indelible ink markers
- Laboratory-grade decontamination detergents (such as Alconox or Liquinox), reagent-grade solvents, and de-ionized, organic-free water to be used for decontaminating equipment between sampling stations
- Squirt bottles
- Ruler and measuring tape
- Garbage bags and plastic sheeting
- Paper towels and/or wipes
- Mini-excavator or back-hoe
- Buckets, wash basins, and scrub brushes to be used for decontaminating equipment
- Steam cleaner or hot water wash and containment pad
- Digital camera or camera and film to document sampling procedures and sample locations
- White board to include in photographs to label samples/photographs
- Shipping labels and forms
- Knife
- Packing/shipping material to prevent damage to sample bottles during shipping
- Strapping, clear plastic, and duct tape
- Re-sealable plastic bags
- Ice
- Portable field instruments, including photoionization detector and GPS

Other sampling materials and equipment may be utilized as warranted by field conditions encountered at time of sampling. Appropriate health and safety equipment and personal protective equipment, per the HASP, will be used.

2.2.2 Equipment Decontamination

Between investigation locations and prior to sample collection, all non-dedicated/non-disposable equipment (i.e., bucket, bowls and field measurement equipment that contacts soil) will be washed with potable water and a laboratory-grade, phosphate-free, detergent (such as Alconox). Equipment will be given a final rinse of distilled or de-ionized water. Larger equipment (e.g., excavator bucket) may be decontaminated with a hot-water wash. Decontamination may take place at the sampling location as long as all liquids are contained in pails, buckets, 55-gallon drums, or similar containers. Between rinses, equipment will be placed on polyethylene sheeting or aluminum foil. At no time will decontaminated equipment be placed directly on the ground. Equipment will be wrapped in polyethylene plastic or aluminum foil and stored. Waste materials generated during sampling activities will be disposed of as required.

2.2.3 Field Records

Field logbooks and entries will be maintained by field staff to provide a daily record of significant events, observations, and measurements during the field investigation. All entries will be signed and dated at the bottom of each page.

Information pertinent to the field investigation and/or sampling activities will be recorded in the logbooks. The logbooks will be bound with consecutively numbered pages. Entries in the logbook will include, at a minimum, the following information:

- Name and title of author, date and time of entry, and physical/environmental/weather conditions during field activity
- Purpose of sampling activity
- Location of sampling activity
- Name of field contact
- Name of field crew members
- Name and organization of any site visitors
- Sample media (e.g., soil)
- Sample collection method
- Number and volume of sample(s) collected
- Description of sampling point(s)
- Sample location coordinates
- Date and time of sample collection
- Sample identification number(s)
- Field observations
- Any field measurements made (e.g., water level elevation)
- References for all maps and photographs of the sampling site(s)

- Information pertaining to sample documentation, such as dates and method of sample shipments, CoC record numbers, and overnight shipping air bill number

All original data recorded in field logbooks, sample tags, and CoC records will be written with waterproof ink. None of these accountable, serialized documents will be destroyed.

If an error is made on an accountable document assigned to one individual, that individual will make all corrections simply by crossing a single line through the error, placing the initials of the individual making the correction and date next to the crossed-out information, and entering the correct information. The erroneous information will not be erased. All field personnel will be instructed as to the proper field logging techniques for maintaining the integrity of the documentation.

2.2.4 General Sample Collection and Processing Procedures

Soil and indoor air samples will be collected as outlined in the Remedial Investigation Work Plan and following procedures described in the SOPs included.

Subsurface soil sample collection will be conducted following these general procedures:

- At the identified investigation location, collect soils from completed test pits as necessary to characterize soils encountered.
- Take care to collect the sample the center of the recovered soil, avoiding soils which were touching the excavator bucket.
- Photograph and visually characterize the recovered soil.
- Place collected soil into a clean stainless steel bowl and homogenize.
- Place the soil sample into laboratory-provided sample containers.

At a minimum, the following will be recorded in the field logbook:

- Site
- Station identification
- Date and time
- Initials of sampling personnel
- Contractor company's name
- Time associated with sample collection
- Amount of soil recovered
- Sample collection methods
- Sample location coordinates
- Photograph of the sample including a white board listing the following: site name, date, sample identification, and time of sample
- Soil description

Indoor air samples will be collected from locations throughout the Site buildings interior. Each location will be sampled once and at a minimum, the following information will be record in the field logbook:

- Site
- Location identification
- Date and time
- Initials of sampling personnel
- Time associated with sample collection

2.2.5 Field Quality Assurance/Quality Control Samples

A trip blank will accompany each cooler transporting sample aliquots that will be analyzed for volatile organic compounds (VOCs) to the laboratory. Trip blanks are used in conjunction with VOC analyses to assist in the assessment of field accuracy and representativeness and are a measure of contamination introduced during sample storage and transport. The sources of the contamination may be associated with the transportation of containers to and from a site, ambient conditions present at a site, and/or other samples shipped with the trip blank. It should be noted that an assessment of accuracy cannot be made by evaluating trip blank data unsupported by other data quality indicators (e.g., matrix spikes [MSs]). The trip blanks will be numbered sequentially and appended with the date.

Equipment blanks will be generated at a minimum frequency of one per collection event per sample matrix that uses non-dedicated sampling equipment. An equipment blank is a way to measure contamination attributed by the sample collection equipment. Contaminant-free water is poured over sampling equipment and then collected for analyses. The presence of measurable concentrations of contaminants in an equipment blank indicates the potential for cross-contamination. The equipment blanks will be numbered sequentially and appended with the date. Equipment blanks will be analyzed for semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, per-and-polyfluoroalkyl substances (PFAS), and metals.

To determine the reproducibility and homogeneity of samples, field duplicates will be collected. The frequency of collection of these samples is 1 per up to 20 field samples per matrix. Duplicate samples will be assigned a unique sample number that correlates with the source sample number. The duplicate sample number and sample number for the source sample will be recorded in the field logbook.

MS/matrix spike duplicate (MSD)/matrix duplicate (MD) samples (MSD for organics; MD for inorganics) will be requested at a frequency of 1 set per 20 field samples. Sufficient additional sample mass or volume to conduct these QC analyses will be collected for each designated sample, as necessary. An MSD sample may be analyzed for metals in lieu of a duplicate.

3 Sample Handling Procedures/Sample Custody

Sample custody procedures will be followed to verify that samples are always in the custody of a responsible person and to provide a record of those responsible for the samples. CoC begins at the time of preparation for the field activity, and the procedures apply to field sampling activities, sample shipping, laboratory analytical procedures, and data reporting. Samples are considered to be in one's custody if they are in the custodian's possession or view, in a secured location (under lock) with restricted access, or in a container that is secured with official seals such that the sample cannot be reached without breaking the seals.

3.1 Sample Custody and Shipping Requirements

CoC procedures will be followed for all samples throughout the collection, handling, and analysis process. The principal document used to track possession and transfer of samples is the CoC form. Each sample identification will be listed on an electronic or hand-written CoC form the day it is collected. All data entries will be made using indelible ink pen. Corrections will be made by drawing a single line through the error, writing in the correct information, and then dating and initialing the change. Blank lines and spaces on the CoC form will be lined-out, dated, and initialed by the individual maintaining custody.

A CoC form will accompany each shipment of samples to the analytical laboratories. Each person who has custody of the samples will verify that the samples are not left unattended unless properly secured. Copies of all CoC forms will be retained in the project files.

All samples will be shipped, couriered, or hand delivered to the analytical laboratory in a timely manner so holding times are not compromised. Samples collected on a Friday may be held until the following Monday for shipment, provided that this does not jeopardize any hold time requirements. Specific sample shipping procedures are as follows:

- Each cooler or container with the samples for analyses will be hand delivered the day of sample collection, couriered, or shipped via overnight delivery to the appropriate analytical laboratory. In the event that Saturday delivery is required, the FC will contact the analytical laboratory before 3 p.m. on Friday to verify that the laboratory is aware of the number of containers shipped and the airbill tracking numbers for those containers.
- Coolant ice will be sealed in separate plastic bags and placed in the shipping containers.
- Individual samples will be placed in a sealable plastic bag, packed to prevent breakage, and transported in a sealed ice chest or other suitable container.
- Glass jars will be separated in the shipping container by shock-absorbent material (e.g., bubble wrap) to prevent breakage.

- If the samples are transferred using a commercial shipping company, the following procedures will be followed:
  - The shipping containers will be clearly labeled with sufficient information (name of project, time and date container was sealed, person sealing the container, and consultant's office name and address) to enable positive identification.
  - The shipping waybill number will be documented on all CoC forms accompanying the samples.
  - CoC forms will be enclosed in a plastic bag and placed inside the cooler.
  - A minimum of two signed and dated CoC seals will be placed on adjacent sides of each cooler prior to shipping.
  - Each cooler will be wrapped securely with strapping tape, labeled "Glass – Fragile" and "This End Up," and clearly labeled with the laboratory's shipping address and the consultant's return address.

Upon transfer of sample possession to the analytical laboratory, the person transferring custody of the sample container will sign the CoC form. Upon receipt of samples at the laboratory, the person receiving the sample will sign the CoC form. The shipping container seals will be broken (if applicable), and the receiver will record the condition of the samples on a sample receipt form. CoC forms will be used internally in the laboratory to track sample handling and final disposition.

4 Quality Assurance/Quality Control

Field and laboratory activities will be conducted in such a manner that the results meet specified quality objectives and are fully defensible. Guidance for QA/QC is derived from the protocols developed for EPA SW-846, the EPA Contract Laboratory Program (EPA 2017a, 2017b), and the cited methods.

4.1 Field Quality Control

Anchor QEA personnel will identify and label samples in a consistent manner to verify that field samples are traceable. Labels should be used in conjunction with the CoCs and this QAPP to provide all information necessary for the laboratory to conduct required analyses properly. QA samples will be collected in the field to verify project data quality objectives (DQOs) are met. Samples will be placed in appropriate containers and preserved for shipment to the laboratory in accordance with the requirements presented in Table 1.

4.1.1 Field Quality Assurance Sampling

Field QA procedures will consist of following procedures for acceptable practices for sample collection and handling. This also includes periodic and routine equipment inspection.

QA samples will be collected along with the environmental samples. QA samples are useful in identifying possible problems resulting from sample collection or sample processing in the field. The collection of QA samples includes equipment rinsate blanks, trip blanks, and field duplicates. Rinsate blanks will be collected at a frequency of one per collection method per event. If target analytes are detected in the rinsate blank at levels above the reporting limits (RLs), blank results will be compared to the sample results, and results within five times the concentration of the blank may be qualified. A trip blank will accompany all sample aliquots for VOC analyses and will be analyzed at a frequency of one per cooler containing the samples. Trip blanks indicate any VOC contamination that might be introduced during storage and transport. If VOCs are detected in the trip blanks, the storage and transport methods will be reviewed and modified to eliminate possible sources of contamination. Field duplicates will be collected at a frequency of one per sampling event or 1 in 20 sample locations processed per matrix (whichever is more frequent), provided sufficient sample mass/volume can be collected.

QA samples will also include the collection of additional sample mass or volume as required to verify that the laboratory has sufficient sample mass or volume to run the matrix-specified analytical QA/QC (MD/MS/MSD) samples for analyses as specified in Table 6. Additional sample mass or volume to meet this requirement will be collected at a frequency of one per matrix per sampling event or 1 in 20 samples processed, whichever is more frequent. The samples designated for MD/MS/MSD analyses should be clearly marked on the CoC.

All field QA samples will be documented on the field forms and verified by the QA Manager or designee.

4.1.2 Sample Containers

Sample containers and preservatives will be provided by the laboratory. The laboratory will maintain documentation certifying the cleanliness of bottles and the purity of preservatives provided. Container requirements are listed in Table 1.

4.1.3 Sample Identification and Labels

Each sample collected as part of this investigation will be given a unique identification. With this type of identification, no two samples will have the same label. Labels or tags that include the sample number will be attached to each sample container.

Each sample will have an adhesive plastic or waterproof paper label affixed to the container and will be labeled at the time of collection. If the label is not waterproof, it will be covered with clear packing tape to render it waterproof. The following information will be recorded on the container label at the time of collection:

- Project name
- Sample identification
- Date and time of sample collection
- Preservative type (if applicable)
- Analysis to be performed

4.2 Data Quality Objectives and Criteria

The QA objective for the project is to develop and implement procedures that will provide data of known, documented quality. Field and laboratory quality QA/QC requirements ensure that acceptable levels of data quality will be maintained throughout the sampling and analysis program. The criteria commonly used to specify QA goals include precision, accuracy, representativeness, comparability, completeness, and sensitivity. These criteria are described in more detail in the following sections and project quantitative goals are listed in Table 7.

4.2.1 Precision

Precision is the ability of an analytical method or instrument to reproduce its own measurement. It is a measure of the variability, or random error, in sampling, sample handling, and laboratory analyses. ASTM recognizes two levels of precision (ASTM 2002):

1. Repeatability: the random error associated with measurements made by a single test operator on identical aliquots of test material in a given laboratory with the same apparatus under constant operating conditions
2. Reproducibility: the random error associated with measurements made by different test operators in different laboratories using the same method but different equipment to analyze identical samples of test material

In the laboratory, “within-batch” precision is measured using duplicate sample or QC analyses and is expressed as the relative percent difference (RPD) between the measurements. The “batch-to-batch” precision is determined from the variance observed in the analyses of standard solutions or laboratory control samples from multiple analytical batches.

Field precision will be evaluated by the collection of field duplicates for chemistry samples at a frequency of 1 in 20 samples. Field chemistry duplicate precision will be screened against an RPD of 50%. However, no data will be qualified based solely on field homogenization duplicate precision.

Precision measurements can be affected by the nearness of a chemical concentration to the MDL, where the percent error (expressed as RPD) increases. The equation used to express precision is as follows:

$$RPD = \frac{(C_1 - C_2)x\ 100\%}{(C_1 + C_2)/2}$$

where:

RPD	=	relative percent difference
C_1	=	larger of the two observed values
C_2	=	smaller of the two observed values

4.2.2 Accuracy

Accuracy is a measure of the closeness of an individual measurement (or an average of multiple measurements) to the true or expected value. Accuracy is determined by calculating the value of results from analyses of laboratory control samples, standard reference materials, and standard solutions. In addition, MS samples are also measured, which indicate the accuracy or bias in the actual sample matrix. Accuracy is expressed as percent recovery of the measured value, relative to the true or expected value. If a measurement process produces results that are not the true or expected values, the process is said to be biased. Bias is the systematic error either inherent in a method of analysis (e.g., extraction efficiencies) or caused by an artifact of the measurement system (e.g., contamination). Analytical laboratories utilize several QC measures to eliminate analytical bias, including systematic analysis of method blanks, laboratory control samples, and independent calibration verification standards. Because bias can be positive or negative, and because several types of bias can occur simultaneously, only the net (or total) bias can be evaluated in a measurement.

Laboratory accuracy will be evaluated using quantitative laboratory control sample, MS, surrogate spike, and calibration standard recoveries compared with method-specified performance criteria or criteria listed in Table 6. Accuracy can be expressed as a concentration compared to the true or reference value or as a percent recovery in those analyses where reference materials are not available and spiked samples are analyzed. The equation used to express accuracy is as follows:

$$\%R = 100\% \; x \; (S - U)/Csa$$

where:

$\%R$	=	percent recovery
S	=	measured concentration in the spiked aliquot
U	=	measured concentration in the unspiked aliquot
Csa	=	actual concentration of spike added

Field accuracy will be controlled by adherence to sample collection procedures outlined in this QAPP.

4.2.3 Representativeness

Representativeness expresses the degree to which data accurately and precisely represent an environmental condition.

4.2.4 Comparability

Comparability expresses the confidence with which one dataset can be evaluated in relation to another dataset. For this program, comparability of data will be established through the use of standard analytical methodologies and reporting formats and through common traceable calibration standards and reference materials.

4.2.5 Completeness

Completeness is a measure of the amount of data that are determined to be valid in proportion to the amount of data collected. Completeness will be calculated as follows:

$$C = \frac{(Number\ of\ acceptable\ data\ points)\ x\ 100}{Total\ number\ of\ data\ points}$$

The DQO for completeness for all components of this project is 95%. Data that have been qualified as estimated because the QC criteria were not met will be considered valid for the purpose of assessing completeness. Data that have been rejected will not be considered valid for the purpose of assessing completeness.

4.2.6 Sensitivity

Sensitivity is a measure of analytical detection and RLs. In general, the lowest technologically achievable MDLs and RLs will be targeted for this project.

The MDL is defined as the minimum concentration at which a given target analyte can be measured and reported with 99% confidence that the analyte concentration is greater than zero. Laboratory RLs are defined as the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. Laboratory MDLs and RLs will be used to evaluate the method sensitivity and/or applicability prior to the acceptance of a method for this program.

The sample-specific MDLs and RLs will be reported by the laboratory and will take into account any factors relating to the sample analysis that might decrease or increase these limits (e.g., dilution factor, percent moisture, and analytical mass/volume). In the event that MDLs and RLs are elevated due to matrix interferences and subsequent dilutions or reductions in sample aliquots, the data will be evaluated by Anchor QEA and the laboratory to determine if an alternative course of action is required or possible. If this situation cannot be resolved readily (i.e., detection limits less than criteria are achieved), EPA will be contacted to discuss an acceptable resolution. The sample-specific RL will be the value provided in the project database.

4.3 Laboratory Quality Control

Laboratory QC procedures, where applicable, include initial and continuing instrument calibrations, standard reference materials, laboratory control samples, matrix replicates, MSs, surrogate spikes (for organic analyses), and method blanks. A summary of the DQOs is provided in Table 7. QA/QC sample analytical frequencies are provided in Table 6.

The analyst will review the results of the QC samples from each sample group immediately after a sample group has been analyzed. The QC sample results will then be evaluated to determine if control limits have been exceeded. If control limits are exceeded in the sample group, the QA Manager will be contacted immediately, and corrective action (e.g., method modifications followed by reprocessing the affected samples) will be initiated prior to processing a subsequent group of samples.

4.3.1 Laboratory Instrument Calibration and Frequency

An initial calibration will be performed on each laboratory instrument to be used prior to the start of the project, after each major interruption to the analytical instrument, and when any ongoing calibration does not meet method control criteria. Calibration verification will be analyzed following each initial calibration and will meet method criteria prior to analyses of samples. Continuing calibration verifications (CCVs) will be analyzed at method-required frequencies to track instrument performance. The frequency of CCVs varies with method. For gas chromatography (GC)/mass spectrometer method (VOCs), one CCV will be analyzed every 12 hours. For inorganic methods that utilize instrumentation, 1 will be analyzed for every 10 samples analyzed and at the end of each run. For liquid chromatography-tandem mass spectrometry (LC-MS/MS) methods (PFAS) 1 will be analyzed for every 10 samples analyzed and at the end of each run If the continuing calibration is out of control, the analysis will be terminated until the source of the control failure is eliminated or reduced to meet control specifications, which may include analyzing a new initial calibration. Any project samples analyzed while the instrument calibration was out of control will be re-analyzed.

Instrument blanks or continuing calibration blanks provide information on the stability of the baseline established. Continuing calibration blanks will be analyzed immediately prior to or immediately following a CCV at the instrument for each type of applicable analysis.

4.3.2 Laboratory Duplicates/Replicates

Analytical duplicates provide information on the precision of the analysis and are useful in assessing potential sample heterogeneity and matrix effects. Analytical duplicates and replicates are subsamples of the original sample that are prepared and analyzed as a separate sample.

4.3.3 Matrix Spikes and Matrix Spike Duplicates

Analyses of MS samples provide information on the extraction efficiency of the method on the sample matrix, as well as any interferences introduced by the sample matrix. By analyzing MS samples in duplicate, information on the precision of the method is also provided.

4.3.4 Method Blanks

Method blanks are prepared and analyzed in the same manner as project samples to assess possible laboratory contamination at all stages of sample preparation and analysis. The method blank for all analyses must be less than the MRL of any single target analyte. If a laboratory method blank exceeds this criterion for any analyte, and the concentration of the analyte in any of the samples is less than five times the concentration found in the blank (ten times for common contaminants), analyses must stop and the source of contamination must be eliminated or reduced. Affected samples should be re-prepared and re-analyzed, if possible.

4.3.5 Laboratory Control Samples

Laboratory control samples are analyzed to assess possible laboratory bias at all stages of sample preparation and analyses. The laboratory control sample is a matrix-dependent spiked sample prepared at the time of sample extraction along with the preparation of the sample, MS, and method blank. The laboratory control sample will provide information on the precision of the analytical process and, when analyzed in duplicate, will provide accuracy information as well.

4.3.6 Laboratory Deliverables

Data packages will be checked for completeness immediately upon receipt from the laboratory to verify that data and QA/QC information requested are present. The analytical laboratory will be required, where applicable, to report the following:

- **Project Narrative**. This summary, in the form of a cover letter, will include a discussion of any problems encountered during analyses. This summary should include (but not be limited to) QA/QC, sample shipment, sample storage, and analytical difficulties. Any problems encountered, actual or perceived, and their resolutions will be documented in as much detail as appropriate.
- **CoC Records**. Legible copies of the CoC forms will be provided as part of the data package. This documentation will include the time of receipt and condition of the samples received by the laboratory. Additional internal tracking of sample custody by the laboratory will also be documented on a sample receipt form. The form must include sample shipping container temperatures measured at the time of sample receipt.
- **Sample Results**. The data package will summarize the results for each sample analyzed. The summary will include the following information when applicable:
  - Field sample identification code and the corresponding laboratory identification code
  - Sample matrix
  - Date of sample preparation/extraction
  - Date and time of analysis
  - Mass and/or volume used for preparation and analysis

  - Final dilution or concentration factors for the sample
  - Identification of the instrument used for analysis
  - MDLs and MRLs accounting for sample-specific factors (e.g., dilution and total solids)
  - Analytical results with reporting units identified
  - Data qualifiers and their definitions
  - An electronic data deliverable with data in a format specified in advance by Anchor QEA
- **QA/QC Summaries**. These sections will contain the results of the laboratory QA/QC procedures. Each QA/QC sample analysis will be documented with the same information required for the sample results. No recovery or blank corrections will be made by the laboratory. The required summaries are as follows (additional information may be requested):
  - **Instrument Performance Checks**. Injection times and percent relative ion abundances will be reported and compared to method criteria. Associated samples and analysis times will also be reported.
  - **Calibration Data Summary**. These summaries will report the concentrations of the initial calibration and continuing calibration standards and the date and time of analyses. The response factor, percent relative standard deviation, percent drift/difference, percent recovery, and retention time for each analyte will be listed, as appropriate. Calibration results for standards will be documented to indicate instrument sensitivity.
  - **Internal Standard Area Summary**. Internal standard areas will be reported and evaluated against method criteria.
  - **Method Blank Analysis**. The method blank analysis associated with each sample and the concentration of all target analytes identified in these blanks will be reported.
  - **Surrogate Spike Recovery**. All surrogate spike recoveries for organic analyses will be reported. The names and concentrations of compounds added, percent recoveries, and range of acceptable recoveries will be provided.
  - **MS Recovery**. MS recovery data for all applicable analyses will be reported. The names and concentrations of compounds added, percent recoveries, and range of acceptable recoveries will be listed. The percent recoveries and RPD values for MSD analyses will be reported.
  - **MD**. The RPD values for MD analyses will be reported.
  - **Laboratory Control Sample**. Laboratory control sample recovery data will be reported. The names and concentrations of compounds added, percent recoveries, and range of acceptable recoveries will be included. The percent recoveries and RPD values for laboratory control sample duplicate analyses will be included.
- **Original Data**. Legible copies of the original data generated by the laboratory will include the following information:

- Sample extraction, preparation, and cleanup logs including methods used
- Instrument analysis logs for all instruments used on days of calibration and sample analyses
- Calculation worksheets as applicable
- Ion chromatograms for all samples, standards, blanks, calibrations, spikes, replicates, and reference materials as applicable
- Copies of full scan chromatograms and quantitation reports for GC/mass spectrometer analyses of samples, standards, blanks, calibrations, spikes, replicates, and reference materials
- Enhanced spectra of detected compounds with associated best-match spectra for each sample

4.4 Instrument/Equipment Testing, Inspection, and Maintenance Requirements

This section describes procedures for testing, inspection, and maintenance of field and laboratory equipment.

4.4.1 Field Instruments/Equipment

In accordance with the QA program, Anchor QEA will maintain an inventory of field instruments and equipment. The frequency and types of maintenance will be based on the manufacturer's recommendations and/or previous experience with the equipment.

The Anchor QEA FC will be responsible for the preparation, documentation, and implementation of the preventive maintenance program. The equipment maintenance information will be documented in the instrument's calibration log. The frequency of maintenance is dependent on the type and stability of the equipment, methods used, intended use of the equipment, and manufacturer's recommendations. Detailed information regarding the calibration and frequency of equipment calibration is provided in each specific manufacturer's instruction manuals.

All maintenance records will be verified prior to each sampling event. The FC will be responsible for verifying that required maintenance has been performed prior to using the equipment in the field. For this project, maintenance inspections will include the following activities:

- The drilling subcontractor will be responsible for confirming proper operation of the drilling equipment daily. This verification may consist of internal diagnostics on field screening instruments as well as function of direct-push drilling equipment.
- The licensed surveyor will be responsible for confirming proper operation of all survey equipment utilized to locate actual sampling locations both horizontally and vertically. This

verification may consist of internal diagnostics on instruments or visiting a location with known coordinates.

Any problems will be noted in the field logbook and corrected prior to continuing sampling operations.

4.4.2 Laboratory Instruments/Equipment

In accordance with the QA program, the laboratory will maintain an inventory of instruments and equipment, and the frequency of maintenance will be based on the manufacturer's recommendations and/or previous experience with the equipment.

The laboratory preventative maintenance program, as detailed in the laboratory QA Plan, is organized to maintain proper instrument and equipment performance and to prevent instrument and equipment failure during use. The program considers instrumentation, equipment, and parts that are subject to wear; deterioration or other changes in operational characteristics; the availability of spare parts; and the frequency at which maintenance is required. Any equipment that has been overloaded, has been mishandled, gives suspect results, or has been determined to be defective will be taken out of service, tagged with the discrepancy noted, and stored in a designated area until the equipment has been repaired. After repair, the equipment will be tested to verify that it is in proper operational condition. The client will be promptly notified in writing if defective equipment casts doubt on the validity of analytical data. The client will also be notified immediately regarding any delays due to instrument malfunctions that could impact holding times.

Laboratories will be responsible for the preparation, documentation, and implementation of the preventative maintenance program. Maintenance records will be checked according to the schedule on an annual basis and recorded by laboratory personnel. The Laboratory QA Manager or designee will be responsible for verifying compliance.

4.4.2.1 Laboratory Instrument/Equipment Calibration

As part of their QC programs, laboratories perform two types of calibrations. A periodic calibration is performed at prescribed intervals (e.g., balances, drying ovens, refrigerators, and thermometers), and operational calibrations are performed daily at a specified frequency or prior to analysis (i.e., initial calibrations) according to method requirements. Calibration procedures and frequency are discussed in the laboratory QA Plan. Calibrations are discussed in the laboratory SOPs for analyses.

The Laboratory QA Manager will be responsible for ensuring that the laboratory instrumentation is calibrated in accordance with specifications. Implementation of the calibration program will be the responsibility of the respective laboratory Group Supervisors. Recognized procedures (EPA, ASTM, or manufacturer's instructions) will be used when available.

Physical standards (i.e., weights or certified thermometers) will be traceable to nationally recognized standards such as the National Institute of Standards and Technology (NIST). Chemical reference standards will be NIST standard reference materials or vendor-certified materials traceable to these standards.

The calibration requirements for each method and respective corrective actions will be accessible, either in the laboratory SOPs or in the laboratory's QA Plan for each instrument or analytical method in use. All calibrations will be preserved on electronic media.

4.5 Inspection/Acceptance of Supplies and Consumables

Inspection and acceptance of field supplies, including laboratory-prepared sampling bottles, will be performed by the FC. All primary chemical standards and standard solutions used for this project, either in the field or laboratory, will be traceable to documented, reliable commercial sources. Standards will be validated to determine their accuracy by comparison with an independent standard. Any impurities found in the standard will be documented.

4.6 Data Management

Field data sheets will be checked for completeness and accuracy by the FC prior to delivery to the Data Manager. Data generated in the field will be documented in electronic or hard copy format and provided to the Data Manager, who is responsible for the data entry into the database. All manually entered data will be verified by a second party. Field documentation will be filed in the main project file after data entry and verification are complete.

Laboratory data will be provided to the Data Manager in Anchor QEA's custom EQuIS electronic format. Laboratory data that are electronically provided and loaded into the database will undergo a check against the laboratory hard copy data. Data will be validated or reviewed manually, and qualifiers, if assigned, will be entered manually. The accuracy of all manually entered data will be verified by a second party. Data tables and reports will be exported from EQuIS to Microsoft Excel tables.

5 Data Reduction, Validation, and Usability

Once data are received from the laboratory, a number of QC procedures will be followed to provide an accurate evaluation of the data quality. Specific procedures will be followed to assess data precision, accuracy, and completeness.

5.1 Compliance Assessments

Laboratory and field performance audits consist of on-site reviews of QA systems and equipment for sampling, calibration, and measurement. Laboratory audits will not be conducted as part of this study; however, all laboratory audit reports will be made available to the project QA Manager upon request. The laboratory is required to have written procedures addressing internal QA/QC. These procedures have been submitted, and the project QA Manager will review them to verify compliance with this QAPP. The laboratory must verify that personnel engaged in analytical tasks have appropriate training. The laboratory will provide written details of any and all method modifications planned prior to project commencement.

5.2 Response and Corrective Actions

The following sections identify the responsibilities of key project team members and actions to be taken in the event of an error, problem, or non-conformance to protocols identified in this document.

5.2.1 Field Activities

The FC will be responsible for correcting equipment malfunctions during the field sampling effort. The project QA Manager will be responsible for resolving situations identified by the FC that may result in non-compliance with this QAPP. All corrective measures will be immediately documented in the field logbook.

5.2.2 Laboratory

The laboratory is required to comply with its SOPs. The Laboratory PM will be responsible for ensuring that appropriate corrective actions are initiated as required for conformance with this QAPP. All laboratory personnel will be responsible for reporting problems that may compromise the quality of the data.

The Laboratory PM will be notified if any QC sample exceeds the project-specified control limits. The analyst will identify and correct the anomaly before continuing with the sample analysis. If the laboratory internal corrective action does not resolve the non-conformance, the Laboratory PM will notify the QA Manager. A narrative describing the anomaly, the steps taken to identify and correct the anomaly, and the treatment of the relevant sample batch (i.e., recalculation, re-analysis, and re-extraction) will be submitted with the data package in the form of a cover letter.

5.3 Data Review, Validation, and Verification

During the validation process, analytical data will be evaluated for project, method, and laboratory QC compliance, and their validity and applicability for program purposes will be determined. Based on the findings of the validation process, data validation qualifiers may be assigned. The validated project data, including qualifiers, will be entered into the project database, thus enabling this information to be retained or retrieved as needed.

5.4 Validation and Verification Methods

Data validation includes the following: signed entries by the field and laboratory technicians on field data sheets and laboratory datasheets, respectively; review for completeness and accuracy by the FC and Laboratory Manager; review by the QA Manager for outliers and omissions; and the use of QC criteria to accept or reject specific data. All data will be entered into the EQuIS database and a raw data file printed or exported. A second data manager or designee will perform a cursory verification of the database raw data file. If errors are found, further verification will be performed to verify that all data are accurate. Any errors found will be corrected in the database.

All laboratory data will be reviewed and verified to determine whether DQOs have been met and that appropriate corrective actions have been taken, when necessary. The project QA Manager or designee will be responsible for the final review of data generated from analyses of samples.

The first level of review will take place in the laboratory as the data are generated. The Laboratory Department Manager or designee will be responsible for ensuring that the data generated meet minimum QA/QC requirements and that the instruments were operating under acceptable conditions during generation of data. DQOs will also be assessed at this point by comparing the results of QC measurements with pre-established criteria as a measure of data acceptability.

The analysts and/or Laboratory Department Manager will prepare a preliminary QC checklist for each parameter and for each sample delivery group (SDG) as soon as analysis of an SDG has been completed. Any deviations from the DQOs on the checklist will be brought to the attention of the Laboratory Manager to determine whether corrective action is needed and to determine the impact on the reporting schedule.

Data packages will be checked for completeness immediately upon receipt from the laboratory to verify that data and QA/QC information requested are present. Stage 2A validation (EPA 2009) will be conducted on the data and a data usability summary report (DUSR) prepared compliant with requirements outlined in DER-10 (NYSDEC2010). Data validation will be conducted by a reviewer using current National Functional Guideline documents (EPA 2020a, 2020b) as guidance by considering the following information, as applicable per method and level of validation:

- CoC documentation and sample receipt condition
- Holding times
- Instrument performance checks
- Initial calibrations
- Continuing calibrations
- Method blanks
- Surrogate recoveries
- Internal standard recoveries
- Detection limits
- RLs
- Laboratory control samples
- MS/MSD samples
- Field and laboratory duplicates
- Rinsate blanks
- Standard reference material results
- Raw data review

The data will be validated in accordance with the project-specific DQOs described above, analytical method criteria, and the laboratory's internal performance standards based on its SOPs. Validated data will be exported from the EQuIS database in New York State Department of Environmental Conservation's Electronic Data Warehouse Standards or as otherwise directed by the Division of Environmental Remediation. A Data Usability Summary Report will be submitted describing the results of the validation, and including an evaluation of the analytical data to determine whether or not the data meet the site/project-specific criteria for data quality and use.

6 Corrective Action

Corrective action is the process of identifying, recommending, approving, and implementing measures to counter unacceptable procedures or out-of-QC performance that can affect data quality. Corrective action can occur during field activities, laboratory analyses, data validation, and data assessment. Corrective action proposed and implemented should be documented in QA reports to management. Corrective action should be implemented only after the approval of the PM and the QA Manager. If immediate corrective action is required, approvals secured by telephone should be documented.

For non-compliance problems, a formal corrective action program will be determined and implemented at the time that the problem is identified. The person who identifies the problem is responsible for notifying the PM and QA Manager. Implementation of corrective action will be confirmed in writing through the same channels.

Non-conformance with the established QC procedures in the QAPP will be identified and corrected in accordance with the QAPP. The FC, QA Manager, or their designees will issue a non-conformance report describing non-conformance action depending on if the non-conformance is related to the field or laboratory activities.

6.1 Field Corrective Action

Corrective action in the field may be required when the sample network is changed (e.g., more or fewer samples, or sampling locations other than those identified in the Field Sampling Plan or QAPP), or when sampling procedures and/or field analytical procedures require modification due to unexpected conditions. The need for corrective action and recommendations will be communicated to the PM, who will approve the corrective action and verify that the corrective action has been implemented. Corrective actions will be implemented and documented in a bound field logbook. No Anchor QEA personnel will initiate corrective action without prior communication of findings through proper channels.

If corrective action taken will result in fewer samples collected, fewer parameters analyzed, alternate sampling locations, or other changes that might result in non-attainment of QA objectives, then the PM must be advised of the proposed corrective action and must concur with its implementation.

6.2 Corrective Action During Data Quality Review and Data Assessment

The need for corrective action may be identified during data quality review or data assessment. Potential types of corrective action may include resampling by the field team or repreparation and/or re-analyses of samples by the laboratory. These actions are dependent upon the ability to mobilize the field team, and whether the data to be collected are necessary to meet the required DQOs. If a corrective action situation is identified, the PM and QA Manager will recommend the implementation of corrective action. The QA Manager will implement and document the approved corrective action.

6.3 Quality Assurance Reports to Management

QA reports to management will only be required if corrective action has been initiated during any phase of this project. The content of the QA report will include a summary of the issue requiring the corrective action, action performed, and results of the follow-up inspection. The impact on any data will also be summarized. QA results will be reported in the Phase II report.

7 References

EPA (U.S. Environmental Protection Agency), 2009. *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. USEPA 540-R-08-005. January 2009.

NYSDEC 2010. DER-10 *Technical Guidance for Site Investigation and Remediation*. Prepared by New York State Department of Environmental Conservation (NYSDEC) Office of Remediation and Materials Management. Published May 3, 2010.

USEPA, 2020a. National Functional Guidelines for Superfund Organic Methods Data Review. Office of Superfund Remediation and Technology Innovation. EPA-540-R-20-005. November 2020.

USEPA, 2020b. National Functional Guidelines for Inorganic Superfund Methods Data Review. Office of Superfund Remediation and Technology Innovation. EPA-542-R-20-006. November 2020.

Tables

Table 1
Sample Sizes, Containers, and Hold Times

Parameter	Sample Size	Container Size and Type	Preservative	Maximum Holding Time
Soil Samples				
Total solids	50 g	4-oz WM-G	Cool/0–6°C	None established
			Freeze -18°C	None established
VOCs	10 g	3 x 40 mL VOA vial	Methanol or sodium bisulfate	14 days
	50 g	4-oz WM-G	Cool/0–6°C; no headspace	
SVOCs	100 g	4-oz WM-G, amber	Cool/0–6°C	14 days to extraction
			Freeze -18°C	1 year to extraction
			Cool/0–6°C	40 days to analysis
Metals	50 g	4-oz WM-G	Cool/0–6°C	6 months; 28 days for mercury
			Freeze -18°C	180 days (except mercury)
PFAS[a]	4 g	8-oz WM-HDPE	Cool/0–6°C	90 days
Water Samples				
VOCs	40 mL	3 x 40 mL VOA vial	Cool/0–6°C	14 days
SVOCs	1 L	2 x 1 L amber glass	Cool/0–6°C	14 days to extraction, 40 days to analysis
Metals	2x50 mL	125 mL HDPE	Cool/0–6°C, HNO3 to pH < 2	6 months; 28 days for mercury
PFAS[a]	500mL	500mL HDPE	Cool/0–6°C	28 days
Indoor Air Samples				
VOCs	6L	6 L Summa canister	Ambient	30 days to analysis
Investigation Derived Waste				
TCLP VOCs	100 g	2-oz wide-mouth glass with Teflon lined septa cap, no headspace	Cool/0–6°C	14 days to extraction, 40 days to analysis
	40 mL	3 x 40-mL septum-sealed VOA vials	Cool/0–6°C, HCl to pH<2	
TCLP SVOCs	100 g	8-oz WM-G	Cool/0–6°C	14 days to extraction, 40 days to analysis
	250 mL	2 x 250-mL amber glass with HDPE-lined lid	Cool/0–6°C	
TCLP Metals	50 g	4-oz WM-G	Cool/0–6°C	180 days and 28 days for mercury to TCLP extraction/analysis
	250 mL	250-mL HDPE	Cool/0–6°C, HNO3 to pH < 2	

Notes:
a Use Teflon free lids
g: gram
WM-G: wide-mouth glass
HCl: hydrochloric acid
HDPE: high density polyethylene
HNO_3: nitric acid
L: liter
mL: milliliter
oz: ounce
'--: not applicable
TCLP: toxicity characteristic leaching procedure

Table 2
Soil analyte List, Methods, and Reporting and Detection Limits

Parameter		Analytical Method	Cleanup Levels [1,2]	Method Detection Limit	Reporting Limit
Conventional Parameters (%)					
Total solids		SM 2540G	--	0.1	0.1
TCL Volatile Organic Compounds (µg/kg)					
Methylene chloride	75-09-2	EPA 8260	--	2.8	5
1,1-Dichloroethane	75-34-3	EPA 8260	--	0.2	5
Chloroform	67-66-3	EPA 8260	--	0.35	5
Carbon tetrachloride	56-23-5	EPA 8260	--	0.26	5
1,2-Dichloropropane	78-87-5	EPA 8260	--	0.2	5
Dibromochloromethane	124-48-1	EPA 8260	--	0.2	5
1,1,2-Trichloroethane	79-00-5	EPA 8260	--	0.2	5
Tetrachloroethene	127-18-4	EPA 8260	--	0.23	5
Chlorobenzene	108-90-7	EPA 8260	--	0.2	5
Trichlorofluoromethane	75-69-4	EPA 8260	--	0.26	5
1,2-Dichloroethane	107-06-2	EPA 8260	--	0.2	5
1,1,1-Trichloroethane	71-55-6	EPA 8260	--	0.2	5
Bromodichloromethane	75-27-4	EPA 8260	--	0.2	5
trans-1,3-Dichloropropene	10061-02-6	EPA 8260	--	0.2	5
cis-1,3-Dichloropropene	10061-01-5	EPA 8260	--	0.2	5
1,1-Dichloropropene	542-75-6	EPA 8260	--	5	0.4556
Bromoform	563-58-6	EPA 8260	--	0.2	5
1,1,2,2-Tetrachloroethane	75-25-2	EPA 8260	--	0.5	5
Benzene	79-34-5	EPA 8260	60	0.2	5
Toluene	71-43-2	EPA 8260	700	0.2	5
Ethylbenzene	108-88-3	EPA 8260	1,000	2	5
Chloromethane	100-41-4	EPA 8260	--	1	5
Bromomethane	74-87-3	EPA 8260	--	1.4	5
Vinyl chloride	74-83-9	EPA 8260	--	0.93	5
Chloroethane	75-01-4	EPA 8260	--	0.46	5
1,1-Dichloroethene	75-00-3	EPA 8260	--	0.41	5

Table 2
Soil analyte List, Methods, and Reporting and Detection Limits

Parameter		Analytical Method	Cleanup Levels [1,2]	Method Detection Limit	Reporting Limit
trans-1,2-Dichloroethene	75-35-4	EPA 8260	--	0.2	5
Trichloroethene	156-60-5	EPA 8260	--	0.2	5
1,2-Dichlorobenzene	540-59-0	EPA 8260	--	0.4	10
1,3-Dichlorobenzene	79-01-6	EPA 8260	--	0.22	5
1,4-Dichlorobenzene	95-50-1	EPA 8260	--	0.2	5
Methyl tert butyl ether	541-73-1	EPA 8260	930	0.2	5
p/m-Xylene	106-46-7	EPA 8260	--	0.22	5
o-Xylene	1634-04-4	EPA 8260	--	0.2	5
Total xylene	179601-23-1	calculated	260	0.37	10
cis-1,2-Dichloroethene	95-47-6	EPA 8260	--	0.2	5
Dibromomethane	1330-20-7	EPA 8260	--	0.52	15
Styrene	100-42-5	EPA 8260	--	1	5
Dichlorodifluoromethane	75-71-8	EPA 8260	--	0.33	5
Acetone	67-64-1	EPA 8260	--	4.7	5
Carbon disulfide	75-15-0	EPA 8260	--	0.29	5
2-Butanone	78-93-3	EPA 8260	--	2	5
Vinyl acetate	108-05-4	EPA 8260	--	0.78	10
4-Methyl-2-pentanone	108-10-1	EPA 8260	--	0.23	5
1,2,3-Trichloropropane	591-78-6	EPA 8260	--	0.87	5
2-Hexanone	97-63-2	EPA 8260	--	0.2	5
Bromochloromethane	107-13-1	EPA 8260	--	0.89	25
2,2-Dichloropropane	74-97-5	EPA 8260	--	0.2	5
1,2-Dibromoethane	109-99-9	EPA 8260	--	15	15
1,3-Dichloropropane	594-20-7	EPA 8260	--	0.2	5
1,1,1,2-Tetrachloroethane	106-93-4	EPA 8260	--	0.2	5
Bromobenzene	142-28-9	EPA 8260	--	0.2	5
n-Butylbenzene	630-20-6	EPA 8260	12,000	0.2	5
sec-Butylbenzene	108-86-1	EPA 8260	11,000	0.2	5
tert-Butylbenzene	104-51-8	EPA 8260	5,900	0.2	5
o-Chlorotoluene	135-98-8	EPA 8260	--	0.2	5

Table 2
Soil analyte List, Methods, and Reporting and Detection Limits

Parameter		Analytical Method	Cleanup Levels [1,2]	Method Detection Limit	Reporting Limit
p-Chlorotoluene	98-06-6	EPA 8260	--	0.2	5
1,2-Dibromo-3-chloropropane	95-49-8	EPA 8260	--	0.2	5
Hexachlorobutadiene	106-43-4	EPA 8260	--	0.2	5
Isopropylbenzene	96-12-8	EPA 8260	2,300	0.5	5
p-Isopropyltoluene	99-87-6	EPA 8260	10,000	0.2	5
Naphthalene	91-20-3	EPA 8260	12,000	0.99	5
Acrylonitrile	107-13-1	EPA 8260	--	0.89	25
n-Propylbenzene	103-65-1	EPA 8260	3,900	0.2	5
1,2,3-Trichlorobenzene	87-61-6	EPA 8260	--	0.88	5
1,2,4-Trichlorobenzene	120-82-1	EPA 8260	--	0.52	5
1,3,5-Trimethylbenzene	108-67-8	EPA 8260	8,400	0.2	5
1,2,4-Trimethylbenzene	95-63-6	EPA 8260	3,600	0.2	5
1,4-Dioxane	123-91-1	EPA 8260	--	20	100
1,4-Diethylbenzene	105-05-5	EPA 8260	--	4	0.2
4-Ethyltoluene	622-96-8	EPA 8260	--	4	0.097
1,2,4,5-Tetramethylbenzene	95-93-2	EPA 8260	--	4	0.181
Ethyl ether	60-29-7	EPA 8260	--	0.25	5
trans-1,4-Dichloro-2-butene	110-57-6	EPA 8260	--	0.67	5
TCL Semivolatile Organic Compounds (µg/kg)					
1,2,4,5-Tetrachlorobenzene	95-94-3	EPA 8270D	--	74	330
1,2,4-Trichlorobenzene	120-82-1	EPA 8270D	--	119	330
1,2-Dichlorobenzene	95-50-1	EPA 8270D	--	57	330
1,3-Dichlorobenzene	541-73-1	EPA 8270D	--	52	330
1,4-Dichlorobenzene	106-46-7	EPA 8270D	--	55	330
2,4,5-Trichlorophenol	95-95-4	EPA 8270D	--	82	330
2,4,6-Trichlorophenol	88-06-2	EPA 8270D	--	74	330
2,4-Dichlorophenol	120-83-2	EPA 8270D	--	64	330
2,4-Dimethylphenol	105-67-9	EPA 8270D	--	59	330
2,4-Dinitrophenol	51-28-5	EPA 8270D	--	540	1700
2,4-Dinitrotoluene	121-14-2	EPA 8270D	--	130	330

Table 2
Soil analyte List, Methods, and Reporting and Detection Limits

Parameter		Analytical Method	Cleanup Levels [1,2]	Method Detection Limit	Reporting Limit
2,6-Dinitrotoluene	606-20-2	EPA 8270D	--	72	330
2-Chloronaphthalene	91-58-7	EPA 8270D	--	66	330
2-Chlorophenol	95-57-8	EPA 8270D	--	55	330
2-Methylnaphthalene	91-57-6	EPA 8270D	--	116	330
2-Methylphenol	95-48-7	EPA 8270D	--	69	330
2-Nitroaniline	88-74-4	EPA 8270D	--	78	330
2-Nitrophenol	88-75-5	EPA 8270D	--	77	330
3,3'-Dichlorobenzidine	91-94-1	EPA 8270D	--	87	330
3-Nitroaniline	99-09-2	EPA 8270D	--	67	330
4,6-Dinitro-2-Methylphenol	534-52-1	EPA 8270D	--	190	1700
4-Bromophenyl phenyl ether	101-55-3	EPA 8270D	--	87	330
4-Chloroaniline	106-47-8	EPA 8270D	--	56	330
4-Chlorophenyl phenyl ether	7005-72-3	EPA 8270D	--	71	330
4-Methylphenol	106-44-5	EPA 8270D	--	33	4.4
4-Nitroaniline	100-01-6	EPA 8270D	--	71	330
4-Nitrophenol	100-02-7	EPA 8270D	--	67	1700
Acenaphthene	83-32-9	EPA 8270D	20,000	63	330
Acenaphthylene	208-96-8	EPA 8270D	100,000	67	330
Acetophenone	98-86-2	EPA 8270D	--	95	330
Aniline	62-53-3	EPA 8270D	--	74	330
Anthracene	120-12-7	EPA 8270D	100,000	55	330
Atrazine	1912-24-9	EPA 8270D	--	98	330
Azobenzene	103-33-3	EPA 8270D	--	33	2.5
Benz(a)anthracene	56-55-3	EPA 8270D	1,000	49	330
Benzaldehyde	100-52-7	EPA 8270D	--	180	330
Benzidine	92-87-5	EPA 8270D	--	420	3300
Benzo(a)pyrene	50-32-8	EPA 8270D	1,000	88	330
Benzo(b)fluoranthene	205-99-2	EPA 8270D	1,000	55	330
Benzo(ghi)perylene	191-24-2	EPA 8270D	100,000	76	330
Benzo(k)fluoranthene	207-08-9	EPA 8270D	800	54	330

Table 2
Soil analyte List, Methods, and Reporting and Detection Limits

Parameter		Analytical Method	Cleanup Levels [1,2]	Method Detection Limit	Reporting Limit
Benzoic Acid	65-85-0	EPA 8270D	--	520	1700
Benzyl Alcohol	100-51-6	EPA 8270D	--	170	330
Biphenyl	92-52-4	EPA 8270D	--	98	330
Bis(2-chloroethoxy)methane	111-91-1	EPA 8270D	--	81	330
Bis(2-chloroethyl)ether	111-44-4	EPA 8270D	--	65	330
Bis(2-chloroisopropyl)ether	108-60-1	EPA 8270D	--	68	330
Bis(2-Ethylhexyl)phthalate	117-81-7	EPA 8270D	--	61	500
Butylbenzylphthalate	85-68-7	EPA 8270D	--	88	330
Caprolactam	105-60-2	EPA 8270D	--	73	330
Carbazole	86-74-8	EPA 8270D	--	54	330
Chrysene	218-01-9	EPA 8270D	1,000	49	330
Dibenz(a,h)anthracene	53-70-3	EPA 8270D	330	72	330
Dibenzofuran	132-64-9	EPA 8270D	--	60	330
Diethylphthalate	84-66-2	EPA 8270D	--	59	330
Dimethylphthalate	131-11-3	EPA 8270D	--	63	330
Di-n-butylphthalate	84-74-2	EPA 8270D	--	54	330
Di-n-octylphthalate	117-84-0	EPA 8270D	--	120	330
Fluoranthene	206-44-0	EPA 8270D	100,000	83	330
Fluorene	86-73-7	EPA 8270D	--	62	330
Hexachlorobenzene	118-74-1	EPA 8270D	--	79	330
Hexachlorobutadiene	87-68-3	EPA 8270D	--	116	330
Hexachlorocyclopentadiene	77-47-4	EPA 8270D	--	110	330
Hexachloroethane	67-72-1	EPA 8270D	--	62	330
Indeno(1,2,3-cd)Pyrene	193-39-5	EPA 8270D	500	110	330
Isophorone	78-59-1	EPA 8270D	--	69	330
Naphthalene	91-20-3	EPA 8270D	--	62	330
Nitrobenzene	98-95-3	EPA 8270D	--	59	330
NitrosoDiPhenylAmine(NDPA)/DPA	86-30-6	EPA 8270D	--	206	330
n-Nitrosodimethylamine	62-75-9	EPA 8270D	--	76	330
N-Nitroso-di-n-propylamine	621-64-7	EPA 8270D	--	110	330

Table 2
Soil analyte List, Methods, and Reporting and Detection Limits

Parameter		Analytical Method	Cleanup Levels [1,2]	Method Detection Limit	Reporting Limit
P-Chloro-M-Cresol	59-50-7	EPA 8270D	--	67	330
Pentachlorophenol	87-86-5	EPA 8270D	--	330	1700
Phenanthrene	85-01-8	EPA 8270D	100,000	47	330
Phenol	108-95-2	EPA 8270D	--	67	330
Pyrene	129-00-0	EPA 8270D	100,000	55	330
Pyridine	110-86-1	EPA 8270D	--	45	330
Metals (mg/kg)					
Aluminum	7429-90-5	EPA 6020B	--	12	20
Antimony	7440-36-0	EPA 6020B	--	0.54	6
Arsenic	7440-38-2	EPA 6020B	--	0.7	1
Barium	7440-39-3	EPA 6020B	--	0.26	2
Beryllium	7440-41-7	EPA 6020B	--	0.029	0.3
Cadmium	7440-43-9	EPA 6020B	--	0.086	0.5
Calcium	7440-70-2	EPA 6020B	--	32	100
Chromium	7440-47-3	EPA 6020B	--	0.35	1
Cobalt	7440-48-4	EPA 6020B	--	0.083	5
Copper	7440-50-8	EPA 6020B	--	0.13	2
Iron	7439-89-6	EPA 6020B	--	13	20
Lead	7439-92-1	EPA 6020B	--	0.4	5
Magnesium	7439-95-4	EPA 6020B	--	13	100
Manganese	7439-96-5	EPA 6020B	--	0.16	2
Mercury	7439-97-6	EPA 7471B	--	0.0130	0.02
Nickel	7440-02-0	EPA 6020B	--	0.66	4
Potassium	7440-09-7	EPA 6020B	--	50	200
Selenium	7782-49-2	EPA 6020B	--	0.54	1
Silver	7440-22-4	EPA 6020B	--	0.09	1
Sodium	7440-23-5	EPA 6020B	--	19	100

Table 2
Soil analyte List, Methods, and Reporting and Detection Limits

Parameter		Analytical Method	Cleanup Levels [1,2]	Method Detection Limit	Reporting Limit
Thallium	7440-28-0	EPA 6020B	--	0.65	1
Vanadium	7440-62-2	EPA 6020B	--	0.069	5
Zinc	7440-66-6	EPA 6020B	--	1.4	2
PFAS (ng/g)					
10:2 FTS - 10:2 Fluorotelomer sulfonic acid		EPA 1633	--	0.5	0.17
11Cl-PF3OUnDS - 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid		EPA 1633	--	0.5	0.051
3:3 Fluorotelomer carboxylic acid		EPA 1633	--	15	0.25
4:2 FTS - 4:2 Fluorotelomer sulfonic acid		EPA 1633	--	0.5	0.071
5:3 FTCA - 5:3 Fluorotelomer carboxylic acid		EPA 1633	--	15	0.25
6:2 FTS - 6:2 Fluorotelomer sulfonic acid		EPA 1633	--	0.5	0.051
7:3 FTCA - 7:3 Fluorotelomer carboxylic acid		EPA 1633	--	15	0.27
8:2 FTS - 8:2 Fluorotelomer sulfonic acid		EPA 1633	--	0.5	0.092
9Cl-PF3ONS		EPA 1633	--	0.5	0.05
ADONA - 4,8-Dioxa-3H-perfluorononanoic acid		EPA 1633	--	0.5	0.05
EtFOSA - N-Ethyl perfluorooctane sulfonamide		EPA 1633	--	0.5	0.05
EtFOSAA - N-Ethylperfluorooctane sulfonamidoacetic acid		EPA 1633	--	0.5	0.091
EtFOSE - N-Ethyl perfluorooctane sulfonamidoethanol		EPA 1633	--	0.5	0.063
FOSA - Perfluorooctane sulfonamide		EPA 1633	--	0.5	0.05
HFPO-DA - Hexafluoropropylene oxide dimer acid		EPA 1633	--	0.5	0.08
MeFOSA - N-Methyl perfluorooctane sulfonamide		EPA 1633	--	0.5	0.05
MeFOSAA - N-Methyl perfluorooctane sulfonamidoacetic acid		EPA 1633	--	0.5	0.13
MeFOSE - N-Methyl perfluorooctane sulfonamidoethanol		EPA 1633	--	0.5	0.079
NFDHA - Nonafluoro-3,6-dioxaheptanoic acid		EPA 1633	--	0.5	0.072
PFBA - Perfluorobutanoic acid		EPA 1633	--	0.5	0.05
PFBS - Perfluorobutane sulfonic acid		EPA 1633	--	0.5	0.054
PFDA - Perfluorodecanoic acid		EPA 1633	--	0.5	0.077
PFDoDA - Perfluorododecanoic acid		EPA 1633	--	0.5	0.07
PFDoDS - Perfluorododecane sulfonic acid		EPA 1633	--	0.5	0.097

Table 2
Soil analyte List, Methods, and Reporting and Detection Limits

Parameter	Analytical Method	Cleanup Levels [1,2]	Method Detection Limit	Reporting Limit
PFDS - Perfluorodecane sulfonic acid	EPA 1633	--	0.5	0.13
PFEESA - Perfluoro(2-ethoxyethane)sulfonic acid	EPA 1633	--	0.5	0.051
PFHpA - Perfluoroheptanoic acid	EPA 1633	--	0.5	0.089
PFHpS - Perfluoroheptane sulfonic acid	EPA 1633	--	0.5	0.061
PFHxA - Perfluorohexanoic acid	EPA 1633	--	0.5	0.082
PFHxDA - Perfluorohexadecanoic acid	EPA 1633	--	0.5	0.17
PFHxS - Perfluorohexane sulfonic acid	EPA 1633	--	0.5	0.082
PFMBA - Perfluoro-4-methoxybutanoic acid	EPA 1633	--	0.5	0.057
PFMPA - Perfluoro-3-methoxypropanoic acid	EPA 1633	--	0.5	0.097
PFNA - Perfluorononanoic acid	EPA 1633	--	0.5	0.1
PFNS - Perfluorononane sulfonic acid	EPA 1633	--	0.5	0.066
PFOA - Perfluorooctanoic acid	EPA 1633	--	0.5	0.11
PFODA - Perfluorooctadecanoic acid	EPA 1633	--	0.5	0.074
PFOS - Perfluorooctane sulfonic acid	EPA 1633	--	0.5	0.11
PFPeA - Perfluoropentanoic acid	EPA 1633	--	0.5	0.061
PFPeS - Perfluoropentane sulfonic acid	EPA 1633	--	0.5	0.063
PFTeDA - Perfluorotetradecanoic acid	EPA 1633	--	0.5	0.14
PFTrDA - Perfluorotridecanoic acid	EPA 1633	--	0.5	0.099
PFUnDA - Perfluoroundecanoic acid	EPA 1633	--	0.5	0.19

Notes:
--: not applicable
EPA: U.S. Environmental Protection Agency
mg/L: milligrams per liter
mg/kg: milligrams per kilogram
ng/g: nanogram per gram
SM: Standard Method
PFAS: per-and-polyfluoroalkyl substances

Table 3

Groundwater analyte List, Methods, and Reporting and Detection Limits

Parameter	CAS RN	Analytical Method	Groundwater Screening Levels[1]	Reporting Limit	Method Detection Limit
TCL Volatile Organic Compounds (µg/L)					
Methylene chloride	75-09-2	EPA 8260	5	0.65	1
1,1-Dichloroethane	75-34-3	EPA 8260	5	0.2	1
Chloroform	67-66-3	EPA 8260	7	0.51	1
Carbon tetrachloride	56-23-5	EPA 8260	0.4	0.34	1
1,2-Dichloropropane	78-87-5	EPA 8260	1	0.2	1
Dibromochloromethane	124-48-1	EPA 8260	50	0.2	1
1,1,2-Trichloroethane	79-00-5	EPA 8260	1	0.2	1
Tetrachloroethene	127-18-4	EPA 8260	0.7	0.21	1
Chlorobenzene	108-90-7	EPA 8260	5	0.2	1
Trichlorofluoromethane	75-69-4	EPA 8260	5	0.24	1
1,2-Dichloroethane	107-06-2	EPA 8260	0.6	0.2	1
1,1,1-Trichloroethane	71-55-6	EPA 8260	5	0.2	1
Bromodichloromethane	75-27-4	EPA 8260	50	0.2	1
trans-1,3-Dichloropropene	10061-02-6	EPA 8260	0.4	0.23	1
cis-1,3-Dichloropropene	10061-01-5	EPA 8260	0.4	0.2	1
1,3-Dichloropropene, Total	542-75-6	EPA 8260	0.4	0.5	0.144
1,1-Dichloropropene	563-58-6	EPA 8260	5	0.2	1
Bromoform	75-25-2	EPA 8260	50	0.25	1
1,1,2,2-Tetrachloroethane	79-34-5	EPA 8260	0.2	0.2	1
Benzene	71-43-2	EPA 8260	1	0.2	1
Toluene	108-88-3	EPA 8260	5	0.2	1
Ethylbenzene	100-41-4	EPA 8260	5	0.2	1
Chloromethane	74-87-3	EPA 8260	5	0.8	1
Bromomethane	74-83-9	EPA 8260	5	0.7	1
Vinyl chloride	75-01-4	EPA 8260	0.3	0.2	1
Chloroethane	75-00-3	EPA 8260	5	0.23	1
1,1-Dichloroethene	75-35-4	EPA 8260	0.7	0.2	1
trans-1,2-Dichloroethene	156-60-5	EPA 8260	5	0.2	1
1,2-Dichloroethene (total)	540-59-0	EPA 8260	--	0.35	2
Trichloroethene	79-01-6	EPA 8260	5	0.2	1
1,2-Dichlorobenzene	95-50-1	EPA 8260	3	0.2	1
1,3-Dichlorobenzene	541-73-1	EPA 8260	3	0.2	1
1,4-Dichlorobenzene	106-46-7	EPA 8260	3	0.2	1
Methyl tert butyl ether	1634-04-4	EPA 8260	10	0.2	1
p/m-Xylene	179601-23-1	EPA 8260	5	0.2	2
o-Xylene	95-47-6	EPA 8260	5	0.2	1
Xylene (Total)	1330-20-7	EPA 8260	5	0.23	3
cis-1,2-Dichloroethene	156-59-2	EPA 8260	5	0.23	1

Table 3
Groundwater analyte List, Methods, and Reporting and Detection Limits

Parameter	CAS RN	Analytical Method	Groundwater Screening Levels[1]	Reporting Limit	Method Detection Limit
Dibromomethane	74-95-3	EPA 8260	5	0.2	1
1,4-Dichlorobutane	110-56-5	EPA 8260	--	5.0	0.464
1,2,3-Trichloropropane	96-18-4	EPA 8260	0.04	0.26	1
Styrene	100-42-5	EPA 8260	5	0.2	1
Dichlorodifluoromethane	75-71-8	EPA 8260	5	0.21	1
Acetone	67-64-1	EPA 8260	50	5	5
Carbon disulfide	75-15-0	EPA 8260	60	0.42	1
2-Butanone	78-93-3	EPA 8260	50	0.78	5
Vinyl acetate	108-05-4	EPA 8260	--	1.1	2
4-Methyl-2-pentanone	108-10-1	EPA 8260	--	0.2	5
2-Hexanone	591-78-6	EPA 8260	50	0.2	5
Ethyl methacrylate	97-63-2	EPA 8260	3	0.2	2
Acrylonitrile	107-13-1	EPA 8260	5	0.9	10
Bromochloromethane	74-97-5	EPA 8260	5	0.2	1
Tetrahydrofuran	109-99-9	EPA 8260	50	1.7	2
2,2-Dichloropropane	594-20-7	EPA 8260	5	0.24	1
1,2-Dibromoethane	106-93-4	EPA 8260	0.0006	0.2	1
1,3-Dichloropropane	142-28-9	EPA 8260	5	0.2	1
1,1,1,2-Tetrachloroethane	630-20-6	EPA 8260	5	0.2	1
Bromobenzene	108-86-1	EPA 8260	5	0.2	1
n-Butylbenzene	104-51-8	EPA 8260	5	0.2	1
sec-Butylbenzene	135-98-8	EPA 8260	5	0.2	1
tert-Butylbenzene	98-06-6	EPA 8260	5	0.2	1
o-Chlorotoluene	95-49-8	EPA 8260	5	0.2	1
p-Chlorotoluene	106-43-4	EPA 8260	5	0.2	1
1,2-Dibromo-3-chloropropane	96-12-8	EPA 8260	0.04	0.45	2
Hexachlorobutadiene	87-68-3	EPA 8260	0.5	0.33	2
Isopropylbenzene	98-82-8	EPA 8260	5	0.2	1
p-Isopropyltoluene	99-87-6	EPA 8260	5	0.2	1
Naphthalene	91-20-3	EPA 8260	10	0.55	1
n-Propylbenzene	103-65-1	EPA 8260	5	0.2	1
1,2,3-Trichlorobenzene	87-61-6	EPA 8260	5	0.25	1
1,2,4-Trichlorobenzene	120-82-1	EPA 8260	5	0.34	1
1,3,5-Trimethylbenzene	108-67-8	EPA 8260	5	0.2	1
1,3,5-Trichlorobenzene	108-70-3	EPA 8260	5	0.27	1
1,2,4-Trimethylbenzene	95-63-6	EPA 8260	5	0.2	1
trans-1,4-Dichloro-2-butene	110-57-6	EPA 8260	5	0.78	1
Ethyl ether	60-29-7	EPA 8260	--	0.2	1
Methyl Acetate	79-20-9	EPA 8260	--	0.33	2

Table 3

Groundwater analyte List, Methods, and Reporting and Detection Limits

Parameter	CAS RN	Analytical Method	Groundwater Screening Levels[1]	Reporting Limit	Method Detection Limit
Ethyl Acetate	141-78-6	EPA 8260	--	10	0.716
Isopropyl Ether	108-20-3	EPA 8260	--	0.2	1
Cyclohexane	110-82-7	EPA 8260	--	0.6	1
Ethyl-Tert-Butyl-Ether	637-92-3	EPA 8260	--	0.2	1
Tertiary-Amyl Methyl Ether	994-05-8	EPA 8260	--	0.2	1
1,4-Dioxane	123-91-1	EPA 8260	--	13	40
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	EPA 8260	5	0.2	1
Methyl cyclohexane	108-87-2	EPA 8260	--	0.2	1
1,4-Diethylbenzene	105-05-5	EPA 8260	--	2.0	0.392
4-Ethyltoluene	622-96-8	EPA 8260	--	2.0	0.34
1,2,4,5-Tetramethylbenzene	95-93-2	EPA 8260	5	2.0	0.542
TCL Semivolatile Organic Compounds (µg/L)					
Bis(2-chloroethyl)ether	111-44-4	EPA 8270D	0.03	0.5	0.0929
Phenol	108-95-2	EPA 8270D	2	0.5	0.0512
2-Chlorophenol	95-57-8	EPA 8270D	--	0.5	0.0912
1,3-Dichlorobenzene	541-73-1	EPA 8270D	3	0.5	0.0783
1,4-Dichlorobenzene	106-46-7	EPA 8270D	3	0.5	0.0828
1,2-Dichlorobenzene	95-50-1	EPA 8270D	3	0.5	0.0680
Bis(2-chloroisopropyl)ether	108-60-1	EPA 8270D	5	0.5	0.1080
2-Methylphenol	95-48-7	EPA 8270D	--	0.5	0.1040
Hexachloroethane	67-72-1	EPA 8270D	5	0.5	0.1020
N-Nitroso-di-n-propylamine	621-64-7	EPA 8270D	--	0.5	0.1230
4-Methylphenol	106-44-5	EPA 8270D	--	0.5	0.1130
Nitrobenzene	98-95-3	EPA 8270D	0.4	0.5	0.1020
Isophorone	78-59-1	EPA 8270D	50	0.5	0.1260
2-Nitrophenol	88-75-5	EPA 8270D	--	0.5	0.1150
2,4-Dimethylphenol	105-67-9	EPA 8270D	50	2.0	0.2410
Bis(2-chloroethoxy)methane	111-91-1	EPA 8270D	5	0.5	0.0854
2,4-Dichlorophenol	120-83-2	EPA 8270D	5	0.5	0.0996
1,2,4-Trichlorobenzene	120-82-1	EPA 8270D	5	0.5	0.0961
Naphthalene	91-20-3	EPA 8270D	10	0.5	0.0876
4-Chloroaniline	106-47-8	EPA 8270D	5	0.5	0.1280
Hexachlorobutadiene	87-68-3	EPA 8270D	0.5	0.5	0.0855
P-Chloro-M-Cresol	59-50-7	EPA 8270D	--	0.5	0.1030
2-Methylnaphthalene	91-57-6	EPA 8270D	--	0.5	0.0911
1,2,4,5-Tetrachlorobenzene	95-94-3	EPA 8270D	5	0.5	0.0797
Hexachlorocyclopentadiene	77-47-4	EPA 8270D	5	0.5	0.1530
Pentachloronitrobenzene	82-68-8	EPA 8270D	ND	0.5	0.1690
2,4,6-Trichlorophenol	88-06-2	EPA 8270D	--	0.5	0.1520

Table 3

Groundwater analyte List, Methods, and Reporting and Detection Limits

Parameter	CAS RN	Analytical Method	Groundwater Screening Levels[1]	Reporting Limit	Method Detection Limit
2,4,5-Trichlorophenol	95-95-4	EPA 8270D	--	0.5	0.0913
2-Chloronaphthalene	91-58-7	EPA 8270D	10	0.5	0.0899
2-Nitroaniline	88-74-4	EPA 8270D	5	0.5	0.1380
Acenaphthylene	208-96-8	EPA 8270D	--	0.5	0.1120
Dimethylphthalate	131-11-3	EPA 8270D	50	0.5	0.1170
2,6-Dinitrotoluene	606-20-2	EPA 8270D	0.07	0.5	0.1680
Acenaphthene	83-32-9	EPA 8270D	20	0.5	0.0955
3-Nitroaniline	99-09-2	EPA 8270D	5	0.5	0.1110
2,4-Dinitrophenol	51-28-5	EPA 8270D	10	5.0	0.7280
Dibenzofuran	132-64-9	EPA 8270D	--	0.5	0.0910
2,4-Dinitrotoluene	121-14-2	EPA 8270D	5	0.5	0.1630
4-Nitrophenol	100-02-7	EPA 8270D	--	2.5	0.5900
2,3,4,6-Tetrachlorophenol	58-90-2	EPA 8270D	--	0.5	0.1430
Fluorene	86-73-7	EPA 8270D	50	0.5	0.1040
4-Chlorophenyl phenyl ether	7005-72-3	EPA 8270D	--	0.5	0.0792
Diethylphthalate	84-66-2	EPA 8270D	50	0.5	0.1800
Azobenzene	103-33-3	EPA 8270D	5	0.5	0.1280
4-Nitroaniline	100-01-6	EPA 8270D	5	0.5	0.1120
4,6-Dinitro-2-Methylphenol	534-52-1	EPA 8270D	--	2.0	0.5100
NitrosoDiPhenylAmine(NDPA)/DPA	86-30-6	EPA 8270D	50	0.5	0.0720
4-Bromophenyl phenyl ether	101-55-3	EPA 8270D	--	0.5	0.0997
Hexachlorobenzene	118-74-1	EPA 8270D	0.04	0.5	0.1220
Pentachlorophenol	87-86-5	EPA 8270D	2	2.0	0.4300
Phenanthrene	85-01-8	EPA 8270D	50	0.5	0.1110
Anthracene	120-12-7	EPA 8270D	50	0.5	0.1370
Carbazole	86-74-8	EPA 8270D	--	0.5	0.1430
Di-n-butylphthalate	84-74-2	EPA 8270D	50	0.5	0.0996
Fluoranthene	206-44-0	EPA 8270D	50	0.5	0.1560
Pyrene	129-00-0	EPA 8270D	50	0.5	0.1700
Butylbenzylphthalate	85-68-7	EPA 8270D	50	0.5	0.0848
3,3'-Dichlorobenzidine	91-94-1	EPA 8270D	5	0.5	0.1930
Benz(a)anthracene	56-55-3	EPA 8270D	0.002	0.5	0.1840
Chrysene	218-01-9	EPA 8270D	0.002	0.5	0.1420
Bis(2-Ethylhexyl)phthalate	117-81-7	EPA 8270D	5	0.5	0.0809
Di-n-octylphthalate	117-84-0	EPA 8270D	50	1.0	0.0786
Benzo(b)fluoranthene	205-99-2	EPA 8270D	0.002	0.5	0.0655
Benzo(k)fluoranthene	207-08-9	EPA 8270D	0.002	0.5	0.1610
Benzo(a)pyrene	50-32-8	EPA 8270D	0.002	0.5	0.0602
Indeno(1,2,3-cd)Pyrene	193-39-5	EPA 8270D	0.002	0.5	0.0896

Table 3
Groundwater analyte List, Methods, and Reporting and Detection Limits

Parameter	CAS RN	Analytical Method	Groundwater Screening Levels[1]	Reporting Limit	Method Detection Limit
Dibenz(a,h)anthracene	53-70-3	EPA 8270D	--	0.5	0.0641
Benzo(ghi)perylene	191-24-2	EPA 8270D	--	0.5	0.1090
Aniline	62-53-3	EPA 8270D	5	1.0	0.1270
Acetophenone	98-86-2	EPA 8270D	--	1.0	0.2070
Atrazine	1912-24-9	EPA 8270D	7.5	0.5	0.1600
Benzaldehyde	100-52-7	EPA 8270D	--	2.0	0.1190
Benzidine	92-87-5	EPA 8270D	5	20.0	0.4640
Caprolactam	105-60-2	EPA 8270D	--	2.0	0.1230
n-Nitrosodimethylamine	62-75-9	EPA 8270D	--	0.5	0.0720
Biphenyl	92-52-4	EPA 8270D	5	0.5	0.1110
Benzyl Alcohol	100-51-6	EPA 8270D	--	0.5	0.1230
Pyridine	110-86-1	EPA 8270D	50	0.5	0.1630
Benzoic Acid	65-85-0	EPA 8270D	--	40.0	3.0100
Metals (mg/L)					
Aluminum	7429-90-5	EPA 6020B	--	23.00	100.0000
Antimony	7440-36-0	EPA 6020B	0.003	6.300	60.0000
Arsenic	7440-38-2	EPA 6020B	0.05	5.5000	10.0000
Barium	7440-39-3	EPA 6020B	1	3.0000	20.0000
Beryllium	7440-41-7	EPA 6020B	0.003	0.1300	3.0000
Cadmium	7440-43-9	EPA 6020B	0.005	0.3500	5.0000
Calcium	7440-70-2	EPA 6020B	--	220.0	1000.0000
Chromium	7440-47-3	EPA 6020B	0.05	1.400	10.0000
Cobalt	7440-48-4	EPA 6020B	--	0.8900	50.0000
Copper	7440-50-8	EPA 6020B	0.2	3.900	20.0000
Iron	7439-89-6	EPA 6020B	--	61.000	100.0000
Lead	7439-92-1	EPA 6020B	0.05	2.100	50.0000
Magnesium	7439-95-4	EPA 6020B	35	29.000	1000.0000
Manganese	7439-96-5	EPA 6020B	--	3.700	10.0000
Mercury	7439-97-6	EPA 7474	0.0007	0.077	0.200
Nickel	7440-02-0	EPA 6020B	0.1	2.600	40.0000
Potassium	7440-09-7	EPA 6020B	--	380.000	2000.0000
Selenium	7782-49-2	EPA 6020B	0.01	6.400	10.0000
Silver	7440-22-4	EPA 6020B	0.05	0.5700	10.0000
Sodium	7440-23-5	EPA 6020B	--	130.000	1000.0000
Thallium	7440-28-0	EPA 6020B	0.0005	7.6000	10.0000
Vanadium	7440-62-2	EPA 6020B	--	0.670	50.0000
Zinc	7440-66-6	EPA 6020B	2	2.400	20.0000
PFAS (ng/L)					
10:2 FTS - 10:2 Fluorotelomer sulfonic acid		EPA 1633	--	5	0.99

Table 3
Groundwater analyte List, Methods, and Reporting and Detection Limits

Parameter	CAS RN	Analytical Method	Groundwater Screening Levels[1]	Reporting Limit	Method Detection Limit
11Cl-PF3OUnDS - 11-Chloroeicosafluoro-3-oxaundecar		EPA 1633	--	5	0.5
3:3 Fluorotelomer carboxylic acid		EPA 1633	--	200	8.4
4:2 FTS - 4:2 Fluorotelomer sulfonic acid		EPA 1633	--	5	1.6
5:3 FTCA - 5:3 Fluorotelomer carboxylic acid		EPA 1633	--	200	3.9
6:2 FTS - 6:2 Fluorotelomer sulfonic acid		EPA 1633	--	5	1.6
7:3 FTCA - 7:3 Fluorotelomer carboxylic acid		EPA 1633	--	200	6.6
8:2 FTS - 8:2 Fluorotelomer sulfonic acid		EPA 1633	--	5	2
9Cl-PF3ONS		EPA 1633	--	5	0.5
ADONA - 4,8-Dioxa-3H-perfluorononanoic acid		EPA 1633	--	5	0.83
EtFOSA - N-Ethyl perfluorooctane sulfonamide		EPA 1633	--	5	0.52
EtFOSAA - N-Ethylperfluorooctane sulfonamidoacetic a		EPA 1633	--	5	1.2
EtFOSE - N-Ethyl perfluorooctane sulfonamidoethanol		EPA 1633	--	5	0.52
FOSA - Perfluorooctane sulfonamide		EPA 1633	--	5	0.61
HFPO-DA - Hexafluoropropylene oxide dimer acid		EPA 1633	--	5	0.94
MeFOSA - N-Methyl perfluorooctane sulfonamide		EPA 1633	--	5	1.2
MeFOSAA - N-Methyl perfluorooctane sulfonamidoace		EPA 1633	--	5	2
MeFOSE - N-Methyl perfluorooctane sulfonamidoethan		EPA 1633	--	5	0.84
NFDHA - Nonafluoro-3,6-dioxaheptanoic acid		EPA 1633	--	5	0.88
PFBA - Perfluorobutanoic acid		EPA 1633	--	5	1.9
PFBS - Perfluorobutane sulfonic acid		EPA 1633	--	5	0.85
PFDA - Perfluorodecanoic acid		EPA 1633	--	5	1.1
PFDoDA - Perfluorododecanoic acid		EPA 1633	--	5	0.62
PFDoDS - Perfluorododecane sulfonic acid		EPA 1633	--	5	1.3
PFDS - Perfluorodecane sulfonic acid		EPA 1633	--	5	0.58
PFEESA - Perfluoro(2-ethoxyethane)sulfonic acid		EPA 1633	--	5	0.5
PFHpA - Perfluoroheptanoic acid		EPA 1633	--	5	0.84
PFHpS - Perfluoroheptane sulfonic acid		EPA 1633	--	5	0.64
PFHxA - Perfluorohexanoic acid		EPA 1633	--	5	2
PFHxDA - Perfluorohexadecanoic acid		EPA 1633	--	5	1.1
PFHxS - Perfluorohexane sulfonic acid		EPA 1633	--	5	0.61
PFMBA - Perfluoro-4-methoxybutanoic acid		EPA 1633	--	5	0.5
PFMPA - Perfluoro-3-methoxypropanoic acid		EPA 1633	--	5	0.5
PFNA - Perfluorononanoic acid		EPA 1633	--	5	1.1
PFNS - Perfluorononane sulfonic acid		EPA 1633	--	5	0.55
PFOA - Perfluorooctanoic acid		EPA 1633	--	5	0.71
PFODA - Perfluorooctadecanoic acid		EPA 1633	--	5	1.2
PFOS - Perfluorooctane sulfonic acid		EPA 1633	--	5	0.55
PFPeA - Perfluoropentanoic acid		EPA 1633	--	5	0.61
PFPeS - Perfluoropentane sulfonic acid		EPA 1633	--	5	0.68
PFTeDA - Perfluorotetradecanoic acid		EPA 1633	--	5	1.5
PFTrDA - Perfluorotridecanoic acid		EPA 1633	--	5	1.6
PFUnDA - Perfluoroundecanoic acid		EPA 1633	--	5	0.56

Table 3
Groundwater analyte List, Methods, and Reporting and Detection Limits

Notes:

1. New York State Groundwater Effluent Limitations, Class GA (NYDEC 1998)

NYSDEC (New York State Department of Environmental Conservation), 1998. *Ambient Water*

--: not applicable

EPA: U.S. Environmental Protection Agency

mg/L: milligrams per liter

ng/L: nanogram per liter

PFAS: per-and-polyfluoroalkyl substances

Table 4

Indoor Air Analyte List, Method, and Reporting and Detection Limits

Parameter	CAS RN	Analytical Method	Groundwater Screening Levels[1] (ug/L)	Method Detection Limit	Reporting Limit
Volatile Organic Compounds (µg/m^3)					
Methylene chloride	75-09-2	EPA TO-15	5	0.0078	0.1
1,1-Dichloroethane	75-34-3	EPA TO-15	5	0.0082	0.025
Chloroform	67-66-3	EPA TO-15	7	0.008	0.1
Carbon tetrachloride	56-23-5	EPA TO-15	0.4	0.0071	0.025
1,2-Dichloropropane	78-87-5	EPA TO-15	1	0.0061	0.025
Dibromochloromethane	124-48-1	EPA TO-15	50	0.0064	0.025
1,1,2-Trichloroethane	79-00-5	EPA TO-15	1	0.0059	0.52
Tetrachloroethene	127-18-4	EPA TO-15	0.7	0.0086	0.025
Chlorobenzene	108-90-7	EPA TO-15	5	0.0097	0.1
Trichlorofluoromethane	75-69-4	EPA TO-15	5	0.0081	0.05
1,2-Dichloroethane	107-06-2	EPA TO-15	0.6	0.0083	0.025
1,1,1-Trichloroethane	71-55-6	EPA TO-15	5	0.009	0.52
Bromodichloromethane	75-27-4	EPA TO-15	50	0.0058	0.025
trans-1,3-Dichloropropene	10061-02-6	EPA TO-15	0.4	0.0048	0.05
cis-1,3-Dichloropropene	10061-01-5	EPA TO-15	0.4	0.0071	0.05
1,3-Dichloropropene, Total	542-75-6	EPA TO-15	0.4	0.5	0.144
1,1-Dichloropropene	563-58-6	EPA TO-15	5	0.24	0.5
Bromoform	75-25-2	EPA TO-15	50	0.11	0.52
1,1,2,2-Tetrachloroethane	79-34-5	EPA TO-15	0.2	0.0087	0.52
Benzene	71-43-2	EPA TO-15	1	0.015	0.075
Toluene	108-88-3	EPA TO-15	5	0.012	0.1
Ethylbenzene	100-41-4	EPA TO-15	5	0.012	0.1
Chloromethane	74-87-3	EPA TO-15	5	0.026	0.05
Bromomethane	74-83-9	EPA TO-15	5	0.0067	0.025
Vinyl chloride	75-01-4	EPA TO-15	0.3	0.012	0.025
Chloroethane	75-00-3	EPA TO-15	5	0.0078	0.025
1,1-Dichloroethene	75-35-4	EPA TO-15	0.7	0.0088	0.54
trans-1,2-Dichloroethene	156-60-5	EPA TO-15	5	0.011	0.025
1,2-Dichloroethene (total)	540-59-0	EPA TO-15	--	0.5	0.163
Trichloroethene	79-01-6	EPA TO-15	5	0.0077	0.025
1,2-Dichlorobenzene	95-50-1	EPA TO-15	3	0.018	0.53
1,3-Dichlorobenzene	541-73-1	EPA TO-15	3	0.017	0.52
1,4-Dichlorobenzene	106-46-7	EPA TO-15	3	0.02	0.52
Methyl tert butyl ether	1634-04-4	EPA TO-15	10	0.012	0.025
p/m-Xylene	179601-23-1	EPA TO-15	5	0.024	0.1
o-Xylene	95-47-6	EPA TO-15	5	0.013	0.1
Xylene (Total)	1330-20-7	EPA TO-15	5	1.0	0.3
cis-1,2-Dichloroethene	156-59-2	EPA TO-15	5	0.0072	0.52

Table 4
Indoor Air Analyte List, Method, and Reporting and Detection Limits

Parameter	CAS RN	Analytical Method	Groundwater Screening Levels[1] (ug/L)	Method Detection Limit	Reporting Limit
Dibromomethane	74-95-3	EPA TO-15	5	0.2	0.5
1,4-Dichlorobutane	110-56-5	EPA TO-15	--	5.0	0.464
1,2,3-Trichloropropane	96-18-4	EPA TO-15	0.04	0.0086	0.5
Styrene	100-42-5	EPA TO-15	5	0.012	0.1
Dichlorodifluoromethane	75-71-8	EPA TO-15	5	0.0085	0.53
Acetone	67-64-1	EPA TO-15	50	0.23	5.2
Carbon disulfide	75-15-0	EPA TO-15	60	0.16	1.1
2-Butanone	78-93-3	EPA TO-15	50	0.11	1.0
Vinyl acetate	108-05-4	EPA TO-15	--	1.2	5.0
4-Methyl-2-pentanone	108-10-1	EPA TO-15	--	0.073	1.1
2-Hexanone	591-78-6	EPA TO-15	50	0.066	1.1
Ethyl methacrylate	97-63-2	EPA TO-15	3	5.0	0.606
Acrylonitrile	107-13-1	EPA TO-15	5	0.11	1.0
Bromochloromethane	74-97-5	EPA TO-15	5	2.5	0.138
Tetrahydrofuran	109-99-9	EPA TO-15	50	0.067	1.0
2,2-Dichloropropane	594-20-7	EPA TO-15	5	0.14	0.5
1,2-Dibromoethane	106-93-4	EPA TO-15	0.0006	0.0067	0.52
1,3-Dichloropropane	142-28-9	EPA TO-15	5	0.26	0.5
1,1,1,2-Tetrachloroethane	630-20-6	EPA TO-15	5	0.0091	0.1
Bromobenzene	108-86-1	EPA TO-15	5	0.0042	0.5
n-Butylbenzene	104-51-8	EPA TO-15	5	0.077	0.52
sec-Butylbenzene	135-98-8	EPA TO-15	5	0.073	0.52
tert-Butylbenzene	98-06-6	EPA TO-15	5	0.080	0.52
o-Chlorotoluene	95-49-8	EPA TO-15	5	0.26	0.5
p-Chlorotoluene	106-43-4	EPA TO-15	5	0.26	0.5
1,2-Dibromo-3-chloropropane	96-12-8	EPA TO-15	0.04	0.014	1.0
Hexachlorobutadiene	87-68-3	EPA TO-15	0.5	0.013	0.52
Isopropylbenzene	98-82-8	EPA TO-15	5	0.077	0.52
p-Isopropyltoluene	99-87-6	EPA TO-15	5	0.081	0.52
Naphthalene	91-20-3	EPA TO-15	10	0.022	0.52
n-Propylbenzene	103-65-1	EPA TO-15	5	0.077	0.53
1,2,3-Trichlorobenzene	87-61-6	EPA TO-15	5	0.27	0.5
1,2,4-Trichlorobenzene	120-82-1	EPA TO-15	5	0.02	0.05
1,3,5-Trimethylbenzene	108-67-8	EPA TO-15	5	0.014	0.52
1,3,5-Trichlorobenzene	108-70-3	EPA TO-15	5	2	0.127
1,2,4-Trimethylbenzene	95-63-6	EPA TO-15	5	0.016	0.1
trans-1,4-Dichloro-2-butene	110-57-6	EPA TO-15	5	2.5	0.173
Ethyl ether	60-29-7	EPA TO-15	--	2.5	0.15
Methyl Acetate	79-20-9	EPA TO-15	--	0.24	0.5

Table 4

Indoor Air Analyte List, Method, and Reporting and Detection Limits

Parameter	CAS RN	Analytical Method	Groundwater Screening Levels[1] (ug/L)	Method Detection Limit	Reporting Limit
Ethyl Acetate	141-78-6	EPA TO-15	--	0.28	2.1
Isopropyl Ether	108-20-3	EPA TO-15	--	0.070	1.1
Cyclohexane	110-82-7	EPA TO-15	--	0.15	1.1
Ethyl-Tert-Butyl-Ether	637-92-3	EPA TO-15	--	0.064	1.1
Tertiary-Amyl Methyl Ether	994-05-8	EPA TO-15	--	0.065	1.1
1,4-Dioxane	123-91-1	EPA TO-15	--	0.0087	0.1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	EPA TO-15	5	0.0081	0.54
Methyl cyclohexane	108-87-2	EPA TO-15	--	0.26	0.5
1,4-Diethylbenzene	105-05-5	EPA TO-15	--	2.0	0.392
4-Ethyltoluene	622-96-8	EPA TO-15	--	0.085	0.53
1,2,4,5-Tetramethylbenzene	95-93-2	EPA TO-15	5	0.22	0.5

Notes:

--: not applicable

$\mu g/m^3$: micrograms per cubic meter

EPA: U.S. Environmental Protection Agency

Table 5
Waste Characterization Analyte List, Methods, and Reporting and Detection Limits

Parameter	Recommended Analytical Method	MDL[1]	MRL[1]
Conventionals (mg/kg)			
pH (SU)	EPA 9045D	—	—
Ignitablility (°)	EPA 1030	—	—
Corrosivity	EPA 9040C	—	—
Total Solids (%)	SM 2540 G	0.10	0.10
TCLP Metals (mg/L)			
Arsenic	EPA 6020A	—	1.0
Barium	EPA 6020A	—	0.500
Cadmium	EPA 6020A	—	1.000
Chromium	EPA 6020A	—	0.100
Lead	EPA 6020A	—	0.100
Mercury	EPA 6020A	—	0.0003
Selenium	EPA 6020A	—	0.500
Silver	EPA 6020A	—	0.100
TCLP VOCs (ug/L)			
Benzene	EPA 8260C	—	50
Carbon tetrachloride	EPA 8260C	—	50
Chlorobenzene	EPA 8260C	—	50
Chloroform	EPA 8260C	—	50
1,2-Dichloroethane	EPA 8260C	—	50
1,1-Dichloroethene	EPA 8260C	—	50
1,4-Dichlorobenzene	EPA 8260C	—	100
2-Butanone	EPA 8260C	—	100
Tetrachloroethene	EPA 8260C	—	50
Trichloroethene	EPA 8260C	—	50
Vinyl chloride	EPA 8260C	—	50
TCLP SVOCs (ug/L)			
2,4,5-Trichlorophenol	EPA 8270D	—	—
2,4,6-Trichlorophenol	EPA 8270D	—	—
2,4-Dinitrotoluene	EPA 8270D	—	—
2-Methylphenol	EPA 8270D	—	—
3- & 4-Methylphenol	EPA 8270D	—	—
Hexachlorobenzene	EPA 8270D	—	100
Hexachlorobutadiene	EPA 8270D	—	50
Hexachloroethane	EPA 8270D	—	0.005
Nitrobenzene	EPA 8270D	—	100
Pentachlorophenol	EPA 8270D	—	0.01
Pyridine	EPA 8270D	—	500

Table 5
Waste Characterization Analyte List, Methods, and Reporting and Detection Limits

Parameter	Recommended Analytical Method	MDL[1]	MRL[1]

Notes:

1. Actual MDLs and MRLs may vary based on sample aliquot size, moisture content, and required dilution factor.

—: not applicable
mg/L: milligrams per liter
ug/L: microgram per liter
EPA: U.S. Environmental Protection Agency
MDL: method detection limit
mg/kg: milligrams per kilogram
mg/L: milligrams per liter
MRL: method reporting limit
SM: Standard Method
SVOC: semivolatile organic compound
VOC: volatile organic compound
TCLP: toxicity characteristic leaching procedure
PCB: polychlorinated biphenyl

Table 6
Laboratory Quality Control Sample Analysis Summary

Analysis Type	Initial Calibration	Ongoing Calibration	Laboratory Control Samples	Duplicates	Matrix Spikes	Matrix Spike Duplicates	Method Blanks	Surrogate Spikes
Total solids	Daily[1,2]	N/A	N/A	1 per 10 samples	N/A	N/A	1 per 20 samples	N/A
Metals	Daily[3]	Every 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	N/A
PFAS	As needed[4]	Every 10 samples	1 per 20 samples	1 per 20 samples	N/A	N/A	1 per 20 samples	Every sample
VOCs and SVOCs	As needed[4]	1 per 20 samples	1 per 20 samples	N/A	N/A	N/A	1 per 20 samples	Every sample

Notes:
1. Calibration and certification of drying ovens and weighing scales are conducted bi-annually.
2. Scale should be calibrated with Class 5 weights daily; weights must bracket the weight of sample and weighing vessel.
3. Initial calibration verification and calibration blank must be analyzed at the beginning of each batch.
4. Initial calibrations are considered valid until the ongoing continuing calibration no longer meets method specifications. At that point, a new initial calibration is performed.

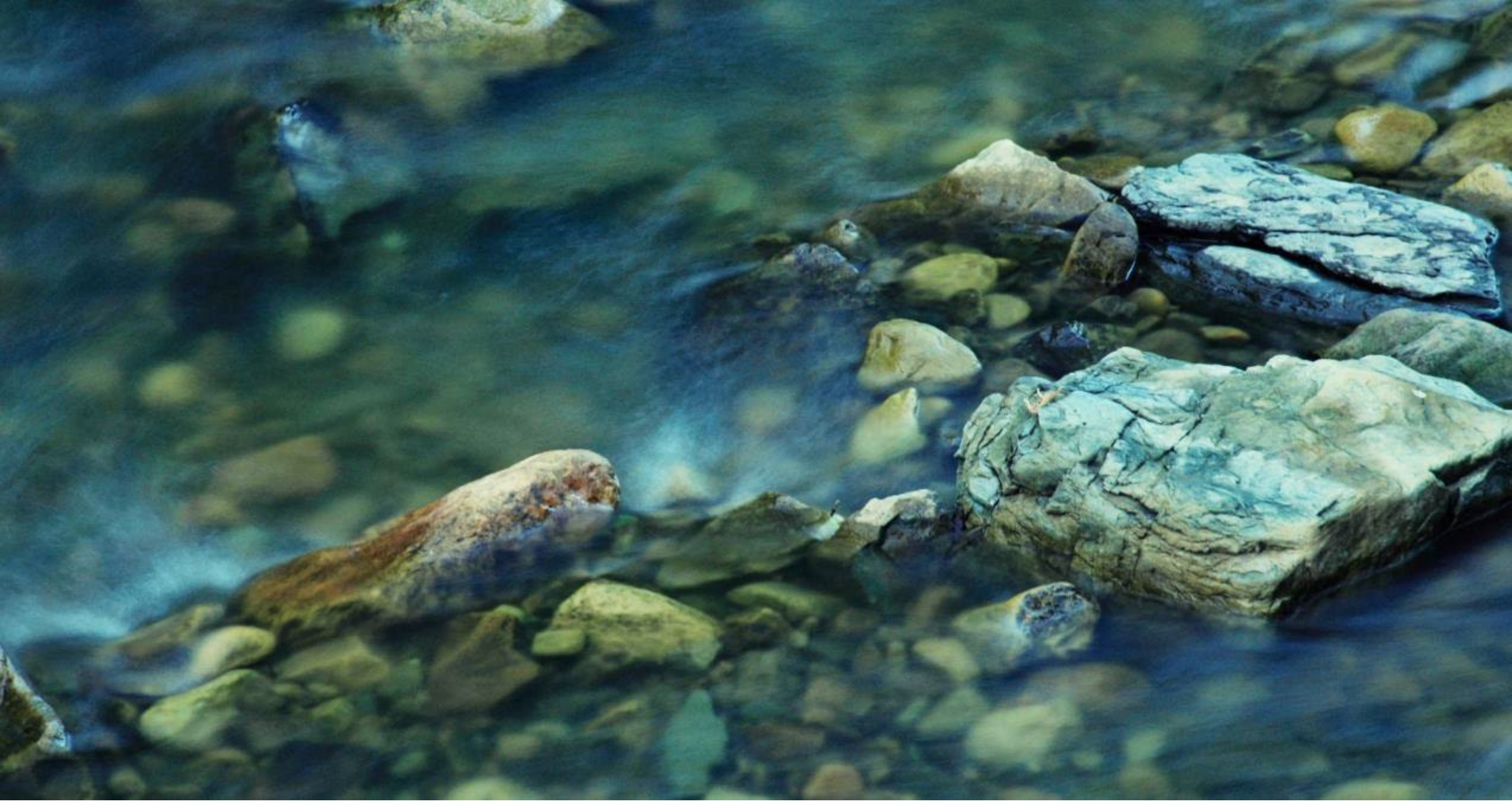
N/A: not applicable
SVOC: semivolatile organic compound
VOC: volatile organic compound

Table 7
Data Quality Objectives

Parameter	Precision[1]	Accuracy[2]	Completeness
Soil Samples			
Total solids	± 20% RPD	N/A	95%
VOCs	± 35% RPD	50–150% R	95%
SVOCs	± 35% RPD	50–150% R	95%
Metals	± 30% RPD	75–125% R	95%
Mercury	± 30% RPD	70 to 130% R	95%
PFAS	± 30% RPD	70 to 130% R	95%
Groundwater Samples			
Total suspended solids	± 20% RPD	N/A	95%
Metals	± 20% RPD	80–120% R	95%
VOCs	± 35% RPD	60–140% R	95%
SVOCs	± 35% RPD	60–140% R	95%
PFAS	± 35% RPD	60–140% R	95%
Indoor Air Samples			
VOCs	± 35% RPD	50–150% R	95%
Waste Characterization Samples			
SVOCs, VOCs	± 35% RPD	50 to 150% R	95%
Metals	± 25% RPD	75 to 125% R	95%

Notes:
1. When the sample concentration is greater than five times the reporting limit.
2. Accuracy goals apply to laboratory control samples and matrix spike samples, as applicable to the analysis.
N/A: not applicable
R: recovery
RPD: relative percent difference
SVOC: semivolatile organic compound
VOC: volatile organic compound

Appendix A
Project Quality Assurance Project Plan (QAPP)



June 2023
Syracuse Bread Factory

Quality Assurance Project Plan

Prepared for Syracuse Bread Factory, LLC

June 2023
Syracuse Bread Factory

Quality Assurance Project Plan

Prepared for
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Prepared by
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TABLE OF CONTENTS

TABLES

ABBREVIATIONS

ASTM	ASTM International
CCV	continuing calibration verification
CoC	chain-of-custody
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
FC	Field Coordinator
GC	gas chromatography
HASP	Health and Safety Plan
MD	matrix duplicate
MDL	method detection limit
MRL	method reporting limit
MS	matrix spike
MSD	matrix spike duplicate
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
NELAP	National Environmental Laboratory Association Program
NIST	National Institute of Standards and Technology
PM	Project Manager
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RL	reporting limit
RPD	relative percent difference
SDG	sample delivery group
Site	former Syracuse Bread Factory Syracuse, New York
SOP	Standard Operating Procedure
SVOC	semivolatile organic compound
VOC	volatile organic compound
PCB	Polychlorinated biphenyl

1 Introduction

1.1 Purpose

This Quality Assurance Project Plan (QAPP) has been prepared to specify recommended quality assurance (QA) procedures to be followed during remedial investigation (RI) fieldwork performed at the former Syracuse Bread Factory in Syracuse, New York (the Site).

1.2 Project Organization

This QAPP has been prepared by Anchor QEA Engineering, PLLC, on behalf of Syracuse Bread Factory, LLC. Anchor QEA is fully committed to implementing an effective QAPP program. The success of this program is based on the concept that implementation of this program is the responsibility of all project participants. Specific responsibilities have also been assigned to key project personnel for the implementation of this QAPP program.

Margaret Carrillo-Sheridan, PE, will serve as the Project Principal and engineer of record. She will be responsible for the overall technical direction and management of the project. Matt Cavas, PG will serve as the Project Manager (PM) responsible for allocation of technical and human resources and schedule management. The PM will provide the overall programmatic guidance to support staff and will verify that all documents, procedures, and project activities meet the objectives contained within this QAPP. The PM will also be responsible for resolving project concerns or conflicts related to technical matters with the Project Principal.

Mr. Cavas will be the Field Coordinator (FC) and will be responsible for day-to-day technical and QA/quality control (QC) oversight for sample collection activities. Mr. Cavas will verify that appropriate protocols for sample collection, preservation, and holding times are observed and will submit environmental samples to the designated laboratories for chemical and physical analyses.

Cindy Fields will act as the QA Manager and will provide QA oversight for both the field sampling and laboratory programs, verify that samples are documented appropriately, coordinate with the analytical laboratories, verify data quality, oversee data validation, and supervise project QA coordination and data validation. Ms. Fields will work with the Laboratory PM to resolve QC issues as they affect the viability of the project data, and she will work with the assigned data validators to verify that all analytical data are in conformance with the requirements of this QAPP.

Laurel Menoche will serve as the Data Manager and will compile field observations and analytical data into a database, review the data for completeness and consistency, append the database with qualifiers assigned by the data validator, and verify that the data obtained are in a format suitable for inclusion in the appropriate databases.

Meghan Pedro is the Laboratory PM with ALS Laboratory, Inc., which is National Environmental Laboratory Association Program (NELAP) certified. Ms. Pedro will oversee all laboratory operations associated with the receipt of the environmental samples, chemical/physical analyses, and laboratory report preparation for this project. The Laboratory PM will review all laboratory reports and prepare case narratives describing any anomalies and exceptions that occurred during analyses.

2 Investigation and Sampling Procedures

The scope of investigations presented in this QAPP include the following:

- Subsurface utility locating
- Monitoring well installation and groundwater sample collection
- Test pitting, soil boring and sample collection
- Indoor air sample collection

Investigations will be conducted in accordance with the project Health and Safety Plan (HASP). Samples will be analyzed according to the U.S. Environmental Protection Agency (EPA) promulgated Standard Method, or ASTM International (ASTM) methods. Regardless of the method used, all preparation and analytical holding times must meet the requirements for that analytical group and as outlined in Table 1. Holding times will be calculated from the sample collection date and time. The method detection limits (MDLs) and method reporting limits (MRLs) for the analytes are laboratory specified for the project based on its most recent MDL studies. Analyte lists for soil, groundwater and indoor air samples are listed in Tables 2 through 4. Analyte lists for waste characterization is listed in Table 5.

2.1 Utility Locating

Remedial investigation investigations will be performed on the Site. Prior to any subsurface intrusive work investigation, target locations will be mapped and private and public utilities will be located to identify potential conflicts. When fieldwork has been completed, actual locations completed will be surveyed.

2.1.1 Utility Locating

Prior to any intrusive fieldwork, utility location work will be completed to identify potential obstructions or conflicts with target locations. Remedial investigation target locations will be marked using white paint or flags using a handheld GPS. These markings will be visible during utility locators for public utilities notified as part of the New York Dig Safe program (811). Responses from the Dig Safe notification will be documented to ensure all public utilities have been marked.

Following public utility marking, a private utility location subcontractor will mobilize to the Site to complete a geophysical survey for additional buried utilities. Tools such as ground penetrating radar, magnetometer, and pipe and cable locators will be used. The firm will focus on the proposed locations and investigate to “clear” a 5-foot buffer around each proposed subsurface investigation location, allowing for adjustments by the contractor in the field to ensure the work is completed in an area clear of subsurface utilities.

2.2 Investigations and Sample Collection

The following sections describe procedures to be followed in the field for soil investigations and soil and groundwater sample collection as applicable.

2.2.1 Sampling Equipment

The following is a general list of equipment that may be necessary for soil investigations and soil and indoor air sample collection:

- Appropriate sample bottles (kept closed and in the laboratory-shipped coolers until the samples are collected) provided by the laboratory
- Chain-of-custody (CoC), labels, tags, seals, and record forms
- Logbook, field sampling records, and indelible ink markers
- Laboratory-grade decontamination detergents (such as Alconox or Liquinox), reagent-grade solvents, and de-ionized, organic-free water to be used for decontaminating equipment between sampling stations
- Squirt bottles
- Ruler and measuring tape
- Garbage bags and plastic sheeting
- Paper towels and/or wipes
- Mini-excavator or back-hoe
- Buckets, wash basins, and scrub brushes to be used for decontaminating equipment
- Steam cleaner or hot water wash and containment pad
- Digital camera or camera and film to document sampling procedures and sample locations
- White board to include in photographs to label samples/photographs
- Shipping labels and forms
- Knife
- Packing/shipping material to prevent damage to sample bottles during shipping
- Strapping, clear plastic, and duct tape
- Re-sealable plastic bags
- Ice
- Portable field instruments, including photoionization detector and GPS

Other sampling materials and equipment may be utilized as warranted by field conditions encountered at time of sampling. Appropriate health and safety equipment and personal protective equipment, per the HASP, will be used.

2.2.2 Equipment Decontamination

Between investigation locations and prior to sample collection, all non-dedicated/non-disposable equipment (i.e., bucket, bowls and field measurement equipment that contacts soil) will be washed with potable water and a laboratory-grade, phosphate-free, detergent (such as Alconox). Equipment will be given a final rinse of distilled or de-ionized water. Larger equipment (e.g., excavator bucket) may be decontaminated with a hot-water wash. Decontamination may take place at the sampling location as long as all liquids are contained in pails, buckets, 55-gallon drums, or similar containers. Between rinses, equipment will be placed on polyethylene sheeting or aluminum foil. At no time will decontaminated equipment be placed directly on the ground. Equipment will be wrapped in polyethylene plastic or aluminum foil and stored. Waste materials generated during sampling activities will be disposed of as required.

2.2.3 Field Records

Field logbooks and entries will be maintained by field staff to provide a daily record of significant events, observations, and measurements during the field investigation. All entries will be signed and dated at the bottom of each page.

Information pertinent to the field investigation and/or sampling activities will be recorded in the logbooks. The logbooks will be bound with consecutively numbered pages. Entries in the logbook will include, at a minimum, the following information:

- Name and title of author, date and time of entry, and physical/environmental/weather conditions during field activity
- Purpose of sampling activity
- Location of sampling activity
- Name of field contact
- Name of field crew members
- Name and organization of any site visitors
- Sample media (e.g., soil)
- Sample collection method
- Number and volume of sample(s) collected
- Description of sampling point(s)
- Sample location coordinates
- Date and time of sample collection
- Sample identification number(s)
- Field observations
- Any field measurements made (e.g., water level elevation)
- References for all maps and photographs of the sampling site(s)

- Information pertaining to sample documentation, such as dates and method of sample shipments, CoC record numbers, and overnight shipping air bill number

All original data recorded in field logbooks, sample tags, and CoC records will be written with waterproof ink. None of these accountable, serialized documents will be destroyed.

If an error is made on an accountable document assigned to one individual, that individual will make all corrections simply by crossing a single line through the error, placing the initials of the individual making the correction and date next to the crossed-out information, and entering the correct information. The erroneous information will not be erased. All field personnel will be instructed as to the proper field logging techniques for maintaining the integrity of the documentation.

2.2.4 General Sample Collection and Processing Procedures

Soil and indoor air samples will be collected as outlined in the Remedial Investigation Work Plan and following procedures described in the SOPs included.

Subsurface soil sample collection will be conducted following these general procedures:

- At the identified investigation location, collect soils from completed test pits as necessary to characterize soils encountered.
- Take care to collect the sample the center of the recovered soil, avoiding soils which were touching the excavator bucket.
- Photograph and visually characterize the recovered soil.
- Place collected soil into a clean stainless steel bowl and homogenize.
- Place the soil sample into laboratory-provided sample containers.

At a minimum, the following will be recorded in the field logbook:

- Site
- Station identification
- Date and time
- Initials of sampling personnel
- Contractor company’s name
- Time associated with sample collection
- Amount of soil recovered
- Sample collection methods
- Sample location coordinates
- Photograph of the sample including a white board listing the following: site name, date, sample identification, and time of sample
- Soil description

Indoor air samples will be collected from locations throughout the Site buildings interior. Each location will be sampled once and at a minimum, the following information will be record in the field logbook:

- Site
- Location identification
- Date and time
- Initials of sampling personnel
- Time associated with sample collection

2.2.5 Field Quality Assurance/Quality Control Samples

A trip blank will accompany each cooler transporting sample aliquots that will be analyzed for volatile organic compounds (VOCs) to the laboratory. Trip blanks are used in conjunction with VOC analyses to assist in the assessment of field accuracy and representativeness and are a measure of contamination introduced during sample storage and transport. The sources of the contamination may be associated with the transportation of containers to and from a site, ambient conditions present at a site, and/or other samples shipped with the trip blank. It should be noted that an assessment of accuracy cannot be made by evaluating trip blank data unsupported by other data quality indicators (e.g., matrix spikes [MSs]). The trip blanks will be numbered sequentially and appended with the date.

Equipment blanks will be generated at a minimum frequency of one per collection event per sample matrix that uses non-dedicated sampling equipment. An equipment blank is a way to measure contamination attributed by the sample collection equipment. Contaminant-free water is poured over sampling equipment and then collected for analyses. The presence of measurable concentrations of contaminants in an equipment blank indicates the potential for cross-contamination. The equipment blanks will be numbered sequentially and appended with the date. Equipment blanks will be analyzed for semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, per-and-polyfluoroalkyl substances (PFAS), and metals.

To determine the reproducibility and homogeneity of samples, field duplicates will be collected. The frequency of collection of these samples is 1 per up to 20 field samples per matrix. Duplicate samples will be assigned a unique sample number that correlates with the source sample number. The duplicate sample number and sample number for the source sample will be recorded in the field logbook.

MS/matrix spike duplicate (MSD)/matrix duplicate (MD) samples (MSD for organics; MD for inorganics) will be requested at a frequency of 1 set per 20 field samples. Sufficient additional sample mass or volume to conduct these QC analyses will be collected for each designated sample, as necessary. An MSD sample may be analyzed for metals in lieu of a duplicate.

3 Sample Handling Procedures/Sample Custody

Sample custody procedures will be followed to verify that samples are always in the custody of a responsible person and to provide a record of those responsible for the samples. CoC begins at the time of preparation for the field activity, and the procedures apply to field sampling activities, sample shipping, laboratory analytical procedures, and data reporting. Samples are considered to be in one's custody if they are in the custodian's possession or view, in a secured location (under lock) with restricted access, or in a container that is secured with official seals such that the sample cannot be reached without breaking the seals.

3.1 Sample Custody and Shipping Requirements

CoC procedures will be followed for all samples throughout the collection, handling, and analysis process. The principal document used to track possession and transfer of samples is the CoC form. Each sample identification will be listed on an electronic or hand-written CoC form the day it is collected. All data entries will be made using indelible ink pen. Corrections will be made by drawing a single line through the error, writing in the correct information, and then dating and initialing the change. Blank lines and spaces on the CoC form will be lined-out, dated, and initialed by the individual maintaining custody.

A CoC form will accompany each shipment of samples to the analytical laboratories. Each person who has custody of the samples will verify that the samples are not left unattended unless properly secured. Copies of all CoC forms will be retained in the project files.

All samples will be shipped, couriered, or hand delivered to the analytical laboratory in a timely manner so holding times are not compromised. Samples collected on a Friday may be held until the following Monday for shipment, provided that this does not jeopardize any hold time requirements. Specific sample shipping procedures are as follows:

- Each cooler or container with the samples for analyses will be hand delivered the day of sample collection, couriered, or shipped via overnight delivery to the appropriate analytical laboratory. In the event that Saturday delivery is required, the FC will contact the analytical laboratory before 3 p.m. on Friday to verify that the laboratory is aware of the number of containers shipped and the airbill tracking numbers for those containers.
- Coolant ice will be sealed in separate plastic bags and placed in the shipping containers.
- Individual samples will be placed in a sealable plastic bag, packed to prevent breakage, and transported in a sealed ice chest or other suitable container.
- Glass jars will be separated in the shipping container by shock-absorbent material (e.g., bubble wrap) to prevent breakage.

- If the samples are transferred using a commercial shipping company, the following procedures will be followed:
  - The shipping containers will be clearly labeled with sufficient information (name of project, time and date container was sealed, person sealing the container, and consultant's office name and address) to enable positive identification.
  - The shipping waybill number will be documented on all CoC forms accompanying the samples.
  - CoC forms will be enclosed in a plastic bag and placed inside the cooler.
  - A minimum of two signed and dated CoC seals will be placed on adjacent sides of each cooler prior to shipping.
  - Each cooler will be wrapped securely with strapping tape, labeled "Glass – Fragile" and "This End Up," and clearly labeled with the laboratory's shipping address and the consultant's return address.

Upon transfer of sample possession to the analytical laboratory, the person transferring custody of the sample container will sign the CoC form. Upon receipt of samples at the laboratory, the person receiving the sample will sign the CoC form. The shipping container seals will be broken (if applicable), and the receiver will record the condition of the samples on a sample receipt form. CoC forms will be used internally in the laboratory to track sample handling and final disposition.

4 Quality Assurance/Quality Control

Field and laboratory activities will be conducted in such a manner that the results meet specified quality objectives and are fully defensible. Guidance for QA/QC is derived from the protocols developed for EPA SW-846, the EPA Contract Laboratory Program (EPA 2017a, 2017b), and the cited methods.

4.1 Field Quality Control

Anchor QEA personnel will identify and label samples in a consistent manner to verify that field samples are traceable. Labels should be used in conjunction with the CoCs and this QAPP to provide all information necessary for the laboratory to conduct required analyses properly. QA samples will be collected in the field to verify project data quality objectives (DQOs) are met. Samples will be placed in appropriate containers and preserved for shipment to the laboratory in accordance with the requirements presented in Table 1.

4.1.1 Field Quality Assurance Sampling

Field QA procedures will consist of following procedures for acceptable practices for sample collection and handling. This also includes periodic and routine equipment inspection.

QA samples will be collected along with the environmental samples. QA samples are useful in identifying possible problems resulting from sample collection or sample processing in the field. The collection of QA samples includes equipment rinsate blanks, trip blanks, and field duplicates. Rinsate blanks will be collected at a frequency of one per collection method per event. If target analytes are detected in the rinsate blank at levels above the reporting limits (RLs), blank results will be compared to the sample results, and results within five times the concentration of the blank may be qualified. A trip blank will accompany all sample aliquots for VOC analyses and will be analyzed at a frequency of one per cooler containing the samples. Trip blanks indicate any VOC contamination that might be introduced during storage and transport. If VOCs are detected in the trip blanks, the storage and transport methods will be reviewed and modified to eliminate possible sources of contamination. Field duplicates will be collected at a frequency of one per sampling event or 1 in 20 sample locations processed per matrix (whichever is more frequent), provided sufficient sample mass/volume can be collected.

QA samples will also include the collection of additional sample mass or volume as required to verify that the laboratory has sufficient sample mass or volume to run the matrix-specified analytical QA/QC (MD/MS/MSD) samples for analyses as specified in Table 6. Additional sample mass or volume to meet this requirement will be collected at a frequency of one per matrix per sampling event or 1 in 20 samples processed, whichever is more frequent. The samples designated for MD/MS/MSD analyses should be clearly marked on the CoC.

All field QA samples will be documented on the field forms and verified by the QA Manager or designee.

4.1.2 Sample Containers

Sample containers and preservatives will be provided by the laboratory. The laboratory will maintain documentation certifying the cleanliness of bottles and the purity of preservatives provided. Container requirements are listed in Table 1.

4.1.3 Sample Identification and Labels

Each sample collected as part of this investigation will be given a unique identification. With this type of identification, no two samples will have the same label. Labels or tags that include the sample number will be attached to each sample container.

Each sample will have an adhesive plastic or waterproof paper label affixed to the container and will be labeled at the time of collection. If the label is not waterproof, it will be covered with clear packing tape to render it waterproof. The following information will be recorded on the container label at the time of collection:

- Project name
- Sample identification
- Date and time of sample collection
- Preservative type (if applicable)
- Analysis to be performed

4.2 Data Quality Objectives and Criteria

The QA objective for the project is to develop and implement procedures that will provide data of known, documented quality. Field and laboratory quality QA/QC requirements ensure that acceptable levels of data quality will be maintained throughout the sampling and analysis program. The criteria commonly used to specify QA goals include precision, accuracy, representativeness, comparability, completeness, and sensitivity. These criteria are described in more detail in the following sections and project quantitative goals are listed in Table 7.

4.2.1 Precision

Precision is the ability of an analytical method or instrument to reproduce its own measurement. It is a measure of the variability, or random error, in sampling, sample handling, and laboratory analyses. ASTM recognizes two levels of precision (ASTM 2002):

1. Repeatability: the random error associated with measurements made by a single test operator on identical aliquots of test material in a given laboratory with the same apparatus under constant operating conditions
2. Reproducibility: the random error associated with measurements made by different test operators in different laboratories using the same method but different equipment to analyze identical samples of test material

In the laboratory, "within-batch" precision is measured using duplicate sample or QC analyses and is expressed as the relative percent difference (RPD) between the measurements. The "batch-to-batch" precision is determined from the variance observed in the analyses of standard solutions or laboratory control samples from multiple analytical batches.

Field precision will be evaluated by the collection of field duplicates for chemistry samples at a frequency of 1 in 20 samples. Field chemistry duplicate precision will be screened against an RPD of 50%. However, no data will be qualified based solely on field homogenization duplicate precision.

Precision measurements can be affected by the nearness of a chemical concentration to the MDL, where the percent error (expressed as RPD) increases. The equation used to express precision is as follows:

$$RPD = \frac{(C_1 - C_2) x\ 100\%}{(C_1 + C_2)/2}$$

where:

RPD	=	relative percent difference
C_1	=	larger of the two observed values
C_2	=	smaller of the two observed values

4.2.2 Accuracy

Accuracy is a measure of the closeness of an individual measurement (or an average of multiple measurements) to the true or expected value. Accuracy is determined by calculating the value of results from analyses of laboratory control samples, standard reference materials, and standard solutions. In addition, MS samples are also measured, which indicate the accuracy or bias in the actual sample matrix. Accuracy is expressed as percent recovery of the measured value, relative to the true or expected value. If a measurement process produces results that are not the true or expected values, the process is said to be biased. Bias is the systematic error either inherent in a method of analysis (e.g., extraction efficiencies) or caused by an artifact of the measurement system (e.g., contamination). Analytical laboratories utilize several QC measures to eliminate analytical bias, including systematic analysis of method blanks, laboratory control samples, and independent calibration verification standards. Because bias can be positive or negative, and because several types of bias can occur simultaneously, only the net (or total) bias can be evaluated in a measurement.

Laboratory accuracy will be evaluated using quantitative laboratory control sample, MS, surrogate spike, and calibration standard recoveries compared with method-specified performance criteria or criteria listed in Table 6. Accuracy can be expressed as a concentration compared to the true or reference value or as a percent recovery in those analyses where reference materials are not available and spiked samples are analyzed. The equation used to express accuracy is as follows:

$$\%R = 100\% \; x \; (S - U)/Csa$$

where:

$\%R$	=	percent recovery
S	=	measured concentration in the spiked aliquot
U	=	measured concentration in the unspiked aliquot
Csa	=	actual concentration of spike added

Field accuracy will be controlled by adherence to sample collection procedures outlined in this QAPP.

4.2.3 Representativeness

Representativeness expresses the degree to which data accurately and precisely represent an environmental condition.

4.2.4 Comparability

Comparability expresses the confidence with which one dataset can be evaluated in relation to another dataset. For this program, comparability of data will be established through the use of standard analytical methodologies and reporting formats and through common traceable calibration standards and reference materials.

4.2.5 Completeness

Completeness is a measure of the amount of data that are determined to be valid in proportion to the amount of data collected. Completeness will be calculated as follows:

$$C = \frac{(Number\ of\ acceptable\ data\ points)\ x\ 100}{Total\ number\ of\ data\ points}$$

The DQO for completeness for all components of this project is 95%. Data that have been qualified as estimated because the QC criteria were not met will be considered valid for the purpose of assessing completeness. Data that have been rejected will not be considered valid for the purpose of assessing completeness.

4.2.6 Sensitivity

Sensitivity is a measure of analytical detection and RLs. In general, the lowest technologically achievable MDLs and RLs will be targeted for this project.

The MDL is defined as the minimum concentration at which a given target analyte can be measured and reported with 99% confidence that the analyte concentration is greater than zero. Laboratory RLs are defined as the lowest level that can be reliably achieved within specified limits of precision and accuracy during routine laboratory operating conditions. Laboratory MDLs and RLs will be used to evaluate the method sensitivity and/or applicability prior to the acceptance of a method for this program.

The sample-specific MDLs and RLs will be reported by the laboratory and will take into account any factors relating to the sample analysis that might decrease or increase these limits (e.g., dilution factor, percent moisture, and analytical mass/volume). In the event that MDLs and RLs are elevated due to matrix interferences and subsequent dilutions or reductions in sample aliquots, the data will be evaluated by Anchor QEA and the laboratory to determine if an alternative course of action is required or possible. If this situation cannot be resolved readily (i.e., detection limits less than criteria are achieved), EPA will be contacted to discuss an acceptable resolution. The sample-specific RL will be the value provided in the project database.

4.3 Laboratory Quality Control

Laboratory QC procedures, where applicable, include initial and continuing instrument calibrations, standard reference materials, laboratory control samples, matrix replicates, MSs, surrogate spikes (for organic analyses), and method blanks. A summary of the DQOs is provided in Table 7. QA/QC sample analytical frequencies are provided in Table 6.

The analyst will review the results of the QC samples from each sample group immediately after a sample group has been analyzed. The QC sample results will then be evaluated to determine if control limits have been exceeded. If control limits are exceeded in the sample group, the QA Manager will be contacted immediately, and corrective action (e.g., method modifications followed by reprocessing the affected samples) will be initiated prior to processing a subsequent group of samples.

4.3.1 Laboratory Instrument Calibration and Frequency

An initial calibration will be performed on each laboratory instrument to be used prior to the start of the project, after each major interruption to the analytical instrument, and when any ongoing calibration does not meet method control criteria. Calibration verification will be analyzed following each initial calibration and will meet method criteria prior to analyses of samples. Continuing calibration verifications (CCVs) will be analyzed at method-required frequencies to track instrument performance. The frequency of CCVs varies with method. For gas chromatography (GC)/mass spectrometer method (VOCs), one CCV will be analyzed every 12 hours. For inorganic methods that utilize instrumentation, 1 will be analyzed for every 10 samples analyzed and at the end of each run. For liquid chromatography-tandem mass spectrometry (LC-MS/MS) methods (PFAS) 1 will be analyzed for every 10 samples analyzed and at the end of each run If the continuing calibration is out of control, the analysis will be terminated until the source of the control failure is eliminated or reduced to meet control specifications, which may include analyzing a new initial calibration. Any project samples analyzed while the instrument calibration was out of control will be re-analyzed.

Instrument blanks or continuing calibration blanks provide information on the stability of the baseline established. Continuing calibration blanks will be analyzed immediately prior to or immediately following a CCV at the instrument for each type of applicable analysis.

4.3.2 Laboratory Duplicates/Replicates

Analytical duplicates provide information on the precision of the analysis and are useful in assessing potential sample heterogeneity and matrix effects. Analytical duplicates and replicates are subsamples of the original sample that are prepared and analyzed as a separate sample.

4.3.3 Matrix Spikes and Matrix Spike Duplicates

Analyses of MS samples provide information on the extraction efficiency of the method on the sample matrix, as well as any interferences introduced by the sample matrix. By analyzing MS samples in duplicate, information on the precision of the method is also provided.

4.3.4 Method Blanks

Method blanks are prepared and analyzed in the same manner as project samples to assess possible laboratory contamination at all stages of sample preparation and analysis. The method blank for all analyses must be less than the MRL of any single target analyte. If a laboratory method blank exceeds this criterion for any analyte, and the concentration of the analyte in any of the samples is less than five times the concentration found in the blank (ten times for common contaminants), analyses must stop and the source of contamination must be eliminated or reduced. Affected samples should be re-prepared and re-analyzed, if possible.

4.3.5 Laboratory Control Samples

Laboratory control samples are analyzed to assess possible laboratory bias at all stages of sample preparation and analyses. The laboratory control sample is a matrix-dependent spiked sample prepared at the time of sample extraction along with the preparation of the sample, MS, and method blank. The laboratory control sample will provide information on the precision of the analytical process and, when analyzed in duplicate, will provide accuracy information as well.

4.3.6 Laboratory Deliverables

Data packages will be checked for completeness immediately upon receipt from the laboratory to verify that data and QA/QC information requested are present. The analytical laboratory will be required, where applicable, to report the following:

- **Project Narrative**. This summary, in the form of a cover letter, will include a discussion of any problems encountered during analyses. This summary should include (but not be limited to) QA/QC, sample shipment, sample storage, and analytical difficulties. Any problems encountered, actual or perceived, and their resolutions will be documented in as much detail as appropriate.
- **CoC Records**. Legible copies of the CoC forms will be provided as part of the data package. This documentation will include the time of receipt and condition of the samples received by the laboratory. Additional internal tracking of sample custody by the laboratory will also be documented on a sample receipt form. The form must include sample shipping container temperatures measured at the time of sample receipt.
- **Sample Results**. The data package will summarize the results for each sample analyzed. The summary will include the following information when applicable:
  - Field sample identification code and the corresponding laboratory identification code
  - Sample matrix
  - Date of sample preparation/extraction
  - Date and time of analysis
  - Mass and/or volume used for preparation and analysis

- Final dilution or concentration factors for the sample
  - Identification of the instrument used for analysis
  - MDLs and MRLs accounting for sample-specific factors (e.g., dilution and total solids)
  - Analytical results with reporting units identified
  - Data qualifiers and their definitions
  - An electronic data deliverable with data in a format specified in advance by Anchor QEA
- **QA/QC Summaries**. These sections will contain the results of the laboratory QA/QC procedures. Each QA/QC sample analysis will be documented with the same information required for the sample results. No recovery or blank corrections will be made by the laboratory. The required summaries are as follows (additional information may be requested):
  - **Instrument Performance Checks**. Injection times and percent relative ion abundances will be reported and compared to method criteria. Associated samples and analysis times will also be reported.
  - **Calibration Data Summary**. These summaries will report the concentrations of the initial calibration and continuing calibration standards and the date and time of analyses. The response factor, percent relative standard deviation, percent drift/difference, percent recovery, and retention time for each analyte will be listed, as appropriate. Calibration results for standards will be documented to indicate instrument sensitivity.
  - **Internal Standard Area Summary**. Internal standard areas will be reported and evaluated against method criteria.
  - **Method Blank Analysis**. The method blank analysis associated with each sample and the concentration of all target analytes identified in these blanks will be reported.
  - **Surrogate Spike Recovery**. All surrogate spike recoveries for organic analyses will be reported. The names and concentrations of compounds added, percent recoveries, and range of acceptable recoveries will be provided.
  - **MS Recovery**. MS recovery data for all applicable analyses will be reported. The names and concentrations of compounds added, percent recoveries, and range of acceptable recoveries will be listed. The percent recoveries and RPD values for MSD analyses will be reported.
  - **MD**. The RPD values for MD analyses will be reported.
  - **Laboratory Control Sample**. Laboratory control sample recovery data will be reported. The names and concentrations of compounds added, percent recoveries, and range of acceptable recoveries will be included. The percent recoveries and RPD values for laboratory control sample duplicate analyses will be included.
- **Original Data**. Legible copies of the original data generated by the laboratory will include the following information:

- Sample extraction, preparation, and cleanup logs including methods used
- Instrument analysis logs for all instruments used on days of calibration and sample analyses
- Calculation worksheets as applicable
- Ion chromatograms for all samples, standards, blanks, calibrations, spikes, replicates, and reference materials as applicable
- Copies of full scan chromatograms and quantitation reports for GC/mass spectrometer analyses of samples, standards, blanks, calibrations, spikes, replicates, and reference materials
- Enhanced spectra of detected compounds with associated best-match spectra for each sample

4.4 Instrument/Equipment Testing, Inspection, and Maintenance Requirements

This section describes procedures for testing, inspection, and maintenance of field and laboratory equipment.

4.4.1 Field Instruments/Equipment

In accordance with the QA program, Anchor QEA will maintain an inventory of field instruments and equipment. The frequency and types of maintenance will be based on the manufacturer's recommendations and/or previous experience with the equipment.

The Anchor QEA FC will be responsible for the preparation, documentation, and implementation of the preventive maintenance program. The equipment maintenance information will be documented in the instrument's calibration log. The frequency of maintenance is dependent on the type and stability of the equipment, methods used, intended use of the equipment, and manufacturer's recommendations. Detailed information regarding the calibration and frequency of equipment calibration is provided in each specific manufacturer's instruction manuals.

All maintenance records will be verified prior to each sampling event. The FC will be responsible for verifying that required maintenance has been performed prior to using the equipment in the field. For this project, maintenance inspections will include the following activities:

- The drilling subcontractor will be responsible for confirming proper operation of the drilling equipment daily. This verification may consist of internal diagnostics on field screening instruments as well as function of direct-push drilling equipment.
- The licensed surveyor will be responsible for confirming proper operation of all survey equipment utilized to locate actual sampling locations both horizontally and vertically. This

verification may consist of internal diagnostics on instruments or visiting a location with known coordinates.

Any problems will be noted in the field logbook and corrected prior to continuing sampling operations.

4.4.2 Laboratory Instruments/Equipment

In accordance with the QA program, the laboratory will maintain an inventory of instruments and equipment, and the frequency of maintenance will be based on the manufacturer's recommendations and/or previous experience with the equipment.

The laboratory preventative maintenance program, as detailed in the laboratory QA Plan, is organized to maintain proper instrument and equipment performance and to prevent instrument and equipment failure during use. The program considers instrumentation, equipment, and parts that are subject to wear; deterioration or other changes in operational characteristics; the availability of spare parts; and the frequency at which maintenance is required. Any equipment that has been overloaded, has been mishandled, gives suspect results, or has been determined to be defective will be taken out of service, tagged with the discrepancy noted, and stored in a designated area until the equipment has been repaired. After repair, the equipment will be tested to verify that it is in proper operational condition. The client will be promptly notified in writing if defective equipment casts doubt on the validity of analytical data. The client will also be notified immediately regarding any delays due to instrument malfunctions that could impact holding times.

Laboratories will be responsible for the preparation, documentation, and implementation of the preventative maintenance program. Maintenance records will be checked according to the schedule on an annual basis and recorded by laboratory personnel. The Laboratory QA Manager or designee will be responsible for verifying compliance.

4.4.2.1 Laboratory Instrument/Equipment Calibration

As part of their QC programs, laboratories perform two types of calibrations. A periodic calibration is performed at prescribed intervals (e.g., balances, drying ovens, refrigerators, and thermometers), and operational calibrations are performed daily at a specified frequency or prior to analysis (i.e., initial calibrations) according to method requirements. Calibration procedures and frequency are discussed in the laboratory QA Plan. Calibrations are discussed in the laboratory SOPs for analyses.

The Laboratory QA Manager will be responsible for ensuring that the laboratory instrumentation is calibrated in accordance with specifications. Implementation of the calibration program will be the responsibility of the respective laboratory Group Supervisors. Recognized procedures (EPA, ASTM, or manufacturer's instructions) will be used when available.

Physical standards (i.e., weights or certified thermometers) will be traceable to nationally recognized standards such as the National Institute of Standards and Technology (NIST). Chemical reference standards will be NIST standard reference materials or vendor-certified materials traceable to these standards.

The calibration requirements for each method and respective corrective actions will be accessible, either in the laboratory SOPs or in the laboratory's QA Plan for each instrument or analytical method in use. All calibrations will be preserved on electronic media.

4.5 Inspection/Acceptance of Supplies and Consumables

Inspection and acceptance of field supplies, including laboratory-prepared sampling bottles, will be performed by the FC. All primary chemical standards and standard solutions used for this project, either in the field or laboratory, will be traceable to documented, reliable commercial sources. Standards will be validated to determine their accuracy by comparison with an independent standard. Any impurities found in the standard will be documented.

4.6 Data Management

Field data sheets will be checked for completeness and accuracy by the FC prior to delivery to the Data Manager. Data generated in the field will be documented in electronic or hard copy format and provided to the Data Manager, who is responsible for the data entry into the database. All manually entered data will be verified by a second party. Field documentation will be filed in the main project file after data entry and verification are complete.

Laboratory data will be provided to the Data Manager in Anchor QEA's custom EQuIS electronic format. Laboratory data that are electronically provided and loaded into the database will undergo a check against the laboratory hard copy data. Data will be validated or reviewed manually, and qualifiers, if assigned, will be entered manually. The accuracy of all manually entered data will be verified by a second party. Data tables and reports will be exported from EQuIS to Microsoft Excel tables.

5 Data Reduction, Validation, and Usability

Once data are received from the laboratory, a number of QC procedures will be followed to provide an accurate evaluation of the data quality. Specific procedures will be followed to assess data precision, accuracy, and completeness.

5.1 Compliance Assessments

Laboratory and field performance audits consist of on-site reviews of QA systems and equipment for sampling, calibration, and measurement. Laboratory audits will not be conducted as part of this study; however, all laboratory audit reports will be made available to the project QA Manager upon request. The laboratory is required to have written procedures addressing internal QA/QC. These procedures have been submitted, and the project QA Manager will review them to verify compliance with this QAPP. The laboratory must verify that personnel engaged in analytical tasks have appropriate training. The laboratory will provide written details of any and all method modifications planned prior to project commencement.

5.2 Response and Corrective Actions

The following sections identify the responsibilities of key project team members and actions to be taken in the event of an error, problem, or non-conformance to protocols identified in this document.

5.2.1 Field Activities

The FC will be responsible for correcting equipment malfunctions during the field sampling effort. The project QA Manager will be responsible for resolving situations identified by the FC that may result in non-compliance with this QAPP. All corrective measures will be immediately documented in the field logbook.

5.2.2 Laboratory

The laboratory is required to comply with its SOPs. The Laboratory PM will be responsible for ensuring that appropriate corrective actions are initiated as required for conformance with this QAPP. All laboratory personnel will be responsible for reporting problems that may compromise the quality of the data.

The Laboratory PM will be notified if any QC sample exceeds the project-specified control limits. The analyst will identify and correct the anomaly before continuing with the sample analysis. If the laboratory internal corrective action does not resolve the non-conformance, the Laboratory PM will notify the QA Manager. A narrative describing the anomaly, the steps taken to identify and correct the anomaly, and the treatment of the relevant sample batch (i.e., recalculation, re-analysis, and re-extraction) will be submitted with the data package in the form of a cover letter.

5.3 Data Review, Validation, and Verification

During the validation process, analytical data will be evaluated for project, method, and laboratory QC compliance, and their validity and applicability for program purposes will be determined. Based on the findings of the validation process, data validation qualifiers may be assigned. The validated project data, including qualifiers, will be entered into the project database, thus enabling this information to be retained or retrieved as needed.

5.4 Validation and Verification Methods

Data validation includes the following: signed entries by the field and laboratory technicians on field data sheets and laboratory datasheets, respectively; review for completeness and accuracy by the FC and Laboratory Manager; review by the QA Manager for outliers and omissions; and the use of QC criteria to accept or reject specific data. All data will be entered into the EQuIS database and a raw data file printed or exported. A second data manager or designee will perform a cursory verification of the database raw data file. If errors are found, further verification will be performed to verify that all data are accurate. Any errors found will be corrected in the database.

All laboratory data will be reviewed and verified to determine whether DQOs have been met and that appropriate corrective actions have been taken, when necessary. The project QA Manager or designee will be responsible for the final review of data generated from analyses of samples.

The first level of review will take place in the laboratory as the data are generated. The Laboratory Department Manager or designee will be responsible for ensuring that the data generated meet minimum QA/QC requirements and that the instruments were operating under acceptable conditions during generation of data. DQOs will also be assessed at this point by comparing the results of QC measurements with pre-established criteria as a measure of data acceptability.

The analysts and/or Laboratory Department Manager will prepare a preliminary QC checklist for each parameter and for each sample delivery group (SDG) as soon as analysis of an SDG has been completed. Any deviations from the DQOs on the checklist will be brought to the attention of the Laboratory Manager to determine whether corrective action is needed and to determine the impact on the reporting schedule.

Data packages will be checked for completeness immediately upon receipt from the laboratory to verify that data and QA/QC information requested are present. Stage 2A validation (EPA 2009) will be conducted on the data and a data usability summary report (DUSR) prepared compliant with requirements outlined in DER-10 (NYSDEC2010). Data validation will be conducted by a reviewer using current National Functional Guideline documents (EPA 2020a, 2020b) as guidance by considering the following information, as applicable per method and level of validation:

- CoC documentation and sample receipt condition
- Holding times
- Instrument performance checks
- Initial calibrations
- Continuing calibrations
- Method blanks
- Surrogate recoveries
- Internal standard recoveries
- Detection limits
- RLs
- Laboratory control samples
- MS/MSD samples
- Field and laboratory duplicates
- Rinsate blanks
- Standard reference material results
- Raw data review

The data will be validated in accordance with the project-specific DQOs described above, analytical method criteria, and the laboratory's internal performance standards based on its SOPs. Validated data will be exported from the EQuIS database in New York State Department of Environmental Conservation's Electronic Data Warehouse Standards or as otherwise directed by the Division of Environmental Remediation. A Data Usability Summary Report will be submitted describing the results of the validation, and including an evaluation of the analytical data to determine whether or not the data meet the site/project-specific criteria for data quality and use.

6 Corrective Action

Corrective action is the process of identifying, recommending, approving, and implementing measures to counter unacceptable procedures or out-of-QC performance that can affect data quality. Corrective action can occur during field activities, laboratory analyses, data validation, and data assessment. Corrective action proposed and implemented should be documented in QA reports to management. Corrective action should be implemented only after the approval of the PM and the QA Manager. If immediate corrective action is required, approvals secured by telephone should be documented.

For non-compliance problems, a formal corrective action program will be determined and implemented at the time that the problem is identified. The person who identifies the problem is responsible for notifying the PM and QA Manager. Implementation of corrective action will be confirmed in writing through the same channels.

Non-conformance with the established QC procedures in the QAPP will be identified and corrected in accordance with the QAPP. The FC, QA Manager, or their designees will issue a non-conformance report describing non-conformance action depending on if the non-conformance is related to the field or laboratory activities.

6.1 Field Corrective Action

Corrective action in the field may be required when the sample network is changed (e.g., more or fewer samples, or sampling locations other than those identified in the Field Sampling Plan or QAPP), or when sampling procedures and/or field analytical procedures require modification due to unexpected conditions. The need for corrective action and recommendations will be communicated to the PM, who will approve the corrective action and verify that the corrective action has been implemented. Corrective actions will be implemented and documented in a bound field logbook. No Anchor QEA personnel will initiate corrective action without prior communication of findings through proper channels.

If corrective action taken will result in fewer samples collected, fewer parameters analyzed, alternate sampling locations, or other changes that might result in non-attainment of QA objectives, then the PM must be advised of the proposed corrective action and must concur with its implementation.

6.2 Corrective Action During Data Quality Review and Data Assessment

The need for corrective action may be identified during data quality review or data assessment. Potential types of corrective action may include resampling by the field team or repreparation and/or re-analyses of samples by the laboratory. These actions are dependent upon the ability to mobilize the field team, and whether the data to be collected are necessary to meet the required DQOs. If a corrective action situation is identified, the PM and QA Manager will recommend the implementation of corrective action. The QA Manager will implement and document the approved corrective action.

6.3 Quality Assurance Reports to Management

QA reports to management will only be required if corrective action has been initiated during any phase of this project. The content of the QA report will include a summary of the issue requiring the corrective action, action performed, and results of the follow-up inspection. The impact on any data will also be summarized. QA results will be reported in the Phase II report.

7 References

EPA (U.S. Environmental Protection Agency), 2009. *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. USEPA 540-R-08-005. January 2009.

NYSDEC 2010. DER-10 *Technical Guidance for Site Investigation and Remediation*. Prepared by New York State Department of Environmental Conservation (NYSDEC) Office of Remediation and Materials Management. Published May 3, 2010.

USEPA, 2020a. National Functional Guidelines for Superfund Organic Methods Data Review. Office of Superfund Remediation and Technology Innovation. EPA-540-R-20-005. November 2020.

USEPA, 2020b. National Functional Guidelines for Inorganic Superfund Methods Data Review. Office of Superfund Remediation and Technology Innovation. EPA-542-R-20-006. November 2020.

Tables

Table 1
Sample Sizes, Containers, and Hold Times

Parameter	Sample Size	Container Size and Type	Preservative	Maximum Holding Time
Soil Samples				
Total solids	50 g	4-oz WM-G	Cool/0–6°C	None established
			Freeze -18°C	None established
VOCs	10 g	3 x 40 mL VOA vial	Methanol or sodium bisulfate	14 days
	50 g	4-oz WM-G	Cool/0–6°C; no headspace	
SVOCs	100 g	4-oz WM-G, amber	Cool/0–6°C	14 days to extraction
			Freeze -18°C	1 year to extraction
			Cool/0–6°C	40 days to analysis
Metals	50 g	4-oz WM-G	Cool/0–6°C	6 months; 28 days for mercury
			Freeze -18°C	180 days (except mercury)
PFAS[a]	4 g	8-oz WM-HDPE	Cool/0–6°C	90 days
Water Samples				
VOCs	40 mL	3 x 40 mL VOA vial	Cool/0–6°C	14 days
SVOCs	1 L	2 x 1 L amber glass	Cool/0–6°C	14 days to extraction, 40 days to analysis
Metals	2x50 mL	125 mL HDPE	Cool/0–6°C, HNO3 to pH < 2	6 months; 28 days for mercury
PFAS[a]	500mL	500mL HDPE	Cool/0–6°C	28 days
Indoor Air Samples				
VOCs	6L	6 L Summa canister	Ambient	30 days to analysis
Investigation Derived Waste				
TCLP VOCs	100 g	2-oz wide-mouth glass with Teflon lined septa cap, no headspace	Cool/0–6°C	14 days to extraction, 40 days to analysis
	40 mL	3 x 40-mL septum-sealed VOA vials	Cool/0–6°C, HCl to pH<2	
TCLP SVOCs	100 g	8-oz WM-G	Cool/0–6°C	14 days to extraction, 40 days to analysis
	250 mL	2 x 250-mL amber glass with HDPE-lined lid	Cool/0–6°C	
TCLP Metals	50 g	4-oz WM-G	Cool/0–6°C	180 days and 28 days for mercury to TCLP extraction/analysis
	250 mL	250-mL HDPE	Cool/0–6°C, HNO3 to pH < 2	

Notes:
a Use Teflon free lids
g: gram
WM-G: wide-mouth glass
HCl: hydrochloric acid
HDPE: high density polyethylene
HNO_3: nitric acid
L: liter
mL: milliliter
oz: ounce

'--: not applicable
TCLP: toxicity characteristic leaching procedure

Table 2
Soil analyte List, Methods, and Reporting and Detection Limits

Parameter		Analytical Method	Cleanup Levels [1,2]	Method Detection Limit	Reporting Limit
Conventional Parameters (%)					
Total solids		SM 2540G	--	0.1	0.1
TCL Volatile Organic Compounds (µg/kg)					
Methylene chloride	75-09-2	EPA 8260	--	2.8	5
1,1-Dichloroethane	75-34-3	EPA 8260	--	0.2	5
Chloroform	67-66-3	EPA 8260	--	0.35	5
Carbon tetrachloride	56-23-5	EPA 8260	--	0.26	5
1,2-Dichloropropane	78-87-5	EPA 8260	--	0.2	5
Dibromochloromethane	124-48-1	EPA 8260	--	0.2	5
1,1,2-Trichloroethane	79-00-5	EPA 8260	--	0.2	5
Tetrachloroethene	127-18-4	EPA 8260	--	0.23	5
Chlorobenzene	108-90-7	EPA 8260	--	0.2	5
Trichlorofluoromethane	75-69-4	EPA 8260	--	0.26	5
1,2-Dichloroethane	107-06-2	EPA 8260	--	0.2	5
1,1,1-Trichloroethane	71-55-6	EPA 8260	--	0.2	5
Bromodichloromethane	75-27-4	EPA 8260	--	0.2	5
trans-1,3-Dichloropropene	10061-02-6	EPA 8260	--	0.2	5
cis-1,3-Dichloropropene	10061-01-5	EPA 8260	--	0.2	5
1,1-Dichloropropene	542-75-6	EPA 8260	--	5	0.4556
Bromoform	563-58-6	EPA 8260	--	0.2	5
1,1,2,2-Tetrachloroethane	75-25-2	EPA 8260	--	0.5	5
Benzene	79-34-5	EPA 8260	60	0.2	5
Toluene	71-43-2	EPA 8260	700	0.2	5
Ethylbenzene	108-88-3	EPA 8260	1,000	2	5
Chloromethane	100-41-4	EPA 8260	--	1	5
Bromomethane	74-87-3	EPA 8260	--	1.4	5
Vinyl chloride	74-83-9	EPA 8260	--	0.93	5
Chloroethane	75-01-4	EPA 8260	--	0.46	5
1,1-Dichloroethene	75-00-3	EPA 8260	--	0.41	5

Table 2
Soil analyte List, Methods, and Reporting and Detection Limits

Parameter		Analytical Method	Cleanup Levels [1,2]	Method Detection Limit	Reporting Limit
trans-1,2-Dichloroethene	75-35-4	EPA 8260	--	0.2	5
Trichloroethene	156-60-5	EPA 8260	--	0.2	5
1,2-Dichlorobenzene	540-59-0	EPA 8260	--	0.4	10
1,3-Dichlorobenzene	79-01-6	EPA 8260	--	0.22	5
1,4-Dichlorobenzene	95-50-1	EPA 8260	--	0.2	5
Methyl tert butyl ether	541-73-1	EPA 8260	930	0.2	5
p/m-Xylene	106-46-7	EPA 8260	--	0.22	5
o-Xylene	1634-04-4	EPA 8260	--	0.2	5
Total xylene	179601-23-1	calculated	260	0.37	10
cis-1,2-Dichloroethene	95-47-6	EPA 8260	--	0.2	5
Dibromomethane	1330-20-7	EPA 8260	--	0.52	15
Styrene	100-42-5	EPA 8260	--	1	5
Dichlorodifluoromethane	75-71-8	EPA 8260	--	0.33	5
Acetone	67-64-1	EPA 8260	--	4.7	5
Carbon disulfide	75-15-0	EPA 8260	--	0.29	5
2-Butanone	78-93-3	EPA 8260	--	2	5
Vinyl acetate	108-05-4	EPA 8260	--	0.78	10
4-Methyl-2-pentanone	108-10-1	EPA 8260	--	0.23	5
1,2,3-Trichloropropane	591-78-6	EPA 8260	--	0.87	5
2-Hexanone	97-63-2	EPA 8260	--	0.2	5
Bromochloromethane	107-13-1	EPA 8260	--	0.89	25
2,2-Dichloropropane	74-97-5	EPA 8260	--	0.2	5
1,2-Dibromoethane	109-99-9	EPA 8260	--	15	15
1,3-Dichloropropane	594-20-7	EPA 8260	--	0.2	5
1,1,1,2-Tetrachloroethane	106-93-4	EPA 8260	--	0.2	5
Bromobenzene	142-28-9	EPA 8260	--	0.2	5
n-Butylbenzene	630-20-6	EPA 8260	12,000	0.2	5
sec-Butylbenzene	108-86-1	EPA 8260	11,000	0.2	5
tert-Butylbenzene	104-51-8	EPA 8260	5,900	0.2	5
o-Chlorotoluene	135-98-8	EPA 8260	--	0.2	5

Table 2
Soil analyte List, Methods, and Reporting and Detection Limits

Parameter		Analytical Method	Cleanup Levels [1,2]	Method Detection Limit	Reporting Limit
p-Chlorotoluene	98-06-6	EPA 8260	--	0.2	5
1,2-Dibromo-3-chloropropane	95-49-8	EPA 8260	--	0.2	5
Hexachlorobutadiene	106-43-4	EPA 8260	--	0.2	5
Isopropylbenzene	96-12-8	EPA 8260	2,300	0.5	5
p-Isopropyltoluene	99-87-6	EPA 8260	10,000	0.2	5
Naphthalene	91-20-3	EPA 8260	12,000	0.99	5
Acrylonitrile	107-13-1	EPA 8260	--	0.89	25
n-Propylbenzene	103-65-1	EPA 8260	3,900	0.2	5
1,2,3-Trichlorobenzene	87-61-6	EPA 8260	--	0.88	5
1,2,4-Trichlorobenzene	120-82-1	EPA 8260	--	0.52	5
1,3,5-Trimethylbenzene	108-67-8	EPA 8260	8,400	0.2	5
1,2,4-Trimethylbenzene	95-63-6	EPA 8260	3,600	0.2	5
1,4-Dioxane	123-91-1	EPA 8260	--	20	100
1,4-Diethylbenzene	105-05-5	EPA 8260	--	4	0.2
4-Ethyltoluene	622-96-8	EPA 8260	--	4	0.097
1,2,4,5-Tetramethylbenzene	95-93-2	EPA 8260	--	4	0.181
Ethyl ether	60-29-7	EPA 8260	--	0.25	5
trans-1,4-Dichloro-2-butene	110-57-6	EPA 8260	--	0.67	5
TCL Semivolatile Organic Compounds (µg/kg)					
1,2,4,5-Tetrachlorobenzene	95-94-3	EPA 8270D	--	74	330
1,2,4-Trichlorobenzene	120-82-1	EPA 8270D	--	119	330
1,2-Dichlorobenzene	95-50-1	EPA 8270D	--	57	330
1,3-Dichlorobenzene	541-73-1	EPA 8270D	--	52	330
1,4-Dichlorobenzene	106-46-7	EPA 8270D	--	55	330
2,4,5-Trichlorophenol	95-95-4	EPA 8270D	--	82	330
2,4,6-Trichlorophenol	88-06-2	EPA 8270D	--	74	330
2,4-Dichlorophenol	120-83-2	EPA 8270D	--	64	330
2,4-Dimethylphenol	105-67-9	EPA 8270D	--	59	330
2,4-Dinitrophenol	51-28-5	EPA 8270D	--	540	1700
2,4-Dinitrotoluene	121-14-2	EPA 8270D	--	130	330

Table 2
Soil analyte List, Methods, and Reporting and Detection Limits

Parameter		Analytical Method	Cleanup Levels [1,2]	Method Detection Limit	Reporting Limit
2,6-Dinitrotoluene	606-20-2	EPA 8270D	--	72	330
2-Chloronaphthalene	91-58-7	EPA 8270D	--	66	330
2-Chlorophenol	95-57-8	EPA 8270D	--	55	330
2-Methylnaphthalene	91-57-6	EPA 8270D	--	116	330
2-Methylphenol	95-48-7	EPA 8270D	--	69	330
2-Nitroaniline	88-74-4	EPA 8270D	--	78	330
2-Nitrophenol	88-75-5	EPA 8270D	--	77	330
3,3'-Dichlorobenzidine	91-94-1	EPA 8270D	--	87	330
3-Nitroaniline	99-09-2	EPA 8270D	--	67	330
4,6-Dinitro-2-Methylphenol	534-52-1	EPA 8270D	--	190	1700
4-Bromophenyl phenyl ether	101-55-3	EPA 8270D	--	87	330
4-Chloroaniline	106-47-8	EPA 8270D	--	56	330
4-Chlorophenyl phenyl ether	7005-72-3	EPA 8270D	--	71	330
4-Methylphenol	106-44-5	EPA 8270D	--	33	4.4
4-Nitroaniline	100-01-6	EPA 8270D	--	71	330
4-Nitrophenol	100-02-7	EPA 8270D	--	67	1700
Acenaphthene	83-32-9	EPA 8270D	20,000	63	330
Acenaphthylene	208-96-8	EPA 8270D	100,000	67	330
Acetophenone	98-86-2	EPA 8270D	--	95	330
Aniline	62-53-3	EPA 8270D	--	74	330
Anthracene	120-12-7	EPA 8270D	100,000	55	330
Atrazine	1912-24-9	EPA 8270D	--	98	330
Azobenzene	103-33-3	EPA 8270D	--	33	2.5
Benz(a)anthracene	56-55-3	EPA 8270D	1,000	49	330
Benzaldehyde	100-52-7	EPA 8270D	--	180	330
Benzidine	92-87-5	EPA 8270D	--	420	3300
Benzo(a)pyrene	50-32-8	EPA 8270D	1,000	88	330
Benzo(b)fluoranthene	205-99-2	EPA 8270D	1,000	55	330
Benzo(ghi)perylene	191-24-2	EPA 8270D	100,000	76	330
Benzo(k)fluoranthene	207-08-9	EPA 8270D	800	54	330

Table 2

Soil analyte List, Methods, and Reporting and Detection Limits

Parameter		Analytical Method	Cleanup Levels [1,2]	Method Detection Limit	Reporting Limit
Benzoic Acid	65-85-0	EPA 8270D	--	520	1700
Benzyl Alcohol	100-51-6	EPA 8270D	--	170	330
Biphenyl	92-52-4	EPA 8270D	--	98	330
Bis(2-chloroethoxy)methane	111-91-1	EPA 8270D	--	81	330
Bis(2-chloroethyl)ether	111-44-4	EPA 8270D	--	65	330
Bis(2-chloroisopropyl)ether	108-60-1	EPA 8270D	--	68	330
Bis(2-Ethylhexyl)phthalate	117-81-7	EPA 8270D	--	61	500
Butylbenzylphthalate	85-68-7	EPA 8270D	--	88	330
Caprolactam	105-60-2	EPA 8270D	--	73	330
Carbazole	86-74-8	EPA 8270D	--	54	330
Chrysene	218-01-9	EPA 8270D	1,000	49	330
Dibenz(a,h)anthracene	53-70-3	EPA 8270D	330	72	330
Dibenzofuran	132-64-9	EPA 8270D	--	60	330
Diethylphthalate	84-66-2	EPA 8270D	--	59	330
Dimethylphthalate	131-11-3	EPA 8270D	--	63	330
Di-n-butylphthalate	84-74-2	EPA 8270D	--	54	330
Di-n-octylphthalate	117-84-0	EPA 8270D	--	120	330
Fluoranthene	206-44-0	EPA 8270D	100,000	83	330
Fluorene	86-73-7	EPA 8270D	--	62	330
Hexachlorobenzene	118-74-1	EPA 8270D	--	79	330
Hexachlorobutadiene	87-68-3	EPA 8270D	--	116	330
Hexachlorocyclopentadiene	77-47-4	EPA 8270D	--	110	330
Hexachloroethane	67-72-1	EPA 8270D	--	62	330
Indeno(1,2,3-cd)Pyrene	193-39-5	EPA 8270D	500	110	330
Isophorone	78-59-1	EPA 8270D	--	69	330
Naphthalene	91-20-3	EPA 8270D	--	62	330
Nitrobenzene	98-95-3	EPA 8270D	--	59	330
NitrosoDiPhenylAmine(NDPA)/DPA	86-30-6	EPA 8270D	--	206	330
n-Nitrosodimethylamine	62-75-9	EPA 8270D	--	76	330
N-Nitroso-di-n-propylamine	621-64-7	EPA 8270D	--	110	330

Table 2
Soil analyte List, Methods, and Reporting and Detection Limits

Parameter		Analytical Method	Cleanup Levels [1,2]	Method Detection Limit	Reporting Limit
P-Chloro-M-Cresol	59-50-7	EPA 8270D	--	67	330
Pentachlorophenol	87-86-5	EPA 8270D	--	330	1700
Phenanthrene	85-01-8	EPA 8270D	100,000	47	330
Phenol	108-95-2	EPA 8270D	--	67	330
Pyrene	129-00-0	EPA 8270D	100,000	55	330
Pyridine	110-86-1	EPA 8270D	--	45	330
Metals (mg/kg)					
Aluminum	7429-90-5	EPA 6020B	--	12	20
Antimony	7440-36-0	EPA 6020B	--	0.54	6
Arsenic	7440-38-2	EPA 6020B	--	0.7	1
Barium	7440-39-3	EPA 6020B	--	0.26	2
Beryllium	7440-41-7	EPA 6020B	--	0.029	0.3
Cadmium	7440-43-9	EPA 6020B	--	0.086	0.5
Calcium	7440-70-2	EPA 6020B	--	32	100
Chromium	7440-47-3	EPA 6020B	--	0.35	1
Cobalt	7440-48-4	EPA 6020B	--	0.083	5
Copper	7440-50-8	EPA 6020B	--	0.13	2
Iron	7439-89-6	EPA 6020B	--	13	20
Lead	7439-92-1	EPA 6020B	--	0.4	5
Magnesium	7439-95-4	EPA 6020B	--	13	100
Manganese	7439-96-5	EPA 6020B	--	0.16	2
Mercury	7439-97-6	EPA 7471B	--	0.0130	0.02
Nickel	7440-02-0	EPA 6020B	--	0.66	4
Potassium	7440-09-7	EPA 6020B	--	50	200
Selenium	7782-49-2	EPA 6020B	--	0.54	1
Silver	7440-22-4	EPA 6020B	--	0.09	1
Sodium	7440-23-5	EPA 6020B	--	19	100

Table 2
Soil analyte List, Methods, and Reporting and Detection Limits

Parameter		Analytical Method	Cleanup Levels [1,2]	Method Detection Limit	Reporting Limit
Thallium	7440-28-0	EPA 6020B	--	0.65	1
Vanadium	7440-62-2	EPA 6020B	--	0.069	5
Zinc	7440-66-6	EPA 6020B	--	1.4	2
PFAS (ng/g)					
10:2 FTS - 10:2 Fluorotelomer sulfonic acid		EPA 1633	--	0.5	0.17
11Cl-PF3OUnDS - 11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid		EPA 1633	--	0.5	0.051
3:3 Fluorotelomer carboxylic acid		EPA 1633	--	15	0.25
4:2 FTS - 4:2 Fluorotelomer sulfonic acid		EPA 1633	--	0.5	0.071
5:3 FTCA - 5:3 Fluorotelomer carboxylic acid		EPA 1633	--	15	0.25
6:2 FTS - 6:2 Fluorotelomer sulfonic acid		EPA 1633	--	0.5	0.051
7:3 FTCA - 7:3 Fluorotelomer carboxylic acid		EPA 1633	--	15	0.27
8:2 FTS - 8:2 Fluorotelomer sulfonic acid		EPA 1633	--	0.5	0.092
9Cl-PF3ONS		EPA 1633	--	0.5	0.05
ADONA - 4,8-Dioxa-3H-perfluorononanoic acid		EPA 1633	--	0.5	0.05
EtFOSA - N-Ethyl perfluorooctane sulfonamide		EPA 1633	--	0.5	0.05
EtFOSAA - N-Ethylperfluorooctane sulfonamidoacetic acid		EPA 1633	--	0.5	0.091
EtFOSE - N-Ethyl perfluorooctane sulfonamidoethanol		EPA 1633	--	0.5	0.063
FOSA - Perfluorooctane sulfonamide		EPA 1633	--	0.5	0.05
HFPO-DA - Hexafluoropropylene oxide dimer acid		EPA 1633	--	0.5	0.08
MeFOSA - N-Methyl perfluorooctane sulfonamide		EPA 1633	--	0.5	0.05
MeFOSAA - N-Methyl perfluorooctane sulfonamidoacetic acid		EPA 1633	--	0.5	0.13
MeFOSE - N-Methyl perfluorooctane sulfonamidoethanol		EPA 1633	--	0.5	0.079
NFDHA - Nonafluoro-3,6-dioxaheptanoic acid		EPA 1633	--	0.5	0.072
PFBA - Perfluorobutanoic acid		EPA 1633	--	0.5	0.05
PFBS - Perfluorobutane sulfonic acid		EPA 1633	--	0.5	0.054
PFDA - Perfluorodecanoic acid		EPA 1633	--	0.5	0.077
PFDoDA - Perfluorododecanoic acid		EPA 1633	--	0.5	0.07
PFDoDS - Perfluorododecane sulfonic acid		EPA 1633	--	0.5	0.097

Table 2
Soil analyte List, Methods, and Reporting and Detection Limits

Parameter	Analytical Method	Cleanup Levels [1,2]	Method Detection Limit	Reporting Limit
PFDS - Perfluorodecane sulfonic acid	EPA 1633	--	0.5	0.13
PFEESA - Perfluoro(2-ethoxyethane)sulfonic acid	EPA 1633	--	0.5	0.051
PFHpA - Perfluoroheptanoic acid	EPA 1633	--	0.5	0.089
PFHpS - Perfluoroheptane sulfonic acid	EPA 1633	--	0.5	0.061
PFHxA - Perfluorohexanoic acid	EPA 1633	--	0.5	0.082
PFHxDA - Perfluorohexadecanoic acid	EPA 1633	--	0.5	0.17
PFHxS - Perfluorohexane sulfonic acid	EPA 1633	--	0.5	0.082
PFMBA - Perfluoro-4-methoxybutanoic acid	EPA 1633	--	0.5	0.057
PFMPA - Perfluoro-3-methoxypropanoic acid	EPA 1633	--	0.5	0.097
PFNA - Perfluorononanoic acid	EPA 1633	--	0.5	0.1
PFNS - Perfluorononane sulfonic acid	EPA 1633	--	0.5	0.066
PFOA - Perfluorooctanoic acid	EPA 1633	--	0.5	0.11
PFODA - Perfluorooctadecanoic acid	EPA 1633	--	0.5	0.074
PFOS - Perfluorooctane sulfonic acid	EPA 1633	--	0.5	0.11
PFPeA - Perfluoropentanoic acid	EPA 1633	--	0.5	0.061
PFPeS - Perfluoropentane sulfonic acid	EPA 1633	--	0.5	0.063
PFTeDA - Perfluorotetradecanoic acid	EPA 1633	--	0.5	0.14
PFTrDA - Perfluorotridecanoic acid	EPA 1633	--	0.5	0.099
PFUnDA - Perfluoroundecanoic acid	EPA 1633	--	0.5	0.19

Notes:
--: not applicable
EPA: U.S. Environmental Protection Agency
mg/L: milligrams per liter
mg/kg: milligrams per kilogram
ng/g: nanogram per gram
SM: Standard Method
PFAS: per-and-polyfluoroalkyl substances

Table 3
Groundwater analyte List, Methods, and Reporting and Detection Limits

Parameter	CAS RN	Analytical Method	Groundwater Screening Levels[1]	Reporting Limit	Method Detection Limit
TCL Volatile Organic Compounds (µg/L)					
Methylene chloride	75-09-2	EPA 8260	5	0.65	1
1,1-Dichloroethane	75-34-3	EPA 8260	5	0.2	1
Chloroform	67-66-3	EPA 8260	7	0.51	1
Carbon tetrachloride	56-23-5	EPA 8260	0.4	0.34	1
1,2-Dichloropropane	78-87-5	EPA 8260	1	0.2	1
Dibromochloromethane	124-48-1	EPA 8260	50	0.2	1
1,1,2-Trichloroethane	79-00-5	EPA 8260	1	0.2	1
Tetrachloroethene	127-18-4	EPA 8260	0.7	0.21	1
Chlorobenzene	108-90-7	EPA 8260	5	0.2	1
Trichlorofluoromethane	75-69-4	EPA 8260	5	0.24	1
1,2-Dichloroethane	107-06-2	EPA 8260	0.6	0.2	1
1,1,1-Trichloroethane	71-55-6	EPA 8260	5	0.2	1
Bromodichloromethane	75-27-4	EPA 8260	50	0.2	1
trans-1,3-Dichloropropene	10061-02-6	EPA 8260	0.4	0.23	1
cis-1,3-Dichloropropene	10061-01-5	EPA 8260	0.4	0.2	1
1,3-Dichloropropene, Total	542-75-6	EPA 8260	0.4	0.5	0.144
1,1-Dichloropropene	563-58-6	EPA 8260	5	0.2	1
Bromoform	75-25-2	EPA 8260	50	0.25	1
1,1,2,2-Tetrachloroethane	79-34-5	EPA 8260	0.2	0.2	1
Benzene	71-43-2	EPA 8260	1	0.2	1
Toluene	108-88-3	EPA 8260	5	0.2	1
Ethylbenzene	100-41-4	EPA 8260	5	0.2	1
Chloromethane	74-87-3	EPA 8260	5	0.8	1
Bromomethane	74-83-9	EPA 8260	5	0.7	1
Vinyl chloride	75-01-4	EPA 8260	0.3	0.2	1
Chloroethane	75-00-3	EPA 8260	5	0.23	1
1,1-Dichloroethene	75-35-4	EPA 8260	0.7	0.2	1
trans-1,2-Dichloroethene	156-60-5	EPA 8260	5	0.2	1
1,2-Dichloroethene (total)	540-59-0	EPA 8260	--	0.35	2
Trichloroethene	79-01-6	EPA 8260	5	0.2	1
1,2-Dichlorobenzene	95-50-1	EPA 8260	3	0.2	1
1,3-Dichlorobenzene	541-73-1	EPA 8260	3	0.2	1
1,4-Dichlorobenzene	106-46-7	EPA 8260	3	0.2	1
Methyl tert butyl ether	1634-04-4	EPA 8260	10	0.2	1
p/m-Xylene	179601-23-1	EPA 8260	5	0.2	2
o-Xylene	95-47-6	EPA 8260	5	0.2	1
Xylene (Total)	1330-20-7	EPA 8260	5	0.23	3
cis-1,2-Dichloroethene	156-59-2	EPA 8260	5	0.23	1

Table 3

Groundwater analyte List, Methods, and Reporting and Detection Limits

Parameter	CAS RN	Analytical Method	Groundwater Screening Levels[1]	Reporting Limit	Method Detection Limit
Dibromomethane	74-95-3	EPA 8260	5	0.2	1
1,4-Dichlorobutane	110-56-5	EPA 8260	--	5.0	0.464
1,2,3-Trichloropropane	96-18-4	EPA 8260	0.04	0.26	1
Styrene	100-42-5	EPA 8260	5	0.2	1
Dichlorodifluoromethane	75-71-8	EPA 8260	5	0.21	1
Acetone	67-64-1	EPA 8260	50	5	5
Carbon disulfide	75-15-0	EPA 8260	60	0.42	1
2-Butanone	78-93-3	EPA 8260	50	0.78	5
Vinyl acetate	108-05-4	EPA 8260	--	1.1	2
4-Methyl-2-pentanone	108-10-1	EPA 8260	--	0.2	5
2-Hexanone	591-78-6	EPA 8260	50	0.2	5
Ethyl methacrylate	97-63-2	EPA 8260	3	0.2	2
Acrylonitrile	107-13-1	EPA 8260	5	0.9	10
Bromochloromethane	74-97-5	EPA 8260	5	0.2	1
Tetrahydrofuran	109-99-9	EPA 8260	50	1.7	2
2,2-Dichloropropane	594-20-7	EPA 8260	5	0.24	1
1,2-Dibromoethane	106-93-4	EPA 8260	0.0006	0.2	1
1,3-Dichloropropane	142-28-9	EPA 8260	5	0.2	1
1,1,1,2-Tetrachloroethane	630-20-6	EPA 8260	5	0.2	1
Bromobenzene	108-86-1	EPA 8260	5	0.2	1
n-Butylbenzene	104-51-8	EPA 8260	5	0.2	1
sec-Butylbenzene	135-98-8	EPA 8260	5	0.2	1
tert-Butylbenzene	98-06-6	EPA 8260	5	0.2	1
o-Chlorotoluene	95-49-8	EPA 8260	5	0.2	1
p-Chlorotoluene	106-43-4	EPA 8260	5	0.2	1
1,2-Dibromo-3-chloropropane	96-12-8	EPA 8260	0.04	0.45	2
Hexachlorobutadiene	87-68-3	EPA 8260	0.5	0.33	2
Isopropylbenzene	98-82-8	EPA 8260	5	0.2	1
p-Isopropyltoluene	99-87-6	EPA 8260	5	0.2	1
Naphthalene	91-20-3	EPA 8260	10	0.55	1
n-Propylbenzene	103-65-1	EPA 8260	5	0.2	1
1,2,3-Trichlorobenzene	87-61-6	EPA 8260	5	0.25	1
1,2,4-Trichlorobenzene	120-82-1	EPA 8260	5	0.34	1
1,3,5-Trimethylbenzene	108-67-8	EPA 8260	5	0.2	1
1,3,5-Trichlorobenzene	108-70-3	EPA 8260	5	0.27	1
1,2,4-Trimethylbenzene	95-63-6	EPA 8260	5	0.2	1
trans-1,4-Dichloro-2-butene	110-57-6	EPA 8260	5	0.78	1
Ethyl ether	60-29-7	EPA 8260	--	0.2	1
Methyl Acetate	79-20-9	EPA 8260	--	0.33	2

Table 3
Groundwater analyte List, Methods, and Reporting and Detection Limits

Parameter	CAS RN	Analytical Method	Groundwater Screening Levels[1]	Reporting Limit	Method Detection Limit
Ethyl Acetate	141-78-6	EPA 8260	--	10	0.716
Isopropyl Ether	108-20-3	EPA 8260	--	0.2	1
Cyclohexane	110-82-7	EPA 8260	--	0.6	1
Ethyl-Tert-Butyl-Ether	637-92-3	EPA 8260	--	0.2	1
Tertiary-Amyl Methyl Ether	994-05-8	EPA 8260	--	0.2	1
1,4-Dioxane	123-91-1	EPA 8260	--	13	40
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	EPA 8260	5	0.2	1
Methyl cyclohexane	108-87-2	EPA 8260	--	0.2	1
1,4-Diethylbenzene	105-05-5	EPA 8260	--	2.0	0.392
4-Ethyltoluene	622-96-8	EPA 8260	--	2.0	0.34
1,2,4,5-Tetramethylbenzene	95-93-2	EPA 8260	5	2.0	0.542
TCL Semivolatile Organic Compounds (μg/L)					
Bis(2-chloroethyl)ether	111-44-4	EPA 8270D	0.03	0.5	0.0929
Phenol	108-95-2	EPA 8270D	2	0.5	0.0512
2-Chlorophenol	95-57-8	EPA 8270D	--	0.5	0.0912
1,3-Dichlorobenzene	541-73-1	EPA 8270D	3	0.5	0.0783
1,4-Dichlorobenzene	106-46-7	EPA 8270D	3	0.5	0.0828
1,2-Dichlorobenzene	95-50-1	EPA 8270D	3	0.5	0.0680
Bis(2-chloroisopropyl)ether	108-60-1	EPA 8270D	5	0.5	0.1080
2-Methylphenol	95-48-7	EPA 8270D	--	0.5	0.1040
Hexachloroethane	67-72-1	EPA 8270D	5	0.5	0.1020
N-Nitroso-di-n-propylamine	621-64-7	EPA 8270D	--	0.5	0.1230
4-Methylphenol	106-44-5	EPA 8270D	--	0.5	0.1130
Nitrobenzene	98-95-3	EPA 8270D	0.4	0.5	0.1020
Isophorone	78-59-1	EPA 8270D	50	0.5	0.1260
2-Nitrophenol	88-75-5	EPA 8270D	--	0.5	0.1150
2,4-Dimethylphenol	105-67-9	EPA 8270D	50	2.0	0.2410
Bis(2-chloroethoxy)methane	111-91-1	EPA 8270D	5	0.5	0.0854
2,4-Dichlorophenol	120-83-2	EPA 8270D	5	0.5	0.0996
1,2,4-Trichlorobenzene	120-82-1	EPA 8270D	5	0.5	0.0961
Naphthalene	91-20-3	EPA 8270D	10	0.5	0.0876
4-Chloroaniline	106-47-8	EPA 8270D	5	0.5	0.1280
Hexachlorobutadiene	87-68-3	EPA 8270D	0.5	0.5	0.0855
P-Chloro-M-Cresol	59-50-7	EPA 8270D	--	0.5	0.1030
2-Methylnaphthalene	91-57-6	EPA 8270D	--	0.5	0.0911
1,2,4,5-Tetrachlorobenzene	95-94-3	EPA 8270D	5	0.5	0.0797
Hexachlorocyclopentadiene	77-47-4	EPA 8270D	5	0.5	0.1530
Pentachloronitrobenzene	82-68-8	EPA 8270D	ND	0.5	0.1690
2,4,6-Trichlorophenol	88-06-2	EPA 8270D	--	0.5	0.1520

Table 3

Groundwater analyte List, Methods, and Reporting and Detection Limits

Parameter	CAS RN	Analytical Method	Groundwater Screening Levels[1]	Reporting Limit	Method Detection Limit
2,4,5-Trichlorophenol	95-95-4	EPA 8270D	--	0.5	0.0913
2-Chloronaphthalene	91-58-7	EPA 8270D	10	0.5	0.0899
2-Nitroaniline	88-74-4	EPA 8270D	5	0.5	0.1380
Acenaphthylene	208-96-8	EPA 8270D	--	0.5	0.1120
Dimethylphthalate	131-11-3	EPA 8270D	50	0.5	0.1170
2,6-Dinitrotoluene	606-20-2	EPA 8270D	0.07	0.5	0.1680
Acenaphthene	83-32-9	EPA 8270D	20	0.5	0.0955
3-Nitroaniline	99-09-2	EPA 8270D	5	0.5	0.1110
2,4-Dinitrophenol	51-28-5	EPA 8270D	10	5.0	0.7280
Dibenzofuran	132-64-9	EPA 8270D	--	0.5	0.0910
2,4-Dinitrotoluene	121-14-2	EPA 8270D	5	0.5	0.1630
4-Nitrophenol	100-02-7	EPA 8270D	--	2.5	0.5900
2,3,4,6-Tetrachlorophenol	58-90-2	EPA 8270D	--	0.5	0.1430
Fluorene	86-73-7	EPA 8270D	50	0.5	0.1040
4-Chlorophenyl phenyl ether	7005-72-3	EPA 8270D	--	0.5	0.0792
Diethylphthalate	84-66-2	EPA 8270D	50	0.5	0.1800
Azobenzene	103-33-3	EPA 8270D	5	0.5	0.1280
4-Nitroaniline	100-01-6	EPA 8270D	5	0.5	0.1120
4,6-Dinitro-2-Methylphenol	534-52-1	EPA 8270D	--	2.0	0.5100
NitrosoDiPhenylAmine(NDPA)/DPA	86-30-6	EPA 8270D	50	0.5	0.0720
4-Bromophenyl phenyl ether	101-55-3	EPA 8270D	--	0.5	0.0997
Hexachlorobenzene	118-74-1	EPA 8270D	0.04	0.5	0.1220
Pentachlorophenol	87-86-5	EPA 8270D	2	2.0	0.4300
Phenanthrene	85-01-8	EPA 8270D	50	0.5	0.1110
Anthracene	120-12-7	EPA 8270D	50	0.5	0.1370
Carbazole	86-74-8	EPA 8270D	--	0.5	0.1430
Di-n-butylphthalate	84-74-2	EPA 8270D	50	0.5	0.0996
Fluoranthene	206-44-0	EPA 8270D	50	0.5	0.1560
Pyrene	129-00-0	EPA 8270D	50	0.5	0.1700
Butylbenzylphthalate	85-68-7	EPA 8270D	50	0.5	0.0848
3,3'-Dichlorobenzidine	91-94-1	EPA 8270D	5	0.5	0.1930
Benz(a)anthracene	56-55-3	EPA 8270D	0.002	0.5	0.1840
Chrysene	218-01-9	EPA 8270D	0.002	0.5	0.1420
Bis(2-Ethylhexyl)phthalate	117-81-7	EPA 8270D	5	0.5	0.0809
Di-n-octylphthalate	117-84-0	EPA 8270D	50	1.0	0.0786
Benzo(b)fluoranthene	205-99-2	EPA 8270D	0.002	0.5	0.0655
Benzo(k)fluoranthene	207-08-9	EPA 8270D	0.002	0.5	0.1610
Benzo(a)pyrene	50-32-8	EPA 8270D	0.002	0.5	0.0602
Indeno(1,2,3-cd)Pyrene	193-39-5	EPA 8270D	0.002	0.5	0.0896

Table 3
Groundwater analyte List, Methods, and Reporting and Detection Limits

Parameter	CAS RN	Analytical Method	Groundwater Screening Levels[1]	Reporting Limit	Method Detection Limit
Dibenz(a,h)anthracene	53-70-3	EPA 8270D	--	0.5	0.0641
Benzo(ghi)perylene	191-24-2	EPA 8270D	--	0.5	0.1090
Aniline	62-53-3	EPA 8270D	5	1.0	0.1270
Acetophenone	98-86-2	EPA 8270D	--	1.0	0.2070
Atrazine	1912-24-9	EPA 8270D	7.5	0.5	0.1600
Benzaldehyde	100-52-7	EPA 8270D	--	2.0	0.1190
Benzidine	92-87-5	EPA 8270D	5	20.0	0.4640
Caprolactam	105-60-2	EPA 8270D	--	2.0	0.1230
n-Nitrosodimethylamine	62-75-9	EPA 8270D	--	0.5	0.0720
Biphenyl	92-52-4	EPA 8270D	5	0.5	0.1110
Benzyl Alcohol	100-51-6	EPA 8270D	--	0.5	0.1230
Pyridine	110-86-1	EPA 8270D	50	0.5	0.1630
Benzoic Acid	65-85-0	EPA 8270D	--	40.0	3.0100
Metals (mg/L)					
Aluminum	7429-90-5	EPA 6020B	--	23.00	100.0000
Antimony	7440-36-0	EPA 6020B	0.003	6.300	60.0000
Arsenic	7440-38-2	EPA 6020B	0.05	5.5000	10.0000
Barium	7440-39-3	EPA 6020B	1	3.0000	20.0000
Beryllium	7440-41-7	EPA 6020B	0.003	0.1300	3.0000
Cadmium	7440-43-9	EPA 6020B	0.005	0.3500	5.0000
Calcium	7440-70-2	EPA 6020B	--	220.0	1000.0000
Chromium	7440-47-3	EPA 6020B	0.05	1.400	10.0000
Cobalt	7440-48-4	EPA 6020B	--	0.8900	50.0000
Copper	7440-50-8	EPA 6020B	0.2	3.900	20.0000
Iron	7439-89-6	EPA 6020B	--	61.000	100.0000
Lead	7439-92-1	EPA 6020B	0.05	2.100	50.0000
Magnesium	7439-95-4	EPA 6020B	35	29.000	1000.0000
Manganese	7439-96-5	EPA 6020B	--	3.700	10.0000
Mercury	7439-97-6	EPA 7474	0.0007	0.077	0.200
Nickel	7440-02-0	EPA 6020B	0.1	2.600	40.0000
Potassium	7440-09-7	EPA 6020B	--	380.000	2000.0000
Selenium	7782-49-2	EPA 6020B	0.01	6.400	10.0000
Silver	7440-22-4	EPA 6020B	0.05	0.5700	10.0000
Sodium	7440-23-5	EPA 6020B	--	130.000	1000.0000
Thallium	7440-28-0	EPA 6020B	0.0005	7.6000	10.0000
Vanadium	7440-62-2	EPA 6020B	--	0.670	50.0000
Zinc	7440-66-6	EPA 6020B	2	2.400	20.0000
PFAS (ng/L)					
10:2 FTS - 10:2 Fluorotelomer sulfonic acid		EPA 1633	--	5	0.99

Table 3

Groundwater analyte List, Methods, and Reporting and Detection Limits

Parameter	CAS RN	Analytical Method	Groundwater Screening Levels[1]	Reporting Limit	Method Detection Limit
11Cl-PF3OUnDS - 11-Chloroeicosafluoro-3-oxaundecar		EPA 1633	--	5	0.5
3:3 Fluorotelomer carboxylic acid		EPA 1633	--	200	8.4
4:2 FTS - 4:2 Fluorotelomer sulfonic acid		EPA 1633	--	5	1.6
5:3 FTCA - 5:3 Fluorotelomer carboxylic acid		EPA 1633	--	200	3.9
6:2 FTS - 6:2 Fluorotelomer sulfonic acid		EPA 1633	--	5	1.6
7:3 FTCA - 7:3 Fluorotelomer carboxylic acid		EPA 1633	--	200	6.6
8:2 FTS - 8:2 Fluorotelomer sulfonic acid		EPA 1633	--	5	2
9Cl-PF3ONS		EPA 1633	--	5	0.5
ADONA - 4,8-Dioxa-3H-perfluorononanoic acid		EPA 1633	--	5	0.83
EtFOSA - N-Ethyl perfluorooctane sulfonamide		EPA 1633	--	5	0.52
EtFOSAA - N-Ethylperfluorooctane sulfonamidoacetic a		EPA 1633	--	5	1.2
EtFOSE - N-Ethyl perfluorooctane sulfonamidoethanol		EPA 1633	--	5	0.52
FOSA - Perfluorooctane sulfonamide		EPA 1633	--	5	0.61
HFPO-DA - Hexafluoropropylene oxide dimer acid		EPA 1633	--	5	0.94
MeFOSA - N-Methyl perfluorooctane sulfonamide		EPA 1633	--	5	1.2
MeFOSAA - N-Methyl perfluorooctane sulfonamidoacet		EPA 1633	--	5	2
MeFOSE - N-Methyl perfluorooctane sulfonamidoethan		EPA 1633	--	5	0.84
NFDHA - Nonafluoro-3,6-dioxaheptanoic acid		EPA 1633	--	5	0.88
PFBA - Perfluorobutanoic acid		EPA 1633	--	5	1.9
PFBS - Perfluorobutane sulfonic acid		EPA 1633	--	5	0.85
PFDA - Perfluorodecanoic acid		EPA 1633	--	5	1.1
PFDoDA - Perfluorododecanoic acid		EPA 1633	--	5	0.62
PFDoDS - Perfluorododecane sulfonic acid		EPA 1633	--	5	1.3
PFDS - Perfluorodecane sulfonic acid		EPA 1633	--	5	0.58
PFEESA - Perfluoro(2-ethoxyethane)sulfonic acid		EPA 1633	--	5	0.5
PFHpA - Perfluoroheptanoic acid		EPA 1633	--	5	0.84
PFHpS - Perfluoroheptane sulfonic acid		EPA 1633	--	5	0.64
PFHxA - Perfluorohexanoic acid		EPA 1633	--	5	2
PFHxDA - Perfluorohexadecanoic acid		EPA 1633	--	5	1.1
PFHxS - Perfluorohexane sulfonic acid		EPA 1633	--	5	0.61
PFMBA - Perfluoro-4-methoxybutanoic acid		EPA 1633	--	5	0.5
PFMPA - Perfluoro-3-methoxypropanoic acid		EPA 1633	--	5	0.5
PFNA - Perfluorononanoic acid		EPA 1633	--	5	1.1
PFNS - Perfluorononane sulfonic acid		EPA 1633	--	5	0.55
PFOA - Perfluorooctanoic acid		EPA 1633	--	5	0.71
PFODA - Perfluorooctadecanoic acid		EPA 1633	--	5	1.2
PFOS - Perfluorooctane sulfonic acid		EPA 1633	--	5	0.55
PFPeA - Perfluoropentanoic acid		EPA 1633	--	5	0.61
PFPeS - Perfluoropentane sulfonic acid		EPA 1633	--	5	0.68
PFTeDA - Perfluorotetradecanoic acid		EPA 1633	--	5	1.5
PFTrDA - Perfluorotridecanoic acid		EPA 1633	--	5	1.6
PFUnDA - Perfluoroundecanoic acid		EPA 1633	--	5	0.56

Table 3

Groundwater analyte List, Methods, and Reporting and Detection Limits

Notes:

1. New York State Groundwater Effluent Limitations, Class GA (NYDEC 1998)

NYSDEC (New York State Department of Environmental Conservation), 1998. *Ambient Water*

--: not applicable

EPA: U.S. Environmental Protection Agency

mg/L: milligrams per liter

ng/L: nanogram per liter

PFAS: per-and-polyfluoroalkyl substances

Table 4

Indoor Air Analyte List, Method, and Reporting and Detection Limits

Parameter	CAS RN	Analytical Method	Groundwater Screening Levels[1] (ug/L)	Method Detection Limit	Reporting Limit
Volatile Organic Compounds (µg/m^3)					
Methylene chloride	75-09-2	EPA TO-15	5	0.0078	0.1
1,1-Dichloroethane	75-34-3	EPA TO-15	5	0.0082	0.025
Chloroform	67-66-3	EPA TO-15	7	0.008	0.1
Carbon tetrachloride	56-23-5	EPA TO-15	0.4	0.0071	0.025
1,2-Dichloropropane	78-87-5	EPA TO-15	1	0.0061	0.025
Dibromochloromethane	124-48-1	EPA TO-15	50	0.0064	0.025
1,1,2-Trichloroethane	79-00-5	EPA TO-15	1	0.0059	0.52
Tetrachloroethene	127-18-4	EPA TO-15	0.7	0.0086	0.025
Chlorobenzene	108-90-7	EPA TO-15	5	0.0097	0.1
Trichlorofluoromethane	75-69-4	EPA TO-15	5	0.0081	0.05
1,2-Dichloroethane	107-06-2	EPA TO-15	0.6	0.0083	0.025
1,1,1-Trichloroethane	71-55-6	EPA TO-15	5	0.009	0.52
Bromodichloromethane	75-27-4	EPA TO-15	50	0.0058	0.025
trans-1,3-Dichloropropene	10061-02-6	EPA TO-15	0.4	0.0048	0.05
cis-1,3-Dichloropropene	10061-01-5	EPA TO-15	0.4	0.0071	0.05
1,3-Dichloropropene, Total	542-75-6	EPA TO-15	0.4	0.5	0.144
1,1-Dichloropropene	563-58-6	EPA TO-15	5	0.24	0.5
Bromoform	75-25-2	EPA TO-15	50	0.11	0.52
1,1,2,2-Tetrachloroethane	79-34-5	EPA TO-15	0.2	0.0087	0.52
Benzene	71-43-2	EPA TO-15	1	0.015	0.075
Toluene	108-88-3	EPA TO-15	5	0.012	0.1
Ethylbenzene	100-41-4	EPA TO-15	5	0.012	0.1
Chloromethane	74-87-3	EPA TO-15	5	0.026	0.05
Bromomethane	74-83-9	EPA TO-15	5	0.0067	0.025
Vinyl chloride	75-01-4	EPA TO-15	0.3	0.012	0.025
Chloroethane	75-00-3	EPA TO-15	5	0.0078	0.025
1,1-Dichloroethene	75-35-4	EPA TO-15	0.7	0.0088	0.54
trans-1,2-Dichloroethene	156-60-5	EPA TO-15	5	0.011	0.025
1,2-Dichloroethene (total)	540-59-0	EPA TO-15	--	0.5	0.163
Trichloroethene	79-01-6	EPA TO-15	5	0.0077	0.025
1,2-Dichlorobenzene	95-50-1	EPA TO-15	3	0.018	0.53
1,3-Dichlorobenzene	541-73-1	EPA TO-15	3	0.017	0.52
1,4-Dichlorobenzene	106-46-7	EPA TO-15	3	0.02	0.52
Methyl tert butyl ether	1634-04-4	EPA TO-15	10	0.012	0.025
p/m-Xylene	179601-23-1	EPA TO-15	5	0.024	0.1
o-Xylene	95-47-6	EPA TO-15	5	0.013	0.1
Xylene (Total)	1330-20-7	EPA TO-15	5	1.0	0.3
cis-1,2-Dichloroethene	156-59-2	EPA TO-15	5	0.0072	0.52

Table 4
Indoor Air Analyte List, Method, and Reporting and Detection Limits

Parameter	CAS RN	Analytical Method	Groundwater Screening Levels[1] (ug/L)	Method Detection Limit	Reporting Limit
Dibromomethane	74-95-3	EPA TO-15	5	0.2	0.5
1,4-Dichlorobutane	110-56-5	EPA TO-15	--	5.0	0.464
1,2,3-Trichloropropane	96-18-4	EPA TO-15	0.04	0.0086	0.5
Styrene	100-42-5	EPA TO-15	5	0.012	0.1
Dichlorodifluoromethane	75-71-8	EPA TO-15	5	0.0085	0.53
Acetone	67-64-1	EPA TO-15	50	0.23	5.2
Carbon disulfide	75-15-0	EPA TO-15	60	0.16	1.1
2-Butanone	78-93-3	EPA TO-15	50	0.11	1.0
Vinyl acetate	108-05-4	EPA TO-15	--	1.2	5.0
4-Methyl-2-pentanone	108-10-1	EPA TO-15	--	0.073	1.1
2-Hexanone	591-78-6	EPA TO-15	50	0.066	1.1
Ethyl methacrylate	97-63-2	EPA TO-15	3	5.0	0.606
Acrylonitrile	107-13-1	EPA TO-15	5	0.11	1.0
Bromochloromethane	74-97-5	EPA TO-15	5	2.5	0.138
Tetrahydrofuran	109-99-9	EPA TO-15	50	0.067	1.0
2,2-Dichloropropane	594-20-7	EPA TO-15	5	0.14	0.5
1,2-Dibromoethane	106-93-4	EPA TO-15	0.0006	0.0067	0.52
1,3-Dichloropropane	142-28-9	EPA TO-15	5	0.26	0.5
1,1,1,2-Tetrachloroethane	630-20-6	EPA TO-15	5	0.0091	0.1
Bromobenzene	108-86-1	EPA TO-15	5	0.0042	0.5
n-Butylbenzene	104-51-8	EPA TO-15	5	0.077	0.52
sec-Butylbenzene	135-98-8	EPA TO-15	5	0.073	0.52
tert-Butylbenzene	98-06-6	EPA TO-15	5	0.080	0.52
o-Chlorotoluene	95-49-8	EPA TO-15	5	0.26	0.5
p-Chlorotoluene	106-43-4	EPA TO-15	5	0.26	0.5
1,2-Dibromo-3-chloropropane	96-12-8	EPA TO-15	0.04	0.014	1.0
Hexachlorobutadiene	87-68-3	EPA TO-15	0.5	0.013	0.52
Isopropylbenzene	98-82-8	EPA TO-15	5	0.077	0.52
p-Isopropyltoluene	99-87-6	EPA TO-15	5	0.081	0.52
Naphthalene	91-20-3	EPA TO-15	10	0.022	0.52
n-Propylbenzene	103-65-1	EPA TO-15	5	0.077	0.53
1,2,3-Trichlorobenzene	87-61-6	EPA TO-15	5	0.27	0.5
1,2,4-Trichlorobenzene	120-82-1	EPA TO-15	5	0.02	0.05
1,3,5-Trimethylbenzene	108-67-8	EPA TO-15	5	0.014	0.52
1,3,5-Trichlorobenzene	108-70-3	EPA TO-15	5	2	0.127
1,2,4-Trimethylbenzene	95-63-6	EPA TO-15	5	0.016	0.1
trans-1,4-Dichloro-2-butene	110-57-6	EPA TO-15	5	2.5	0.173
Ethyl ether	60-29-7	EPA TO-15	--	2.5	0.15
Methyl Acetate	79-20-9	EPA TO-15	--	0.24	0.5

Table 4
Indoor Air Analyte List, Method, and Reporting and Detection Limits

Parameter	CAS RN	Analytical Method	Groundwater Screening Levels[1] (ug/L)	Method Detection Limit	Reporting Limit
Ethyl Acetate	141-78-6	EPA TO-15	--	0.28	2.1
Isopropyl Ether	108-20-3	EPA TO-15	--	0.070	1.1
Cyclohexane	110-82-7	EPA TO-15	--	0.15	1.1
Ethyl-Tert-Butyl-Ether	637-92-3	EPA TO-15	--	0.064	1.1
Tertiary-Amyl Methyl Ether	994-05-8	EPA TO-15	--	0.065	1.1
1,4-Dioxane	123-91-1	EPA TO-15	--	0.0087	0.1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	EPA TO-15	5	0.0081	0.54
Methyl cyclohexane	108-87-2	EPA TO-15	--	0.26	0.5
1,4-Diethylbenzene	105-05-5	EPA TO-15	--	2.0	0.392
4-Ethyltoluene	622-96-8	EPA TO-15	--	0.085	0.53
1,2,4,5-Tetramethylbenzene	95-93-2	EPA TO-15	5	0.22	0.5

Notes:

--: not applicable

μg/m^3: micrograms per cubic meter

EPA: U.S. Environmental Protection Agency

Table 5
Waste Characterization Analyte List, Methods, and Reporting and Detection Limits

Parameter	Recommended Analytical Method	MDL[1]	MRL[1]
Conventionals (mg/kg)			
pH (SU)	EPA 9045D	—	—
Ignitablility (°)	EPA 1030	—	—
Corrosivity	EPA 9040C	—	—
Total Solids (%)	SM 2540 G	0.10	0.10
TCLP Metals (mg/L)			
Arsenic	EPA 6020A	—	1.0
Barium	EPA 6020A	—	0.500
Cadmium	EPA 6020A	—	1.000
Chromium	EPA 6020A	—	0.100
Lead	EPA 6020A	—	0.100
Mercury	EPA 6020A	—	0.0003
Selenium	EPA 6020A	—	0.500
Silver	EPA 6020A	—	0.100
TCLP VOCs (ug/L)			
Benzene	EPA 8260C	—	50
Carbon tetrachloride	EPA 8260C	—	50
Chlorobenzene	EPA 8260C	—	50
Chloroform	EPA 8260C	—	50
1,2-Dichloroethane	EPA 8260C	—	50
1,1-Dichloroethene	EPA 8260C	—	50
1,4-Dichlorobenzene	EPA 8260C	—	100
2-Butanone	EPA 8260C	—	100
Tetrachloroethene	EPA 8260C	—	50
Trichloroethene	EPA 8260C	—	50
Vinyl chloride	EPA 8260C	—	50
TCLP SVOCs (ug/L)			
2,4,5-Trichlorophenol	EPA 8270D	—	—
2,4,6-Trichlorophenol	EPA 8270D	—	—
2,4-Dinitrotoluene	EPA 8270D	—	—
2-Methylphenol	EPA 8270D	—	—
3- & 4-Methylphenol	EPA 8270D	—	—
Hexachlorobenzene	EPA 8270D	—	100
Hexachlorobutadiene	EPA 8270D	—	50
Hexachloroethane	EPA 8270D	—	0.005
Nitrobenzene	EPA 8270D	—	100
Pentachlorophenol	EPA 8270D	—	0.01
Pyridine	EPA 8270D	—	500

Table 5

Waste Characterization Analyte List, Methods, and Reporting and Detection Limits

Parameter	Recommended Analytical Method	MDL[1]	MRL[1]

Notes:

1. Actual MDLs and MRLs may vary based on sample aliquot size, moisture content, and required dilution factor.

—: not applicable
mg/L: milligrams per liter
ug/L: microgram per liter
EPA: U.S. Environmental Protection Agency
MDL: method detection limit
mg/kg: milligrams per kilogram
mg/L: milligrams per liter
MRL: method reporting limit
SM: Standard Method
SVOC: semivolatile organic compound
VOC: volatile organic compound
TCLP: toxicity characteristic leaching procedure
PCB: polychlorinated biphenyl

Table 6
Laboratory Quality Control Sample Analysis Summary

Analysis Type	Initial Calibration	Ongoing Calibration	Laboratory Control Samples	Duplicates	Matrix Spikes	Matrix Spike Duplicates	Method Blanks	Surrogate Spikes
Total solids	Daily[1,2]	N/A	N/A	1 per 10 samples	N/A	N/A	1 per 20 samples	N/A
Metals	Daily[3]	Every 10 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	1 per 20 samples	N/A
PFAS	As needed[4]	Every 10 samples	1 per 20 samples	1 per 20 samples	N/A	N/A	1 per 20 samples	Every sample
VOCs and SVOCs	As needed[4]	1 per 20 samples	1 per 20 samples	N/A	N/A	N/A	1 per 20 samples	Every sample

Notes:
1. Calibration and certification of drying ovens and weighing scales are conducted bi-annually.
2. Scale should be calibrated with Class 5 weights daily; weights must bracket the weight of sample and weighing vessel.
3. Initial calibration verification and calibration blank must be analyzed at the beginning of each batch.
4. Initial calibrations are considered valid until the ongoing continuing calibration no longer meets method specifications. At that point, a new initial calibration is performed.

N/A: not applicable
SVOC: semivolatile organic compound
VOC: volatile organic compound

Table 7
Data Quality Objectives

Parameter	Precision[1]	Accuracy[2]	Completeness
Soil Samples			
Total solids	± 20% RPD	N/A	95%
VOCs	± 35% RPD	50–150% R	95%
SVOCs	± 35% RPD	50–150% R	95%
Metals	± 30% RPD	75–125% R	95%
Mercury	± 30% RPD	70 to 130% R	95%
PFAS	± 30% RPD	70 to 130% R	95%
Groundwater Samples			
Total suspended solids	± 20% RPD	N/A	95%
Metals	± 20% RPD	80–120% R	95%
VOCs	± 35% RPD	60–140% R	95%
SVOCs	± 35% RPD	60–140% R	95%
PFAS	± 35% RPD	60–140% R	95%
Indoor Air Samples			
VOCs	± 35% RPD	50–150% R	95%
Waste Characterization Samples			
SVOCs, VOCs	± 35% RPD	50 to 150% R	95%
Metals	± 25% RPD	75 to 125% R	95%

Notes:
1. When the sample concentration is greater than five times the reporting limit.
2. Accuracy goals apply to laboratory control samples and matrix spike samples, as applicable to the analysis.
N/A: not applicable
R: recovery
RPD: relative percent difference
SVOC: semivolatile organic compound
VOC: volatile organic compound

Appendix B
Standard Operating Procedures (SOP)

STANDARD OPERATING PROCEDURES

Standard Operating Procedure

Field Records

SOP 001

Project: Syracuse Bread Factory

Revision Date: June 2023

1. Purpose

The purpose of this Standard Operating Procedure (SOP) is to establish uniform procedures for the documentation of field activities during implementation of field tasks. Field documentation will consist of field forms, daily logs, photographs, and electronically recorded field measurements.

2. Equipment List

The following is a list of equipment that may be necessary to carry out the procedures contained in this SOP. Additional equipment may be required pending field conditions including, but not limited to, the following:

- Daily logs
- Field forms and records
- Waterproof pen
- Camera

3. Documentation Procedures

Field team members will keep a daily record of significant events, observations, and measurements on paper field forms. All field activities will be recorded on forms specific to the collection activity and will be maintained by the Field Team Leader. Field notes should be maintained for all field activities (e.g., the collection of samples or the gathering of environmental data). The on-site field representative will record on the daily log forms information pertinent to the field task, including, at a minimum, the following information:

- Project name
- Field personnel on site
- Health and safety discussions
- Soil boring location ID
- Well location number
- Observations made during sample collection, including weather conditions, complications, and other details

- Sampling method and description of activities
- Name, telephone number, and category of site visitors (e.g., Client, Regulatory, Municipal, or General Public).
- Meetings in the field associated with sampling/installation activities

Field notes shall be written in water-resistant paper logbooks or on pre-printed forms, and all field documentation will be made using an indelible, waterproof ink pen. Corrections will be made by drawing a single line through the error, writing in the correct information, then dating and initialing the change. Blank pages or lines in the field logbook will be lined out, dated, and initialed at the end of each sampling day. The field forms will be scanned into the project file directory as convenient during the sampling event or upon completion of each sampling event.

4. Quality Assurance/Quality Control

It is the responsibility of the Field Team Leader to periodically check to ensure that the procedures are in conformance with those stated in this SOP.

Attachment

Attachment 1 Daily Log

Attachment 1

Daily Log

Daily Log

Anchor QEA, LLC
290 Elwood Davis Rd, Suite 340
Liverpool, NY 13088
Phone 315.453.9009 Fax 315.453.9010

PROJECT NAME: DATE:

SITE ADDRESS: PERSONNEL:

WEATHER:	WIND FROM:	N	NE	E	SE	S	SW	W	NW	LIGHT	MEDIUM	HEAVY
		SUNNY		CLOUDY		RAIN			?	TEMPERATURE:	° F .	° C

[Circle appropriate units]

TIME	COMMENTS

Signature:

Ground Penetrating Radar (GPR)

SOP 002

Project: Syracuse Bread Factory

Revision Date: June 2023

1. Purpose

The purpose of this Standard Operating Procedure (SOP) is to establish uniform procedures for the identification of subsurface infrastructure using the geophysical survey of ground penetrating radar (GPR). GPR equipment transmits high frequency electromagnetic waves into the ground and detects energy reflected back to the surface. Energy is reflected along subsurface interfaces that possess different electrical properties. Reflections typically occur at lithologic contacts or when the electromagnetic waves encounter subsurface materials having high electrical contrasts, including metal objects such as underground storage tanks (USTs), drums, and utility pipes. These reflections are detected by the antenna and processed into an electrical signal, which can then be used to image the subsurface feature.

Typical objectives of a GPR survey are to image the lateral extent (length and width) of subsurface infrastructure such as concrete, asphalt, metals, pipes, or cables. The results of the survey can be used in combination with information obtained from other preliminary activities to identify areas for test pitting and soil boring.

This SOP describes the equipment, field procedures, materials, and documentation procedures necessary to perform GPR surveys. The details within this SOP should be used in conjunction with the project work plan.

2. Scope and Applicability

This SOP applies to task orders and projects associated with Anchor QEA. This SOP may be modified, as required, depending on site-specific conditions, equipment limitations, or limitations imposed by the procedure. The ultimate procedure employed will be documented in the appropriate project work plan or reports. If changes to the procedures are required due to unanticipated field conditions, the changes will be discussed with the project manager as soon as practicable and will be documented in the final project report.

3. Personnel Qualifications

Only qualified personnel will lead geophysical survey activities. Training requirements for direction of these activities include reviewing this SOP, applicable SOPs provided by subcontractor and/or manufacturer, guidance documents, and health and safety training.

Field personnel executing these procedures will have read, be familiar with, and comply with the requirements of this SOP. Additionally, field personnel will be under the direct supervision of qualified professionals who are experienced in performing the tasks required for geophysical data collection.

Anchor QEA field personnel and subcontractors will have completed current company-required health and safety training (e.g., 40-hour Hazardous Waste Operations training, site-specific training, and first aid and cardiopulmonary resuscitation [CPR] training) as needed.

4. Equipment List

Equipment and materials that will be used for performing a GPR survey may include the following:

- Appropriate personal protective equipment (PPE), as specified in the site Health and Safety Plan (HASP; Appendix C)
- Indelible ink pen
- Non-conductive tape measure and stakes or marker flags
- Survey equipment or GPS system
- Geophysical Survey System, Inc. (GSSI) Subsurface Interfacing Radar (SIR) System-2000 radar or equivalent
- One antenna of an appropriate frequency (typically 100 to 500 megahertz) to achieve the survey depth needed, and delineate the subsurface features of interest
- Connecting cables, survey wheel, and 12-volt power source
- Camera
- Whiteboard with erasable markers
- Field logbook

5. Health and Safety Considerations

Health and safety issues for the work associated with this SOP, including physical, chemical, and biological hazards, are addressed in the project HASP (Appendix C). The HASP will be followed during all activities conducted by Anchor QEA personnel and subcontractors.

The site-specific HASP and GPR subcontractor's HASP will be used to guide the performance of the GPR survey in a safe manner. Job Safety Analyses (JSAs) will be prepared by Anchor QEA and subcontractors.

6. GPR Survey Procedure

Prior to initiating the GPR survey, any known surface or potential subsurface conditions (e.g., utilities, foundation remnants) that may present in the work area should be identified and located to the extent practical.

- Obtain and review plates, drawings, and maps for each subsurface work location, if available.
- Contact the facility and ask if they have any historical information on subsurface utilities in the area of interest. Identify utility lines that would be anticipated to be present based on facility usage (e.g., electric, water, natural gas).
- Conduct mark-outs using the following methods:
  - Code 753 call in (i.e., "811" or "Dig Safely New York") at 800-272-4480 for public utilities.
  - Private Utility Contractor for private property, if applicable.
- Inspect the area for cuts in the asphalt or dips in asphalt surfaces that may represent past work or settlement along a utility line. Identify lamp posts, electrical enclosure boxes, or detached buildings that may contain utility connections other than from the main service connection to the site.

Any identified or suspected utility lines within the area of interest for which reliable mapping is not available should be an area of focus during the GPR survey. In addition, the GPR results can be used to verify the accuracy of available utility and structural information.

The GPR survey procedures are outlined as follows:

1. Identify the traverse location(s) in the field notebook or on a site plan map.
2. Don personal protective equipment as required by the site-specific HASP (Appendix C).
3. Establish a temporary control grid over the designated survey area(s) using conventional surveying methods and/or referenced to the site plan using a baseline established from site features. Lay out the measuring tape along the desired traverse, or mark a reference grid on the ground using the measuring tape.
4. Initial calibration of the GPR system and antenna will be performed by the operator using subsurface soil boring information, if available, and observed response of the GPR's analog signal. Calibration of the system will be completed using the GSSI system setting and adjusting the range and dielectric constant parameters to the approximate subsurface conditions at the site. If available, calibrate the depth (using the dielectric constant) of the GPR over a buried pipe

(or other object) of known depth. Re-calibrate the equipment if the antenna or system settings are changed.

5. Connect the GPR control unit and antenna with appropriate cables, and adjust the instrument gains, if needed, to obtain a satisfactory record throughout the desired survey depth range.
6. Use the survey control grid to determine the GPR survey line location and sequence for collecting the GPR data. Optionally, use a differential GPS system connected to the GPR system to locate the data collected along each survey line.
7. Record GPR data while slowly pulling the antenna(s) along the survey traverse(s). Annotate the record using the antenna's marker switch, at even distance increments (10 feet, or as needed).
8. Make note of any variable surface condition (e.g., terrain changes, surface cover materials, standing water) that could affect data interpretation. Also note any surface expressions of potential buried utilities or structures.
9. Conduct data analysis in accordance with the manufacturer's recommendations RADAN for Windows software, or equivalent and industry practice.

7. Quality Assurance

It is the responsibility of the field team leader to periodically check to ensure the procedures are in conformance with those stated in this SOP.

Standard Operating Procedure

Utility Clearance

SOP 003

Project: Syracuse Bread Factory

Date: June 2023

1. Purpose

The purpose of this Standard Operating Procedure (SOP) is to establish uniform procedures for Utility Clearance prior to and in support of the drilling and test pit excavation of fill and unconsolidated soils.

This SOP describes the requirements, process, and documentation procedures necessary to locate and mark utilities before soil boring and well installation.

The details within this SOP should be used in conjunction with the project work plan.

2. Scope and Applicability

This SOP applies to task orders and projects associated with Anchor QEA. This SOP may be modified, as required, depending on site-specific conditions, equipment limitations, or limitations imposed by the procedure. The ultimate procedure employed will be documented in the appropriate project work plan or reports. If changes to the installation procedures are required due to unanticipated field conditions, the changes will be discussed with the project manager as soon as practicable and will be documented in the final project report.

3. Summary of Method

Utility clearance is required before any subsurface work associated with this project. This is an Anchor QEA requirement. The following is a summary of the methods for utility clearance:

- Obtain and review plates, drawings, and maps for each subsurface work location (Anchor QEA lead) if available
- Conduct mark-outs using the following methods:
  - Code 753 call in (i.e., "811" or "Dig Safe New York") at 800-272-4480 (drilling subcontractor lead with Anchor QEA confirmation) for public utilities
  - Private Utility Contractor for private property if applicable (Anchor QEA lead)
- Site walk (Anchor QEA lead)
- Utility clearance – sample location confirmation (Anchor QEA lead)

  - Tolerance Zone
  - Test Pit/Soft Dig
  - Sample location field measurements to fixed objects
  - Re-excavate cleared locations by hand, as needed
- Documentation
  - Utility Contact Prevention Checklist (Anchor QEA lead)
- Notice-to-Proceed (Anchor QEA lead)

4. Personnel Qualifications

Only qualified personnel will manage utility clearance activities. Training requirements for direction of utility clearance activities include reviewing this SOP, other applicable SOPs, guidance documents, and health and safety training.

Field personnel executing these procedures will have read, be familiar with, and comply with the requirements of this SOP. Additionally, field personnel will be under the direct supervision of qualified professionals who are experienced in performing the tasks required for utility clearance.

Anchor QEA field personnel and subcontractors will have completed current company-required health and safety training (e.g., 40-hour Hazardous Waste Operations training, site-specific training, and first aid and cardiopulmonary resuscitation [CPR] training) as needed.

5. Equipment List

Equipment and materials that will be used by Anchor QEA personnel for overseeing and directing utility clearance include the following:

- Camera
- Tape measure
- Spray paint
- Field logbook
- Utility Contact Prevention Checklist
- Appropriate personal protective equipment (PPE), as specified in the site Health and Safety Plan (HASP)
- Indelible ink pen
- Whiteboard with erasable markers
- Air monitoring equipment (during sample location confirmation Test Pit/Soft Dig)

6. Cautions

Special care must be taken when conducting Test Pit/Soft Dig activities, as well as subsurface work even following completion of Utility Clearance procedures. It should be assumed that utilities can exist in any work area. Completion of all Utility Clearance procedures does not fully guarantee utilities are not present in the work area. As such, subsurface work must always be conducted with an abundance of caution, given the substantial and historic level of urbanization of the site area.

7. Health and Safety Considerations

Health and safety issues for the work associated with this SOP, including physical, chemical, and biological hazards, are addressed in the project HASP (Appendix C). The HASP will be followed during all activities conducted by Anchor QEA personnel and subcontractors.

The site-specific HASP and (as needed) subcontracted utility clearance firm's HASP will be used to guide the locating activities in a safe manner. Job Safety Analyses (JSAs) will be prepared for oversight by Anchor QEA and subcontractors. The following specific health and safety issues must be considered when conducting locating activities:

- Underground and overhead utility hazards must be mitigated prior to subsurface work.
- Test Pit/Soft Dig equipment present a variety of safety hazards. Equipment must be inspected each day prior to use. All personal must know where the emergency "kill" switch is, and the switch must be tested daily. Only the equipment operator and helper may approach the equipment during locating activities.
- Air monitoring will be conducted for chemicals at action level as established in the site-specific HASP.
- Appropriate PPE must be worn.
- Potential hazards from working in a public area and potential hazards to the public by locating activities must be addressed before activities begin and as conditions change.
- Waste generated during the locating activities must be properly managed in accordance with facility and applicable regulatory requirements.

8. Procedure

During utility clearance activities, the Utility Contact Prevention Checklist (Attachment 1) will be used and/or filled in to ensure all practicable steps have been taken to locate utilities in the work area. It is the responsibility of Anchor QEA project managers, with the assistance of the field team members, to ensure these documents are used for each sampling location.

8.1 Obtain and Review Plates, Drawings and Maps for Each Subsurface Work Location

Efforts will be made to obtain hard copies of available utility plates, drawings, and/or maps by Anchor QEA if available. Drawings, plates, etc., should be reviewed as a preliminary step to determine the type and approximate size and location of utilities in the vicinity of the sampling location. The drawing title, most recent revision date shown on the drawings, approximate scale, and source shall be documented in the appropriate space(s) on the Utility Contact Prevention Checklist (Attachment 1).

The source of the drawings may vary depending on whether the site is a private/public property or extends into a public street/sidewalk. Drawings for private properties and facilities, such as apartments, schools, churches, residences, etc., can typically be reviewed at, and/or obtained from, the property/facility manager and Department of Public Works and/or Department of Buildings in the municipality where the property is located.

8.2 Conduct Utility Mark-Outs

Given the urban/public/private nature of the site and substantial history of development and redevelopment, two types of utility mark-outs may be required by default for each sampling location:

- Code 753 call in (i.e., "811" or "Dig Safe New York") at 800-272-4480 for public property
- Private Utility Contractor for private property

The results of the utility mark-outs will be documented on the Utility Contact Prevention Checklist (Attachment 1).

8.2.1 Code 753 – Public Property

A Code 753 utility mark out by calling (800) 272-4480 must be conducted for each sampling location by the excavator with Anchor QEA support (i.e., providing sampling locations). Consistent with the One-Call (also called Dig Safe New York) criteria, the request should be made at least 72 hours prior to initiating fieldwork.

Confirmation that mark outs completed under Code 753, and as received by e-mail, facsimile or telephone from the participating utility companies, must be documented on the Utility Contact Prevention Checklist (Attachment 1). The mark-outs must be maintained by the excavator. If the physical markings become faint or obscure, they must be refreshed by over-painting with new paint as needed. When the utility mark-outs are being refreshed, the Anchor QEA field lead MUST be present and observe and document (via photographs) this activity.

When performing the Code 753 utility mark out, confirm the ticket includes the property address (in addition to cross streets) and has the "private property" portion of the Dig Site Information completed as needed:

Example Description of Dig Site Information and Location Portion of One Call Ticket

Dig Site Information			
Type of Work:	SOIL BORINGS		
Type of Equipment:	DRILL RIG		
Work Being Done For:	ANCHOR QEA		
In Street: X	On Sidewalk: X	Private Property: X	Other:
Front: X	Rear: X	Side: X	
Dig Site Location			
State:	NY	County:	NEW YORK
Place:	MANHATTAN		
Dig Street:	PETER COOPER ROAD	Address:	2
Nearest Intersecting Street:	AVENUE C		
Second Intersecting Street:	1ST AVE		
Location of Work:			
MARK CROSS STREET TO CROSS STREET AND FRONT REAR AND BOTH SIDES OF ADDRESS			
Remarks:			
Map Coord NW Lat: 40.736820	Lon: -73.979940	SE Lat: 40.732575	Lon: -73.974427

8.2.2 Private Utility Contractor – Public and Private Property

Sampling location may be investigated by a private utility contractor using non-intrusive methods to identify potential utilities in the work area. Locating activities will include a minimum 5-foot by 5-foot buffer around each sampling location. The non-intrusive investigations will consist at a minimum of a ground penetrating radar (GPR) survey and an electromagnetic utility clearance survey.

Following locating activities, newly identified, known utilities will be marked in standard industry colors (e.g., blue for water lines), and probable utilities (i.e., an object identified in the subsurface by either means employed but which could not be readily identified by tracing to a known termination such as a manhole or gas valve) will be marked with orange paint. Markings made by the private utility contractor will not obscure or supersede markings done during the Code 753 mark-out. Following the locating activities, the private utility contractor will prepare a report for each sampling location that documents on maps and by photographs/measurements known and probably utilities, supported by:

- Review of applicable utility drawings
- Reconciliation of drawings with mark-outs identified by the Code 753 survey at the property perimeter
- Determination of the presence and type nature of utilities and confirm their configuration during the utility survey
- Inspection of the site to identify where utility service enters and/or leaves the property and/or building

- Identification of utility access-ways including manholes, vaults, gas, and/or water valves boxes and telephone, cable and communication boxes
- Identification of apparent uncertainties such as manholes containing service lines that apparently go to the building or property, but that cannot be located within the basement of the building or on site

8.3 Site Walk

After completion of the activities outlined above, a site walk shall be conducted by Anchor QEA. All site walk activities and results will be documented on the Utility Contact Prevention Checklist (Attachment 1).

The key objectives of the site walk are as follows:

- Review all planned locations where invasive activities will be performed.
- Adjust the positions of the locations away from utilities as marked out (as necessary).
- Collectively determine the appropriate utility clearance activities (e.g., test pits, soft digs) that will be performed at each location.

Other site conditions and project issues assessed during the site walk should include the following:

- Presence and location of overhead utilities and/or obstructions that might prevent the safe operation of equipment
- Presence of, or need for, appropriate grounding for electrical equipment at the site
- Site access to equipment
- Storage of equipment/supplies overnight (e.g., establish a staging area)
- Storage and management of investigative derived waste (IDW)
- Hours of on-site work
- Permits needed, if any
- Review roles and responsibilities of all project personnel who will be onsite
- Review site and emergency contacts
- Review anticipated schedule of work and contingency action as deemed appropriate

8.4 Utility Clearance – Sample Location Confirmation

Once utilities have been identified using the suite of methods described above (drawing reviews, mark-outs via Code 753, private utility contractor, and site walk), sample location confirmation will be conducted to further protect workers from contacting utilities and utility damage.

8.4.1 Tolerance Zone

Sample locations will be moved outside the tolerance zone, if possible. If no tolerance zone is marked out during the utility survey (i.e., only a utility center line is marked), the tolerance zone will be defined in the field as follows: the distance of one-half of the known diameter of the utility plus two feet on either side of the centerline as marked out.

8.4.2 Test Pit/Soft Dig

After adjusting sample locations for tolerance zones, a utility clearance test pit or soft dig may be excavated to a minimum of 6-feet below ground surface using non-mechanical methods, such as hand auger, post-hole digger and/or vacuum truck. The diameter of the test pit will be at least two inches wider than the outer diameter (OD) of the mechanized drilling equipment. The 6-foot depth is consistent with the concept that most utilities are typically installed within the top three to four feet of the subsurface. The need for performing a soft dig will be determined based on results of the private utility contractor, Code 753, and Site walk.

NOTE: Utilities may be deeper than four feet due to buildup of surface grade on properties and/or streets or right-of-ways. Although the original depth of utilities is anticipated to be within the upper five feet, utilities that are buried in areas that have been built up will presently be deeper by the thickness of the built-up material.

Where physical constraints prohibit the relocation of proposed sample locations outside the tolerance zone, the adjacent utility(ies) will be exposed by excavating using non-mechanical methods to visually confirm its physical location and configuration. This confirmatory excavation will be completed in addition, a 6-foot excavation at the specific location being investigated (e.g., soil boring, monitoring well boring), as described above.

Photographs and measurements will be taken at each test pit/soft dig location to document the inside conditions of each excavation and the absence of utilities.

8.4.3 Sample Location Field Measurements to Fixed Objects

Once sample locations have been confirmed, no less than three lateral measurements to the nearest inch from fixed objects will be collected, photographed, and documented on the Utility Contact Prevention Checklist (Attachment 1) to enable future precise re-location of the confirmed sample location.

8.4.4 Re-Excavate Cleared Locations

Prior to beginning the drilling activities at a sample location (which was previously cleared following the steps outlined in this document), the driller will manually re-excavate, as needed, the bore hole to 6-feet below ground surface and visually re-confirm the absence of subsurface utilities. Following completion of the re-excavation and visual re-confirmation that no subsurface utilities are visibly present, the drilling will begin.

8.5 Documentation

All activities conducted under this SOP will be documented, at a minimum, on the Utility Contact Prevention Checklist (Attachment 1). Additional required field documentation includes field notes and photographs. Documentation from utility mark-out efforts by others (i.e., Code 753 and private utility contractors must also be maintained).

9. Waste Management

IDW, rinse water, PPE, and other waste materials generated during utility clearance activities (waste) must be placed in appropriate containers and labeled. Waste materials will be stored securely in a location that has been approved by Syracuse Bread Factory.

10. Data Recording and Management

All information relevant to the activities above will be recorded by Anchor QEA field staff using the field logbook and on the Utility Contact Prevention Checklist (Attachment 1) to enable future precise re-location of the confirmed sample location, at a minimum. Field equipment decontamination activities and waste management activities will be recorded in the field logbook. Records generated as a result of implementing this SOP will be controlled and maintained in the project record files in accordance with client-specific requirements.

11. Quality Assurance

It is the responsibility of the field team leader to periodically check to ensure the procedures are in conformance with those stated in this SOP.

Attachment

Attachment 1 Utility Contact Prevention Checklist

Attachment 1

Utility Contact Prevention Checklist

Utility Contact Prevention Checklist

NOTE: Utility mark-out requirements vary from state to state;
consult state authorities before beginning work.

Purpose: This form is intended to help the Field Lead confirm that underground or overhead utilities are identified to the extent practicable and consistent with applicable regulations **PRIOR** to site work.

INVESTIGATIONS MUST NOT OCCUR UNTIL MULTIPLE LINES OF EVIDENCE INDICATE THAT SUBSURFACE OR OVERHEAD UTILITIES ARE NOT PRESENT IN THE WORK AREA

Project Name/No: ______________________ **Date:** ______________________

Field Lead: ______________________ **Project Address:** ______________________

Project Manager: ______________________ **Health & Safety Officer:** ______________________

Emergency Contact Information for One Call: ______________________

Duration/Summary of Work to be Performed: ______________________

____

____

Consideration	Check		Explanation	Initial
Has the state One Call been contacted?	☐ Yes	☐ No		
Has the property owner or client been contacted for local knowledge of utilities, as applicable?	☐ Yes	☐ No		
Does the property owner or client have specific utility contact prevention procedures and, if so, have they been completed?	☐ Yes	☐ No		
Are any as-built drawings available? If so, do they show any utilities?	☐ Yes	☐ No		
Has a visual inspection of the work area(s) been completed?	☐ Yes	☐ No		
Has the potential presence of in-water utilities been assessed (shore markers, streets dead-ending at water's edge, etc.)	☐ Yes	☐ No		
Is evidence of electrical utilities present? (electric meters on structures, conduits, overhead lines, light poles, etc.)	☐ Yes	☐ No		
Is evidence of water/sewer utilities present? (water meter, hydrants, restrooms, grates in ground, etc.)	☐ Yes	☐ No		
Is evidence of telecommunications utilities present? (fiber optic warning signs, conduits from utility poles, wall-mounted boxes, etc.)	☐ Yes	☐ No		
Is other evidence of utilities present? (unknown ground markings, manholes or valve covers, "Call Before You Dig" signs, linear asphalt or concrete repair characteristics, liner subsidence of ground surface, pin flags or stakes, etc.)	☐ Yes	☐ No		

PLAYING IT SAFE

Utility Contact Prevention Checklist

ANCHOR QEA

NOTE: Utility mark-out requirements vary from state to state; consult state authorities before beginning work.

Consideration	Check		Explanation	Initial
Has a private locating service been contacted?	☐ Yes	☐ No		
Were any utilities identified and marked out through a private locating service? If so, duplicate mark-outs on site drawings.	☐ Yes	☐ No		
Are there any fiber optic cables, fuel lines, or high-pressure lines within 50 feet of work locations?	☐ Yes	☐ No		
If fiber optic cables, fuel lines, or high-pressure lines are within 50 feet, has an agreement with the utility owner been established?	☐ Yes	☐ No		
Can a test borehole be advanced by hand digging, probing, post-hole digging, and/or air knifing to 5 feet below ground surface (bgs)?	☐ Yes	☐ No		
If hand digging, probing, post-hole digging, and/or air knifing to 5 feet bgs is not possible, can a non-invasive geophysical investigation be conducted? If not, why?	☐ Yes	☐ No		
Other considerations:				

NOTE: Please fill in second page and attach additional reports, drawings, or other information, as necessary.

Confirmation Number: ______________________

Contact Name: ______________ **Organization:** ______________

Contact Date: ______________ **Contact Time:** ______________

Response: ______________________

____

____

____

Completed by:

Printed Name ______ Signature ______ Date ______

Contractor:

Printed Name ______ Signature ______ Date ______

Standard Operating Procedure

Test Pit Excavation

SOP 004

Project: Syracuse Bread Factory

Revision Date: June 2023

1. Purpose

The purpose of this Standard Operating Procedure (SOP) is to establish uniform procedures for the excavation of fill and unconsolidated soils. Test pits may be utilized to identify subsurface structures, to obtain bulk soil samples that cannot be collected by soil borings, and/or to characterize subsurface conditions.

This SOP describes the equipment, field procedures, materials, and documentation procedures necessary to excavate test pits. The details within this SOP should be used in conjunction with the project work plan and the SOP should be added as an appendix to the work plan.

2. Scope and Applicability

This SOP applies to all Anchor QEA field work involving excavation of test pits and should be included as an attachment to the work plan documentation developed for the project. This SOP may be modified, as required, depending on site-specific conditions, equipment limitations, or limitations imposed by the procedure. If changes to the procedures are required due to unanticipated field conditions, the changes will be discussed with the project manager as soon as practicable and will be documented in the final project report.

3. Summary of Method

The subsurface investigations will use equipment such as a backhoe or excavator. The equipment type and size will be determined based on project objectives, required depth/size of excavation, and site access limitations.

Prior to any excavation, utility clearance will be performed in accordance with SOP #3.

Once the location has been cleared, the test pit can be excavated deeper, or the center of the cleared hole can be marked and backfilled to be excavated later.

4. Personnel Qualifications

Only qualified personnel will lead excavation activities as defined in the project work plan and the project specific health and safety plan. Training requirements for these activities include reviewing this SOP, applicable SOPs provided by subcontractor and/or manufacturer, guidance documents, and appropriate health and safety training, if necessary.

Field personnel executing these procedures will have read, be familiar with, and comply with the requirements of this SOP. Additionally, field personnel will be under the direct supervision of qualified professionals who are experienced in performing the tasks required for data and sample collection.

Anchor QEA field personnel and subcontractors will have completed current company-required health and safety training (e.g., 40-hour Hazardous Waste Operations training, site-specific training, and first aid and cardiopulmonary resuscitation [CPR] training) in accordance with the project specific health and safety plan.

5. Equipment List

Equipment and materials that will be used for overseeing and directing test pit excavations may include the following:

- Appropriate personal protective equipment (PPE), as specified in the site Health and Safety Plan (HASP; Appendix C)
- Indelible ink pen
- Tape measure and/or survey rod
- Putty knife or other tools for inspection of recovered soil samples
- Camera
- Whiteboard with erasable markers
- Air monitoring equipment if required based on the project specific health and safety plan
- Soil description aids (e.g., Munsell color chart and grain or size charts)
- Field logbook; field forms for sample collection, material description, and sketches; or notebook with relevant forms
- Safety knife or scissors
- Traffic cones and flagging if working in a high traffic area
- Photo-ionization device with appropriate lamp and calibration gas

This list does not include equipment that will be provided by subcontracted equipment operators. However, to address potential releases to the environment, the following equipment is required in addition to all necessary supplies for test pit excavation:

- Spill-containment and clean-up kit
- Secondary containment for backhoe/excavator and all equipment that contains fuels or hydraulic fluids

6. Health and Safety Considerations

Health and safety issues for the work associated with this SOP, including physical, chemical, and biological hazards, are addressed in the project HASP (Appendix C). The HASP will be followed during all activities conducted by Anchor QEA personnel and subcontractors.

The site-specific HASP and excavation subcontractor's HASP will be used to guide the installation of the test pits in a safe manner. Job Safety Analyses (JSAs), included in the HASP, will be prepared for excavation oversight by Anchor QEA and subcontractors. The following specific health and safety issues must be considered when excavating test pits in accordance with the HASP:

- Underground and overhead utility hazards must be mitigated prior to drilling.
- Excavation equipment presents a variety of safety hazards. Equipment must be inspected each day prior to use. No employee is permitted within the swing radius of the excavator bucket or underneath loads being handled by lifting or digging equipment.
- Personnel should stand upwind of the excavation area to the extent possible. Air monitoring will be conducted for chemicals at action level as established in the site-specific HASP (Appendix C).
- The subcontractor and sampling personnel will not enter a test pit that is deeper than 4 feet unless the: 1) side walls are sloped back to a grade of 1:1 or 2) side walls are braced or shored.
- A confined space entry permit is required to enter a test pit greater than 4 feet deep (refer to OSHA Regulations 29 Code of Federal Regulations [CFR] Part 1926, 1910.120 and 1910.134).
- Appropriate PPE must be worn.
- Potential hazards from working in a public area and potential hazards to the public by excavation activities must be addressed before activities begin and as conditions change.
- Waste generated during the excavation must be properly managed in accordance with facility and applicable regulatory requirements.

7. Test Pit Logging and Sampling Procedure

Prior to initializing excavation, any surface or potential subsurface conditions (e.g., utilities) that may impact the scope of work must be documented and reported to the project manager immediately, prior to continuing work. The subsurface excavation procedures are outlined as follows:

1. Excavation will be conducted at the selected locations that have been cleared for utilities per SOP 3 until the target depth, groundwater, or bedrock is encountered, or to within the physical limits of the backhoe/excavator.
2. Test pit materials and samples will be visually observed and described with respect to depth and location. Photographs of the test pit and of the removed soil will be taken during the excavation and referenced by location, depth, and direction for future use. In addition, results of soil head space screening will be recorded.

3. If the test pit is less than 4 feet deep, samples may be collected directly from the trench wall or from the backhoe bucket. Before collecting trench wall samples, the wall surface must be shaved using a decontaminated stainless steel trowel, spatula, knife, or spoon to remove the surface layer. Samples may be collected using a decontaminated stainless steel shovel, scoop, or hand auger. Alternatively, the sample bottle or tube may be pushed directly into the trench wall or the sample may be collected from the center of the backhoe bucket, as described below.
4. If the test pit is deeper than 4 feet and its walls are not graded or shored, samples will be obtained using the excavator bucket. The entire grab sample will be collected from within a 1-foot radius of the designated sampling point. Samples obtained using a backhoe will be taken from the center of the backhoe bucket from material not touching the bucket walls or teeth.
5. Samples will be placed in an appropriate sample container using decontaminated stainless-steel sampling equipment. Additional soil from the backhoe bucket or sampler may be examined for visual and olfactory evidence of contamination and field screened using a PID.
6. All field activities will be documented in the field logbook or on field forms, including sample collection activities and processing.
7. As applicable, test pits will be backfilled to original grade and compacted after sampling and inspection are complete. The backfill will be placed in approximately the same sequence as the soils were excavated prior to the initiation of the next text pit.
8. To facilitate surveying, the location of the pit will be marked with stakes after it has been backfilled. Stakes should be placed at the ends of the test pit and at any significant bend or corner, as appropriate.

8. Waste Management

Material removed from the test pit during excavation will be placed on polyethylene sheeting. If such material has been previously characterized for chemical constituents in situ, its subsequent disposition (e.g., replacement in the test pit or off-site disposal) will be based on the results of that sampling, in accordance with applicable requirements. If the material has not previously been chemically characterized, it will be so characterized ex situ as necessary to determine appropriate disposition, and its disposition will be based on those characterization results, in accordance with applicable requirements.

IDW, rinse water, PPE, and other waste materials generated during equipment decontamination (waste) must be placed in appropriate containers and labeled. Waste materials will be stored securely, and handling and disposal of waste procedures are documented in the site-specific work plan and in SOP 005: Investigation-Derived Waste.

9. Data Recording and Management

All information relevant to the test pit excavation will be recorded by Anchor QEA field staff using the field logbook or on a test pit log form, including a plan view of the test pit and cross-sections of the excavation walls, where appropriate. Upon completion and prior to backfilling of the excavation, photos will be taken lengthwise and widthwise across the excavation, with a survey rod or measuring tape inserted into the open excavation if it can be safely accessed. Field equipment decontamination activities and waste management activities will be recorded in the field logbook. Records generated as a result of implementing this SOP will be controlled and maintained in the project record files in accordance with client-specific requirements.

10. Quality Assurance

It is the responsibility of the field team leader to periodically check to ensure the procedures are in conformance with those stated in this SOP.

Attachments

Attachment 1 Test Pit Log
Attachment 2 Soil Visual Description Key

Attachment 1

Test Pit Log

ANCHOR QEA

290 Elwood Davis Road
Suite 340
Liverpool, NY 13088

TEST PIT LOG
MATERIAL DESCRIPTION

Test Pit No.	
Sheet No.	1 of 3
Project No.	
Date Began	
Date Finished	
Surface Elev.	

Project Name:	
Client:	
Location:	

METHOD OF INVESTIGATION

Operator:
Inspector:
Equipment:
Type:
Bucket Size:

GROUNDWATER OBSERVATIONS

Date	Time	Depth (Ft.)	Comment

VISUAL CLASSIFICATION OF MATERIAL

Depth Scale (Feet)	Sample No.	Sample Depth (Ft.) From	Sample Depth (Ft.) To	PID/FID (ppm)	c - coarse m - medium f - fine	and - 35 to 50% / some - 20 to 35% little - 10 to 20% / trace - 0 to 10%	
0							
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

Remarks:

290 Elwood Davis Road
Suite 340
Liverpool, NY 13088

TEST PIT LOG
PHOTOGRAPHS

Test Pit No.	
Sheet No.	2 of 3
Project No.	

Photograph 1:

Photograph 2:

Remarks:

ANCHOR QEA	290 Elwood Davis Road Suite 340 Liverpool, NY 13088	**TEST PIT LOG SKETCHES/NOTES**	**Test Pit No.**	
			Sheet No.	3 of 3
			Project No.	

Remarks:

Attachment 2
Soil Visual Description Key

Soil Visual Description Key

Visual soil descriptions consist of the following:

Moisture content, density/consistency, color, minor constituent, MAJOR CONSTITUENT/GROUP NAME; structure descriptions (as needed); amount and shape of minor constituents (e.g., organics and anthropogenics); biota; odor; sheen

Recovered and in situ depths

Recovered = measured in the laboratory, actual soil depth from core tube

Soil Description Terminology		
1. Moisture Content		
Dry	Little perceptible moisture (upland only)	
Moist	Probably near-optimum moisture content, no visible water (most soil)	
Wet	Visible free water, probably above optimum	
2. Density (Core Drive Penetration and Finger Pressure)		
SAND or GRAVEL		
Density	**Visual**	**Notes**
Very loose	Freefall	May occur at the top of a core
Loose	Easy penetration	
Medium dense	Moderate penetration	Typically down core due to compaction or compression
Dense	Hard penetration	Bottom of a core, typical to glacial deposits
Very dense	Refusal	
SILT or CLAY		
Consistency	**Visual**	**Notes**
Very soft	Freefall	Soupy, not cohesive
Soft	Easy penetration	Easily penetrated, just starting to be cohesive
Medium stiff	Moderate penetration	Cohesive, molded by finger pressure
Stiff	Hard penetration	Can indent and mold by stiff finger pressure
Very stiff/hard	Refusal	Modeling clay (rolls to a ball)

3. Color and Shading	
Example Colors	**Shades**
Black	Light
Browns (olive, yellow, red)	Dark
Grays (gray, olive, brown)	Very dark
Mottling: Streaks or spots of a minor color within the larger color unit	
4. Minor and MAJOR Group Name	
Gravel	Silt
Sand	Clay
* MAJOR is written in all CAPITAL LETTERS	
* Description of minor constituent precedes MAJOR constituent, except for trace	
Minor Constituents	**Percent**
Trace (clay, silt, sand, gravel)*	0 to 5
Slightly (clayey, silty, sandy, gravelly)	5 to 15
Clayey, silty, sandy, gravelly	15 to 30
Very (clayey, silty, sandy, gravelly)	30 to 50
GROUP NAME	Greater than 50
* For trace minor constituents, place after MAJOR constituent	

Soil Description Terminology	
Descriptors	
Sand and Gravel	Rounding
	Sorting
	Grain color

5. Other Minor Constituents: % by volume (e.g., organics and anthropogenics)*	
Other Minor Constituents*	**Percent**
Trace	0 to 5
Occasional	5 to 10
Moderate	10 to 30
Substantial	30 to 50
*Separate major from other minor constituents with a period	
6. Biota	
Marsh grass, shells, worms, etc.	
7. Odor Descriptions (No odor detected unless noted)	
Intensity	**Odor Types**
Trace (faint)	Petroleum-like
Moderate (obvious)	Naphthalene-like
Strong (overwhelming)	H_2S-like (Hydrogen sulfide-like)
	Septic-like
	Solvent-like
	Metallic-like

8. Visual Impacts	
8a. Sheen (No sheen observed unless noted) (Modified from ASTM F2534-06)	
Components of a sheen description: Start and end depths, modifier describing relative sample surface area with sheen, sheen color, description of sheen distribution (e.g., continuous, present as 0.5-inch spots, etc.)	
Silvery	Metallic, silver/gray colored
Rainbow	Multicolored
Dark Rainbow	Multicolored with some dark metallic or brown/black coloring
Dark	Dark metallic or brown/black colored
Sheen Distribution Terminology	
Streaks	Flat, lines of sheen (describe size and number)
Florets	Semi-circular, flat, spots of sheen (described size and number)
Covered	Sheen appears continuous over a portion of the sample surface
Distinguishing hydrocarbon-sheen from biological-sheen: If disturbed, a hydrocarbon-sheen will typically coalesce, where an inorganic sheen will break apart and has a blocky appearance	

Modifiers	
Amount	**Percent**
Trace	Less than 2
Slight	2 to 15
Moderate	15 to 40
Moderate to heavy	40 to 70
Heavy	Greater than 70

Soil Description Terminology

8b. Nonaqueous Phase Liquid (NAPL)

Components of a NAPL description: Start and end depths, color, amount (droplets, covered, soaked); droplet frequency/percent of sample covered or soaked; viscosity

Note: Observations of sheen or NAPL on the sampling equipment during sampling will be recorded on the sampling log and included in the notes section of the core log.

Blebs	Observed discrete sphericals of NAPL, but for the most part, the soil matrix was not visibly contaminated or saturated. Typically this is residual product. The estimated size and number of blebs should be reported.
Coated	soil grains are coated with NAPL. There is not sufficient NAPL material present to saturate the pore spaces. The degree of coating should be described as light, moderate, or heavy.
Saturated	The entirety of the pore space for a sample is saturated with the NAPL. Care should be taken to ensure that water saturating the pore spaces is not observed when using this term. Depending on viscosity, NAPL-saturated materials may freely drain from a soil sample.

Relative Viscosity	
High viscosity	Taffy-like
Viscous	No. 6 fuel oil or bunker crude-like (molasses-like)
Low viscosity	No. 2 fuel oil-like

Nonaqueous phase liquid (NAPL): NAPL is generally classified as light NAPL (LNAPL) if the density is less than that of water (i.e., will float on water) and dense NAPL (DNAPL) if the density is greater than that of water (i.e., will sink in water). Use a shake test to identify whether observation NAPL is an LNAPL or DNAPL.

Soil Description Terminology	
9. Structure and Other soil Descriptions	
Hummocky	Cohesive soil that can be broken down into smaller lumps
Gummy	Cohesive, pliable soil with high percentage of clay
Bed	Greater than or equal to 0.5 inch thick
Thin bed	Less than 0.5 inch thick
Pockets	Semi-circular to circular inclusion/deposit
Laminated beds	Thin beds (less than 0.5 inch thick) lying between or alternating within a greater unit
Stratified beds	Beds (greater than 0.5 inch thick) lying between or alternating within a greater unit
Organic matter	Mass of leaves, twigs, wood, etc.
Anthropogenic material	Material originated from industrial activity such as coal fragments, slag, etc.
Aggregates	Industrial waste products
Anthropogenic debris	Debris originated from human activity such as trash, plastic, etc.
Decomposed	Visible sign of decomposition or discoloration
Fresh	No visible sign of decomposition or discoloration
Winnowed	Loss of material that occurred during coring, creating a washed-out void space

Notes:

* = Classification of soil on logs is based on visual field observations, which include density/consistency, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein.

Visual-manual classification method ASTM International (ASTM) D-2488 for the description and identification of soils was used as an identification guide.

"Grades to" indicates that all characteristics not called out stay the same as the unit above.

@ symbol indicates one single piece of the material (when not accompanied with a "grades to" or contact)

Acronyms/terms used in core logs:

NAPL = nonaqueous phase liquid

Native = Soil deposited prior to the physical influence of humans on the natural environment

PID = Photoionization detector, measures volatile organic compounds (VOCs)

Standard Operating Procedure

Investigation-Derived Waste

SOP 005

Project: Syracuse Bread Factory

Revision Date: June 2023

1. Purpose

The purpose of this Standard Operating Procedure (SOP) is to establish uniform procedures for the proper disposal of investigation-derived waste (IDW; i.e., soil, water, personal protective equipment [PPE], and other potentially contaminated materials) generated during implementation of fieldwork. Procedures for IDW handling and disposal outlined in this SOP are expected to be followed. Substantive deviations from the procedures detailed in the SOP will be recorded on the Daily Log (see SOP 001: Field Records). The details within this SOP should be used in conjunction with project work plan.

2. Scope and Applicability

This SOP applies to task orders and projects associated with Anchor QEA. This SOP may be modified, as required, depending on site-specific conditions, equipment limitations or limitations imposed by the procedure. The ultimate procedure employed will be documented in the appropriate project work plan or report. If there are changes made to the IDW handling and disposal due to unanticipated field conditions, the changes will be discussed with the project manager as soon as practicable and documented in the project report.

3. Personnel Qualifications

Only qualified personnel will direct IDW handling and disposal activities. Training requirements for IDW handling and disposal activities include reviewing this SOP and other applicable SOPs and/or guidance documents and health and safety training.

Field personnel executing these procedures will have read, be familiar with, and comply with the requirements of this SOP. Additionally, field personnel will be under the direct supervision of qualified professionals who are experienced in performing the tasks required for IDW handling and disposal.

Anchor QEA field personnel and subcontractors will have completed current company-required health and safety training (e.g., 40-hour Hazardous Waste Operations training, site-specific training, first aid and cardiopulmonary resuscitation [CPR] training), as needed.

4. Equipment List

The following is a list of equipment that may be necessary to carry out the procedures contained in this SOP. Additional equipment may be required, pending field conditions may include, but are not limited to, the following:

- Appropriate PPE, as specified in the site Health and Safety Plan (HASP)
- U.S. Department of Transportation (DOT)-approved 55-gallon open-top or closed-top drums, roll-off or Baker tank with lid for collection of solids and liquids
- Garbage bags
- 5- to 10-gallon buckets or carboys to be used as satellite waste-collection containers
- 55-gallon DOT chemical drums (as needed)
- Drum pad or secondary containment
- Drum cart
- Bung tool to open closed-top drums (as needed)
- Drum wrenches to tighten open-top drum lids
- Spill kits
- Labels and tags
- Drum log forms
- Drum marking crayons (or similar)

5. Health and Safety Considerations

Health and safety issues for the work associated with this SOP, including physical, chemical, and biological hazards, are addressed in the site-specific HASP. The HASP will be followed during all activities conducted by Anchor QEA personnel and its subcontractors.

The site-specific HASP will be used to guide the IDW handling in a safe manner. Job Safety Analyses will be prepared as part of the HASP for IDW handling. The following specific health and safety issues must be considered for management of IDW:

- IDW should be placed in secondary containment to minimize risk of a release to the environment whenever practical.
- Appropriate PPE must be worn to avoid contact with chemicals during IDW handling activities.
- Potential hazards from management of IDW in a public area and potential hazards to public must be addressed before activities begin and as conditions change (e.g., waste secured away from public).

6. Secondary Containment

Prior to storage of IDW, a secondary containment area should be established as follows:

1. Identify a location where IDW can be stored. The area should be relatively flat and secure so that any IDW and associated equipment to be stored is not at risk of being disturbed, stolen, or tampered with.
2. Once the storage area has been selected, construct a secondary containment. Pre-made secondary containments can be used or new containments can be constructed, but either should able to contain solids and/or liquids spilled within the secondary containment.
3. If a secondary containment is constructed, a minimum of 2x4-inch lumber or similar material will be used and wrapped in plastic. The lumber will be arranged into a square or rectangular shape so that the plastic wraps over the lumber, creating a lip with plastic stretching between.
4. Once the plastic sheeting has been stretched, IDW drums can be placed within the secondary containment.

7. Waste Disposal Procedures

Materials that are known or suspected to be contaminated with hazardous substances through the actions of sample collection or personnel and equipment decontamination are said to be IDW. These wastes are classified into the following three categories:

1. Solid materials consisting of soils, used core tubes, used PPE, and other materials used in the handling, processing, and storage of soil
2. Liquid wastes, such as waste water and decontamination water
3. Spent and residual chemicals (liquids) from decontamination

Each type of material will be handled in a manner described in this SOP.

7.1 Solid Waste

Solid residual wastes generated during field activities will consist of two types of materials—soil and non-soil solids. Soil wastes could include discarded soil or waste soil generated during drilling activities. Non-soil wastes may include items such as used PPE (e.g., gloves, Tyvek suits, and plastic sheeting). Non-soil and soil wastes will be segregated and stored in separate containers pending characterization and disposal. Loose soil will be removed from non-soil waste items prior to disposal, to the extent practical.

Soil and non-soil wastes will be segregated and containerized in closed 5-gallon buckets or trash bags, as necessary and appropriate, and secured until transferred into labeled 55-gallon drums (or dedicated roll-off container). Soil and non-soil wastes placed in labeled 55-gallon drums (or dedicated roll-off container) will be stored temporarily pending characterization and transfer to an approved disposal facility.

7.2 Waste Water

Waste water will be generated during sample collection, well installation, decontamination, and well development activities. Soils recovered during this process will be handled as solid waste as described above. Waste water will be collected in 55-gallon closed-top drums or in a large, contaminated-liquid waste tank until the material is characterized and transferred off site for disposal.

7.3 IDW Management

Soil and non-soil wastes generated will be placed in labeled drums or dedicated roll-off containers. Individual drums will be tracked using sequential numbers. Sequential drum numbers and the type of material placed in each drum will be indicated on the top and sides of the drums using a drum-marking crayon and a log recording this information. Placement of soil, non-soil, and/or liquid waste into sequentially numbered disposal drums will be documented in IDW logs (see example of IDW log in Attachment 1) listing the sample ID from which waste material originated. Information recorded on the IDW logs will include the following:

- Sequential drum number
- Type of waste stored in drum (e.g., wet soil or water)
- Accumulation start and end dates
- Hazardous waste manifest number and date
- Transport contractor name and date of pickup

A composite sample may be collected and analyzed for compounds specific to the project disposal facility at the frequency required by the disposal facility or project manager/client.

8. Data Recording and Management

Anchor QEA field sampling personnel will record all IDW in the IDW log (Attachment 1). Records generated as a result of implementing this SOP will be controlled and maintained in the project record files in accordance with client-specific requirements.

9. Quality Assurance/Quality Control

It is the responsibility of the Field Team Leader to periodically check and ensure that IDW handling and disposal procedures are in conformance with those stated in this SOP.

Attachment

Attachment 1 Investigation-Derived Waste Log

Attachment 1
Investigation-Derived Waste Log

Investigation-derived Waste Drum Log

Drum Number:	Investigation-derived Waste (IDW) Medium:		
Accumulation Start Date:		Manifest Number:	
Accumulation End Date:		Manifest Date:	
Transport Contractor:		Lab ID Number:	
Transport Pick-up Date:		Haz Characterization Date:	
Manifest Copy Received from Waste Facility: _______________		Date:	

Samples placed in Drum	Date of Placement	Comment	Initials

IDW Medium:
Soil
Soiled PPE

Equipment Decontamination

SOP 006

Project: Syracuse Bread Factory

Date: June 2023

1. Purpose

This Standard Operating Procedure (SOP) describes the decontamination of non-dedicated sampling equipment, instruments, and other materials used during implementation of field tasks at the project site that come in contact with contaminated site media. Decontamination is the process of neutralizing, washing, and rinsing field sampling equipment to clean field equipment and minimize the potential for sample cross-contamination.

Personnel performing decontamination activities shall wear appropriate personal protective equipment (PPE), as presented in the site-specific Health and Safety Plan.

Procedures for equipment decontamination outlined in this SOP are expected to be followed. Substantive deviations from the procedures detailed in this SOP will be recorded on the Daily Field Log and communicated to task and project management.

2. Scope and Applicability

This SOP applies to task orders and projects associated with Anchor QEA. This SOP may be modified, as required, depending on site-specific conditions, equipment limitations, or limitations imposed by the procedure. The ultimate procedure employed will be documented in the appropriate project work plan or reports. If changes to the installation procedures are required due to unanticipated field conditions, the changes will be discussed with the project manager as soon as practicable and will be documented in the final project report.

Sample containers, instruments, working surfaces, technician protective gear, and other items that may come into contact with sample media must meet high standards of cleanliness. All equipment and instruments that are in direct contact with the sample medium will be decontaminated prior to use in the field.

3. Equipment List

- Personal protective equipment, as required by the HASP
- Scrub brushes
- Plastic wash and rinse buckets or tubs

- Phosphate-free biodegradable detergent (e.g., Liquinox® or Alconox®)
- Deionized (DI) water (or distilled water)
- Spray bottles
- Aluminum foil
- Tap water source (any treated municipal water supply)
- Investigation-derived waste (IDW) storage containers (refer to SOP 005: Investigation derived Waste Handling and Disposal)

4. Summary of Method

Generally, dedicated sampling equipment will be used during the investigations (i.e., stainless-steel trowels and shovels, plastic scoops, ground-water sample bailers). However, equipment that is not dedicated (i.e., non-dedicated drilling equipment) will be decontaminated prior to each use to mitigate the potential for cross-contamination of the samples collected for laboratory analysis.

The following steps will be used to decontaminate supporting equipment that are not in direct contact with samples or mercury contaminated media:

1. Equipment will be rinsed with tap water or wiped down as appropriate.
2. Rinse water will be contained, and any wipes used to clean containerized as IDW.

The following decontamination steps will be used to decontaminate sampling equipment that come into contact with sample media in areas of suspected impacts. Decontamination of all items will follow the *Field Branches Quality Management Plan* (USEPA 2009) and *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (SW-846 protocols; USEPA 2013). The decontamination procedure for sampling equipment is as follows:

1. Rinse in phosphate-free wash and sufficiently scrub to remove any remaining sample material.
2. Rinse with tap water.
3. Rinse with distilled water. If significant contamination is anticipated, the following steps may be added:
    a. Rinse with 10% Nitric acid (when sampling for metals).
    b. Rinse with methanol rinse (when sampling for volatiles).
4. Rinse with hexane (when sampling for PCBs).
5. Rinse with distilled water.
6. Air dry sampling equipment.
7. Use immediately or cover all decontaminated items with aluminum foil once dry.

The following decontamination steps will be used to decontaminate sampling equipment that come into contact with sample media and is being removed from the work area. The decontamination procedure for sampling equipment is as follows:

1. Rinse in phosphate-free wash and sufficiently scrubbed to remove any remaining sample material.
2. Rinse with tap water.
3. Rinse with distilled water.
4. Air dry sampling equipment.

All used decontamination fluids will be collected and placed in labeled, designated containers suitable for disposal in accordance with IDW procedures outlined in SOP-005 – Investigation-Derived Waste.

Quality Assurance/Quality Control

It is the responsibility of the Field Team Leader to periodically check to ensure that the procedures are in conformance with those stated in this SOP. As described in the QAPP (Appendix A to the RI Work Plan), equipment blanks will be collected periodically to validate the effectiveness of decontamination procedures.

References

USEPA (U.S. Environmental Protection Agency), 2009. *Field Branches Quality Management Plan*. May 8, 2009.

USEPA, 2013. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*. USEPA SW-846. Available from: http://www.epa.gov/osw/hazard/testmethods/sw846/online/index.htm.

Sample Custody

SOP 007

Project: Syracuse Bread Factory

Date: June 2023

1. Scope and Applicability

This Standard Operating Procedure (SOP) addresses the sampling program requirements for maintaining custody of samples throughout the sample collection and shipping process. The objective of chain-of-custody (COC) procedures is to provide sufficient evidence of sample integrity to satisfy data defensibility requirements.

Procedures for sample custody outlined in this SOP are expected to be followed. Substantive deviations from the procedures detailed in the SOP will be recorded on the Daily Field Log and communicated to task and project management.

2. Personnel Qualifications

Field personnel executing these procedures will have read, be familiar with, and comply with the requirements of this SOP, the Field Sampling Plan (Anchor QEA 2021), and the corresponding documents (i.e., HASP, Quality Assurance Project Plan [QAPP, Anchor QEA 2021], etc.). Specialized training is not required for scanning and use of equipment; however, field staff will be supervised by experienced staff.

Anchor QEA field personnel and subcontractors will have completed current company-required health and safety training (e.g., 40-hour Hazardous Waste Operations training, site-specific training, and first aid and cardiopulmonary resuscitation [CPR] training) as needed.

3. Equipment List

The following is a list of equipment that may be necessary to carry out the procedures contained in this SOP. Additional equipment may be required, pending field conditions. Equipment includes:

- Approved documents including HASP and Remedial Investigation Work Plan (Anchor QEA 2022)
- Bound, waterproof field logbooks
- Ballpoint black ink pens or permanent markers (or equivalent)
- Custody tape or seals
- Sample labels
- COC forms on waterproof paper (see example in Attachment 1)

- Waterproof bags for COCs
- Clear-plastic sealing tape

4. Chain-of-Custody Procedures

As few people as possible should handle the samples. Each sample generated in the field will be assigned a unique identification. A label will be attached to each bottle used for sampling. Labels will be applied to the container, not the lid, whenever possible. The lid will also be labeled with the sample identification written in waterproof, indelible black ink as a backup for the container label.

When practical, the project identification, sample matrix, laboratory designation/analyses requested, field sample identification code, and preservation will be typed or printed onto the label before sampling. Completion of the sample labels (including the field team staff's initials and the date and time of sample collection) will occur prior to filling the sample bottles. Labels will be completed in waterproof, indelible black ink. Individual sample bottles will be properly labeled and securely sealed before being placed in the container for shipment to the laboratory.

Samples are considered to be in one's possession if the samples are: 1) in the custodian's possession or view; 2) in a secured location (under lock) with restricted access; or 3) in a container that is secured with an official seal(s) such that the sample cannot be reached without breaking the seal(s). Field COC procedures shall be followed from the time a sample is collected until it is relinquished to the analytical laboratory (either in person or to a shipper). The principal document used to track possession and transfer of samples is the COC form. A COC form shall be filled out in duplicate and initiated when the first sample is collected and updated continuously through the sampling event. A new COC form shall be prepared for each day of field sampling. Information to be entered on the COC form includes the following:

- Project identification (project and task number)
- Sample identification
- Time and date of sampling
- Sample matrix (e.g., sediment, water, and air)
- Number of containers for each sample
- Analyses requested
- Preservative, if applicable
- Grab or composite sample designation, if applicable
- Signatures of field team staff/sample custodian
- Field team staff's remarks
- Destination (e.g., laboratory name and location)
- Page number (e.g., 1 of 2, 2 of 2)
- Air bill or other shipping number, if applicable

- Any special instructions

All data entries will be made using a waterproof, indelible ink pen. Corrections will be made by drawing a single line through the error, writing in the correct information, and then dating and initialing the change. Blank lines and spaces on the COC form will be lined-out, dated, and initialed by the individual maintaining custody. A COC form will accompany each cooler of samples to the analytical laboratories. Each person who has custody of the samples will sign the COC form and ensure that the samples are not left unattended unless properly secured. One copy of the COC form should be placed in a waterproof bag and attached to the inside of each sample cooler. In the event that sediment subsamples are being sent to different laboratories, separate COC forms should be prepared for each laboratory and each sample cooler. A custody seal should be placed on the sample cooler when it is not in the custody of a member of the sampling team.

When samples are relinquished, either to the laboratory or for shipment, the COC form must be completed by the sample deliverer (except in the case of a commercial carrier such as FedEx). It should include the printed and signed name of the deliverer, the organization that person represents, date and time of sample relinquishment, and method of shipment, if appropriate. A completed copy of the laboratory-verified COC form will be distributed via email or fax to the Project Chemist within 24 hours of sample receipt at the laboratory. The original will be retained by the laboratory.

5. Quality Assurance/Quality Control

Completed COC forms will be reviewed by the individuals preparing the samples for shipment for completeness, accuracy, and legibility. Specifically, the sample labels and COC record will be compared to ensure agreement between the samples and the COC and to verify the number of sample containers.

It is the responsibility of the Field Team Leader to periodically check to ensure that the procedures are in conformance with those stated in this SOP.

Standard Operating Procedure

Low-Flow Groundwater Sampling

SOP 008

Project: Syracuse Bread Factory

Revision Date: October 2022

1. Purpose

The purpose of this Standard Operating Procedure (SOP) is to establish uniform procedures for the documentation of field activities during implementation of field tasks. Field documentation will consist of field forms, daily logs, photographs, and electronically recorded field measurements.

2. Equipment List

The following is a list of equipment that may be necessary to carry out the procedures contained in this SOP. Additional equipment may be required, pending field conditions may include, but are not limited to, the following:

- Daily logs
- Field forms and records
- Small-diameter water-level indicator
- Peristaltic, small-diameter bladder or Waterra inertial lift pump with dedicated polyethylene tubing
- Silicone flexible tubing (for peristaltic pump)
- Marine battery
- Multi-parameter water quality meter and manufacturer's operating manual
- Calibration standards
  - pH (4.0, 7.0, and 10.0 standard buffer solutions)
  - Conductivity
  - Turbidity standards (0 nephelometric turbidity units [NTU], 40 NTU, and 100 NTU)
  - Miscellaneous others (as necessary)
- 0.45-micron field sampling filters
- Deionized water
- Laboratory-issued sampling containers
- 5-gallon buckets with lids or suitable containers for purge water
- Graduated measuring cup
- Tape measure

- Plastic or duct tape
- Paper towels
- Camera
- Waterproof pen

3. Groundwater Sampling

The following general activities and sampling procedures will be implemented for groundwater sampling:

1. A depth-to-groundwater reading from the top of the well casing will be measured using a water-level indicator and will be recorded in the field notes.
2. A total depth of well casing will be measured using a water-level indicator and recorded in the field notes. The depth-to-groundwater measurement and total depth of well casing will be used to assess how much water is present in the well casing before sampling starts.
3. Polyethylene tubing will be lowered to the well screen for groundwater sampling using a peristaltic pump. Pump instrumentation may vary due to water-level depths. For example, in areas where depth-to-water is greater than 27 feet, a Waterra inertial pump with dedicated Waterra tubing and check-valve may be used. For depths greater than 50 feet, an electrical submersible or bladder pump system may be allowed.
4. Collect purge water in 5-gallon buckets and transfer to investigation-derived waste 55-gallon drums when needed.
5. During purging of groundwater, water quality parameters (pH, conductivity, dissolved oxygen [DO], temperature, oxidation reduction potential [ORP], and turbidity) will be measured and recorded with a portable instrument (Horiba U-10 or similar instrument).
6. Samples will be collected after field water quality parameters have stabilized. The groundwater will be considered adequately purged when the water quality parameters have stabilized as follows (for three consecutive measurements):
    a. ± 0.1 for pH
    b. ± 3% for specific conductance (conductivity)
    c. ± 10 millivolts for ORP
    d. ± 10% for DO and turbidity
    e. ± 10 millivolts for ORP
    f. ± 10% for DO and turbidity
7. During sampling, the pump will be run at a purge rate of less than 500 milliliters (mL) per minute to avoid over-pressure and clogging or excessive vacuum bubbles in the sampling line as well as minimizing the chance of pulling groundwater that is not local to the depth of the monitoring well.

8. In the event that the parameters or water level within the monitoring well do not stabilize during purging, the purge rate will be adjusted in an attempt to stabilize.
9. Should the monitoring well become evacuated or the purging rate fall below 50 mL per minute, purging will be stopped and the well allowed to recover (with periodic water level monitoring) for up to 4 hours.
10. After the well has recovered or 4 hours have passed, the water level will be measured again and samples will be collected for chemical analyses.
11. Groundwater samples will be packaged for shipment and placed in a cooler at 4°C for transport.
12. All field activities will be documented.

4. Quality Assurance/Quality Control

It is the responsibility of the Field Team Leader to periodically check to ensure that the procedures are in conformance with those stated in this SOP.

Attachment

Attachment 1 Groundwater Sampling Form

Attachment 1
Groundwater Sampling Form

Low-Flow Groundwater Sample Collection Field Form

Project:	Date:	☐ QC Sample
Project No:	Location ID:	
Field Staff:		

A. Monitoring Setup

Time:		Pump Installed Depth (feet; measured from top of inner casing):	
Depth to Water (feet; measured from top of inner casing):		NAPL Present (Yes/No):	

Water Quality Instrument Make/Model:				Instrument Serial No.			
Sensor (check applicable parameters)	☐ Temperature	☐ pH	☐ Spec. Conductance	☐ Diss. Oxygen	☐ Oxygen Reduction Potential	☐ Turbidity	☐ Other?
Sensor ID/serial No.	#______	#____	#_____	#_____	#_____	#_____	#_____

B. Water Quality Data

Pre-Purge Start Time*:	Sampler Inlet Depth:
Pre-Purge Rate*:	Initial Depth to Water:

Time	Pump Rate (mL/min)	Temperature (°C)	pH	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	ORP (mV)	Turbidity (NTU)	Water Level (feet)	Notes (color, odor, etc.):

Sampling ID	Sampling Depth (Below Mudline) (ft)	Sample Time	Analyses

Notes:

ANCHOR QEA

Standard Operating Procedure

Subsurface Soil Investigations

SOP 009

Project: Syracuse Bread Factory

Revision Date: October 2022

1. Purpose

The purpose of this Standard Operating Procedure (SOP) is to establish uniform procedures for the drilling, installation, and development of fill and unconsolidated soils for groundwater monitoring wells.

This SOP describes the equipment, field procedures, materials, and documentation procedures necessary to install the above-mentioned wells. The details within this SOP should be used in conjunction with the project work plan.

2. Scope and Applicability

This SOP applies to task orders and projects associated with Anchor QEA. This SOP may be modified, as required, depending on site-specific conditions, equipment limitations, or limitations imposed by the procedure. The ultimate procedure employed will be documented in the appropriate project work plan or reports. If changes to the installation procedures are required due to unanticipated field conditions, the changes will be discussed with the project manager as soon as practicable and will be documented in the final project report.

3. Summary of Method

The subsurface investigations to be completed will use direct-push drilling equipment such as a Geoprobe®. A direct-push machine is a vehicle-mounted, hydraulically powered machine that uses static force and percussion to advance small-diameter sampling tools into the subsurface for collecting soil core, soil gas, or groundwater samples.

4. Personnel Qualifications

Only qualified personnel will lead direct-push drilling and field screening activities. Training requirements for direction of these activities include reviewing this SOP, applicable SOPs provided by subcontractor and/or manufacturer, guidance documents, and health and safety training.

Field personnel executing these procedures will have read, be familiar with, and comply with the requirements of this SOP. Additionally, field personnel will be under the direct supervision of qualified professionals who are experienced in performing the tasks required for data and sample collection.

Anchor QEA field personnel and subcontractors will have completed current company-required health and safety training (e.g., 40-hour Hazardous Waste Operations training, site-specific training, and first aid and cardiopulmonary resuscitation [CPR] training) as needed.

5. Equipment List

Equipment and materials that will be used for overseeing and directing the well installation and development may include the following:

- Appropriate personal protective equipment (PPE), as specified in the site Health and Safety Plan (HASP; Appendix C)
- Indelible ink pen
- Tape measure
- Putty knife or other tools for inspection of recovered soil samples
- Camera
- Whiteboard with erasable markers
- Air monitoring equipment
- Soil description aids (e.g., Munsell color chart and grain or size charts)
- Field logbook; field forms for core collection, well construction, and well development; or notebook with relevant forms
- Safety knife or scissors
- Photo-ionization device with appropriate lamp and calibration gas

This list does not include equipment that will be provided by subcontracted environmental drillers. However, to address potential releases to the environment, the following equipment is required in addition to all necessary supplies for well installation and development:

- Spill-containment and clean-up kit
- Secondary containment for drill rig and all equipment that contains fuels or hydraulic fluids

6. Cautions

The depth and volume of the borehole, including the over-drilling, if applicable, must be calculated, and the appropriate materials for investigation-derived waste (IDW) must be procured prior to drilling activities. Special care must be taken to minimize or prevent inadvertent cross-contamination between borehole locations.

No lubricating oils or grease should be used on casing threads. No glue of any type should be used to secure casing joints. Teflon O-Rings can be used to ensure a tight fit and minimize leakage; however, O-Rings made of other materials are not acceptable if the well is going to be sampled for organic compound analyses.

7. Health and Safety Considerations

Health and safety issues for the work associated with this SOP, including physical, chemical, and biological hazards, are addressed in the project HASP (Appendix C). The HASP will be followed during all activities conducted by Anchor QEA personnel and subcontractors.

The site-specific HASP and subcontracted driller's HASP will be used to guide the installation of the wells in a safe manner. Job Safety Analyses (JSAs) will be prepared for well installation oversight by Anchor QEA and subcontractors. The following specific health and safety issues must be considered when installing the wells:

- Underground and overhead utility hazards must be mitigated prior to drilling.
- Drilling rigs and equipment present a variety of safety hazards. Drill rigs must be inspected each day prior to use. All personal must know where the emergency "kill" switch is, and the switch must be tested daily. Only the drill rig operator and helper may approach the rig during drilling activities.
- Air monitoring will be conducted for chemicals at action level as established in the site-specific HASP (Appendix C).
- Appropriate PPE must be worn.
- Potential hazards from working in a public area and potential hazards to the public by drilling and well installation activities must be addressed before activities begin and as conditions change.
- Waste generated during the well installation must be properly managed in accordance with facility and applicable regulatory requirements.

8. Soil Boring, Logging, and Sampling Procedure

Prior to initializing drilling, any surface or potential subsurface conditions (e.g., utilities) that may impact the scope of work must be documented and reported to the project manager immediately, prior to continuing work. The subsurface soil investigation procedures are outlined as follows:

1. A direct-push drill rig will be used to position itself at each target station for soil investigation.
2. The borehole should be drilled as close to vertical as possible. Prior to beginning any drilling or sampling, ensure the rig is level by checking with a plumb bob or level. Deviation from plumb should be within 1°per 50 feet of depth.
3. The direct push drill will be advanced and operated to the target depth specified in the work plan.

   a. Once the target depth is reached, the borehole will be converted to a monitoring well.
4. Soil cores may be collected at each location by using a dual tube sampling system equipped with core liners. The liners will be lowered slowly to the soil surface and allowed to penetrate the soil driven by a hydraulic hammer.
5. During dual-tube soil core collection, both the outer and inner drill rods are advanced simultaneously. The outer rods will prevent the borehole walls from collapsing and will allow for continuous soil extraction and sampling via the inner drill rods. The process for dual-tube sampling is generally described as follows:
6. Once positioned, the initial soil core will be collected by advancing both the inner and outer drill rods the length of the core barrel (typically 4 or 5 feet).
7. The inner drill rods can then be removed to inspect collected soil samples while the outer casing (4.5-inch outer diameter and 3.75-inch inner diameter) remains in place to stabilize the borehole walls.
8. With the initial soil core removed, a cutting tool will be used to open the core liner and a visual description of the soil will be recorded onto a Soil Boring Log (Attachment 3) with the aid of a Soil Visual Description Key (Attachment 4). Cores will be screened with a photoionization detector (PID) and results will be recorded in the field notes. For each core segment, a representative photograph will be taken with a place card of the sample station, and the date. A ruler will be visible in the photograph.
9. After removing the initial soil core, the core barrel will be decontaminated and then re-inserted into the borehole through the in-place outer casing to collect the second soil core interval.
10. Additional drill rods and outer casing lengths will be added to advance the core barrel to thru the next interval.
11. These steps will be repeated until target depth is reached or until refusal.
12. Soil samples will be collected from 1-foot zones identified and agreed to based upon results of the field screening. To minimize the loss of volatile organic compounds (VOCs), subsamples for VOCs will be collected immediately upon retrieval after sample characterization.
13. After description and field screening, the VOC sample will be collected from the center of the soil core interval (avoiding the sidewalls) and placed into the laboratory-provided container until full (with zero headspace remaining).
14. Only pre-cleaned stainless-steel instruments will be used to collect sample material.
15. Each sample container will be filled completely with soil, allowing minimal headspace. Samples will be stored on ice in the dark at 4°C plus or minus 2°C.
16. All material from processed cores, decontamination fluids, and used PPE will be containerized as IDW and disposed of according to SOP005: Investigation-Derived Waste.
17. All field activities will be documented, including core collection activities and core processing.

9. Waste Management

IDW, rinse water, PPE, and other waste materials generated during equipment decontamination (waste) must be placed in appropriate containers and labeled. Waste materials will be stored securely and handling and disposal of waste procedures are documented in the site-specific work plan and in SOP003: Investigation-Derived Waste.

10. Data Recording and Management

All information relevant to the drilling will be recorded by Anchor QEA field staff using the field logbook. Field equipment decontamination activities and waste management activities will be recorded in the field logbook. Records generated as a result of implementing this SOP will be controlled and maintained in the project record files in accordance with client-specific requirements.

11. Quality Assurance

It is the responsibility of the field team leader to periodically check to ensure the procedures are in conformance with those stated in this SOP.

Attachments

Attachment 1 Soil Boring Log
Attachment 2 Soil Visual Description Key

Attachment 1
Soil Boring Log

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LOG OF EXPLORATORY BORING

CLIENT/PROJECT NAME:	BORING #
PROJECT NUMBER:	DATE BEGAN:
GEOLOGIST/ENGINEER:	DATE COMPLETED:
DRILLING CONTRACTOR:	TOTAL DEPTH:
DRILLING METHOD:	SHEET OF
HOLE DIAMETER:	

OTHER*	WELL OR PIEZOMETER DETAILS	SAMPLING DATA						DEPTH IN FEET	SOIL GROUP SYMBOL (USCS)	Field location of boring LITHOLOGIC DESCRIPTION
		SAMPLING METHOD	SAMPLE NUMBER	FID / PID (ppm)	RECOVERY (feet)	BLOWS / 6 INCHES	DEPTH SAMPLED			

Remarks:

Attachment 2
Soil Visual Description Key

ANCHOR QEA

Soil Visual Description Key

Visual soil descriptions consist of the following:

Moisture content, density/consistency, color, minor constituent, MAJOR CONSTITUENT/GROUP NAME; structure descriptions (as needed); amount and shape of minor constituents (e.g., organics and anthropogenics); biota; odor; sheen

Recovered and in situ depths

Recovered = measured in the laboratory, actual soil depth from core tube

Soil Description Terminology		
1. Moisture Content		
Dry	Little perceptible moisture (upland only)	
Moist	Probably near-optimum moisture content, no visible water (most soil)	
Wet	Visible free water, probably above optimum	
2. Density (Core Drive Penetration and Finger Pressure)		
SAND or GRAVEL		
Density	**Visual**	**Notes**
Very loose	Freefall	May occur at the top of a core
Loose	Easy penetration	
Medium dense	Moderate penetration	Typically down core due to compaction or compression
Dense	Hard penetration	Bottom of a core, typical to glacial deposits
Very dense	Refusal	
SILT or CLAY		
Consistency	**Visual**	**Notes**
Very soft	Freefall	Soupy, not cohesive
Soft	Easy penetration	Easily penetrated, just starting to be cohesive
Medium stiff	Moderate penetration	Cohesive, molded by finger pressure
Stiff	Hard penetration	Can indent and mold by stiff finger pressure
Very stiff/hard	Refusal	Modeling clay (rolls to a ball)
3. Color and Shading		
Example Colors		**Shades**
Black		Light
Browns (olive, yellow, red)		Dark
Grays (gray, olive, brown)		Very dark
Mottling: Streaks or spots of a minor color within the larger color unit		
4. Minor and MAJOR Group Name		
Gravel		Silt
Sand		Clay
* MAJOR is written in all CAPITAL LETTERS		
* Description of minor constituent precedes MAJOR constituent, except for trace		
Minor Constituents		**Percent**
Trace (clay, silt, sand, gravel)*		0 to 5
Slightly (clayey, silty, sandy, gravelly)		5 to 15
Clayey, silty, sandy, gravelly		15 to 30
Very (clayey, silty, sandy, gravelly)		30 to 50
GROUP NAME		Greater than 50
* For trace minor constituents, place after MAJOR constituent		

Soil Description Terminology		
Descriptors		
Sand and Gravel	Rounding	
	Sorting	
	Grain color	
5. Other Minor Constituents: % by volume (e.g., organics and anthropogenics)*		
Other Minor Constituents*	**Percent**	
Trace	0 to 5	
Occasional	5 to 10	
Moderate	10 to 30	
Substantial	30 to 50	
*Separate major from other minor constituents with a period		
6. Biota		
Marsh grass, shells, worms, etc.		
7. Odor Descriptions (No odor detected unless noted)		
Intensity	**Odor Types**	
Trace (faint)	Petroleum-like	
Moderate (obvious)	Naphthalene-like	
Strong (overwhelming)	H_2S-like (Hydrogen sulfide-like)	
	Septic-like	
	Solvent-like	
	Metallic-like	
8. Visual Impacts		
8a. Sheen (No sheen observed unless noted) (Modified from ASTM F2534-06)		
Components of a sheen description: Start and end depths, modifier describing relative sample surface area with sheen, sheen color, description of sheen distribution (e.g., continuous, present as 0.5-inch spots, etc.)		
Silvery	Metallic, silver/gray colored	
Rainbow	Multicolored	
Dark Rainbow	Multicolored with some dark metallic or brown/black coloring	
Dark	Dark metallic or brown/black colored	
Sheen Distribution Terminology		
Streaks	Flat, lines of sheen (describe size and number)	
Florets	Semi-circular, flat, spots of sheen (described size and number)	
Covered	Sheen appears continuous over a portion of the sample surface	
Distinguishing hydrocarbon-sheen from biological-sheen: If disturbed, a hydrocarbon-sheen will typically coalesce, where an inorganic sheen will break apart and has a blocky appearance		

Modifiers	
Amount	**Percent**
Trace	Less than 2
Slight	2 to 15
Moderate	15 to 40
Moderate to heavy	40 to 70
Heavy	Greater than 70

Soil Description Terminology	
8b. Nonaqueous Phase Liquid (NAPL)	
Components of a NAPL description: Start and end depths, color, amount (droplets, covered, soaked); droplet frequency/percent of sample covered or soaked; viscosity	
Note: Observations of sheen or NAPL on the sampling equipment during sampling will be recorded on the sampling log and included in the notes section of the core log.	
Blebs	Observed discrete sphericals of NAPL, but for the most part, the soil matrix was not visibly contaminated or saturated. Typically this is residual product. The estimated size and number of blebs should be reported.
Coated	soil grains are coated with NAPL. There is not sufficient NAPL material present to saturate the pore spaces. The degree of coating should be described as light, moderate, or heavy.
Saturated	The entirety of the pore space for a sample is saturated with the NAPL. Care should be taken to ensure that water saturating the pore spaces is not observed when using this term. Depending on viscosity, NAPL-saturated materials may freely drain from a soil sample.
Relative Viscosity	
High viscosity	Taffy-like
Viscous	No. 6 fuel oil or bunker crude-like (molasses-like)
Low viscosity	No. 2 fuel oil-like
Nonaqueous phase liquid (NAPL): NAPL is generally classified as light NAPL (LNAPL) if the density is less than that of water (i.e., will float on water) and dense NAPL (DNAPL) if the density is greater than that of water (i.e., will sink in water). Use a shake test to identify whether observation NAPL is an LNAPL or DNAPL.	

Soil Description Terminology	
9. Structure and Other soil Descriptions	
Hummocky	Cohesive soil that can be broken down into smaller lumps
Gummy	Cohesive, pliable soil with high percentage of clay
Bed	Greater than or equal to 0.5 inch thick
Thin bed	Less than 0.5 inch thick
Pockets	Semi-circular to circular inclusion/deposit
Laminated beds	Thin beds (less than 0.5 inch thick) lying between or alternating within a greater unit
Stratified beds	Beds (greater than 0.5 inch thick) lying between or alternating within a greater unit
Organic matter	Mass of leaves, twigs, wood, etc.
Anthropogenic material	Material originated from industrial activity such as coal fragments, slag, etc.
Aggregates	Industrial waste products
Anthropogenic debris	Debris originated from human activity such as trash, plastic, etc.
Decomposed	Visible sign of decomposition or discoloration
Fresh	No visible sign of decomposition or discoloration
Winnowed	Loss of material that occurred during coring, creating a washed-out void space

Notes:

* = Classification of soil on logs is based on visual field observations, which include density/consistency, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein.

Visual-manual classification method ASTM International (ASTM) D-2488 for the description and identification of soils was used as an identification guide.

"Grades to" indicates that all characteristics not called out stay the same as the unit above.

@ symbol indicates one single piece of the material (when not accompanied with a "grades to" or contact)

Acronyms/terms used in core logs:

NAPL = nonaqueous phase liquid

Native = Soil deposited prior to the physical influence of humans on the natural environment

PID = Photoionization detector, measures volatile organic compounds (VOCs)

ANCHOR QEA

Standard Operating Procedure

Monitoring Well Installation and Development

SOP 010

Project: Syracuse Bread Factory

Revision Date: October 2019

1. Purpose

The purpose of this Standard Operating Procedure (SOP) is to establish uniform procedures for the installation and development of fill and unconsolidated soils for groundwater monitoring wells.

This SOP describes the equipment, field procedures, materials, and documentation procedures necessary to install the above-mentioned wells. The details within this SOP should be used in conjunction with the project work plan.

2. Scope and Applicability

This SOP applies to task orders and projects associated with Anchor QEA. This SOP may be modified, as required, depending on site-specific conditions, equipment limitations, or limitations imposed by the procedure. The ultimate procedure employed will be documented in the appropriate project work plan or reports. If changes to the installation procedures are required due to unanticipated field conditions, the changes will be discussed with the project manager as soon as practicable and will be documented in the final project report.

3. Summary of Method

Geoprobe® direct push machine is a vehicle-mounted, hydraulically powered machine that uses static force and percussion to advance small-diameter sampling tools into the subsurface for collecting soil core, soil gas, or groundwater samples. The Geoprobe® refers to both machines and tools manufactured by Geoprobe Systems®, Salina, Kansas.

Following borehole drilling, a groundwater monitoring well is constructed in the temporary Geoprobe® casing in the boring. The well casing and screen are inserted into the casing. The temporary casing allows the passage of the tremie pipe for well grout placement, as well as free passage of filter sands and bentonite pellets dropped through the casing. The wells are finished with a flush mount vault and a lockable cap.

Well development is conducted to remove residual materials remaining in the monitoring wells after installation has been completed and to re-establish the natural hydraulic flow conditions of the formations that were disturbed during well construction. The well is developed until the column of water in the well is free of visible soil and the pH, temperature, turbidity, and specific conductivity have stabilized.

4. Personnel Qualifications

Only qualified personnel will direct well installation activities. Training requirements for direction of well installation activities include reviewing this SOP, other applicable SOPs, guidance documents, and health and safety training.

Field personnel executing these procedures will have read, be familiar with, and comply with the requirements of this SOP. Additionally, field personnel will be under the direct supervision of qualified professionals who are experienced in performing the tasks required for sample collection.

Anchor QEA field personnel and subcontractors will have completed current company-required health and safety training (e.g., 40-hour Hazardous Waste Operations training, site-specific training, and first aid and cardiopulmonary resuscitation [CPR] training) as needed.

5. Equipment List

Equipment and materials that will be used for overseeing and directing the well installation and development may include the following:

- Appropriate personal protective equipment (PPE), as specified in the site Health and Safety Plan (HASP)
- Water-level indicator or interface probe
- Indelible ink pen
- Tape measure
- Small-diameter water-level indicator
- Peristaltic, small-diameter bladder or Waterra inertial lift pump (or similar) with dedicated polyethylene tubing
- Silicone flexible tubing (for peristaltic pump)
- Marine battery
- Multi-parameter water quality meter and manufacturer's operating manual
- Calibration standards
  - pH (4.0, 7.0, and 10.0 standard buffer solutions)
  - Conductivity
  - Turbidity standards (0 nephelometric turbidity units [NTU], 40 NTU, and 100 NTU)
  - Miscellaneous others (as necessary)

- Camera
- Whiteboard with erasable markers
- Air monitoring equipment
- Field logbook; field forms for core collection, well construction, and well development; or notebook with relevant forms
- Safety knife or scissors
- Photo-ionization device with appropriate lamp and calibration gas

This list does not include equipment that will be provided by subcontracted well drillers. However, to address potential releases to the environment, the following equipment is required in addition to all necessary supplies for well installation and development:

- Spill-containment and clean-up kit
- Secondary containment for drill rig and all equipment that contains fuels or hydraulic fluids

6. Cautions

The depth and volume of the borehole, including the over-drilling, if applicable, must be calculated, and the appropriate materials for well construction and investigation-derived waste (IDW) must be procured prior to drilling activities.

Special care must be taken to minimize or prevent inadvertent cross-contamination between borehole locations.

No lubricating oils or grease should be used on casing threads. No glue of any type should be used to secure casing joints. Teflon O-Rings can be used to ensure a tight fit and minimize leakage; however, O-Rings made of other materials are not acceptable if the well is going to be sampled for organic compound analyses.

7. Health and Safety Considerations

Health and safety issues for the work associated with this SOP, including physical, chemical, and biological hazards, are addressed in the project HASP (Appendix C). The HASP will be followed during all activities conducted by Anchor QEA personnel and subcontractors.

The site-specific HASP and subcontracted driller's HASP will be used to guide the installation of the wells in a safe manner. Job Safety Analyses (JSAs) will be prepared for well installation oversight by Anchor QEA and subcontractors. The following specific health and safety issues must be considered when installing the wells:

- Underground and overhead utility hazards must be mitigated prior to drilling.
- Drilling rigs and equipment present a variety of safety hazards. Drill rigs must be inspected each day prior to use. All personal must know where the emergency "kill" switch is, and the

switch must be tested daily. Only the drill rig operator and helper may approach the rig during drilling activities.

- Air monitoring will be conducted for chemicals at action level as established in the site-specific HASP.
- Appropriate PPE must be worn.
- Potential hazards from working in a public area and potential hazards to the public by drilling and well installation activities must be addressed before activities begin and as conditions change.
- Waste generated during the well installation must be properly managed in accordance with facility and applicable regulatory requirements.

8. Procedure

The following general activities and procedures will be implemented for groundwater monitoring wells.

8.1 Well Installation

1. After notification of appropriate parties, the drilling subcontractor will install the monitoring wells. The work areas will be cordoned off and a traffic plan implemented to direct road traffic as necessary.
2. A decontamination area will be established.
3. Once drilling activities commence, soil cores will be collected at each location by using a Geoprobe® drill rig or similar drill rig. Soil samples may be collected using a dual tube sampling system equipped with core liners will be advanced into the soil by a hydraulic hammer.
4. During soil sample collection, one set of drill rods will be advanced and serve as an outer casing. This will prevent the boring from collapsing and will allow for continuous extraction and sampling. The process for dual-tube sampling is generally described as follows:
    a. Once positioned, the initial soil core will be collected beginning at the ground surface and advancing the length of the core barrel (typically 4 or 5 feet).
    b. Before removal of the initial soil core, a second drill string will be advanced downward, outside of the initial soil core. This will serve as the outer casing (4.5-inch outer diameter and 3.75-inch inner diameter).
    c. Once the outer casing is in place, the initial soil core will be removed for visual description.
    d. After removing the initial soil core, the core barrel will be decontaminated and then re-inserted into the borehole through the in-place outer casing to collect the second soil core interval.
    e. Prior to removing the second soil core, the outer casing will be advanced the length of the core barrel to prevent the boring from collapsing.

   f. These steps will be repeated until target depth is reached.

5. A cutting tool will be used to open core liners, and a physical description of the sediment and depth of native material will be recorded.
6. Borings will be advanced into the soils to a pre-determined target depth below ground surface.
7. After soil core collection and processing, a monitoring well will be installed in the existing borehole or the borehole can be re-drilled and widened using appropriately sized augers.
8. A 10-foot-long, 2-inch-diameter, 0.010-inch slot monitoring well will be installed within the borehole. The flush-thread riser pipe will be connected to the well screen and continue to the surface.
9. An appropriately sized filter sand will be placed around the well screen to a height within the borehole two-feet above the top of the well screen.
10. Above the filter sand, a seal consisting of bentonite chips or fine-grained sand (No. 00 or similar) will be placed above the well screen until at least a 1 foot of thickness is reached.
11. Cement and bentonite grout will then be placed above the seal to the ground surface where a flush-mount type surface completion will be installed.
12. Completed monitoring wells will be surveyed by a licensed surveyor to establish the elevation of the well casing for use in groundwater level monitoring.
13. All information relevant to the drilling and well installation beyond the items identified in the Well Construction Log (Attachment 1).
14. Should a monitoring well need to be abandoned, the monitoring wells will be abandoned by removing the well casing and monitoring screen if possible and backfilling the borehole with bentonite pellets or cement and bentonite grout to a depth of approximately 1 foot below ground surface and then placing a 1-foot-thick concrete patch. Alternatively, the monitoring well can be abandoned in place by filling the monitoring well with bentonite pellets or cement and bentonite grout to the ground surface and completing the abandonment as described previously.

8.2 Well Development

1. The installed monitoring well will not be developed for at least 12 to 24 hours after the cement grout has been installed.
2. After the appropriate amount of time has passed, assemble the necessary equipment on a plastic sheet surrounding the well. Record pertinent information on the Well Development Log (Attachment 2).
3. Open monitoring well and take air reading at the top of casing and in the breathing zone as appropriate.
4. Measure depth to water and the total depth of the monitoring well. Calculate the water column volume of the well.

5. Surge the well using appropriately sized surge block to loosen soil buildup in well within the surrounding filter pack. Following the removal of suspended sand-sized soil, the well development process should include over-pumping the well (that is, pumping the well at a higher rate where drawdown is induced). Using a downhole pump, begin development and measure the initial pH, temperature, turbidity, and specific conductivity of the water and record on the field Well Development Log (Attachment 2). Note the initial color, clarity, and odor of the water.
6. Continue to develop the well (alternating pumping and surging the well) and periodically measure the water quality parameters indicated in Step 5 (above). Development will proceed until water quality parameters stabilize or until the water has a turbidity of less than 50 NTUs for three consecutive readings are recorded or a maximum of 5 well volumes have been purged from the well. Anchor QEA personnel will record well development measurements and observations in Well Development Log (Attachment 2).
7. All water produced by development must be containerized or treated. Each container must be clearly labeled with the location ID and date collected. Determination of the appropriate disposal method will be based on the analytical results from each well.

9. Waste Management

IDW, rinse water, PPE, and other waste materials generated during equipment decontamination (waste) must be placed in appropriate containers and labeled. Waste materials will be stored securely in a location. Handling and disposal of waste procedures are documented in the site-specific work plan and in SOP003: Investigation-Derived Waste.

10. Data Recording and Management

All information relevant to the drilling and well installation beyond the items identified in the Well Construction Log (Attachment 1) will be recorded by Anchor QEA field staff using the field logbook. Field equipment decontamination activities and waste management activities will be recorded in the field logbook. Records generated as a result of implementing this SOP will be controlled and maintained in the project record files in accordance with client-specific requirements.

11. Quality Assurance

It is the responsibility of the field team leader to periodically check to ensure the procedures are in conformance with those stated in this SOP.

Attachments

Attachment 1 Well Construction Log
Attachment 2 Well Development Log

Attachment 1
Well Construction Log

MONITORING WELL CONSTRUCTION DATA

DATE:	CLIENT:	PROJECT NO:

WELL/BORING NO: ____________

STATE PLANE COORDINATES:

NORTH ____________

PROJECT NAME: ____________

EAST ____________

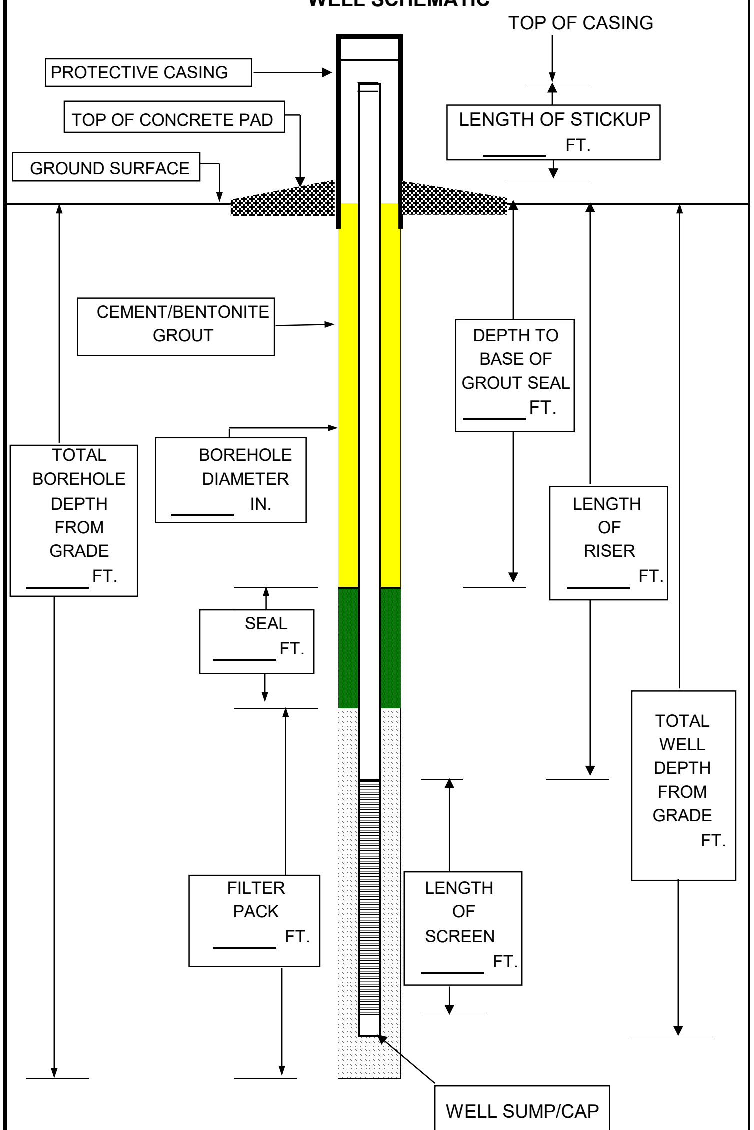
ADDRESS: ____________

TOP OF SLAB ELEVATION: ____________

WELL CONTRACTOR: ____________

TOP OF CASING ELEVATION: ____________

WELL SCHEMATIC



ALL ELEVATIONS ARE IN FEET NGVD

CONSTRUCTION DATA

CASING INFORMATION

MATERIAL: ☐ PVC ☐ STAINLESS ☐ CARBON
☐ OTHER ____________

DIAMETER: ☐ 2" ☐ 4" ☐ 6"
☐ OTHER ____________ IN.

JOINTS: ☐ THREADED ☐ WELDED
☐ SCREWED ☐ COUPLED
☐ OTHER ____________

SCHEDULE: ____________

SCREEN INFORMATION

MATERIAL: ☐ PVC
☐ STAINLESS
☐ TEFLON
☐ OTHER ____________

DIAMETER: ☐ 2"
☐ 4"
☐ 6"
☐ OTHER ________ IN

SLOT: ☐ 0.010
☐ 0.020
☐ OTHER ________ IN

CENTRALIZER: ☐ YES ☐ NO

SHOW LOCATION OF CENTRALIZER(S) ON SCHEMATIC

FILTER PACK MATERIAL

20/40 SAND ☐

OTHER ☐ ____________

SECONDARY FILTER PACK MATERIAL

SUGAR SAND ☐

OTHER ☐ ____________

BENTONITE WELL SEAL

☐ 1/2-INCH PELLETS
☐ 1/4-INCH PELLETS
☐ CHIPS
☐ OTHER ____________

SURFACE PROTECTION

CONCRETE PAD: ☐ 3'X3'
☐ 4'X4'
☐ OTHER ________ FT

WELL SUMP/CAP

☐ YES
☐ NO
LENGTH ____ FT.

Attachment 2
Well Development Log

Well Development Log

FACILITY NAME: ______________________ DATE: ______________________

LOCATION: ______________________ ARRIVE TIME: ______________________

FIELD PERSONNEL: ______________________ WEATHER: ______________________

WELL NUMBER:________________ WELL DEPTH IN FEET (WD):________________ START TIME:_______

WELL DIAMETER:________________ WATER LEVEL IN FEET (WL):________________

TYPE OF CASING:________________ LENGTH OF WATER COLUMN :_________ FEET

MEASURING POINT: ________________ (WD) - (WL) = (LWC)

FLUSH MOUNT / STICK-UP ONE CASING VOLUME:______________ GALLONS

COMMENTS:________________________________ (LWC) x (WCV)

____ THREE CASING VOLUMES:____________ GALLONS

____ ACTUAL VOLUME DEVELOPED:_________ GALLONS

WELL CASING VOLUMES (WCV)

2" = 0.17 Gal/Ft 3" = 0.38 Gal/Ft 4" = 0.66 Gal/Ft 6" = 1.5 Gal/Ft 8" = 2.6 Gal/Ft 12" = 5.8 Gal/Ft

TIME	DEVELOPMENT METHOD	ESTIMATED FLOW RATE (gpm)	GALLONS PURGED	pH UNITS	SPECIFIC COND. (µS)	TEMP (C°)	DISSOLVED OXYGEN (mg/L)	OXIDATION REDUCTION POTENTIAL (mV)	TURBIDITY (NTU)	DEPTH TO WATER (feet TOC)

PROTECTIVE CASING:_______ PAD:_______ LOCK:_______ VEGETATION:_______ ACCESS: _______

Field Personnel Signature: **Date:**

Comments:

Notes:
µS = micro-Siemen
C° = degrees Celsius
mg/L = milligrams per liter
mV = millivolt
NTU = nephelometric turbidity units

Method Reference:
Temperature: SM 2550 B-2000
Specific conductivity: EPA Method 120.1, Rev. 1982
DO: SM 4500 O G-2001
pH: SM 4500-H^+ B-2000

ANCHOR QEA

Standard Operating Procedure

Subsurface Structure Assessment

SOP 011

Project: Syracuse Bread Factory

Revision Date: October 2022

1. Purpose

The purpose of this Standard Operating Procedure (SOP) is to establish uniform procedures for the assessment of subsurface structures located at the project site.

This SOP describes the equipment, field procedures, materials, and documentation procedures necessary to perform the assessment. The details within this SOP should be used in conjunction with the project work plan.

2. Scope and Applicability

This SOP applies to task orders and projects associated with Anchor QEA. This SOP may be modified, as required, depending on site-specific conditions, equipment limitations, or limitations imposed by the procedure. The ultimate procedure employed will be documented in the appropriate project work plan or reports. If changes to the installation procedures are required due to unanticipated field conditions, the changes will be discussed with the project manager as soon as practicable and will be documented in the final project report.

3. Summary of Method

Prior to evaluating each subsurface structure, the cover will be removed and the air inside the structure will be monitored for volatile organic vapors, oxygen, combustible gases, carbon monoxide, and hydrogen sulfide. The subsurface structure assessment will be performed from the ground surface only to determine the following information:

- Dimensions of each subsurface structure (e.g., size of the cover, depth from the rim to the bottom of the structure, interior dimensions of the structure, and depth of the rim to the inverts for process piping entering or leaving the structure)
- Size, orientation, and material of construction for process piping entering and exiting each subsurface structure (e.g., corrugated metal, concrete, vitrified clay)
- Material of construction (e.g., pre-cast concrete, brick, and mortar) and overall condition of each subsurface structure

- The presence and depth of liquids (if any), the presence of sheens on the surface of the water, and the approximate flow rate of water discharging into or out of the structure (if any)
- The presence and depth of debris/sediment in each subsurface structure and piping connected to the subsurface structure

The results of the subsurface structure assessment activities will be recorded on the attached field form. For each subsurface structure surveyed, field personnel will photograph the interior of the structure for inclusion in the documentation record. Samples of accumulated debris/sediment (if any) within the structures may be sampled based on the volatile organic vapors readings and ability to safely access the materials to collect the sample from the ground surface.

4. Personnel Qualifications

Only qualified personnel will direct well installation activities. Training requirements for direction of well installation activities include reviewing this SOP, other applicable SOPs, guidance documents, and health and safety training.

Field personnel executing these procedures will have read, be familiar with, and comply with the requirements of this SOP. Additionally, field personnel will be under the direct supervision of qualified professionals who are experienced in performing the tasks required for sample collection.

Anchor QEA field personnel and subcontractors will have completed current company-required health and safety training (e.g., 40-hour Hazardous Waste Operations training, site-specific training, and first aid and cardiopulmonary resuscitation [CPR] training) as needed.

5. Equipment List

Equipment and materials that will be used for overseeing and directing the well installation and development may include the following:

- Appropriate personal protective equipment (PPE), as specified in the site Health and Safety Plan (HASP)
- Indelible ink pen
- Tape measure
- Camera
- Whiteboard with erasable markers
- Air monitoring equipment
- Field logbook; field forms for core collection, well construction, and well development; or notebook with relevant forms
- Photo-ionization device with appropriate lamp and calibration gas

6. Waste Management

IDW, rinse water, PPE, and other waste materials generated during subsurface assessment (waste) must be placed in appropriate containers and labeled. Waste materials will be stored securely in a location. Handling and disposal of waste procedures are documented in the site-specific work plan and in SOP 005: Investigation-Derived Waste.

7. Data Recording and Management

All information relevant to the subsurface structure assessment will be recorded by Anchor QEA field staff using the field logbook and assessment form (Attachment 1). Field equipment decontamination activities and waste management activities will be recorded in the field logbook. Records generated as a result of implementing this SOP will be controlled and maintained in the project record files in accordance with client-specific requirements.

8. Quality Assurance

It is the responsibility of the field team leader to periodically check to ensure the procedures are in conformance with those stated in this SOP.

Attachments

Attachment 1 Subsurface Structure Assessment Form

Attachment 1
Subsurface Structure Assessment Form

SUBSURFACE STRUCTURE REVIEW FORM

Client:
Site:
Location:
Project:
Job Number:

Day/Date: ______________________________
Weather: ______________________________
Temperature: ___________________________
Wind: _________________________________
Inspector/Recorder: ____________________
Structure ID: __________________________

Cover

Location: In Pavement / Concrete / Crushed Stone / Grass / Other: ________________ (Circle One)
Dimensions: ______________________ Distance Above Grade: ______________________
Type of Cover: Solid Steel / Catch Basin Type / Other: ______________________________ (Circle One)

Subsurface Structure

Type of Structure: Manhole / Catch Basin / Conduit Vault / Other: ________________ (Circle One)
Construction Materials:
Riser Section: Brick&Mortar / Concrete / Other: ______________________________ (Circle One)
Sidewalls: Brick&Mortar / Concrete Block / Concrete / Other: ____________________ (Circle One)
Bottom: Brick&Mortar / Concrete Block / Concrete / Other: ____________________ (Circle One)
Overall Condition of Structure: ____
Height of Riser Section: ______________________________
Depth from Rim to Bottom of Structure: ________________ Interior Dimensions of Structure: ____________
Depth of Water in Structure: ________________________ Sheen Present on Water (Y/N): ______________
Depth of Debris in Structure: _______________________ Description of Debris: ____________________
Debris Sample ID (if collected): _____________________ Time Collected: _________________________

Pipe Information

O'clock Position	12:00			
Pipe Material				
Pipe Diameter				
Rim to Invert				
Flow (Y/N)				
Am't/Type Sediment				

Air Monitoring Results

Total Organic Vapors (ppm): ________________________
Carbon Monoxide (ppm): ___________________________ Lower Explosive Limit (%): ________________
Hydrogen Sulfide (ppm): ___________________________ Oxygen (%): ____________________________

Photograph No.: ______________________________ Facing: N / S / E / W

Other Information: ____
____
____
____

***Use back for field sketch.

Standard Operating Procedure

Soil Gas Sampling

SOP 012

Project: Syracuse Bread Factory

Revision Date: February 2026

1. Purpose

The purpose of this Standard Operating Procedure (SOP) is to establish uniform procedures for the assessment of subsurface structures located at the project site.

This SOP describes the equipment, field procedures, materials, and documentation procedures necessary to perform the assessment. The details within this SOP should be used in conjunction with the project work plan.

2. Scope and Applicability

This SOP applies to task orders and projects associated with Anchor QEA. This SOP may be modified, as required, depending on site-specific conditions, equipment limitations, or limitations imposed by the procedure. The ultimate procedure employed will be documented in the appropriate project work plan or reports. If changes to the installation procedures are required due to unanticipated field conditions, the changes will be discussed with the project manager as soon as practicable and will be documented in the final project report.

3. Summary of Method

Prior to evaluating each subsurface structure, the cover will be removed and the air inside the structure will be monitored for volatile organic vapors, oxygen, combustible gases, carbon monoxide, and hydrogen sulfide. The subsurface structure assessment will be performed from the ground surface only to determine the following information:

- Dimensions of each subsurface structure (e.g., size of the cover, depth from the rim to the bottom of the structure, interior dimensions of the structure, and depth of the rim to the inverts for process piping entering or leaving the structure)
- Size, orientation, and material of construction for process piping entering and exiting each subsurface structure (e.g., corrugated metal, concrete, vitrified clay)
- Material of construction (e.g., pre-cast concrete, brick, and mortar) and overall condition of each subsurface structure

- The presence and depth of liquids (if any), the presence of sheens on the surface of the water, and the approximate flow rate of water discharging into or out of the structure (if any)
- The presence and depth of debris/sediment in each subsurface structure and piping connected to the subsurface structure

The results of the subsurface structure assessment activities will be recorded on the attached field form. For each subsurface structure surveyed, field personnel will photograph the interior of the structure for inclusion in the documentation record. Samples of accumulated debris/sediment (if any) within the structures may be sampled based on the volatile organic vapors readings and ability to safely access the materials to collect the sample from the ground surface.

4. Personnel Qualifications

Only qualified personnel will direct well installation activities. Training requirements for direction of well installation activities include reviewing this SOP, other applicable SOPs, guidance documents, and health and safety training.

Field personnel executing these procedures will have read, be familiar with, and comply with the requirements of this SOP. Additionally, field personnel will be under the direct supervision of qualified professionals who are experienced in performing the tasks required for sample collection.

Anchor QEA field personnel and subcontractors will have completed current company-required health and safety training (e.g., 40-hour Hazardous Waste Operations training, site-specific training, and first aid and cardiopulmonary resuscitation [CPR] training) as needed.

5. Equipment List

Equipment and materials that will be used for overseeing and directing the well installation and development may include the following:

- Appropriate personal protective equipment (PPE), as specified in the site Health and Safety Plan (HASP)
- Indelible ink pen
- Tape measure
- Camera
- Whiteboard with erasable markers
- Air monitoring equipment
- Field logbook; field forms for core collection, well construction, and well development; or notebook with relevant forms
- Photo-ionization device with appropriate lamp and calibration gas

6. Waste Management

IDW, rinse water, PPE, and other waste materials generated during subsurface assessment (waste) must be placed in appropriate containers and labeled. Waste materials will be stored securely in a location. Handling and disposal of waste procedures are documented in the site-specific work plan and in SOP 005: Investigation-Derived Waste.

7. Data Recording and Management

All information relevant to the subsurface structure assessment will be recorded by Anchor QEA field staff using the field logbook and assessment form (Attachment 1). Field equipment decontamination activities and waste management activities will be recorded in the field logbook. Records generated as a result of implementing this SOP will be controlled and maintained in the project record files in accordance with client-specific requirements.

8. Quality Assurance

It is the responsibility of the field team leader to periodically check to ensure the procedures are in conformance with those stated in this SOP.

Attachments

Attachment 1 Soil Gas Sampling Form

Attachment 1
Soil Gas Vapor Sampling Documentation Form

Field Sampling Form

Project #: ________________________ Sample #: ____________ **(Attach Sample Map)**

Project Name: ________________________

Sampled By: ________________________

Date Sampled: ________________________ Time: ____________

General Site Conditions:

Atmospheric Data:

____________ Source of Data

____________ Precipitation during sampling

____________ Amount of Precipitation

____________ Barometric Press.(Outside/Inside))

____________ Temp(Outside/Inside)

____________ Wind Speed

____________ Wind Direction

Sampling System (check one)

QA/QC Sample?______(if yes, select type below)

Sampling System (check one)

( ) Whole-Air active approach (summa)

( ) Whole-Air passive approach

( ) Sorbed contaminants-active approach

( ) Sorbed contaminants-passive approach

( ) Headspace or extraction approach

( ) soil pore liquid headspace approach

( ) Field Blank

( ) Trip Blank

( ) Field Duplicate

System Purge Volume (0.086 L/ft) * Depth (ft): ____________ Volumes Purged (3): ____________ Sample Volume: ____________

Sorbent Device: Installed: ________________________ Date/time

Recovered ________________________ Date/time

Sample Container Type: ____________ Sample Container #: ____________

For Summa Canister Sample Collection:

Sample ID	Canister Number	Location	Time Start	Time End	Pressure (in. Hg) Start	Pressure (in. Hg) End	Sampling Rate

Sample Location Description

Surface cover: ____

Concrete/Asphalt Thickness: ____

Condition Of Concrete Floor near Sample: ____

Sample Depth: ______________

Soil Conditions

Soil Composition:

Clay ____________%

Soil Organic matter ____________%

Fine Granular Material ____________%

Coarse Granular Material ____________%

Approximate Moisture Content: ____________%

Other characteristics:

______________________free water present

______________________free product present

______________________PID Reading

______________________Odors

______________________Soil discoloration

QA/QC Testing Results

Note- Each vapor point must pass all the QA\QC Tests below before sampling. Reseal and Retest until the vapor point passes the test.

Test #1A- Short Circuit Test

Oxygen reading in % O_2 : ___________ Did the vapor points pass the test (<=18.8%): Y/N (circle one)

Notes: ____

Test #1B- Short Circuit Test

Oxygen reading in % O_2 : ___________ Did the vapor points pass the test (<=18.8%): Y/N (circle one)

#2- Helium Test (SOP 12 or 13 Soil Gas or Sub-Slab Air Sampling SOP for details)

Test #2A- Helium Concentration within the Shroud: ______________________

Helium Concentration within tubing: ____________

Did the vapor points pass the test (tubing<10% of the shroud): Y/N (circle one)

Test #2B- Helium Concentration within the Shroud: ____

Helium Concentration within tubing: ____________

Did the vapor points pass the test (tubing<10% of the shroud): Y/N (circle one) Notes:

____

Test #3- Shut-in Test (Please see Attachment 3- Active Soil Gas or Sub-Slab Air Sampling SOP for details)

Test 3A# Pass Shut in test by maintaining -7 in. Hg in tubing from the shroud to the summa canister for 5 minutes: Y/N (circle one)

Notes:

____

Test 3B# Pass Shut in test by maintaining -7 in. Hg in tubing from the shroud to the summa canister for 5 minutes: Y/N (circle one)

Notes:

____

Test 3C# Pass Shut in test by maintaining -7 in. Hg in tubing from the shroud to the summa canister for 5 minutes: Y/N (circle one)

Notes:

____

Sample #________- ________________________

Did the occupants not follow any of the "Instructions for Residents" directions? *Yes / No*

If so, describe modifications: ____

General Observations

Provide any information that may be pertinent to the sampling event and may assist in the data interpretation process.

Standard Operating Procedure

Sub-Slab Soil Vapor Sampling

SOP 013

Project: Syracuse Bread Factory

Revision Date: February 2026

1. Purpose

The purpose of this Standard Operating Procedure (SOP) is to establish uniform procedures for the assessment of sub-slab soil vapors at the project site.

This SOP describes the equipment, field procedures, materials, and documentation procedures necessary to perform the assessment. The details within this SOP should be used in conjunction with the project work plan.

2. Scope and Applicability

This SOP applies to task orders and projects associated with Anchor QEA. This SOP may be modified, as required, depending on site-specific conditions, equipment limitations, or limitations imposed by the procedure. The ultimate procedure employed will be documented in the appropriate project work plan or reports. If changes to the installation procedures are required due to unanticipated field conditions, the changes will be discussed with the project manager as soon as practicable and will be documented in the final project report.

3. Summary of Method

This sampling procedure will be used for installation and sampling of temporary sub-slab vapor collection points.

3.1 Temporary Sub-Slab Vapor Collection Point Installation

On the day prior to sampling, Anchor QEA personnel will install a temporary sub-slab vapor sample collection point at each proposed sampling location inside the building at the locations presented on attached Figure 2-1 of the RI Work Plan. Each point will be installed by coring through the floor slab using a hammer drill equipped with a ½-inch diameter pulverizing bit or core drill and then inserting a section of ¼-inch inside diameter Teflon®-lined tubing into the corehole. The drill bit will be advanced two to three inches into the sub-slab material to create an open cavity, if needed. The annular space between the tubing and the corehole will be sealed with hydrated bentonite.

3.2 Sub-Slab Vapor Purging Activities

Prior to initiating the collection of samples, atmospheric air will be removed from the sample point via purging using the attached tubing and a gas-tight syringe at a flow rate of less than 200 milliliters per minute (mL/min). Purging will continue until approximately one to three times the volume of air inside the tubing has been removed. The purge air collected in the syringe will be discharged outdoors or in building areas separated from the sample location by physical barriers. Tracer gas testing will be performed during purging to evaluate the integrity of the seals around the soil vapor sampling points.

3.3 Sub-Slab Vapor Collection Activities

Each sub-slab vapor sample will be collected in a separate, batch-certified-clean SUMMA® canister provided by the analytical laboratory with an initial vacuum of at least 26 inches of mercury (in. of Hg). Flow regulators will be pre-set to draw soil vapor at a uniform rate over an approximate 2-hour period (i.e., at approximately 50 mL/min). When the canister vacuum reaches approximately five in. of Hg, the valve on the canister will be closed, leaving a vacuum in the canister as a means for the laboratory to verify the canister does not leak while in transit. After sampling is completed, the core holes for the sub-slab vapor sampling will be either plugged using the recovered cores or grouted closed.

An upwind, ambient air sample will be collected on the day of sub-slab vapor air sampling. In addition, field duplicates will be collected in support of the sub-slab vapor sampling at a frequency of one duplicate per 10 samples, with at least one duplicate per sample delivery group.

4. Personnel Qualifications

Only qualified personnel will direct well installation activities. Training requirements for direction of well installation activities include reviewing this SOP, other applicable SOPs, guidance documents, and health and safety training.

Field personnel executing these procedures will have read, be familiar with, and comply with the requirements of this SOP. Additionally, field personnel will be under the direct supervision of qualified professionals who are experienced in performing the tasks required for sample collection.

Anchor QEA field personnel and subcontractors will have completed current company-required health and safety training (e.g., 40-hour Hazardous Waste Operations training, site-specific training, and first aid and cardiopulmonary resuscitation [CPR] training) as needed.

5. Equipment List

In addition to the items listed in the above procedures, the following equipment and materials may be used for this SOP:

- Appropriate personal protective equipment (PPE), as specified in the site Health and Safety Plan (HASP)
- Indelible ink pen
- Tape measure
- Camera
- Personal Air monitoring equipment per HASP
- Field logbook; field forms for core collection, well construction, and well development; or notebook with relevant forms

6. Waste Management

IDW, rinse water, PPE, and other waste materials generated during subsurface assessment (waste) must be placed in appropriate containers and labeled. Waste materials will be stored securely in a location. Handling and disposal of waste procedures are documented in the site-specific work plan and in SOP 005: Investigation-Derived Waste.

7. Data Recording and Management

All information relevant to the sub-slab soil vapor sampling will be recorded by Anchor QEA field staff using the field logbook and assessment form (Attachment 1). Field equipment decontamination activities and waste management activities will be recorded in the field logbook. Records generated as a result of implementing this SOP will be controlled and maintained in the project record files in accordance with client-specific requirements.

8. Quality Assurance

It is the responsibility of the field team leader to periodically check to ensure the procedures are in conformance with those stated in this SOP.

Attachments

Attachment 1 Subslab Soil Vapor Sampling Documentation Form

Attachment 1
Subslab Soil Vapor Sampling
Documentation Form

Field Sampling Form

Project #: ______________________________ Sample #: __________ **(Attach Sample Map)**

Project Name: ______________________________

Sampled By: ______________________________

Date Sampled: ______________________________ Time: ______________

General Site Conditions:

Atmospheric Data:

__________ Source of Data

__________ Precipitation during sampling

__________ Amount of Precipitation

__________ Barometric Press.(Outside/Inside))

__________ Temp(Outside/Inside)

__________ Wind Speed

__________ Wind Direction

Sampling System (check one)

Sampling System (check one)

( ) Whole-Air active approach (summa)

( ) Whole-Air passive approach

( ) Sorbed contaminants-active approach

( ) Sorbed contaminants-passive approach

( ) Headspace or extraction approach

( ) soil pore liquid headspace approach

QA/QC Sample?______(if yes, select type below)

( ) Field Blank

( ) Trip Blank

( ) Field Duplicate

System Purge Volume (0.086 L/ft) * Depth (ft): ______________ Volumes Purged (3): __________ Sample Volume: __________

Sorbent Device: Installed: ______________________________ Date/time

Recovered ______________________________ Date/time

Sample Container Type: ______________ Sample Container #: __________

For Summa Canister Sample Collection:

Sample ID	Canister Number	Location	Time Start	Time End	Pressure (in. Hg) Start	Pressure (in. Hg) End	Sampling Rate

Sample Location Description

Surface cover: ____

Concrete/Asphalt Thickness: ____

Condition Of Concrete Floor near Sample: ____

Sample Depth: ______________

Soil Conditions

Soil Composition:

Clay ______________%

Soil Organic matter ______________%

Fine Granular Material ______________%

Coarse Granular Material ______________%

Approximate Moisture Content: ______________%

Other characteristics:

______________________free water present

______________________free product present

______________________PID Reading

______________________Odors

______________________Soil discoloration

QA/QC Testing Results

Note- Each vapor point must pass all the QA\QC Tests below before sampling. Reseal and Retest until the vapor point passes the test.

Test #1A- Short Circuit Test

Oxygen reading in % O_2 : ___________ Did the vapor points pass the test (<=18.8%): Y/N (circle one)

Notes: ____

Test #1B- Short Circuit Test

Oxygen reading in % O_2 : ___________ Did the vapor points pass the test (<=18.8%): Y/N (circle one)

#2- Helium Test (SOP 12 or 13 Soil Gas or Sub-Slab Air Sampling SOP for details)

Test #2A- Helium Concentration within the Shroud: ______________________

Helium Concentration within tubing: ____________

Did the vapor points pass the test (tubing<10% of the shroud): Y/N (circle one)

Test #2B- Helium Concentration within the Shroud: ____

Helium Concentration within tubing: ____________

Did the vapor points pass the test (tubing<10% of the shroud): Y/N (circle one) Notes:

____

Test #3- Shut-in Test (Please see Attachment 3- Active Soil Gas or Sub-Slab Air Sampling SOP for details)

Test 3A# Pass Shut in test by maintaining -7 in. Hg in tubing from the shroud to the summa canister for 5 minutes: Y/N (circle one)

Notes:

____

Test 3B# Pass Shut in test by maintaining -7 in. Hg in tubing from the shroud to the summa canister for 5 minutes: Y/N (circle one)

Notes:

____

Test 3C# Pass Shut in test by maintaining -7 in. Hg in tubing from the shroud to the summa canister for 5 minutes: Y/N (circle one)

Notes:

____

Sample #________- ________________________

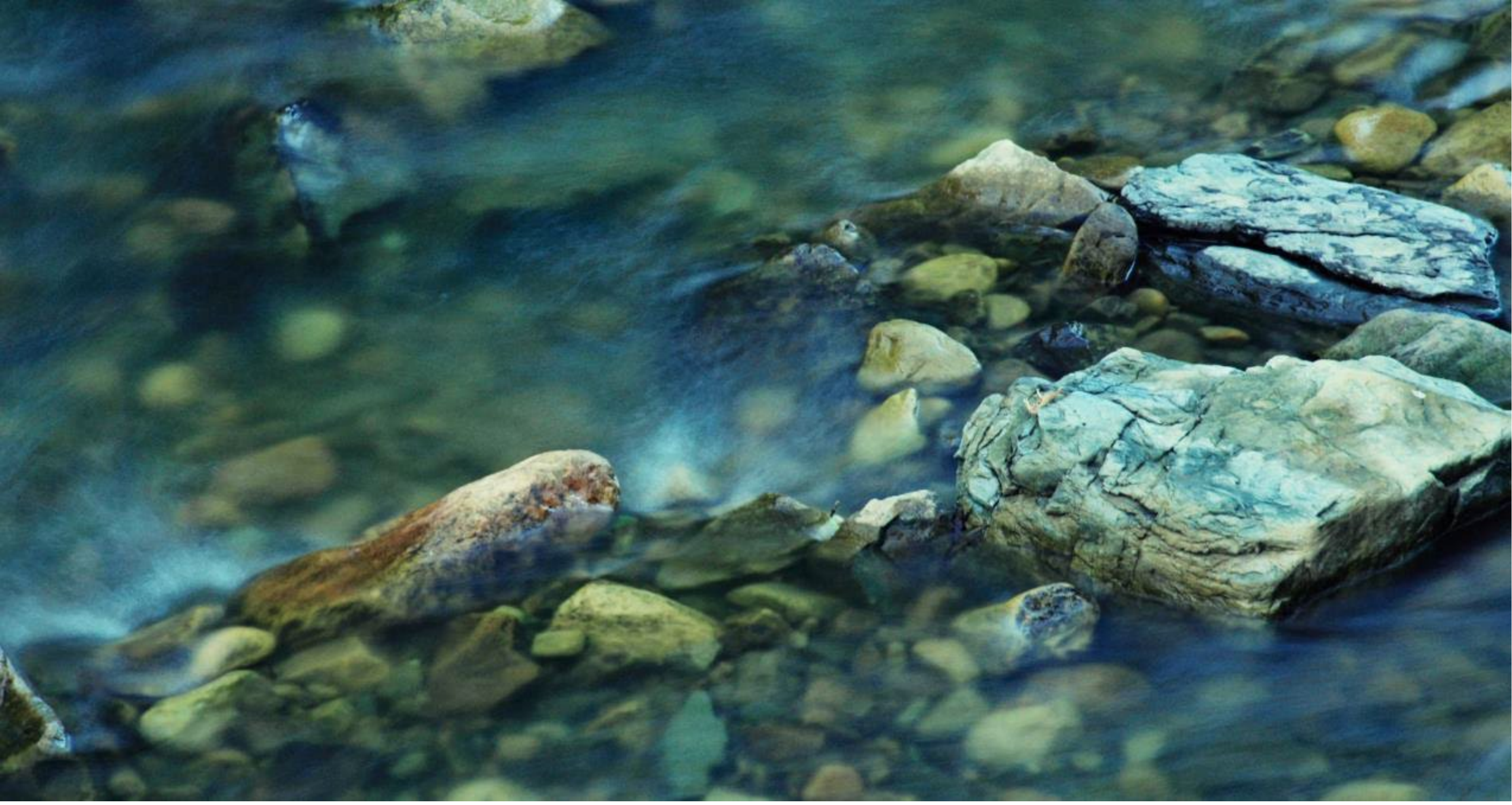
Did the occupants not follow any of the "Instructions for Residents" directions? *Yes / No*

If so, describe modifications: ____

General Observations

Provide any information that may be pertinent to the sampling event and may assist in the data interpretation process.

Appendix C
Health and Safety Plan (HASP)



March 2026
Syracuse Bread Factory
Site No. C734155

Health and Safety Plan

Prepared for Syracuse Bread Factory, LLC

PLAYING IT SAFE

Responsibility Is Taken, Not Given
Take Responsibility For Safety

March 2026
Syracuse Bread Factory
Site No. C734155

Health and Safety Plan

Prepared for
Syracuse Bread Factory, LLC
444 South Salina Street #602
Syracuse, NY 13201

Prepared by
Anchor QEA Engineering, PLLC
54 Genesee Street, Suite 100A
Camillus, NY 13031

Certification Page

Margaret Carrillo-Sheridan, PE

Project Manager

Anchor QEA Engineering, PLLC

Date: March 31, 2026

Field Lead

Anchor QEA Engineering, PLLC

Date: Click here to enter a date.

The information in this Health and Safety Plan has been designed for the work presently contemplated by Anchor QEA Engineering, PLLC. Therefore, this document may not be appropriate if the work is not performed by or using the methods presently contemplated by Anchor QEA. In addition, as the work is performed, conditions different from those anticipated may be encountered and this document may have to be modified. Therefore, Anchor QEA only intends this plan to address currently anticipated activities and conditions and makes no representations or warranties as to the adequacy of the Health and Safety Plan for all conditions encountered.

Health and Safety Plan Acknowledgement Form

Project Number: 212407-01.01

Project Name: Syracuse Bread Factory

My signature below certifies that I have read and understand the policies and procedures specified in this Health and Safety Plan (HASP). For non-Anchor QEA employees, this HASP may include company-specific appendices to this plan developed by entities other than Anchor QEA. Non-affiliated personnel may be required to sign the Liability Waiver following this Acknowledgement Form.

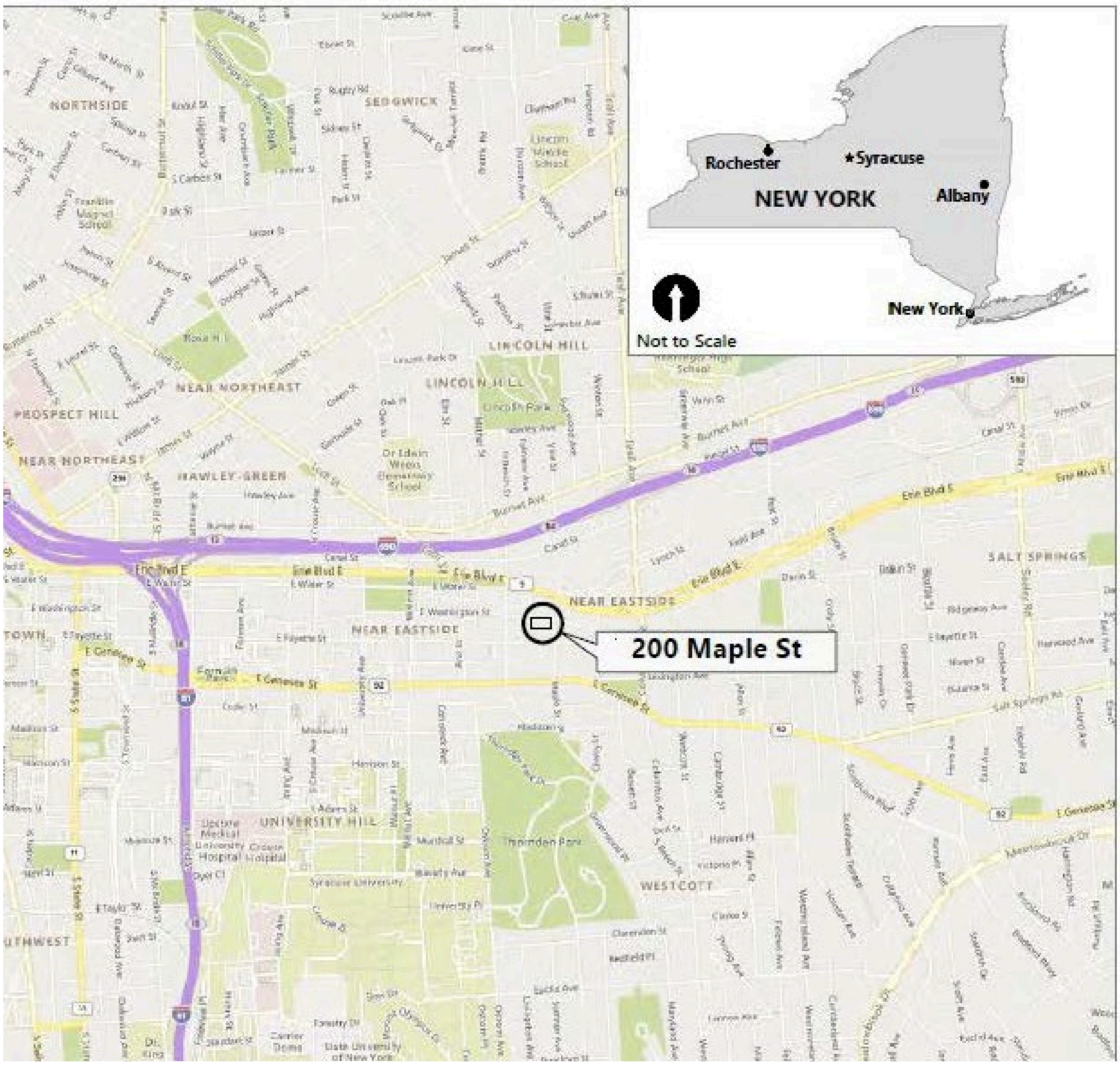
Date	Name (print)	Signature	Company

Date	Name (print)	Signature	Company

Site Emergency Procedures

Site Map

Figure A
General Site Location Overview



Emergency Contact Information

Table A
Site Emergency Form and Emergency Phone Numbers*

Category	Information	
Possible Chemicals of Concern	VOC, SVOC, metals	
Minimum Level of Protection	Level D	
Site(s) Location Address	200 Maple Street, Onondaga County, Syracuse, NY 13210	
Emergency Phone Numbers		
Ambulance	911	
Fire	911	
Police	911	
Poison Control	(800) 222-1222	
Client Contact	Jason Evans	Cell: 315-559-5793
Project Manager (PM)	Margaret Carrillo-Sheridan, PE	Office: (315) 414-2049 Cell: (315) 744-3123
Field Lead (FL)	To be Completed Prior to Start of Remedial Investigation	Office: Cell:
Corporate Health and Safety Manager (CHSM)	Tim Shaner, CSP, ASHM	Office: (251) 375-5282 Cell: (251) 281-3386
Health and Safety Program Lead	Matt Gruber, CIH, CSP	Office: (828) 771-0327 Cell: (828) 490-6877
State Emergency Response System	(800) 457-7362	
EPA Emergency Response Team,[1] Region 2	(212) 637-3660	

Notes:
* In the event of any emergency, contact the PM and FL.
1. For local resources, please visit: http://www2.epa.gov/emergency-response/emergency-response-my-community. The National Response Center hotline is (800) 424-8802.

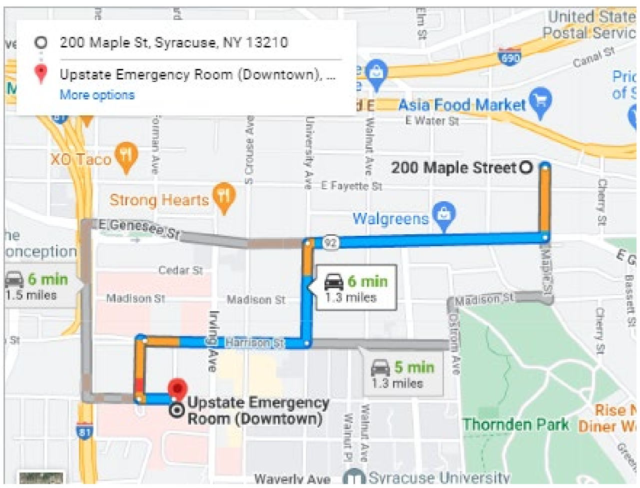
Table B
Hospital Information

Category	Information
Hospital Name	Upstate University Hospital
Address	750 East Adams Street
City, State	Syracuse, NY
Phone	(315) 464-5540
Emergency Phone	911

Hospital Route Map and Driving Directions

1. Depart Site and travel south on Maple St. towards East Fayette St. 0.1 mi.
2. Turn **Right** onto East Genesee St. and continue for 0.4 mi.
3. Turn **Left** onto University Ave and continue for 0.2 mi.
4. Turn **Right** onto Harrison St. and continue for 0.3 mi.
5. Turn **Left** onto Sarah Loguen St and continue for 0.1 mi.
6. Turn **Left** onto East Adams Street and continue approximately 350 ft.
7. Destination will be on the **Right**.

Figure B
Hospital Route Map



Care Management—WorkCare Incident Intervention

Anchor QEA has an additional Incident Intervention resource from WorkCare to help answer questions, alleviate uncertainty and stress in a potential injury situation, and maintain the health and safety of our employees. Incident Intervention is an injury and illness management tool that provides employees with 24 hours a day/7 days a week (24/7) immediate telephone access to a member of WorkCare's clinical staff of nurses and physicians who intervene at the time of a workplace injury or illness. Contact information is provided below:

- **Access WorkCare 24/7 from anywhere using the toll-free number: 1-888-449-7787**

At the time of a workplace injury or illness, the employee, manager, or another employee at the scene notifies WorkCare using the toll-free number listed above. The caller provides information on the type of incident, possible cause, and the scope of the situation. With the details of the incident recorded, an experienced nurse or physician provides the following:

- Responsive evaluation of the incident
- Direction on the appropriate course of action
- Consultation with the employee's treating physician to design a quality care treatment plan that meets the needs of the employee and Anchor QEA

All employees are encouraged to use this service should a workplace injury or illness occur.

Key Safety Personnel

The following people share responsibility for health and safety at the site. See Section 4 of this Health and Safety Plan (HASP) for a description of the role and responsibility of each.

Client Contact: Jason Evans	Cell:(315) 559-5793
Project Manager (PM): Margaret Carrillo-Sheridan, PE	Office: (315) 414-2049 Cell: (315) 744-3123
Field Lead (FL): Matthew Cavas, PG	Office: (518) 886-0643 Cell: (518) 222-5486
Corporate Health and Safety Manager (CHSM): David Templeton	Office: (206) 287-9130 Cell: (206) 910-4279
Health and Safety Program Lead: Tim Shaner	Office: (251) 375-5282

Personal Incident Response Procedures

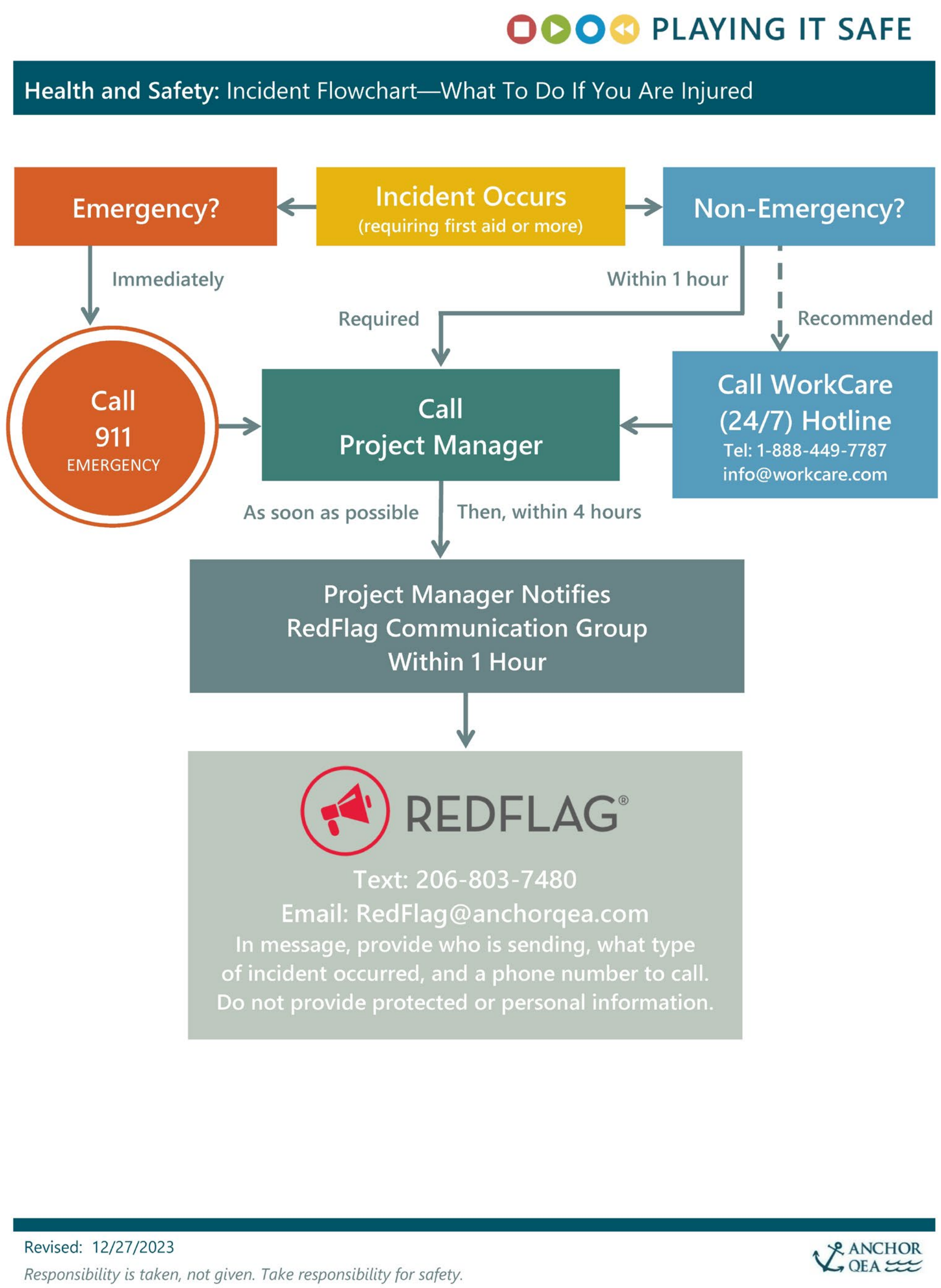
In the event of an emergency, immediate action must be taken by the first person to recognize the event. Use the following steps as a guideline and refer to Figure C:

1. Survey the situation to verify that it is safe for you and the victim. Do not endanger your own life. Do not enter an area to rescue someone who has been overcome unless properly equipped and trained. Verify that all protocols are followed. If applicable, review Safety Data Sheets (SDS) to evaluate response actions for chemical exposures.
2. Call the appropriate emergency number (911, if available) or direct someone else to do this immediately (see Table A). Explain the physical injury, chemical exposure, fire, or release and location of the incident.
3. Have someone retrieve the nearest first aid kit (containing appropriate items for the particular work scope) and Automated External Defibrillator (AED), if available. Note: Only use an AED if you have been properly trained and are currently certified to do so.
4. Decontaminate the victim without delaying life-saving procedures (see Section 8).

5. Administer first aid and cardiopulmonary resuscitation (CPR), if properly trained, until emergency responders arrive.[1]
6. In the event that evacuation is required, the FL must perform a head count to verify that all Anchor QEA personnel are accounted for.
7. Notify the Field Lead (FL) and Project Manager (PM); the PM will notify the client contact. The PM will also contact the Corporate Health and Safety Manager (CHSM). The CHSM will facilitate the incident investigation. All client requirements pertinent to personal incident reporting will also be adhered to.
8. Complete the appropriate incident investigation reports.

[1] Personnel qualified and currently certified in basic first aid or CPR are protected under Good Samaritan policies as long as they only perform the basic tasks that they were taught. Do not perform first aid or CPR tasks if you have not been trained in first aid or CPR.

Figure C
Incident Flowchart



Non-Personal Incident Response Procedures

All incidents including, but not limited to, fire, explosion, property damage, or environmental release will be responded to in accordance with the site-specific HASP. In general, this includes securing the site appropriate to the incident, turning control over to the emergency responders, or securing the site and summoning appropriate remedial personnel or equipment. Anchor QEA will immediately notify the client of any major incident, fire, equipment or property damage, or environmental incident with a preliminary report. A full report will be provided within 72 hours.

Spills and Releases of Hazardous Materials

When required, notify the National Response Center and local state agencies. The following information should be provided to the National Response Center:

- Name and telephone number
- Name and address of incident location
- Time and type of incident
- Name and quantity of materials involved, if known
- Extent of injuries
- Possible hazards to human health or the environment outside the facility

The emergency telephone number for the National Response Center is (800) 424-8802. If hazardous waste is released or produced through control of the incident, verify the following:

- Waste is collected and contained
- Containers of waste are removed or isolated from the immediate site of the emergency
- Treatment or storage of the recovered waste, contaminated soil or surface water, or any other material that results from the incident or its control is provided
- No waste that is incompatible with released material is treated or stored in the facility until cleanup procedures are completed

Verify that all emergency equipment used is decontaminated, recharged, and fit for its intended use before operations are resumed.

Near-Miss Reporting

All near-miss incidents (i.e., those that could have reasonably led to an injury, environmental release, or other incident) must be reported to the FL and PM immediately, so action can be taken to verify that such conditions that led to the near-miss incident are readily corrected to prevent future occurrences.

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
AED	Automated External Defibrillator
ALARA	as low as reasonably achievable
ANSI	American National Standards Institute
APR	Air-Purifying Respirator
ASTM	ASTM International
CDC	Centers for Disease Control and Prevention
CFR	Code of Federal Regulations
CHSM	Corporate Health and Safety Manager
COC	chemical of concern
CPR	cardiopulmonary resuscitation
CRZ	Contamination Reduction Zone
dBA	A-weighted decibel
dB	decibel
DOT	U.S. Department of Transportation
DPT	direct push technology
EPA	U.S. Environmental Protection Agency
eV	electron volts
EZ	Exclusion Zone/Hot Zone
FID	flame ionization detector
FL	Field Lead
GFCI	ground-fault circuit interrupter
H:V	horizontal to vertical
HASP	Health and Safety Plan
HAZMAT	Hazardous Materials
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	high-efficiency particulate air
HMIS	Hazardous Material Information System
IDLH	immediately dangerous to life or health
JSA	Job Safety Analysis
kPa	kilopascal
kV	kilovolt
LEL	lower-explosive limit
LO/TO	lockout/tagout
mg/m^3	milligram per cubic meter
MHR	maximum heart rate
MUTCD	Manual of Uniform Traffic Control Devices

NEC	National Electrical Code
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NPL	National Priority List
NRR	Noise Reduction Rating
O_2	oxygen
OSHA	Occupational Safety and Health Act or Administration
OV	organic vapor
OVM	organic vapor monitor
PAH	polycyclic aromatic hydrocarbon
PE	Professional Engineer
PEL	Permissible Exposure Limit
PFD	personal flotation device
PID	photoionization detector
PM	Project Manager
PPE	personal protective equipment
ppm	parts per million
PRCS	Permit-Required Confined Spaces
QLFT	qualitative fit test
REL	Recommended Exposure Limit
RCRA	Resource Conservation and Recovery Act
RPP	Respiratory Protection Program
SDS	Safety Data Sheets
SZ	Support Zone/Clean Zone
TLV	Threshold Limit Value
TSD	treatment, storage, and disposal
tsf	ton per square foot
TWA	time-weighted average
TWIC	Transportation Worker Identification Credential
USCG	U.S. Coast Guard
UV	ultraviolet
VOC	volatile organic compound
WBGT	wet bulb globe temperature
XRF	x-ray fluorescence

1 Introduction

This Health and Safety Plan (HASP) was prepared on behalf of Syracuse Bread Factory, LLC and presents health and safety requirements and procedures that will be followed by Anchor QEA Engineering, PLLC (Anchor QEA), personnel and at a minimum by Anchor QEA subcontractors during work activities at the former Syracuse Bread Factory (the site). This HASP was developed in accordance with Title 29 of the Code of Federal Regulations (CFR), Part 1910.120(b), and will be used in conjunction with Anchor QEA's Corporate Health and Safety Program. See Section 1.1 for HASP modification procedures.

The provisions of this HASP are mandatory for all Anchor QEA personnel assigned to the project. A copy of this HASP must be maintained on site and available for employee review at all times. Anchor QEA subcontractors are also expected to follow the provisions of this HASP unless they have their own HASP that covers their specific activities related to this project. Any subcontractor HASPs must include the requirements set forth in this HASP, at a minimum. All visitors to the work site must also abide by the requirements of this HASP and will attend a pre-work briefing where the contents of this HASP will be presented and discussed.

Personnel assigned to work at the project site will be required to read this plan and must sign the Health and Safety Plan Acknowledgement Form to confirm that they understand and agree to abide by the provisions of this HASP.

Subcontractors are ultimately responsible for the health and safety of their employees. Subcontractors may mandate health and safety protection measures for their employees beyond the minimum requirements specified in this HASP.

The objectives of this HASP are to identify potential physical, chemical, and biological hazards associated with field activities; establish safe working conditions and protective measures to control those hazards; define emergency procedures; and describe the responsibilities, training requirements, and medical monitoring requirements for site personnel.

This HASP prescribes the procedures that must be followed during specific site activities. Significant operational changes that could affect the health and safety of personnel, the community, or the environment will not be made without the prior approval of the Project Manager (PM) and the Corporate Health and Safety Manager (CHSM).

Issuance of this approved HASP documents that the workplace has been evaluated for hazards. A hazard assessment was performed, and the adequacy of the personal protective equipment (PPE) selected was evaluated as required by 29 CFR 1910.132(d)—Personal Protective Equipment, General Requirements (General Industry); 29 CFR 1910.134—Respiratory Protection; 29 CFR 1926.28—Personal Protective Equipment (Construction Industry); and 29 CFR 1926.55—Gases, Vapors, Fumes, Dusts and Mist, and is duly noted by the signature(s) and date appearing on the certification page of this document.

1.1 Health and Safety Plan Modifications

This HASP will be modified by amendment, if necessary, to address changing field conditions or additional work tasks not already described in this document. Modifications will be proposed by the Field Lead (FL) using the Modification to Health and Safety Plan form included in Appendix A. Modifications will be reviewed by the CHSM or authorized representative and approved by the PM.

2 Site Description and Background Information

2.1 Site Description

The Site consists of an approximately 0.75-acre parcel located in an urban setting in the City of Syracuse. The Site occupies a City of Syracuse tax lot designated as 31-14-04 and is currently owned by the Greater Syracuse Land Bank. During a site visit, the Site was found to consist of a large vacant former industrial structure with some lawn areas on the northern and eastern sides of the structure as well as a pedestrian sidewalk along the east side of the Site.

The Site is bordered by East Washington Street to the north, Lombardi Avenue to the northeast, and Maple Street to the east. The south and west sides of the property are bounded by residential and commercial properties. Immediately north of the Site are three vacant parcels, which are not included in the Site and consist of vegetation and a gravel parking area. The Site and these three vacant parcels are intended to be redeveloped by Syracuse Bread Factory as a mixed-use development consisting of commercial, retail and residential uses.

2.2 Site Background Information

Based on a review of information included in the Phase I Environmental Site Assessment (Stantec 2020), the Site has had a range of uses and occupants over the past 200 years including residential, rail tunnel, and commercial bakery. Presented below is a summary of known Site occupants and commercial activities.

2.2.1.1 City Directory Review

The City Directory review included in the Phase I ESA indicates that the Site was occupied by J. Kidder in 1892 and that by 1924, the Site occupant was General Baking Company. **Table 1-1** below summarizes the Site occupancy through 2022.

Table 2-1
Site Occupancy

Past Operator Name	Estimated Dates of Occupancy	Use (if known)
Greater Syracuse Landbank[2]	12/12/2018 - Present	Maintaining property in current state
Baruch Zvi Holdings LLC	January 30, 2006 – 12/12/2018	Unknown
200 Maple Street Realty Company and Cooper Drapery Company	May 4, 2001 – January 30, 2006	Used for the manufacture and warehousing of decorations and drapery
Cooper Decoration Inc. and Cooper Drapery Company	Circa 1968 – May 4, 2001	

[2] The City of Syracuse and the Greater Syracuse Landbank acquired Parcel A vis tax foreclosure.

Past Operator Name	Estimated Dates of Occupancy	Use (if known)
General Baking Company	1922 - 1968	Commercial baking
Syracuse Bread Company/General Baking Company	1912 - 1922	Commercial baking
J. Kidder (1892)	1892 - 1910	Vacant

The 1892 and 1910 Sanborn Fire Insurance Maps also indicate the Site was not developed prior to 1910. The earliest available aerial photograph (1938) included in the Phase I ESA shows the Site occupied by the former factory building by 1938.

As shown on the 1953 Fire Insurance Map the former factory building included the following processes/infrastructure:

- Proving box and ovens (2) on the second floor
- Dough room on the third floor
- Storage and mixing room on the fourth floor
- Shipping room, wagon and auto house on the ground floor
- Two-story garage
- Auto repairing and painting (two stories)
- Automatic sprinkler system
- Chemical extinguishers

The Sanborn map did not indicate the presence of fuel storage tanks on the property. Review of the other Sanborn maps (from 1951. 1964, 1968, 1971 and 1990) did not present additional information or indicate the presence of fuel storage tanks on-site.

3 Scope of Work

3.1 Project Scope of Work

This plan addresses health and safety issues associated with the following field tasks:

- Coordination of underground utility mark outs (mark outs conducted by others) for public and private utilities
- Subsurface soil investigation
- Groundwater monitoring
- Subsurface structure assessment.

Prior to engaging in intrusive activities, Anchor QEA will contact the New York Dig Safe authority to identify public utilities at the site. Following sufficient time to allow for public utilities to be marked, Anchor QEA will review the marked utilities, document any conflicts with the proposed intrusive investigation locations, and discuss alternate locations with the subcontractor and property owners. Anchor QEA may also contract with a private utility locator to employ tools such as ground penetrating radar to provide additional subsurface clearance for each of the investigation locations.

Test pit(s) are planned to investigate the locations of former underground petroleum storage tank(s). Soils removed will be field screened and samples may be collected depending on what is observed. Collected soils that are not suitable for placement back into the test pit excavation will be containerized in 55-gallon drums or staged on plastic for disposal pending waste characterization.

Soil borings are planned to support installation of groundwater monitoring wells (3 total). Two of the soil borings will be located in grassed or asphalt areas outside the former building, and one boring is proposed for inside the building assuming the proposed area can be safely accessed with a drilling rig.

Accessible subsurface structures in the basement and or first floor of the former manufacturing building will be assessed to determine the presence of waste materials within the structures as well as piping which may connect to suspect underground storage tank(s).

4 Authority and Responsibilities of Key Personnel

This section describes the authority and responsibilities of key Anchor QEA project personnel. The names and contact information for the following key safety personnel are listed in the Site Emergency Procedures section at the beginning of this HASP. Should key site personnel change during the course of the project, a new list will be established and posted immediately at the site. The emergency phone number for the site is **911** and should be used for all medical, fire, and police emergencies.

4.1 Project Manager

The PM provides overall direction for the project. The PM is responsible for ensuring that the project meets the client's objectives in a safe and timely manner. The PM is responsible for providing qualified staff for the project and adequate resources and budget for the health and safety staff to carry out their responsibilities during the field work. The PM will be in regular contact with the FL and CHSM to verify that appropriate health and safety procedures are implemented into each project task.

The PM has authority to direct response operations; the PM assumes total control over project activities but may assign responsibility for aspects of the project to others. In addition, the PM performs the following tasks:

- Overseeing the preparation and organization of background review of the project, the Scope of Work, and the field team
- Verifying that the team obtains permission for site access and coordinates activities with appropriate officials
- Briefing the FL and field personnel on specific assignments
- Together with the FL, seeing that health and safety requirements are met
- Consulting with the CHSM regarding unsafe conditions, incidents, or changes in site conditions or the Scope of Work

4.2 Field Lead

The FL reports to the PM, has authority to direct response operations, and assumes control over on-site activities. The FL will direct field activities, will coordinate the technical and health and safety components of the field program, and is responsible in general for enforcing this site-specific HASP and Corporate Health and Safety Program requirements. The FL will be the primary point of contact for all field personnel and visitors and has direct responsibility for implementation and administration of this HASP. The FL and any other member of the field team have **STOP WORK AUTHORITY**—the authority to stop or suspend work in the event of an emergency, if conditions arise that pose an unacceptable health and safety risk to the field team or environment, or if conditions arise that warrant modifications to this HASP. It is critical that both the FL and PM communicate regularly to proactively identify and address any safety-related concerns that may arise. The functions of the FL related to this HASP include, but are not necessarily limited to, the following:

- Conducting and documenting daily safety meetings or designate an alternate FL in his or her absence
- Executing the Scope of Work and schedule
- Conducting periodic field health and safety inspections to verify compliance with this HASP
- Overseeing implementation of safety procedures
- Implementing site personnel protection levels
- Enforcing site control measures to help verify that only authorized personnel are allowed on site
- Notifying, when necessary, local public emergency officials (all personnel on site may conduct this task as needed)
- Following up on incident reports to the PM
- Periodically inspecting protective clothing and equipment for adequacy and safety compliance
- Verifying that protective clothing and equipment are properly stored and maintained
- Performing or overseeing air monitoring (if required) in accordance with this HASP
- Maintaining and overseeing operation of monitoring equipment and interpretation of data from the monitoring equipment
- Monitoring site personnel for signs of stress, including heat stress, overexertion, cold exposure, and fatigue
- Requiring participants to use the “buddy” system in performing tasks
- Providing (via implementation of this HASP) emergency procedures, evacuation routes, and telephone numbers for the local hospital, poison control center, fire department, and police department
- Communicating incidents promptly to the PM
- Maintaining communication with the CHSM regarding on-site activities
- If applicable, verifying that decontamination and disposal procedures are followed
- Maintaining the availability of required safety equipment
- Advising appropriate health services and medical personnel of potential exposures
- Notifying emergency response personnel in the event of an emergency and coordinate emergency medical care

The FL will record health-and-safety-related details of the project in the field logbook. At a minimum, each day’s entries must include the following information:

- Project name or location

- Names of all on-site personnel
- Level of PPE worn and any other specifics regarding PPE
- Weather conditions
- Type of field work being performed

The FL will have completed the required Occupational Safety and Health Administration (OSHA) 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training and annual updates, the 8-hour Supervisor training, medical monitoring clearance, and current first aid and cardiopulmonary resuscitation (CPR) training. Other certifications or training may be stipulated based on client or site requirements.

4.3 Corporate Health and Safety Manager

The CHSM (or designee) will be responsible for managing on-site health and safety activities and will provide support to the PM and FL on health and safety-related issues. The following are specific duties of the CHSM:

- Providing technical input into the design and implementation of this HASP
- Advising on the potential for occupational exposure to project hazards, along with appropriate methods and/or controls to eliminate site hazards
- Verifying that a hazard assessment has been performed and that the adequacy of the PPE selected was evaluated as required by 29 CFR 1910.132(d), 29 CFR 1910.134, 29 CFR 1926.25, and 29 CFR 1926.55, and is duly noted by the signatures and date appearing on the Certification Page of this document
- Consulting with the FL on matters relating to suspending site activities in the event of an emergency
- Verifying that all on-site Anchor QEA personnel and subcontractors have read and signed the HASP Acknowledgement Form
- Verifying that corrective actions resulting from deficiencies identified by audit and observations are implemented and effective

The CHSM or designee will have completed the required OSHA 40-hour HAZWOPER training and annual updates as well as the 8-hour Supervisor training (or a minimum of 5 years of supervisory experience).

4.4 Project Field Team

All project field team members will attend a project-specific meeting conducted by the FL concerning safety issues and project work task review before beginning work on site. All field team members, including subcontractors, must be familiar with and comply with this HASP. The field team has the responsibility to immediately report any potentially unsafe or hazardous conditions to the FL, and all members of the field team have **STOP WORK AUTHORITY**—the authority to stop or suspend work if conditions arise that pose an unacceptable health and safety risk to the field team or environment, or if conditions arise that warrant modifications to this HASP. It is critical that all field team members proactively communicate with the FL to identify potential unsafe conditions. The field team reports to the FL for on-site activities and is responsible for the following:

- Reviewing and maintaining a working knowledge of this HASP
- Safely completing on-site tasks required to fulfill the Scope of Work
- Complying with the HASP
- Attending and participating in daily safety meetings
- Notifying the FL of existing or potential safety conditions at the site
- Reporting all incidents to the FL
- Demonstrating safety and health-conscious conduct

Per OSHA 1910.120(e)(3)(i),[3] newly assigned HAZWOPER 40-hour trained field team members must have at least 3 days of field work supervised by an experienced FL (preferably an individual with HAZWOPER Supervisor training). It is the responsibility of the PM to identify such "short service" personnel and verify that their supervised field experience occurs (or has occurred) and is documented in the project field notes and on the Daily Safety Briefing form (Appendix A).

[3] "General site workers (such as equipment operators, general laborers and supervisory personnel) engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazards shall receive a minimum of 40 hours of instruction off the site, and a minimum of three days actual field experience under the direct supervision of a trained experienced supervisor."

5 Project-Specific Requirements

This section provides activity-specific levels of protection and air monitoring requirements to be used on this site based on the Scope of Work and the chemicals of concern (COCs).

5.1 Activity-Specific Level of Protection Requirements

Refer to Section 10 for general requirements for PPE. Level D is the minimum acceptable level for most sites. An upgrade to Modified Level D occurs when there is a possibility that contaminated media can come in contact with the skin or work uniform. An upgrade to Level C occurs when there is a potential for exposure to airborne COCs (i.e., if the results of air monitoring reveal that action levels have been exceeded). Hearing protection must be worn when there are high noise levels. Site personnel must maintain proficiency in the use and care of PPE that is to be worn.

Table 5-1 describes the specific means of protection needed for each identified work activity.

5.2 Project Air Monitoring Requirements

Refer to Section 11 of this plan for general requirements for air monitoring at the project site, including information on air monitoring equipment. Upgrade from Level D and/or Modified Level D to Level C when the results of air monitoring reveals that action levels have been exceeded. Use of Level C by Anchor QEA staff requires participation in Anchor QEA's Respiratory Protection Program (RPP).

All intrusive work will require a Community Air Monitoring Program (CAMP). Table 5-1 describes the specific air monitoring required for each identified work activity.

Table 5-1
Project Job Tasks and Required Personal Protective Equipment

Job Tasks		PPE Requirements
• Loading and unloading sample coolers, general fieldwork/Site visits • Working near equipment used for test pit completion • Subcontractor oversight	☒	Standard work uniform/coveralls
	☒	Work boots with safety toe conforming to ASTM International (ASTM) F2412-05/ASTM F2413-05
	☒	High-visibility traffic safety vest
	☐	Chemical-resistant clothing <u>check appropriate garments</u>: ☐ One-piece coverall ☐ Hooded one- or two-piece chemical splash suit ☐ Disposable chemical coveralls ☐ Chemical-resistant hood and apron ☐ Bib-style overalls and jacket with hood **Fabric Type**: Tyvek NOTE: Thick rain pants and coveralls may be substituted for coated Tyvek if sediments are not obviously contaminated with polycyclic aromatic hydrocarbons (PAHs) or related petroleum products. Rain slickers cannot be effectively decontaminated of tar/petroleum contamination.
	☐	Disposable inner gloves (latex or equivalent "surgical")
	☐	Disposable chemical-resistant outer gloves **Material Type**: Nitrile
	☐	Chemical-resistant boots with safety toe conforming to ASTM F2412-05/ASTM F2413-05 or disposable boot covers for safety toe/work boots **Material Type**: Rubber or leather
	☐	Puncture-resistant shanks in safety shoes conforming to ASTM F2412-05/ASTM F2413-05
	☐	Metatarsal guards conforming to ASTM F2412-05/ASTM F2413-05
	☐	Sleeves to be duct-taped over gloves and pants to be duct-taped over boots
	☐	Splash-proof safety goggles
	☒	Safety glasses
	☒	Hard hat
	☐	Hard hat with face shield
	☒	Hearing protectors (**REQUIRED** if site noise levels are greater than 85 decibels [dB] based on an 8-hour time-weighted average [TWA]). **Type**: over-ear or in-ear to reduce decibel level
	☐	Two-way radio communication (intrinsically safe, if explosive atmosphere is a potential)

Job Tasks		PPE Requirements
	☐	Long cotton underwear
	☐	High-visibility, U.S. Coast Guard (USCG)-approved personal flotation device (PFD) (if working on any water vessel or without fall protection within 10 feet of water)
	☐	USCG-approved float coat and bib-overalls (e.g., full two-piece "Mustang" survival suit or similar) or one-piece survival suit if combined air and water temperature is below 90°F
	☐	Half-face Air-Purifying Respirator (APR) (OSHA/NIOSH-approved)
	☐	Full-face APR (OSHA/NIOSH-approved)
	☐	**Type of Cartridges to be Used**: ☐ **OV or** ☐ **OV/HEPA (if samples are dry)**

Table 5-2
Project Air Monitoring Requirements

Instrument*	Job Tasks/Functions	Measurement	Monitoring Schedule[3]	Actions[1]
PID (11.7*eV Lamp; Measures Total Organic Vapors)	Conduct air monitoring for VOCs[1] during activities where contaminated media are present. Make sure that a background reading is taken before the start of activities and periodically thereafter.	0 to 5 ppm above background in breathing zone	Periodically (every 15 to 30 minutes)	Acceptable, continue work.
		> 5 to 25 ppm above background	Periodically (every 15 minutes)	Stop work and consult with Field Lead and PM. Upgrade to Level C[3] protection may be necessary.
		> 25 ppm above background in breathing zone		Stop work required.[2] Leave work area and contact PM and CHSM for guidance.
Dust Monitor (respirable fraction)	Conduct monitoring when dusty conditions are encountered in areas that contain potentially contaminated soils. Monitor in employee breathing zones and general areas. Determine if potentially contaminated materials are migrating off-site. Dust concentration action levels are based on downwind minus upwind measurements.	< 0.5 mg/m^3	Initially and every 15 minutes while conditions persist	Continue work.
		0.5 to 5 mg/m^3 above background	Continuously	Stop work and consult with Field Lead and PM. Upgrade to Level C[3] protection may be necessary.
		> 5 mg/m^3 above background		Stop dust-producing activity if levels cannot be maintained < 5 mg/m^3. Move support zone to upwind location.

Notes:
*Note: Instruments must be calibrated according to manufacturer's recommendations.
1. For VOCs, a sustained reading for greater than 2 minutes in excess of the action level will trigger a protective measure.
2. Contact with the CHSM and PM must be made prior to continuance of work. A hazard review must be conducted before proceeding with work. Corrective actions may include temporary work stoppage to allow vapors to dissipate, and then returning to work if air monitoring data permits.
3. Work must be conducted in accordance with Anchor QEA's RPP. Contact the CHSM for respiratory protection fit testing and air purifying cartridge change-out requirements.

6 Risk Analysis and Control

The following sections discuss the potential health and safety hazards associated with the field tasks described in the Scope of Work. Controls of these hazards are addressed through the mechanical and physical control measures, use of PPE, monitoring, training, decontamination, emergency response, and safety procedures.

Significant changes in the Scope of Work covered by this HASP must be communicated to the PM and CHSM, and a modification to this HASP must be created as needed (see Section 1.1). Any task conducted beyond those identified in the Scope of Work and this HASP must be evaluated using the Job Safety Analysis (JSA) process prior to conducting the work.

6.1 Job Safety Analysis

Anchor QEA work tasks have been evaluated for their hazards and JSA documents have been developed that detail the chemical, physical, and biological hazards associated with these tasks along with the control measures (e.g., engineering controls, administrative controls, and/or PPE) that will be used to conduct them in a safe manner.

The PM and FL are responsible for identifying work tasks and project site conditions that are beyond the previously developed JSA documents and for communicating such information to the CHSM. The CHSM will provide support, as needed, to the PM and the FL, who will have primary responsibility to develop project-specific JSAs.

The contents of the JSA documents shall be communicated to project personnel during the site orientation meeting and during daily safety meetings when conducting work where the specific JSAs are applicable.

JSA documents applicable to this project are located in Appendix B and include the following field tasks:

- Field Activities
- Sample and Laboratory Glassware Handling
- Motor Vehicle Operation
- Decontamination Activities
- Utility Contact Prevention Checklist
- Soil Excavation and Earthworks

6.1.1 Augmented Job Safety Analysis Process

If significant work tasks are identified during the course of the project that were not previously addressed in the JSA documentation supplied in Appendix B, then a task-specific JSA document must be developed prior to conducting the work. The PM and FL shall develop this document(s) with input from the CHSM, as needed, and this HASP will be modified to include the JSA document (see Section 1.1 for HASP modification procedures). Project personnel shall be trained on the contents of the developed task-specific JSA prior to its implementation. Appendix B of this HASP includes a blank JSA form that can be used to create a new task-specific JSA.

6.2 Exposure Routes

Possible routes of exposure to the chemicals potentially encountered on this project include inhalation, dermal contact, and ingestion of dust, mist, gas, vapor, or liquid. Exposure will be minimized by using safe work practices and by wearing the appropriate PPE. A further discussion of PPE requirements is presented in Section 10.

6.2.1 Inhalation

Inhalation of particulates, dust, mist, gas, or vapor during field activities is possible. Whenever possible, work activities will be oriented so that personnel are upwind of the sampling location. An organic vapor monitor (OVM) may be used to monitor ambient air and the breathing zone within the work area for organic compounds. Section 5.2 describes potential OVM action levels and response procedures.

6.2.2 Dermal Contact

Dermal contact with potentially contaminated soil, sediment, or groundwater during field activities is possible. Direct contact will be minimized by using appropriate PPE and decontamination procedures.

6.2.3 Ingestion

Direct ingestion of contaminants can occur by inhaling airborne dust, mist, or vapors, or by swallowing contaminants trapped in the upper respiratory tract. Indirect ingestion can occur by introducing the contaminants into the mouth by way of food, tobacco, fingers, or other carriers. Although ingestion of contaminants can occur, proper hygiene, decontamination, and contamination reduction procedures should reduce the probability of this route of exposure.

6.3 Chemicals of Concern Profile

Table 6-1 provides a summary profile for the COCs for this project. As available, this profile is based on recent site history and site characterization information. For more detailed and specific information, always refer to the Safety Data Sheet (SDS) or equivalent information for the chemical (see Appendix C).

These chemicals can be encountered during subsurface and intrusive investigation in and around the site. Both real-time breathing zone air-monitoring for on-site workers and a CAMP will be performed by Anchor QEA’s field investigator, using a PID dust monitor in accordance with applicable regulations. The real-time data will be recorded in the field book by the field investigator/site health and safety representative, following each observation and during intrusive activities and sampling activities. All air monitoring data will be downloaded daily and kept as an electronic file. Requirements for real-time breathing zone air monitoring are presented in Section 11. Requirements for CAMP monitoring are described in Section 11.2**.**

Table 6-1
Chemicals of Concern Profile

Chemical/Compound (synonym)	OSHA PEL[a] (ppm or as otherwise noted)	IDLH (ppm)	Odor Threshold[b] (ppm)	Odor Character	Vapor Pressure (mm Hg)	LEL (%)	Physical State at STP	Detectible with 11.7 eV lamp PID (I.P. eV)
Benzene	1 5 [STEL]	500 [CA]	119	Aromatic, Sweet	75	1.2	Flammable Liquid	Yes (9.24)
o-,m-, p-Xylenes	100 150 [STEL]	1000	20	Aromatic	7,9,9	0.9	Flammable Liquid Vapor	Yes (8.4–8.6)
Toluene	200 300 [CEIL]	500	37	Sweet, Pungent Benzene-like	20	1.1	Flammable Liquid Vapor	Yes (8.82)
Ethyl Benzene	100 125 [TLV-STEL]	800	0.8	Oily Solvent	10	0.8	Flammable Liquid	Yes (8.76)

a. See 29 CFR 1910, June 30, 1993 (8-hour time-weighted average unless otherwise specified). These values may be modified by OSHA. The values should be checked and updated, as necessary, prior to commencing work activities.
b. Highest reported value of acceptable odor threshold range (AIHA 2013). These values may be modified by ACGIH. The values should be checked and updated, as necessary, prior to commencing work activities.
c. For hydrogen sulfide detection, a gas meter with hydrogen sulfide detection capability will be used.

CA: suspected carcinogen; minimize all possible exposures
CEIL: ceiling limit; not to be exceeded at any time during a work day
SKIN: designates that skin is an important possible route of exposure
AIHA (American Industrial Hygiene Association), 2013. *Odor Thresholds for Chemicals with Established Occupational Health Standards*. Second Edition. Editors, S.S. Murnane, A.H. Lehocky, and P.D. Owens. 2013.

7 Site Control and Communications

The primary purposes for site controls are to establish the hazardous area perimeter, reduce migration of contaminants into clean areas, and prevent unauthorized access or exposure to hazardous materials by site personnel and the public. Site control is especially important in emergency situations.

7.1 General Site Control Safety Procedures

The following standard safe work practices apply to all Anchor QEA site personnel and subcontractors and shall be discussed in the safety briefing prior to initiating work on the site:

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited on site except in designated areas.
- Hands and faces must be washed upon leaving the work area and before eating, drinking, chewing gum or tobacco, and smoking.
- A buddy system will be used. Radio, cell phone, or hand signals will be established to maintain communication.
- During site operations, each worker will consider himself/herself as a safety backup to his/her partner.
- Visual contact will be maintained between buddies on site when performing potentially hazardous duties.
- No personnel will be admitted to the site without the proper safety equipment, training, and (if required) medical monitoring certification.
- All personnel must comply with established safety procedures. Any staff member who does not comply with safety policy as established in this HASP may be subject to corrective action, potentially including but not limited to, being reprimanded or immediately dismissed.
- Proper decontamination procedures must be followed before leaving a contaminated work area.

7.2 Work Area Access Control

If work is performed in public areas, the following precautions shall be taken to protect both the site personnel and the public. Access control to the work area will be accomplished using a combination of the following devices and/or methods:

- Fences and/or barricades
- Traffic control devices and/or use of flaggers
- Caution tape
- Other methods to keep the site secure and provide a visual barrier to help keep unauthorized personnel from entering the site and active work areas

7.3 Hazardous Waste Site Work Control Procedures

To prevent contamination from migrating from personnel and equipment, work areas will be clearly specified as an Exclusion Zone/Hot Zone (EZ), Contamination Reduction Zone (CRZ), or Support Zone/Clean Zone (SZ) prior to beginning operations. Each work area will be clearly identified using signs or physical barriers. At the end of each workday, the site should be secured and/or guarded to prevent unauthorized entry.

The site work zones will be defined as follows:

- **Exclusion Zone/Hot Zone (EZ).** The EZ will be the "hot zone" or contaminated area inside the site perimeter (or sample collection area of boat). The EZ is the defined area where potential respiratory and/or health hazards exist. All personnel entering the EZ must use the required PPE, as set forth in this HASP, and meet the appropriate training and medical clearance. Entry to and exit from this zone will be made through a designated point. Appropriate warning signs to identify the EZ should be posted (e.g., DANGER, AUTHORIZED PERSONNEL ONLY, PROTECTIVE EQUIPMENT REQUIRED BEYOND THIS POINT). Personnel and equipment decontamination must be performed upon exiting the EZ.
- **Contamination Reduction Zone (CRZ).** The CRZ, also known as the "warm zone," is a transitional zone between the EZ and the SZ (also known as the "cold zone" or "clean zone"). The CRZ provides a location for removal and decontamination of PPE and tools leaving the EZ. A separate decontamination area will be established for heavy equipment. All personnel and equipment must exit via the CRZ. If the CRZ is compromised at any time, a new CRZ will be established.
- **Support Zone/Clean Zone (SZ).** This uncontaminated zone will be the area outside the EZ and CRZ and within the geographic perimeters of the site (including boat and processing areas). The SZ is used for support personnel; staging materials; parking vehicles; office, laboratory, and sanitation facilities; and receiving deliveries. Personnel entering this zone may include delivery personnel, visitors, security guards, and others who will not necessarily be permitted in the EZ or CRZ.

A log of all personnel visiting, entering, or working on the site shall be maintained by the FL. No visitor will be allowed in the EZ without showing proof of training and medical certification, per 29 CFR 1910.120(e),(f) (and 29 CFR 1926.1101(k)(9),(m) if appropriate). Visitors will attend a site orientation given by the FL and sign the HASP.

7.4 Working at Excavation or Trenching Sites

This section contains guidelines for maintaining safe conditions when working at an excavation site such as when test pit(s) are being completed.

Observe the following site control practices and procedures when working around excavation and trenching sites:

- A "competent person" is required per Occupational Safety and Health Act (OSHA), 29 CFR 1926.P.
- Safeguard open excavations by restricting unauthorized access.
- Highlight the work area using prominent warning signs (e.g., cones, sawhorses, or other barricades, and signage) placed a minimum of 10 feet back from the excavation opening.
- Maintain zone definition along the perimeter with a continuous string of high-visibility caution tape.

7.4.1 Excavations Left Unattended or Overnight

Use one of the following methods for excavations left unattended or overnight:

- Surround the entire perimeter with plastic or cloth construction net fencing. Anchor the fencing to the ground using steel posts driven into the ground. Space out posts no greater than 8 feet apart. The fence should be a minimum of 4 feet high. Fence material must be of a quality capable of withstanding a pressure of 200 pounds. Place the fencing a minimum of 10 feet back from the excavation opening.
- Place 8-foot-long barricades affixed with flashing lights end to end with 4-foot-high construction net fence attached to barricades.
- Use temporary curbing or concrete "jersey" barriers affixed with flashing signal lights or other effective warning signs.

7.5 Field Communications

Communications between all Anchor QEA employees and subcontractors at the work site can be verbal and/or non-verbal. Verbal communication can be affected by the on-site background noise and various PPE. See Table 7-1 for a list of the types of communication methods and equipment to use, depending on site conditions. Communication equipment must be checked daily to verify proper operation. All project personnel must be initially briefed on the communication methods prior to starting work; communication methods should be reviewed in daily safety meetings.

Table 7-1
Field Communication Methods

Type of Communication	Communication Device	Signal
Emergency notification	On-site Telephone or Cellular Telephone	Initiate phone call using applicable emergency numbers
Emergency notification among site personnel	Two-way Radio	Initiate radio communication with Code Red message
Hailing site personnel for non-emergency	Compressed Air Horn	One long blast, one short blast
Hailing site personnel for emergency evacuation	Compressed Air Horn	Three long, continuous blasts
Hailing site personnel for distress, need help	Visual	Arms waved in circle over head
Hailing site personnel for emergency evacuation	Visual	Arms waved in criss-cross over head
Contaminated air/strong odor	Visual	Hands clutching throat
Break, lunch, end of day	Visual	Two hands together, break apart

8 Decontamination Procedures and Practices

8.1 Minimization of Contamination

The following measures will be observed to prevent or minimize exposure to potentially contaminated materials:

Personnel

- Do not walk through spilled materials.
- Do not handle, touch, or smell sample media directly.
- Make sure PPE has no cuts or tears prior to use.
- Protect and cover any skin injuries.
- Stay upwind of airborne dusts and vapors.
- Do not eat, drink, chew tobacco, or smoke in the work zones.

Sampling Equipment and Vehicles/Vessels

- Use care to avoid getting sampled media on the outside of sample containers.
- If necessary, bag sample containers before filling with sampled media.
- Place clean equipment on a plastic sheet to avoid direct contact with contaminated media.
- Keep contaminated equipment and tools separate from clean equipment and tools.
- Fill sample containers over a plastic tub to contain spillage.
- Clean up spilled material immediately to avoid tracking around the vehicle/vessel.

8.2 Decontamination Equipment

All vehicles, vessels, and equipment that have entered potentially contaminated areas will be visually inspected and, if necessary, decontaminated prior to leaving the area. If the level of vehicle contamination is low, decontamination may be limited to rinsing tires and wheel wells with an appropriate detergent and water. If the vehicle is significantly contaminated, steam cleaning or pressure washing may be required. Tools will be cleaned in the same manner. Rinsate from all decontamination activities will be collected for proper disposal. Decontamination of equipment and tools will take place within the CRZ.

The following supplies will be available to perform decontamination activities:

- Wash and rinse buckets
- Tap water and phosphate-free detergent
- Scrub brushes
- Distilled/deionized water
- Deck pump with pressurized freshwater hose (aboard the vessel)
- Pressure washer/steam cleaner, if appropriate
- Paper towels and plastic garbage bags

8.3 Personnel Decontamination

The FL will verify that all site personnel are familiar with personnel decontamination procedures as listed below. All personnel wearing PPE in a work area (EZ) must undergo decontamination prior to entering the SZ. Personnel will perform the following decontamination procedures:

- Wash and rinse outer gloves and boots in portable buckets to remove gross contamination.
- If suit is heavily soiled, rinse it off.
- Remove outer gloves; inspect and discard if damaged. Leave inner gloves on. Personnel will remove their outer garment and gloves, dispose of them, and properly label container or drum. Personnel will then decontaminate their hard hats and boots with an aqueous solution of detergent or other appropriate cleaning solution. These items then will be hand-carried to the next station. Remove inner gloves.
- Thoroughly wash hands and face before leaving CRZ.
- Sanitize respirators and place in a clean plastic bag.

8.4 Sampling and Processing Equipment Decontamination

To prevent sample cross-contamination, sampling and processing equipment in contact with soil, sediment, or water samples will undergo the following decontamination procedures when work is completed in the CRZ and prior to additional use:

1. Rinse with potable water and wash with scrub brush.
2. Wash with phosphate-free detergent (Alconox).
3. Visually inspect the sampler and repeat the scrub and rinse step, if necessary. If scrubbing and rinsing with Alconox is insufficient to remove visually observable tar-related contamination on equipment, the equipment will be scrubbed and rinsed using hexane (or similar type solution) until all visual signs of contamination are absent.
4. Rinse external sampling equipment with potable water three times prior to use. Rinse homogenizing equipment once with potable water and three times with distilled water prior to and between sample processing.

8.5 Handling of Investigation-Derived Waste

All remaining soil or sediment, fluids used for decontamination of sampling equipment, and sample collection disposable wastes (e.g., gloves, paper towels, foil, or others) will be placed into appropriate containers and staged on site for disposal.

8.5.1 Disposable Personal Protective Equipment

Disposable PPE may include Tyvek suits, inner latex gloves, and respirator cartridges. Dispose of PPE according to the requirements of the client and state and federal agencies.

8.5.2 Non-Disposable Personal Protective Equipment

Non-disposable PPE may include respirators and boots and gloves. When decontaminating respirators, observe the following practices and procedures:

- Wipe out the respirator with a disinfecting pad prior to donning.
- Decontaminate the respirator on site at the close of each day with an approved sanitizing solution.

When decontaminating boots and gloves, observe the following practices and procedures:

- Decontaminate the boots or gloves outside with a solution of detergent and water; rinse with water prior to leaving the site.
- Protect the boots or gloves from exposure by covering with disposable covers such as plastic to minimize required decontamination activities.

8.6 Sanitizing Personal Protective Equipment

Respirators, reusable protective clothing, and other personal articles must be not only decontaminated before being reused, but also sanitized. The insides of masks and clothing become soiled due to exhalation, body oils, and perspiration. Manufacturer's instructions should be used to sanitize respirator masks. If practical, reusable protective clothing should be machine-washed after a thorough decontamination; otherwise, it must be cleaned by hand.

8.7 Emergency Personnel Decontamination

Personnel with medical problems or injuries may also require decontamination. There is the possibility that the decontamination may aggravate or cause more serious health effects. If prompt lifesaving, first aid, and medical treatment are required, decontamination procedures will be omitted. In either case, a member of the site management team will accompany contaminated personnel to the medical facility to advise on matters involving decontamination.

8.8 Containment of Decontamination Fluids

As necessary, spill control measures will be used to contain contaminated runoff that may enter into clean areas. Use plastic sheeting, hay bales, or install a spill control system to prevent spills and contain contaminated water.

8.9 Pressure Washing

The following procedure is required when using high-pressure washing equipment for decontamination purposes:

- Wear modified Level D protection, including a face shield and safety goggles.
- Verify that other personnel are out of the area prior to decontamination.

- Secure the area around the decontamination pad with cones, caution tape, or barricades.
- Verify that safe work practices and precautions are taken to minimize the potential for physical injury from high-pressure water spray. Follow the manufacturer's operating instructions.
- The pressure washer wand must be equipped with a safety release handle.
- Verify that the area is clean after equipment is decontaminated. Barricades, cones, or caution tape must be left in place and secured at all times.

9 Health and Safety Training and Informational Programs

This section describes the health and safety training and informational programs with which Anchor QEA project site personnel must comply. All certifications required in this section are provided in Appendix D and will be kept on internal file.

9.1 Initial Project Site Orientation

Work on all Anchor QEA project sites requires participation in an initial health and safety orientation presented by the PM or FL that will consist of, at a minimum, the following topics:

- A review of the contents of this HASP, including the Scope of Work and associated site hazards and control methods and procedures.
- Provisions of this plan are mandatory for all Anchor QEA personnel assigned to the project.
- Anchor QEA subcontractors are also expected to follow the provisions of this plan unless they have their own HASP that covers their specific activities related to this project and includes the minimum requirements of this HASP.
- All visitors to the work site will also be required to abide by the requirements of this plan.
- Personnel assigned to perform work at the project site, working under the provisions of this HASP, will be required to read the plan and must sign the Health and Safety Plan Acknowledgement Form to confirm that they understand and agree to abide by the provisions of this plan. Personnel not directly affiliated with the project (i.e., visitors) may also be required to sign the Liability Waiver.

9.2 Daily Safety Meetings

Daily safety meetings ("tailgate meetings") make accident prevention a top priority for everyone and reinforce awareness of important accident-prevention techniques. The following daily safety meeting procedures and practices are required:

- Daily safety meetings will be held each morning prior to conducting site activities.
- The Daily Safety Briefing form in Appendix A will be used to document each meeting.
- Copies of the completed Daily Safety Briefing forms will be maintained on site during the course of the project.

9.3 End-of-Day Wellness Checks

Similar to the daily safety meetings, field staff will gather at the end of the day to verify group health and wellness and discuss any near misses that occurred that day. The wellness checks will be recorded on that day's Daily Safety Briefing form.

9.4 Hazardous Waste Operations Training

Personnel working on project sites that present a potential exposure to hazardous wastes or other hazardous substances shall be trained in accordance with the requirements of the 29 CFR 1910.120 (HAZWOPER) regulation. Training requirements will consist of the following:

- Field personnel must complete a minimum of 40 hours of hazardous waste activity instruction.
- Field personnel must complete a minimum of 3 days of supervised field instruction.
- Field personnel assigned to the site will also have received 8 hours of refresher training if the time lapse since their previous training has exceeded 1 year.
- On-site managers and supervisors directly responsible for employees engaged in hazardous waste operations will receive an additional 8 hours of supervisory training.
- Field personnel shall be current in first aid/CPR training offered by the American Red Cross or equivalent.
- Other training may be required depending on the task to be performed (e.g., confined space, excavation/trenching, underground storage tank removal, fall protection, respiratory protection, and hazard communication).

9.5 Hazard Communication Program

The purpose of hazard communication (Employee Right-to-Know) is to verify that the hazards of all chemicals located at the field project site are communicated to all Anchor QEA personnel and subcontractors according to 29 CFR 1926.59. Refer to the Anchor QEA Hazard Communication Program document for additional information.

Every container of hazardous materials must be labeled by the manufacturer, who must also provide a SDS upon initial order of the product and upon request thereafter. The actual format may differ from company to company (e.g., National Fire Protection Association [NFPA], Hazardous Material Information System [HMIS], or other), but the labels must contain similar types of information. Maintain manufacturer labels if possible. The label may use words or symbols to communicate the following:

- Introduction
- Hazard(s) identification
- Composition/information on ingredients
- First-aid measures
- Fire-fighting measures
- Accidental release response measures
- Handling and storage
- Exposure controls/personal protection
- Physical and chemical properties

- Stability and reactivity properties
- Toxicological properties
- Ecological properties
- Disposal considerations
- Transport considerations
- Regulatory information
- Other information, including at a minimum, label preparation or last revision date

SDS for all chemicals brought onto the site or anticipated to be used on site shall be provided in Appendix C of this HASP. These SDS shall be readily available for reference by site personnel and emergency response personnel.

Hazardous materials received without proper labels shall be set aside and not distributed for use until properly labeled.

If a hazardous chemical is transferred into a portable container (approved safety can), even if for immediate use only, the contents (e.g., acetone or gasoline) of the portable container must be identified.

10 General PPE Requirements

The minimum level of PPE should be selected according to the hazards that may be encountered during site activities in accordance with established U.S. Environmental Protection Agency (EPA) levels of protection (D and C). Only PPE that meets American National Standards Institute (ANSI) standards shall be worn. Site personnel must maintain proficiency in the use and care of PPE. Damaged or defective PPE must be replaced and may not be used. Anchor QEA will provide all necessary PPE for its employees as described in this HASP.

Refer to Section 5 for site-specific job task and level-of-protection requirements.

10.1 Minimum Requirements: Level D Protection

The minimum level of protection on project sites will be Level D protection, which consists of the following equipment:

- Standard work uniform/coveralls
- Work boots with safety toe conforming to ASTM International (ASTM) F2412-05/ASTM F2413-05
- Approved safety glasses or goggles (meets ANSI Z87.1—2010 requirements for eye protection)
- Hard hat (meets ANSI Z89.1—1986 requirements for head protection)
- High-visibility traffic safety vest
- Hearing protection when there are high noise levels

Level D protection will be used only when:

- The atmosphere contains no known hazards
- Work functions preclude splashes, immersions, or the potential for unexpected inhalation of, or contact with, hazardous concentrations of chemicals
- Atmospheric concentrations of contaminants are less than the Permissible Exposure Limit (PEL) and/or Threshold Limit Value (TLV)

10.1.1 Modified Level D Protection Requirements

Depending on the Scope of Work and the potential hazards to be encountered, Level D protection shall be modified to include additional protective equipment such as USCG-approved PFDs, face shields/goggles, chemical-resistant clothing, and disposable gloves of varying materials depending on the chemical substances involved. An upgrade to Modified Level D occurs when there is a possibility that contaminated media can contact the skin or work uniform, or if unique, site-specific hazards exist.

10.2 Respiratory Protection Requirements

Respiratory protection devices may potentially be used for protection against particulates and organic vapors during the course of an Anchor QEA field project. The need for respiratory protection will be determined by air monitoring results and site conditions, and in accordance with Anchor QEA's RPP (contact David Templeton with questions). However, engineering and administrative controls must first be evaluated for use as the primary controls for protection against site respiratory hazards. In the event that engineering and administrative controls are deemed not feasible, respiratory protection will be required.

The remainder of this section is provided as general reference and is meant to summarize salient points from Anchor QEA's RPP. For projects requiring respiratory protection, this section will be amended as appropriate based on project-specific respiratory hazard analysis, and all respiratory protection will take place in accordance with Anchor QEA's RPP.

10.2.1 Level C Protection Requirements

An upgrade to Level C protection occurs when the results of air monitoring reveal that action levels have been exceeded. An upgrade to Level B protection occurs when the results of air monitoring reveal that action levels have been exceeded.

Level C protection, in addition to Level D equipment, involves the use of full-face and/or half-face Air-Purifying Respirators (APRs) equipped with cartridges of appropriate type for the airborne hazards and National Institute for Occupational Safety and Health (NIOSH) approved.

Level C protection shall be used in the following situations:

- When there is a recognized need for protection against particulates, organic vapors, or other airborne contaminants during the course of the project.
- During activities where product odors or exposure symptoms are noted.

If, during the use of respiratory protection, any unusual odors or other evidence of elevated concentrations of chemicals in the workers' breathing zone is noted, the work shall be stopped, workers shall exit the work area, and the PM and CHSM shall be contacted for instructions.

10.2.2 Cartridge Change-Out Schedule

Cartridge change-out schedule data are subject to updates by manufacturers at any time. The data provided in this section must be verified prior to HASP finalization on a project-specific basis.

Field personnel must understand the limitations of APRs and the End-of-Service Life cartridge change-out schedule for the particular type of respirator that will be used. Manufacturer's data have been evaluated for three types of respirators: Scott, MSA, and Survivair.

See Table 10-1 for an OV cartridge change-out schedule for total hydrocarbons and benzene.

Table 10-1
Respirator Cartridge Change-Out Schedule

Total Hydrocarbons (Toluene, Ethylbenzene, Xylenes) Air Concentration (ppm)	Change-Out Schedule			
	SCOTT642 OV/Acid Gas642 OV642 MPC Cartridges	MSA Ultra Twin GME Cartridge	Survivair Organic Vapor Cartridge 100100	Survivair OV/Acid Gas Cartridge 100300/1053 (includes P-100)
< 150	8 hours	8 hours	8 hours	8 hours
> 150 to 200	8 hours	8 hours	8 hours	8 hours
> 200 to 250	8 hours	8 hours	8 hours	8 hours
> 250	Stop Work	Stop Work	Stop Work	Stop Work
Benzene Air Concentration (ppm)	**SCOTT642 OV/Acid Gas642 OV642 MPC Cartridges**	**MSA Ultra Twin GME Cartridge**	**Survivair Organic Vapor Cartridge 100100**	**Survivair OV/Acid Gas Cartridge 100300/1053 (includes P-100)**
< 10	8 hours	8 hours	8 hours	8 hours
> 10 to 100	8 hours	8 hours	8 hours	7 hours
> 100 to 125	7 hours	7 hours	7 hours	6 hours
> 125	Stop Work	Stop Work	Stop Work	Stop Work

Personnel using a respirator that is not listed above must contact the CHSM to determine the change-out schedule for the particular respirator used. Any questions regarding the site-specific respiratory protection program must be directed to the FL and PM.

All cartridges will be changed a minimum of once daily or more frequently if personnel begin to experience increased inhalation resistance. Cartridges will be changed immediately if breakthrough, a chemical warning property (e.g., eye, nose, or throat irritation or odor), or cartridge end-of-life indicator activation occurs. The FL will review this requirement after monitoring the employee’s breathing zone for site contaminants and will revise this schedule as may be necessary to avoid over-exposure.

10.2.3 Level B and A Protection Requirements

An upgrade to Level B or Level A protection occurs when the results of air monitoring reveal that action levels have been exceeded. Anchor QEA employees are not permitted to work in atmospheres requiring Level B or Level A respiratory protection.

10.2.4 Respirator Fit Testing

All Anchor QEA personnel who may be required to wear a negative-pressure APR in the performance of their work duties shall be fit-tested on an annual basis. Employees who wear a respirator for more than 30 days per year shall be enrolled in a medical monitoring program as detailed in Section 13 of this HASP.

Employees shall have the opportunity to handle the respirators and wear them in normal air for a familiarity period prior to fit-testing. On each occasion that employees don a respirator for work purposes, they shall test the piece-to-face seal by use of the following positive and negative pressure tests:

- ***Positive Pressure Test:*** With the exhaust port(s) blocked, the positive pressure of slight exhalation should remain consistent for several seconds.
- ***Negative Pressure Test:*** With the intake ports blocked, the negative pressure of slight inhalation should remain constant for several seconds.

APRs shall not be worn when conditions prevent a seal of the respirator to the wearer. Such conditions may be the growth of a beard, sideburns, a skull cap that projects under the face piece, or temple pieces on glasses. No employee may wear a beard if it interferes with the fit of the respirator. Also, the absence of one or both dentures can seriously affect the fit of a face-piece, and should be worn at all times that respirators are being used.

10.2.5 Respirator Cleaning, Maintenance, and Inspection

All respirators used on site shall be cleaned and maintained in the following manner:

- Remove filters and cartridges.
- Visually inspect face piece and parts, and discard faulty items.
- Remove all elastic headbands.
- Remove exhalation cover and inhalation valves.
- Wash, sanitize, and rinse face piece. Wash any parts that were removed separately.
- Dry the mask. Wipe face pieces and valves.
- Disassemble and clean the exhalation valve.
- Visually inspect face piece and all parts for deterioration, distortion, or other faults that might affect the performance of the respirator.
- Replace any questionable or faulty parts.
- Reassemble mask and visually inspect completed assembly.
- Seal mask in plastic bag.

11 General Air Monitoring Requirements

11.1 General Requirements

In general, air monitoring shall be conducted when the possibility of hazardous atmospheres, chemical volatilization, or contaminated airborne dust exists (e.g., from intrusive activities involving contaminated soils or groundwater, developing new monitoring wells, working with wells containing known COCs, confined space entry, or others).

Air movers or other engineering controls shall be used to exhaust or dilute solvent vapors emanating from monitoring wells or hazardous atmospheres in confined spaces prior to the use of respiratory protection devices.

Site-specific air monitoring action levels are provided in Section 5.2.

11.2 Real-Time Air Monitoring Equipment – CAMP

As applicable, organic vapor concentrations shall be monitored in the field with either a photoionization detector (PID) or flame ionization detector (FID). Flammable vapors and/or gasses are monitored with an oxygen/lower-explosive limit (O_2/LEL) real-time instrument. Organic vapor measurements are usually taken in the breathing zone of the worker while O_2/LEL measurements are taken at the point of operation (e.g., monitoring well head or auger point).

As applicable, airborne dust/particulate concentrations shall be measured using a real-time aerosol monitor (using a scattered light photometric sensing cell) when there are visible signs of potentially contaminated airborne dust. Both area and personal air monitoring readings are to be taken to characterize site activities. The monitoring device to be used, at a minimum, is a MiniRAM (or equivalent) dust particulate monitor capable or measuring particulate matter less than 10 micrometers in size (PM10).

A CAMP consisting of two air monitoring stations, each equipped with a RAE Systems MultiRAE (or equivalent) PID and a miniRAM (or equivalent) dust particular monitor—ideally an upwind and downwind locations—will be set up in the breathing zone surrounding the work zone (Appendix E). Air monitoring results shall be documented every 15 minutes on the Daily Air Monitoring Record form (see Appendix A) or in the field logbook during intrusive activities and sampling activities. All air monitoring data will be downloaded daily and kept as an electronic file.

11.3 Equipment Calibration and Maintenance

Calibration and maintenance of air monitoring equipment shall follow manufacturer specifications and must be documented. Recalibration and adjustment of air monitoring equipment shall be completed as site conditions and equipment operation warrant. Record all air monitoring equipment calibration and adjustment information on the Daily Air Monitoring Record form (see Appendix A) and in the field logbook.

11.4 Air Monitoring Action Levels

Air monitoring action levels have been developed that stipulate the chemical concentrations in the breathing zone that require an upgrade in level of PPE. Table 11-1 lists the monitoring frequency and actions required based on air monitoring readings.

Air monitoring action levels are typically set at one-half of the OSHA PEL, NIOSH Recommended Exposure Limit (REL), or the American Conference of Governmental Industrial Hygienists (ACGIH) TLVs. The rationale for establishing action levels is based on the available data that characterize COCs in site media.

Air monitoring measurements shall generally be taken in the breathing zone of the worker most likely to have the highest exposure. Transient peaks will not automatically trigger action. Action will be taken when levels are consistently exceeded in a 2-minute period. Similarly, if chemical odors are detected that are a nuisance, bothersome, or irritating, an upgrade in respiratory protection can provide an extra level of comfort or protection when conducting site activities.

Table 11-1
Air Monitoring Action Levels

Contaminant/ Instrument[1]	Job Tasks/Functions	Measurement	Monitoring Schedule[2]	Actions[3]
Total OVs (using PID with 11.7 eV lamp)	Conduct air monitoring for OVs during intrusive activities. Monitor in the workers' breathing zone.	0 to 1 ppm above background	Every 15 to 30 minutes	Acceptable, continue work.
		> 1 ppm[4] above background	Stop Work	Stop work, investigate cause of reading, consult with PM and CHSM to determine PPE, mechanical ventilation, or possible changes in work task.

Notes:

1. Instruments must be calibrated according to manufacturer's recommendations.
2. Monitoring frequency is from the beginning of each task and at specified intervals thereafter, or when detectable contamination is encountered (as indicated by strong, sustained odor; visual evidence of product; or discolored sampling matrices).
3. For VOCs, a sustained reading for greater than 2 minutes in excess of the action level will trigger a protective measure.
4. Twenty-five ppm total OVs as measured at the downwind perimeter of the work area as described in *New York State DER-10 Technical Guidance for Site Investigation and Remediation*, page 204 Appendix 1A.

11.5 Air Monitoring Frequency Guidelines

In general, conduct periodic air monitoring when:

- It is possible that an immediately dangerous to life or health (IDLH) condition or a flammable atmosphere has developed (e.g., confined space entry or intrusive activities).
- There is an indication that exposures may have risen over established action levels, PELs, or published exposure levels since the last monitoring. Look for a possible rise in exposures associated with the following situations:
  - Change in site area (e.g., work begins on a different section of the site).
  - Change in on-site activity (e.g., one operation ends and another begins).
  - Change in contaminants (e.g., handling contaminants other than those first identified).
  - Visible signs of particulate exposure from intrusive activities such as drilling, boring, or excavation.
  - Perceptible chemical odors or symptoms of exposure.
  - Handling leaking drums or containers.
  - Working with obvious liquid contamination (e.g., a spill or lagoon).
  - When the possibility of volatilization exists (such as with a new monitoring well or a well containing known COCs).

12 Health and Safety Procedures and Practices

In addition to the task-specific JSAs listed in Section 6.1 and presented in Appendix B, this section lists the health and safety procedures and practices applicable to this project. For additional information, consult with the PM.

12.1 Physical Hazards and Controls

12.1.1 General Site Activities

Observe the following general procedures and practices to prevent physical hazards:

- Legible and understandable precautionary labels shall be affixed prominently to containers of potentially contaminated soil, sediment, water, and clothing.
- No food or beverages shall be present or consumed in areas that have the potential to contain COCs and/or contaminated materials or equipment.
- No tobacco products or cosmetics shall be present or used in areas that have the potential to contain COCs and/or contaminated materials or equipment.
- An emergency eyewash unit shall be located immediately adjacent to employees who handle hazardous or corrosive materials, including decontamination fluids. All operations involving the potential for eye injury or splash must have approved eyewash units locally available capable of delivering at least 0.4 gallons per minute for at least 15 minutes.
- Personnel working within 10 feet of bodies of water shall wear USCG-approved PFDs.
- Certain project sites may have newly finished work (e.g., concrete, paving, framing, habitat reconstruction, or sediment caps) that may be damaged by unnecessary contact, or that could cause dangerous conditions for personnel (e.g., slipping, sinking, or tripping). Personnel working in or around these areas shall communicate with the PM, FL, and client contact as needed to prevent damaging new work or entering dangerous conditions.
- Generally, all on-site activities will be conducted during daylight hours. If work after dusk is planned or becomes necessary due to an emergency, adequate lighting must be provided.
- Hazardous work, such as handling hazardous materials and heavy loads and operating equipment, should not be conducted during severe storms.
- All temporary electrical power must have a ground-fault circuit interrupter (GFCI) as part of its circuit if the circuit is not part of permanent wiring. All equipment must be suitable and approved for the class of hazard present.

12.1.2 Slips, Trips, and Falls

Observe the following procedures and practices to prevent slips, trips, and falls:

- Inspect each work area for slip, trip, and fall potential prior to each work task.

- Slip, trip, and fall hazards identified must be communicated to all personnel. Hazards identified shall be corrected or labeled with warning signs to be avoided.
- All personnel must be aware of their surroundings and maintain constant communication with each other at all times.

12.1.3 Ergonomic Considerations

Certain field tasks may involve workers in fixed positions (e.g., observing subcontractor work) or performing repetitive motions over a period of time (e.g., sediment sample processing). It is important that workers self-monitor for ergonomic fatigue (e.g., soreness, tightness, stiffness, or pain in muscles) and make adjustments to work tasks, body positions, or work areas so that ergonomic stressors are minimized. Suggestions for decreasing the likelihood of ergonomic stress include the following:

- Limit fixed positions. Periodically vary standing and sitting positions, take frequent short walks, and modify observation locations when possible.
- Minimize extreme postures. Conduct work tasks using comfortable postures (particularly if the tasks are repetitive), and use tools or structures to minimize the need to hold or work with materials or access the work area.
- Limit contact stress. Be aware of soft tissue resting on hard surfaces, and limit these occurrences (e.g., use comfortable footwear, and use tools to hold materials).
- Contact the Field Mobilization Team in advance for prolonged field efforts that involve a field trailer. This group can set up field staff with a monitor, mouse, and keyboard so they are not working solely on laptops.
- Take breaks from work tasks, particularly repetitive ones.
- Consider performing stretching exercises before and during work activities, if those tasks are anticipated to be long in duration and/or strenuous.

12.1.4 Corrosive Material Handling Procedures

Corrosive materials include acids and bases. They are extremely corrosive materials with a variety of uses. Acids include hydrochloric, nitric, and sulfuric acids. Bases include sodium hydroxide. Observe the following procedures when working with corrosive materials:

- Wear gloves and eye-splash protection while using acid dispensed from a small dropper bottle during water sampling.
- Wear a full-face APR equipped with combination cartridges (organic vapor/acid gas) as well as Tyvek coveralls and nitrile gloves for large volume applications.
- Have an eyewash bottle and/or portable eyewash station on site.
- Do not add anything into a virgin chemical drum, including unused product.

- Avoid mixing strong acids and bases. Consult the CHSM for task-specific evaluation. If mixing is absolutely necessary, do it slowly. Avoid vapors or fumes that are generated.
- When diluting acids and bases, add the acid or base to water in small quantities and mix cautiously.

12.1.5 Underground or Overhead Utility Line Contact Prevention

Observe the following underground/overhead utility line contact prevention procedures and practices:

- Prior to conducting work, the PM or FL shall verify that all existing underground or overhead utilities in the work area are located per the state or local mark-out methods and subcontract. Documentation of utility mark-out shall be completed using the Utility Contact Prevention Checklist form (see Appendix A). No excavation work is to be performed until all utility mark-outs are verified.
- The PM or FL shall conduct a site survey to search for signs of other buried or overhead utilities. The results of such surveys shall be documented on the Utility Mark-out documentation form.
- The property owner or facility operator shall be consulted on the issue of underground utilities. As-built drawings shall be reviewed, when available, to verify that underground utility locations are consistent with the utility location mark-outs. All knowledge of past and present utilities must be evaluated prior to conducting work.
- If on-site subsurface utility locations are in question, a private locating service shall be contacted to verify locations. If the investigation calls for boreholes in an area not covered by the municipal One-Call system, then a private utility locate firm shall be contacted to determine the location of other underground utilities.
- The PM shall have documented verbal contact and an agreement with the fiber optic company for all work within 50 feet of any fiber optic cables.
- **Only non-destructive excavation, such as hand digging or hydro excavation, is permitted within 3 feet of underground high voltage, product, or gas lines.** Once the line is exposed, heavy equipment can be used, but must remain at least 3 feet from the exposed line.
- Elevated superstructures (e.g., drill rig, backhoe, scaffolding, ladders, and cranes) shall remain a distance of 10 feet away from utility lines and 20 feet away from power lines. Distance from utility lines may be adjusted by the FL depending on actual voltage of the lines.
- Overhead utility locations shall be marked with warning tape or flags where equipment has the potential for contacting overhead utilities.

Table 12-1 shows the minimum clearances required for energized overhead electrical lines.

Table 12-1
Overhead Utility Clearance Requirements

Minimum Clearance from Energized Overhead Electric Lines	
Nominal System Voltage	**Minimum Required Clearance**
0 to 50 kV	10 feet
51 to 100 kV	12 feet
101 to 200 kV	15 feet
201 to 300 kV	20 feet
301 to 500 kV	25 feet
501 to 750 kV	35 feet
751 to 1,000 kV	45 feet

Notes:
Whenever equipment operations must be performed closer than 20 feet from overhead power lines, the FL must be notified. When clearance to proceed is received from the FL, the electric utility company must be contacted to turn the power off or physically insulate (protect) the lines if the operation must be performed closer to the power line than is allowed in this table. For voltages not listed on this table, add 0.4 inches per kilovolt (kV) to obtain the safe distance between equipment and power lines.

12.1.6 Electric Safety

Observe the following procedures and practices to prevent electric shock:

- General
  - Use only appropriately trained and certified electricians to perform tasks related to electrical equipment. A good rule of thumb is to defer any task that would not normally and reasonably be completed by the average public consumer.
  - Each circuit encountered will be considered live until proven otherwise.
  - Only proper tools will be used to test circuits.
  - No wire will be touched until the circuit is determined to be de-energized.
- Extension Cords
  - All extension cords used on any project will be three-pronged.
  - All extension cords will be in good working order.
  - Each extension cord ground will be tested for continuity on at least a quarterly basis and marked to indicate when the inspection occurred.
  - Each extension cord will be visually inspected before each use.
  - If any extension cord is found in disrepair or fails the continuity test, it will be taken out of service.
  - Any extension cord that does not have the grounding pin will be taken out of service and not used.
  - Extension cords will not be used in place of fixed wiring.
  - Extension cords will not be run through holes in walls, ceilings, or floors.
  - Extension cords will not be attached to the surface of any building.

- No extension cord will be of the “flat wire” type. Every extension cord will have each individual wire insulated and further protected by an outside cover.
  - Be sure to locate extension cords out of traffic areas or, if this is unavoidable, flag cords and protect workers from tripping over them (i.e., use barricades and tape the cord down).
  - Do not stage extension cords or powered equipment in wet areas, to the degree possible. Elevate cords, connections, and equipment out of puddles.
- Power Tools/Plug and Cord Sets
  - Any cord that is cut in a way that exposes insulation will be removed from service.
  - All tools and plug and cord sets will be tested for continuity.
  - If grounding pins are missing, the plug and cord will be removed from service.
  - Any tool or plug and cord set failing the continuity test will be removed from service.
  - All power tools will have three-pronged plugs unless double insulated.
- Ground-fault Circuit Interrupters
  - Each 120-volt electrical wall receptacle providing power to the job site will be protected by a portable GFCI.
  - Each GFCI will be tested quarterly and marked to indicate when the inspection occurred.
  - Each 120-volt, single-phase, 15- and 20-ampere receptacle outlet, including those on generators, will have an approved GFCI.
  - GFCIs will be located in line as close to the piece of equipment as possible.
- Specific
  - If unsure if a task requires specific electrical training, err on the side of caution and contact the PM and FL prior to proceeding.
  - If subsurface work is to be performed, follow the guidelines in Section 12.1.6 and conduct utility locating prior to work and in accordance with local ordinances.
  - If lock out/tag out (LO/TO) procedures are required (i.e., de-energizing machinery or equipment so work may be performed), the equipment owner must provide LO/TO procedures and training. By default, the equipment owner should perform any LO/TO. If it becomes necessary for Anchor QEA personnel to perform LO/TO tasks, contact the PM and FL prior to doing so.
  - Maintain appropriate distance from overhead utilities (see Table 12-1).
  - If unexpected electrical equipment is encountered (i.e., buried wire) assume it is live, stop work, and contact the PM and FL immediately.
  - If working in enclosed or restricted areas where electrical hazards may be present, contact a licensed electrician or other suitably trained party to provide barriers, shields, or insulating materials to prevent electric shock.
  - If working in areas where electrical hazards are present, verify that conductive clothing and jewelry is replaced with non-conductive clothing, or removed.

12.1.7 Heavy Equipment Operations

Observe the following heavy equipment operations procedures and practices:

- Wear leather gloves while attaching support members to protect against pinching injuries.
- While working from elevated levels greater than 6 feet, verify that all employees have fall protection that meets OSHA and ANSI Z3591 standards.
- Do not stand under loads that are being raised or lowered with cranes or aerial lifts.
- The subcontractor or Anchor QEA equipment operator must conduct pre-operational inspections of all equipment. In addition, daily inspections will be conducted on the equipment prior to site activities.
- Maintain the appropriate distance from overhead utilities (see Table 12-1):
- Always stay out of the swing radius of all heavy equipment. Always use a spotter during movement of equipment. The spotter and others, as appropriate, shall maintain constant communication with the operator.
- All operators must have adequate training and be qualified to operate the particular heavy equipment unit.
- Conduct a site evaluation to determine proper positioning for the unit. Make sure the surface is level. Cordon off holes, drop-offs, bumps, or weak ground surfaces.
- When using a crane, do not use hands when the load is being lifted or lowered. Use non-conductive tag line to help direct and position the load.
- Never climb a raised platform or stand on the mid-rail or top-rail.
- Tools should always be hung or put into a belt whenever possible

12.1.8 Hand and Power Tools

Observe the following procedures and practices when working with hand and power tools:

- Keep hand tools sharp, clean, oiled, dressed, and not abused.
- Worn tools are dangerous. For example, the "teeth" in a pipe wrench can slip if worn smooth, an adjustable wrench will slip if the jaws are sprung, and hammerheads can fly off loose handles.
- Tools subject to impact (e.g., chisels, star drills, and caulking irons) tend to "mushroom." Keep them dressed to avoid flying spalls, and use tool holders.
- Do not force tools beyond their capacity.
- Flying objects can result from operating almost any power tool, so always warn people in the vicinity and use proper eye protection.
- Each power tool should be examined before use for damaged parts, loose fittings, and frayed or cut electric cords. Tag and return defective tools for repairs. Verify that there is adequate lighting, inspect tools for proper lubrication, and relocate tools or material that could "vibrate into trouble."

- Compressed air must be shut off or the electric cord unplugged before making tool adjustments. Air must be “bled down” before replacement or disconnection.
- Proper guards or shields must be installed on all power tools before issue. Do not use improper tools or tools without guards in place.
- Replace all guards before startup. Remove cranks, keys, or wrenches used in service work.

12.1.9 Drilling with Direct Push Technology

General rules associated with direct push technology (DPT) intrusive activities are as follows:

- Maintain all equipment in a safe condition.
- Keep all guards in place during use.
- Before DPT sampling is started, verify that everyone who operates the rig has had adequate training and is thoroughly familiar with the DPT rig, its controls, capabilities, and operating manual.
- Set-up on stable and level terrain.
- Outriggers shall be extended per the manufacturer’s specifications.
- Do not place outriggers on underground structures such as vaults, manholes, stormwater inlets, catch basins, or well boxes.
- Use proper dunnage, cribbage, plates, or wooden blocks between outriggers and supporting surfaces.
- The Driller and helper must be present during all active operations and TEST THE TWO KILL SWITCHES DURING EACH STARTUP.
- The DPT rig helper and other site personnel must know the location of the two emergency shutoff switches.
- The area around the drilling operation must be cordoned off/barricaded.
- When hazardous conditions are deemed present, the operation must be shut down.
- Team members shall not wear loose clothing, free long hair, jewelry, or equipment that might become caught in moving machinery. Secure PPE close to the body to avoid getting caught in moving parts.
- Unauthorized personnel must be kept clear of the DPT rig.
- Shut down, lock, and tag out the DPT rig to make repairs or adjustments or to lubricate fittings. Release all pressure on the hydraulic systems, the drilling fluid system, and the air pressure systems of the drill rig prior to performing maintenance.
- Identify and understand parts of the equipment that may cause crushing, pinching, rotating, or similar injuries.
- Neatly stack pipe, rods, or similar on racks or sills to prevent spreading, rolling, or sliding.
- Wear proper work gloves when the possibility of pinching or other injury may be caused by moving or handling large or heavy objects.

- Establish a system of responsibility for the operator and helpers to follow during the series of various activities, such as connecting and disconnecting sections and inserting and removing the sections.
- Never reach behind or around rotating equipment for any reason.
- Clean equipment only when the DPT rig is in neutral and the equipment has stopped.
- Don't place hands, feet, and/or limbs into or through openings of equipment frames or structures that were not intended to be used in such a fashion.

12.1.10 Motor Vehicle Operation

All drivers are required to have a valid driver's license, and all vehicles must have appropriate state vehicle registration and inspection stickers. **Anchor QEA prohibits the use of hand-held wireless devices while driving any vehicle for business use at any time, for personal use during business hours, and as defined by law**. Additionally, site-specific motor vehicle requirements must be followed, if any.

When driving to, from, and within the job site, be aware of potential hazards including:

- Vehicle accidents
- Distractions
- Fatigue
- Weather and road conditions

To mitigate these hazards, observe the following procedures and practices regarding motor vehicle operation:

- Before leaving, inspect fuel and fluid levels and air pressure in tires, and adjust mirrors and seat positions appropriately.
- Wear a seat belt at all times and make sure that clothing will not interfere with driving.
- Plan your travel route and check maps for directions or discuss with colleagues.
- Clean windows and mirrors as needed throughout the trip.
- Wear sunglasses as needed.
- Fill up when the fuel level is low (not near empty).
- Follow a vehicle maintenance schedule to reduce the possibility of a breakdown while driving.
- Stop driving the vehicle, regardless of the speed (e.g., even 5 miles per hour) or location (e.g., a private road), when the potential of being distracted by conversation exists.
- Using hand-held communication devices (e.g., cell phones) while operating any motor vehicle is prohibited.
- Get adequate rest prior to driving.
- Periodically change your seat position, stretch, open the window, or turn on the radio to stay alert.

- Pull over and rest if you are experiencing drowsiness.
- Check road and weather conditions prior to driving.
- Be prepared to adjust your driving plans if conditions change.
- Travel in daylight hours, if possible.
- Give yourself plenty of time to allow for slowdowns due to construction, accidents, or other unforeseen circumstances.
- Use lights at night and lights and wipers during inclement weather.

12.1.11 Vehicular Traffic

Observe the following procedures and practices regarding vehicular traffic:

- Wear a high-visibility traffic safety vest when vehicle hazards exist.
- Use cones, flags, barricades, and caution tape to define the work area.
- Use a vehicle to block the work area (if conditions allow).
- Engage a police detail for high-traffic situations.
- Always use a spotter in tight or congested areas for material deliveries.
- As necessary, develop traffic control plans and train personnel as flaggers in accordance with the DOT MUTCD and/or local requirements.

12.1.12 Excavation and Trenching Activities

Observe the following practices and procedures when performing excavation and trenching work.

The purpose of this procedure is to describe the company requirements for excavation and trenching safety. These requirements are based on the federal OSHA excavation standard found in 29 CFR 1926.P. Local regulations should also be consulted for the state in which the work is being performed.

With very few exceptions, protective systems must be designed and installed to protect employees who enter excavations of 4 feet or more in depth. Accepted protective systems include sloping, shoring, and shielding.

The protective system must be designed by a registered Professional Engineer (PE, civil), and plans must be available for inspections on site, under prescribed conditions.

12.1.12.1 Definitions

Angle of Repose: The greatest angle above the horizontal plane at which a material will lie without sliding.

Benching: A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels of steps, usually with vertical or near-vertical surfaces between levels.

Competent Person: An employee who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has the authority to take prompt corrective measures to eliminate them.

Excavation: Any man-made cut, cavity, trench, or depression in an earth surface, including its sides, walls, or faces, formed by earth removal.

Registered Professional Engineer: An individual currently registered as a PE (preferably civil) in the state where work is to be performed.

Sheeting: Members of a shoring system that retain the earth in position, and in turn are supported by other members of the shoring system.

Shield: A structure that is able to withstand the forces imposed on it by a cave-in and thereby protects employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Shields may be pre-manufactured or job-built in accordance with 29 CFR 1926.652(c)(3) or (c)(4). Shields used in trenches are usually referred to as "trench boxes" or "trench shields."

Shoring: Structure such as a metal hydraulic, mechanical, or timber shoring system that supports the sides of an excavation and that is designed to prevent cave-ins.

Sloping: A method of protecting employees from cave-ins by excavating to form sides of a trench that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

Support System: A structure such as underpinning, bracing, or shoring, that provides support to an adjacent structure, underground installation, or the sides of an excavation.

Trench: A narrow (in relation to its length) excavation made below the surface of the ground. In general, the depth is greater than the width at the bottom, but the width of a trench at the bottom is not greater than 15 feet.

Type A Soil: Cohesive soils with an unconfined compressive strength of 1.5 tons per square foot (tsf) (144 kilopascal [kPa]) or greater. Examples of cohesive soils are: clay, silty clay, sandy clay, clay loam, and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. However, soil is NOT Type A if:

- The soil is fissured
- The soil is subject to vibration from heavy traffic, pile driving, or similar effects
- The soil has been previously disturbed

- The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of 4H:1V or greater
- The material is subjected to other factors that would require it to be classified as a less stable material

Type B Soil: This classification refers to:

- Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa), but less than 1.5 tsf (144 kPa)
- Granular, cohesionless soils including angular gravel (similar to crushed rock), silt, silt loam, sandy loam, and, in some cases, silty clay loam and sandy clay loam
- Previously disturbed soils except those that would otherwise be classified as Type C soil
- Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subjected to vibration
- Dry rock that is not stable
- Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than 4H:1V, but only if the material would otherwise be classified as Type B

Type C Soil: This classification refers to:

- Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less
- Granular soils including gravel, sand, and loamy sand
- Submerged soil or soil from which water is freely seeping
- Submerged rock that is not stable
- Material in a sloped, layered system where the layers dip into the excavation or a slope of 4H:1V or steeper

12.1.12.2 Pre-Excavation Requirements

Underground Installations: Prior to opening an excavation, the estimated locations of underground utilities such as sewer, telephone, fuel, electric, water, or any other underground installations that may reasonably be expected to be encountered during the excavation work shall be determined.

The property owner and/or utility location service shall be contacted within the established pre-notification time, advised of the proposed work, and asked to delineate the location of all underground utilities. Employees should be careful to protect and preserve the utility markings until they are no longer required for safe excavation. At least 3 feet of clearance between any underground utility and the cutting edge or point of powered excavation equipment will be maintained until the precise location of the utility is determined. Initial excavation within this 3-foot area will be conducted manually.

Surface Encumbrances: All surface encumbrances (e.g., trees, poles, or boulders) that may create a hazard to employees shall be removed or supported.

Vehicular Traffic: Employees exposed to vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material. Traffic control devices (e.g., barricades, signs, cones, or flagpersons) shall be specified and used in accordance with regulations applicable to the roadway or area in which excavation activities are occurring.

12.1.12.3 Training

Those who supervise the entry of personnel into an excavation, a "Competent Person," must have completed a training course that included instruction in:

- Types of hazards associated with excavation operations
- Safe work practices and techniques
- A review of applicable federal, state, and local regulations
- A review of this procedure

Employees who enter excavations are required to complete a site-specific training session to enable them to recognize unsafe conditions in and around the excavation. This training can be conducted during a tailgate safety meeting that emphasizes the specific excavation hazards that may be encountered.

Training documentation shall be maintained in the project files. As part of the standard employee supervision process, training shall be complemented with on-the-job instruction and reinforcement of accepted practices to the extent necessary to verify compliance with this procedure and all other applicable regulations.

12.1.12.4 Excavation Work Practices

General: Each employee working within an excavation shall be protected from cave-ins by an adequate protective system designed in accordance with 29 CFR 1926.P, except when the excavation is made entirely in stable rock or when the excavation is less than 4 feet deep and examination of the ground by a competent person provides no indication of a potential cave-in. A competent person shall verify that protective systems, when required, are installed and maintained per the design specifications. No employees shall be permitted to enter an excavation unless it is absolutely essential to do so and all requirements of this procedure are met.

Supervision: Work in an excavation shall be supervised at all times by a competent person. This individual will remain outside of the excavation at all times, and will be responsible for identifying any unusual developments aboveground that may warn of impending earth movement.

Soil Classification: Based on their training, the competent person will classify each soil or rock deposit as stable rock, Type A, Type B, or Type C. When layers of soil or rock exist, the weakest layer will be classified; however, each layer may be classified individually when a more stable layer lies under a less stable layer. If the properties or conditions of a soil or rock deposit change in any way, re-evaluation will be required.

Access and Egress: Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design.

A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet or more in depth so as to require no more than 25 feet of lateral travel for employees.

Protective Systems: Protective systems shall be designed in accordance with 29 CFR 1926.652(b) or (c) and shall have the capacity to resist, without failure, all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

Exposure to Falling Loads: No employees shall be permitted underneath loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded provided the vehicles are equipped with a cab shield and/or canopy adequate to protect the operator from shifting or falling materials.

Warning System for Mobile Equipment: When mobile equipment is operated adjacent to an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs.

Hazardous Atmospheres (see related information in Tables 5-1, 5-2, and 7-1): Where an oxygen-deficient (less than 19.5% O_2) or hazardous atmosphere exists, or could reasonably be expected to exist, the excavation shall be tested before employees enter. Testing shall be conducted as often as necessary to verify that the atmosphere remains safe. Some excavations may be considered confined spaces that require compliance with appropriate procedures (see Section 12.1.21). Adequate precautions shall be taken to prevent employee exposure to oxygen-deficient or hazardous atmospheres. As appropriate, ventilation and/or respiratory protective devices shall be used (see Table 7-1).

Water Accumulation Hazards: Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. If water is controlled or prevented from accumulating by the use of water removal equipment, the process shall be monitored by a competent person to verify proper operation.

If the excavation work interrupts the natural drainage of surface water (e.g., streams or run-off channels), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to run-off from heavy rains shall be regularly inspected by a competent person.

Stability of Adjacent Structures: Structures adjoining an excavation shall be evaluated to assess their stability. Excavation below the level of the base or footing of any foundation or retaining wall that could reasonably be expected to pose a hazard to employees shall only be permitted when:

- A support system (underpinning) is provided to verify the safety of employees and the stability of the structure
- The excavation is in stable rock
- A registered PE has determined that the structure will be unaffected by the excavation
- A registered PE has determined that such excavation will not pose a hazard to employees

Sidewalks, pavements, and other surface structures shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

Protection from Loose Rock or Soil: Employees shall be protected from loose rock or soil that could fall or roll from the excavation face or edge. Such protection could consist of scaling to remove loose materials, or the installation of protective barriers. All spoil shall be placed at least 2 feet from the edge of the excavation. It is strongly recommended that spoil be placed 4 feet or more from the excavation edge so as not to cover surface indicators of subsidence (such as fissures or cracks).

Inspections: A competent person shall make daily inspections of excavations, adjacent areas, and protective systems for evidence of conditions that could result in a cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. The inspection shall be made prior to start of work, and as needed throughout the shift. Inspections shall be made after each rainstorm or other hazard-increasing event, and will be documented. Where the inspection finds evidence of any hazardous condition, exposed employees shall immediately be removed from the hazardous area until necessary precautions have been taken.

Fall Protection: Where employees or equipment are permitted to cross over excavations, walkways or bridges shall be provided. Standard guard rails shall be provided where walkways are 6 feet or more above lower levels. Adequate barriers or other types of physical protection shall be provided at all remotely located excavations. All wells, pits, or shafts, shall be barricaded or covered, and shall be backfilled as soon as possible.

12.1.13 Noise

Excessive noise is hazardous not only because of its potential to damage hearing, but also because of its potential to disrupt communications and instructions. The following procedures and practices shall be followed to prevent noise-related hazards:

- All employees will have access to ear protection with a Noise Reduction Rating of not less than 30.
- Ear protection must be worn in any environment where site personnel must raise their voices to be heard while standing at a distance of 3 feet or less.
- Ear protection must be worn by any personnel observing or operating concrete cutting or sawing equipment, pile driving, or other loud noise-generating activities.

Hearing protection is required for site personnel operating or working near noisy equipment or operations, where the noise level is greater than 85 A-weighted decibels (dBA) (time-weighted average [TWA]), as well as personnel working around heavy equipment. The FL will determine the need and appropriate testing procedures, (i.e., sound level meter and/or dosimeter) for noise measurement.

When needed, a sound level meter will be used to measure noise levels at selected locations in the work area and on the site perimeter. When used, noise monitoring equipment must be calibrated before and after each shift.

If continuous noise levels are found to exceed 85 dBA at any location within the work area, warning signs will be posted. Site personnel and visitors will be notified that hearing protection is required. Appropriate hearing protection (i.e., ear plugs or ear muffs) will be worn whenever personnel or visitors are working in that location. A supply of ear plugs will be maintained on site.

Action levels in Table 12-3 will trigger the use of appropriate hearing protection (plugs or muffs). Hearing protection must be able to attenuate noise below 90 dBA (8-hour TWA). Each hearing protection or device has a Noise Reduction Rating (NRR) assigned by EPA. The calculation for a hearing protection device’s effectiveness is as follows:

Equation 1

$$\text{Noise reading } dBA - (NNR - 7dB) < 90dBA$$

where:

dB	=	decibel
dBA	=	A-weighted decibel
NRR	=	Noise Reduction Rating

Table 12-3
Noise Exposure Action Levels

Instrument	Measurement	Action
Type I or Type II Sound Level Meter or Dosimeter	> 80 dBA to 85 dBA	Hearing protection recommended. Limit work duration to 8-hour shifts.
	> 85 dBA to 90 dBA	Hearing protection required. Limit work duration to 8-hour shifts.
	> 90 dBA to 115 dBA	Hearing protection required. Investigate use of engineering controls. Limit work duration to 8-hour shifts.
	> 115 dBA	Stop work. Consult CHSM.

12.1.14 Lifting and Material Handling

Observe the following procedures and practices for lifting and material handling:

- Use leather gloves when handling metal, wire rope, sharp debris, or transporting materials (e.g., wood, piping, or drums).
- The size, shape, and weight of the object to be lifted must first be considered. No individual employee is permitted to lift any object that weighs more than 60 pounds. Multiple employees or mechanical lifting devices are required for objects heavier than the 60-pound limit.
- Plan a lift before doing it. Bend at the knees and lift with the legs; maintain the natural curves of the back; do not use back muscles.
- Check the planned route for clearance.
- Use the buddy system when lifting heavy or awkward objects.
- Do not twist your body while lifting.
- Know the capacity of any handling device (e.g., crane, forklift, chain fall, or come-along) that you intend to use.
- Use tag lines to control loads.
- Verify that your body, material, tools, and equipment are safe from such unexpected movement as falling, slipping, rolling, tripping, bowing, or any other uncontrolled motion.

- Trucks (i.e., flat beds) hauling equipment or materials must not be moved once rigging has been released.
- Chock all material and equipment (such as pipe, drums, tanks, reels, trailers, and wagons) as necessary to prevent rolling.
- Tie down all light, large-surface-area material that might be moved by the wind.
- When working at heights, secure tools, equipment, and wrenches against falling.
- Do not store materials or tools on ducts, lighting fixtures, beam flanges, hung ceilings, or similar elevated locations.
- Fuel-powered tools used inside buildings or enclosures shall be vented and checked for excessive noise.

12.1.15 Fire Control

Observe the following fire control procedures and practices:

- Smoke only in designated areas.
- Keep flammable liquids in closed containers.
- Keep the work site clean; avoid accumulating combustible debris such as paper.
- Obtain and follow property owner hot work safety procedures when welding or performing other activities requiring an open flame.
- Isolate flammable and combustible materials from ignition sources.
- Verify fire safety integrity of equipment installations according to National Electrical Code (NEC) specifications.

12.1.16 Static Electricity and Transfer of Flammable Liquids

Observe the following procedures and practices regarding static electricity when transferring flammable liquids:

- Electrically bond and ground pumps, transfer vessels, tanks, drums, bailers, and probes when moving flammable liquids.
- Electrically bond and ground vacuum trucks and the tanks they are emptying.
- Do not splash fill containers with flammable liquids.
- Pour flammable liquids slowly and carefully.
- Two fire extinguishers (2A20:BC) must be available, charged, inspected, and readily accessible.

12.1.17 Cleaning Equipment

Observe the following procedures and practices when cleaning equipment:

- Wear appropriate PPE to avoid skin and eye contact with isopropyl alcohol, Alconox, or other cleaning materials.
- Stand upwind to minimize any potential inhalation exposure.

- Dispose of spent cleaning solutions and rinses accordingly.

12.2 Environmental Hazards and Controls

12.2.1 Fatigue Management

Because Anchor QEA personnel may be working during both daytime and nighttime hours several days per week, depending on the activity, it is important that all personnel are aware of the hazards related to fatigue. Fatigue can be defined as an increasing difficulty in performing physical or mental activities. Signs of fatigue may include tiredness, changes in behavior, loss of energy, and reduced ability to concentrate. Fatigued site personnel may have a reduced ability to recognize or avoid risks on the work site, which may lead to an increase in the number and severity of injuries and other incidents. Fatigue can occur at any time when working and may cause safety concerns due to decreased manual dexterity, reaction time, and alertness.

Fatigue results from insufficient rest and sleep between activities. Contributing factors to fatigue may include the following:

- The time of day that work takes place
- The length of time spent at work and in work-related duties
- The type and duration of a work task and the environment (e.g., weather conditions and ambient noise) in which it is performed
- The quantity and quality of rest obtained prior to, during, and after a work period
- Non-work activities
- Individual factors such as sleeping disorders, medications, or emotional state

Personnel suffering from fatigue may exhibit both physical and mental effects, such as the following:

- Slower movements
- Poor coordination
- Slower response time to interaction
- Bloodshot eyes
- Slumped or weary appearance
- Nodding off
- Distractedness or poor concentration
- Inability to complete tasks
- Fixed gaze
- Appearing depressed, irritable, frustrated, or disinterested

Employees are strongly encouraged to get sufficient pre-work rest, maintain sufficient nutritional intake during work (i.e., eat and drink at regular intervals), and communicate with team members and leaders if their level of fatigue elevates.

Use the following procedures to help detect and address fatigue-related issues:

- Periodically observe and query coworkers for signs or symptoms of fatigue.
- Site personnel that express concern over their level of fatigue, or that are observed to be fatigued such that elevated worker risk is evident, will be relieved or have their work tasks adjusted so that they may rest sufficiently.
- Work schedules will consider fatigue factors and optimize continuous periods available for uninterrupted sleep. The employee is responsible for reporting to work properly rested and fit for duty. In case of an emergency or operational difficulties (e.g., limited access due to water levels or boat repairs), work hours may require adjustment.
- Maintain a routine exercise program and regular sleep schedule as much as possible over the course of the work.
- Avoid heavy meals or caffeine and minimize or eliminate the consumption of alcohol and nicotine before sleeping.

12.2.2 Heat Stress

Observe the following general procedures and practices regarding heat stress:

- Increase the number of rest breaks and/or rotate site personnel in shorter work shifts.
- Watch for signs and symptoms of heat stress and fatigue (see Section 12.2.2.1).
- During hot months, plan work for early morning or evening.
- Use ice vests when necessary.
- Rest in cool, dry areas.
- Verify that employees have access to potable drinking water and shade.
- During conditions exceeding 95°F, verify that the following additional procedures are adhered to:
  - Establish effective communication by voice, observation, or electronic means.
  - Observe employees for alertness and signs or symptoms of heat illness.
  - Designate one or more employees on each work site as authorized to call for emergency medical services.
  - Remind employees to drink water throughout the shift.
  - Conduct pre-shift meetings before beginning work to review the high heat procedures, encourage drinking water, and remind employees of their right to take a cool-down rest when necessary.

12.2.2.1 Signs, Symptoms, and Treatment

The FL will be trained in heat stress prevention, including the following, prior to supervising employees:

- Procedures to prevent heat illness.
- Procedures to follow when an employee exhibits symptoms consistent with possible heat illness, including emergency response procedures.

The information provided below addresses these training requirements.

Adverse climatic conditions are important considerations in planning and conducting site operations. High ambient temperature can result in health effects ranging from transient heat fatigue, physical discomfort, reduced efficiency, personal illness, and increased accident probability to serious illness or death. Heat stress is of particular concern when chemical protective garments are worn because they prevent evaporative body cooling. Wearing PPE places employees at considerable risk of developing heat stress.

Heat stress is caused by a number of interacting factors, including environmental conditions, clothing, workload, and the individual characteristics of the worker. Because heat stress is probably one of the most common (and potentially serious) illnesses, regular monitoring and other preventive precautions are vital.

Heat Rash. Heat rash can be caused by continuous exposure to hot and humid air and skin abrasion from sweat-soaked clothing, rubber boots, or impermeable waders. The condition is characterized by a localized red skin rash and reduced sweating. Heat rash reduces the ability to tolerate heat. To treat, keep skin hygienically clean and allow it to dry thoroughly after using chemical protective clothing. Take measures to prevent heat rash by changing clothes often to maximize use of dry garments, or taking frequent breaks to allow doffing of equipment and drying of skin.

Heat Cramps. Heat cramps are caused by profuse perspiration with inadequate electrolytic fluid replacement. This often robs the larger muscle groups (stomach and quadriceps) of blood, which can cause painful muscle spasms and pain in the extremities and abdomen. To treat, move the employee to a cool place and give sips of water or an electrolytic drink. Watch for signs of heat exhaustion or heat stroke.

Heat Exhaustion. Heat exhaustion is a mild form of shock caused by increased stress on various organs to meet increased demand to cool the body. Onset is gradual and symptoms should subside within 1 hour. Symptoms include a weak pulse; shallow breathing; pale, cool, moist skin; profuse sweating; dizziness; and fatigue. To treat, move the employee to a cool place and remove as much clothing as possible. Give sips of water or electrolytic solution and fan the person continuously to remove heat by convection. Do not allow the affected person to become chilled. Treat for shock if necessary.

Heat Stroke. Heat stroke is the most severe form of heat stress; the body must be cooled immediately to prevent severe injury and/or death. ***This is a medical emergency!*** Symptoms include red, hot, dry skin; a body temperature of 105°F or higher; no perspiration; nausea; dizziness and confusion; and a strong, rapid pulse. Because heat stroke is a true medical emergency, transport the individual to a medical facility immediately. Prior to transport, remove as much clothing as possible and wrap the individual in a sheet soaked with water. Fan the individual vigorously while transporting to help reduce body temperature. If available, apply cold packs under the arms, around the neck, or any other place where they can cool large surface blood vessels. If transportation to a medical facility is delayed, reduce body temperature by immersing the individual in a cool-water bath (however, be careful not to over-chill the individual once body temperature is reduced below 102°F). If this is not possible, keep the individual wrapped in a sheet and continuously douse with water and fan.

12.2.2.2 Prevention

The implementation of preventative measures is the most effective way to limit the effects of heat-related illnesses. During periods of high heat, adequate liquids must be provided to replace lost body fluids. Replacement fluids can be a 0.1% saltwater solution, a commercial mix such as Gatorade, or a combination of these with fresh water. The replacement fluid should be kept cool, 50°F to 60°F, and it should be placed close to the work area. Employees must be encouraged to drink more than the amount required to satisfy thirst. Employees should also be encouraged to salt their foods more heavily during hot times of the year.

Cooling devices such as vortex tubes or cooling vests can be worn beneath impermeable clothing. If cooling devices are worn, only physiological monitoring will be used to determine work activity.

All site personnel are to rest when any symptoms of heat stress are noticed. Rest breaks are to be taken in a cool, shaded rest area. Employees shall remove chemical protective garments during rest periods and will not be assigned other tasks.

All employees shall be informed of the importance of adequate rest and proper diet, including the harmful effects of excessive alcohol and caffeine consumption.

12.2.2.3 Monitoring

Heat stress monitoring should be performed when employees are working in environments exceeding 90°F ambient air temperature. If employees are wearing impermeable clothing, this monitoring should begin at 77°F. There are two general types of monitoring that the health and safety representative can designate to be used: wet bulb globe temperature (WBGT), and physiological. The Heat Stress Monitoring Record form (see Appendix A) will be used to record the results of heat stress monitoring.

Note that some states such as Washington and California have specific regulatory standards for protection of employees from heat stress-related injuries.

Wet Bulb Globe Temperature (WBGT). The WBGT index is the simplest and most suitable technique to measure the environmental factors that most nearly correlate with core body temperature and other physiological responses to heat. When WBGT exceeds 25°C (77°F), the work regimen in Table 12-4 should be followed.

Table 12-4
Permissible Heat Exposure Threshold Limit Values

Work/Rest Regimen	Workload		
	Light	Moderate	Heavy
Continuous work	86°F (30.0°C)	80°F (26.7°C)	77°F (25.0°C)
75% work, 25% rest each hour	87°F (30.6°C)	82°F (28.0°C)	78°F (25.9°C)
50% work, 50% rest, each hour	89°F (31.4°C)	85°F (29.4°C)	82°F (27.9°C)
25% work, 75% rest, each hour	90°F (32.2°C)	88°F (31.1°C)	86°F (30.0°C)
These TLVs assume that nearly all acclimated, fully-clothed site personnel with adequate water and salt intake should be able to function effectively under the given working conditions without exceeding a deep body temperature of 100.4°F (38°C).			

(From OSHA Technical Manual, Section III: Chapter 4 - Heat Stress)

The TLVs denoted in Table 12-4 apply to physically fit and acclimatized individuals wearing light, summer clothing. If heavier clothing that impedes sweat or has a higher insulation value is required, the permissible heat exposure TLVs should be adjusted based on the WBGT Correction Factors in Table 12-5.

Table 12-5
Wet Bulb Globe Temperature Correction Factors

Clothing Type	WBGT Correction
Summer lightweight working clothing	0°F (0°C)
Cotton coveralls	-3.6°F (-2°C)
Winter work clothing	-7.2°F (-4°C)
Water barrier, permeable	-10.8°F (-6°C)
Fully encapsulating	-14.4°F (-10°C)

Physiological. Physiological monitoring can be used in lieu of, or in addition to, WBGT. This monitoring can be self-performed once the health and safety representative demonstrates appropriate techniques to affected employees. Because individuals vary in their susceptibility to heat, this type of monitoring has its advantages. The following two parameters are to be monitored at the beginning of each rest period:

- **Heart Rate:** The maximum heart rate (MHR) is the amount of work (beats) per minute a healthy person's heart can be expected to safely deliver. Each individual will count his/her radial (wrist) pulse for 1 minute as early as possible during each rest period. If the heart rate of any individual exceeds 75% of his/her calculated MHR (MHR = 200 - age) at the beginning of the rest period, then the work cycle will be decreased by one-third. The rest period will remain the same. An individual is not permitted to return to work until his/her sustained heart rate is below 75% of his/her calculated MHR.

- **Temperature:** Each individual will measure his/her temperature with a thermometer for 1 minute as early as possible in the first rest period. If the temperature exceeds 99.6°F at the beginning of the rest period, then the work cycle will be decreased by one-third. The rest period will remain the same. An individual is not permitted to return to work if his/her temperature exceeds 100.4°F.

12.2.2.4 Training

Employees potentially exposed to heat stress conditions will be instructed on the contents of this procedure. This training can be conducted during daily tailgate safety meetings.

12.2.3 Cold Stress

Observe the following procedures and practices regarding cold stress:

- Take breaks in heated shelters when working in extremely cold temperatures.
- Upon entering the shelter, remove the outer layer of clothing and loosen other layers to promote evaporation of perspiration.
- Drink warm liquids to reduce the susceptibility to cold stress.
- Be aware of cold stress symptoms, including shivering, numbness in the extremities, and sluggishness.
- Provide adequate insulating dry clothing to maintain warmth if work is performed in air temperature below 40°F. Wind chill cooling rates and the cooling power of air are critical factors. The higher the wind speed and the lower the temperature in the work area, the greater the insulation value of the protective clothing required.
- If the air temperature is 32°F or less, hands should be protected.
- If only light work is involved and if the clothing on the worker may become wet on the job site, the outer layer of the clothing in use should be impermeable to water. With more severe work under such conditions, the outer layer should be water repellent, and the outer wear should be changed as it becomes wetted. The outer garments should include provisions for easy ventilation in order to prevent wetting of the inner layer by sweat.
- If available clothing does not give adequate protection to prevent cold injury, work should be modified or suspended until adequate clothing is made available, or until weather conditions improve.
- Implement a buddy system in which site personnel are responsible for observing fellow workers for early signs and symptoms of cold stress.

12.2.3.1 Signs, Symptoms, and Treatment

Cold stress can range from frostbite to hypothermia. The signs and symptoms of cold stress are listed below. The appropriate guidelines should be followed if any personnel exhibit these symptoms:

Frostbite. Frostbite is characterized by pain in the extremities and loss of manual dexterity. "Frostnip," or reddening of the tissue, is accompanied by a tingling or loss of sensation in the extremities and continuous shivering.

Hypothermia. Hypothermia is characterized by pain in the extremities and loss of manual dexterity, with severe, uncontrollable shivering, and an inability to maintain the level of activity. Symptoms include excessive fatigue, drowsiness, irritability, or euphoria. Severe hypothermia includes clouded consciousness, low blood pressure, pupil dilation, cessation of shivering, unconsciousness, and possible death.

Move the individual to a warm, dry place. If the individual's clothing is wet, remove it and replace it with dry clothing. Keep the individual warm. Re-warming of the individual should be gradual to avoid stroke symptoms. Dehydration, or the loss of body fluids, may result in a cold injury due to a significant change in blood flow to the extremities. If the individual is conscious and alert, warm sweet liquids should be provided. Coffee and other caffeinated liquids should be avoided because of diuretic and circulatory effects. Extremities affected by frostbite should be gradually warmed up and returned to normal temperature. Moist compresses should be applied; begin with lukewarm compresses and slowly increase the temperature as changes in skin temperature are detected. Keep the individual warm and calm and move them to a medical facility as soon as possible.

12.2.4 Sunlight and Ultraviolet Exposure

Observe the following procedures and practices regarding ultraviolet (UV) exposure:

- Protect against extended exposure to sunlight with shade, long clothing, sunscreen, and high-SPF, broad-spectrum sunscreen applied frequently.
- Plan work to avoid unnecessary UV exposure (see Section 12.2.4.2).
- During peak daylight months, plan work for early morning or evening.
- Many factors affect the hazards associated with UV exposure, including the following:
  - **Time of day:** UV rays are strongest between 10:00 a.m. and 4:00 p.m.
  - **Season of the year:** UV rays are stronger during spring and summer months. This is less of a factor near the equator.
  - **Distance from the equator (latitude):** UV exposure goes down as you get farther from the equator.
  - **Altitude:** More UV rays reach the ground at higher elevations.
  - **Cloud cover**: The effect of clouds can vary. Sometimes cloud cover blocks some UV from the sun and lowers UV exposure, while some types of clouds can reflect UV and

increase UV exposure. What is important to know is that UV rays can get through, even on a cloudy day. Consider monitoring the UV index for your work area: http://www2.epa.gov/sunwise/uv-index.

  – **Reflection off surfaces**: UV rays can bounce off surfaces like water, sand, snow, pavement, or grass, leading to an increase in UV exposure.

- Evaluate site-specific factors affecting UV exposure and address work practices as appropriate.

12.2.4.1 Signs, Symptoms, and Treatment

The best way to treat sunburn is to prevent it using the guidelines listed in the preceding bullets and in Section 12.2.4.2. Signs of sunburn include the following:

- Pinkness or redness
- Skin that feels warm or hot to the touch
- Pain, tenderness, or itching
- Swelling
- Small, fluid-filled blisters, which may break
- Headache, fever, chills, and fatigue if the sunburn is severe

If signs of sunburn are noticed, avoid further exposure and immediately implement treatment. If the sunburn is blistering *and* covers 15% or more of the body, seek medical attention.

12.2.4.2 Prevention

UV exposure hazards and their impacts on each worksite should be evaluated to determine the best practices for risk mitigation. The most effective way to prevent skin damage from UV exposure is to protect bare skin from the exposure. This can be accomplished with shade, clothing (e.g., pants, long sleeves, or hats), sunscreen, and sunglasses. Plan work to either create shade or take advantage of natural shade, and avoid peak UV times during the day when possible.

12.2.5 Inclement Weather

Observe the following procedures and practices regarding inclement weather:

- Evaluate the worksite for hazards that may be amplified during inclement weather, such as traction issues, ingress and egress, slope stability, or wind-driven hazards (e.g., dust, debris, or falling trees).
- Stop outdoor work during electrical storms (lightning strikes), hailstorms, high winds, and other extreme weather conditions such as extreme heat or cold.
- Take cover indoors or in a vehicle that will provide adequate protection. In some cases, this may require exiting the worksite, such as during windstorms in areas with overhead hazards (e.g., trees or power lines).

- Listen to local forecasts for warnings about specific weather hazards such as tornadoes, hurricanes, and flash floods.
- Verify that on-site equipment and resources are adequately protected from inclement weather.
- If working in an unfamiliar geographic location, consult with local resources for unique weather hazards.

12.2.6 Insects and Spiders

Observe the following general procedures and practices regarding insects/spiders:

- Tuck pants into socks.
- Wear long sleeves.
- Use insect repellent.
- Avoid contact by always looking ahead to where you will be walking, standing, sitting, leaning, grabbing, lifting, or reaching.
- Check for signs of insect/spider bites, such as redness, swelling, and flu-like symptoms.

The most dangerous spiders to humans in North America are black widows and brown spiders (also known as brown recluse or fiddleback spiders). A guide to identifying these spiders is presented in Table 12-6.

Table 12-6
North American Hazardous Spider Identification Guide

Hazardous Spider Identification Guide	
Black Widow Spider • Abdomen usually shows hourglass marking • Female is 3 to 4 centimeters in diameter • Have been found in well casings and flush-mount covers • Not aggressive, but more likely to bite if guarding eggs • Light, local swelling and reddening are early signs of a bite, followed by intense muscular pain, rigidity of the abdomen and legs, difficulty breathing, and nausea • If bitten, see a physician as soon as possible	
Brown Spiders (aka Brown Recluse or Fiddleback) • Found in the central and southern United States, although in some other areas, as well • 1/4-to-1/2-inch-long body, and size of a silver dollar • Hide in baseboards, ceiling cracks, and undisturbed piles of material • Bite may either go unnoticed or may be followed by a severe localized reaction, including scabbing, necrosis of the affected tissue, and very slow healing • If bitten, see a physician as soon as possible	

12.2.7 Bees and Wasps

Many encounters with bees and wasps occur when nests built in well casings or excavation areas are disturbed. Before opening a well casing, take a few moments to observe whether or not insects are entering or exiting. If they are flying to and from the casing, avoid it if possible. If you must be in an area where disturbing a nest is likely, be sure to wear long pants and a long-sleeved shirt. Stinging insects fly around the top of their target, so if you get into trouble, pull a portion of your shirt over your head and run away.

If you get stung, look for a stinger and, if one is present, remove it as soon as possible. Several over-the-counter products or a simple cold compress can be used to alleviate the pain of the sting. If the sting is followed by severe symptoms, or if it occurs in the neck or the mouth, seek medical attention immediately because swelling could cause suffocation.

If you need to destroy a nest, consult with the PM and project FL first. Commercially available stinging insect control aerosols are very effective, but could potentially contaminate the well. Once the nest is destroyed, fine mesh may be applied over the exit and entry points of a well casing to prevent re-infestation.

12.2.8 Ticks

Ticks in North America can be carriers of several diseases, including Lyme disease, Rocky Mountain spotted fever, and ehrlichiosis.

Limiting exposure to ticks reduces the likelihood of infection when exposed to tick-infested habitats. Measures to prevent tick exposure include the following:

- Remove leaf litter and brush in areas where you will be working prior to tick season.
- Wear light-colored clothing so that ticks are visible.
- Tuck your pant legs into your socks.
- Apply repellents to discourage tick attachment.
- Promptly inspect your body and remove crawling or attached ticks when you leave a tick-infested area.
- Conduct tick checks on buddies upon exiting any suspect area (may be needed multiple times per work day).
- Be aware of seasonal activity; ticks are often most active in the spring.

Observe the following procedures and practices if you are bitten by a tick:

- Use fine-tipped tweezers or shield your fingers with tissue, paper towel, or rubber gloves.

- Grasp the tick as close to the skin surface as possible and pull upward with steady, even pressure. Do not twist or jerk the tick; this may cause mouthparts to break off and remain in the skin.
- Do not squeeze, crush, or puncture the body of the tick because its fluids may contain infectious organisms.
- Do not handle the tick with bare hands because infectious agents may enter through mucous membranes or breaks in the skin.
- After removing the tick, thoroughly disinfect the bite site and wash your hands with soap and water.
- You may wish to save the tick for identification in case you become ill within 2 to 3 weeks. Place the tick in a sealed plastic bag in the freezer, and mark the bag with the date of the bite.

12.2.9 Mosquitoes

Mosquitoes in the United States have been known to carry West Nile virus, Zika virus, St. Louis encephalitis, and dengue fever. Avoid mosquito bites by doing the following:

- Apply insect repellent containing DEET (N,N-diethyl-meta-toluamide) when outdoors. DEET is very effective, but could potentially contaminate samples.
- Read and follow the product directions whenever you use insect repellent.
- Wear long-sleeved clothes and long pants treated with repellent to further reduce your risk, or stay indoors during peak mosquito feeding hours (dusk until dawn).
- Limit the number of places available for mosquitoes to lay their eggs by eliminating standing water sources from around the work area.
- If you need to destroy a nest, consult with the PM and project FL first.
- Check to see if there is an organized mosquito control program near the project site. If no program exists, work with the local government officials to establish a program.

12.2.9.1 Zika Virus

The Zika virus has generated concern starting in 2016 in the southern United States. According to the Centers for Disease Control and Prevention (CDC),[4] Zika infection during pregnancy can cause a birth defect of the brain called microcephaly and other severe fetal brain defects. There have also been increased reports of Guillain-Barré syndrome, an uncommon sickness of the nervous system, in areas affected by Zika. The practices listed in the bullets above should be followed to avoid mosquito bites and help prevent contraction of the Zika virus. Symptoms of Zika and treatment options are listed

[4] https://www.cdc.gov/zika/about/overview.html

below, should you suspect that you or another employee has been in contact with Zika-infected mosquitoes:

- The most common symptoms of Zika (similar to those of dengue fever) are fever, rash, joint pain, or conjunctivitis (red eyes). Other common symptoms include muscle pain and headache. The incubation period (the time from exposure to symptoms) for Zika virus disease is not known, but is likely to be a few days to a week.
- The illness is usually mild, with symptoms lasting for several days to a week. Severe disease requiring hospitalization is uncommon.
- Call WorkCare or see your healthcare provider if you develop the symptoms described above and have visited an area where Zika is found. If you have recently traveled, tell your healthcare provider when and where you traveled. Your healthcare provider may order blood tests to look for Zika or other similar viruses like dengue fever.

12.2.10 Poisonous Snakes

Observe the following procedures and practices regarding poisonous snakes:

- Avoid walking in areas where snakes may nest or hide. When walking, always look ahead for signs of snakes.
- Use extreme caution when moving or lifting objects that could be used by snakes as cover.
- Never reach under or behind objects or into other areas where snakes may hide.
- Wear sturdy leather boots.
- Poisonous snakebites are medical emergencies. If bitten by any type of snake, immediately seek medical attention.

12.2.11 Bird Droppings

Large populations of roosting birds may present a disease risk. The most serious health risks arise from disease organisms that grow in the accumulations of bird droppings, feathers, and debris under a roost—especially if roosts have been active for years. Among the fungal diseases associated with bird droppings, the two most common are Histoplasmosis and Cryptococcosis.

If you are working in an area where large quantities of droppings are present, follow certain precautions to minimize the risk from disease organisms in the droppings:

- Wear a respirator that can filter particles as small as 0.3 microns, such as a HEPA filter.
- Wear disposable protective gloves, hat, coveralls, and boots if you will be in close contact.
- Wash or shower at the work site after cleanup, if possible.
- If allowable, modify the structure or use methods to prevent birds from re-establishing the roost.

12.2.12 Feral Dogs

Feral (i.e., "wild" or "stray") dogs have been observed at several Anchor QEA job sites. Packs of feral dogs can be dangerous, so if you observe them on the site, call animal control immediately. If a dog approaches you, take the following steps to reduce your chances of being attacked:

- Do not run away or run past the dog.
- Remain calm. If you say anything, speak calmly and firmly. Avoid eye contact. Try to stay still until the dog leaves, or back away slowly until the dog is out of sight. Do not turn and run.
- If you fall to the ground or are knocked down, curl into a ball, placing your hands over your head and neck. Protect your face.

If a dog bites someone, take the following steps:

- Restrain the dog immediately, if it is safe to do so. The dog will have to be quarantined or tested for rabies.
- Check on the victim's condition. Call 911 if paramedic response is required.

12.2.13 Rodent-Borne Diseases

Rodent infestation on a site has the potential to cause serious communicable diseases including hantavirus pulmonary syndrome and bubonic plague. The most common rodent-borne disease is hantavirus, which may infect workers who inhale tiny droplets containing the virus when fresh rodent urine, droppings, or nesting materials are stirred up.

Working conditions that may put workers at risk of hantavirus include:

- Contact with rodent feces or dried urine, which may mobilize particles of these wastes into the air where they may be inhaled
- Entry into rooms or warehouses that have been closed up and infested for extended periods
- Activities that stir up dust that may mobilize hantavirus

If working in areas of obvious rodent infestation, the CDC recommends the following precautions:

- Do not enter rooms or warehouses that have been closed up unless absolutely necessary.
- If work in closed-up areas or areas with rodent infestation is necessary, contact professional exterminators to eliminate the infestation and clean up the location
- If an exterminator is not available or possible, employees should clean up the infested area using the following steps:
  - When going into outbuildings or rooms that have been closed for an extended period, open them up and air them out before cleaning.
  - Don an APR equipped with HEPA P-100 cartridges and nitrile gloves before cleaning.
  - Do not stir up dust by sweeping or vacuuming droppings, urine, or nesting materials.

- Thoroughly wet contaminated areas with detergent or liquid to deactivate the virus. Most general-purpose disinfectants and household detergents are effective. However, a hypochlorite solution prepared by mixing 1 and 1/2 cups of household bleach in 1 gallon of water may be used in place of a commercial disinfectant.
- Once everything is wet, pick up contaminated materials with a damp towel, then mop or sponge the area with disinfectant.
- Spray dead rodents with disinfectant and flea repellent (to avoid bubonic plague), then double-bag and dispose of in an appropriate waste disposal system. Contact the local or state health department for other disposal methods.
- Finally, remove respirator and disinfect gloves before taking them off with disinfectant or soap and water. After taking off the clean gloves, thoroughly wash hands with soap and warm water.

If you experience hantavirus symptoms (fatigue, fever, and muscle aches) within 1 to 5 weeks of exposure to potentially affected rodents and their droppings, contact your supervisor immediately.

12.2.14 Poisonous Plants

Poisonous plants include poison ivy, poison oak, and poison sumac as shown in Table 12-10. Observe the following procedures and practices regarding poisonous plants:

- Avoid entering areas infested with poisonous plants.
- Immediately wash any areas that come into contact with poisonous plants.
- Use PPE when there is a possibility of contact with poisonous plants.

Table 12-10
North American Hazardous Plant Identification Guide

Hazardous Plant Identification Guide		
Poison Ivy • Grows in the West, Midwest, Texas, and the East Coast • Several forms—vine, trailing shrub, or shrub • Three leaflets (can vary from three to nine) • Leaves are green in summer and red in fall • Yellow or green flowers • White berries		
Poison Oak • Grows in the East (New Jersey to Texas) and Pacific Coast • 6-foot tall shrubs or long vines • Oak-like leaves in clusters of three • Yellow berries		
Poison Sumac • Grows in boggy areas, especially in the Southwest and Northern United States • Shrub up to 15 feet tall • Seven to 13 smooth-edged leaflets • Glossy pale yellow or cream-colored berries		

If you have been exposed to poison ivy, oak, or sumac, act quickly because the toxin in the plants penetrates the skin within minutes. If possible, stay outdoors until you complete the first two steps:

1. Cleanse the exposed skin with generous amounts of isopropyl alcohol.
2. Wash the skin with water.
3. Take a regular shower with soap and warm water. Do not use soap until this point because it will pick up the toxin from the surface and move it around.
4. Wash clothes, tools, and anything else that may have been in contact with the toxin with alcohol and water. Be sure to wear hand protection during that process.

Signs and symptoms of exposure include redness and swelling that appears 12 to 48 hours after exposure. Blistering and itching will follow. If you have had a severe reaction in the past, you should see a physician right away. Over-the-counter products that are available to alleviate symptoms include Cortaid, Lanacort, baking soda, Aveeno oatmeal baths, and calamine lotion.

12.2.15 The Public at Large

The community residents around worksites may pose their own specific hazards. These conditions may include the following:

- Unintentional disruption of work
- Benign or malicious trespass
- Criminal intent

Scenarios may include the following:

- Pedestrians, cyclists, or motorists disregarding site boundaries due to distraction or willful disobedience.
- Public use of private site facilities for shelter, relief, and other reasons with no ill-intention.
- Public use of private site facilities for mischievous or criminal activity, such as loitering, vandalism, or theft.
- Encounters with community members who are disgruntled with the project activity.
- Encounters with criminal activities on or near a project site.

If any of the previously mentioned scenarios are anticipated to be likely, take the following precautions as appropriate:

- Verify that the site is adequately marked and barricaded to limit unintentional disruptions of the work by the public.
- Review the site for attractive nuisances (e.g., hazards or conditions that are likely to attract children), and mitigate those.
- Secure all equipment and site facilities to prevent unauthorized access or use.
- Remove valuable items from the site or adequately secure them on site to limit the temptation for potential criminals.
- Have contact information for the client's or owner's public relations office while on site, and direct disgruntled community members to that office. If necessary, vacate the site to relieve the situation and notify the PM or FL.
- Work in pairs when uncertain of the public safety situation at a site. In questionable situations, postpone work as necessary until a plan of action can be developed to verify a safe working environment.

12.2.16 Personal Health and Safety

In addition to hazards associated with chemicals of concern, equipment, operations, or site conditions discussed above, there may be additional personal safety issues to consider at a site, including those related to one or multiple protected classes, such as race, gender, religion, ability, sexual orientation, or gender identity. These conditions may involve the following, perpetrated by the public or those associated with the work:

- Malicious disruption of work
- Harassment, including unwanted comments, gestures, or actions
- Threats of violence, either implied (using derogatory language) or explicit
- Assault

<u>It is critical that the work environment be discussed within the project team to evaluate risks, ways to avoid those risks, and communication protocols. Anchor QEA requires that work be performed in teams.</u>

Specifically, if any of the above are anticipated, take the following precautions as appropriate:

- Alert the PM, FL, CHSM, and Human Resources Department of potential issue(s).
- Formulate a plan of action to verify and maintain a safe working environment prior to field work, which may include the following:
  - Working in pairs and/or within a certain physical distance of other work groups.
  - Coordinated check-ins (calls to or from the office or visual check-ins with other field members).
- Whenever possible, schedule work only within daylight hours (which fluctuate seasonally) or on weekends when questionable scenarios may be less likely.
  - If night work is required, maintain a minimum of two field personnel at all times, and potentially increase the total number of personnel.
  - If working in high-risk areas, discuss the possibility of hiring security if work needs to be performed at night, in low light, or near potentially dangerous areas (e.g., abandoned buildings, public displays of hostility, discrimination, or gang-related activity).
- Maintain a field phone with active GPS and non-locking 911 capability at all times while out in the field.
- If a need arises for a change in field work (e.g., additional sampling or moving to an area that was not planned) or travel plans (e.g., dead battery or flat tire), immediately alert the FL and PM as to the event.

In addition, practice active awareness of your environment. Discuss personal health and safety concerns at the daily tailgate meeting. If you feel unsafe based on the potential behavior of others, immediately bring it up to field team coworkers. If the issue is not resolved to your satisfaction, alert the PM, FL, CHSM, and Human Resources Department to assist in resolving any potential issue(s).

13 Medical Monitoring Program

This section describes the medical monitoring program that Anchor QEA field personnel must comply with when working on sites where there is a potential for exposure to hazardous wastes or other hazardous substances.

13.1 General Requirements

Anchor QEA employees shall be enrolled in a medical monitoring program in compliance with OSHA standards (29 CFR 1910.120(f)) under the following circumstances:

- If they are involved with any of the following operations:
  - *Cleanup operations* required by a governmental body, whether federal, state, local, or other involving hazardous substances that are conducted at uncontrolled hazardous waste sites (including, but not limited to, the EPA's National Priority List [NPL] sites, state priority list sites, sites recommended for the EPA NPL, and initial investigation of government-identified sites that are conducted before the presence or absence of hazardous substances has been ascertained)
  - *Corrective actions* involving cleanup operations at sites covered by the Resource Conservation and Recovery Act of 1976 (RCRA) as amended (42 United States Code 6901 et seq)
  - *Voluntary cleanup operations* at sites recognized by federal, state, local, or other governmental bodies as uncontrolled hazardous waste sites
  - *Operations involving hazardous wastes* that are conducted at treatment, storage, and disposal (TSD) facilities regulated by 40 CFR 264 and 40 CFR 265 pursuant to RCRA or by agencies under agreement with the EPA to implement RCRA regulations
  - *Emergency response operations* for releases of, or substantial threats of releases of, hazardous substances without regard to the location of the hazard
- And, if they meet the following criteria:
  - Are or may be exposed to hazardous substances or health hazards at or above the established PEL, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more per year
- In addition, employees are required to be enrolled in the medical monitoring program if they meet any of the following conditions:
  - Wear a respirator for 30 days or more per year
  - Are injured, become ill, or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operations
  - Are members of a Hazardous Materials (HAZMAT) team

Anchor QEA employees required to be enrolled in a medical monitoring program under 29 CFR 1910.120(f) shall have medical examinations and consultations made available to them by Anchor QEA on the following schedule:

- Prior to assignment
- At least once every 12 months unless the attending physician believes a longer interval (not greater than biennially) is appropriate
- At termination of employment or reassignment to an area where the employee would not be covered if the employee has not had an examination within the last 6 months
- As soon as possible upon notification that the employee has developed signs or symptoms indicating possible overexposure to hazardous substances or health hazards, or that the employee has been injured or exposed above the PEL or published exposure levels in an emergency situation
- At more frequent times, if the examining physician determines that an increased frequency of examination is medically necessary

The content of medical examinations or consultations made available to employees shall be determined by the attending physician but shall include, at a minimum, a medical and work history with special emphasis on symptoms related to the handling of hazardous substances and health hazards, and to fitness for duty including the ability to wear any required PPE under conditions (i.e., temperature extremes) that may be expected at the work site.

The attending physician shall provide Anchor QEA with a written opinion for each examined employee that contains the following information:

- Whether the employee has any detected medical conditions that would place the employee at an increased risk of impairment of the employee's health from hazardous waste operations work, emergency response, or respirator use
- Any recommended limitations on the employee's assigned work
- A statement that the employee has been informed of the results of the medical examination and any medical conditions that require further examination or treatment

The written opinion obtained by Anchor QEA shall not reveal specific findings or diagnoses unrelated to occupational exposures. Medical monitoring and other employee-related medical records shall be retained for at least the duration of employment plus 30 years.

13.2 Team Self-Monitoring

All personnel will be instructed to look for and inform each other of any deleterious changes in their physical or mental condition during the performance of all field activities. Examples of such changes are as follows:

- Headaches
- Dizziness
- Nausea
- Blurred vision
- Cramps
- Irritation of eyes, skin, or respiratory system
- Skin chafing from damp or wet clothing
- Changes in complexion or skin color
- Changes in apparent motor coordination
- Increased frequency of minor mistakes
- Excessive salivation or changes in papillary response
- Changes in speech ability or speech pattern
- Symptoms of heat stress or heat exhaustion
- Symptoms of hypothermia

If any of these conditions develop, the affected person will be moved from the immediate work location and evaluated. If further assistance is needed, personnel at the local hospital will be notified, and an ambulance will be summoned if the condition is thought to be serious. If the condition is the result of sample collection or processing activities, procedures and/or PPE will be modified to address the problem.

Appendix A
Health and Safety Logs and Forms

Incident Report Form

Please immediately contact your manager when a work-related incident has occurred. It is your responsibility (or your manager's if you are not able) to contact Human Resources (HR) (Elizabeth Barnick) and Health and Safety (H&S) (Tim Shaner) ASAP when an incident happens.

This Incident Report is the first form you must complete when a work-related incident has occurred. Once completed, forward this form to the HR and H&S contacts listed above.

Incident Type: ☐ Injury ☐ Illness ☐ Near Miss ☐ Spill ☐ Fire ☐ Other ___________________________

Employees Involved in Incident

____

____

Was anyone injured? ☐ Yes ☐ No

(If **Yes**, complete **a** and **b** below)

a. Information Regarding Injured or Ill Employee

Full name: ______________________________

Street: ______________________________

City: ____________________ **State:** __________ **Zip:** __________

Date of birth: ____________________ **Sex:** __________

Date hired: ____________________ **Job title:** ____________________

b. Information about the Physician or Health Care Professional

Was medical treatment required? ☐ Yes ☐ No

First aid only: ☐ Yes ☐ No

Name of physician/health care professional: ______________________________

If treatment was given away from the worksite, where was it given?

Facility: ______________________________

Street: ______________________________

City: ____________________ **State:** __________ **Zip:** __________

Was employee treated in emergency room? ☐ Yes ☐ No

Was employee hospitalized overnight as an in-patient? ☐ Yes ☐ No

Did the employee miss a full day of work following the incident? ☐ Yes ☐ No

Date of last day worked: ______________________________

Date of return to work: ______________________________

Number of restricted days of work: ______________________________

Incident Report Form

Information about the Incident:

Date of incident: ______________________

Time of incident: ______________________

Location of incident: ______________________

Were there any witnesses? ☐ Yes ☐ No

Name and phone number of witness: ______________________

____

What was employee doing just before the incident occurred? Describe the activity, as well as the tools, equipment, or material the employee was using. Be specific (e.g., climbing a ladder while carrying roofing materials, spraying chlorine from hand sprayer, daily computer key-entry).

What happened? Tell us how the injury occurred (e.g., when ladder slipped on wet floor, worker fell 20 feet; worker was sprayed with chlorine when gasket broke during replacement; worker developed soreness in wrist over time).

Incident Report Form

If an injury or illness, what was it? Tell us the part of the body that was affected and how it was affected.

Employer Use Only:

Date Recorded in Incident Log: ____________________ **By:** ____________________

Investigation:

Date Investigation Started: ______________ **Date Investigation Concluded:** ______________

Investigation Team Leader and Title: ______________________________

Investigation Team Member Names and Titles:

Name	Title

Incident Report Form

Root Cause Determination (attach other sheets as necessary)

Any statements, photographs, sketches, or other documents should be attached to this document.

Corrective Actions: *Documentation supporting completion of corrective actions should be attached to this report.

Corrective Action	Person Responsible	Due Date	Completion Date	Completion Notes	Completed By

ANCHOR QEA

Daily Air Monitoring Record

Project Name: ____________________ **Date:** ____________________

Project Number: ____________________ **Location:** ____________________

Temperature: ____

Conditions: ____

____

____

____

COC	Instrument	S/N	Calibration Date	Calibration Gas/Method	Calibration by
Organic vapors					
Particulates					
O_2					
Other:					
Other:					
Other:					

Time	Location/Description	Organic Vapor (ppm)	O2%	CG %LEL	Other	Other

Notes:

Completed by:

Printed Name ____________________ Signature ____________________ Date ____________________

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Daily Safety Briefing Form

Date: ____________________

Project No: ____________________

Project Name: ____________________

Person Conducting Meeting: ____________________ **Health & Safety Officer:** ____________________ **Project Manager:** ____________________

TOPICS COVERED: *Highlighted topics are required*

- ☐ Emergency Procedures and Evacuation Route
- ☐ Directions to Hospital
- ☐ HASP Review and Location
- ☐ Safety Equipment Location
- ☐ Proper Safety Equipment Use
- ☐ Employee Right-to-Know/ SDS Location
- ☐ Fire Extinguisher Location
- ☐ Eye Wash Station Location
- ☐ Buddy System
- ☐ Self and Coworker Monitoring
- ☐ Lines of Authority
- ☐ Communication
- ☐ Site Security
- ☐ Vessel Safety Protocols
- ☐ Work Zones
- ☐ Vehicle Safety and Driving/ Road Conditions
- ☐ Equipment Safety and Operation
- ☐ Proper Use of PPE
- ☐ Decontamination Procedures
- ☐ Near Miss Reporting Procedures
- ☐ Lifting Techniques
- ☐ Slips, Trips, and Falls
- ☐ Hazard Exposure Routes
- ☐ Heat and Cold Stress
- ☐ Overhead and Underfoot Hazards
- ☐ Chemical Hazards
- ☐ Flammable Hazards
- ☐ Biological Hazards
- ☐ Eating/Drinking/Smoking
- ☐ Reviewed Prior Lessons Learned
- ☐ Field Team Medical Conditions for Emergency Purposes (Confidential): ____________________
- ☐ Other: ____________________

Weather Conditions: ____________________

Daily Work Scope: ____________________

Site-specific Hazards: ____________________

Safety Comments: ____________________

Attendees

Printed Name	Signature

End of Day Wellness Check

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Field Safety Equipment Checklist

The following is a list of safety-related gear that may be appropriate depending on the type of work being conducted. The purpose of this checklist is twofold: 1) ensure that all field crew members think about appropriate safety gear needs before heading to the worksite; and 2) provide an extensive list of gear to consider in order to serve as a reminder of potential safety gear needs during a field effort.

☐ **Safety Briefing Log or Notebook**

Personal Protective Gear

☐ Rain pants and jacket
☐ Hard hats
☐ Boots (steel-toed, if appropriate)
☐ Safety glasses
☐ Ear protection
☐ Nitrile gloves (inner and outer pair)
☐ Tyvek overalls
☐ H_2S sensor
☐ Flashlight
☐ EpiPen (inquire if any field staff use one)
☐ Other:

Warm Weather Safety Gear

☐ Sunscreen
☐ Water
☐ Hat
☐ Light clothes

Cold Weather Safety Gear

☐ Warm clothes (preferably synthetics)
☐ Hat
☐ Gloves
☐ Boot warmers
☐ Thermos of warm drink/soup

Communications

☐ Notify office staff of day's field plan
☐ Walkie Talkies
☐ Cell phones
☐ Satellite phone (if appropriate)
☐ Contact numbers (e.g., for other field crew members, the PM, or others to notify that you are accessing site)

General Gear for Work Near Water

☐ Life jacket
☐ Boots or waders (hip or chest)
☐ Throwline

Boat Safety Gear

U.S. Coast Guard Required Gear:
☐ 1. Personal flotation device (PFD), preferably life jacket, for each occupant
☐ 2. Fire extinguisher (filled to operable range)
☐ 3. Flares (unexpired)
☐ 4. Horn
☐ 5. Navigation lights

☐ First aid kit
☐ Bowline and stern line
☐ Anchor and anchor line
☐ Paddle
☐ Spare propeller and linchpin
☐ Appropriate personal protective gear (boots or waders) to step onto shore if necessary
☐ Drain plug (and spare)
☐ Boat fuel and oil
☐ Weather radio (if appropriate)
☐ Weather, tides, and currents forecasts
☐ Warm clothes/blanket in dry bag

Modification to Health and Safety Plan

Date: ______________________________

Project No: ______________________________

Project Name: ______________________________

Modification: ______________________________

____

____

____

____

Reason for Modification: ______________________________

____

____

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____

Site Personnel Briefed

Name: ______________________ **Date:** ______________

Name: ______________________ **Date:** ______________

Name: ______________________ **Date:** ______________

Name: ______________________ **Date:** ______________

Name: ______________________ **Date:** ______________

Name: ______________________ **Date:** ______________

Name: ______________________ **Date:** ______________

Name: ______________________ **Date:** ______________

Name: ______________________ **Date:** ______________

Name: ______________________ **Date:** ______________

Name: ______________________ **Date:** ______________

Approvals

Field Lead:	______________________	______________________	____________
	Printed Name	Signature	Date
Project Manager:	______________________	______________________	____________
	Printed Name	Signature	Date

PLAYING IT SAFE

ANCHOR QEA

Heat Stress Monitoring Record

Date: ______________________________

Project No: ______________________________

Project Name: ______________________________

Location: ______________________________

Employee Name	Monitoring Results												
	Initial Reading Time:	First Work Period Time:		Second Work Period Time:		Third Work Period Time:		Fourth Work Period Time:		Fifth Work Period Time:		Sixth Work Period Time:	
	WBGT (°F):	WBGT (°F):		WBGT (°F):		WBGT (°F):		WBGT (°F):		WBGT (°F):		WBGT (°F):	
	Air Temp (°F):	Air Temp (°F):		Air Temp (°F):		Air Temp (°F):		Air Temp (°F):		Air Temp (°F):		Air Temp (°F):	
	Initial Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:
	Initial H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:
	Initial Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:
	Initial H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:
	Initial Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:
	Initial H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:
	Initial Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:
	Initial H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:
	Initial Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:	Initial Temp:	Final Temp:
	Initial H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:	Initial H.R.:	Final H.R.:

Notes:

Completed by:

Printed Name ______________ Signature ______________ Date ______________

PLAYING IT SAFE

Utility Contact Prevention Checklist

NOTE: Utility mark-out requirements vary from state to state; consult state authorities before beginning work.

Purpose: This form is intended to help the Field Lead confirm that underground or overhead utilities are identified to the extent practicable and consistent with applicable regulations **PRIOR** to site work.

INVESTIGATIONS MUST NOT OCCUR UNTIL MULTIPLE LINES OF EVIDENCE INDICATE THAT SUBSURFACE OR OVERHEAD UTILITIES ARE NOT PRESENT IN THE WORK AREA

Project Name/No: ______________________ **Date:** ______________________

Field Lead: ______________________ **Project Address:** ______________________

Project Manager: ______________________ **Health & Safety Officer:** ______________________

Emergency Contact Information for One Call: ______________________

Duration/Summary of Work to be Performed: ______________________

____

____

Consideration	Check		Explanation	Initial
Has the state One Call been contacted?	☐ Yes	☐ No		
Has the property owner or client been contacted for local knowledge of utilities, as applicable?	☐ Yes	☐ No		
Does the property owner or client have specific utility contact prevention procedures and, if so, have they been completed?	☐ Yes	☐ No		
Are any as-built drawings available? If so, do they show any utilities?	☐ Yes	☐ No		
Has a visual inspection of the work area(s) been completed?	☐ Yes	☐ No		
Has the potential presence of in-water utilities been assessed (shore markers, streets dead-ending at water's edge, etc.)	☐ Yes	☐ No		
Is evidence of electrical utilities present? (electric meters on structures, conduits, overhead lines, light poles, etc.)	☐ Yes	☐ No		
Is evidence of water/sewer utilities present? (water meter, hydrants, restrooms, grates in ground, etc.)	☐ Yes	☐ No		
Is evidence of telecommunications utilities present? (fiber optic warning signs, conduits from utility poles, wall-mounted boxes, etc.)	☐ Yes	☐ No		
Is other evidence of utilities present? (unknown ground markings, manholes or valve covers, "Call Before You Dig" signs, linear asphalt or concrete repair characteristics, liner subsidence of ground surface, pin flags or stakes, etc.)	☐ Yes	☐ No		

Utility Contact Prevention Checklist

NOTE: Utility mark-out requirements vary from state to state; consult state authorities before beginning work.

Consideration	Check		Explanation	Initial
Has a private locating service been contacted?	☐ Yes	☐ No		
Were any utilities identified and marked out through a private locating service? If so, duplicate mark-outs on site drawings.	☐ Yes	☐ No		
Are there any fiber optic cables, fuel lines, or high-pressure lines within 50 feet of work locations?	☐ Yes	☐ No		
If fiber optic cables, fuel lines, or high-pressure lines are within 50 feet, has an agreement with the utility owner been established?	☐ Yes	☐ No		
Can a test borehole be advanced by hand digging, probing, post-hole digging, and/or air knifing to 5 feet below ground surface (bgs)?	☐ Yes	☐ No		
If hand digging, probing, post-hole digging, and/or air knifing to 5 feet bgs is not possible, can a non-invasive geophysical investigation be conducted? If not, why?	☐ Yes	☐ No		
Other considerations:				

NOTE: Please fill in second page and attach additional reports, drawings, or other information, as necessary.

Confirmation Number: ____________________

Contact Name: ____________________ **Organization:** ____________________

Contact Date: ____________________ **Contact Time:** ____________________

Response: ____________________

____

____

____

Completed by:

Printed Name ____________________ Signature ____________________ Date ____________________

Contractor:

Printed Name ____________________ Signature ____________________ Date ____________________

Appendix B
Job Safety Analysis (JSA) Documents

Job Safety Analysis

Field Activities

Project Name: Syracuse Bread Factory	Project Number: TBD	JSA Number: 001	Issue Date: 05/17/2022
Location: Syracuse, N.Y.	**Contractor:** Anchor QEA Engineering, PLLC	**Analysis by:** Delaney Inman	**Analysis Date:** 3/19/2021
Work Operation: Field activities	**Superintendent/Competent Person:** Matthew Cavas, P.G.	**Revised by:**	**Revised Date:**
Required Personal Protective Equipment (PPE): • Modified Level D—Long pants, long sleeves, and/or Tyvek coveralls if handling potentially contaminated media, and steel-toed footwear conforming to ASTM International (ASTM) F2412-05/ASTM F2413-05 • Depending on activity, the following PPE may also be required: safety glasses/splash goggles, hard hat, nitrile outer gloves and latex inner gloves, and, if boating, U.S. Coast Guard-approved personal flotation device (PFD; see cold stress section for cold-weather PFD information)		**Reviewed by:** **Approved by:**	**Reviewed Date:** **Approved Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
If boating		• Follow the Job Safety Analysis (JSA) for boating activities.	
Outdoor, physical activity	Slips, trips, and falls	• Avoid walking while writing or texting—maintain a heads-up posture. • Be aware of potentially slippery surfaces and tripping hazards. Use handrails where available. Wear footwear that has sufficient traction. • Maintain good housekeeping practices. Clean up all spills immediately. • Be aware of weather effects on the work area, including wet and/or frozen ground. • Jumping, running, and horseplay are prohibited. • Keep all areas clean and free of debris to prevent any trips and falls. • Be aware of and limit loose clothing or untied shoelaces that may contribute to slips, trip, and falls. • Notify the field team members of any unsafe conditions.	• Routinely inspect work area for unsafe conditions.

Job Safety Analysis

Field Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Outdoor, physical activity (continued)	Heat stress	• Adjust work schedules, as necessary, to avoid the hottest part of the day. • Take rest breaks as warranted. • Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. • Maintain body fluids at normal levels. • Train workers to recognize the symptoms of heat-related illness.	• Review weather forecast prior to field work. • Monitor workers' physical conditions. • Monitor outside temperature versus worker activity.
	Cold stress	• Provide shelter (enclosed, heated environment) to protect personnel during rest periods. • Educate workers to recognize the symptoms of frostbite and hypothermia. • Use appropriate cold-weather gear, up to and including Mustang-type bib coveralls or jacket/bib combinations. • Consider additional precautions if working near water in cold weather. • Have a dry change of clothing available. • Train workers to recognize the symptoms of cold-related illness.	• Review weather forecast prior to field work. • Monitor workers' physical conditions and PPE. • Monitor outside and water temperature versus worker activity and PPE.
	Rain or snow	• Wear appropriate PPE (rain gear). • Be aware of slip hazards, puddles, and electrical hazards when working in wet conditions. • If extremely cold conditions are forecast, consider additional precautions or postponing work activity.	• Review weather forecast prior to field work. • Inspect PPE daily prior to use. • Routinely inspect work area for deteriorating conditions.
	Sunshine	• Have sunscreen available for ultraviolet protection. • Have abundant water available to prevent dehydration. • Consider wearing wide-brimmed headwear and light-colored, lightweight, sun-blocking clothing.	• Ensure that sunscreen and water are available.
	Lightning	• Do not begin or continue work until lightning subsides for at least 30 minutes. Disconnect and do not use or touch electronic equipment. • Immediately head for shore if on the water and lightning is observed. If not able to get to shore, disconnect and do not use or touch the major electronic equipment, including the radio, throughout the duration of the storm.	• Obtain weather forecast and updates as needed.

Job Safety Analysis

Field Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Outdoor, physical activity (continued)	High winds	• Wear goggles or safety glasses if dust or debris are visible.	• Review weather forecast prior to field work. • Ensure that goggles or safety glasses are available.
	Biological hazards (flora [e.g., poison ivy and poison oak] and fauna [e.g., ticks, bees, spiders, mosquitoes, and snakes])	• Be aware of likely biological hazards in the work area. • Wear appropriate clothing (i.e., hat, long-sleeve shirt, long pants, leather gloves, boots, and Tyvek coveralls, as appropriate), and apply insect repellant. • Wear hand and arm protection when clearing plants or debris from the work area. • Be aware of potential wildlife and defensive behavior (e.g., nesting birds, or animals with young).	• Ensure that insect repellent is available. • Inspect clothing and skin for insects (e.g., ticks) after working in insect-prone areas.
	Noise exposure	• Wear hearing protection in high noise environments or when working around heavy machinery or equipment (action level of 85 decibels averaged over an 8-hour day).	• Ensure that hearing protection is available.

Training Requirements:

- All personnel working on hazardous waste sites must receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120(e), including but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings.
- Medical clearance must be received on an annual basis as required by 29 CFR 1910.120(f).
- If boating is involved, and a professional captained vessel is not in use, boat operators must take the appropriate state or provincial boater safety courses.
- All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during their daily safety meeting.

Job Safety Analysis

Decontamination Activities

Project Name: Syracuse Bread Factory	Project Number: TBD	JSA Number: 002	Issue Date: 5/17/2022
Location: Syracuse, N.Y.	**Contractor:** Anchor QEA Engineering, PLLC	**Analysis by:** Matthew Cavas, PG	**Analysis Date:** 5/16/2022
Work Operation: Decontamination activities	**Superintendent/Competent Person:** Matthew Cavas, PG	**Revised by:**	**Revised Date:**
Required Personal Protective Equipment (PPE): • High-visibility safety vest • Hard hat where overhead hazards and/or heavy equipment are present • U.S. Coast Guard-approved personal flotation device (PFD), if boating (see cold stress section for cold-weather PFD information)		**Reviewed by:**	**Reviewed Date:**
		Approved by:	**Approved Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
If boating		• Follow the Job Safety Analysis (JSA) for boating activities.	
Decontamination area set up	Vehicle, heavy equipment traffic, or boat traffic in work area	• Wear high-visibility safety vest and hard hat PPE. • Be alert when working around heavy equipment and/or other boats, especially if wearing hearing protection.	• Ensure that safety vests are available for staff and visitors.
	Muscle strain or injuries from improper lifting	• Use proper lifting techniques or ask for assistance with heavy objects. • If boating, avoid carrying objects directly onto or off of the boat; rather, load/unload objects while on the boat to/from the pier/shore.	• Evaluate weight and center of gravity of heavier items prior to lifting or moving.
	Biological hazards (flora [e.g., poison ivy, and poison oak] and fauna [e.g., ticks, bees, spiders, mosquitoes, and snakes])	• Be aware of likely biological hazards in the work area. • Wear appropriate clothing (i.e., hat, long-sleeve shirt, long pants, leather gloves, boots, and Tyvek coveralls, as appropriate), and apply insect repellent. • Wear hand and arm protection when clearing plants or debris from the work area.	• Ensure that insect repellent is available. • Inspect clothing and skin for insects (e.g., ticks) after working in insect-prone areas.

Job Safety Analysis

Decontamination Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Decontamination activities	Injury from hand and power tool operation (e.g., spatula or drill)	• Be aware of sharp edges on hand tools (e.g., spatulas, knives, drill bits, and saw blades). • Be aware of electrical connections and water hazards when working with electric- or battery-operated tools. • Ensure that all tools are working properly; repair or replace defective tools. Repair when unplugged and off. • Keep guards on power tools when not in use.	• Inspect tools to ensure that they are in good working order. • Inspect electrical connections (if applicable). • Inspect tools periodically to ensure dry and clean operation.
	Noise exposure	• Wear hearing protection in high noise environments or when working around heavy machinery or equipment (action level of 85 decibels averaged over an 8-hour day).	• Ensure that hearing protection is available.
	Slips, trips, and falls	• Avoid walking while writing or texting—maintain a heads-up posture. • Be aware of potentially slippery surfaces and tripping hazards. Use handrails where available. Wear footwear that has sufficient traction. • Maintain good housekeeping practices. Clean up all spills immediately. • Be aware of weather effects on the work area, including wet and/or frozen ground. • Jumping, running, and horseplay are prohibited. • Keep all areas clean and free of debris to prevent any trips and falls. • Notify the field team members of any unsafe conditions.	• Routinely inspect work area for unsafe conditions.
	Ingestion of contaminants or decontamination fluids, or skin or eye contact with contaminants or decontamination fluids	• Wear appropriate PPE to prevent/reduce exposure. • Contact 911, as necessary; perform CPR if breathing stops. • Move exposed person away from source of contamination, and rinse mouth. If exposure to skin occurs, promptly wash contaminated skin using soap or mild detergent and water. Rinse eyes with large amounts of water. • Follow decontamination procedures as outlined in the Health and Safety Plan (HASP).	• Ensure that decontamination procedures are on hand and are reviewed. • Ensure that PPE and rinsing water are available.
Working outdoors	Heat stress	• Adjust work schedules, as necessary, to avoid the hottest part of the day. • Take rest breaks as warranted. • Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods. • Maintain body fluids at normal levels. • Train workers to recognize the symptoms of heat-related illness.	• Review weather forecast prior to field work. • Monitor workers' physical conditions. • Monitor outside temperature versus worker activity.

Job Safety Analysis

Decontamination Activities

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Working outdoors (continued)	Cold stress	• Provide shelter (enclosed, heated environment) to protect personnel during rest periods. • Educate workers to recognize the symptoms of frostbite and hypothermia. • Use appropriate cold-weather gear, up to and including Mustang-type bib coveralls or jacket/bib combinations. • Consider additional precautions if working near water in cold weather. • Have a dry change of clothing available. • Train workers to recognize the symptoms of cold-related illness.	• Review weather forecast prior to field work. • Monitor workers' physical conditions and PPE. • Monitor outside and water temperature versus worker activity and PPE.
	Rain or snow	• Wear appropriate PPE (rain gear). • Be aware of slip hazards, puddles, and electrical hazards when working in wet conditions. • If extremely cold conditions are forecast, consider additional precautions or postponing work activity.	• Review weather forecast prior to field work. • Inspect PPE daily prior to use. • Routinely inspect work area for deteriorating conditions.
	Sunshine	• Have sunscreen available for ultraviolet protection. • Have abundant water available to prevent dehydration. • Consider wearing wide-brimmed headwear and light-colored, lightweight, sun-blocking clothing.	• Ensure that sunscreen and water are available.
	Lightning	• Do not begin or continue work until lightning subsides for at least 30 minutes. Disconnect and do not use or touch electronic equipment.	• Obtain weather forecast and updates as needed.
	High winds	• Wear goggles or safety glasses if dust or debris are visible.	• Review weather forecast prior to field work. • Ensure that goggles or safety glasses are available.

Training Requirements:

- All personnel working on hazardous waste sites must receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120(e), including but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings.
- Medical clearance must be received on an annual basis as required by 29 CFR 1910.120(f).

Decontamination Activities

- If boating is involved, and a professional captained vessel is not in use, boat operators must take the appropriate state or provincial boater safety courses.
- All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during their daily safety meeting.

Job Safety Analysis

Anchor QEA Motor Vehicle Operation

Project Name: Syracuse Bread Factory	Project Number: TBD	JSA Number: 003	Issue Date: April 14, 2015
Location: Syracuse, N.Y.	**Contractor:** Anchor QEA Engineering, PLLC	**Analysis by:** David Gillingham	**Analysis Date:** April 9, 2015
Work Operation: Anchor QEA motor vehicle operation	**Superintendent/Competent Person:** Vehicle Driver	**Revised by:** Christopher R. Torell PG, CSP	**Revised Date:** April 13, 2015
Required Personal Protective Equipment (PPE): • Wear seat belt at all times • Make sure that clothing will not interfere with driving		**Reviewed by:** David Gillingham	**Reviewed Date:** April 13, 2015
		Approved by: Christopher R. Torell PG, CSP	**Approved Date:** April 14, 2015

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Anchor QEA motor vehicle operation	Unfamiliar with the vehicle	• Allow yourself some time to get familiar with an Anchor QEA vehicle, a rental vehicle, or one not used often. • Test the lights, windshield wipers, hazard lights, horn, parking brake, and other important functions. • Review the dashboard controls, steering radius, and overhead and side clearances. • Allow extra side, front, and back space around the vehicle while driving or parking an unfamiliar vehicle. • Adjust mirrors and the seat while the vehicle is in park. • Drive slowly in confined locations, as in a parking garage, parking lots, or industrial settings. Confirm adequate clearances by sight before turning or backing up in tight or unfamiliar locations. • Use a second person to be a spotter outside the vehicle if needed in tight spaces.	• Inspect fluid levels and air pressure in tires, adjust mirrors and seat positions appropriately, monitor the fuel level, and fill up when the fuel level is low
	Speed and braking	• Fasten and properly adjust the seat belt. • Obey all posted and designated speed limits. • Radar detectors are prohibited in all company-owned, leased, or rented vehicles. • Reduce travel speed during hazardous conditions (e.g., rain, fog, or snow). • Identify whether your vehicle has Anti-Lock Brakes (ABS). If it does, DO NOT pump the brakes to stop when the vehicle has begun to skid. Apply steady pressure to the brakes. If the vehicle does not have ABS, pump the brakes to stop during slippery conditions.	• Seatbelt • Identify designated speed limits • Determine if vehicle has ABS

Job Safety Analysis

Anchor QEA Motor Vehicle Operation

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Anchor QEA motor vehicle operation (continued)	Distance spacing	• Continually check your rear and side view mirrors. • Use the 3-second rule to keep a safe distance between vehicles. • Increase the 3-second rule as necessary during hazardous travel conditions. • Regularly scan the area you will be entering in the next 10 to 12 seconds. • Always leave yourself an “out” during travel. • When stopping, make sure that you leave enough distance between you and the car in front of you. You should be able to see the rear tires of the vehicle in front when stopped. • Obey the speed limit and traffic regulations. • When at a red light and it turns green, use the “delayed start” technique, by counting to three before you take your foot off the brake. • DO NOT TAILGATE. • Keep headlights (and running lights, if available) on for maximum visibility.	• Seatbelt
	Skids	• If the vehicle has begun to skid out of control, turn the steering wheel in the direction of the skid and re-adjust the wheel, as necessary. • Reduce speed during hazardous travel conditions. • Use 4-wheel drive, if available, when driving vehicles off-road, on steep inclines, or in muddy conditions. • Do not take vehicles off-road if they cannot be operated safely in such conditions.	• Seatbelt
	Blind spots	• Become familiar with any blind spots associated with your vehicle. • Adjust mirrors to give the maximum viewing area. • Use your directional devices to signal all turns and when changing lanes; check rear and side view mirror and glance over your shoulder to check that the lane is clear. • Avoid other driver’s blind spots; slow down and let the other vehicle pass. • If parked for an extended period and staying in the vehicle, be sure to inspect the area for changed conditions (e.g., a car that moved in behind you) before leaving.	• Seatbelt • Mirrors
	Backing	• Back into parking spaces upon arrival whenever possible. • Perform a 360-degree walk around the vehicle before backing to identify any new conditions or obstructions. • Use a spotter when backing whenever possible. • Understand hand signals. • Sound the horn prior to backing. • Check the rear and side view mirrors prior to backing. • Back slowly in areas of obstructed vision. • Anticipate others who may be backing out into your pathway and adjust accordingly.	• Seatbelt • Mirrors

Job Safety Analysis

Anchor QEA Motor Vehicle Operation

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Anchor QEA motor vehicle operation (continued)	Distractions (e.g., cell phones, reading maps or directions, eating)	• Do not engage in distracted driving—focus on operating the vehicle, and on your surroundings (e.g., road conditions and other drivers). • Obey state or local laws regarding cell phone use, at a minimum. • Certain clients prohibit cell phone use regardless of the state you are operating in—know your client's policy. • Use hands-free devices (not hand-held cellular phones) while driving. • Pull over to the side of the road when making a call or checking directions.	• Seatbelt • Hands-free devices connected and ready for use
	Accidents	• In the event of an accident, use the following procedures: – Stop, call for medical assistance, notify police, and complete an accident report and submit it to your supervisor. – Notify the Project Manager (PM) and Field Lead (FL). – Complete the appropriate incident investigation reports. – Contact Sara Weiskotten, Operations Liaison, at (857) 445-4987. – Contact Diana Reynolds, Insurance Liaison, at (302) 236-8403.	• Seatbelt
	Influenced by drugs or alcohol	• NEVER DRIVE UNDER THE INFLUENCE OF DRUGS OR ALCOHOL. • Keep in mind that the person in another vehicle may be under the influence of controlled substances, and be prepared for erratic or sudden driving changes on their part.	• Seatbelt
	Driver attitude	• Do not operate any vehicle when abnormally tired, temporarily disabled (i.e., injured), or under the influence of drugs or alcohol. • Keep an even temper when driving. Do not let the actions of others affect your attitude. • Do not allow yourself to become frustrated, rushed, distracted, or drowsy.	• Seatbelt
	Fatigue	• Stop and rest if fatigued. Exit the road and enter a safe area. Rest until fully refreshed. • Be aware that certain medications (such as cold or allergy medicines) may make you drowsy when driving a vehicle.	• Seatbelt
	Vehicle loading	• DO NOT OVERLOAD the vehicle. • Secure all equipment and supplies within the body of the vehicle using proper tie-downs. • Do not block side view mirrors with the load. • Do not transport U.S. Department of Transportation (DOT)-manifested hazardous materials. • Dispatch all equipment and personnel with proper forms and identification.	• Seatbelt

Job Safety Analysis

Anchor QEA Motor Vehicle Operation

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Anchor QEA motor vehicle operation (continued)	Equipment failure	• Perform daily inspections of your vehicle. • Maintain vehicle safety equipment (e.g., mirrors, alarms, horns, wipers, lights, and brakes). • Maintain the vehicle (e.g., tire pressure and fluid levels). • Any vehicle with mechanical defects that may endanger the safety of the driver, passengers, or the public shall not be used. • Ensure that appropriate safety equipment is in the vehicle. Safety equipment should include a spare tire, jack, first-aid kit, fire extinguisher, and flashlight. Flares and/or reflective triangles should be available in larger trucks. • Ensure that the proper documentation is in the vehicle. Documentation should include an operations manual for the vehicle, insurance card, vehicle registration, and accident forms.	• Inspect and maintain the vehicle

Training Requirements:

- All drivers are required to have a valid driver's license, and all vehicles must have appropriate state vehicle registration and inspection stickers. The use of hand-held wireless devices is prohibited while driving any vehicle for business use at any time, for personal use during business hours, and as defined by law.
- **If operating a vehicle or vehicle and trailer with a capacity greater than 10,000 pounds, U.S. Department of Transportation regulations may apply. Contact the PM prior to any travel in this configuration.**
- All assigned employees are required to read, familiarize themselves with the contents of this Job Safety Analysis, and sign the signature page before the operation of an Anchor QEA vehicle, and review it with their supervisor during their daily safety meeting.
- All assigned employees are required to enroll and complete the Smith System Virtual Driving training programs (*Distracted Driving* and *Small Vehicle Forward - Five Keys to Safe Driving*) prior to driving an Anchor QEA vehicle.

Job Safety Analysis

Anchor QEA Motor Vehicle Operation

Vehicle Operation Job Safety Analysis Acknowledgement Form

The Anchor QEA Motor Vehicle Operation Job Safety Analysis must be read, understood, and signed before the operation of any Anchor QEA vehicle. My signature below certifies that I have read and understand the procedures presented in the Anchor QEA Motor Vehicle Operation Job Safety Analysis and have completed the Smith System Virtual Driving *Distracted Driving* and *Small Vehicle Forward - Five Keys to Safe Driving* training programs.

Date	Name (print)	Signature

Job Safety Analysis

Anchor QEA Motor Vehicle Operation

Date	Name (print)	Signature

Job Safety Analysis

Sample and Laboratory Glassware Handling

Project Name: Syracuse Bread Factory	**Project Number:** TBD	**JSA Number:** 004	**Issue Date:** 5/17/2022
Location: Syracuse, N.Y.	**Contractor:** Anchor QEA Engineering, PLLC	**Analysis by:** Matthew Cavas, PG	**Analysis Date:** 5/16/2022
Work Operation: Sample and laboratory glassware handling	**Superintendent/Competent Person:** Matthew Cavas, PG	**Revised by:**	**Revised Date:**
Required Personal Protective Equipment (PPE): • Modified Level D—Long pants, long sleeves, and/or Tyvek coveralls if handling potentially contaminated media, and steel-toed footwear conforming to ASTM International (ASTM) F2412-05/ASTM F2413-05 • Depending on activity, the following PPE may also be required: safety glasses/splash goggles, hard hat, nitrile outer gloves and latex inner gloves, and, if boating, U.S. Coast Guard-approved personal flotation device (PFD)		**Reviewed by:** **Approved by:**	**Reviewed Date:** **Approved Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Transporting and using glassware	Breakage of containers during field activities	• Use appropriately sized tubs or bottle carriers with dividers to prevent bottle-to-bottle contact during transport. • Consider using coated glassware, if practicable. • Carry oversize bottles in tubs or bottle carriers using both hands during transfer to the sampling vessel and whenever the vessel is underway.	• Ensure dividers are sufficient and will remain in place during transport.
	Faulty glassware	• Replace any glassware that is chipped, nicked, or cracked.	• Inspect glassware before use.
	Impact with equipment and other objects	• Use care when loading and unloading sampling equipment. • Minimize the handling of individual containers to the extent possible.	
Filling sample containers	Over-tightening of bottle lids causing breakage	• Avoid use of excessive force to tighten bottle caps (i.e., finger tight). • Secure lids with clear tape to prevent opening during transport.	
	Breakage during sample collection	• Place containers in plastic tubs between aliquots to limit contact with hard surfaces. • Place containers on a stable and non-slip surface during collection. • Use the buddy system as needed to hold bottles during filling.	

Job Safety Analysis

Sample and Laboratory Glassware Handling

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Filling sample containers (continued)	Contact with sample preservatives (generally HCL or H_2SO_4 to lower pH to less than 2)	• Wear nitrile gloves and protective eyewear to prevent skin and eye contact if a container is damaged. • Do not open preserved bottles until necessary.	
Packing samples for shipment	Breakage during packing and shipment	• Use bottle wraps, foam sleeves, or bubble wrap to prevent bottle contact in the cooler. • Pack coolers snugly, but do not over pack.	• Ensure glass bottles do not touch to minimize potential breakage during transport.

Training Requirements:

- All personnel working on hazardous waste sites must receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120(e), including, but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings.
- Medical clearance must be received on an annual basis as required by 29 CFR 1910.120(f).
- All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during their daily safety meeting.

Job Safety Analysis

Investigation-derived Waste Management

Project Name: Syracuse Bread Factory	**Project Number:** TBD	**JSA Number:** 005	**Issue Date:** 5/17/2022
Location: Syracuse, N.Y.	**Contractor:** Anchor QEA Engineering, PLLC	**Analysis by:** Matthew Cavas, PG	**Analysis Date:** 5/16/2022
Work Operation: Investigation-derived waste management	**Superintendent/Competent Person:** Matthew Cavas, PG	**Revised by:**	**Revised Date:**
Required Personal Protective Equipment (PPE): • Modified Level D—Long pants, long sleeves, and/or Tyvek coveralls if handling potentially contaminated media, and steel-toed footwear conforming to ASTM International (ASTM) F2412-05/ASTM F2413-05 • Depending on activity, the following PPE may also be required: safety glasses/splash goggles, hard hat, nitrile outer gloves and latex inner gloves, and, if boating, U.S. Coast Guard-approved personal flotation device (PFD).		**Reviewed by:**	**Reviewed Date:**
		Approved by:	**Approved Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Containerizing investigation-derived waste (IDW) at the source	Lifting	• Use care when lifting to redistribute IDW from one container (e.g., drums and buckets) to another at the source. • Seek assistance if loads are too heavy, or if you are experiencing fatigue. • Fill containers only to the degree that will be manageable in the future (e.g., half full) and to limit weight.	• Inspect containers for competency (i.e., no cracks, and handles in good repair).
	Pinch points	• Wear hand protection when closing containers. • Use the buddy system when affixing drum rings.	• Inspect drums for rust or sharp edges prior to opening or closing.
Relocating or staging IDW containers	Lifting	• Use task-specific tools whenever possible to move full containers (i.e., hoists, drum caddies or dollies, and vehicles). • When task-specific tools are not available, use the buddy system to move containers that are reasonable to lift. • Never roll drums or containers holding IDW. • Stage containers in areas protected from heavy traffic and weather, if possible.	• Ensure tools are in good repair. • Assess IDW container weight prior to moving.

Job Safety Analysis

Investigation-derived Waste Management

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements
Relocating or staging IDW containers (continued)	Pinch points or crushing	• Use tools to achieve the final arrangement when staging containers—do not place hands on the edges of containers while moving them into place. • Stand well clear of containers being moved in case they become dislodged from their handling tool during transport. • Do not stack IDW containers, as this poses a risk for container toppling and damage. • Place containers on a wooden pallet for easy transfer using a pallet jack, if possible.	• Inspect drums for evidence of cracks or rust.
IDW management – general	Splash	• Wear the required PPE at all times. • Use care to minimize splashing or smearing of IDW during handling and containerization.	• Inspect PPE upon donning and periodically during tasks.

Training Requirements:

- All personnel working on hazardous waste sites must receive appropriate training as required by 29 Code of Federal Regulations (CFR) 1910.120(e), including but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings.
- Medical clearance must be received on an annual basis as required by 29 CFR 1910.120(f).
- All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during their daily safety meeting.

Job Safety Analysis

Soil Excavations and Earthworks

Project Name: Syracuse Bread Factory	**Project Number:** TBD	**JSA Number:** 006	**Issue Date:** 5/17/2022
Location: Syracuse, N.Y.	**Contractor:** Anchor QEA Engineering, PLLC	**Analysis by:** Matthew Cavas, PG	**Analysis Date:** 5/16/2022
Work Operation: Soil Excavations and Earthworks	**Superintendent/Competent Person:** Matthew Cavas, PG	**Revised by:**	**Revised Date:**
Buddy System Requirements (please indicate which of the following applies to the daily task): ☑ Buddy system operation—Two personnel must be within visual line of sight, and in contact either verbally or via VHF radio with phone-connect ☑ Two people on site—Requires the use of VHF radio with phone-connect, and possibly use of lone-worker device ☐ Lone worker operation—Requires use of VHF radio with phone-connect, and lone-worker device **Required Personal Protective Equipment (PPE):** • Hard Hat • Safety glasses • Steel-toed boots • Hearing protection (as needed) • High-visibility clothing • Photo ionization detector (PID; calibrated daily in accordance with manufacturer's specification; to be documented in accordance with current site HASP)		**Reviewed by:** **Approved by:**	**Reviewed Date:** **Approved Date:**

Work Activity	Potential Hazards	Preventive or Corrective Measures	Observation/Inspection Requirements
Health and Safety Tailgate Meeting	General	• Park the vehicle in a safe area where everyone can participate. Review the HASP, especially chemical and site hazards, JSAs, work activities, access and egress, facility rules if applicable, and site-specific hospital/emergency care. Determine operation of other workers on site. Discuss any new or unknown hazard. • Follow all safety procedures required by the excavating contractor.	
Inspect Equipment	Mechanical Hazards	• Confirm that equipment is in proper working order. • Always use appropriate PPE (see PPE requirements above).	• Inspect equipment before every use. Specific inspection checklist may apply.

Job Safety Analysis

Soil Excavations and Earthworks

Work Activity	Potential Hazards	Preventive or Corrective Measures	Observation/Inspection Requirements
Review Site Conditions	Slips, Trips, and Falls	• Ensure excavation areas are free of trip hazards. Be aware of wet and muddy conditions. Remove hazards if possible. Plan foot paths and routes.	
	Unexploded Ordinance (UXO) clearance	• Prior to work commencing, a UXO inspection must be performed by a trained Anchor QEA staff member.	
	Biological Hazards	• Identify any poisonous plants common to the area. Be aware of snakes, bees, ants, and other stinging insects.	
	Utility/Cap Damage	• Prior to ground disturbance, verify the location of known and suspected utilities. (When applicable, One-Call should already have been called and public utilities should be fully marked.) Be observant of pavement repairs indicative of utilities. If possible, request that the client verify the absence of utilities for all excavation locations. If it appears that a utility has not been marked, contact the site project manager (PM). Be conscious of the depth of the landfill cap and keep excavation at a maximum depth of 6 inches. Stop work if it is suspected that the cap has been penetrated.	
Set Up Work Area	Traffic Hazards	• If in a trafficked area, secure the work area with reflective cones and park in a safe area.	• Routinely inspect work area for unsafe conditions.
	Slips, Trips, and Falls	• Set up working area with clear walking paths, devoid of tripping hazards.	
	Ergonomic Hazards	• Use proper lifting technique when unloading equipment: Lift with legs, and avoiding twisting or over-reaching while lifting. • Use two or more people to lift when necessary. • Wear work gloves to avoid hand injuries.	• Routinely inspect work area for unsafe conditions.
Excavate/Move Soils	Personal Injury Struck-By	• Beware of proximity to operating equipment. Establish exclusion zones and discuss ways of communication between personnel in the field and equipment operators. If available, use two-way radios. • Beware of proximity to open excavations and trenches. • Request that the operator point out all of the pinch points on the excavator. • Maintain spill kit (for the excavator), fire extinguisher, and first aid kit in case of emergencies.	• Routinely inspect work area for unsafe conditions.

Job Safety Analysis

Soil Excavations and Earthworks

Work Activity	Potential Hazards	Preventive or Corrective Measures	Observation/Inspection Requirements
	Utility Damage	• If additional utilities are discovered, stop work immediately and contact the PM.	• Routinely inspect work area for unsafe conditions.
	Trenching	• The depth of the trench shall be kept at 36 inches or less unless the slopes are laid back at a maximum 2:1 slope. A Competent Person in excavation shall evaluate the weather, soil, and work in progress to determine if a hazard related to trench collapse is possible. • Spoil pile will be at least 4 feet from the edge of the excavation. If soil is not suitable to be used for backfill, it will be immediately removed from site and hauled to a designated area.	• Keep heavy equipment away from trench edges. • Inspect trenches daily and following rainfall. • Provide safe egress. • Use approved shoring methods when required. • Follow all OSHA requirements related to trenching and excavation safety.
	Driving	• When driving vehicles or heavy equipment on site, care should be taken to avoid getting stuck in soft soils. Stay on designated roads whenever possible. If not possible, take paths to avoid wet or soft soils. Work may need to be postponed until conditions are dry.	
	Slips, Trips, and Falls	• Ensure tools and equipment are stored neatly, and that the excavation is properly cordoned off and flagged.	• Routinely inspect work area for unsafe conditions.
Excavate/Move Soils (continued)	Heavy Machinery	• Establish non-audible communication methods when working around heavy machinery. • Use caution when approaching heavy machinery or personnel near heavy machinery. • Ensure that parked heavy equipment and field vehicles have emergency brake engaged and chocked if parked on slopes. • Workers shall not be within the swing radius of heavy equipment unless absolutely necessary. If necessary, the operator shall be informed prior to entering the swing radius. • Care should be taken to avoid damage to hydraulic lines. If hydraulic lines are damaged, equipment shall be turned off and repairs shall be made.	• Establish an "exclusion zone" where personnel are out of reach of heavy machinery. • Inspect hydraulic lines daily.
	Chemical Hazards	• Wear PPE including safety glasses and nitrile gloves. • Decontaminate equipment between excavation locations if waste is encountered.	

Job Safety Analysis

Soil Excavations and Earthworks

Work Activity	Potential Hazards	Preventive or Corrective Measures	Observation/Inspection Requirements
	Hearing Damage	• Wear ear plugs or earmuffs when in the vicinity of heavy equipment.	
	Inhalation Hazards	• Wet ground if necessary, to prevent airborne dust.	
Outdoor, Physical Activity	Rain/Snow	• Wear appropriate PPE (rain gear). • Be aware of slip hazards, puddles, and electrical hazards when working in wet conditions. • If extremely cold conditions are forecast, consider additional precautions or postponing work activity.	• Inspect PPE daily prior to use. • Routinely inspect work area for deteriorating conditions.
	Sunshine	• Have sunscreen available for ultraviolet protection. • Have abundant water available to prevent dehydration. • Consider wearing wide-brimmed headwear and light-colored, lightweight, sun-blocking clothing.	• Ensure that sunscreen and water are available.
	Lightning	• Do not begin or continue work until lightning subsides for at least 20 minutes. Disconnect and do not use or touch electronic equipment. • Immediately head for shore if on the water and lightning is observed. If not able to get to shore, disconnect and do not use or touch the major electronic equipment, including the radio, throughout the duration of the storm.	• Obtain weather forecast and updates as needed.
	High winds	• Wear goggles or safety glasses if dust or debris are visible.	• Ensure that goggles or safety glasses are available.
Outdoor, Physical Activity (continued)	Biological hazards (flora [e.g., poison ivy and poison oak] and fauna [e.g., ticks, bees, mosquitoes, and snakes])	• Be aware of likely biological hazards in the work area. • Wear appropriate clothing (i.e., hat, long-sleeve shirt, long pants, leather gloves, boots, and Tyvek coveralls, as appropriate), and apply insect repellant. • Wear hand and arm protection when clearing plants or debris from the work area. • Be aware of potential wildlife and defensive behavior (e.g., nesting birds, or deer with young).	• Ensure that insect repellent is available.
	Noise exposure	• Wear hearing protection in high noise environments or when working around heavy machinery or equipment (action level of 85 decibels averaged over an 8-hour day).	• Ensure that hearing protection is available.

Soil Excavations and Earthworks

Training Requirements:

- Per 29 Code of Federal Regulations (CFR) 1910.120(e), workers on site only occasionally for a specific limited task (such as, but not limited to, ground water monitoring, land surveying, or geophysical surveying) and who are unlikely to be exposed over permissible exposure limits and published exposure limits shall receive a minimum of 24 hours of instruction off the site, and the minimum of 1 day actual field experience under the direct supervision of a trained, experienced supervisor. All personnel working regularly on hazardous waste sites must receive appropriate training as required by 29 CFR 1910.120(e), including but not limited to initial 40-hour, 8-hour supervisor, and annual 8-hour refresher trainings. All 24-hour HAZWOPER trained staff will be supervised by a 40-hour or supervisor trained HAZWOPER staff member. Documentation of this training must be available on site.
- All site workers must review and sign the site-specific Health and Safety Plan (HASP) administered by Anchor QEA.
- All Anchor QEA employees must receive medical clearance on an annual basis as required by 29 CFR 1910.120(f) and detailed in the Anchor QEA Medical Monitoring Program.
- A competent operator is required to operate heavy equipment; they must have partner/senior staff approval. The competent operator must be familiar with the owner's manual prior to use.
- All assigned employees will familiarize themselves with the contents of this JSA before starting a work activity and review it with their supervisor during the kickoff meeting and during the daily safety meeting.

Job Safety Analysis

Soil Excavations and Earthworks

Employee Signatures

All employees overseeing or performing excavations or earthworks at the site must sign off on this JSA at a minimum of 1-week intervals for the duration of the work being done. The signature indicates that the employee has reviewed the JSA and understands its contents.

Printed Name	Signature	Date

Appendix C
Safety Data Sheets (SDS)

Safety Data Sheet
according to 1907/2006/EC (REACH), 1272/2008/EC (CLP), and GHS

Printing date: 31.12.2013 **Revision:** 31.12.2013

1 Identification of the substance/mixture and of the company/undertaking

· **1.1 Product identifier**

· **Trade name: ALCONOX**
· **1.2 Relevant identified uses of the substance or mixture and uses advised against**
No further relevant information available.

· **Application of the substance / the mixture:** Cleaning material/ Detergent

· **1.3 Details of the supplier of the Safety Data Sheet**
· **Manufacturer/Supplier:**
Alconox, Inc.
30 Glenn St., Suite 309
White Plains, NY 10603
Phone: 914-948-4040
· **Further information obtainable from:** Product Safety Department

· **1.4 Emergency telephone number:**
ChemTel Inc.
(800)255-3924, +1 (813)248-0585

2 Hazards identification

· **2.1 Classification of the substance or mixture**
· **Classification according to Regulation (EC) No 1272/2008**

GHS05 corrosion

Eye Dam. 1; H318: Causes serious eye damage.

GHS07

Skin Irrit. 2; H315: Causes skin irritation.

· **Classification according to Directive 67/548/EEC or Directive 1999/45/EC**

Xi; Irritant

R38-41: Irritating to skin. Risk of serious damage to eyes.
· **Information concerning particular hazards for human and environment:**
The product has to be labelled due to the calculation procedure of the "General Classification guideline for preparations of the EU" in the latest valid version.
· **Classification system:**
The classification is according to the latest editions of the EU-lists, and extended by company and literature data.
The classification is in accordance with the latest editions of international substances lists, and is supplemented by information from technical literature and by information provided by the company.

· **2.2 Label elements**
· **Labelling according to Regulation (EC) No 1272/2008**
The product is classified and labelled according to the CLP regulation.

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· **Hazard pictograms**

GHS05

· **Signal word:** Danger

· **Hazard-determining components of labelling:**
sodium dodecylbenzene sulfonate
· **Hazard statements**
H315: Causes skin irritation.
H318: Causes serious eye damage.
· **Precautionary statements**
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P264: Wash thoroughly after handling.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310: Immediately call a POISON CENTER or doctor/physician.
P321: Specific treatment (see on this label).
P362: Take off contaminated clothing and wash before reuse.
P332+P313: If skin irritation occurs: Get medical advice/attention.
P302+P352: IF ON SKIN: Wash with plenty of soap and water.
· **Hazard description:**
· **WHMIS-symbols:**
D2B - Toxic material causing other toxic effects

· **NFPA ratings (scale 0 - 4)**

Health = 1
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**

Health = 1
Fire = 0
Reactivity = 0

· **HMIS Long Term Health Hazard Substances**
None of the ingredients is listed.

· **2.3 Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

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3 Composition/information on ingredients

· **3.2 Mixtures**
· **Description:** Mixture of substances listed below with nonhazardous additions.

· **Dangerous components:**

CAS: 68081-81-2	sodium dodecylbenzene sulfonate Xn R22; Xi R36 Acute Tox. 4, H302; Eye Irrit. 2, H319	10-25%
CAS: 497-19-8 EINECS: 207-838-8 Index number: 011-005-00-2	Sodium Carbonate Xi R36 Eye Irrit. 2, H319	2,5-10%
CAS: 7722-88-5 EINECS: 231-767-1	tetrasodium pyrophosphate substance with a Community workplace exposure limit	2,5-10%
CAS: 151-21-3 EINECS: 205-788-1	sodium dodecyl sulphate Xn R21/22; Xi R36/38 Acute Tox. 4, H302; Acute Tox. 4, H312; Skin Irrit. 2, H315; Eye Irrit. 2, H319	2,5-10%

· **Additional information:** For the wording of the listed risk phrases refer to section 16.

4 First aid measures

· **4.1 Description of first aid measures**
· **After inhalation:** Supply fresh air; consult doctor in case of complaints.
· **After skin contact:**
Immediately wash with water and soap and rinse thoroughly.
If skin irritation continues, consult a doctor.
· **After eye contact:**
Remove contact lenses if worn.
Rinse opened eye for several minutes under running water. If symptoms persist, consult a doctor.
· **After swallowing:**
Rinse out mouth and then drink plenty of water.
Do not induce vomiting; call for medical help immediately.
· **4.2 Most important symptoms and effects, both acute and delayed**
No further relevant information available.
· **4.3 Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Firefighting measures

· **5.1 Extinguishing media**
· **Suitable extinguishing agents:**
CO2, powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

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· **5.2 Special hazards arising from the substance or mixture:** No further relevant information available.
· **5.3 Advice for firefighters**
· **Protective equipment:**
Wear self-contained respiratory protective device.
Wear fully protective suit.
· **Additional information:** No further relevant information available.

6 Accidental release measures

· **6.1 Personal precautions, protective equipment and emergency procedures**
Product forms slippery surface when combined with water.
· **6.2 Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
· **6.3 Methods and material for containment and cleaning up:**
Pick up mechanically.
Clean the affected area carefully; suitable cleaners are:
Warm water
· **6.4 Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.

7 Handling and storage

· **7.1 Precautions for safe handling**
Prevent formation of dust.
Keep receptacles tightly sealed.
· **Information about fire - and explosion protection:** No special measures required.

· **7.2 Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** No special requirements.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:** Protect from humidity and water.
· **7.3 Specific end use(s):** No further relevant information available.

8 Exposure controls/personal protection

· **Additional information about design of technical facilities:** No further data; see item 7.

· **8.1 Control parameters**

· **Ingredients with limit values that require monitoring at the workplace:**

7722-88-5 tetrasodium pyrophosphate

REL (USA)	5 mg/m³
TLV (USA)	TLV withdrawn
EV (Canada)	5 mg/m³

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· **Additional information:** The lists valid during the making were used as basis.

· **8.2 Exposure controls**

· **Personal protective equipment:**

· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Avoid contact with the skin.
Avoid contact with the eyes and skin.

· **Respiratory protection:**
Not required under normal conditions of use.
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use self-contained respiratory protective device.

· **Protection of hands:**

Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation.

· **Material of gloves**
Butyl rubber, BR
Nitrile rubber, NBR
Natural rubber, NR
Neoprene gloves
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material cannot be calculated in advance and has therefore to be checked prior to the application.

· **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

· **Eye protection:**

Safety glasses

· **Body protection:** Protective work clothing

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9 Physical and chemical properties

· **9.1 Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Powder
Colour:	White
· **Odour:**	Odourless
· **Odour threshold:**	Not determined.
· **pH-value (10 g/l) at 20 °C:**	9,5 (- NA for Powder form)
· **Change in condition**	
Melting point/Melting range:	Not Determined.
Boiling point/Boiling range:	Undetermined.
· **Flash point:**	Not applicable.
· **Flammability (solid, gaseous):**	Not determined.
· **Ignition temperature:**	
Decomposition temperature:	Not determined.
· **Self-igniting:**	Product is not self-igniting.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapour pressure:**	Not applicable.
· **Density at 20 °C:**	1,1 g/cm³
· **Relative density**	Not determined.
· **Vapour density**	Not applicable.
· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with water:**	Soluble.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
· **Solvent content:**	
Organic solvents:	0,0 %
Solids content:	100 %
· **9.2 Other information**	No further relevant information available.

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10 Stability and reactivity

· **10.1 Reactivity**
· **10.2 Chemical stability**
· **Thermal decomposition / conditions to be avoided:**
No decomposition if used according to specifications.
· **10.3 Possibility of hazardous reactions**
Reacts with acids.
Reacts with strong alkali.
Reacts with strong oxidizing agents.
· **10.4 Conditions to avoid:** No further relevant information available.
· **10.5 Incompatible materials:** No further relevant information available.
· **10.6 Hazardous decomposition products:**
Carbon monoxide and carbon dioxide
Phosphorus compounds
Sulphur oxides (SOx)

11 Toxicological information

· **11.1 Information on toxicological effects**
· **Acute toxicity:**
· **Primary irritant effect:**
· **On the skin:** Irritant to skin and mucous membranes.
· **On the eye:** Strong irritant with the danger of severe eye injury.
· **Sensitization:** No sensitizing effects known.
· **Additional toxicological information:**
The product shows the following dangers according to the calculation method of the General EU Classification Guidelines for Preparations as issued in the latest version:
Irritant
Swallowing will lead to a strong caustic effect on mouth and throat and to the danger of perforation of esophagus and stomach.

12 Ecological information

· **12.1 Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **12.2 Persistence and degradability:** No further relevant information available.
· **12.3 Bioaccumulative potential:** Not worth-mentioning accumulating in organisms
· **12.4 Mobility in soil:** No further relevant information available.
· **Additional ecological information:**
· **General notes:**
Water hazard class 2 (German Regulation) (Self-assessment): hazardous for water.
Do not allow product to reach ground water, water course or sewage system.
Danger to drinking water if even small quantities leak into the ground.
· **12.5 Results of PBT and vPvB assessment**
· **PBT:** Not applicable.

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· **vPvB:** Not applicable.
· **12.6 Other adverse effects:** No further relevant information available.

13 Disposal considerations

· **13.1 Waste treatment methods**
· **Recommendation**
Smaller quantities can be disposed of with household waste.
Small amounts may be diluted with plenty of water and washed away. Dispose of bigger amounts in accordance with Local Authority requirements.
The surfactant used in this product complies with the biodegradability criteria as laid down in Regulation (EC) No. 648/2004 on detergents. Data to support this assertion are held at the disposal of the competent authorities of the Member States and will be made available to them, at their direct request or at the request of a detergent manufacturer.

· **Uncleaned packaging:**
· **Recommendation:** Disposal must be made according to official regulations.
· **Recommended cleansing agents:** Water, if necessary together with cleansing agents.

14 Transport information

· **14.1 UN-Number** · **DOT, ADR, IMDG, IATA, ICAO**	Not Regulated
· **14.2 UN proper shipping name** · **DOT, ADR, IMDG, IATA, ICAO**	Not Regulated
· **14.3 Transport hazard class(es)** · **DOT, ADR, IMDG, IATA, ICAO** · **Class**	Not Regulated
· **14.4 Packing group** · **DOT, ADR, IMDG, IATA, ICAO**	Not Regulated
· **14.5 Environmental hazards:** · **Marine pollutant:**	No
· **14.6 Special precautions for user**	Not applicable.
· **14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **UN "Model Regulation":**	Not Regulated

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15 Regulatory information

· **15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **United States (USA)**
· **SARA**

· **Section 355 (extremely hazardous substances):**
None of the ingredients is listed.
· **Section 313 (Specific toxic chemical listings):**
None of the ingredients is listed.
· **TSCA (Toxic Substances Control Act):**
All ingredients are listed.

· **Proposition 65 (California):**

· **Chemicals known to cause cancer:**
None of the ingredients is listed.
· **Chemicals known to cause reproductive toxicity for females:**
None of the ingredients is listed.
· **Chemicals known to cause reproductive toxicity for males:**
None of the ingredients is listed.
· **Chemicals known to cause developmental toxicity:**
None of the ingredients is listed.

· **Carcinogenic Categories**

· **EPA (Environmental Protection Agency)**
None of the ingredients is listed.
· **IARC (International Agency for Research on Cancer)**
None of the ingredients is listed.
· **TLV (Threshold Limit Value established by ACGIH)**
None of the ingredients is listed.
· **NIOSH-Ca (National Institute for Occupational Safety and Health)**
None of the ingredients is listed.
· **OSHA-Ca (Occupational Safety & Health Administration)**
None of the ingredients is listed.

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· **Canada**

· **Canadian Domestic Substances List (DSL)**

All ingredients are listed.

· **Canadian Ingredient Disclosure list (limit 0.1%)**

None of the ingredients is listed.

· **Canadian Ingredient Disclosure list (limit 1%)**

497-19-8	Sodium Carbonate
7722-88-5	tetrasodium pyrophosphate
151-21-3	sodium dodecyl sulphate

· **15.2 Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

16 Other information

This information is based on our present knowledge. However, this shall not constitute a guarantee for any specific product features and shall not establish a legally valid contractual relationship.

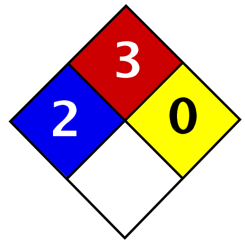
· **Relevant phrases**

H302: Harmful if swallowed.
H312: Harmful in contact with skin.
H315: Causes skin irritation.
H319: Causes serious eye irritation.

R21/22: Harmful in contact with skin and if swallowed.
R22: Harmful if swallowed.
R36: Irritating to eyes.
R36/38: Irritating to eyes and skin.

· **Abbreviations and acronyms:**

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road) IMDG: International Maritime Code for Dangerous Goods DOT: US Department of Transportation
IATA: International Air Transport Association
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
ACGIH: American Conference of Governmental Industrial Hygienists
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Benzene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Benzene

Catalog Codes: SLB1564, SLB3055, SLB2881

CAS#: 71-43-2

RTECS: CY1400000

TSCA: TSCA 8(b) inventory: Benzene

CI#: Not available.

Synonym: Benzol; Benzine

Chemical Name: Benzene

Chemical Formula: C6-H6

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
Benzene	71-43-2	100

Toxicological Data on Ingredients: Benzene: ORAL (LD50): Acute: 930 mg/kg [Rat]. 4700 mg/kg [Mouse]. DERMAL (LD50): Acute: >9400 mg/kg [Rabbit]. VAPOR (LC50): Acute: 10000 ppm 7 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of eye contact (irritant), of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC.
MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE].
The substance is toxic to blood, bone marrow, central nervous system (CNS).
The substance may be toxic to liver, Urinary System.
Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

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

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 497.78°C (928°F)

Flash Points: CLOSED CUP: -11.1°C (12°F). (Setaflash)

Flammable Limits: LOWER: 1.2% UPPER: 7.8%

Products of Combustion: These products are carbon oxides (CO, CO2).

Fire Hazards in Presence of Various Substances:
Highly flammable in presence of open flames and sparks, of heat.
Slightly flammable to flammable in presence of oxidizing materials.
Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available.
Risks of explosion of the product in presence of static discharge: Not available.
Explosive in presence of oxidizing materials, of acids.

Fire Fighting Media and Instructions:
Flammable liquid, soluble or dispersed in water.
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:
Extremely flammable liquid and vapor. Vapor may cause flash fire.
Reacts on contact with iodine heptafluoride gas.

Dioxygenyl tetrafluoroborate is as very powferful oxidant. The addition of a small particle to small samples of benzene, at ambient temperature, causes ignition.
Contact with sodium peroxide with benzene causes ignition.
Benzene ignites in contact with powdered chromic anhydride.
Virgorous or incandescent reaction with hydrogen + Raney nickel (above 210 C) and bromine trifluoride.

Special Remarks on Explosion Hazards:
Benzene vapors + chlorine and light causes explosion.
Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate.
Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion.
Interaction of nitryl perchlorate with benzene gave a slight explosion and flash.
The solution of permanganic acid (or its explosive anhydride, dimaganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene.
Peroxodisulfuric acid is a very powferful oxidant. Uncontrolled contact with benzene may cause explosion.
Mixtures of peroxomonsulfuric acid with benzene explodes.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid.
Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:

TWA: 0.5 STEL: 2.5 (ppm) from ACGIH (TLV) [United States]
TWA: 1.6 STEL: 8 (mg/m3) from ACGIH (TLV) [United States]
TWA: 0.1 STEL: 1 from NIOSH
TWA: 1 STEL: 5 (ppm) from OSHA (PEL) [United States]
TWA: 10 (ppm) from OSHA (PEL) [United States]
TWA: 3 (ppm) [United Kingdom (UK)]
TWA: 1.6 (mg/m3) [United Kingdom (UK)]
TWA: 1 (ppm) [Canada]
TWA: 3.2 (mg/m3) [Canada]
TWA: 0.5 (ppm) [Canada]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor:
Aromatic. Gasoline-like, rather pleasant.
(Strong.)

Taste: Not available.

Molecular Weight: 78.11 g/mole

Color: Clear Colorless. Colorless to light yellow.

pH (1% soln/water): Not available.

Boiling Point: 80.1 (176.2°F)

Melting Point: 5.5°C (41.9°F)

Critical Temperature: 288.9°C (552°F)

Specific Gravity: 0.8787 @ 15 C (Water = 1)

Vapor Pressure: 10 kPa (@ 20°C)

Vapor Density: 2.8 (Air = 1)

Volatility: Not available.

Odor Threshold: 4.68 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 2.1

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether, acetone.

Solubility:
Miscible in alcohol, chloroform, carbon disulfide oils, carbon tetrachloride, glacial acetic acid, diethyl ether, acetone.
Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources, incompatibles.

Incompatibility with various substances: Highly reactive with oxidizing agents, acids.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Benzene vapors + chlorine and light causes explosion.
Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate.
Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion.
Interaction of nitryl perchlorate with benzene gave a slight explosion and flash.
The solution of permanganic acid (or its explosive anhydride, dimaganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene.
Peroxodisulfuric acid is a very powferful oxidant. Uncontrolled contact with benzene may cause explosion.
Mixtures of peroxomonsulfuric acid with benzene explodes.

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.
Acute oral toxicity (LD50): 930 mg/kg [Rat].
Acute dermal toxicity (LD50): >9400 mg/kg [Rabbit].
Acute toxicity of the vapor (LC50): 10000 7 hours [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC.
MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast.
DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE].
Causes damage to the following organs: blood, bone marrow, central nervous system (CNS).
May cause damage to the following organs: liver, Urinary System.

Other Toxic Effects on Humans:
Very hazardous in case of inhalation.
Hazardous in case of skin contact (irritant, permeator), of ingestion.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects (female fertility, Embryotoxic and/or foetotoxic in animal) and birth defects.
May affect genetic material (mutagenic).
May cause cancer (tumorigenic, leukemia))
Human: passes the placental barrier, detected in maternal milk.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: Causes skin irritation. It can be absorbed through intact skin and affect the liver, blood, metabolism,and urinary system.
Eyes: Causes eye irritation.
Inhalation: Causes respiratory tract and mucous membrane irritation. Can be absorbed through the lungs. May affect behavior/Central and Peripheral nervous systems (somnolence, muscle weakness, general anesthetic, and

other symptoms similar to ingestion), gastrointestinal tract (nausea), blood metabolism, urinary system.
Ingestion: May be harmful if swallowed. May cause gastrointestinal tract irritation including vomiting. May affect behavior/Central and Peripheral nervous systems (convulsions, seizures, tremor, irritability, initial CNS stimulation followed by depression, loss of coordination, dizziness, headache, weakness, pallor, flushing), respiration (breathlessness and chest constriction), cardiovascular system, (shallow/rapid pulse), and blood.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : Benzene UNNA: 1114 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Benzene
California prop. 65 (no significant risk level): Benzene: 0.007 mg/day (value)
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Benzene
Connecticut carcinogen reporting list.: Benzene
Connecticut hazardous material survey.: Benzene
Illinois toxic substances disclosure to employee act: Benzene
Illinois chemical safety act: Benzene
New York release reporting list: Benzene
Rhode Island RTK hazardous substances: Benzene
Pennsylvania RTK: Benzene
Minnesota: Benzene
Michigan critical material: Benzene
Massachusetts RTK: Benzene
Massachusetts spill list: Benzene
New Jersey: Benzene
New Jersey spill list: Benzene
Louisiana spill reporting: Benzene
California Director's list of Hazardous Substances: Benzene

TSCA 8(b) inventory: Benzene
SARA 313 toxic chemical notification and release reporting: Benzene
CERCLA: Hazardous substances.: Benzene: 10 lbs. (4.536 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).
EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F).
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R11- Highly flammable.
R22- Harmful if swallowed.
R38- Irritating to skin.
R41- Risk of serious damage to eyes.
R45- May cause cancer.
R62- Possible risk of impaired fertility.
S2- Keep out of the reach of children.
S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S39- Wear eye/face protection.
S46- If swallowed, seek medical advice immediately and show this container or label.
S53- Avoid exposure - obtain special instructions before use.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves.
Lab coat.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/10/2005 08:35 PM

Last Updated: 11/06/2008 12:00 PM

Appendix D
Certifications

Appendix E
Community Air Monitoring Program (CAMP)

March 2026
Syracuse Bread Factory

Appendix E – Community Air Monitoring Plan

Prepared for
Syracuse Bread Factory, LLC

Prepared by
Anchor QEA Engineering, PLLC
54 Genesee Street, Suite 100A
Camillus, NY 13031

TABLE OF CONTENTS

TABLE

ATTACHMENT

ABBREVIATIONS

$\mu g/m^3$	micrograms per cubic meter
CAMP	Community Air Monitoring Plan
HASP	Health and Safety Plan
MGP	manufactured gas plant
NAPL	nonaqueous phase liquid
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OVA	organic vapor analyzer
particulates	total suspended particulates
PID	photoionization detector
PM10	particulate matter less than 10 microns in diameter
ppm	parts per million
QEP	Qualified Environmental Professional
Site	former manufactured gas plant sites East 14th Street Works and East 21st Street Works
VOC	volatile organic compound

1 Introduction

This Community Air Monitoring Plan (CAMP) has been prepared to support performance of intrusive work at former Syracuse Bread Factory (the Site) in Syracuse, New York pursuant to the Site-specific Health and Safety Plan (HASP).

The purpose of this CAMP is to describe real-time air monitoring for volatile organic compounds (VOCs) and particulates within and at the perimeter of any areas where intrusive activities are to occur. This CAMP includes monitoring requirements during intrusive activities, minimum requirements for dust and odor controls, air emission action levels, air monitoring procedures, a monitoring schedule, and data collection and reporting to be performed during and following the intrusive activities.

A Qualified Environmental Professional (QEP) is responsible for providing all labor, materials, and equipment necessary to implement the community air monitoring program specified herein. The QEP is ultimately responsible for confirming all corrective measures associated with the community air monitoring program (including the control of dust, vapors, and odors) are performed in accordance with this CAMP.

1.1 Overview of Intrusive Work Activities

Anchor QEA Engineering, PLLC (Anchor QEA), will be completing field investigations as part of the site characterization throughout the Site. Locations of test pit(s) and soil borings to be completed are included in the Remedial Investigation Work Plan.

1.2 Potential Air Emissions Related to Intrusive Activities

As indicated in the New York State Department of Health (NYSDOH) Generic CAMP (Appendix E-1), the following intrusive activities may be performed at the Site and have the potential to generate localized impacts to air quality:

- Installation of soil borings or monitoring wells
- Test pit excavation
- Installation of soil gas probes
- Groundwater monitoring
- Material handling (e.g., manipulation of excavated materials and/or investigation-derived waste to render them suitable for off-site treatment/disposal, and loading materials for transport to the off-site treatment/disposal facility)

2 Air Monitoring Procedures

The community air monitoring program is intended to be a discrete program that will operated in conjunction with the Exclusion Zone air monitoring program as defined by the Site-specific HASP. The QEP will conduct real-time community air monitoring throughout the remedial construction. Monitoring will be conducted at representative locations around the perimeter of the Exclusion Zone for VOCs and total suspended particulates (particulates). However, particulate monitoring will not be performed during precipitation or groundwater monitoring events. Additional information regarding the monitoring locations, equipment, and action levels is presented below.

Data will be collected daily and submitted weekly, in an electronic format, to the following regulatory agencies and Syracuse Bread Factory, LLC. A hard copy of the data will be maintained by the QEP:

Table 1
CAMP Contact List

Name/Title	Affiliation	Contact Information
Anthony Russo, Environmental Program Specialist	New York State Department of Environmental Conservation	Contact No. 315 426-7466
Steven Berninger, Project Manager	New York State Department of Health	Contact No. 518-402-7860
Jason Evans. Syracuse Bread Factory Representative	Syracuse Bread Factory, LLC	Contact No. 315-559-5793
Matthew Cavas, PG Qualified Environmental Professional	Anchor QEA Engineering, PLLC	Office: 518-886-0643 Mobile: 518-222-5486

2.1 Monitoring Location Selection and Deployment

VOCs and particulate monitoring station locations will be determined daily based on data from the on-site meteorological monitoring station and the nature of the anticipated remediation activities. Up to three monitoring stations are proposed for the investigation: one upwind and up to two downwind stations. The upwind location for VOCs and particulate monitoring will be selected at the start of each workday based on wind direction. The downwind locations for VOCs and particulate monitoring will also be selected based on predominant wind direction. When performing exterior investigation activities, a second CAMP station will be deployed between the work area and downwind residential properties. The VOCs and particulate monitoring stations will be deployed each day before the start of work activities. If wind direction shifts radically during the workday for an extended period of time, such that the upwind location and downwind locations no longer fall within acceptable guidelines (+/- 60° compass change from the original wind direction), the monitoring stations will be relocated so the upwind and downwind positions are maintained throughout the duration of the work day. Air monitoring location changes will be documented in a field logbook.

2.2 Sampling Methods

Real-time monitoring for total VOCs and particulate matter less than 10 microns in diameter (PM10) will be conducted during intrusive activities at the Site. As required by the NYSDOH Generic CAMP (Attachment D-1), VOCs will be monitored continuously during all intrusive and/or potential dust-generating activities (e.g., installation of erosion control measures, sheetpile installation, excavation, backfilling, soil mixing/stabilization, and material handling activities) using instrumentation equipped with electronic data-logging capabilities.

2.2.1 Total Volatile Organic Compounds

Total VOCs in ambient air will be monitored and recorded using a portable organic vapor analyzer (OVA) equipped with a photoionization detector (PID) with data-logging capabilities (MiniRae2000 or equivalent). The OVA-PID may be housed in a watertight shelter attached to a tripod and set to an appropriate height. All measurements should be made at a height of approximately 5 feet above the ground. Total VOC levels will be measured continuously, and a running average calculated and recorded every 15-minutes.

2.2.2 PM10 Monitoring

Real-time monitoring for particulates will be conducted during investigation activities at the Site. As required by the NYSDOH Generic CAMP (Attachment D-1), real-time airborne particulate monitoring will be conducted continuously during all intrusive and/or potential dust-generating activities (e.g., installation of soil borings and monitoring wells, excavation, backfilling, and material-handling activities) using instrumentation equipped with electronic data-logging capabilities. A real-time particulate monitor (MIE DataRAM PDR1000 or equivalent) will be used for particulate monitoring. The equipment will be equipped with an audible alarm to indicate exceedance of the action level.

In addition, fugitive dust migration will be visually assessed during all work activities. All average concentrations (calculated for continuous 15-minute increments [e.g., 08:00 to 08:15, 08:15 to 08:30]) and any instantaneous readings taken to assess appropriate course of action will be recorded using an electronic data logger and/or in the field logbook.

Fugitive dust migration will be visually assessed during all work activities, and reasonable dust-suppression techniques will be used during any Site activities that may generate fugitive dust.

2.3 Action Levels

The action levels provided below will be used to initiate corrective actions, if necessary, based on real-time monitoring. Each piece of monitoring equipment will have alarm capabilities (audible and/or visual) to indicate exceedances of the action levels specified below.

2.3.1 Action Levels for VOCs

As outlined in the NYSDOH Generic CAMP (Attachment D-1), if the ambient air concentration for total VOCs exceeds 5.0 parts per million (ppm) above background (i.e., upwind location) for the 15-minute average, work activities will be temporarily halted while monitoring continues. If the total VOCs concentrations readily decrease (through observation of instantaneous readings) below 5.0 ppm above background, then work activities can resume with continuous monitoring.

If the ambient air concentrations for total VOCs persist at levels in excess of 5.0 ppm above background but less than 25.0 ppm above background, work activities will be halted, the source of the elevated VOCs concentrations identified, corrective actions undertaken to reduce or abate the emissions, and air monitoring will be continued. Once these actions have been implemented, work activities can resume provided the following two conditions are met:

- The 15-minute average VOCs concentrations remain below 5.0 ppm above background.
- The VOCs level 200 feet downwind of the monitoring location or half the distance to the nearest potential receptor or residential/commercial structure (whichever is less, but in no case less than 20 feet) is below 5.0 ppm above background for the 15-minute average.

If the ambient air concentrations for total VOCs exceed 25.0 ppm above background, the work activities must cease and emissions-control measures must be implemented.

2.3.2 Action Levels for PM10

The following PM10 action levels and responses, based on the NYSDOH generic CAMP, will be implemented during any intrusive activity that may generate emissions:

- If the average ambient air concentration of PM10 at any one (or more) of the sampling locations is noted at levels in excess of 100 micrograms per cubic meter ($\mu g/m^3$) above the background (upwind location) for the 15-minute interval, or if airborne dust is observed leaving the work area, intrusive Site activities will be temporarily halted. The source of the elevated PM10 concentration is to be identified, corrective actions to reduce or abate the emissions will be undertaken, and air monitoring will continue. Work may continue following the implementation of dust-suppression techniques, provided the PM10 levels do not exceed 150 $\mu g/m^3$ above background and no visible dust is migrating from the work area.
- If, after implementation of dust-suppression techniques, the PM10 levels are greater than 150 $\mu g/m^3$ above background, work will stop and Site activities will be re-evaluated. Work will only resume after dust-suppression measures and other controls are implemented, PM10

levels are less than 150 µg/m^3 above background, and no visible dust is migrating from the work area.

2.4 Emissions Control Measures

Air emissions-control measures will be implemented by a QEP (or person under their supervision) concurrently with any intrusive activities (as needed) to limit the potential for organic vapor and dust emissions or odors from the Site. Air emissions associated with excavation and backfilling, material handling and stockpiling, other intrusive activities, and certain non-intrusive activities, such as mobilization, transportation, and restoration activities, will be controlled as described below.

The following emissions-control measures may be used during these activities, depending on specific circumstances, visual observations, and air monitoring results:

- Apply water or BioSolve spray to exposed soil/material piles.
- Cover excavated material or excavation faces with polyethylene sheeting or other appropriate material.
- Minimize surface area of exposed material.
- Containerize excavation materials and soil.
- Apply vapor-suppression foam.
- Apply water on haul roads and/or staging areas, wet equipment, and spray water on earth-removal equipment buckets during dumping.
- Establish a vegetative cover immediately after placement of cover soil.

The QEP is required to mobilize emission control measures (either vapor suppressant sprays or foam, or cover materials) to the Site prior to initiating intrusive activities and to maintain an adequate supply of such materials for the duration of such activities.

2.5 Meteorological Monitoring

Meteorological monitoring will be conducted continuously at the Site using a portable meteorological monitoring system (such as a wind sock). The meteorological monitoring system will be deployed at a location in accordance with siting criteria established by the U.S. Environmental Protection Agency and the New York State Department of Environmental Conservation (NYSDEC) for meteorological monitoring systems (*Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV - Meteorological Measurements*, as revised August 1989 [NYSDEC 1989b]; and New York State Air Guide-19 – *Oversight of Private Air Monitoring Networks*, dated June 1989 [NYSDEC 1989a]). Use of these guidelines enables the meteorological monitoring system to provide representative observations of the local meteorological conditions. Security and accessibility to the meteorological monitoring system will also be considered during the selection of the meteorological monitoring system location.

The on-site meteorological monitoring system will monitor wind direction and speed. Local weather data will be used to record ambient pressure, precipitation, relative humidity, and ambient temperature. Wind direction and speed will be monitored and recorded at least once per hour during intrusive activities. Wind direction will be determined using a windsock, wind vane, multi-purpose wind meter, or other appropriate equipment. Wind speed may be determined using a handheld wind speed meter. Alternatively, Anchor QEA may use a multi-parameter meteorological monitoring system (such as a Met One station or equivalent).

2.6 Instrument Calibration

Calibration of thePID, PM10, and meteorological monitoring instrumentation will be conducted in accordance with each of the equipment manufacturer's calibration and quality assurance requirements. The VOC and particulate monitors will be calibrated daily (at a minimum), and calibrations will be recorded in the field logbook.

3 Vapor Emission Response Plan

Anchor QEA will prepare a Vapor Emission Response Plan to be implemented for worker safety following an exceedance of the 15-minute average VOCs concentration within the Exclusion Zone. Anchor QEA (and its subcontractors) will initiate engineering controls for employee safety.

If an exceedance of the 15-minute average VOCs concentration of 5.0 ppm above background is measured at the perimeter of the Exclusion Zone, all intrusive activities will be stopped, and the following action will be taken:

- Continue total VOCs monitoring within the Exclusion Zone and at the perimeter of the Exclusion Zone. If the total VOCs level drops below 5.0 ppm above background, then excavation activities can resume with the addition of engineering controls or modifications to the excavation process to minimize VOCs emissions. However, if the VOC level persists above 5.0 ppm, based on continual observance of the total volatile organic analyzer, then the contractor will immediately implement engineering controls such as misting the area with a vapor-suppression solution of BioSolve, covering the excavation, and backfilling, as needed, to reduce emissions and, at the same time, should notify NYSDEC and Syracuse Bread Factory, LLC.
- If after the implementation of additional engineering controls, the total VOCs levels drop below 5.0 ppm (above background) within the Exclusion Zone and at the perimeter of the Exclusion Zone, then the excavation activity can resume, provided process and work activities were adjusted to reduce emission levels
- If the total VOCs levels continue to be greater than 5.0 ppm (above background) at the perimeter of the Exclusion Zone, then all Site activities must be discontinued. When the work is shut down, downwind air monitoring as directed by Anchor QEA's QEP in consultation with the NYSDEC representative will be implemented to ensure the emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission Response Plan (Section 4.0).

The following primary engineering controls may be implemented to reduce emission levels:

- Adding a vapor-suppression solution of BioSolve to impacted media (application in excavated areas will be a light mist as to avoid increasing solubility of wastes leading to increased groundwater contamination).
- Covering the surface of exposed soils with polyethylene sheeting.
- Limiting excavation size and the surface area of exposed contaminated soil.

4 Major Vapor Emission Response Plan

If, after the cessation of the work activities and implementation of engineering controls, total VOCs levels exceed 5.0 ppm (above background) at the perimeter of the Exclusion Zone (as defined by the Site-specific HASP), then the following actions will be immediately taken:

- Cover the excavation with polyethylene sheeting or clean soil.
- Notify individuals on the CAMP contact list provide in Table 1 and City Police Department at 911.
- Continue real-time VOCs monitoring at the upwind, downwind, and nearest receptor until VOCs levels drop below 5.0 ppm.
- If total VOCs levels persist above the 5.0 ppm (above background), Anchor QEA's QEP, Syracuse Bread Factory, LLC, NYSDEC, and NYSDOH will consult with each other and the emergency response agencies to determine the appropriate actions to be implemented. Anchor QEA has ultimate authority during major vapor emission emergencies. Intrusive activities shall not be resumed until the NYSDEC approves the restart of work activities.

5 Monitoring Schedule and Data Collection and Reporting

The following identifies the monitoring schedule and data collection and reporting requirements.

5.1 Monitoring Schedule

Real-time VOC and PM10 monitoring will be performed continuously throughout the intrusive activities. VOC monitoring will also be performed during non-intrusive sampling-type activities (such as soil boring and monitoring well installations). Wind direction and speed will be monitored and recorded at least once per hour during investigation activities.

5.2 Data Collection and Reporting

Air monitoring data will be collected continuously from VOC and PM10 monitors during intrusive (and non-intrusive) monitored activities by an electronic data-logging system. The data management software will be set up so instantaneous observed readings would be recorded by the electronic data acquisition system and averaged throughout 15-minute time periods. All readings will be recorded and archived for review by NYSDOH and NYSDEC personnel.

6 References

NYSDEC (New York State Department of Environmental Conservation), 1989a, *New York State Air Guide-19 – Oversight of Private Air Monitoring Networks*. June 1989.

NYSDEC, 1989b. *Quality Assurance Handbook for Air Pollution Measurement Systems, Volume IV - Meteorological Measurements.* Revised August 1989.

Attachment D-1
New York State Department of Health
Generic Community Air Monitoring Plan

Appendix 1A
New York State Department of Health
Generic Community Air Monitoring Plan

Overview

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

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

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

Community Air Monitoring Plan

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

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

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

<u>VOC Monitoring, Response Levels, and Actions</u>

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

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

<u>Particulate Monitoring, Response Levels, and Actions</u>

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

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

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

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

December 2009