Fischbach, LLC

Site Management Plan

235 Metro Park Brighton Site
Rochester, New York
Site No. 828150

December 2025

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Site No. 828150

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Certification Statement

I, MOH MOHIUDDIN, certify that I am currently a New York State registered Professional Engineer as defined in 6 NYCRR Part 375 and, that this Site Management 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).

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Acronyms and Abbreviations

AOC	area of concern
Arcadis	Arcadis of New York, Inc.
AROD	Amended Record of Decision
ASTM	American Society for Testing and Materials
bgs	below ground surface
BMP	Best Management Practices
CVA	Climate Vulnerability Assessment
CVOC	chlorinated volatile organic compound
DER	Division of Environmental Remediation
DER-10	Division of Environmental Remediation “Technical Guidance for Site Investigation and Remediation”
EC	Engineering Control
ECL	Environmental Conservation Law
EWP	Excavation Work Plan
Fischbach	Fischbach, LLC
FSP	Field Sampling Plan
HASP	Health and Safety Plan
IC	Institutional Control
IRM	Interim Remedial Measure
MNA	monitored natural attenuation
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYCRR	New York Codes, Rules, and Regulations
Passero	Passero Associates, P.C.
PCB	polychlorinated biphenyl
PE	Professional Engineer
PFAS	per- and polyfluoroalkyl substances
PRR	Periodic Review Report
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objective
ROD	Record of Decision

RSO	Remedial System Optimization
SMP	Site Management Plan
SCO	soil cleanup objective
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound

Executive Summary

The following provides a brief summary of the controls implemented for the Site, as well as the inspections, monitoring, maintenance and reporting activities required by this Site Management Plan (SMP):

Site Identification:	235 Metro Park Brighton Site Brighton, New York Site No. 828150
Institutional Controls:	1. The property may be used for commercial/industrial use. 2. Imposition of an Environmental Easement pursuant to Article 71, Title 36 of the New York State Environmental Conservation Law that will: • Limit the use and development of the property to commercial/industrial use only. • Restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment, as determined by the New York State Department of Health and/or the Monroe County Department of Health. • Maintain the existing site cover. • Require inspection of Engineering Controls (ECs) at a frequency and in a manner defined in this SMP. • Require periodic certification of Institutional Controls and ECs. • Require compliance with this SMP. Compliance with the approved SMP. 3. All ECs must be inspected at a frequency and in a manner defined in the SMP.
Engineering Controls:	1. Cover System
Inspections: 1. Cover Inspection	Frequency: Annually and following severe weather events
Monitoring: 1. Groundwater Monitoring Wells	Frequency: Annually
Reporting: 1. Groundwater Data 2. Periodic Review Report	Frequency: Annually Annually

Further descriptions of the above requirements are provided in detail in the latter sections of this SMP.

1 Introduction

1.1 General

This Site Management Plan (SMP) is a required element of the remedial program for the 235 Metro Park Brighton Site located in the Town of Brighton, Rochester, New York (hereinafter referred to as the "Site"). A site location map is included as Figure 1. The Site is currently in the New York State, Inactive Hazardous Waste Disposal Site Remedial Program, Site No. 828150, which is administered by New York State Department of Environmental Conservation (NYSDEC).

Fischbach, LLC (Fischbach) entered into an Order on Consent, on November 19, 2009, with the NYSDEC to remediate the Site. A figure showing the site layout and boundaries is included as Figure 2. The boundaries of the Site are more fully described in the metes and bounds site description that is part of the Environmental Easement provided in Appendix A.

After completion of the remedial work, some contamination was left at this Site, which is hereafter referred to as "remaining contamination." Institutional and Engineering Controls (ICs and ECs) have been incorporated into the site remedy to control exposure to remaining contamination to ensure protection of public health and the environment. An Environmental Easement granted to the NYSDEC, and recorded with the Monroe County Clerk, requires compliance with this SMP and all ECs and ICs placed on the Site.

This SMP was prepared to manage remaining contamination at the Site until the Environmental Easement is extinguished in accordance with the Environmental Conservation Law (ECL), Article 71, Title 36. This plan has been approved by the NYSDEC project manager, and compliance with this plan is required by the grantor of the Environmental Easement and the grantor's successors and assigns. This SMP may only be revised with the approval of the NYSDEC project manager.

It is important to note that:

- This SMP details the site-specific implementation procedures that are required by the Environmental Easement. Failure to properly implement the SMP is a violation of the Environmental Easement, which is grounds for revocation of the Certificate of Completion; and
- Failure to comply with this SMP is also a violation of the ECL; 6 New York Codes, Rules, and Regulations (NYCRR) Part 375 (NYSDEC 2006, or current version) and the Order on Consent (Index No. B8-0778-08-03A) for the Site, and thereby subject to applicable penalties.

All reports associated with the Site can be viewed by contacting the NYSDEC or its successor agency managing environmental issues in New York State. A list of contacts for persons involved with the Site is provided in Table 1.1 (in Section 1.3) and Appendix B of this SMP.

235 Metro Park Associates, LLC (Site Owner) and Fischbach (Responsible Party) share the responsibility for implementing the SMP. A description of each party's responsibilities is provided in Appendix C.

This SMP was prepared by Arcadis of New York, Inc. (Arcadis), on behalf of Fischbach, in accordance with the requirements of the NYSDEC's Division of Environmental Remediation (DER) "Technical Guidance for Site Investigation and Remediation" (DER-10), dated May 2010 (NYSDEC 2010a), and the guidelines provided by the NYSDEC. This SMP addresses the means for implementing the ICs and/or ECs that are required by the Environmental Easement for the Site.

1.2 Revisions and Alterations

Revisions and alterations to this plan will be proposed in writing to the NYSDEC's project manager. The NYSDEC project manager can also make changes to the SMP or request revisions from the remedial party. Revisions will be necessary upon, but not limited to, the following occurring: a change in media monitoring requirements, upgrades to or shutdown of a remedial system, post-remedial removal of contaminated sediment or soil, or other significant change to the Site conditions. All approved alterations must conform with Article 145 Section 7209 of the Education Law regarding the application of professional seals and alterations. For example, any changes to as-built drawings must be stamped by a New York State Professional Engineer (PE). In accordance with the Environmental Easement for the Site, the NYSDEC project manager will provide a notice of any approved changes to the SMP and append these notices to the SMP that is retained in its files.

1.3 Notifications

Notifications will be submitted by Fischbach and/or the property owner to the NYSDEC, as needed, in accordance with NYSDEC's DER-10 (NYSDEC 2010a, or current version) for the following reasons:

1. 60-day advance notice of any proposed changes in site use that are required under the terms of the Order on Consent, 6 NYCRR Part 375 (NYSDEC 2006, or current version), and/or ECL.
2. 7-day advance notice of any field activity associated with the remedial program.
3. 15-day advance notice of any proposed ground-intrusive activity pursuant to the Excavation Work Plan (EWP). If the ground-intrusive activity qualifies as a change of use as defined in 6 NYCRR Part 375, the above mentioned 60-day advance notice is also required.
4. Notice within 48 hours of any damage or defect to the foundation, structures, or EC that reduces or has the potential to reduce the effectiveness of an EC, and likewise, any action to be taken to mitigate the damage or defect.
5. Notice within 48 hours of any non-routine maintenance activities.
6. Verbal notice by noon of the following day of any emergency, such as a fire; flood; or earthquake that reduces or has the potential to reduce the effectiveness of ECs in place at the Site, with written confirmation within 7 days that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public.
7. Follow-up status reports on actions taken to respond to any emergency event requiring ongoing responsive action submitted to the NYSDEC project manager within 45 days describing and documenting actions taken to restore the effectiveness of the ECs.

Any change in the ownership of the Site or the responsibility for implementing this SMP will include the following notifications:

8. At least 60 days prior to the change, the NYSDEC will be notified in writing of the proposed change. This will include a certification that the prospective purchaser/Remedial Party has been provided with a copy of the Order on Consent, and all approved work plans and reports, including this SMP.
9. Within 15 days after the transfer of all or part of the Site, the new owner's name, contact representative, and contact information will be confirmed in writing to the NYSDEC project manager.

Table 1.1 below includes contact information for the above notifications. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in Appendix B.

*Table 1.1 – Notifications**

Name/Affiliation	Address	Contact Information	Required Notification**
NYSDEC			
Charlotte Theobald Project Manager	6274 East Avon-Lima Road Avon, New York 14414	T: 585-226-5354 Charlotte.Theobald@dec.ny.gov	All Notifications
David Pratt, P.E.	6274 East Avon-Lima Road Avon, New York 14414	T: 585-226-5449 David.Pratt@dec.ny.gov	All Notifications
Kelly Lewandowski Site Control	625 Broadway Albany, New York 12233	T: 518-402-9569 Kelly.Lewandowski@dec.ny.gov	Notifications 1 and 8
New York State Department of Health (NYSDOH)			
Julia Kenney Project Manager	Empire Plaza Corning State Plaza Albany, NY 12233-0001	T:518-402-7873 Julia.Kenney@health.ny.gov	Notifications 4, 6, and 7

*Note: Notifications are subject to change and will be updated as necessary.

** Note: Numbers in this column reference the numbered bullets in the notification list in this section.

2 Summary of Previous Investigation and Remedial Actions

This section summarizes the Site's background information relevant to the development of this SMP, including the Site's location and description, physical setting, investigation and remedial history, Remedial Action Objectives (RAOs), and a summary of the remaining contamination.

2.1 Site Location and Description

The Site is located in the Town of Brighton, Monroe County, New York (see Figure 1 and Figure 2), and is identified as property parcel numbers 149.17-2-7.11 and 149.17-2-7.12 (Section 149.17, Block 2 and Lots 7.11 and 7.12) on the Town of Brighton, Monroe County Tax Map (see Figure 3). The Site is a combined approximate 5-acre area and is bounded by Metro Park and commercial properties to the north; several businesses followed by Brighton Henrietta Town Line Road to the south; a home health care business, nursing home, and East Henrietta Road to the east; and commercial and industrial properties to the west. The boundaries of the Site are more fully described in the Environmental Easement included as Appendix A. The owner of the Site parcels at the time of issuance of this SMP are:

235 Metro Park Associates, LLC.

The operator/tenant of the site parcels at the time of issuance of this SMP is:

TLF Graphics, Inc.

2.2 Physical Setting

An overview of the Site's physical setting is presented below, including a description of the Site's land use, geology, and hydrogeology.

2.2.1 Land Use

The Site consists of a manufacturing building that is approximately 20,000 square feet, an approximate 36,500 square foot parking lot, vacant grass areas, and landscaped lawn. The Site is zoned for commercial use and is currently used for label manufacturing and office space.

The properties adjoining the Site and in the neighborhood surrounding the Site primarily include commercial, light industrial, and utility rights-of-way. The properties immediately south of the Site include commercial properties; the properties immediately north of the Site include commercial properties; the properties immediately east of the Site include commercial properties; and the properties to the west of the Site include commercial and industrial properties.

2.2.2 Geology

Site geology consists of unconsolidated soil units underlain by sedimentary shale bedrock. These soil units are composed of low-permeability, undifferentiated clays and silts that extend down to approximately 65 to 68 feet below ground surface (bgs) and represent the main geologic unit at the Site. The silts and clays represent low-

energy deposition materials deposited in a glacial lake environment (i.e., glaciolacustrine deposits). This unit is underlain by a thin, coarser silty sand and gravelly sand unit extending down to approximately 74 feet bgs that likely represents glacial outwash deposits. This deeper sandy layer is then underlain by a very dense, undifferentiated glacial till consisting of silty sand from approximately 77 to 84 feet bgs on top of bedrock.

A cross-section line is shown on Figure 4 with the geologic cross-section shown on Figure 5. Site-specific boring logs and monitoring well construction logs are provided in Appendix D.

2.2.3 Hydrogeology

These low-permeability layers are considered a non-productive unit that yields little water (Arcadis 2011). Shallow groundwater at the Site ranges from 4 to 11 feet bgs. Average hydraulic conductivity in the clay and silt unit was 0.008 feet/day based on historical testing. Estimated groundwater velocity is less than 1 foot per year based on the low hydraulic conductivity, a measured hydraulic gradient of 0.005 feet/feet, and an estimated effective porosity of 0.3 (Arcadis 2016). Low-permeability soils are limiting contaminant migration.

A groundwater contour map from the August 7, 2023 gauging event is shown on Figure 6. Groundwater elevation data is provided in Table 1. Groundwater monitoring well construction logs are provided in Appendix D.

2.3 Investigation and Remedial History

The following narrative provides a remedial history timeline and a brief summary of the available project records to document key investigative and remedial milestones for the Site. Full titles for each of the reports referenced below are provided in Section 8 - References.

2.3.1 Operational History

Historically, a variety of light industrial/commercial enterprises have occupied the Site. The building, reportedly constructed in 1968, was used for the sales and service of electric motors and transformers until May 2001.

2.3.2 Investigation History

The Site has been subject to several environmental assessments and investigations as summarized below. Historical sampling locations are shown on Figure 4. Full titles for each of the reports referenced below are provided in Section 8.

- Environmental Audit Report (Eder Associates Consulting Engineers, P.C. 1988). Several areas of concern (AOCs) were identified during the site audit, and recommendations for corrective measures were suggested. The site inspection identified stained concrete in the drum storage area, a floor drain near the motor parts degreasing unit that connected to the storm sewer, improperly labeled hazardous waste drums, and the contents of transformers needed to be identified and properly labeled. It was suggested that the identified floor drain be plugged or diverted to the sanitary sewer system.
- Subsurface Investigation (Eder Associates Consulting Engineers, P.C. 1989). As a result of the Environmental Audit, a subsurface investigation was conducted in March 1989 to estimate the degree and extent of contamination in the vicinity of the drum storage area. Based on the results of this investigation, it

was recommended that the upper 2 feet of soil, from an area extending 10 feet from the edge of the drum storage area, be removed.

- Subsurface Investigation (Piedmont Equipment Incorporated 1999). This investigation included reviewing public documents with respect to the closure of two underground storage tanks (USTs) in 1990. The documents indicated that two tanks were removed in September 1990 and replaced with USTs. Additionally, a subsurface investigation was conducted in September 1999 to identify the impacts to soil and groundwater with respect to historically identified recognized environmental concerns. Five soil borings were installed in September 1999; two of these borings were located in the vicinity of soil stains on the storage yard, and the additional three borings were installed near the USTs. Both soil and water samples were analyzed for target compound list volatile organic compounds (VOCs) by United States Environmental Protection Agency (USEPA) Method 8260, stars list VOCs by USEPA Method 8021, and semi-volatile organic compounds by USEPA Method 8270. In addition, soil samples were also analyzed for lead. Only one soil sample, located near the USTs, had a lead concentration above the method detection limit.
- Supplementary Subsurface Investigation (Ridge Environmental Services, Inc. 2000). This investigation was conducted to evaluate the extent of contamination near the concrete pad, to identify a potential source of the contamination, and provide recommendations for additional steps to be taken, if any. This investigation included installing six shallow soil borings in the area surrounding the concrete storage pad and three temporary groundwater monitoring wells at locations along the perimeter of the Site to monitor groundwater quality migrating to and from the Site.

  The investigation concluded that hydraulic conductivity at the Site is very low, the rate of groundwater flow is extremely low, groundwater contamination is not migrating to or from the Site, and soil above the water table is not impacted, except for an area in the immediate vicinity of the concrete pad.

  Based on the results of this investigation, it was recommended that a supplementary sampling program be conducted to further refine the extent of impacts to soil and groundwater and to confirm the limited depth of contaminated groundwater in the area north and east of the concrete pad, as well as north of the UST area.
- Phase I Environmental Site Assessment Report (Passero Associates, P.C. [Passero] 2000a). A Phase I investigation was conducted in July 2000, which recommended additional investigation to characterize the environmental conditions more thoroughly at the Site. Additionally, the Phase I investigation recommended making the two USTs compliant with the federal UST regulation or properly removing them in accordance with NYSDEC Part 613.9 Petroleum Bulk Tank Regulations when they were no longer required for petroleum storage at the Site.

  Ridge Environmental Services, Inc. performed an environmental investigation in May 2000 that identified various chlorinated compounds. The groundwater concentrations were greater than the NYSDEC groundwater standards, and a supplemental sampling program was recommended to further refine the extent and depth of impacted groundwater. A subsurface drilling program was recommended to characterize Site soils concurrently with the groundwater sampling program.

  Due to the historical use of the building being used to service electrical components, it was recommended that wipe samples be collected in the former service area because of the historical presence of polychlorinated biphenyls (PCBs) in transformers and oil-stained floors.
- Supplemental Phase II Environmental Site Investigation (Passero 2000b). A Phase II Investigation conducted in September 2000 and April 2001 characterized impacts within the warehouse facility and subsurface soil and groundwater impacts at the Site. Data from this investigation indicated that the contaminated groundwater plume had not migrated offsite and identified two distinct sources of tetrachloroethylene

groundwater contamination. The first source area is located east of the building, and the second source area is located beneath the driveway northeast of the building. Based on parent/daughter products, the investigation concluded that the second source area was more recent.

- The Site owner entered into the State's Voluntary Clean Up Agreement Program in October 2001 and completed the following Interim Remedial Measures (IRMs) in September 2002:
  - UST Removal – On September 16, 2002, two tanks registered as 2,000-gallon USTs were discovered to be one 4,000-gallon UST that was vaulted into two 2,000-gallon compartments. No soils were removed from the tank pit in connection with the tank removal. Based on the appearance of the tank when removed, the absence of odor, visible staining, or product, and the photoionization detector screening of tank soils, the UST did not appear to be a source of contamination in Site soils or groundwater.
  - Surficial Cleanup – During the Phase II work conducted in 2002, staining was noted on surficial soils east of the building at the northwest corner of a fenced area. Geoprobe sampling indicated that the contamination was limited to surficial soil. Three small areas of surficial oil-stained soil were removed.
  - PCBs Cleanup – In September 2000, 10 wipe samples were collected for PCB analysis from the concrete floor in the eastern portion of the building. Nine of the 10 total wipe samples showed low or non-detect concentrations of PCBs. One sample slightly exceeded the USEPA PCB guidance criteria. An IRM, consisting of pressure washing the floor in accordance with the Code of Federal Regulations 40 Subpart G, Section 761.125, was completed. Several areas of staining on the concrete walls were also pressure washed as part of this IRM. Seventeen additional wipe samples were collected and submitted for PCB analysis subsequent to the IRM. Each location exhibited low or no PCB detections.
- Voluntary Cleanup Site Investigation Report (Passero 2005). The activities during this investigation consisted of installing and sampling groundwater monitoring wells. Eleven monitoring wells were installed in April 2003, and groundwater samples were collected in June and December 2003 for VOC analysis. The June 2003 groundwater results indicated that three of the 11 monitoring wells had elevated VOC concentrations, which was confirmed with the December 2003 data results.
- Remedial Design Investigation Report (Passero 2007). A Remedial Design Investigation was conducted to identify the environmental impacts related to soil and groundwater. The activities during this investigation consisted of installing 11 additional wells (seven shallow wells, three deep wells, and one intermediate well). One sample exhibiting the highest potential contamination, based on visual evidence (staining) and photoionization detector measurements, was submitted for laboratory analysis from each soil boring. Results of this investigation indicated that none of the soil samples exhibited VOCs at concentrations greater than 6 NYCRR Part 375 (NYSDEC 2006) unrestricted use soil cleanup objectives (SCOs). The groundwater data from this investigation confirmed two independent plumes of trichloroethylene-impacted groundwater. The first area was located near the southwest corner of the building, and the second area was located in the driveway area east of the loading docks.
- Remedial Investigation and Feasibility Study (Passero 2008). This report was prepared to summarize investigation activities conducted onsite since 1988. This Feasibility Study identified four AOCs:
  - Impacted groundwater in the northeast area of the Site;
  - Impacted groundwater near the southeast corner of the building;
  - Impacted sub-slab vapor; and
  - Impacted surficial soils.

- Supplemental Investigation and a Feasibility Study Report (Arcadis 2011). A Supplemental Investigation was conducted to characterize impacts to Site media more thoroughly and included:
  - Collecting indoor air and sub-slab soil gas samples within the existing office/warehouse facility;
  - Performing a perimeter soil vapor sampling program;
  - Completing two soil borings to characterize overburden stratigraphy;
  - Collecting groundwater samples from the existing monitoring well network to confirm VOC contamination in the AOCs and establish concentrations of certain constituents that could impact the applicability of potential remedial alternatives; and
  - Performing hydraulic conductivity testing at select monitoring well locations to characterize groundwater flow and provide the necessary data to evaluate remedial alternatives.

  This Feasibility Study reviewed the feasibility of potential remedies for the Site. Based on the results of this comparative analysis, in-situ reductive dichlorination of the two primary source areas was selected to reduce chlorinated volatile organic compound (CVOC) concentrations to targeted levels. In addition, monitored natural attenuation (MNA) of the overall site-wide impacted groundwater was also recommended.
- Remedial Action Work Plan (Arcadis 2015a). The March 2012 Record of Decision (ROD) (NYSDEC 2012) identified the site remedy as in-situ reductive dichlorination to restore groundwater source(s) to pre-released conditions to the extent practical. The remedy was designed to achieve these objectives by focusing biological treatment of CVOCs in groundwater via in-situ reductive dechlorination. In-situ reductive dechlorination is an anaerobic biological treatment process that involves delivering a degradable organic carbon source to a contaminated zone. Introduction of a degradable organic carbon substrate leads to molecular hydrogen production through fermentation reactions, which is substituted for chlorine atoms in the reductive dichlorination process used by dechlorinating bacteria. CVOCs are transformed to less chlorinated compounds and then to non-chlorinated compounds, resulting in mass destruction.
- Pilot Test and MNA Assessment Report (Arcadis 2016). Arcadis proposed conducting a Pilot Injection Program to test the efficacy of the selected remedy. During the pilot test, shallow groundwater and groundwater mounding resulted in groundwater rising near the surface such that, if tests were continued, groundwater discharge to the surface would have occurred. The pilot results and observations indicated that the proposed remedy or other injection-based remedies were not feasible at the Site due to soil conditions, depth of groundwater, and other factors.
- Emerging Contaminant Sampling Assessment Report (Arcadis 2021a). In July 2021, per the NYSDEC's request, three wells were selected for emerging contaminant sampling to assess per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane concentrations upgradient, downgradient, and onsite. Results indicated that PFAS detected onsite potentially originated offsite and that groundwater with PFAS and 1,4-dioxane concentrations exceeding screening criteria is not migrating offsite. The report recommended no further action with respect to PFAS and 1,4-dioxane.
- Monitored Natural Attenuation Assessment Report (Arcadis 2021b). A site-wide groundwater sampling event was conducted to collect updated VOC concentration and MNA parameter data. This data provided a review of the environmental fate and stability of plume areas and supporting indicators of biological MNA processes and indicated MNA of CVOCs is occurring at the Site.

2.4 Remedial Action Objectives

2.4.1 Remedial Action Objectives Listed in the Record of Decision

The RAOs for the Site, as listed in Section 6 of the ROD dated March 2012 (NYSDEC 2012), are as follows:

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of, volatiles from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Remove the source of ground or surface water contamination.

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

2.4.2 Remedial Action Objectives Listed in the Amended Record of Decision

The RAOs for the Site, as listed in Section 8 of the Amended Record of Decision (AROD) dated July 2023 (NYSDEC 2023), are as follows:

Groundwater

RAOs for Public Health Protection

- Prevent ingestion of groundwater with contaminant levels exceeding drinking water standards.
- Prevent contact with, or inhalation of, volatiles from contaminated groundwater.

RAOs for Environmental Protection

- Restore ground water aquifer to pre-disposal/pre-release conditions, to the extent practicable.
- Remove the source of ground or surface water contamination.

Soil

RAOs for Public Health Protection

- Prevent ingestion/direct contact with contaminated soil.
- Prevent inhalation of or exposure from contaminants volatilizing from contaminants in soil.

RAOs for Environmental Protection

- Prevent migration of contaminants that would result in groundwater or surface water contamination.

- Prevent impacts to biota from ingestion/direct contact with soil causing toxicity or impacts from bioaccumulation through the terrestrial food chain.

Soil Vapor

RAOs for Public Health Protection

- Mitigate impacts to public health resulting from existing, or the potential for, soil vapor intrusion into buildings at a site.

2.5 Remaining Contamination

The extent of contamination at the Site is presented in the following subsections.

2.5.1 Soil

Based on historical investigation activities, CVOCs in surface soil and subsurface soil indicate no detections greater than commercial use SCOs. An area where two polycyclic aromatic hydrocarbons (benzo(a)pyrene and dibenzo(a,h)pyrene) were detected above the commercial use SCOs in surface soil was subsequently paved in 2006, limiting direct exposure. Additionally, arsenic was detected above commercial SCOs in soil boring BH-16, which was installed in 2002. This sample was collected from 4 to 5 feet bgs and has site cover (soil and grass) limiting direct exposure.

Table 2 summarizes the analytical results for surface soil samples and Table 3 summarizes analytical results for subsurface soil samples collected at the Site compared to Protection of Groundwater Use and Commercial Use SCOs at the Site after completion of the remedial action. Additionally, remaining detected surface and subsurface soil analytical results are summarized on Figure 7 and Figures 8a, 8b, 8c, and 8d, respectively. Please note that 2006 BH-11 through BH-17 sample locations could not be identified on historical maps and, therefore, their location and data are not presented on summary figures.

2.5.2 Groundwater

Table 4 summarizes the analytical results for groundwater compared to the NYSDEC Technical and Operational Guidance Series 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (NYSDEC 2008) after completion of the remedial action. Primary constituents of concern are CVOCs and include the following:

- 1,1,1-Trichloroethane;
- 1,1-Dichloroethane;
- 1,1-Dichloroethene;
- cis-1,2-Dichloroethene;
- Tetrachloroethene;
- Trichloroethene; and
- Vinyl Chloride.

Recent analytical data indicates that natural attenuation is occurring in groundwater at the Site, and impacted groundwater is not migrating offsite. Additionally, detected groundwater analytical results are presented on Figure 9.

During the October 21, 2020, groundwater sampling event, additional groundwater samples were collected from a subset of the Site wells for PFAS and 1,4-dioxane analysis (also known as emerging contaminants). This sampling event was repeated during the August 14, 2024, groundwater sampling event. Table 5 summarizes PFAS and 1,4-dioxane groundwater results, and Figure 10 summarizes detected PFAS and 1,4-dioxane groundwater results. Detected concentrations of PFAS in upgradient monitoring well MW-01 indicates PFAS detected in MW-04S and MW-17S potentially originates offsite. Concentrations of PFAS and 1,4-dioxane at the downgradient edge of the Site (MW-17S) marginally exceeded screening criteria.

2.5.3 Soil Vapor/Indoor Air

Results for historical sub-slab soil vapor, indoor air, and outdoor air samples collected from the building in June 2010 and March 2014 indicated no discernable exposure pathway to Site-related impacts (Arcadis 2015b). More recent soil vaporing sampling results collected from the building in February 2023, February 2024, and February 2025 confirm that no discernable exposure pathway to Site-related impacts exists (Arcadis 2025). Table 6 summarizes the soil vapor and indoor and outdoor air sample analytical results collected at the Site. Figure 11 summarizes detected soil vapor and indoor and outdoor air sample analytical results.

3 Institutional and Engineering Control Plan

3.1 General

Since remaining contamination exists at the Site, ICs and ECs are required to protect human health and the environment. This IC/EC Plan describes the procedures for the implementation and management of all IC/ECs at the Site. The IC/EC Plan is one component of the SMP and is subject to revision by the NYSDEC project manager.

This plan provides:

- A description of all IC/ECs on the Site;
- The basic implementation and intended role of each IC/EC;
- A description of the key components of the ICs set forth in the Environmental Easement;
- A description of the controls to be evaluated during each required inspection and periodic review;
- A description of plans and procedures to be followed for implementation of IC/ECs, such as the implementation of the EWP (as provided in Appendix E) for the proper handling of remaining contamination that may be disturbed during maintenance or redevelopment work on the Site; and
- Any other provisions necessary to identify or establish methods for implementing the IC/ECs required by the site remedy, as determined by the NYSDEC project manager.

3.2 Institutional Controls

A series of ICs is required by the AROD (NYSDEC 2023) to: (1) implement, maintain and monitor EC systems; (2) prevent future exposure to remaining contamination; and (3) limit the use and development of the Site to commercial and industrial uses only. Adherence to these ICs on the Site is required by the Environmental Easement and will be implemented under this SMP. ICs identified in the Environmental Easement may not be discontinued without an amendment to or extinguishment of the Environmental Easement. The IC boundaries are shown on Figure 3.

These ICs are:

- The property may be used for: commercial and industrial use.
- All ECs must be operated and maintained as specified in this SMP.
- All ECs must be inspected at a frequency and in a manner defined in the SMP.
- The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Monroe County Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department.
- Groundwater and other environmental or public health monitoring must be performed as defined in this SMP.
- Data and information pertinent to site management must be reported at the frequency and in a manner as defined in this SMP.

- All future activities that will disturb remaining contaminated material must be conducted in accordance with this SMP.
- Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in this SMP.
- Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical component of the remedy shall be performed as defined in this SMP.
- Access to the Site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by the Environmental Easement.
- The potential for vapor intrusion must be evaluated for any buildings developed in the area within the IC boundaries noted on Figure 3, and any potential impacts that are identified must be monitored or mitigated.
- Vegetable gardens and farming on the Site are prohibited.
- An evaluation shall be performed to determine the need for further investigation and remediation should large scale redevelopment occur, if any of the existing structures are demolished, or if the subsurface is otherwise made accessible.

3.3 Engineering Controls

An overview of the ECs established for the Site is presented below.

3.3.1 Cover

Exposure to remaining contamination at the Site is prevented by the cover system placed over the Site. This cover system is comprised of a minimum of 12 inches of clean soil, asphalt pavement, concrete-covered sidewalks, and/or concrete building slabs. Figure 12 presents the location of the cover system. The EWP provided in Appendix E outlines the procedures required to be implemented in the event the cover system is breached, penetrated, or temporarily removed. Procedures for the inspection of this cover are provided in the Monitoring and Sampling Plan included in Section 4 of this SMP. Any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) (Appendix F) and the NYSDOH's Generic Community Air Monitoring Plan (Appendix G). Any breach of the Site's cover system must be overseen by a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State.

3.3.2 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, remedial processes are considered completed when monitoring indicates that the remedy has achieved the RAOs identified by the decision document. The framework for determining when remedial processes are complete is provided in Section 6.4 of NYSDEC DER-10 (NYSDEC 2010a, or current version). Unless waived by the NYSDEC project manager, confirmation samples of applicable environmental media are required before terminating any remedial actions at the Site. Confirmation samples require Category B deliverables and a Data Usability Summary Report.

As discussed below, the NYSDEC project manager may approve termination of a groundwater monitoring program. When a remedial party receives this approval, the remedial party will decommission all Site-related monitoring, injection, and recovery wells as per the NYSDEC CP-43 policy (NYSDEC 2009, or current version).

The remedial party will also conduct any needed site restoration activities, such as asphalt patching and decommissioning treatment system equipment. In addition, the remedial party will conduct any necessary restoration of vegetation coverage, trees, and wetlands, and will comply with NYSDEC and United States Army Corps of Engineers regulations and guidance. Also, the remedial party will ensure that no ongoing erosion is occurring on the Site.

3.3.2.1 Cover

The composite cover system is a permanent control and the quality and integrity of this system will be inspected at defined, regular intervals in accordance with this SMP in perpetuity.

3.3.2.2 Monitoring Wells Associated with Monitored Natural Attenuation

Groundwater monitoring activities to assess natural attenuation will continue, as determined by the NYSDEC project manager in consultation with NYSDOH project manager, until residual groundwater concentrations are found to be consistently below ambient water quality standards, the Site standards, criteria and guidance, or have become asymptotic at an acceptable level over an extended period. In the event that monitoring data indicates that monitoring for natural attenuation may no longer be required, a proposal to discontinue the monitoring will be submitted by the remedial party. Monitoring will continue until permission to discontinue is granted in writing by the NYSDEC project manager. If groundwater contaminant levels become asymptotic at a level that is not acceptable to the NYSDEC project manager, additional source removal, treatment, and/or control measures will be evaluated.

4 Monitoring and Sampling Plan

4.1 General

This Monitoring and Sampling Plan describes the measures for evaluating the overall performance and effectiveness of the remedy. This Monitoring and Sampling Plan may only be revised with approval of the NYSDEC project manager. Details regarding the sampling procedures, data quality usability objectives, analytical methods, etc., for all samples collected as part of site management for the Site are included in the Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP) provided in Appendix H and Appendix I, respectively.

This Monitoring and Sampling Plan describes the methods to be used for:

- Sampling and analysis of all appropriate media (e.g., groundwater, indoor air, soil vapor, soils);
- Assessing compliance with applicable NYSDEC standards, criteria and guidance, particularly groundwater standards and 6 NYCRR Part 375 SCOs (NYSDEC 2006, or current version) for soil; and
- Evaluating site information periodically to confirm that the remedy continues to be effective in protecting public health and the environment.

To adequately address these issues, this Monitoring and Sampling Plan provides information on:

- Sampling locations, protocol, and frequency;
- Information on all designed monitoring systems;
- Analytical sampling program requirements;
- Inspection and maintenance requirements for monitoring wells;
- Monitoring well decommissioning procedures; and
- Annual inspection and periodic certification.

Reporting requirements are provided in Section 7 of this SMP.

4.2 Site-Wide Inspection

Site-wide inspections will be performed once per year. These periodic inspections must be conducted when the ground surface is visible (i.e., no snow cover). Site-wide inspections will be performed by a qualified environmental professional as defined in 6 NYCRR Part 375 (NYSDEC 2006, or current version), a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State. Modification to the frequency or duration of the inspections will require prior approval from the NYSDEC project manager. Site-wide inspections will also be performed after all severe weather conditions that may affect ECs or monitoring devices. During these inspections, an inspection form will be completed as provided in Appendix J. The form will compile sufficient information to assess the following:

- Compliance with all ICs, including site usage;
- An evaluation of the condition and continued effectiveness of ECs;
- General Site conditions at the time of the inspection;
- Whether stormwater management systems, such as basins and outfalls, are working as designed;

- The site management activities being conducted including, where appropriate, confirmation sampling and a health and safety inspection; and
- Confirm that Site records are up to date.

Inspections of all remedial components installed at the Site will be conducted. A comprehensive site-wide inspection will be conducted and documented according to the SMP schedule, regardless of the frequency of the Periodic Review Report (PRR). The inspections will determine and document the following:

- Whether ECs continue to perform as designed;
- If these controls continue to be protective of human health and the environment;
- Compliance with requirements of this SMP and the Environmental Easement;
- Achievement of remedial performance criteria; and
- If Site records are complete and up to date.

Reporting requirements are outlined in Section 7 of this SMP.

Inspections will also be performed in the event of an emergency. If an emergency such as a natural disaster or an unforeseen failure of any of the ECs occurs that reduces or has the potential to reduce the effectiveness of ECs in place at the Site, verbal notice to the NYSDEC project manager must be given by noon of the following day. In addition, an inspection of the Site will be conducted within 5 days of the event to verify the effectiveness of the IC/ECs implemented at the Site by a qualified environmental professional, as defined in 6 NYCRR Part 375 (NYSDEC 2006, or current version). Written confirmation must be provided to the NYSDEC project manager within 7 days of the event that includes a summary of actions taken, or to be taken, and the potential impact to the environment and the public. The remedial party will submit follow-up status reports to the NYSDEC project manager within 45 days of the event on actions taken to respond to any emergency event requiring ongoing responsive action, describing and documenting actions taken to restore the effectiveness of the ECs.

4.3 Post-Remediation Media Monitoring and Sampling

Samples shall be collected from groundwater monitoring wells on a routine basis. Sampling locations, required analytical parameters, and schedule are provided in Table 4.1 – Post-Remediation Sampling Requirements and Schedule, below. Modification to the frequency or sampling requirements will require prior approval from the NYSDEC project manager.

Table 4.1 – Post-Remediation Sampling Requirements and Schedule

Sampling Location	Analytical Parameters				Water-Level Monitoring	Schedule
	VOCs[1]	MNA Parameters[2]	VOCs[3]	PFAS and 1,4-Dioxane[4]		
MW-04S, MW-04D, MW-05, MW-06, MW-10, MW-13S, MW-14S, MW-15S, MW-16S, MW-16I, MW-19, and MW-20	X	X			X	Annually
MW-02, MW-12S, and MW-17S	X				X	Annually
MW-01, MW-03, MW-07, MW-08, MW-09, MW-11S,					X	Annually

Sampling Location	Analytical Parameters				Water-Level Monitoring	Schedule
	VOCs[1]	MNA Parameters[2]	VOCs[3]	PFAS and 1,4-Dioxane[4]		
MW-12D, MW-13D, MW-17D, and MW-18						
MW-01, MW-04S, MW-17S				X		Triennially, beginning in 2024
IA-1, IA-2, I-A3, IA-4, IA-5, OA-1, SS-1, SS-3, and SS-5			X			Annually for 3 consecutive years (2023-2025)

Note:
1. VOCs by USEPA Method 8260.
2. MNA parameters include: total organic carbon (USEPA Method 9060A), nitrate (USEPA Method 353.2), total and dissolved iron (USEPA Method 6010C), sulfate (USEPA Method 9056A), dissolved gasses (methane, ethene, and ethane) (USEPA Method RSK-175), and alkalinity (USEPA Method SM2320B).
3. VOCs by USEPA Method TO-15.
4. PFAS by USEPA Modified Method 537 and 1,4-dioxane by USEPA Modified Method 8270 SIM or as per current guidance.

Detailed sample collection and analytical procedures and protocols are provided in the FSP (Appendix H) and the QAPP (Appendix I).

4.3.1 Groundwater Sampling

Groundwater monitoring will be performed annually to assess the performance of the remedy. Modification of the frequency or the sampling requirements will require prior approval from the NYSDEC project manager.

The network of monitoring wells has been installed to monitor upgradient, onsite, and downgradient groundwater conditions at the Site. The network of onsite wells has been designed based on the following criteria:

1. Confirm that groundwater-flow patterns have not changed appreciably.
2. Document the quality of groundwater entering the Site.
3. Document that the extent of groundwater impacted by remaining contamination remains stable or is decreasing.

The monitoring well network includes two sentinel wells that monitor downgradient plume migration. Sentinel wells are uncontaminated wells located directly downgradient of the plume and upgradient of sensitive receptors. The monitoring well network for this Site includes the following sentinel wells: MW-12S and MW17S. These wells were selected as sentinel wells because they are located hydraulically downgradient from the Site.

Periodic groundwater level gauging during the groundwater sampling event and groundwater sampling, as described in the following subsections, will be completed to meet these objectives.

4.3.1.1 Groundwater Level Gauging

To meet criteria #1, synoptic rounds of groundwater levels will be collected annually at Site monitoring wells. Water-level monitoring will be performed in conjunction with groundwater sampling (discussed in Section 4.3.1.2). As such, groundwater levels will be measured (prior to sampling) whenever groundwater samples are collected from Site monitoring wells.

A potentiometric surface map will be prepared depicting the water table following completion of each groundwater level gauging event.

4.3.1.2 Groundwater Sampling

To meet criteria #2 and #3, groundwater samples will be periodically collected from the monitoring wells listed in Table 4.1. Based on historical groundwater data, the extent of impacted groundwater at the Site is stable. Therefore, groundwater sampling will be performed annually to assess natural attenuation. Based on groundwater sampling activity results, the quantity of wells sampled or the frequency of sampling may be reduced. Any modification to the frequency or sampling requirements presented in this SMP will require prior approval from the NYSDEC. Monitoring will continue until written permission to discontinue is granted by the NYSDEC. This SMP will be modified to reflect changes in the groundwater sampling plan once approved by the NYSDEC.

Well construction details, including the well identification number, depths, diameter, and screened intervals of the wells to be sampled are presented in Table 7. Monitoring well construction logs are included in Appendix D of this document.

Groundwater samples will be collected from the wells listed in Table 4.1 using low-flow purging and sampling techniques in accordance with the FSP (Appendix H). The groundwater samples will be submitted to an NYSDOH-certified laboratory for analysis of the parameters listed in Table 4.1. Analytical parameters to be analyzed, along with the detection limits and minimum reporting limits to be achieved by the Environmental Laboratory Approval Program-certified laboratory, are included in the QAPP (Appendix I). Analytical results will be reported using NYSDEC Analytical Services Protocol Category B data deliverables. The analytical results will be validated in accordance with USEPA National Functional Guidelines and as per DER-10 (NYSDEC 2010a, or current version).

4.3.1.3 Monitoring Well Repairs, Replacement, and Decommissioning

If biofouling or silt accumulation occurs in the onsite monitoring wells, the wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced, if an event renders the wells unusable.

Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance.

The NYSDEC project manager will be notified prior to any repair or decommissioning of any monitoring well for the purpose of replacement, and the repair or decommissioning and replacement process will be documented in the subsequent PRR. Well decommissioning without replacement will be done only with the prior approval of the NYSDEC project manager. Well abandonment will be performed in accordance with NYSDEC's guidance entitled CP-43: Groundwater Monitoring Well Decommissioning Procedures (NYSDEC 2009, or current version). Monitoring wells that are decommissioned because they have been rendered unusable will be replaced in kind in the nearest available location, unless otherwise approved by the NYSDEC project manager.

The sampling frequency may only be modified with the prior approval of the NYSDEC project manager. This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC project manager.

Deliverables for the groundwater monitoring program are specified in Section 7 – Reporting Requirements.

4.3.2 Soil Vapor Intrusion Sampling

Soil vapor intrusion sampling has been performed annually for a period of 3 consecutive years (beginning in 2023) to assess the performance of the remedy. Based on the 3 consecutive soil vapor intrusion sampling events the NYSDEC project manager, with concurrence from the NYSDOH project manager, has determined additional sampling events are not needed at this time.

Additional soil vapor intrusion sampling and the modification to the frequency or sampling requirements will require prior approval from the NYSDEC project manager. If sampling is required in the future, sampling will be performed at the locations listed in Table 4.1 using sampling techniques in accordance with the FSP (Appendix H). The soil vapor (SS), indoor air (IA), and outdoor air (OA) samples will be submitted to a NYSDOH-certified laboratory for analysis for the parameters listed in Table 4.1. Analytical parameters to be analyzed, along with the detection limits and minimum reporting limits to be achieved by the Environmental Laboratory Approval Program-certified laboratory, are included in the QAPP. Analytical results will be reported using NYSDEC Analytical Services Protocol Category B data deliverables. The analytical results will be validated in accordance with DER-10 (NYSDEC 2010a, or current version) as well as USEPA National Functional Guidelines.

The sampling frequency may only be modified with the prior approval of the NYSDEC project manager. This SMP will be modified to reflect changes in sampling plans approved by the NYSDEC project manager.

Deliverables for the soil vapor intrusion sampling program are specified in Section 7.0 – Reporting Requirements.

4.3.3 Monitoring and Sampling Protocol

All sampling activities will be recorded in a field book and associated sampling log as provided in the FSP (Appendix H). Other observations (e.g., groundwater monitoring well integrity) will be noted on the sampling log. The sampling log will serve as the inspection form for the monitoring network. Additional detail regarding monitoring and sampling protocols are provided in the site-specific FSP provided in Appendix H of this document.

5 Operation and Maintenance Plan

The site remedy does not rely on any mechanical systems, such as groundwater treatment systems, sub-slab depressurization systems or air sparge/soil vapor extraction systems to protect public health and the environment. Therefore, the operation and maintenance of such components is not included in this SMP.

6 Periodic Assessments/Evaluations

6.1 Climate Change Vulnerability Assessment

Increases in both the severity and frequency of storms/weather events, an increase in sea level elevations along with accompanying flooding impacts, shifting precipitation patterns and wide temperature fluctuation, resulting from global climactic change and instability, have the potential to significantly impact the performance, effectiveness and protectiveness of a given site and associated remedial systems. Vulnerability assessment provide information so that the site and associated remedial systems are prepared for the impacts of increasing frequency and intensity of severe storms/weather events and associated flooding. This section provides a current vulnerability assessment that evaluates the vulnerability of the site and/or engineering controls to severe storms/weather events and associated flooding. This section also identifies vulnerability assessment updates that will be conducted for the site in PRRs.

A climate screening assessment was prepared for the Site and is detailed in Table 6.1 below. The assessment was completed following the guidelines presented in the U.S. Climate Resilience Toolkit (https://toolkit.climate.gov/) and the resources identified in the notes section of Table 6.1. As noted in the table, modeled data and results are provided (with discussion) in Appendix K.

Table 6.1 – Climate Screening Assessment

Potential Vulnerability	Screening Method	Potential Risk (Yes/No)	Conclusion
Flooding/Flood Plain	Climate Explorer[1]	Yes	Potential risk to Site workers and transportation to/from the Site.
Sea Level Rise	Sea Level Rise Viewer[2]	No	Screening tool indicates no further evaluation required.
Site Drainage and Storm Water Management	Climate Explorer[1], Review of Site Drainage Infrastructure	No	Site is within an industrial park with established storm sewer system. Precipitation at the Site sheet flows to collection basins with no preferential pathways.
Erosion	Landslide Hazard Maps[3], Review of Site Topography.	No	Screening tool indicates no further evaluation required for landslides. Site is generally topographically flat with surface cover (vegetation/asphalt).
High Wind	EPA's Climate Resilience Evaluation and Awareness Tool (CREAT)[4]	Yes	Potential risk to Site workers and transportation to/from the Site.
Drought	Climate Explorer[1]	No	See precipitation data modeling in Appendix K. Screening tool indicates no appreciable change in precipitation over the next several decades. No further evaluation required.

Potential Vulnerability	Screening Method	Potential Risk (Yes/No)	Conclusion
High Heat	Climate Explorer[1]	Yes	See temperature data modeling in Appendix K. Potential risk to Site workers.
Extreme Cold	Climate Explorer[1]	Yes	See temperature data modeling in Appendix K. Potential risk to Site workers.
Electricity	Review of Site/Remedy Assets Electricity Usage	No	Remedy and Site assets rely on battery power only. No further evaluation required.
Containment Releases Due to Storm Damage	Review of Remaining Contamination in Site Media and Waste Management Procedures.	No	Site cover is adequate to prevent potential risk. Waste generated during routine monitoring will be managed in accordance with the FSP and removed in a timely manner. No further evaluation required.
Wildfires	Wildfire Risk to Communities[5]	No	See wildfire risk modeling in Appendix K. Screening tool indicates no further evaluation required.

Notes:
1. Climate Explorer (https://crt-climate-explorer.nemac.org)
2. Sea Level Rise viewer (https://coast.noaa.gov/slr/#)
3. Landslide Hazard Maps (https://www.usgs.gov/programs/landslide-hazards/maps)
4. The USEPA Climate Resilience Evaluation and Awareness Tool (CREAT) (https://www.epa.gov/crwu/climate-resilience-evaluation-and-awareness-tool)
5. Wildfire Risk to Communities (https://wildfirerisk.org)

Table 8 evaluates potential vulnerabilities identified in table 6.1 with respect to Site-specific assets (Site assets and remedy assets). The Site ECs are passive and are not vulnerable to changing or extreme weather conditions. The remaining contaminated materials are below the site cover and below the ground surface, which is anticipated to withstand foreseeable rain, snow, and potential flooding and protect against long-term direct contact exposures. Based on the thickness and integrity of the site cover systems, contaminated materials are not anticipated to be released from the Site during extreme weather events, including flooding. Wastes generated during routine monitoring events will be appropriately managed in accordance with the FSP and properly disposed of offsite in a timely manner. Potential weather-related vulnerabilities (extreme temperatures [hot/cold], severe weather) exist with respect to worker health and safety and will be mitigated by using Best Management Practices (BMPs), the Site HASP, and scheduling work around potential severe weather events.

Future Climate Screening processes and results will be documented in the form of a completed checklist to be included in the PRR and/or in a brief standalone letter report. The Climate Checklist to be filled out and included in the PRR is provided in Appendix J. If the Climate Screening results indicate that a CVA is necessary, a complete CVA Report will be developed. The CVA Report will be included as an Appendix or Attachment in relevant documents and/or submitted as a standalone report. If a CVA is not required, the Climate Screening will be updated during each PRR or after any changes in the remedy or in Site conditions to determine if the exposure to vulnerabilities has changed and to confirm that the Site is still resilient.

6.2 Green Remediation Evaluation

The NYSDEC's DER-31 Green Remediation (NYSDEC 2010b, or current version) provides the framework for DER's approach to remediating sites in the context of the larger environment, a concept known as Green Remediation. Green Remediation (or greener cleanups) considers all the environmental effects of remedy implementation and incorporates specific actions/alternatives to minimize the overall environmental footprint of cleanup actions.

The NYSDEC's DER-31 Green Remediation (NYSDEC 2010b, or current version) requires that green remediation concepts and techniques be considered during all stages of the remedial program, including site management, with the goal of improving the sustainability of the cleanup and summarizing the net environmental benefit of any implemented green technology. This section provides an environmental footprint analysis of the remedy, as implemented at the time of this SMP. This section of the SMP also provides a summary of green remediation evaluations to be completed for the Site during site management, and as reported in PRRs.

The Standard Guide for Greener Cleanups (E2893-16E01) (American Society for Testing and Materials [ASTM] 2017) provides guidance for screening, prioritizing, selecting, and implementing BMPs and greener cleanup BMPs in a verifiable manner. Considering the relatively low complexity of the current remedy (groundwater monitoring, soil vapor intrusion monitoring, and site cover), a BMP analysis was conducted to identify BMPs that could help reduce/minimize the environmental footprint over the remedy lifespan. Consistent with NYSDEC's DER-31 (NYSDEC 2010b, or current version) and the site remedy, the environmental footprint/BMPs analysis for the Site focused on the following core elements of greener cleanups:

- Minimizing the total energy use and maximizing renewable energy use;
- Reducing direct and indirect air pollutants and greenhouse emissions;
- Minimizing water use and impacts to water resources;
- Minimizing waste generated (reduce, reuse, and recycle); and
- Protecting the land and ecosystem.

A BMP checklist for the Site, consistent with the Standard Guide for Greener Cleanups (E2893-16E01) (ASTM 2017) and the USEPA Green Remediation BMPs (https://clu-in.org/greenremediation/bmps), has been prepared and is provided in Appendix L.

The environmental footprint factors for the Site are associated with field activities and transportation impacts related to the long-term monitoring detailed in Section 4 and are directly affected by monitoring/inspection frequency and remedy lifespan. Other factors affecting the remedy's environmental footprint include waste generation (low-flow groundwater sampling), transportation, and disposal and minor factors common to all remedies, such as routine management and reporting.

The BMP checklist in Appendix L focuses on minimizing the remedy environmental footprint by:

- Reducing air pollution and fuel consumption by coordinating and consolidating field activities and labor time (i.e. scheduling sampling and inspection at the same time);
- Bundling routine Site activities with other nearby sites (if possible);
- Implementing a no-idling policy and carpooling where possible;
- Choosing the nearest offsite laboratories, material vendors, and waste disposal facilities to minimize transportation impacts;

- Reducing sampling frequency and/or number of samples collected/analyzed (if feasible and approved by the NYSDEC project manager); and
- Implementing no-purging groundwater sampling procedures for groundwater sample collection to minimize/eliminate waste (if feasible and approved by the NYSDEC project manager).

The BMP checklist will be reviewed annually or after any changes in the remedy or in Site conditions to evaluate that the listed BMPs are still applicable and to identify any additional potential minimization or optimization opportunities. Any changes to the BMP checklist will be reported in the PRR.

6.2.1 Timing of Green Remediation Evaluations

For major remedial system components, green remediation evaluations and corresponding modifications will be undertaken as part of a formal Remedial System Optimization (RSO), or at any time that the NYSDEC project manager feels appropriate (e.g., during significant maintenance events or in conjunction with storm recovery activities).

Modifications resulting from green remediation evaluations will be routinely implemented and scheduled to occur during planned/routine operation and maintenance activities after approval from the DER project manager. Reporting of these modifications will be presented in the PRR.

6.2.2 Frequency of System Checks, Sampling and Other Periodic Activities

Transportation to and from the Site, use of consumables in relation to visiting the Site in order to collect samples, and shipping samples to a laboratory for analyses have direct and/or inherent energy costs. The schedule and/or means of these periodic activities have been prepared so that these tasks can be accomplished in a manner that does not impact remedy protectiveness but reduces expenditure of energy or resources.

6.2.3 Metrics and Reporting

As discussed in Section 7.0 and as shown in Appendix J – Site Management Forms, information on energy usage, solid waste generation, transportation and shipping, water usage and land use, and ecosystems will be recorded to facilitate and document consistent implementation of green remediation during site management and to identify corresponding benefits. A set of metrics has been developed and will be evaluated over time to ensure that green remediation actions are achieving the desired results.

6.3 Remedial System Optimization

An RSO study will be conducted any time that the NYSDEC project manager or the remedial party requests in writing that an in-depth evaluation of the remedy is needed. An RSO may be appropriate if any of the following occur:

- The remedial actions have not met or are not expected to meet RAOs in the time frame estimated in the Decision Document;
- The management and operation of the remedial system is exceeding the estimated costs;
- The remedial system is not performing as expected or as designed;

- Previously unidentified source material may be suspected;
- Plume shift has potentially occurred;
- Site conditions change due to development, change of use, change in groundwater use, etc.;
- There is an anticipated transfer of the site management to another remedial party or agency; and
- A new and applicable remedial technology becomes available.

An RSO will provide a critique of a site's conceptual model, give a summary of past performance, document current cleanup practices, summarize progress made toward the site's cleanup goals, gather additional performance or media specific data and information, and provide recommendations for improvements to enhance the ability of the present system to reach RAOs or to provide a basis for changing the remedial strategy.

If requested, the RSO study will focus on overall Site cleanup strategy, process optimization, and management with the intent of identifying impediments to cleanup and improvements to Site operations to increase efficiency, cost effectiveness, and remedial time frames. Green remediation technology and principals are to be considered when performing the RSO.

7 Reporting Requirements

7.1 Site Management Reports

All site management inspection, maintenance, and monitoring events will be recorded on the appropriate site management forms provided in Appendix J. These forms are subject to NYSDEC project manager revision. All site management inspection, maintenance, and monitoring events will be conducted by a qualified environmental professional as defined in 6 NYCRR Part 375, (NYSDEC 2006, or current version), a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State.

All applicable inspection forms and other records, including media sampling data and system maintenance reports, generated for the Site during the reporting period will be provided in electronic format to the NYSDEC project manager in accordance with the requirements of Table 7.1 below and summarized in the PRR.

Table 7.1 – Schedule of Interim Monitoring/Inspection Reports

Task/Report	Reporting Frequency[2]
MNA Assessment Report	Annually
Indoor Air and Sub-Slab Vapor Report	Upon request
PRR[1]	Annually

Notes:
1. Activities and results of each site inspection will be summarized in the respective PRR.
2. The frequency of events will be conducted as specified until otherwise approved by the NYSDEC project manager.

All interim monitoring/inspection reports will include, at a minimum:

- Date of event or reporting period;
- Name, company, and position of person(s) conducting monitoring/inspection activities;
- Description of the activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet);
- Type of samples collected (e.g., soil, groundwater, indoor air, outdoor air, sub-slab vapor);
- Copies of all field forms completed (e.g., well sampling logs, chain-of-custody documentation);
- Sampling results in comparison to appropriate standards/criteria;
- A figure illustrating sample type and sampling locations;
- Copies of all laboratory data sheets and the required laboratory data deliverables required for all points sampled (to be submitted electronically in the NYSDEC-identified format);
- Any observations, conclusions, or recommendations; and
- A determination as to whether contaminant conditions have changed since the last reporting event.

Routine maintenance event reporting forms will include, at a minimum:

- Date of event;

- Name, company, and position of person(s) conducting maintenance activities;
- Description of maintenance activities performed;
- Any modifications to the system;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents noted (included either on the checklist/form or on an attached sheet); and
- Other documentation, such as copies of invoices for maintenance work, receipts for replacement equipment, etc. (attached to the checklist/form).

Non-routine maintenance event reporting forms will include, at a minimum:

- Date of event;
- Name, company, and position of person(s) conducting non-routine maintenance/repair activities;
- Description of non-routine activities performed;
- Where appropriate, color photographs or sketches showing the approximate location of any problems or incidents (included either on the form or on an attached sheet); and
- Other documentation, such as copies of invoices for repair work, receipts for replacement equipment, etc. (attached to the checklist/form).

Data will be reported in digital format as determined by the NYSDEC. Currently, data is to be supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link http://www.dec.ny.gov/chemical/62440.html.

7.2 Periodic Review Report

A PRR will be submitted to the NYSDEC project manager beginning 16 months after the Certificate of Completion or equivalent document (e.g., Satisfactory Completion Letter) is issued. After submittal of the initial PRR, the next PRR shall be submitted annually to the NYSDEC project manager or at another frequency as may be required by the NYSDEC project manager. In the event that the Site is subdivided into separate parcels with different ownership, a single PRR will be prepared that addresses the Site described in Appendix A – Environmental Easement. The report will be prepared in accordance with NYSDEC's DER-10 (NYSDEC 2010a, or current version) and submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the PRR. The report will include:

- Identification, assessment and certification of all ECs/ICs required by the remedy for the Site.
- Results of the required annual site inspections, fire inspections and severe condition inspections, if applicable.
- Description of any change of use, import of materials, or excavation that occurred during the certifying period.
- All applicable site management forms and other records generated for the Site during the reporting period in the NYSDEC-approved electronic format, if not previously submitted.
- Identification of any wastes generated during the reporting period, along with waste characterization data, manifests, and disposal documentation.
- A summary of any discharge monitoring data and/or information generated during the reporting period, with comments and conclusions.

- Data summary tables and graphical representations of contaminants of concern by media (e.g., soil, groundwater, air, sub-slab vapor), which include a listing of all compounds analyzed, along with the applicable standards, with all exceedances highlighted. These tables and figures will include a presentation of past data as part of an evaluation of contaminant concertation trends, including but not limited to:
  - Trend monitoring graphs that present groundwater contaminant levels from before the start of the remedy implementation to the most current sampling data;
  - Trend monitoring graphs depicting system influent analytical data on a per event and cumulative basis;
  - Operation and maintenance data summary tables;
  - A current plume map for sites with remaining groundwater contamination; and
  - A groundwater elevation contour map for each gauging event.
- Results of all analyses, copies of all laboratory data sheets, and the required laboratory data deliverables for all samples collected during the reporting period will be submitted in digital format as determined by the NYSDEC project manager. Currently, data is supplied electronically and submitted to the NYSDEC EQuIS™ database in accordance with the requirements found at this link: http://www.dec.ny.gov/chemical/62440.html.
- A site evaluation, which includes the following:
  - The compliance of the remedy with the requirements of the site-specific Remedial Action Work Plan, AROD (NYSDEC 2023), or Decision Document;
  - Any new conclusions or observations regarding Site contamination based on inspections or data generated by the Monitoring and Sampling Plan for the media being monitored;
  - Recommendations regarding any necessary changes to the remedy and/or Monitoring Sampling Plan;
  - An update to the climate screening to determine if the remedy remains resilient to projected changes in climate hazards.
  - An update to the CVA if Site or external conditions have changed since the previous assessment or if the Climate Screening determines one is now required, and recommendations to address vulnerabilities.
  - A summary of the Green Remediation evaluation, including a quantitative and qualitative overview of a site's environmental impacts and recommendations to improve the remedy's environmental footprint. The PRR will include the completed Summary of Green Remediation Metrics form provided in Appendix J.
  - An evaluation of trends in contaminant levels in the affected media to determine if the remedy continues to be effective in achieving remedial goals as specified by the RAWP (Arcadis 2015a), AROD (NYSDEC 2023), or Decision Document; and
  - The overall performance and effectiveness of the remedy.

7.2.1 Certification of Institutional and Engineering Controls

Following the last inspection of the reporting period, a qualified environmental professional as defined in 6 NYCRR Part 375 (NYSDEC 2006, or current version) will prepare, and include in the PRR, the following certification as per the requirements of NYSDEC DER-10 (NYSDEC 2010a, or current version):

"For each institutional or engineering control identified for the Site, I certify that all of the following statements are true:

- *The inspection of the Site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under my direction;*
- *The institutional control and/or engineering control employed at this Site is unchanged from the date the control was put in place, or last approved by the Department;*
- *Nothing has occurred that would impair the ability of the control to protect the public health and environment;*
- *Nothing has occurred that would constitute a violation or failure to comply with any site management plan for this control;*
- *Access to the Site will continue to be provided to the Department to evaluate the remedy, including access to evaluate the continued maintenance of this control;*
- If a financial assurance mechanism is required under the oversight document for the Site, the mechanism remains valid and sufficient for the intended purpose under the document;
- *Use of the Site is compliant with the environmental easement;*
- *The engineering control systems are performing as designed and are effective;*
- *To the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the Site remedial program and generally accepted engineering practices; and*
- *The information presented in this report is accurate and complete.*

I certify that all information and statements in this certification form are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law. I, [insert name of Professional Engineer], of [business address], am certifying as 235 Metro Park Brighton's Representative for the Site."

The signed certification will be included in the PRR.

The PRR will be submitted, in electronic format, to the NYSDEC project manager and the NYSDOH project manager. The PRR may also need to be submitted in hard-copy format if requested by the NYSDEC project manager.

7.3 Corrective Measures Work Plan

If any component of the remedy is found to have failed, or if the periodic certification cannot be provided due to the failure of an IC or EC or failure to conduct site management activities, a Corrective Measures Work Plan will be submitted to the NYSDEC project manager for approval. This plan will explain the failure and provide the details and schedule for performing work necessary to correct the failure. Unless an emergency condition exists, no work will be performed pursuant to the Corrective Measures Work Plan until it has been approved by the NYSDEC project manager.

7.4 Remedial System Optimization Report

If an RSO is to be performed (see Section 6.3), upon completion of an RSO, an RSO report must be submitted to the NYSDEC project manager for approval. A general outline for the RSO report is provided in Appendix M. The RSO report will document the research/investigation and data gathering that was conducted, evaluate the results and facts obtained, present a revised conceptual site model, and present recommendations. RSO

recommendations are to be implemented upon approval from the NYSDEC project manager. Additional work plans, design documents, HASPs, etc., may still be required to implement the recommendations, based upon the actions that need to be taken. A final engineering report and update to the SMP may also be required.

The RSO report will be submitted, in electronic format, to the NYSDEC project manager and the NYSDOH project manager.

8 References

Arcadis. 2011. Supplemental Remedial Investigation and Feasibility Study Report, 235 Metro Park Site, Town of Brighton, NY. April 2011.

Arcadis. 2015a. Remedial Action Work Plan, 235 Metro Park Site, Town of Brighton, NY. July 2015.

Arcadis. 2015b. Pilot Test Work Plan, 235 Metro Park Site, Town of Brighton, NY. November 2015.

Arcadis. 2016. Pilot Test and MNA Assessment Report, 235 Metro Park Brighton Site, Site No. 828150, Rochester, NY. August 2016.

Arcadis. 2021a. Emerging Contaminant Sampling Assessment Report, 235 Metro Park Site, Town of Brighton, NY. July 2021.

Arcadis. 2021b. 2021 Monitored Natural Attenuation Assessment Report, 235 Metro Park Site, Town of Brighton, NY. July 2021.

Arcadis. 2025. Soil Vapor Intrusion Evaluation Summary Report, 235 Metro Park Brighton Site, Rochester, NY. June 2, 2025.

ASTM. 2017. Standard Guide for Greener Cleanups (E2893-16E01). January 6, 2017.

Eder Associates Consulting Engineers, P.C. 1988. Environmental Audit Report, 235 Metro Park Site, Town of Brighton, NY. December 1988.

Eder Associates Consulting Engineers, P.C. 1989. Subsurface Investigation, 235 Metro Park Site, Town of Brighton, NY. May 1989.

NYSDEC. 2006. 6 NYCRR Part 375 Environmental Remediation Programs Subparts 375-1 to 375-4 & 375-6. December 14, 2006.

NYSDEC. 2008. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (Technical and Operational Guidance Series 1.1.1), Reissued June 1998 and addended April 2000, June 2004 and February 2023.

NYSDEC. 2009. CP-43: Groundwater Monitoring Well Decommissioning Policy. November 2009.

NYSDEC. 2010a. DER-10 Technical Guidance for Site Investigation and Remediation. May 3, 2010.

NYSDEC. 2010b. DER-31 Green Remediation. August 11, 2010.

NYSDEC. 2012. Record of Decision, 235 Metro Park Brighton, State Superfund Project, Brighton, Monroe County. Site Number 828150. March 2012.

NYSDEC. 2023. Amended Record of Decision, 235 Metro Park Brighton, Town of Brighton, Monroe County, New York. Site Number 828150. July 2023.

Passero. 2000a. Phase I Environmental Site Assessment Report, 235 Metro Park, Town of Brighton, NY. July 10 2000.

Passero. 2000b. Supplemental Phase II Environmental Site Investigation, 235 Metro Park, Town of Brighton, NY. September 2000.

Passero. 2005. Voluntary Cleanup Site Investigation Report, 235 Metro Park, Town of Brighton, NY. December 7, 2005.

Passero. 2007. Remedial Design Investigation Report, 235 Metro Park, Town of Brighton, NY. January 23, 2007.

Passero. 2008. Remedial Investigation and Feasibility Study, 235 Metro Park, Town of Brighton, NY. December, 31 2008.

Piedmont Equipment Incorporated.1999. Subsurface Investigation, 235 Metro Park Site, Town of Brighton, NY. September 27, 1999.

Ridge Environmental Services, Inc. 2000. Supplementary Subsurface Investigation, 235 Metro Park Site, Town of Brighton NY, May 26, 2000.

Tables

Table 1
Gauging Data
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Well ID	Measuring Point Elevation	Screened Interval (ft bgs)	12/7/2015			10/19/2020		
			Depth to Bottom (ft bTOC)	Depth to Water (ft bTOC)	Groundwater Elevation	Depth to Bottom (ft bTOC)	Depth to Water (ft bTOC)	Groundwater Elevation
MW-01	554.71	6-16	17.10	5.01	552.29	16.87	9.09	545.62
MW-02	553.26	5-15	17.04	3.41	552.09	17.04	11.20	544.30
MW-03	552.17	10-20	19.92	2.70	549.70	19.92	4.99	547.41
MW-04S	552.37	6-16	15.54	2.79	549.91	15.54	5.29	547.41
MW-04D	552.57	67.5-77.5	75.95	21.71	531.19	75.92	23.23	529.67
MW-05	551.87	10.5-30.5	30.25	3.16	548.84	30.24	5.90	546.10
MW-06	552.62	10-20	21.64	6.46	548.24	21.61	7.89	546.81
MW-07	551.80	6.5-16.5	18.59	5.63	548.77	18.61	12.98	541.42
MW-08	552.50	4.5-14.5	16.83	5.77	550.23	16.83	12.18	543.82
MW-09	553.03	13.5-23.5	24.45	4.67	550.63	25.46	10.72	544.58
MW-10	550.62	5-15	14.03	0.69	549.91	14.06	3.76	546.84
MW-11S	554.07	6-16	20.08	6.83	551.57	20.09	13.05	545.35
MW-12S	553.33	6-16	19.00	6.92	550.08	19.00	13.13	543.87
MW-12D	553.66	61-71	72.99	24.66	532.14	72.98	25.82	530.98
MW-13S	550.26	6-16	15.61	1.00	549.40	15.58	3.15	547.25
MW-13D	550.75	68-75	76.55	22.71	530.69	76.55	24.03	529.37
MW-14S	550.18	6-16	16.13	0.61	549.29	16.15	2.87	547.03
MW-15S	553.20	6-16	18.32	5.98	549.92	18.32	8.68	547.22
MW-16S	552.17	6-16	15.52	4.60	547.60	15.52	5.58	546.62
MW-16I	552.02	43-53	51.03	8.29	543.91	51.02	9.21	542.99
MW-17S	550.84	6-16	15.60	6.06	547.74	15.61	7.59	543.31
MW-17D	550.79	52-62	64.63	23.56	527.34	64.69	24.70	529.10
MW-18	552.25	10-20	18.92	4.60	--	18.92	5.81	--
MW-19	552.51	5-15	21.99	3.85	--	19.00	6.38	546.13
MW-20	551.44	5-15	19.36	1.40	--	19.39	5.53	--

See notes on last page.

Table 1
Gauging Data
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Well ID	Measuring Point Elevation	Screened Interval (ft bgs)	8/7/2023			8/12/2024		
			Depth to Bottom (ft bTOC)	Depth to Water (ft bTOC)	Groundwater Elevation	Depth to Bottom (ft bTOC)	Depth to Water (ft bTOC)	Groundwater Elevation
MW-01	554.71	6-16	14.26	5.75	548.96	14.26	5.86	548.85
MW-02	553.26	5-15	14.52	5.41	547.85	14.50	6.86	546.40
MW-03	552.17	10-20	19.81	2.85	549.32	19.80	3.80	548.37
MW-04S	552.37	6-16	15.47	2.23	550.14	15.47	2.82	549.55
MW-04D	552.57	67.5-77.5	75.88	21.63	530.94	75.91	21.75	530.82
MW-05	551.87	10.5-30.5	30.14	4.22	547.65	30.23	2.62	549.25
MW-06	552.62	10-20	21.62	6.02	548.77	18.80	3.80	548.82
MW-07	551.80	6.5-16.5	15.88	7.53	544.27	15.88	8.60	543.20
MW-08	552.50	4.5-14.5	13.27	5.53	546.97	13.28	6.44	546.06
MW-09	553.03	13.5-23.5	23.20	5.86	547.17	23.19	6.25	546.78
MW-10	550.62	5-15	14.06	0.50	550.12	14.20	1.85	548.77
MW-11S	554.07	6-16	15.61	6.40	547.67	15.60	0.56	553.51
MW-12S	553.33	6-16	15.14	6.09	547.24	15.12	6.66	546.67
MW-12D	553.66	61-71	70.03	21.18	532.48	70.60	21.20	532.46
MW-13S	550.26	6-16	15.57	0.89	549.37	15.58	1.35	548.91
MW-13D	550.75	68-75	73.98	20.09	530.66	75.00	20.20	530.55
MW-14S	550.18	6-16	16.13	0.50	549.68	16.15	1.10	549.08
MW-15S	553.20	6-16	15.07	3.03	550.17	15.13	3.82	549.38
MW-16S	552.17	6-16	15.53	4.50	547.67	15.58	5.00	547.17
MW-16I	552.02	43-53	50.99	8.36	543.66	50.96	8.50	543.52
MW-17S	550.84	6-16	15.61	6.68	544.16	15.60	6.90	543.94
MW-17D	550.79	52-62	61.74	20.54	530.25	61.80	20.52	530.27
MW-18	552.25	10-20	18.92	4.37	547.88	18.90	4.62	547.63
MW-19	552.51	5-15	19.05	3.51	549.00	19.05	4.56	547.95
MW-20	551.44	5-15	19.23	2.70	548.74	19.30	3.22	548.22

See notes on last page.

Table 1
Gauging Data
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Notes:

1. Elevations referenced to the 1988 North American Vertical Datum, surveyed December 19, 2013, and resurveyed October 21, 2020, following well repairs. October 2020 groundwater elevations referenced to the December 19, 2013 survey.
2. MW-6 surface completion converted from a stick-up to a flush mount on August 8, 2023. Measuring point re-surveyed by Fisher Associates on December 1, 2023, using the coordinate system referenced in Note 1.
3. -- Indicates measurement not taken or not available.
4. The August 12, 2024 depth to water measurement at MW-11S is suspected to be a field error and was not used for development of the potentiometric surface.

Acronyms and Abbreviations:

ft bgs - feet below ground surface
ft bTOC - feet below top of casing

Table 2
Surface Soil Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID: / Date Collected:	Protection of Groundwater Soil Cleanup Objectives	Commercial Soil Cleanup Objectives	Units	Surface-Smpl-1 09/17/02	Surface-Smpl-2 09/17/02	Surface-Smpl-3 09/17/02	Surface-Smpl-4 09/17/02	Surface-Smpl-5 09/17/02	Surface-Smpl-6 09/17/02	Surface-Smpl-7 09/17/02	Surface-Smpl-8 09/17/02	Surface-Smpl-9 09/17/02	Surface-Smpl-10 09/17/02	Surficial-E 02/22/06	Surficial-NW 02/23/06	Surficial-SW 02/22/06
Volatile Organic Compounds																
1,1-Dichloroethene	0.33	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
Acetone	0.05	500	mg/kg	0.046 J	0.018 J	0.020 J	0.019 J	ND	0.0090 J	ND	ND	**0.057 J**	ND	NA	NA	NA
Chloroform	0.37	350	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0030 J	NA	NA	NA
Chloromethane	- -	- -	mg/kg	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	0.25	500	mg/kg	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	- -	- -	mg/kg	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyclohexane	- -	- -	mg/kg	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	- -	- -	mg/kg	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane	- -	- -	mg/kg	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	1	390	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
Isopropylbenzene	- -	- -	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
m,p-Xylene	- -	- -	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
Methyl acetate	- -	- -	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
Methyl tert-butyl ether	0.93	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
Methylcyclohexane	- -	- -	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
Methylene Chloride	0.05	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
o-Xylene	- -	- -	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
Styrene	- -	- -	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
Tetrachloroethene	1.3	150	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
Toluene	0.7	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
trans-1,2-Dichloroethene	0.19	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
trans-1,3-Dichloropropene	- -	- -	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
Trichloroethene	0.47	200	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
Semivolatile Organic Compounds																
Acenaphthene	98	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.018 J	0.25 J	0.038 J
Acetophenone	- -	- -	mg/kg	ND	ND	ND	ND	0.065 J	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	1,000	500	mg/kg	0.068 J	ND	ND	ND	0.12 J	0.12 J	0.84 J	0.13 J	0.066 J	0.048 J	0.066 J	0.91	0.16 J
Benzo(a)anthracene	1	5.6	mg/kg	0.32 J	ND	ND	0.11 J	0.88	0.75	**4.1**	0.53	0.37 J	0.37 J	0.38 J	**2.9**	0.83
Benzo(a)pyrene	22	1	mg/kg	0.37 J	ND	ND	0.11 J	1.4	0.81 J	5.0	0.51	0.46	0.55	0.36 J	2.0	0.72
Benzo(b)fluoranthene	1.7	5.6	mg/kg	0.42	ND	ND	0.13 J	1.7	0.84 J	**5.1**	0.56	0.58	0.66	0.80	**3.0**	1.2
Benzo(g,h,i)perylene	1,000	500	mg/kg	0.25 J	ND	ND	0.079 J	1.5	0.78 J	4.2	0.37 J	0.40 J	0.64	0.066 J	0.28 J	0.13 J
Benzo(k)fluoranthene	1.7	56	mg/kg	0.22 JH	ND	ND	0.076 J	1.0	0.52 J	**3.4 J**	0.42	0.34 J	0.40	0.84	1.0	0.30 J
bis(2-Ethylhexyl)phthalate	- -	- -	mg/kg	0.060 J	ND	ND	0.039 J	0.068 J	ND	3.4 J	0.075 J	0.13 J	0.071 J	ND	ND	ND
Butylbenzylphthalate	- -	- -	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	0.12 J	ND	ND	ND	ND
Carbazole	- -	- -	mg/kg	ND	ND	ND	ND	0.15 J	0.073 J	0.55 J	0.11 J	0.064 J	0.057 J	0.054 J	0.75	0.13 J
Chrysene	1	56	mg/kg	0.37 J	ND	ND	0.11 J	**1.5**	0.86	**5.0**	0.61	0.53	0.59	0.53	**3.3**	0.99
Dibenzo(a,h)anthracene	1,000	0.56	mg/kg	0.056 J	ND	ND	ND	0.28 J	0.21 J	0.86 J	0.092 J	0.091 J	0.12 J	0.098 J	0.50	0.20 J

See notes on last page.

Table 2
Surface Soil Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID: / Date Collected:	Protection of Groundwater Soil Cleanup Objectives	Commercial Soil Cleanup Objectives	Units	Surface-Smpl-1 09/17/02	Surface-Smpl-2 09/17/02	Surface-Smpl-3 09/17/02	Surface-Smpl-4 09/17/02	Surface-Smpl-5 09/17/02	Surface-Smpl-6 09/17/02	Surface-Smpl-7 09/17/02	Surface-Smpl-8 09/17/02	Surface-Smpl-9 09/17/02	Surface-Smpl-10 09/17/02	Surficial-E 02/22/06	Surficial-NW 02/23/06	Surficial-SW 02/22/06
Semivolatile Organic Compounds (cont.)																
Dibenzofuran	210	350	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	0.14 J	0.018 J
Di-n-Butylphthalate	- -	- -	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	0.054 J	ND	ND	0.49	ND
Fluoranthene	1,000	500	mg/kg	0.90	0.053 J	ND	0.22 J	3.0	1.6	12	1.5	0.10	1.1	0.91	9.1 D	1.7
Fluorene	386	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.020 J	0.35 J	0.042 J
Indeno(1,2,3-cd)pyrene	8.2	5.6	mg/kg	0.24 J	ND	ND	0.078 J	1.3	0.76 J	3.8	0.36 J	0.47 J	0.54	0.36 J	1.7	0.67
Naphthalene	12	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	0.059 D	ND
Phenanthrene	1,000	500	mg/kg	0.42	ND	ND	0.093 J	0.94	0.47 J	5.4	0.79	0.46	0.34 J	0.42 J	6.4 D	0.80
Phenol	0.33	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND	0.33	**500**
Pyrene	1,000	500	mg/kg	0.72	0.050 J	ND	0.20 J	2.6	1.1	9.5	1.1	0.87	0.84	0.85	6.1 D	1.6
Polychlorinated Biphenyls																
Aroclor-1254	- -	- -	mg/kg	NA	0.0840	0.0970	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics																
Aluminum	- -	- -	mg/kg	14,800	9,560	6,370	13,700	12,400	928	6,500	11,400	13,100	6,740	NA	NA	NA
Arsenic	16	16	mg/kg	4.90	4.10	3.40	3.80	5.60	3.50	2.50	4.40	3.70	2.80	NA	NA	NA
Barium	820	400	mg/kg	106	76.9	47.8	108	97.1	ND	ND	76.7	87.2	61.0	NA	NA	NA
Cadmium	7.5	9.3	mg/kg	ND	ND	ND	ND	ND	2.30	ND	ND	NA	ND	NA	NA	NA
Calcium	- -	- -	mg/kg	12,400	40,800	111,000	15,200	18,600	133,000	11,300	4,250	6,010	54,900	NA	NA	NA
Chromium	- -	- -	mg/kg	17.6	11.0	8.60	18.0	15.9	10.0	9.60	16.6	28.6	10.1	NA	NA	NA
Cobalt	- -	- -	mg/kg	ND	ND	ND	ND	12.5	ND	ND	ND	ND	ND	NA	NA	NA
Copper	1,720	270	mg/kg	50.1	13.8	13.7	13.8	15.3	10.3	13.7	9.60	12.5	10.1	NA	NA	NA
Iron	- -	- -	mg/kg	21,300	16,300	11,500	21,200	24,400	9,880	10,600	17,900	19,000	13,500	NA	NA	NA
Lead	450	1,000	mg/kg	25.9	12.3	13.4	11.9	29.0	39.1	19.1	17.3	20.5	21.5	NA	NA	NA
Magnesium	- -	- -	mg/kg	7,050	8,330	13,100	4,190	8,870	80,100	5,410	3,300	3,950	23,800	NA	NA	NA
Manganese	2,000	10,000	mg/kg	435	465	366	310	938	296	268	282	309	550	NA	NA	NA
Mercury	0.73	2.8	mg/kg	ND	ND	ND	0.400	ND	ND	ND	ND	ND	ND	NA	NA	NA
Nickel	130	310	mg/kg	15.6	10.2	10.3	16.9	17.3	ND	ND	12.0	13.7	10.9	NA	NA	NA
Potassium	- -	- -	mg/kg	1,260	ND	ND	1,190	ND	ND	ND	ND	1,420	ND	NA	NA	NA
Vanadium	- -	- -	mg/kg	29.0	19.4	14.6	28.1	31.1	ND	14.7	24.4	25.3	16.9	NA	NA	NA
Zinc	2,480	10,000	mg/kg	345	72.6	110	77.0	98.2	1,120	65.9	68.4	81.6	73.5	NA	NA	NA

Notes:
1. Bold concentrations exceed 6NYCRR Part 375 Soil Cleanup Objectives for protection of groundwater.
2. Gray shaded concentrations exceed 6NYCRR Part 375 Commercial Use Soil Cleanup Objectives.
3. - - Indicates standard or guidance value does not exist.

Acronyms and Abbreviations:
mg/kg - milligrams per kilograms
NA - not analyzed
ND - not detected
NYCRR - New York Codes, Rules and Regulations

Lab Qualifiers:
D - Compound quantitated using a secondary dilution.
J - Indicates the result is less than the quantitation limit but greater than the method detection limit. The result is an approximate value.

Table 3
Subsurface Soil Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Sample ID: Sample Depth (ft bgs): Sample Date:	Protection of Groundwater Soil Cleanup Objectives	Commercial Soil Cleanup Objectives	Units	SS-01 0 - 2 03/06/89	SS-01 2 - 4 03/06/89	SS-02 0 - 2 03/06/89	SS-03 0 - 2 03/06/89	SS-06 0 - 2 03/06/89	SS-06 2 - 4 03/06/89	GP-101-S-3 4 - 6 09/02/99	GP-102-S-3 4 - 6 09/02/99	GP-103-S-1 2 - 4 09/02/99	GP-104-S-2 4 - 6 09/02/99
Volatile Organic Compounds													
1,1,1-Trichloroethane	0.68	500	mg/kg	ND	ND	0.25	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND
1,1,2-trichloro-1,2,2-trifluoroethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND
1,1,2-Trichloroethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND
1,1-Dichloroethane	0.27	240	mg/kg	ND	ND	ND	ND	ND	ND	ND	0.011	ND	ND
1,1-Dichloroethene	0.33	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	1.1	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	0.02	30	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	2.4	280	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	1.8	130	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	0.05	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	0.06	44	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Disulfide	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	0.76	22	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	1.1	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.37	350	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	0.25	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	1	390	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl acetate	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl ethyl ketone (MEK, 2-butanone)	0.12	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl isobutyl ketone (MIBK, 4-methyl-2-pentanone)	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	0.93	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylcyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	0.05	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
o-Xylene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	1.3	150	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

See notes on last page.

Table 3
Subsurface Soil Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Sample ID: Sample Depth (ft bgs): Sample Date:	Protection of Groundwater Soil Cleanup Objectives	Commercial Soil Cleanup Objectives	Units	SS-01 0 - 2 03/06/89	SS-01 2 - 4 03/06/89	SS-02 0 - 2 03/06/89	SS-03 0 - 2 03/06/89	SS-06 0 - 2 03/06/89	SS-06 2 - 4 03/06/89	GP-101-S-3 4 - 6 09/02/99	GP-102-S-3 4 - 6 09/02/99	GP-103-S-1 2 - 4 09/02/99	GP-104-S-2 4 - 6 09/02/99
Volatile Organic Compounds (cont.)													
Toluene	0.7	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	0.19	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	0.47	200	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	0.02	13	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds													
Acenaphthene	98	500	mg/kg	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND
Anthracene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND
Benzo(a)anthracene	1	5.6	mg/kg	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND
Benzo(a)pyrene	22	1	mg/kg	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND
Benzo(b)fluoranthene	1.7	5.6	mg/kg	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND
Benzo(g,h,i)perylene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND
Benzo(k)fluoranthene	1.7	56	mg/kg	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND
Chrysene	1	56	mg/kg	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND
Dibenzo(a,h)anthracene	1,000	0.56	mg/kg	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND
Di-n-Butylphthalate	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND
Fluorene	386	500	mg/kg	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	8.2	5.6	mg/kg	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND
Naphthalene	12	500	mg/kg	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND
Phenanthrene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND
Pyrene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	ND	ND	ND	ND
Total Petroleum Hydrocarbons													
TPH	- -	- -	mg/kg	89	89	410	47	840	50	NA	NA	NA	NA
Polychlorinated Biphenyls													
Total PCBs	3.2	1	mg/kg	0.0350	ND	0.0580	ND	0.549	ND	NA	NA	NA	NA
Inorganics													
Aluminum	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	16	16	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	820	400	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	1,720	270	mg/kg	15.0	10.0	19.0	13.0	15.0	12.0	NA	NA	NA	NA
Iron	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	450	1,000	mg/kg	20.0	1.00	28.0	18.0	29.0	11.0	ND	ND	ND	ND
Magnesium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	2,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	130	310	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	2,480	10,000	mg/kg	78.0	89.0	90.0	75.0	70.0	51.0	NA	NA	NA	NA

See notes on last page.

Table 3
Subsurface Soil Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Sample ID: / Sample Depth (ft bgs): / Sample Date:	Protection of Groundwater Soil Cleanup Objectives	Commercial Soil Cleanup Objectives	Units	GP-105-S-3 6 - 8 09/02/99	GP-202 2 - 4 3/1/2000*	GP-203 2 - 4 3/1/2000*	BH-2 3 - 6 09/06/00	BH-3 3 - 6 09/06/00	BH-4 3 - 6 09/06/00	BH-5 3 - 6 09/06/00	BH-6 3 - 4 09/06/00	BH-7 3 - 4 09/06/00	BH-8 3 - 4 09/06/00
Volatile Organic Compounds													
1,1,1-Trichloroethane	0.68	500	mg/kg	ND	NA	NA	ND	ND	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	- -	- -	mg/kg	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA
1,1,2-trichloro-1,2,2-trifluoroethane	- -	- -	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	- -	- -	mg/kg	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA
1,1-Dichloroethane	0.27	240	mg/kg	ND	NA	NA	ND	ND	ND	ND	ND	ND	NA
1,1-Dichloroethene	0.33	500	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
1,2,4-Trichlorobenzene	- -	- -	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
1,2-Dibromo-3-chloropropane	- -	- -	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
1,2-Dibromoethane	- -	- -	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
1,2-Dichlorobenzene	1.1	500	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
1,2-Dichloroethane	0.02	30	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
1,2-Dichloropropane	- -	- -	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
1,3-Dichlorobenzene	2.4	280	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
1,4-Dichlorobenzene	1.8	130	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
2-Hexanone	- -	- -	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
Acetone	0.05	500	mg/kg	NA	0.045 U	**0.14**	ND	ND	ND	ND	ND	ND	ND
Benzene	0.06	44	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
Bromodichloromethane	- -	- -	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
Bromoform	- -	- -	mg/kg	NA	NA	NA	ND	ND	ND	0.10 BH	ND	ND	NA
Bromomethane	- -	- -	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
Carbon Disulfide	- -	- -	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
Carbon Tetrachloride	0.76	22	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
Chlorobenzene	1.1	500	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
Chloroethane	- -	- -	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
Chloroform	0.37	350	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
Chloromethane	- -	- -	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
cis-1,2-Dichloroethene	0.25	500	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
cis-1,3-Dichloropropene	- -	- -	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
Cyclohexane	- -	- -	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
Dibromochloromethane	- -	- -	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
Dichlorodifluoromethane	- -	- -	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
Ethylbenzene	1	390	mg/kg	NA	0.074	0.0083 U	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	- -	- -	mg/kg	NA	NA	NA	ND	ND	ND	ND	NA	ND	NA
m,p-Xylene	- -	- -	mg/kg	NA	0.19	0.0083 U	ND	ND	ND	ND	0.011	ND	ND
Methyl acetate	- -	- -	mg/kg	NA	NA	NA	ND	ND	ND	ND	NA	NA	NA
Methyl ethyl ketone (MEK, 2-butanone)	0.12	500	mg/kg	NA	0.023 U	0.042	ND	ND	ND	ND	ND	ND	ND
Methyl isobutyl ketone (MIBK, 4-methyl-2-pentanone)	- -	- -	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	NA
Methyl tert-butyl ether	0.93	500	mg/kg	NA	NA	NA	ND	ND	ND	ND	NA	NA	NA
Methylcyclohexane	- -	- -	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	0.05	500	mg/kg	NA	NA	NA	ND	ND	ND	ND	ND	NA	NA
o-Xylene	- -	- -	mg/kg	NA	0.033	0.0083 U	ND	ND	ND	ND	ND	0.013	ND
Styrene	- -	- -	mg/kg	NA	NA	NA	ND	ND	NA	NA	ND	NA	NA
Tetrachloroethene	1.3	150	mg/kg	NA	NA	NA	ND	ND	0.0091	0.023	ND	ND	ND

See notes on last page.

Table 3
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Site Management Plan
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Sample ID: / Sample Depth (ft bgs): / Sample Date:	Protection of Groundwater Soil Cleanup Objectives	Commercial Soil Cleanup Objectives	Units	GP-105-S-3 6 - 8 09/02/99	GP-202 2 - 4 3/1/2000*	GP-203 2 - 4 3/1/2000*	BH-2 3 - 6 09/06/00	BH-3 3 - 6 09/06/00	BH-4 3 - 6 09/06/00	BH-5 3 - 6 09/06/00	BH-6 3 - 4 09/06/00	BH-7 3 - 4 09/06/00	BH-8 3 - 4 09/06/00
Volatile Organic Compounds (cont.)													
Toluene	0.7	500	mg/kg	NA	NA	NA	ND	ND	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	0.19	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	- -	- -	mg/kg	NA	NA	NA	ND	ND	NA	NA	ND	NA	NA
Trichloroethene	0.47	200	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichlorofluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	0.02	13	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds													
Acenaphthene	98	500	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	1,000	500	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1	5.6	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	22	1	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1.7	5.6	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	1,000	500	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	1.7	56	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	1	56	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	1,000	0.56	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-Butylphthalate	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	1,000	500	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	386	500	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	8.2	5.6	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	12	500	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	1,000	500	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	1,000	500	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons													
TPH	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls													
Total PCBs	3.2	1	mg/kg	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA
Inorganics													
Aluminum	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	16	16	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	820	400	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	1,720	270	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	450	1,000	mg/kg	10.8	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	2,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	130	310	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	2,480	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

See notes on last page.

Table 3
Subsurface Soil Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Sample ID: Sample Depth (ft bgs): Sample Date:	Protection of Groundwater Soil Cleanup Objectives	Commercial Soil Cleanup Objectives	Units	BH-9 0 - 4 09/06/00	BH-10 0 - 6 09/07/00	BH-11 0 - 4 09/07/00	BH-12 0 - 8 09/07/00	BH-13 0 - 8 09/07/00	BH-14 0 - 4 09/07/00	BH-18 1 - 3 04/12/01	BH-19 3 - 4 04/12/01	BH-101 2 - 3 04/12/01	BH-102 2 - 3 04/12/01	BH-103 2 - 3 04/12/01
Volatile Organic Compounds														
1,1,1-Trichloroethane	0.68	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
1,1,2,2-Tetrachloroethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
1,1,2-trichloro-1,2,2-trifluoroethane	- -	- -	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
1,1-Dichloroethane	0.27	240	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
1,1-Dichloroethene	0.33	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
1,2,4-Trichlorobenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	1.1	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	0.02	30	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
1,2-Dichloropropane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
1,3-Dichlorobenzene	2.4	280	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	1.8	130	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	- -	- -	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	0.05	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	0.06	44	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Bromodichloromethane	- -	- -	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Bromoform	- -	- -	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Bromomethane	- -	- -	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Carbon Disulfide	- -	- -	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	0.76	22	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Chlorobenzene	1.1	500	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	- -	- -	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.37	350	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Chloromethane	- -	- -	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
cis-1,2-Dichloroethene	0.25	500	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	- -	- -	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Cyclohexane	- -	- -	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	- -	- -	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Dichlorodifluoromethane	- -	- -	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	1	390	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylene	- -	- -	mg/kg	0.0095	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl acetate	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl ethyl ketone (MEK, 2-butanone)	0.12	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl isobutyl ketone (MIBK, 4-methyl-2-pentanone)	- -	- -	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	0.93	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylcyclohexane	- -	- -	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	0.05	500	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
o-Xylene	- -	- -	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	- -	- -	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	1.3	150	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

See notes on last page.

Table 3
Subsurface Soil Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Sample ID: Sample Depth (ft bgs): Sample Date:	Protection of Groundwater Soil Cleanup Objectives	Commercial Soil Cleanup Objectives	Units	BH-9 0 - 4 09/06/00	BH-10 0 - 6 09/07/00	BH-11 0 - 4 09/07/00	BH-12 0 - 8 09/07/00	BH-13 0 - 8 09/07/00	BH-14 0 - 4 09/07/00	BH-18 1 - 3 04/12/01	BH-19 3 - 4 04/12/01	BH-101 2 - 3 04/12/01	BH-102 2 - 3 04/12/01	BH-103 2 - 3 04/12/01
Volatile Organic Compounds (cont.)														
Toluene	0.7	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	0.19	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
trans-1,3-Dichloropropene	- -	- -	mg/kg	ND	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Trichloroethene	0.47	200	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Trichlorofluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Vinyl Chloride	0.02	13	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	ND	ND	ND
Semivolatile Organic Compounds														
Acenaphthene	98	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1	5.6	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	22	1	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1.7	5.6	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	1.7	56	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	1	56	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	1,000	0.56	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-Butylphthalate	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	386	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	8.2	5.6	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	12	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons														
TPH	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls														
Total PCBs	3.2	1	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Inorganics														
Aluminum	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	7,190	NA	NA	NA
Arsenic	16	16	mg/kg	NA	NA	NA	NA	NA	NA	NA	3.50	NA	NA	NA
Barium	820	400	mg/kg	NA	NA	NA	NA	NA	NA	NA	52.7	NA	NA	NA
Calcium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	51,200	NA	NA	NA
Chromium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	11.4	NA	NA	NA
Copper	1,720	270	mg/kg	NA	NA	NA	NA	NA	NA	NA	12.5	NA	NA	NA
Iron	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	15,000	NA	NA	NA
Lead	450	1,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	8.60	NA	NA	NA
Magnesium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	17,700	NA	NA	NA
Manganese	2,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	497	NA	NA	NA
Nickel	130	310	mg/kg	NA	NA	NA	NA	NA	NA	NA	13.3	NA	NA	NA
Potassium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	914	NA	NA	NA
Vanadium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	20.3	NA	NA	NA
Zinc	2,480	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	59.7	NA	NA	NA

See notes on last page.

Table 3
Subsurface Soil Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Sample ID: Sample Depth (ft bgs): Sample Date:	Protection of Groundwater Soil Cleanup Objectives	Commercial Soil Cleanup Objectives	Units	SS-1 0 - 1 10/15/02	SS-2 0 - 1 10/15/02	SS-3 1 - 2 10/15/02	SS-4 0 - 1 10/15/02	SS-5 0 - 1 10/15/02	SS-6 0 - 1 10/15/02	SS-7 0 - 1 10/15/02	SS-8 0 - 1 10/15/02	SS-9 0 - 1 10/15/02	SS-10 0 - 1 10/15/02	SS-11 1 - 2 10/15/02
Volatile Organic Compounds														
1,1,1-Trichloroethane	0.68	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	- -	- -	mg/kg	ND	ND	ND	ND	ND	0.0070 J	0.0070 J	ND	ND	ND	ND
1,1,2-trichloro-1,2,2-trifluoroethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	0.27	240	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	0.33	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	1.1	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	0.02	30	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	2.4	280	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	1.8	130	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	- -	- -	mg/kg	0.032 J	0.010 J	ND	ND	ND	ND	0.082 J	0.042 J	0.089 J	0.010 J	0.012 J
Acetone	0.05	500	mg/kg	0.032 J	0.010 J	ND	ND	ND	ND	**0.082 J**	0.042 J	**0.089 J**	0.010 J	0.012 J
Benzene	0.06	44	mg/kg	0.032 J	0.010 J	ND	ND	ND	ND	**0.082 J**	0.042 J	**0.089 J**	0.010 J	0.012 J
Bromodichloromethane	- -	- -	mg/kg	0.032 J	0.010 J	ND	ND	ND	ND	0.082 J	0.042 J	0.089 J	0.010 J	0.012 J
Bromoform	- -	- -	mg/kg	0.032 J	0.010 J	ND	ND	ND	ND	0.082 J	0.042 J	0.089 J	0.010 J	0.012 J
Bromomethane	- -	- -	mg/kg	0.032 J	0.010 J	ND	ND	ND	ND	0.082 J	0.042 J	0.089 J	0.010 J	0.012 J
Carbon Disulfide	- -	- -	mg/kg	0.032 J	0.010 J	ND	ND	ND	ND	0.082 J	0.042 J	0.089 J	0.010 J	0.012 J
Carbon Tetrachloride	0.76	22	mg/kg	0.032 J	0.010 J	ND	ND	ND	ND	0.082 J	0.042 J	0.089 J	0.010 J	0.012 J
Chlorobenzene	1.1	500	mg/kg	0.032 J	0.010 J	ND	ND	ND	ND	0.082 J	0.042 J	0.089 J	0.010 J	0.012 J
Chloroethane	- -	- -	mg/kg	0.032 J	0.010 J	ND	ND	ND	ND	0.082 J	0.042 J	0.089 J	0.010 J	0.012 J
Chloroform	0.37	350	mg/kg	0.032 J	0.010 J	ND	ND	ND	ND	0.082 J	0.042 J	0.089 J	0.010 J	0.012 J
Chloromethane	- -	- -	mg/kg	0.032 J	0.010 J	ND	ND	ND	ND	0.082 J	0.042 J	0.089 J	0.010 J	0.012 J
cis-1,2-Dichloroethene	0.25	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	0.14	ND	ND	ND
cis-1,3-Dichloropropene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	1	390	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl acetate	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl ethyl ketone (MEK, 2-butanone)	0.12	500	mg/kg	0.0090 J	ND	ND	ND	ND	ND	0.021 J	NA	0.026 J	ND	ND
Methyl isobutyl ketone (MIBK, 4-methyl-2-pentanone)	- -	- -	mg/kg	0.032 J	0.010 J	ND	ND	ND	ND	0.082 J	0.042 J	0.089 J	0.010 J	0.012 J
Methyl tert-butyl ether	0.93	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylcyclohexane	- -	- -	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0020 J	ND
Methylene Chloride	0.05	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0040 J
o-Xylene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	1.3	150	mg/kg	ND	ND	ND	ND	ND	ND	ND	0.056	ND	ND	ND

See notes on last page.

Table 3
Subsurface Soil Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Sample ID: Sample Depth (ft bgs): Sample Date:	Protection of Groundwater Soil Cleanup Objectives	Commercial Soil Cleanup Objectives	Units	SS-1 0 - 1 10/15/02	SS-2 0 - 1 10/15/02	SS-3 1 - 2 10/15/02	SS-4 0 - 1 10/15/02	SS-5 0 - 1 10/15/02	SS-6 0 - 1 10/15/02	SS-7 0 - 1 10/15/02	SS-8 0 - 1 10/15/02	SS-9 0 - 1 10/15/02	SS-10 0 - 1 10/15/02	SS-11 1 - 2 10/15/02
Volatile Organic Compounds (cont.)														
Toluene	0.7	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	0.19	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	0.47	200	mg/kg	ND	ND	ND	ND	0.0030 J	ND	ND	0.0060 J	ND	ND	ND
Trichlorofluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	0.02	13	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds														
Acenaphthene	98	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1	5.6	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	22	1	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1.7	5.6	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	1.7	56	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	1	56	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	1,000	0.56	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-Butylphthalate	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	0.056 J	NA	NA
Fluoranthene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	386	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	8.2	5.6	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	12	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons														
TPH	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls														
Total PCBs	3.2	1	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Inorganics														
Aluminum	- -	- -	mg/kg	12,700	NA	NA	NA	5,270	NA	NA	NA	NA	NA	NA
Arsenic	16	16	mg/kg	5.20	NA	NA	NA	3.10	NA	NA	NA	NA	NA	NA
Barium	820	400	mg/kg	114	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	- -	- -	mg/kg	4,510	NA	NA	NA	41,300	NA	NA	NA	NA	NA	NA
Chromium	- -	- -	mg/kg	18.1	NA	NA	NA	9.10	NA	NA	NA	NA	NA	NA
Copper	1,720	270	mg/kg	15.2	NA	NA	NA	9.00	NA	NA	NA	NA	NA	NA
Iron	- -	- -	mg/kg	22,200	NA	NA	NA	12,300	NA	NA	NA	NA	NA	NA
Lead	450	1,000	mg/kg	14.2	NA	NA	NA	6.20	NA	NA	NA	NA	NA	NA
Magnesium	- -	- -	mg/kg	3,880	NA	NA	NA	18,400	NA	NA	NA	NA	NA	NA
Manganese	2,000	10,000	mg/kg	19.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	130	310	mg/kg	19.5	NA	NA	NA	9.50	NA	NA	NA	NA	NA	NA
Potassium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	- -	- -	mg/kg	17.6	NA	NA	NA	17.7	NA	NA	NA	NA	NA	NA
Zinc	2,480	10,000	mg/kg	60.2	NA	NA	NA	177	NA	NA	NA	NA	NA	NA

See notes on last page.

Table 3
Subsurface Soil Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Sample ID: Sample Depth (ft bgs): Sample Date:	Protection of Groundwater Soil Cleanup Objectives	Commercial Soil Cleanup Objectives	Units	BH-1 4 - 6 10/09/02	BH-2 4 - 6 10/09/02	BH-3 12 - 14 10/09/02	BH-4 11 - 12 10/09/02	BH-5 4 - 5 10/09/02	BH-6 12 - 13 10/09/02	BH-7 11 - 15 10/09/02	BH-8 8 - 11 10/09/02	BH-9 19 - 22 10/09/02	BH-10 10 - 11 10/10/02	BH-11 4 - 5 10/10/02
Volatile Organic Compounds														
1,1,1-Trichloroethane	0.68	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	- -	- -	mg/kg	ND	ND	ND	ND	ND	0.0070 J	0.0070 J	ND	ND	ND	ND
1,1,2-trichloro-1,2,2-trifluoroethane	- -	- -	mg/kg	ND	ND	ND	0.010	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	- -	- -	mg/kg	ND	ND	ND	NA	ND	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	0.27	240	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	0.33	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	1.1	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	0.02	30	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	2.4	280	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	1.8	130	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	0.05	500	mg/kg	ND	ND	ND	ND	ND	0.012 J	ND	ND	ND	0.012 J	ND
Benzene	0.06	44	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Disulfide	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	0.76	22	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	1.1	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.37	350	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	0.25	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	1	390	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl acetate	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl ethyl ketone (MEK, 2-butanone)	0.12	500	mg/kg	ND	ND	ND	0.011	ND	ND	ND	ND	ND	ND	ND
Methyl isobutyl ketone (MIBK, 4-methyl-2-pentanone)	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	0.93	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylcyclohexane	- -	- -	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0020 J	ND
Methylene Chloride	0.05	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0040 J
o-Xylene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA
Styrene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA
Tetrachloroethene	1.3	150	mg/kg	ND	ND	ND	ND	ND	0.056	ND	0.056	ND	ND	ND

See notes on last page.

Table 3
Subsurface Soil Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Sample ID: / Sample Depth (ft bgs): / Sample Date:	Protection of Groundwater Soil Cleanup Objectives	Commercial Soil Cleanup Objectives	Units	BH-1 4 - 6 10/09/02	BH-2 4 - 6 10/09/02	BH-3 12 - 14 10/09/02	BH-4 11 - 12 10/09/02	BH-5 4 - 5 10/09/02	BH-6 12 - 13 10/09/02	BH-7 11 - 15 10/09/02	BH-8 8 - 11 10/09/02	BH-9 19 - 22 10/09/02	BH-10 10 - 11 10/10/02	BH-11 4 - 5 10/10/02
Volatile Organic Compounds (cont.)														
Toluene	0.7	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	0.19	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA
Trichloroethene	0.47	200	mg/kg	ND	ND	ND	ND	ND	ND	ND	0.0040 J	ND	ND	ND
Trichlorofluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	0.02	13	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds														
Acenaphthene	98	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1	5.6	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	22	1	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1.7	5.6	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	1.7	56	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	1	56	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	1,000	0.56	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-Butylphthalate	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	386	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	8.2	5.6	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	12	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons														
TPH	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls														
Total PCBs	3.2	1	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Inorganics														
Aluminum	- -	- -	mg/kg	4,750	NA	5,870	NA	NA	NA	NA	NA	3,470	NA	NA
Arsenic	16	16	mg/kg	3.30	NA	2.30	NA	NA	NA	NA	NA	2.10 B	NA	NA
Barium	820	400	mg/kg	39.5 B	NA	56.4	NA	NA	NA	NA	NA	36.5 B	NA	NA
Calcium	- -	- -	mg/kg	53,100	NA	57,500	NA	NA	NA	NA	NA	60,200	NA	NA
Chromium	- -	- -	mg/kg	8.30	NA	10.8	NA	NA	NA	NA	NA	8.20	NA	NA
Copper	1,720	270	mg/kg	10.7	NA	10.8	NA	NA	NA	NA	NA	8.90	NA	NA
Iron	- -	- -	mg/kg	13,000	NA	13,500	NA	NA	NA	NA	NA	10,400	NA	NA
Lead	450	1,000	mg/kg	10.7	NA	7.30	NA	NA	NA	NA	NA	6.80	NA	NA
Magnesium	- -	- -	mg/kg	18,400	NA	17,400	NA	NA	NA	NA	NA	20,800	NA	NA
Manganese	2,000	10,000	mg/kg	303	NA	421	NA	NA	NA	NA	NA	356	NA	NA
Nickel	130	310	mg/kg	8.70 B	NA	12.2	NA	NA	NA	NA	NA	7.90 B	NA	NA
Potassium	- -	- -	mg/kg	732 B	NA	1,120	NA	NA	NA	NA	NA	903	NA	NA
Vanadium	- -	- -	mg/kg	17.6	NA	18.4	NA	NA	NA	NA	NA	14.3	NA	NA
Zinc	2,480	10,000	mg/kg	65.6	NA	50.8	NA	NA	NA	NA	NA	32.2	NA	NA

See notes on last page.

Table 3
Subsurface Soil Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Sample ID: Sample Depth (ft bgs): Sample Date:	Protection of Groundwater Soil Cleanup Objectives	Commercial Soil Cleanup Objectives	Units	BH-12 8 - 9 10/10/02	BH-13 19 - 20 10/10/02	BH-14 4 - 5 10/10/02	BH-15 29 - 30 10/10/02	BH-16 4 - 5 10/10/02	BH-17 3 - 4 10/10/02	BH-18 3 - 4 10/10/02	BH-19 3 - 4 10/10/02	BH-20 3 - 4 10/10/02	BH-21 4 - 5 10/10/02	BH-22 4 - 5 10/10/02
Volatile Organic Compounds														
1,1,1-Trichloroethane	0.68	500	mg/kg	0.0050 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	- -	- -	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-trichloro-1,2,2-trifluoroethane	- -	- -	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND
1,1-Dichloroethane	0.27	240	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethene	0.33	500	mg/kg	0.0020 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	1.1	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	0.02	30	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	2.4	280	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	1.8	130	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	0.05	500	mg/kg	ND	0.013 J	ND	0.010 J	ND	ND	0.0090 J	ND	ND	ND	0.010 J
Benzene	0.06	44	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Disulfide	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	0.76	22	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	1.1	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.37	350	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	0.25	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	1	390	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl acetate	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl ethyl ketone (MEK, 2-butanone)	0.12	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl isobutyl ketone (MIBK, 4-methyl-2-pentanone)	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	0.93	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylcyclohexane	- -	- -	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	0.05	500	mg/kg	ND	ND	0.0040 J	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	1.3	150	mg/kg	ND	ND	ND	ND	ND	0.0040 J	ND	ND	ND	ND	ND

See notes on last page.

Table 3
Subsurface Soil Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Sample ID: Sample Depth (ft bgs): Sample Date:	Protection of Groundwater Soil Cleanup Objectives	Commercial Soil Cleanup Objectives	Units	BH-12 8 - 9 10/10/02	BH-13 19 - 20 10/10/02	BH-14 4 - 5 10/10/02	BH-15 29 - 30 10/10/02	BH-16 4 - 5 10/10/02	BH-17 3 - 4 10/10/02	BH-18 3 - 4 10/10/02	BH-19 3 - 4 10/10/02	BH-20 3 - 4 10/10/02	BH-21 4 - 5 10/10/02	BH-22 4 - 5 10/10/02
Volatile Organic Compounds (cont.)														
Toluene	0.7	500	mg/kg	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND	0.0040 J
trans-1,2-Dichloroethene	0.19	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	0.47	200	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	0.02	13	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds														
Acenaphthene	98	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1	5.6	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	22	1	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1.7	5.6	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	1.7	56	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	1	56	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	1,000	0.56	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-Butylphthalate	- -	- -	mg/kg	NA	NA	0.068 J	NA	0.040 J	NA	NA	NA	NA	NA	NA
Fluoranthene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	386	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	8.2	5.6	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	12	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons														
TPH	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls														
Total PCBs	3.2	1	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Inorganics														
Aluminum	- -	- -	mg/kg	NA	NA	6,170	NA	5,060	NA	NA	7,190	NA	NA	NA
Arsenic	16	16	mg/kg	NA	NA	2.60	NA	**39.5**	NA	NA	3.50	NA	NA	NA
Barium	820	400	mg/kg	NA	NA	52.5	NA	59.5	NA	NA	52.7	NA	NA	NA
Calcium	- -	- -	mg/kg	NA	NA	65,100	NA	59,300	NA	NA	51,200	NA	NA	NA
Chromium	- -	- -	mg/kg	NA	NA	10.9	NA	9.10	NA	NA	11.4	NA	NA	NA
Copper	1,720	270	mg/kg	NA	NA	10.2	NA	11.0	NA	NA	12.5	NA	NA	NA
Iron	- -	- -	mg/kg	NA	NA	13,900	NA	12,000	NA	NA	15,000	NA	NA	NA
Lead	450	1,000	mg/kg	NA	NA	6.70	NA	7.70	NA	NA	8.60	NA	NA	NA
Magnesium	- -	- -	mg/kg	NA	NA	19,200	NA	16,600	NA	NA	17,700	NA	NA	NA
Manganese	2,000	10,000	mg/kg	NA	NA	407	NA	490	NA	NA	497	NA	NA	NA
Nickel	130	310	mg/kg	NA	NA	11.5	NA	11.7	NA	NA	13.3	NA	NA	NA
Potassium	- -	- -	mg/kg	NA	NA	1,150	NA	784 B	NA	NA	914	NA	NA	NA
Vanadium	- -	- -	mg/kg	NA	NA	20.4	NA	16.5	NA	NA	20.3	NA	NA	NA
Zinc	2,480	10,000	mg/kg	NA	NA	60.0	NA	45.7	NA	NA	59.7	NA	NA	NA

See notes on last page.

Table 3
Subsurface Soil Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Sample ID: / Sample Depth (ft bgs): / Sample Date:	Protection of Groundwater Soil Cleanup Objectives	Commercial Soil Cleanup Objectives	Units	BH-23 11 - 12 10/10/02	BH-24 3 - 4 10/10/02	BH-25 2 - 3 10/10/02	BH-26 2 - 3 10/10/02	BH-26 7 - 8 10/10/02	BH-26 9 - 10 10/10/02	BH-27 1 - 2 10/10/02	BH-28 2 - 3 10/10/02	BH-29 1 - 2 10/10/02	BH-30 5 - 6 10/10/02	BH-11 4 - 6 02/22/06
Volatile Organic Compounds														
1,1,1-Trichloroethane	0.68	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	- -	- -	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
1,1,2-trichloro-1,2,2-trifluoroethane	- -	- -	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
1,1,2-Trichloroethane	- -	- -	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
1,1-Dichloroethane	0.27	240	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	ND
1,1-Dichloroethene	0.33	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	1.1	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	0.02	30	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	2.4	280	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	1.8	130	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acetone	0.05	500	mg/kg	0.022 J	0.022 J	0.015 J	0.019 J	ND	ND	0.019 J	**0.12 B**	0.012 J	ND	ND
Benzene	0.06	44	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromoform	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bromomethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Disulfide	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	0.76	22	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	1.1	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.37	350	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	0.25	500	mg/kg	ND	ND	ND	ND	0.026	0.015	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	1	390	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
m,p-Xylene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl acetate	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl ethyl ketone (MEK, 2-butanone)	0.12	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	0.034 J	ND	ND	NA
Methyl isobutyl ketone (MIBK, 4-methyl-2-pentanone)	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	0.93	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylcyclohexane	- -	- -	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
Methylene Chloride	0.05	500	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.0050 J
o-Xylene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	1.3	150	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

See notes on last page.

Table 3
Subsurface Soil Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Sample ID: / Sample Depth (ft bgs): / Sample Date:	Protection of Groundwater Soil Cleanup Objectives	Commercial Soil Cleanup Objectives	Units	BH-23 11 - 12 10/10/02	BH-24 3 - 4 10/10/02	BH-25 2 - 3 10/10/02	BH-26 2 - 3 10/10/02	BH-26 7 - 8 10/10/02	BH-26 9 - 10 10/10/02	BH-27 1 - 2 10/10/02	BH-28 2 - 3 10/10/02	BH-29 1 - 2 10/10/02	BH-30 5 - 6 10/10/02	BH-11 4 - 6 02/22/06
Volatile Organic Compounds (cont.)														
Toluene	0.7	500	mg/kg	0.011 J	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
trans-1,2-Dichloroethene	0.19	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	0.47	200	mg/kg	ND	ND	ND	ND	ND	0.0090 J	ND	ND	ND	ND	ND
Trichlorofluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	0.02	13	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds														
Acenaphthene	98	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1	5.6	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	22	1	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1.7	5.6	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	1.7	56	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chrysene	1	56	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	1,000	0.56	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Di-n-Butylphthalate	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fluorene	386	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	8.2	5.6	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	12	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pyrene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons														
TPH	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls														
Total PCBs	3.2	1	mg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA
Inorganics														
Aluminum	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	16	16	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	820	400	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Calcium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Copper	1,720	270	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	450	1,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Magnesium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	2,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nickel	130	310	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Potassium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	2,480	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

See notes on last page.

Table 3
Subsurface Soil Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Sample ID: Sample Depth (ft bgs): Sample Date:	Protection of Groundwater Soil Cleanup Objectives	Commercial Soil Cleanup Objectives	Units	BH-12 6 - 8 02/22/06	BH-13 6 - 8 03/02/06	BH-14 6 - 8 03/02/06	BH-15 4 - 6 03/08/06	BH-15 10 - 12 03/08/06	BH-16 4 - 6 03/08/06	BH-17 4 - 6 03/08/06
Volatile Organic Compounds										
1,1,1-Trichloroethane	0.68	500	mg/kg	ND	ND	0.0020 J	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
1,1,2-trichloro-1,2,2-trifluoroethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethane	0.27	240	mg/kg	ND	ND	ND	0.0010 J	0.0030 J	ND	ND
1,1-Dichloroethene	0.33	500	mg/kg	ND	ND	0.0020 J	ND	ND	ND	ND
1,2,4-Trichlorobenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromo-3-chloropropane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
1,2-Dibromoethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	1.1	500	mg/kg	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	0.02	30	mg/kg	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloropropane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
1,3-Dichlorobenzene	2.4	280	mg/kg	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	1.8	130	mg/kg	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Acetone	0.05	500	mg/kg	0.0040 J	ND	ND	ND	ND	ND	ND
Benzene	0.06	44	mg/kg	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Bromoform	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Bromomethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Carbon Disulfide	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	0.76	22	mg/kg	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	1.1	500	mg/kg	NA	NA	NA	NA	NA	NA	NA
Chloroethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Chloroform	0.37	350	mg/kg	NA	NA	NA	NA	NA	NA	NA
Chloromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
cis-1,2-Dichloroethene	0.25	500	mg/kg	ND	ND	ND	0.028	0.018	0.0060 J	ND
cis-1,3-Dichloropropene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Cyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Dibromochloromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Dichlorodifluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	1	390	mg/kg	NA	NA	NA	NA	NA	NA	NA
Isopropylbenzene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
m,p-Xylene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Methyl acetate	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Methyl ethyl ketone (MEK, 2-butanone)	0.12	500	mg/kg	NA	NA	NA	NA	NA	NA	NA
Methyl isobutyl ketone (MIBK, 4-methyl-2-pentanone)	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Methyl tert-butyl ether	0.93	500	mg/kg	NA	NA	NA	NA	NA	NA	NA
Methylcyclohexane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Methylene Chloride	0.05	500	mg/kg	0.013	ND	ND	ND	ND	ND	ND
o-Xylene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Styrene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethene	1.3	150	mg/kg	ND	0.0020 J	ND	ND	ND	ND	ND

See notes on last page.

Table 3
Subsurface Soil Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Sample ID: / Sample Depth (ft bgs): / Sample Date:	Protection of Groundwater Soil Cleanup Objectives	Commercial Soil Cleanup Objectives	Units	BH-12 6 - 8 02/22/06	BH-13 6 - 8 03/02/06	BH-14 6 - 8 03/02/06	BH-15 4 - 6 03/08/06	BH-15 10 - 12 03/08/06	BH-16 4 - 6 03/08/06	BH-17 4 - 6 03/08/06
Volatile Organic Compounds (cont.)										
Toluene	0.7	500	mg/kg	NA	NA	NA	NA	NA	NA	NA
trans-1,2-Dichloroethene	0.19	500	mg/kg	NA	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Trichloroethene	0.47	200	mg/kg	ND	ND	ND	ND	0.0060 J	ND	ND
Trichlorofluoromethane	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	0.02	13	mg/kg	NA	NA	NA	NA	NA	NA	NA
Semivolatile Organic Compounds										
Acenaphthene	98	500	mg/kg	NA	NA	NA	NA	NA	NA	NA
Anthracene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1	5.6	mg/kg	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	22	1	mg/kg	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	1.7	5.6	mg/kg	NA	NA	NA	NA	NA	NA	NA
Benzo(g,h,i)perylene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA
Benzo(k)fluoranthene	1.7	56	mg/kg	NA	NA	NA	NA	NA	NA	NA
Chrysene	1	56	mg/kg	NA	NA	NA	NA	NA	NA	NA
Dibenzo(a,h)anthracene	1,000	0.56	mg/kg	NA	NA	NA	NA	NA	NA	NA
Di-n-Butylphthalate	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Fluoranthene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA
Fluorene	386	500	mg/kg	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	8.2	5.6	mg/kg	NA	NA	NA	NA	NA	NA	NA
Naphthalene	12	500	mg/kg	NA	NA	NA	NA	NA	NA	NA
Phenanthrene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA
Pyrene	1,000	500	mg/kg	NA	NA	NA	NA	NA	NA	NA
Total Petroleum Hydrocarbons										
TPH	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Polychlorinated Biphenyls										
Total PCBs	3.2	1	mg/kg	NA	NA	NA	NA	NA	NA	NA
Inorganics										
Aluminum	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Arsenic	16	16	mg/kg	NA	NA	NA	NA	NA	NA	NA
Barium	820	400	mg/kg	NA	NA	NA	NA	NA	NA	NA
Calcium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Chromium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Copper	1,720	270	mg/kg	NA	NA	NA	NA	NA	NA	NA
Iron	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Lead	450	1,000	mg/kg	NA	NA	NA	NA	NA	NA	NA
Magnesium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Manganese	2,000	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA
Nickel	130	310	mg/kg	NA	NA	NA	NA	NA	NA	NA
Potassium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Vanadium	- -	- -	mg/kg	NA	NA	NA	NA	NA	NA	NA
Zinc	2,480	10,000	mg/kg	NA	NA	NA	NA	NA	NA	NA

See notes on last page.

Table 3
Subsurface Soil Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Notes:
1. Bold concentrations exceed 6NYCRR Part 375 Soil Cleanup Objectives for protection of groundwater.
2. Gray shaded concentrations exceed 6NYCRR Part 375 Commercial Use Soil Cleanup Objectives.
3. * - Indicates the exact data of sample collection could not be determined.
4. - - Indicates standard or guidance value does not exist.

Acronyms and Abbreviations:
ft bgs - feet below ground surface
mg/kg - milligrams per kilograms
NA - not analyzed
ND - not detected
NYCRR - New York Codes, Rules and Regulations

Lab Qualifiers:
B - Indicates possible laboratory blank contamination.
J - Indicates the result is less than the quantitation limit but greater than the method detection limit. The result is an approximate value.
U - Indicates the compound was not detected at the indicated concentration.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-01			MW-02					MW-03	
Date Collected:			04/15/14	10/21/20	08/14/24	04/15/14	12/08/15	10/21/20	08/09/23	08/14/24	06/05/10	04/10/14
Volatile Organic Compounds												
1,1,1-Trichloroethane*	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	7.9	1 U
1,1,2,2-Tetrachloroethane	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
1,1,2-Trichloroethane	1	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
1,1-Dichloroethane*	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	3	0.54 J
1,1-Dichloroethene*	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	2.2	1 U
1,2,3-Trichlorobenzene	5	µg/L	NA	1 U	NA	NA	1 U	1 U	1.0 U	0.25 U	NA	NA
1,2,4-Trichlorobenzene	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.34 U	1 U	1 U
1,2-Dibromo-3-chloropropane	0.04	µg/L	2 U	2 U	NA	2 U	2 U	2 U	2.0 U	0.45 U	2 U	2 U
1,2-Dibromoethane	0.0006	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
1,2-Dichlorobenzene	3	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
1,2-Dichloroethane	0.6	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
1,2-Dichloropropane	1	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
1,3-Dichlorobenzene	3	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
1,4-Dichlorobenzene	3	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
1,4-Dioxane*	0.35	µg/L	NA	R	NA	NA	40 U	R	40 U	13 U	NA	NA
2-Hexanone	50	µg/L	5 U	5 U	NA	5 U	5 U	5 U	5.0 U	0.20 U	5 U	5 U
Acetone	50	µg/L	5 U	7.2	NA	5 U	5 U	10	5.0 UJ	5.0 U	1.7 J	5 U
Benzene	1	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
Bromochloromethane	5	µg/L	NA	1 U	NA	NA	1 U	1 U	1.0 U	0.20 U	NA	NA
Bromodichloromethane	50	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
Bromoform	50	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.25 U	1 U	1 UJ
Bromomethane	5	µg/L	1 UJ	1 UJ	NA	1 UJ	1 U	1 UJ	1.0 U	0.70 U	1 U	1 U
Carbon Disulfide	60	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.42 U	1 U	1 U
Carbon Tetrachloride	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.34 U	1 U	1 U
Chlorobenzene	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
Chloroethane	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.23 UJ	1 U	1 U
Chloroform	7	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.51 U	1 U	1 U
Chloromethane	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.80 U	1 U	1 U
cis-1,2-Dichloroethene*	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.23 U	1 U	1 U
cis-1,3-Dichloropropene	0.4	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-01			MW-02					MW-03	
Date Collected:			04/15/14	10/21/20	08/14/24	04/15/14	12/08/15	10/21/20	08/09/23	08/14/24	06/05/10	04/10/14
Volatile Organic Compounds (cont.)												
Cyclohexane	- -	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.60 U	1 U	1 U
Dibromochloromethane	50	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
Dichlorodifluoromethane	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.21 U	1 U	1 U
Ethylbenzene	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
Isopropylbenzene	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
m,p-Xylene	5	µg/L	2 U	2 U	NA	2 U	2 U	2 U	1.0 U	0.53 U	2 U	2 U
Methyl acetate	- -	µg/L	2 U	2 U	NA	2 U	2 U	2 U	2.0 UJ	0.87 U	2 U	2 U
Methyl ethyl ketone (MEK, 2-butanone)	50	µg/L	5 U	5 U	NA	5 U	5 U	5 U	5.0 U	0.78 U	5 UJ	5 U
Methyl isobutyl ketone (MIBK, 4-methyl-2-pentanone)	- -	µg/L	5 U	5 U	NA	5 U	5 U	5 U	5.0 U	0.20 U	5 U	5 U
Methyl tert-butyl ether	10	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
Methylcyclohexane	- -	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
Methylene Chloride	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.65 U	ND	1 U
o-Xylene	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
Styrene	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
Tetrachloroethene*	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.21 U	1 U	1 U
Toluene	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
trans-1,2-Dichloroethene	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
trans-1,3-Dichloropropene	0.4	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.23 U	1 U	1 U
Trichloroethene*	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
Trichlorofluoromethane	5	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.24 U	1 U	1 U
Vinyl Chloride*	2	µg/L	1 U	1 U	NA	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U
Tentatively Identified Compounds												
Acetic acid, (trimethylsilyl)-	- -	µg/L	NA	5.1 Jn	NA	NA	NA	NA	NA	NA	NA	NA
Isopropyl Alcohol (2-Propanol)	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Biogeochemical Parameters												
Acetylene	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity as CaCO3 (total)	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	242	NA
Chloride	250	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	12.2	NA
Ethane	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-01			MW-02					MW-03	
Date Collected:			04/15/14	10/21/20	08/14/24	04/15/14	12/08/15	10/21/20	08/09/23	08/14/24	06/05/10	04/10/14
Biogeochemical Parameters (cont.)												
Iron (dissolved)	0.3	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	ND	NA
Iron (total)	0.3	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	10	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	0.54	NA
Nitrite as Nitrogen	1	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	250	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	17.6	NA
Total Organic Carbon	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	8.5	NA
Field Parameters												
Specific Conductivity	- -	mS/cm	NA	0.58	358.4	NA	1.18	0.732	0.547	0.704	NA	NA
Dissolved Oxygen	- -	mg/L	NA	1.35	0.06	NA	1.98	2.89	0.63	0.34	NA	NA
Oxidation Reduction Potential	- -	mV	NA	153.2	-28.5	NA	210.8	264.5	47.7	-47.0	NA	NA
pH	- -	SU	NA	7.08	7.21	NA	7.17	7.32	7.09	7.80	NA	NA
Temperature	- -	C	NA	15.9	17.5	NA	10.3	15.89	15.9	19.27	NA	NA
Turbidity	- -	NTU	NA	5.13	11.99	NA	9.78	10.06	0.0	7.3	NA	NA

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-04D									
Date Collected:			06/03/03	12/04/03	04/05/06	06/05/10	04/10/14	05/14/14	12/09/15	10/19/20	08/08/23	08/13/24
Volatile Organic Compounds												
1,1,1-Trichloroethane*	5	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	1.4 J	2.7	2.3 J
1,1,2,2-Tetrachloroethane	5	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.50 U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.50 U
1,1,2-Trichloroethane	1	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.50 U
1,1-Dichloroethane*	5	µg/L	ND	4 J	4 J	1.8	2.3	0.77 J	3.3	16	48	53
1,1-Dichloroethene*	5	µg/L	ND	2 J	2 J	1.1	1.8	0.86 J	2.7	6.7	11	14
1,2,3-Trichlorobenzene	5	µg/L	NA	NA	NA	NA	NA	NA	1 U	2.5 U	2.5 U	0.63 U
1,2,4-Trichlorobenzene	5	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.85 U
1,2-Dibromo-3-chloropropane	0.04	µg/L	ND	ND	ND	2 U	2 U	2 U	2 U	5 U	5.0 UJ	1.2 U
1,2-Dibromoethane	0.0006	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.50 U
1,2-Dichlorobenzene	3	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.50 U
1,2-Dichloroethane	0.6	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.50 U
1,2-Dichloropropane	1	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.50 U
1,3-Dichlorobenzene	3	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.50 U
1,4-Dichlorobenzene	3	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.50 U
1,4-Dioxane*	0.35	µg/L	NA	NA	NA	NA	NA	NA	40 UJ	R	100 U	33 U
2-Hexanone	50	µg/L	ND	ND	ND	5 U	5 U	5 U	5 U	13 U	13 U	0.50 U
Acetone	50	µg/L	28	66	16	4.7 J	5.6 J	3 J	5 UB	13 U	13 UJ	13 U
Benzene	1	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.50 U
Bromochloromethane	5	µg/L	NA	NA	NA	NA	NA	NA	1 U	2.5 U	2.5 U	0.50 U
Bromodichloromethane	50	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.50 U
Bromoform	50	µg/L	ND	ND	ND	1 U	1 UJ	1 U	1 U	2.5 U	2.5 UJ	0.63 U
Bromomethane	5	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 UJ	2.5 U	1.8 UJ
Carbon Disulfide	60	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	1.1 U
Carbon Tetrachloride	5	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.85 U
Chlorobenzene	5	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.50 U
Chloroethane	5	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.58 UJ
Chloroform	7	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	1.3 U
Chloromethane	5	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	2.0 U
cis-1,2-Dichloroethene*	5	µg/L	14	85	96	70	120	45	120	340	350	480
cis-1,3-Dichloropropene	0.4	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	5.0 U	0.50 U

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-04D									
Date Collected:			06/03/03	12/04/03	04/05/06	06/05/10	04/10/14	05/14/14	12/09/15	10/19/20	08/08/23	08/13/24
Volatile Organic Compounds (cont.)												
Cyclohexane	- -	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	1.5 U
Dibromochloromethane	50	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.50 U
Dichlorodifluoromethane	5	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.53 U
Ethylbenzene	5	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.50 U
Isopropylbenzene	5	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.50 U
m,p-Xylene	5	µg/L	ND	ND	ND	2 U	2 U	2 U	2 U	5 U	5.0 U	1.4 U
Methyl acetate	- -	µg/L	ND	ND	ND	2 U	2 U	2 U	2 U	5 U	5.0 UJ	2.2 U
Methyl ethyl ketone (MEK, 2-butanone)	50	µg/L	3 J	10 J	3 J	5 UJ	5 U	5 U	5 U	13 U	13 U	2.0 U
Methyl isobutyl ketone (MIBK, 4-methyl-2-pentanone)	- -	µg/L	ND	ND	ND	5 U	5 U	5 U	5 U	13 U	13 U	0.50 U
Methyl tert-butyl ether	10	µg/L	ND	ND	10	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.50 U
Methylcyclohexane	- -	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.50 U
Methylene Chloride	5	µg/L	ND	ND	ND	ND	1 U	1 U	1 U	2.5 U	2.5 U	1.7 U
o-Xylene	5	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.50 U
Styrene	5	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.50 U
Tetrachloroethene*	5	µg/L	ND	12	8 J	2.4	6.2	3.5	4	4.9	4.3	2.3 J
Toluene	5	µg/L	ND	ND	ND	1 U	1 U	1.2	0.26 J	2.5 U	2.5 U	0.54 J
trans-1,2-Dichloroethene	5	µg/L	ND	3 J	2 J	0.66 J	1.8	1 U	1.1	1.8 J	3.5	4.2
trans-1,3-Dichloropropene	0.4	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.58 U
Trichloroethene*	5	µg/L	12	120	110	22	44	17	50	85	340	400
Trichlorofluoromethane	5	µg/L	ND	ND	ND	1 U	1 U	1 U	1 U	2.5 U	2.5 U	0.60 U
Vinyl Chloride*	2	µg/L	ND	31	16	4.2	8.4	3.9	8.6	16	22	23
Tentatively Identified Compounds												
Acetic acid, (trimethylsilyl)-	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropyl Alcohol (2-Propanol)	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Biogeochemical Parameters												
Acetylene	- -	µg/L	NA	NA	NA	NA	NA	NA	0.57 n	0.74 U	NA	NA
Alkalinity as CaCO3 (total)	- -	mg/L	NA	NA	NA	55	NA	NA	91.7	184	172	146
Chloride	250	mg/L	NA	NA	NA	291	NA	NA	456	1,550	NA	NA
Ethane	- -	µg/L	NA	NA	NA	NA	NA	NA	2	0.44 J	NA	1.30 J
Ethene	- -	µg/L	NA	NA	NA	NA	NA	NA	1.5	1.6	NA	1.30 U

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-04D									
Date Collected:			06/03/03	12/04/03	04/05/06	06/05/10	04/10/14	05/14/14	12/09/15	10/19/20	08/08/23	08/13/24
Biogeochemical Parameters (cont.)												
Iron (dissolved)	0.3	mg/L	NA	NA	NA	ND	NA	NA	0.1 U	0.1 U	0.1 U	130 U
Iron (total)	0.3	mg/L	NA	NA	NA	NA	NA	NA	0.1 U	0.414	0.080 J	130 U
Methane	- -	µg/L	NA	NA	NA	NA	NA	NA	36	25	NA	49.0
Nitrate	10	mg/L	NA	NA	NA	0.51	NA	NA	1 U	1 U	1.0 U	0.2 U
Nitrite as Nitrogen	1	mg/L	NA	NA	NA	NA	NA	NA	10 U	NA	NA	NA
Sulfate	250	mg/L	NA	NA	NA	60.3	NA	NA	59.8	56.6	87.8	80.9
Total Organic Carbon	- -	mg/L	NA	NA	NA	6.25	NA	NA	3.3	3.5	4.8	4.2
Field Parameters												
Specific Conductivity	- -	mS/cm	NA	NA	NA	NA	NA	NA	1.89	6222	5.837	3298
Dissolved Oxygen	- -	mg/L	NA	NA	NA	NA	NA	NA	0.41	4.44	7.42	4.57
Oxidation Reduction Potential	- -	mV	NA	NA	NA	NA	NA	NA	155.7	57	-22.4	-13.6
pH	- -	SU	NA	NA	NA	NA	NA	NA	11.55	12.33	11.97	11.91
Temperature	- -	C	NA	NA	NA	NA	NA	NA	14.6	14.7	16.1	21.6
Turbidity	- -	NTU	NA	NA	NA	NA	NA	NA	10.45	29.7	11.6	15.64

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-04S									MW-05
Date Collected:			06/03/03	12/04/03	04/05/06	06/05/10	04/09/14	12/08/15	10/21/20	08/08/23	08/12/24	06/05/10
Volatile Organic Compounds												
1,1,1-Trichloroethane*	5	µg/L	100 J	78	260 D	12	26	53	30	17 J	17	1.8
1,1,2,2-Tetrachloroethane	5	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.0 U	1 U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.0 U	1 U
1,1,2-Trichloroethane	1	µg/L	ND	ND	1 J	2.5 U	10 U	10 U	20 U	20 U	2.0 U	1 U
1,1-Dichloroethane*	5	µg/L	ND	78	170	13	27	76	120	71	67	22
1,1-Dichloroethene*	5	µg/L	ND	82	240 D	16	40	70	53	34	43	7.1
1,2,3-Trichlorobenzene	5	µg/L	NA	NA	NA	NA	NA	10 U	20 U	20 U	2.5 U	NA
1,2,4-Trichlorobenzene	5	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	3.4 U	1 U
1,2-Dibromo-3-chloropropane	0.04	µg/L	ND	ND	ND	5 U	20 U	20 U	40 U	40 UJ	4.5 U	2 U
1,2-Dibromoethane	0.0006	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.0 U	1 U
1,2-Dichlorobenzene	3	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.0 U	1 U
1,2-Dichloroethane	0.6	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.0 U	1.4 U
1,2-Dichloropropane	1	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.0 U	1 U
1,3-Dichlorobenzene	3	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.0 U	1 U
1,4-Dichlorobenzene	3	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.0 U	1 U
1,4-Dioxane*	0.35	µg/L	NA	NA	NA	NA	NA	400 U	R	800 U	130 U	NA
2-Hexanone	50	µg/L	ND	ND	ND	14 U	50 U	50 U	100 U	100 U	2.0 U	5 U
Acetone	50	µg/L	ND	ND	ND	4.9 UJ	50 U	50 UB	100 U	100 UJ	50 U	2.9 UJ
Benzene	1	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.0 U	1 U
Bromochloromethane	5	µg/L	NA	NA	NA	NA	NA	10 U	20 U	20 U	2.0 U	NA
Bromodichloromethane	50	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.0 U	1 U
Bromoform	50	µg/L	ND	ND	ND	2.5 U	10 UJ	10 U	20 U	20 UJ	2.5 U	1 U
Bromomethane	5	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 UJ	20 U	7.0 U	1 U
Carbon Disulfide	60	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	4.2 U	1 U
Carbon Tetrachloride	5	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	3.4 U	1 U
Chlorobenzene	5	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.0 U	1 U
Chloroethane	5	µg/L	ND	3 J	ND	2.5 U	10 U	10 U	20 U	20 U	2.3 UJ	1 U
Chloroform	7	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	5.1 U	1 U
Chloromethane	5	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	8.0 U	1 U
cis-1,2-Dichloroethene*	5	µg/L	340	420 E	930 D	140	160	810	1,800	1,500	2,200 DJ	13
cis-1,3-Dichloropropene	0.4	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.0 U	1 U

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-04S									MW-05
Date Collected:			06/03/03	12/04/03	04/05/06	06/05/10	04/09/14	12/08/15	10/21/20	08/08/23	08/12/24	06/05/10
Volatile Organic Compounds (cont.)												
Cyclohexane	- -	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	6.0 U	1 U
Dibromochloromethane	50	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.0 U	1 U
Dichlorodifluoromethane	5	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.1 U	1 U
Ethylbenzene	5	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.0 U	1 U
Isopropylbenzene	5	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.0 U	1 U
m,p-Xylene	5	µg/L	ND	ND	ND	5 U	20 U	20 U	40 U	40 U	5.3 U	2 U
Methyl acetate	- -	µg/L	ND	ND	ND	5 U	20 U	20 U	40 U	40 UJ	8.7 U	2 U
Methyl ethyl ketone (MEK, 2-butanone)	50	µg/L	ND	ND	ND	13 UJ	50 U	50 U	100 U	100 U	7.8 U	5 U
Methyl isobutyl ketone (MIBK, 4-methyl-2-pentanone)	- -	µg/L	ND	ND	ND	15 U	50 U	50 U	100 U	100 U	2.0 U	5 U
Methyl tert-butyl ether	10	µg/L	ND	ND	3 J	2.5 U	10 U	10 U	20 U	20 U	2.0 U	8.5
Methylcyclohexane	- -	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.0 U	1 U
Methylene Chloride	5	µg/L	ND	ND	ND	ND	10 U	10 U	20 U	20 U	6.5 U	ND
o-Xylene	5	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.0 U	1 U
Styrene	5	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.0 U	1 U
Tetrachloroethene*	5	µg/L	ND	9 J	5 J	8.6	4.6 J	10 U	7.8 J	20 U	2.1 U	1 U
Toluene	5	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.0 U	1 U
trans-1,2-Dichloroethene	5	µg/L	ND	5 J	9 J	2.8	10 U	13	18 J	11 J	12	0.38 J
trans-1,3-Dichloropropene	0.4	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.3 U	1 U
Trichloroethene*	5	µg/L	3,400	3,300 D	9,400 D	560 D	1,900	3,200 D	920	380	580	1 U
Trichlorofluoromethane	5	µg/L	ND	ND	ND	2.5 U	10 U	10 U	20 U	20 U	2.4 U	1 U
Vinyl Chloride*	2	µg/L	110 J	120	310 D	51	28	57	250	120	82	0.43 J
Tentatively Identified Compounds												
Acetic acid, (trimethylsilyl)-	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropyl Alcohol (2-Propanol)	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Biogeochemical Parameters												
Acetylene	- -	µg/L	NA	NA	NA	NA	NA	0.5 U	0.74 U	NA	NA	NA
Alkalinity as CaCO3 (total)	- -	mg/L	NA	NA	NA	120	131	218	287	295	322	465
Chloride	250	mg/L	NA	NA	NA	160	302	580	567	NA	NA	103
Ethane	- -	µg/L	NA	NA	NA	NA	1.3	2.8	9.3	NA	3.20 J	NA
Ethene	- -	µg/L	NA	NA	NA	NA	7.6	18	44	NA	1.30 U	NA

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-04S									MW-05
Date Collected:			06/03/03	12/04/03	04/05/06	06/05/10	04/09/14	12/08/15	10/21/20	08/08/23	08/12/24	06/05/10
Biogeochemical Parameters (cont.)												
Iron (dissolved)	0.3	mg/L	NA	NA	NA	ND	0.1 U	0.1 U	0.155	0.340	70 U	ND
Iron (total)	0.3	mg/L	NA	NA	NA	NA	0.1 U	0.21	1.83	3.0	5,400	NA
Methane	- -	µg/L	NA	NA	NA	NA	180 D	230	510	NA	140	NA
Nitrate	10	mg/L	NA	NA	NA	ND	1 U	1 U	1 U	1.0 U	0.2 UJ	0.52
Nitrite as Nitrogen	1	mg/L	NA	NA	NA	NA	1 U	10 U	NA	NA	NA	NA
Sulfate	250	mg/L	NA	NA	NA	137	140	126	109	99.5	101	113
Total Organic Carbon	- -	mg/L	NA	NA	NA	9.875	5.9	114	5.5	16.2	3.4	7.35
Field Parameters												
Specific Conductivity	- -	mS/cm	NA	NA	NA	NA	NA	2.13	2.18	4.335	1417.4	NA
Dissolved Oxygen	- -	mg/L	NA	NA	NA	NA	NA	0.16	0.3	0.55	0.54	NA
Oxidation Reduction Potential	- -	mV	NA	NA	NA	NA	NA	124.3	-65.2	-97.8	-91.1	NA
pH	- -	SU	NA	NA	NA	NA	NA	7.34	6.99	7.01	7.08	NA
Temperature	- -	C	NA	NA	NA	NA	NA	15	19.7	20.8	22.2	NA
Turbidity	- -	NTU	NA	NA	NA	NA	NA	252	1.47	46.01	16.72	NA

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-05 (cont.)						MW-06			
Date Collected:			04/15/14	05/14/14	12/09/15	10/19/20	08/08/23	08/13/24	06/05/10	04/15/14	12/09/15	10/20/20
Volatile Organic Compounds												
1,1,1-Trichloroethane*	5	µg/L	0.54 J	1 U	0.69 J	1 U	1.0 U	0.20 U	5 U	1.4	1.5	0.65 J
1,1,2,2-Tetrachloroethane	5	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U
1,1-Dichloroethane*	5	µg/L	6.1	2.2 J	9.4	0.77 J	1.8	1.3	5 U	0.44 J	0.36 J	1 U
1,1-Dichloroethene*	5	µg/L	2.1	1 U	2.1	0.29 J	0.36 J	0.26 J	5 U	1 U	1 U	1 U
1,2,3-Trichlorobenzene	5	µg/L	NA	NA	1 U	1 U	1.0 U	0.25 U	NA	NA	1 U	1 U
1,2,4-Trichlorobenzene	5	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.34 U	5 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	0.04	µg/L	2 U	2 U	2 U	2 U	2.0 UJ	0.45 U	10 U	2 U	2 U	2 U
1,2-Dibromoethane	0.0006	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U
1,2-Dichlorobenzene	3	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U
1,2-Dichloroethane	0.6	µg/L	0.53 J	1 U	0.58 J	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U
1,2-Dichloropropane	1	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U
1,3-Dichlorobenzene	3	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U
1,4-Dichlorobenzene	3	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.21 UB	5 U	1 U	1 U	1 U
1,4-Dioxane*	0.35	µg/L	NA	NA	40 U	R	40 U	13 U	NA	NA	40 U	R
2-Hexanone	50	µg/L	5 U	5 U	5 U	5 U	5.0 U	0.20 U	25 U	5 U	5 U	5 U
Acetone	50	µg/L	5 U	1.9 J	5 U	5 U	5.0 UJ	5.0 U	25 U	5 U	5 U	5 U
Benzene	1	µg/L	1 U	1 U	0.21 J	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U
Bromochloromethane	5	µg/L	NA	NA	1 U	1 U	1.0 U	0.20 U	NA	NA	1 U	1 U
Bromodichloromethane	50	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U
Bromoform	50	µg/L	1 U	1 U	1 U	1 U	1.0 UJ	0.25 U	5 U	1 U	1 U	1 U
Bromomethane	5	µg/L	1 UJ	1 U	1 U	1 UJ	1.0 U	0.70 UJ	5 U	1 UJ	1 U	1 UJ
Carbon Disulfide	60	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.42 U	5 U	1 U	1 U	1 U
Carbon Tetrachloride	5	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.34 U	5 U	1 U	1 U	1 U
Chlorobenzene	5	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U
Chloroethane	5	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.23 UJ	5 U	1 U	1 U	1 U
Chloroform	7	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.51 U	5 U	1 U	1 U	1 U
Chloromethane	5	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.80 U	5 U	1 U	1 U	1 U
cis-1,2-Dichloroethene*	5	µg/L	5.9	0.57 J	7.8	1.2	0.78 J	0.58 J	5 U	0.73 J	0.84 J	0.3 J
cis-1,3-Dichloropropene	0.4	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-05 (cont.)						MW-06			
Date Collected:			04/15/14	05/14/14	12/09/15	10/19/20	08/08/23	08/13/24	06/05/10	04/15/14	12/09/15	10/20/20
Volatile Organic Compounds (cont.)												
Cyclohexane	- -	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.60 U	5 U	1 U	1 U	1 U
Dibromochloromethane	50	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U
Dichlorodifluoromethane	5	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.21 U	5 U	1 U	1 U	1 U
Ethylbenzene	5	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U
Isopropylbenzene	5	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U
m,p-Xylene	5	µg/L	2 U	2 U	2 U	2 U	2.0 U	0.53 U	10 U	2 U	2 U	2 U
Methyl acetate	- -	µg/L	2 U	2 U	2 U	2 U	2.0 UJ	0.87 U	10 U	2 U	2 U	2 U
Methyl ethyl ketone (MEK, 2-butanone)	50	µg/L	5 U	5 U	5 U	5 U	5.0 U	0.78 U	25 U	5 U	5 U	5 U
Methyl isobutyl ketone (MIBK, 4-methyl-2-pentanone)	- -	µg/L	5 U	5 U	5 U	5 U	5.0 U	0.20 U	25 U	5 U	5 U	5 U
Methyl tert-butyl ether	10	µg/L	2.4	0.37 J	3.2	0.23 J	0.58 J	0.34 J	5 U	1 U	1 U	1 U
Methylcyclohexane	- -	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U
Methylene Chloride	5	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.65 U	ND	1 U	1 U	1 U
o-Xylene	5	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U
Styrene	5	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U
Tetrachloroethene*	5	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.21 U	5 U	1 U	1 U	0.42 J
Toluene	5	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	5	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	0.4	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.23 U	5 U	1 U	1 U	1 U
Trichloroethene*	5	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U
Trichlorofluoromethane	5	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.24 U	5 U	1 U	1 U	1 U
Vinyl Chloride*	2	µg/L	1 U	1 U	1 U	1 U	1.0 U	0.20 U	5 U	1 U	1 U	1 U
Tentatively Identified Compounds												
Acetic acid, (trimethylsilyl)-	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropyl Alcohol (2-Propanol)	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Biogeochemical Parameters												
Acetylene	- -	µg/L	NA	NA	0.5 U	0.74 U	NA	NA	NA	NA	0.5 U	0.74 U
Alkalinity as CaCO3 (total)	- -	mg/L	NA	NA	430	222	417	414	200	NA	220	234
Chloride	250	mg/L	NA	NA	72.5	210	NA	NA	1,080	NA	1,210	2,000
Ethane	- -	µg/L	NA	NA	0.2 U	1 U	NA	0.850 U	NA	NA	0.2 U	1 U
Ethene	- -	µg/L	NA	NA	0.2 U	1 U	NA	1.30 U	NA	NA	0.2 U	1 U

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-05 (cont.)						MW-06			
Date Collected:			04/15/14	05/14/14	12/09/15	10/19/20	08/08/23	08/13/24	06/05/10	04/15/14	12/09/15	10/20/20
Biogeochemical Parameters (cont.)												
Iron (dissolved)	0.3	mg/L	NA	NA	0.1 U	0.1 U	0.290	330	ND	NA	0.1 U	0.1 U
Iron (total)	0.3	mg/L	NA	NA	0.54	4.84	1.12	480	NA	NA	0.1 U	0.1 U
Methane	- -	µg/L	NA	NA	8.5	22	NA	9.80	NA	NA	0.5 U	4.5 J
Nitrate	10	mg/L	NA	NA	1 U	0.4 J	1.0 U	0.2 U	1.21	NA	1 U	2.2
Nitrite as Nitrogen	1	mg/L	NA	NA	1 U	NA	NA	NA	NA	NA	10 U	NA
Sulfate	250	mg/L	NA	NA	167	69.5	124	136	71.7	NA	139	77.5
Total Organic Carbon	- -	mg/L	NA	NA	9.1	4.8	20.8	2.3	2.525	NA	6.3	1.1
Field Parameters												
Specific Conductivity	- -	mS/cm	NA	NA	1.22	1.019	1.503	1.69	NA	NA	4.16	7.08
Dissolved Oxygen	- -	mg/L	NA	NA	0.75	2.55	1.03	0.38	NA	NA	1.05	2.01
Oxidation Reduction Potential	- -	mV	NA	NA	68.3	206.8	57.6	1.0	NA	NA	273.4	197.5
pH	- -	SU	NA	NA	7.24	8.04	7.26	7.77	NA	NA	7.59	7.38
Temperature	- -	C	NA	NA	14.6	17.59	16.3	23.27	NA	NA	13.8	16.1
Turbidity	- -	NTU	NA	NA	1.08	18.2	18.8	13.5	NA	NA	6.36	1.51

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-06 (cont.)		MW-07	MW-08	MW-09	MW-10				
Date Collected:			08/08/23	08/13/24	04/14/14	04/14/14	04/14/14	06/03/03	12/04/03	04/05/06	06/05/10	04/11/14
Volatile Organic Compounds												
1,1,1-Trichloroethane*	5	µg/L	0.61 J	0.56 J	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
1,1,2,2-Tetrachloroethane	5	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
1,1,2-Trichloroethane	1	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
1,1-Dichloroethane*	5	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
1,1-Dichloroethene*	5	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
1,2,3-Trichlorobenzene	5	µg/L	1.0 U	0.25 U	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	5	µg/L	1.0 U	0.34 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
1,2-Dibromo-3-chloropropane	0.04	µg/L	2.0 U	0.45 U	2 U	2 U	2 U	ND	ND	ND	2 U	10 U
1,2-Dibromoethane	0.0006	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
1,2-Dichlorobenzene	3	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
1,2-Dichloroethane	0.6	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
1,2-Dichloropropane	1	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
1,3-Dichlorobenzene	3	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
1,4-Dichlorobenzene	3	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
1,4-Dioxane*	0.35	µg/L	40 U	13 U	NA	NA	NA	NA	NA	NA	NA	NA
2-Hexanone	50	µg/L	5.0 U	0.20 U	5 U	5 U	5 U	ND	ND	ND	5 U	25 U
Acetone	50	µg/L	5.0 UJ	5.0 U	5 U	5 U	5 U	ND	ND	ND	1.8 J	25 U
Benzene	1	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
Bromochloromethane	5	µg/L	1.0 U	0.20 U	NA	NA	NA	NA	NA	NA	NA	NA
Bromodichloromethane	50	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
Bromoform	50	µg/L	1.0 U	0.25 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 UJ
Bromomethane	5	µg/L	1.0 U	0.70 UJ	1 UJ	1 UJ	1 UJ	ND	ND	ND	1 U	5 U
Carbon Disulfide	60	µg/L	1.0 U	0.42 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
Carbon Tetrachloride	5	µg/L	1.0 U	0.34 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
Chlorobenzene	5	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
Chloroethane	5	µg/L	1.0 U	0.23 UJ	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
Chloroform	7	µg/L	1.0 U	0.51 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
Chloromethane	5	µg/L	1.0 U	0.80 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
cis-1,2-Dichloroethene*	5	µg/L	1.0 U	0.23 U	1 U	1 U	1 U	ND	ND	ND	0.74 J	5 U
cis-1,3-Dichloropropene	0.4	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-06 (cont.)		MW-07	MW-08	MW-09	MW-10				
Date Collected:			08/08/23	08/13/24	04/14/14	04/14/14	04/14/14	06/03/03	12/04/03	04/05/06	06/05/10	04/11/14
Volatile Organic Compounds (cont.)												
Cyclohexane	- -	µg/L	1.0 U	0.60 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
Dibromochloromethane	50	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
Dichlorodifluoromethane	5	µg/L	1.0 U	0.21 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
Ethylbenzene	5	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
Isopropylbenzene	5	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
m,p-Xylene	5	µg/L	2.0 U	0.53 U	2 U	2 U	2 U	ND	ND	ND	2 U	10 U
Methyl acetate	- -	µg/L	2.0 UJ	0.87 U	2 U	2 U	2 U	ND	ND	ND	2 U	10 U
Methyl ethyl ketone (MEK, 2-butanone)	50	µg/L	5.0 U	0.78 U	5 U	5 U	5 U	ND	ND	ND	5 UJ	25 U
Methyl isobutyl ketone (MIBK, 4-methyl-2-pentanone)	- -	µg/L	5.0 U	0.20 U	5 U	5 U	5 U	ND	ND	ND	0.44 J	25 U
Methyl tert-butyl ether	10	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
Methylcyclohexane	- -	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
Methylene Chloride	5	µg/L	1.0 U	0.65 U	1 U	1 U	1 U	ND	ND	ND	ND	5 U
o-Xylene	5	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
Styrene	5	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
Tetrachloroethene*	5	µg/L	0.66 J	0.73 J	1 U	1 U	1 U	540 E	170	480 D	510 D	530
Toluene	5	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
trans-1,2-Dichloroethene	5	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
trans-1,3-Dichloropropene	0.4	µg/L	1.0 U	0.23 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
Trichloroethene*	5	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	2 J	6 J	8.2	9.8
Trichlorofluoromethane	5	µg/L	1.0 U	0.24 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
Vinyl Chloride*	2	µg/L	1.0 U	0.20 U	1 U	1 U	1 U	ND	ND	ND	1 U	5 U
Tentatively Identified Compounds												
Acetic acid, (trimethylsilyl)-	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropyl Alcohol (2-Propanol)	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Biogeochemical Parameters												
Acetylene	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity as CaCO3 (total)	- -	mg/L	235	272	NA	NA	NA	NA	NA	NA	399	498
Chloride	250	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	140	1,090
Ethane	- -	µg/L	NA	0.850 U	NA	NA	NA	NA	NA	NA	NA	1 U
Ethene	- -	µg/L	NA	1.30 U	NA	NA	NA	NA	NA	NA	NA	1 U

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-06 (cont.)		MW-07	MW-08	MW-09	MW-10				
Date Collected:			08/08/23	08/13/24	04/14/14	04/14/14	04/14/14	06/03/03	12/04/03	04/05/06	06/05/10	04/11/14
Biogeochemical Parameters (cont.)												
Iron (dissolved)	0.3	mg/L	0.12 UB	130 U	NA	NA	NA	NA	NA	NA	ND	0.1 U
Iron (total)	0.3	mg/L	0.15 UB	130 U	NA	NA	NA	NA	NA	NA	NA	0.1 U
Methane	- -	µg/L	NA	3.00 U	NA	NA	NA	NA	NA	NA	NA	2.4
Nitrate	10	mg/L	5.3	3.2	NA	NA	NA	NA	NA	NA	0.97	1 UJ
Nitrite as Nitrogen	1	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	20 UJ
Sulfate	250	mg/L	67	59.7	NA	NA	NA	NA	NA	NA	84.8	100
Total Organic Carbon	- -	mg/L	9.2	1.6	NA	NA	NA	NA	NA	NA	5.4	2
Field Parameters												
Specific Conductivity	- -	mS/cm	8.153	7.36	NA	NA	NA	NA	NA	NA	NA	NA
Dissolved Oxygen	- -	mg/L	0.44	0.47	NA	NA	NA	NA	NA	NA	NA	NA
Oxidation Reduction Potential	- -	mV	50.8	66	NA	NA	NA	NA	NA	NA	NA	NA
pH	- -	SU	7.29	8.57	NA	NA	NA	NA	NA	NA	NA	NA
Temperature	- -	C	18.5	21.37	NA	NA	NA	NA	NA	NA	NA	NA
Turbidity	- -	NTU	7.12	3.6	NA	NA	NA	NA	NA	NA	NA	NA

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-10 (cont.)				MW-11S			MW-12D		
Date Collected:			12/08/15	10/20/20	08/09/23	08/12/24	04/05/06	06/05/10	04/15/14	04/05/06	06/05/10	05/14/14
Volatile Organic Compounds												
1,1,1-Trichloroethane*	5	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
1,1,2,2-Tetrachloroethane	5	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
1,1,2-Trichloroethane	1	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
1,1-Dichloroethane*	5	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
1,1-Dichloroethene*	5	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
1,2,3-Trichlorobenzene	5	µg/L	1 U	1 U	1.0 U	0.25 U	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	5	µg/L	1 U	1 U	1.0 U	0.34 U	ND	1 U	1 U	ND	2 U	1 U
1,2-Dibromo-3-chloropropane	0.04	µg/L	2 U	2 U	2.0 U	0.45 U	ND	2 U	2 U	ND	4 U	2 U
1,2-Dibromoethane	0.0006	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
1,2-Dichlorobenzene	3	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
1,2-Dichloroethane	0.6	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
1,2-Dichloropropane	1	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
1,3-Dichlorobenzene	3	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
1,4-Dichlorobenzene	3	µg/L	1 U	1 U	1.0 U	0.20 J	ND	1 U	1 U	ND	2 U	1 U
1,4-Dioxane*	0.35	µg/L	40 U	R	40 U	13 U	NA	NA	NA	NA	NA	NA
2-Hexanone	50	µg/L	5 U	5 U	5.0 U	0.20 U	ND	5 U	5 U	ND	10 U	5 U
Acetone	50	µg/L	5 U	5 U	5.0 UJ	5.0 U	ND	5 U	5 U	16	10 UJ	1.5 J
Benzene	1	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
Bromochloromethane	5	µg/L	1 U	1 U	1.0 U	0.20 U	NA	NA	NA	NA	NA	NA
Bromodichloromethane	50	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
Bromoform	50	µg/L	1 U	1 U	1.0 U	0.25 U	ND	1 U	1 U	ND	2 U	1 U
Bromomethane	5	µg/L	1 U	1 UJ	1.0 U	0.70 UJ	ND	1 U	1 UJ	ND	2 U	1 U
Carbon Disulfide	60	µg/L	1 U	1 U	1.0 U	0.42 U	ND	1 U	1 U	ND	2 U	1 U
Carbon Tetrachloride	5	µg/L	1 U	1 U	1.0 U	0.34 U	ND	1 U	1 U	ND	2 U	1 U
Chlorobenzene	5	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
Chloroethane	5	µg/L	1 U	1 U	1.0 U	0.23 UJ	ND	1 U	1 U	ND	2 U	1 U
Chloroform	7	µg/L	1 U	1 U	1.0 U	0.51 U	ND	1 U	1 U	ND	2 U	1 U
Chloromethane	5	µg/L	1 U	1 U	1.0 U	0.80 U	ND	1 U	1 U	ND	2 U	1 U
cis-1,2-Dichloroethene*	5	µg/L	6.1	2.4	1.5	4.1	ND	1 U	1 U	ND	2 U	1 U
cis-1,3-Dichloropropene	0.4	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-10 (cont.)				MW-11S			MW-12D		
Date Collected:			12/08/15	10/20/20	08/09/23	08/12/24	04/05/06	06/05/10	04/15/14	04/05/06	06/05/10	05/14/14
Volatile Organic Compounds (cont.)												
Cyclohexane	- -	µg/L	1 U	1 U	1.0 U	0.60 U	ND	1 U	1 U	ND	2 U	1 U
Dibromochloromethane	50	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
Dichlorodifluoromethane	5	µg/L	1 U	1 U	1.0 U	0.21 U	ND	1 U	1 U	ND	2 U	1 U
Ethylbenzene	5	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
Isopropylbenzene	5	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
m,p-Xylene	5	µg/L	2 U	2 U	2.0 U	0.53 U	ND	2 U	2 U	ND	4 U	2 U
Methyl acetate	- -	µg/L	2 U	2 U	2.0 UJ	0.87 U	ND	2 U	2 U	ND	4 U	2 U
Methyl ethyl ketone (MEK, 2-butanone)	50	µg/L	5 U	5 U	5.0 U	0.78 U	ND	5 UJ	5 U	ND	10 U	5 U
Methyl isobutyl ketone (MIBK, 4-methyl-2-pentanone)	- -	µg/L	5 U	5 U	0.22 J	0.20 U	ND	5 U	5 U	ND	10 U	5 U
Methyl tert-butyl ether	10	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
Methylcyclohexane	- -	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
Methylene Chloride	5	µg/L	1 U	1 U	1.0 U	0.65 U	ND	ND	1 U	ND	ND	1 U
o-Xylene	5	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
Styrene	5	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
Tetrachloroethene*	5	µg/L	190	58	76	62	3 J	1 U	1 U	ND	2 U	1 U
Toluene	5	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1.6
trans-1,2-Dichloroethene	5	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
trans-1,3-Dichloropropene	0.4	µg/L	1 U	1 U	1.0 U	0.23 U	ND	1 U	1 U	ND	2 U	1 U
Trichloroethene*	5	µg/L	17	5.4	3.1	5.8	ND	1 U	1 U	ND	2 U	1 U
Trichlorofluoromethane	5	µg/L	1 U	1 U	1.0 U	0.24 U	ND	1 U	1 U	ND	2 U	1 U
Vinyl Chloride*	2	µg/L	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U	ND	2 U	1 U
Tentatively Identified Compounds												
Acetic acid, (trimethylsilyl)-	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropyl Alcohol (2-Propanol)	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Biogeochemical Parameters												
Acetylene	- -	µg/L	0.5 U	0.74 U	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity as CaCO3 (total)	- -	mg/L	450	173	454	417	NA	441	NA	NA	126	NA
Chloride	250	mg/L	1,590	166	NA	NA	NA	6.6	NA	NA	ND	NA
Ethane	- -	µg/L	0.2 U	1 U	NA	0.850 U	NA	NA	NA	NA	NA	NA
Ethene	- -	µg/L	0.2 U	1 U	NA	1.30 U	NA	NA	NA	NA	NA	NA

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-10 (cont.)				MW-11S			MW-12D		
Date Collected:			12/08/15	10/20/20	08/09/23	08/12/24	04/05/06	06/05/10	04/15/14	04/05/06	06/05/10	05/14/14
Biogeochemical Parameters (cont.)												
Iron (dissolved)	0.3	mg/L	0.1 U	0.1 U	0.1 U	70 U	NA	ND	NA	NA	0.117	NA
Iron (total)	0.3	mg/L	0.17	0.416	0.15 UB	260	NA	NA	NA	NA	NA	NA
Methane	- -	µg/L	1.2	3.7 J	NA	3.00 U	NA	NA	NA	NA	NA	NA
Nitrate	10	mg/L	1 U	1 U	0.3 J	0.3 J	NA	0.58	NA	NA	0.51	NA
Nitrite as Nitrogen	1	mg/L	10 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	250	mg/L	199	24	77.9	77.0	NA	58.8	NA	NA	35.5	NA
Total Organic Carbon	- -	mg/L	11.4	3.1	19.6	2.6	NA	3.375	NA	NA	9.05	NA
Field Parameters												
Specific Conductivity	- -	mS/cm	5.52	0.66	1.268	644.28	NA	NA	NA	NA	NA	NA
Dissolved Oxygen	- -	mg/L	0.19	3.36	0.61	0.69	NA	NA	NA	NA	NA	NA
Oxidation Reduction Potential	- -	mV	9.5	98.2	62.8	41.3	NA	NA	NA	NA	NA	NA
pH	- -	SU	7.19	7.81	6.99	7.04	NA	NA	NA	NA	NA	NA
Temperature	- -	C	13.8	19.1	21.4	22.4	NA	NA	NA	NA	NA	NA
Turbidity	- -	NTU	2.35	11.3	0	9.95	NA	NA	NA	NA	NA	NA

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-12S							MW-13D		
Date Collected:			04/05/06	06/05/10	04/11/14	12/07/15	10/21/20	08/09/23	08/14/24	04/05/06	06/05/10	05/14/14
Volatile Organic Compounds												
1,1,1-Trichloroethane*	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
1,1,2,2-Tetrachloroethane	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
1,1,2-Trichloroethane	1	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
1,1-Dichloroethane*	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
1,1-Dichloroethene*	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
1,2,3-Trichlorobenzene	5	µg/L	NA	NA	NA	1 U	1 U	1.0 U	0.25 U	NA	NA	NA
1,2,4-Trichlorobenzene	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.34 U	ND	1 U	1 U
1,2-Dibromo-3-chloropropane	0.04	µg/L	ND	2 U	2 U	2 U	2 U	2.0 U	0.45 U	ND	2 U	2 U
1,2-Dibromoethane	0.0006	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
1,2-Dichlorobenzene	3	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
1,2-Dichloroethane	0.6	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
1,2-Dichloropropane	1	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
1,3-Dichlorobenzene	3	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
1,4-Dichlorobenzene	3	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
1,4-Dioxane*	0.35	µg/L	NA	NA	NA	40 U	R	40 U	13 U	NA	NA	NA
2-Hexanone	50	µg/L	ND	5 U	5 U	5 U	5 U	5.0 U	0.20 U	ND	5 U	5 U
Acetone	50	µg/L	ND	5 U	5 U	5 U	5 U	5.0 UJ	5.0 U	580	5 UJ	1.6 J
Benzene	1	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
Bromochloromethane	5	µg/L	NA	NA	NA	1 U	1 U	1.0 U	0.20 U	NA	NA	NA
Bromodichloromethane	50	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
Bromoform	50	µg/L	ND	1 U	1 UJ	1 U	1 U	1.0 U	0.25 U	ND	1 U	1 U
Bromomethane	5	µg/L	ND	1 U	1 U	1 UB	1 UJ	1.0 U	0.70 U	ND	1 U	1 U
Carbon Disulfide	60	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.42 U	2 J	1 U	1 U
Carbon Tetrachloride	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.34 U	ND	1 U	1 U
Chlorobenzene	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
Chloroethane	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.23 UJ	ND	1 U	1 U
Chloroform	7	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.51 U	ND	1 U	1 U
Chloromethane	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.80 U	ND	1 U	1 U
cis-1,2-Dichloroethene*	5	µg/L	ND	1 U	1 U	1 U	0.36 J	1.0 U	0.23 U	4 J	1 U	1 U
cis-1,3-Dichloropropene	0.4	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-12S							MW-13D		
Date Collected:			04/05/06	06/05/10	04/11/14	12/07/15	10/21/20	08/09/23	08/14/24	04/05/06	06/05/10	05/14/14
Volatile Organic Compounds (cont.)												
Cyclohexane	- -	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.60 U	ND	1 U	1 U
Dibromochloromethane	50	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
Dichlorodifluoromethane	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.21 U	ND	1 U	1 U
Ethylbenzene	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
Isopropylbenzene	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
m,p-Xylene	5	µg/L	ND	2 U	2 U	2 U	2 U	2.0 U	0.53 U	ND	2 U	2 U
Methyl acetate	- -	µg/L	ND	2 U	2 U	2 U	2 U	2.0 UJ	0.87 U	ND	2 U	2 U
Methyl ethyl ketone (MEK, 2-butanone)	50	µg/L	ND	5 UJ	5 U	5 U	5 U	5.0 U	0.78 U	ND	5 UJ	5 U
Methyl isobutyl ketone (MIBK, 4-methyl-2-pentanone)	- -	µg/L	ND	5 U	5 U	5 U	5 U	5.0 U	0.20 U	ND	5 U	5 U
Methyl tert-butyl ether	10	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
Methylcyclohexane	- -	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
Methylene Chloride	5	µg/L	ND	ND	1 U	1 U	1 U	1.0 U	0.65 U	ND	ND	1 U
o-Xylene	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
Styrene	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
Tetrachloroethene*	5	µg/L	ND	1 U	1 U	1 U	1 U	0.28 J	0.21 U	ND	1 U	1 U
Toluene	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
trans-1,2-Dichloroethene	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
trans-1,3-Dichloropropene	0.4	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.23 U	ND	1 U	1 U
Trichloroethene*	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	2 J	1 U	1 U
Trichlorofluoromethane	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.24 U	ND	1 U	1 U
Vinyl Chloride*	2	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	1 J	1 U	1 U
Tentatively Identified Compounds												
Acetic acid, (trimethylsilyl)-	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropyl Alcohol (2-Propanol)	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Biogeochemical Parameters												
Acetylene	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Alkalinity as CaCO3 (total)	- -	mg/L	NA	380	NA	NA	NA	NA	NA	NA	229	NA
Chloride	250	mg/L	NA	11.6	NA	NA	NA	NA	NA	NA	2.3	NA
Ethane	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethene	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-12S							MW-13D		
Date Collected:			04/05/06	06/05/10	04/11/14	12/07/15	10/21/20	08/09/23	08/14/24	04/05/06	06/05/10	05/14/14
Biogeochemical Parameters (cont.)												
Iron (dissolved)	0.3	mg/L	NA	ND	NA	NA	NA	NA	NA	NA	ND	NA
Iron (total)	0.3	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methane	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nitrate	10	mg/L	NA	0.52	NA	NA	NA	NA	NA	NA	0.54	NA
Nitrite as Nitrogen	1	mg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sulfate	250	mg/L	NA	78.2	NA	NA	NA	NA	NA	NA	28.4	NA
Total Organic Carbon	- -	mg/L	NA	3.375	NA	NA	NA	NA	NA	NA	3.55	NA
Field Parameters												
Specific Conductivity	- -	mS/cm	NA	NA	NA	1.29	0.947	0.847	1.00	NA	NA	NA
Dissolved Oxygen	- -	mg/L	NA	NA	NA	1.74	1.05	0.72	0.36	NA	NA	NA
Oxidation Reduction Potential	- -	mV	NA	NA	NA	258.9	139.1	56	-24	NA	NA	NA
pH	- -	SU	NA	NA	NA	7.31	8.6	7.18	7.71	NA	NA	NA
Temperature	- -	C	NA	NA	NA	12.1	17.58	16.4	18.52	NA	NA	NA
Turbidity	- -	NTU	NA	NA	NA	1.28	1.48	4.98	3.5	NA	NA	NA

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-13S							MW-14S		
Date Collected:			04/05/06	06/05/10	04/11/14	12/08/15	10/20/20	08/09/23	08/12/24	04/05/06	06/05/10	04/11/14
Volatile Organic Compounds												
1,1,1-Trichloroethane*	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	14	50	23
1,1,2,2-Tetrachloroethane	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
1,1,2-Trichloroethane	1	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
1,1-Dichloroethane*	5	µg/L	ND	0.61 J	1 U	1 U	1 U	1.0 U	0.20 U	3 J	15	7.8
1,1-Dichloroethene*	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	7 J	58	34
1,2,3-Trichlorobenzene	5	µg/L	NA	NA	NA	1 U	1 U	1.0 U	0.25 U	NA	NA	NA
1,2,4-Trichlorobenzene	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.34 U	ND	1 U	1 U
1,2-Dibromo-3-chloropropane	0.04	µg/L	ND	2 U	2 U	2 U	2 U	2.0 U	0.45 U	ND	2 U	2 U
1,2-Dibromoethane	0.0006	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
1,2-Dichlorobenzene	3	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
1,2-Dichloroethane	0.6	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
1,2-Dichloropropane	1	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
1,3-Dichlorobenzene	3	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
1,4-Dichlorobenzene	3	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.21 J	ND	1 U	1 U
1,4-Dioxane*	0.35	µg/L	NA	NA	NA	40 U	R	40 U	13 U	NA	NA	NA
2-Hexanone	50	µg/L	ND	5 U	5 U	5 U	5 U	5.0 U	0.20 U	ND	5 U	5 U
Acetone	50	µg/L	ND	5 UJ	5 U	5 U	5 U	5.0 UJ	5.0 U	6 J	5 U	5 U
Benzene	1	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
Bromochloromethane	5	µg/L	NA	NA	NA	1 U	1 U	1.0 U	0.20 U	NA	NA	NA
Bromodichloromethane	50	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
Bromoform	50	µg/L	ND	1 U	1 UJ	1 U	1 U	1.0 U	0.25 U	ND	1 U	1 UJ
Bromomethane	5	µg/L	ND	1 U	1 U	1 UB	1 UJ	1.0 U	0.70 UJ	ND	1 U	1 U
Carbon Disulfide	60	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.42 U	ND	1 U	1 U
Carbon Tetrachloride	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.34 U	ND	1 U	1 U
Chlorobenzene	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
Chloroethane	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.23 UJ	ND	1 U	1 U
Chloroform	7	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.51 U	ND	1 U	1 U
Chloromethane	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.80 U	ND	1 U	1 U
cis-1,2-Dichloroethene*	5	µg/L	3 J	14	2.3	2.9	1 U	1.0 U	0.23 U	2 J	8.9	6.3
cis-1,3-Dichloropropene	0.4	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-13S							MW-14S		
Date Collected:			04/05/06	06/05/10	04/11/14	12/08/15	10/20/20	08/09/23	08/12/24	04/05/06	06/05/10	04/11/14
Volatile Organic Compounds (cont.)												
Cyclohexane	- -	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.60 U	ND	1 U	1 U
Dibromochloromethane	50	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
Dichlorodifluoromethane	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.21 U	ND	1 U	0.5 J
Ethylbenzene	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
Isopropylbenzene	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
m,p-Xylene	5	µg/L	ND	2 U	2 U	2 U	2 U	2.0 U	0.53 U	ND	2 U	2 U
Methyl acetate	- -	µg/L	ND	2 U	2 U	2 U	2 U	2.0 UJ	0.87 U	ND	2 U	2 U
Methyl ethyl ketone (MEK, 2-butanone)	50	µg/L	ND	5 U	5 U	5 U	5 U	2.0 U	0.78 U	2 J	5 UJ	5 U
Methyl isobutyl ketone (MIBK, 4-methyl-2-pentanone)	- -	µg/L	ND	5 U	5 U	5 U	5 U	2.0 U	0.20 U	ND	5 U	5 U
Methyl tert-butyl ether	10	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	2 J	2.7	0.56 J
Methylcyclohexane	- -	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
Methylene Chloride	5	µg/L	ND	NA	1 U	1 U	1 U	1.0 U	0.65 U	ND	ND	1 U
o-Xylene	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
Styrene	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U	1 U
Tetrachloroethene*	5	µg/L	ND	1 U	1 U	4.6	0.24 J	1.0 U	0.21 U	ND	1 U	1 U
Toluene	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	1 J	1 U	1 U
trans-1,2-Dichloroethene	5	µg/L	ND	0.29 J	1 U	1 U	1 U	1.0 U	0.20 U	ND	0.25 J	0.33 J
trans-1,3-Dichloropropene	0.4	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.23 U	ND	1 U	1 U
Trichloroethene*	5	µg/L	ND	0.97 J	0.68 J	1.8	1.1	0.95 J	0.84 J	ND	1 U	1 U
Trichlorofluoromethane	5	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.24 U	ND	1 U	1 U
Vinyl Chloride*	2	µg/L	ND	1 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	3.4	2.2
Tentatively Identified Compounds												
Acetic acid, (trimethylsilyl)-	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropyl Alcohol (2-Propanol)	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Biogeochemical Parameters												
Acetylene	- -	µg/L	NA	NA	NA	8.8	1.6	15.6	NA	NA	3.8	NA
Alkalinity as CaCO3 (total)	- -	mg/L	NA	505	NA	510	497	502	515	NA	368	NA
Chloride	250	mg/L	NA	41.9	NA	144	1,110	NA	NA	NA	47.9	NA
Ethane	- -	µg/L	NA	NA	NA	1 U	0.6 J	0.6 J	0.850 U	NA	0.55	NA
Ethene	- -	µg/L	NA	NA	NA	1 U	NA	NA	1.30 U	NA	NA	NA

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-13S							MW-14S		
Date Collected:			04/05/06	06/05/10	04/11/14	12/08/15	10/20/20	08/09/23	08/12/24	04/05/06	06/05/10	04/11/14
Biogeochemical Parameters (cont.)												
Iron (dissolved)	0.3	mg/L	NA	ND	NA	0.1 U	0.216	0.24 UB	70 U	NA	NA	NA
Iron (total)	0.3	mg/L	NA	NA	NA	0.1 U	0.1 U	0.1 U	140	NA	ND	NA
Methane	- -	µg/L	NA	NA	NA	142	1,190	127	3.00 U	NA	80.5	NA
Nitrate	10	mg/L	NA	0.86	NA	0.5 U	2.8 J	NA	0.5 J	NA	NA	NA
Nitrite as Nitrogen	1	mg/L	NA	NA	NA	0.2 U	1 U	NA	NA	NA	NA	NA
Sulfate	250	mg/L	NA	116	NA	NA	1 U	NA	143	NA	NA	NA
Total Organic Carbon	- -	mg/L	NA	9.95	NA	0.5 U	0.74 U	NA	1.2	NA	NA	NA
Field Parameters												
Specific Conductivity	- -	mS/cm	NA	NA	NA	1.7	1.14	1.620	1.57	NA	NA	NA
Dissolved Oxygen	- -	mg/L	NA	NA	NA	0.6	2.57	1.09	1.01	NA	NA	NA
Oxidation Reduction Potential	- -	mV	NA	NA	NA	5.2	75.4	45.7	14	NA	NA	NA
pH	- -	SU	NA	NA	NA	7.2	7.02	6.95	8.97	NA	NA	NA
Temperature	- -	C	NA	NA	NA	13.2	17.2	21.5	22.58	NA	NA	NA
Turbidity	- -	NTU	NA	NA	NA	3.69	5.4	4.27	3.8	NA	NA	NA

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-14S (cont.)				MW-15S					
Date Collected:			12/09/15	10/20/20	08/08/23	08/12/24	04/05/06	06/05/10	04/10/14	12/09/15	10/20/20	08/09/23
Volatile Organic Compounds												
1,1,1-Trichloroethane*	5	µg/L	15	4.4	6.2	3.6	110 D	230	2.7	3.8	3	0.91 J
1,1,2,2-Tetrachloroethane	5	µg/L	1 U	1 U	1.0 U	0.20 U	ND	20 U	1 U	1 U	1 U	1.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	µg/L	1 U	1 U	1.0 U	0.20 U	ND	20 U	1 U	1 U	1 U	1.0 U
1,1,2-Trichloroethane	1	µg/L	1 U	1 U	1.0 U	0.20 U	ND	20 U	1 U	1 U	1 U	1.0 U
1,1-Dichloroethane*	5	µg/L	12	6.1	7.7	6.3	480 D	360	14	30	23	12
1,1-Dichloroethene*	5	µg/L	32	17 J	19	13	86 D	140	2.4	3.7	3.3	0.89 J
1,2,3-Trichlorobenzene	5	µg/L	1 U	1 U	1.0 U	0.25 U	NA	NA	NA	1 U	1 U	1.0 U
1,2,4-Trichlorobenzene	5	µg/L	1 U	1 U	1.0 U	0.34 U	ND	20 U	1 U	1 U	1 U	1.0 U
1,2-Dibromo-3-chloropropane	0.04	µg/L	2 U	2 U	2.0 UJ	0.45 U	ND	40 U	2 U	2 U	2 U	2.0 U
1,2-Dibromoethane	0.0006	µg/L	1 U	1 U	1.0 U	0.20 U	ND	20 U	1 U	1 U	1 U	1.0 U
1,2-Dichlorobenzene	3	µg/L	1 U	1 U	1.0 U	0.20 U	ND	20 U	1 U	1 U	1 U	1.0 U
1,2-Dichloroethane	0.6	µg/L	1 U	1 U	1.0 U	0.20 U	ND	20 U	1 U	1 U	1 U	1.0 U
1,2-Dichloropropane	1	µg/L	1 U	1 U	1.0 U	0.20 U	ND	20 U	1 U	1 U	1 U	1.0 U
1,3-Dichlorobenzene	3	µg/L	1 U	1 U	1.0 U	0.20 U	ND	20 U	1 U	1 U	1 U	1.0 U
1,4-Dichlorobenzene	3	µg/L	1 U	1 U	1.0 U	0.20 U	ND	20 U	1 U	1 U	1 U	1.0 U
1,4-Dioxane*	0.35	µg/L	40 U	R	40 U	13 U	NA	NA	NA	40 U	16 J	40 U
2-Hexanone	50	µg/L	5 U	5 U	5.0 U	0.20 U	ND	100 U	5 U	5 U	5 U	5.0 U
Acetone	50	µg/L	5 U	5 U	5.0 UJ	5.0 U	ND	100 U	1.7 J	5 U	5 U	5.0 UJ
Benzene	1	µg/L	1 U	1 U	1.0 U	0.20 U	ND	20 U	1 U	1 U	0.2 J	1.0 U
Bromochloromethane	5	µg/L	1 U	1 U	1.0 U	0.20 U	NA	NA	NA	1 U	1 U	1.0 U
Bromodichloromethane	50	µg/L	1 U	1 U	1.0 U	0.20 U	ND	20 U	1 U	1 U	1 U	1.0 U
Bromoform	50	µg/L	1 U	1 U	1.0 UJ	0.25 U	ND	20 U	1 UJ	1 U	1 U	1.0 U
Bromomethane	5	µg/L	1 U	1 UJ	1.0 U	0.70 UJ	ND	20 U	1 U	1 U	1 UJ	1.0 U
Carbon Disulfide	60	µg/L	1 U	1 U	1.0 U	0.42 U	ND	20 U	1 U	1 U	1 U	1.0 U
Carbon Tetrachloride	5	µg/L	1 U	1 U	1.0 U	0.34 U	ND	20 U	1 U	1 U	1 U	1.0 U
Chlorobenzene	5	µg/L	1 U	1 U	1.0 U	0.20 U	ND	20 U	1 U	1 U	1 U	1.0 U
Chloroethane	5	µg/L	1 U	1 U	1.0 U	0.23 UJ	ND	20 U	1 U	1 U	1 U	1.0 U
Chloroform	7	µg/L	1 U	1 U	1.0 U	0.51 U	ND	20 U	1 U	1 U	1 U	1.0 U
Chloromethane	5	µg/L	1 U	1 U	1.0 U	0.80 U	ND	20 U	1 U	1 U	1 U	1.0 U
cis-1,2-Dichloroethene*	5	µg/L	5.1	3.7	6.4	5.9	2,600 DJ	2,700	170	240 D	150	54
cis-1,3-Dichloropropene	0.4	µg/L	1 U	1 U	1.0 U	0.20 U	ND	20 U	1 U	1 U	1 U	1.0 U

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-14S (cont.)				MW-15S					
Date Collected:			12/09/15	10/20/20	08/08/23	08/12/24	04/05/06	06/05/10	04/10/14	12/09/15	10/20/20	08/09/23
Volatile Organic Compounds (cont.)												
Cyclohexane	- -	µg/L	1 U	1 U	1.0 U	0.60 U	ND	20 U	1 U	1 U	1 U	1.0 U
Dibromochloromethane	50	µg/L	1 U	1 U	1.0 U	0.20 U	ND	20 U	1 U	1 U	1 U	1.0 U
Dichlorodifluoromethane	5	µg/L	1 U	1 U	1.0 U	0.21 U	ND	20 U	1 U	1 U	1 U	1.0 U
Ethylbenzene	5	µg/L	1 U	1 U	1.0 U	0.20 U	ND	20 U	1 U	1 U	1 U	1.0 U
Isopropylbenzene	5	µg/L	1 U	1 U	1.0 U	0.20 U	ND	20 U	1 U	1 U	1 U	1.0 U
m,p-Xylene	5	µg/L	2 U	2 U	2.0 U	0.53 U	ND	40 U	2 U	2 U	2 U	2.0 U
Methyl acetate	- -	µg/L	2 U	2 U	2.0 UJ	0.87 U	ND	40 U	2 U	2 U	2 U	2.0 UJ
Methyl ethyl ketone (MEK, 2-butanone)	50	µg/L	5 U	5 U	5.0 U	0.78 U	ND	100 UJ	5 U	5 U	5 U	5.0 U
Methyl isobutyl ketone (MIBK, 4-methyl-2-pentanone)	- -	µg/L	5 U	5 U	5.0 U	0.20 U	ND	100 U	5 U	5 U	5 U	5.0 U
Methyl tert-butyl ether	10	µg/L	0.59 J	0.35 J	0.34 J	0.26 J	ND	4.8 J	0.45 J	1	0.64 J	1.0 U
Methylcyclohexane	- -	µg/L	1 U	1 U	1.0 U	0.20 U	ND	20 U	1 U	1 U	1 U	1.0 U
Methylene Chloride	5	µg/L	1 U	1 U	1.0 U	0.65 U	ND	ND	1 U	1 U	1 U	1.0 U
o-Xylene	5	µg/L	1 U	1 U	1.0 U	0.20 U	ND	20 U	1 U	1 U	1 U	1.0 U
Styrene	5	µg/L	1 U	1 U	1.0 U	0.20 U	ND	20 U	1 U	1 U	1 U	1.0 U
Tetrachloroethene*	5	µg/L	1 U	1 U	1.0 U	0.21 U	ND	20 U	1 U	1 U	0.21 J	1.0 U
Toluene	5	µg/L	1 U	1 U	1.0 U	0.20 U	ND	20 U	1 U	1 U	1 U	1.0 U
trans-1,2-Dichloroethene	5	µg/L	1 U	0.24 J	0.26 J	0.38 J	72 D	72	11	18	9.2	4.2
trans-1,3-Dichloropropene	0.4	µg/L	1 U	1 U	1.0 U	0.23 U	ND	20 U	1 U	1 U	1 U	1.0 U
Trichloroethene*	5	µg/L	1 U	1 U	1.0 U	0.20 U	260 D	2,700	51	53	69	17
Trichlorofluoromethane	5	µg/L	1 U	1 U	1.0 U	0.24 U	ND	20 U	1 U	1 U	1 U	1.0 U
Vinyl Chloride*	2	µg/L	0.71 J	0.66 J	1.4	0.29 J	970 D	640	35	27	7	4.3
Tentatively Identified Compounds												
Acetic acid, (trimethylsilyl)-	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropyl Alcohol (2-Propanol)	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Biogeochemical Parameters												
Acetylene	- -	µg/L	7.4	2.4	10.6	NA	NA	15	9.2	15	4.3	17.3
Alkalinity as CaCO3 (total)	- -	mg/L	360	228	280	287	NA	432	400	405	391	348
Chloride	250	mg/L	95.2	81	NA	NA	NA	161	131	192	241	NA
Ethane	- -	µg/L	1 U	0.4 J	1.0 U	0.850 U	NA	ND	1 U	1 U	1 U	1.0 U
Ethene	- -	µg/L	1 U	NA	NA	1.30 U	NA	NA	1 U	1 U	NA	NA

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-14S (cont.)				MW-15S					
Date Collected:			12/09/15	10/20/20	08/08/23	08/12/24	04/05/06	06/05/10	04/10/14	12/09/15	10/20/20	08/09/23
Biogeochemical Parameters (cont.)												
Iron (dissolved)	0.3	mg/L	0.1 U	0.481	0.120	70 U	NA	NA	0.106	0.1	0.159	0.11 UB
Iron (total)	0.3	mg/L	0.1 U	0.0693 J	100 U	240	NA	ND	0.103	0.1 U	0.1 U	0.1 U
Methane	- -	µg/L	91.5	51.7	74.4	3.60 J	NA	93.9	96.8	95.7	56.3	38.8
Nitrate	10	mg/L	1.2	4.9 J	NA	0.3 J	NA	NA	69	63	18	NA
Nitrite as Nitrogen	1	mg/L	0.2 U	1 U	NA	NA	NA	NA	2.7	3.8	1.2	NA
Sulfate	250	mg/L	0.2 U	1 U	NA	81.5	NA	NA	1 U	0.72	1 U	NA
Total Organic Carbon	- -	mg/L	0.5 U	0.74 U	NA	2.0	NA	NA	NA	0.5 U	0.74 U	NA
Field Parameters												
Specific Conductivity	- -	mS/cm	1.05	1.064	1.804	2.10	NA	NA	NA	1.56	1.429	1.347
Dissolved Oxygen	- -	mg/L	1.17	1.9	0.85	0.41	NA	NA	NA	0.29	1.08	0.47
Oxidation Reduction Potential	- -	mV	187.6	234.7	65.9	41	NA	NA	NA	34.2	242.1	66.6
pH	- -	SU	7.34	7.31	7.10	8.60	NA	NA	NA	6.46	7.07	7.24
Temperature	- -	C	14.2	17.6	19.3	23.70	NA	NA	NA	14.6	16.12	17.7
Turbidity	- -	NTU	1.8	3.24	3.03	4.0	NA	NA	NA	0.66	2.47	0

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-15S (cont.)	MW-16I							MW-16S	
Date Collected:			08/13/24	04/05/06	06/05/10	05/14/14	12/08/15	10/19/20	08/08/23	08/14/24	04/05/06	06/05/10
Volatile Organic Compounds												
1,1,1-Trichloroethane*	5	µg/L	0.93 J	ND	10 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U
1,1,2,2-Tetrachloroethane	5	µg/L	0.20 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	µg/L	0.20 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U
1,1,2-Trichloroethane	1	µg/L	0.20 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U
1,1-Dichloroethane*	5	µg/L	12	ND	10 U	2.1	0.97 J	0.7 J	0.53 J	0.46 J	2 J	22
1,1-Dichloroethene*	5	µg/L	1.1	ND	10 U	1 U	1 U	1 U	1.0 U	0.20 U	1 J	2.8
1,2,3-Trichlorobenzene	5	µg/L	0.25 U	NA	NA	NA	1 U	1 U	1.0 U	0.25 U	NA	NA
1,2,4-Trichlorobenzene	5	µg/L	0.34 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.34 U	ND	1 U
1,2-Dibromo-3-chloropropane	0.04	µg/L	0.45 U	ND	20 U	2 U	2 U	2 U	2.0 UJ	0.45 U	ND	2 U
1,2-Dibromoethane	0.0006	µg/L	0.20 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U
1,2-Dichlorobenzene	3	µg/L	0.20 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U
1,2-Dichloroethane	0.6	µg/L	0.20 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U
1,2-Dichloropropane	1	µg/L	0.20 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U
1,3-Dichlorobenzene	3	µg/L	0.20 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U
1,4-Dichlorobenzene	3	µg/L	0.20 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.21 UB	ND	1 U
1,4-Dioxane*	0.35	µg/L	13 U	NA	NA	NA	40 U	R	40 U	13 U	NA	NA
2-Hexanone	50	µg/L	0.20 U	ND	50 U	5 U	5 U	5 U	5.0 U	0.20 U	ND	5 U
Acetone	50	µg/L	5.0 U	12	50 U	1.9 J	5 UB	5 U	5.0 UJ	5.0 U	ND	2 J
Benzene	1	µg/L	0.20 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	0.47 J
Bromochloromethane	5	µg/L	0.20 U	NA	NA	NA	1 U	1 U	1.0 U	0.20 U	NA	NA
Bromodichloromethane	50	µg/L	0.20 U	1 J	10 U	1 U	1 U	1 U	1.0 U	0.20 U	1 J	1 U
Bromoform	50	µg/L	0.25 U	ND	10 U	1 U	1 U	1 U	1.0 UJ	0.25 U	ND	1 U
Bromomethane	5	µg/L	0.70 UJ	ND	10 U	1 U	1 U	1 UJ	1.0 U	0.70 U	ND	1 U
Carbon Disulfide	60	µg/L	0.42 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.42 U	ND	1 U
Carbon Tetrachloride	5	µg/L	0.34 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.34 U	ND	1 U
Chlorobenzene	5	µg/L	0.20 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U
Chloroethane	5	µg/L	0.23 UJ	ND	10 U	1 U	1 U	1 U	1.0 U	0.23 UJ	ND	1 U
Chloroform	7	µg/L	0.51 U	26	10 U	1 U	1 U	1 U	1.0 U	0.51 U	ND	1 U
Chloromethane	5	µg/L	0.80 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.80 U	ND	1 U
cis-1,2-Dichloroethene*	5	µg/L	60	11	7.8 J	26	8.4	6.5	3.2	2.8	160	400 D
cis-1,3-Dichloropropene	0.4	µg/L	0.20 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-15S (cont.)	MW-16I							MW-16S	
Date Collected:			08/13/24	04/05/06	06/05/10	05/14/14	12/08/15	10/19/20	08/08/23	08/14/24	04/05/06	06/05/10
Volatile Organic Compounds (cont.)												
Cyclohexane	- -	µg/L	0.60 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.60 U	ND	1 U
Dibromochloromethane	50	µg/L	0.20 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U
Dichlorodifluoromethane	5	µg/L	0.21 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.21 U	ND	1 U
Ethylbenzene	5	µg/L	0.20 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U
Isopropylbenzene	5	µg/L	0.20 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U
m,p-Xylene	5	µg/L	0.53 U	ND	20 U	2 U	2 U	2 U	2.0 U	0.53 U	ND	2 U
Methyl acetate	- -	µg/L	0.87 U	ND	20 U	2 U	2 U	2 U	2.0 UJ	0.87 U	5 J	2 U
Methyl ethyl ketone (MEK, 2-butanone)	50	µg/L	0.78 U	ND	50 U	5 U	5 U	5 U	5.0 U	0.78 U	ND	5 UJ
Methyl isobutyl ketone (MIBK, 4-methyl-2-pentanone)	- -	µg/L	0.20 U	ND	50 U	5 U	5 U	5 U	5.0 U	0.20 U	ND	5 U
Methyl tert-butyl ether	10	µg/L	0.20 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.20 U	7 J	3
Methylcyclohexane	- -	µg/L	0.20 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U
Methylene Chloride	5	µg/L	0.65 U	2 J	ND	1 U	1 U	1 U	1.0 U	0.65 U	ND	1 U
o-Xylene	5	µg/L	0.20 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U
Styrene	5	µg/L	0.20 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U
Tetrachloroethene*	5	µg/L	0.21 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.21 U	ND	1 U
Toluene	5	µg/L	0.20 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.20 U	ND	1 U
trans-1,2-Dichloroethene	5	µg/L	4.5	ND	10 U	0.98 J	1 U	1 U	1.0 U	0.20 U	11	19
trans-1,3-Dichloropropene	0.4	µg/L	0.23 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.23 U	ND	1 U
Trichloroethene*	5	µg/L	18	3 J	10 U	1 U	1 U	1 U	1.0 U	0.20 U	2 J	0.22 J
Trichlorofluoromethane	5	µg/L	0.24 U	ND	10 U	1 U	1 U	1 U	1.0 U	0.24 U	ND	1 U
Vinyl Chloride*	2	µg/L	4.4	5 J	10 U	4.3	1.8	0.64 J	1.0 U	0.20 U	49	150
Tentatively Identified Compounds												
Acetic acid, (trimethylsilyl)-	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropyl Alcohol (2-Propanol)	- -	µg/L	NA	NA	NA	NA	NA	R	NA	NA	NA	NA
Biogeochemical Parameters												
Acetylene	- -	µg/L	NA	NA	5.475	NA	6.2	1.8	11	NA	NA	7.825
Alkalinity as CaCO3 (total)	- -	mg/L	295	NA	70	NA	48	161	243	257	NA	530
Chloride	250	mg/L	NA	NA	3,040	NA	2,910	1,540	NA	NA	NA	861
Ethane	- -	µg/L	0.850 U	NA	0.53	NA	1 U	0.5 J	0.6 J	0.850 U	NA	ND
Ethene	- -	µg/L	1.30 U	NA	NA	NA	10 U	NA	NA	1.30 U	NA	NA

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-15S (cont.)	MW-16I							MW-16S	
Date Collected:			08/13/24	04/05/06	06/05/10	05/14/14	12/08/15	10/19/20	08/08/23	08/14/24	04/05/06	06/05/10
Biogeochemical Parameters (cont.)												
Iron (dissolved)	0.3	mg/L	70 U	NA	NA	NA	0.97	0.97	2.00	70 U	NA	NA
Iron (total)	0.3	mg/L	100	NA	ND	NA	0.1 U	0.1 U	0.070 J	500	NA	ND
Methane	- -	µg/L	12.0	NA	119	NA	88.6	59.7	38.9	3.00 U	NA	73
Nitrate	10	mg/L	0.2 U	NA	NA	NA	9.9	12	NA	0.3 J	NA	NA
Nitrite as Nitrogen	1	mg/L	NA	NA	NA	NA	0.54	1 U	NA	NA	NA	NA
Sulfate	250	mg/L	33.6	NA	NA	NA	0.35	0.46 J	NA	35.0	NA	NA
Total Organic Carbon	- -	mg/L	3.0	NA	NA	NA	0.5 U	0.74 U	NA	2.3	NA	NA
Field Parameters												
Specific Conductivity	- -	mS/cm	1165.5	NA	NA	NA	5.77	48.63	2.525	998.8	NA	NA
Dissolved Oxygen	- -	mg/L	0.62	NA	NA	NA	5.14	0.25	1.56	1.75	NA	NA
Oxidation Reduction Potential	- -	mV	175.1	NA	NA	NA	283.4	26.8	51.2	124.2	NA	NA
pH	- -	SU	7.05	NA	NA	NA	8.93	9.16	8.46	8.47	NA	NA
Temperature	- -	C	19.4	NA	NA	NA	12.1	15.5	18.5	19.0	NA	NA
Turbidity	- -	NTU	6.14	NA	NA	NA	14.9	20.4	32.24	24.91	NA	NA

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-16S (cont.)					MW-17D			MW-17S	
Date Collected:			04/15/14	12/08/15	10/20/20	08/08/23	08/13/24	04/05/06	06/05/10	05/14/14	04/05/06	06/05/10
Volatile Organic Compounds												
1,1,1-Trichloroethane*	5	µg/L	1 U	2.5 U	5 U	10 U	0.50 U	ND	5 UJ	1 U	ND	1 U
1,1,2,2-Tetrachloroethane	5	µg/L	1 U	2.5 U	5 U	10 U	0.50 U	ND	5 UJ	1 U	ND	1 U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	µg/L	1 U	2.5 U	5 U	10 U	0.50 U	ND	5 UJ	1 U	ND	1 U
1,1,2-Trichloroethane	1	µg/L	1 U	2.5 U	5 U	10 U	0.50 U	ND	5 UJ	1 U	ND	1 U
1,1-Dichloroethane*	5	µg/L	58	59	33	100	29	ND	5 UJ	1 U	ND	1 U
1,1-Dichloroethene*	5	µg/L	6.5	9.6	8.5	20	4.8	ND	5 UJ	1 U	ND	1 U
1,2,3-Trichlorobenzene	5	µg/L	NA	2.5 U	5 U	10 U	0.63 U	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	5	µg/L	1 U	2.5 U	5 U	10 U	0.85 U	ND	5 UJ	1 U	ND	1 U
1,2-Dibromo-3-chloropropane	0.04	µg/L	2 U	5 U	10 U	20 U	1.2 U	ND	10 UJ	2 U	ND	2 U
1,2-Dibromoethane	0.0006	µg/L	1 U	2.5 U	5 U	10 U	0.50 U	ND	5 UJ	1 U	ND	1 U
1,2-Dichlorobenzene	3	µg/L	1 U	2.5 U	5 U	10 U	0.50 U	ND	5 UJ	1 U	ND	1 U
1,2-Dichloroethane	0.6	µg/L	1 U	2.5 U	5 U	10 U	0.50 U	ND	5 UJ	1 U	ND	1 U
1,2-Dichloropropane	1	µg/L	1 U	2.5 U	5 U	10 U	0.50 U	ND	5 UJ	1 U	ND	1 U
1,3-Dichlorobenzene	3	µg/L	1 U	2.5 U	5 U	10 U	0.50 U	ND	5 UJ	1 U	ND	1 U
1,4-Dichlorobenzene	3	µg/L	1 U	2.5 U	5 U	10 U	0.50 U	ND	5 UJ	1 U	ND	1 U
1,4-Dioxane*	0.35	µg/L	NA	100 U	R	400 U	33 U	NA	NA	NA	NA	NA
2-Hexanone	50	µg/L	5 U	13 U	25 U	50 U	0.50 U	ND	25 UJ	5 U	ND	5 U
Acetone	50	µg/L	5 U	13 U	25 U	50 U	13 U	110	25 UJ	2.7 J	ND	5 U
Benzene	1	µg/L	0.39 J	0.6 J	5 U	2.0 J	0.52 J	ND	5 UJ	0.25 J	ND	1 U
Bromochloromethane	5	µg/L	NA	2.5 U	5 U	10 U	0.50 U	NA	NA	NA	NA	NA
Bromodichloromethane	50	µg/L	1 U	2.5 U	5 U	10 U	0.50 U	ND	5 UJ	1 U	ND	1 U
Bromoform	50	µg/L	1 U	2.5 U	5 U	10 U	0.63 U	ND	5 UJ	1 U	ND	1 U
Bromomethane	5	µg/L	1 UJ	2.5 U	5 UJ	10 U	1.8 U	ND	5 UJ	1 UB	ND	1 U
Carbon Disulfide	60	µg/L	1 U	2.5 U	5 U	10 U	1.1 U	ND	5 UJ	1 U	ND	1 U
Carbon Tetrachloride	5	µg/L	1 U	2.5 U	5 U	10 U	0.85 U	ND	5 UJ	1 U	ND	1 U
Chlorobenzene	5	µg/L	1 U	2.5 U	5 U	10 U	0.50 U	ND	5 UJ	1 U	ND	1 U
Chloroethane	5	µg/L	1 U	2.5 U	5 U	10 U	0.58 UJ	ND	5 UJ	1 U	ND	1 U
Chloroform	7	µg/L	1 U	2.5 U	5 U	10 U	1.3 U	ND	5 UJ	1 U	ND	1 U
Chloromethane	5	µg/L	1 U	2.5 U	5 U	10 U	2.0 U	ND	5 UJ	1 U	ND	1 U
cis-1,2-Dichloroethene*	5	µg/L	420 D	570 D	440	1,200	310	ND	5 UJ	1 U	ND	1 U
cis-1,3-Dichloropropene	0.4	µg/L	1 U	2.5 U	5 U	10 U	0.50 U	ND	5 UJ	1 U	ND	1 U

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-16S (cont.)					MW-17D			MW-17S	
Date Collected:			04/15/14	12/08/15	10/20/20	08/08/23	08/13/24	04/05/06	06/05/10	05/14/14	04/05/06	06/05/10
Volatile Organic Compounds (cont.)												
Cyclohexane	- -	µg/L	1.4	2.5 U	1.7 J	7.9 J	1.5 U	ND	5 UJ	1 U	ND	1 U
Dibromochloromethane	50	µg/L	1 U	2.5 U	5 U	10 U	0.50 U	ND	5 UJ	1 U	ND	1 U
Dichlorodifluoromethane	5	µg/L	1 U	2.5 U	5 U	10 U	0.53 U	ND	5 UJ	1 U	ND	1 U
Ethylbenzene	5	µg/L	1 U	2.5 U	5 U	10 U	0.50 U	ND	5 UJ	1 U	ND	1 U
Isopropylbenzene	5	µg/L	1 U	2.5 U	5 U	10 U	0.50 U	ND	5 UJ	1 U	ND	1 U
m,p-Xylene	5	µg/L	2 U	5 U	10 U	20 U	1.4 U	ND	10 UJ	2 U	ND	2 U
Methyl acetate	- -	µg/L	2 U	5 U	10 U	20 U	2.2 U	ND	10 UJ	2 U	ND	2 U
Methyl ethyl ketone (MEK, 2-butanone)	50	µg/L	5 U	13 U	25 U	50 U	2.0 U	ND	25 UJ	5 U	ND	5 U
Methyl isobutyl ketone (MIBK, 4-methyl-2-pentanone)	- -	µg/L	5 U	13 U	25 U	50 U	0.50 U	ND	25 UJ	5 U	ND	5 U
Methyl tert-butyl ether	10	µg/L	4	2.3 J	1.4 J	3.9 J	0.91 J	ND	5 UJ	1 U	ND	1 U
Methylcyclohexane	- -	µg/L	1 U	2.5 U	5 U	10 U	0.50 U	ND	5 UJ	1 U	ND	1 U
Methylene Chloride	5	µg/L	1 U	2.5 U	5 U	10 U	1.7 U	ND	UJ	1 U	ND	ND
o-Xylene	5	µg/L	1 U	2.5 U	5 U	10 U	0.50 U	ND	5 UJ	1 U	ND	1 U
Styrene	5	µg/L	1 U	2.5 U	5 U	10 U	0.50 U	ND	5 UJ	1 U	ND	1 U
Tetrachloroethene*	5	µg/L	1 U	2.5 U	5 U	10 U	0.53 U	ND	5 UJ	1 U	ND	1 U
Toluene	5	µg/L	1 U	2.5 U	5 U	10 U	0.50 U	ND	5 UJ	0.28 J	ND	1 U
trans-1,2-Dichloroethene	5	µg/L	16	18	15	31	8.2	ND	5 UJ	1 U	1 J	1 U
trans-1,3-Dichloropropene	0.4	µg/L	1 U	2.5 U	5 U	10 U	0.58 U	ND	5 UJ	1 U	ND	1 U
Trichloroethene*	5	µg/L	1 U	0.93 J	17	77	23	2 J	5 UJ	1 U	2 J	1 U
Trichlorofluoromethane	5	µg/L	1 U	2.5 U	5 U	10 U	0.60 U	ND	5 UJ	1 U	ND	1 U
Vinyl Chloride*	2	µg/L	130	110	68	280	68	ND	5 UJ	1 U	ND	1 U
Tentatively Identified Compounds												
Acetic acid, (trimethylsilyl)-	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropyl Alcohol (2-Propanol)	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Biogeochemical Parameters												
Acetylene	- -	µg/L	4.7	7.2	3.2	25.4	NA	NA	2.6	NA	NA	2.225
Alkalinity as CaCO3 (total)	- -	mg/L	491	460	434	399	401	NA	200	NA	NA	359
Chloride	250	mg/L	1,640	2,080	2,110	NA	NA	NA	ND	NA	NA	136
Ethane	- -	µg/L	1 U	1 U	1 U	1.0 U	0.940 J	NA	ND	NA	NA	0.57
Ethene	- -	µg/L	40 U	10 U	NA	NA	1.30 U	NA	NA	NA	NA	NA

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-16S (cont.)					MW-17D			MW-17S	
Date Collected:			04/15/14	12/08/15	10/20/20	08/08/23	08/13/24	04/05/06	06/05/10	05/14/14	04/05/06	06/05/10
Biogeochemical Parameters (cont.)												
Iron (dissolved)	0.3	mg/L	0.1 U	0.1 U	0.33	0.70	130 U	NA	NA	NA	NA	NA
Iron (total)	0.3	mg/L	0.1 U	0.1 U	0.0807 J	0.1 U	480	NA	ND	NA	NA	ND
Methane	- -	µg/L	80.7	88.7	86.2	101	120	NA	20.3	NA	NA	54.8
Nitrate	10	mg/L	240 D	280	330	NA	0.2 U	NA	NA	NA	NA	NA
Nitrite as Nitrogen	1	mg/L	6.2	5.7	4.4	NA	NA	NA	NA	NA	NA	NA
Sulfate	250	mg/L	1 U	0.93	1.9	NA	96.5	NA	NA	NA	NA	NA
Total Organic Carbon	- -	mg/L	NA	0.5 U	0.74 U	NA	3.9	NA	NA	NA	NA	NA
Field Parameters												
Specific Conductivity	- -	mS/cm	NA	6.11	5.6	11.43	3527	NA	NA	NA	NA	NA
Dissolved Oxygen	- -	mg/L	NA	0.17	0.29	0.45	0.60	NA	NA	NA	NA	NA
Oxidation Reduction Potential	- -	mV	NA	108.2	71.5	78.7	72.0	NA	NA	NA	NA	NA
pH	- -	SU	NA	6.78	6.58	6.41	6.55	NA	NA	NA	NA	NA
Temperature	- -	C	NA	13.8	19.5	21.4	23.1	NA	NA	NA	NA	NA
Turbidity	- -	NTU	NA	2.76	2.57	5.45	12.00	NA	NA	NA	NA	NA

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-17S (cont.)					MW-18	MW-19			
Date Collected:			04/14/14	12/07/15	10/21/20	08/08/23	08/14/24	04/15/14	04/10/14	12/09/15	10/20/20	08/09/23
Volatile Organic Compounds												
1,1,1-Trichloroethane*	5	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	0.36 J	4	1.8	1.5	1.0 U
1,1,2,2-Tetrachloroethane	5	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U	1 U	1 U	1.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U	1 U	1 U	1.0 U
1,1,2-Trichloroethane	1	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U	1 U	1 U	1.0 U
1,1-Dichloroethane*	5	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	0.25 J	2.4	1.8	1.3	1.0 U
1,1-Dichloroethene*	5	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1.5	1 U	0.51 J	1.0 U
1,2,3-Trichlorobenzene	5	µg/L	NA	1 U	1 U	1.0 U	0.25 U	NA	NA	1 U	1 U	1.0 U
1,2,4-Trichlorobenzene	5	µg/L	1 U	1 U	1 U	1.0 U	0.34 U	1 U	1 UB	1 U	1 U	1.0 U
1,2-Dibromo-3-chloropropane	0.04	µg/L	2 U	2 U	2 U	2.0 UJ	0.45 U	2 U	2 U	2 U	2 U	2.0 U
1,2-Dibromoethane	0.0006	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U	1 U	1 U	1.0 U
1,2-Dichlorobenzene	3	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U	1 U	1 U	1.0 U
1,2-Dichloroethane	0.6	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U	1 U	1 U	1.0 U
1,2-Dichloropropane	1	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U	1 U	1 U	1.0 U
1,3-Dichlorobenzene	3	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U	1 U	1 U	1.0 U
1,4-Dichlorobenzene	3	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U	1 U	1 U	1.0 U
1,4-Dioxane*	0.35	µg/L	NA	40 U	R	40 U	13 U	NA	NA	40 U	R	40 U
2-Hexanone	50	µg/L	5 U	5 U	5 U	5.0 U	0.20 U	5 U	5 U	5 U	5 U	5.0 U
Acetone	50	µg/L	5 U	5 U	5 U	5.0 UJ	5.0 U	4.8 J	3.9 J	5 UB	5 U	5.0 UJ
Benzene	1	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	0.23 J	1 U	1 U	1.0 U
Bromochloromethane	5	µg/L	NA	1 U	1 U	1.0 U	0.20 U	NA	NA	1 U	1 U	1.0 U
Bromodichloromethane	50	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U	1 U	1 U	1.0 U
Bromoform	50	µg/L	1 U	1 U	1 U	1.0 UJ	0.25 U	1 U	1 UJ	1 U	1 U	1.0 U
Bromomethane	5	µg/L	1 UJ	1 UB	1 UJ	1.0 U	0.70 U	1 U	0.3 J	1 U	1 UJ	1.0 U
Carbon Disulfide	60	µg/L	1 U	1 U	1 U	1.0 U	0.42 U	0.29 J	1 U	1 U	1 U	1.0 U
Carbon Tetrachloride	5	µg/L	1 U	1 U	1 U	1.0 U	0.34 U	1 U	1 U	1 U	1 U	1.0 U
Chlorobenzene	5	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U	1 U	1 U	1.0 U
Chloroethane	5	µg/L	1 U	1 U	1 U	1.0 U	0.23 UJ	1 U	1 U	1 U	1 U	1.0 U
Chloroform	7	µg/L	1 U	1 U	1 U	1.0 U	0.51 U	1 U	1 U	1 U	1 U	1.0 U
Chloromethane	5	µg/L	1 U	1 U	1 U	1.0 U	0.80 U	1 U	1 U	1 U	1 U	1.0 U
cis-1,2-Dichloroethene*	5	µg/L	1 U	1 U	1 U	1.0 U	0.23 U	0.99 J	44	17	14	1.6
cis-1,3-Dichloropropene	0.4	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U	1 U	1 U	1.0 U

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-17S (cont.)					MW-18	MW-19			
Date Collected:			04/14/14	12/07/15	10/21/20	08/08/23	08/14/24	04/15/14	04/10/14	12/09/15	10/20/20	08/09/23
Volatile Organic Compounds (cont.)												
Cyclohexane	- -	µg/L	1 U	1 U	1 U	1.0 U	0.60 U	1 U	5.5	1.1	1 U	1.0 U
Dibromochloromethane	50	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U	1 U	1 U	1.0 U
Dichlorodifluoromethane	5	µg/L	1 U	1 U	1 U	1.0 U	0.21 U	1 UJ	1 U	1 U	1 U	1.0 U
Ethylbenzene	5	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U	1 U	1 U	1.0 U
Isopropylbenzene	5	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U	1 U	1 U	1.0 U
m,p-Xylene	5	µg/L	2 U	2 U	2 U	2.0 U	0.53 U	2 U	2 U	2 U	2 U	2.0 U
Methyl acetate	- -	µg/L	2 U	2 U	2 U	2.0 UJ	0.87 U	2 U	2 U	2 U	2 U	2.0 UJ
Methyl ethyl ketone (MEK, 2-butanone)	50	µg/L	5 U	5 U	5 U	5.0 U	0.78 U	5 U	5 U	5 U	5 U	5.0 U
Methyl isobutyl ketone (MIBK, 4-methyl-2-pentanone)	- -	µg/L	5 U	5 U	5 U	5.0 U	0.20 U	5 U	5 U	5 U	5 U	5.0 U
Methyl tert-butyl ether	10	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U	1 U	1 U	1.0 U
Methylcyclohexane	- -	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	1 U	1 U	1 U	1.0 U
Methylene Chloride	5	µg/L	1 U	1 U	1 U	1.0 U	0.65 U	1 U	1 U	1 U	1 U	1.0 U
o-Xylene	5	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	0.21 J	1 U	1 U	1.0 U
Styrene	5	µg/L	1 U	1 UJ	1 U	1.0 U	0.20 U	1 U	1 U	1 U	1 U	1.0 U
Tetrachloroethene*	5	µg/L	1 U	1 U	1 U	1.0 U	0.21 U	1 U	180 D	64	29	1.0 U
Toluene	5	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	0.34 J	1 U	1 U	1.0 U
trans-1,2-Dichloroethene	5	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	8.1	3.3	2.6	1.0 U
trans-1,3-Dichloropropene	0.4	µg/L	1 U	1 U	1 U	1.0 U	0.23 U	1 U	1 U	1 U	1 U	1.0 U
Trichloroethene*	5	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	130	41	25	0.61 J
Trichlorofluoromethane	5	µg/L	1 U	1 U	1 U	1.0 U	0.24 U	1 U	1 U	1 U	1 U	1.0 U
Vinyl Chloride*	2	µg/L	1 U	1 U	1 U	1.0 U	0.20 U	1 U	5.6	1	0.77 J	1.0 U
Tentatively Identified Compounds												
Acetic acid, (trimethylsilyl)-	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Isopropyl Alcohol (2-Propanol)	- -	µg/L	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Biogeochemical Parameters												
Acetylene	- -	µg/L	NA	NA	NA	NA	NA	4.6	8.9	12.6	7.5	20
Alkalinity as CaCO3 (total)	- -	mg/L	NA	NA	NA	NA	NA	188	535	532	512	319
Chloride	250	mg/L	NA	NA	NA	NA	NA	2,970	34.2	22.9	17	NA
Ethane	- -	µg/L	NA	NA	NA	NA	NA	1 U	1 U	1 U	1 U	1.0 U
Ethene	- -	µg/L	NA	NA	NA	NA	NA	100 U	1 U	1 U	NA	NA

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-17S (cont.)					MW-18	MW-19			
Date Collected:			04/14/14	12/07/15	10/21/20	08/08/23	08/14/24	04/15/14	04/10/14	12/09/15	10/20/20	08/09/23
Biogeochemical Parameters (cont.)												
Iron (dissolved)	0.3	mg/L	NA	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.103	1.46
Iron (total)	0.3	mg/L	NA	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	1.05
Methane	- -	µg/L	NA	NA	NA	NA	NA	217	343	461	363	43.2
Nitrate	10	mg/L	NA	NA	NA	NA	NA	68	9	6.1	11	NA
Nitrite as Nitrogen	1	mg/L	NA	NA	NA	NA	NA	1 U	1 U	0.2 U	1 U	NA
Sulfate	250	mg/L	NA	NA	NA	NA	NA	1 U	1 U	0.2 U	1 U	NA
Total Organic Carbon	- -	mg/L	NA	NA	NA	NA	NA	NA	NA	0.5 U	0.74 U	NA
Field Parameters												
Specific Conductivity	- -	mS/cm	NA	2.44	2.7	3.181	1693.7	NA	NA	1.73	1.423	0.700
Dissolved Oxygen	- -	mg/L	NA	4.49	3.49	2.12	3.11	NA	NA	0.35	1.85	0.37
Oxidation Reduction Potential	- -	mV	NA	281.9	190.8	69.4	195.9	NA	NA	15.4	258	-127.2
pH	- -	SU	NA	7.16	6.87	6.83	7.01	NA	NA	7.54	6.78	7.17
Temperature	- -	C	NA	12.2	16.4	16.3	17.8	NA	NA	12.5	14.57	17.7
Turbidity	- -	NTU	NA	1.5	2.14	2.14	8.35	NA	NA	1.29	2.17	0

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-19 (cont.)	MW-20				
Date Collected:			08/13/24	04/11/14	12/08/15	10/19/20	08/07/23	08/13/24
Volatile Organic Compounds								
1,1,1-Trichloroethane*	5	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
1,1,2,2-Tetrachloroethane	5	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
1,1,2-Trichloroethane	1	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
1,1-Dichloroethane*	5	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
1,1-Dichloroethene*	5	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
1,2,3-Trichlorobenzene	5	µg/L	0.25 U	NA	20 U	20 U	2.5 U	0.50 U
1,2,4-Trichlorobenzene	5	µg/L	0.34 U	20 U	20 U	20 U	2.5 U	0.68 U
1,2-Dibromo-3-chloropropane	0.04	µg/L	0.45 U	40 U	40 U	40 U	5.0 U	0.90 U
1,2-Dibromoethane	0.0006	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
1,2-Dichlorobenzene	3	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
1,2-Dichloroethane	0.6	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
1,2-Dichloropropane	1	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
1,3-Dichlorobenzene	3	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
1,4-Dichlorobenzene	3	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
1,4-Dioxane*	0.35	µg/L	13 U	NA	800 U	R	100 U	26 U
2-Hexanone	50	µg/L	0.20 U	100 U	100 U	100 U	13 U	0.40 U
Acetone	50	µg/L	5.0 U	100 U	100 U	100 U	13 U	10 U
Benzene	1	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
Bromochloromethane	5	µg/L	0.20 U	NA	20 U	20 U	2.5 U	0.40 U
Bromodichloromethane	50	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
Bromoform	50	µg/L	0.25 U	20 UJ	20 U	20 U	2.5 U	0.50 U
Bromomethane	5	µg/L	0.70 UJ	20 U	6.6 J	20 UJ	2.5 U	1.4 UJ
Carbon Disulfide	60	µg/L	0.42 U	20 U	20 U	20 U	2.5 U	0.84 U
Carbon Tetrachloride	5	µg/L	0.34 U	20 U	20 U	20 U	2.5 U	0.68 U
Chlorobenzene	5	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
Chloroethane	5	µg/L	0.23 UJ	20 U	20 U	20 U	2.5 U	0.46 UJ
Chloroform	7	µg/L	0.51 U	5.6 J	20 UB	20 U	2.5 U	1.1 U
Chloromethane	5	µg/L	0.80 U	20 U	20 U	20 U	2.5 U	1.6 U
cis-1,2-Dichloroethene*	5	µg/L	1.9	20 U	8.6 J	20 U	1.8 J	4.7
cis-1,3-Dichloropropene	0.4	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-19 (cont.)	MW-20				
Date Collected:			08/13/24	04/11/14	12/08/15	10/19/20	08/07/23	08/13/24
Volatile Organic Compounds (cont.)								
Cyclohexane	- -	µg/L	0.60 U	20 U	20 U	20 U	2.5 U	1.2 U
Dibromochloromethane	50	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
Dichlorodifluoromethane	5	µg/L	0.21 U	20 U	20 U	20 U	2.5 U	0.42 U
Ethylbenzene	5	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
Isopropylbenzene	5	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
m,p-Xylene	5	µg/L	0.53 U	40 U	40 U	40 U	5.0 U	1.1 U
Methyl acetate	- -	µg/L	0.87 U	40 U	40 U	40 U	5.0 U	1.8 U
Methyl ethyl ketone (MEK, 2-butanone)	50	µg/L	0.78 U	100 U	100 U	100 U	13 U	1.6 U
Methyl isobutyl ketone (MIBK, 4-methyl-2-pentanone)	- -	µg/L	0.20 U	100 U	100 U	100 U	13 U	0.40 U
Methyl tert-butyl ether	10	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
Methylcyclohexane	- -	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
Methylene Chloride	5	µg/L	0.65 U	20 U	20 U	20 U	2.5 U	1.3 U
o-Xylene	5	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
Styrene	5	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
Tetrachloroethene*	5	µg/L	0.21 U	3,400	2,700	1,700	260	1,200 DJ
Toluene	5	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
trans-1,2-Dichloroethene	5	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
trans-1,3-Dichloropropene	0.4	µg/L	0.23 U	20 U	20 U	20 U	2.5 U	0.46 U
Trichloroethene*	5	µg/L	0.55 J	76	80	38	5.0	22
Trichlorofluoromethane	5	µg/L	0.24 U	20 U	20 U	20 U	2.5 U	0.48 U
Vinyl Chloride*	2	µg/L	0.20 U	20 U	20 U	20 U	2.5 U	0.40 U
Tentatively Identified Compounds								
Acetic acid, (trimethylsilyl)-	- -	µg/L	NA	NA	NA	NA	NA	NA
Isopropyl Alcohol (2-Propanol)	- -	µg/L	NA	NA	NA	NA	NA	NA
Biogeochemical Parameters								
Acetylene	- -	µg/L	NA	2	14.4	1.6	18.4	NA
Alkalinity as CaCO3 (total)	- -	mg/L	326	512	480	454	459	472
Chloride	250	mg/L	NA	8.8	6.7	15.4	NA	NA
Ethane	- -	µg/L	0.850 U	1 J	1 U	0.4 J	0.8 J	0.850 U
Ethene	- -	µg/L	1.30 U	1 UJ	1 U	NA	NA	1.30 U

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:	NYSDEC TOGS 1 1 1 (GW Standard)	Units	MW-19 (cont.)	MW-20				
Date Collected:			08/13/24	04/11/14	12/08/15	10/19/20	08/07/23	08/13/24
Biogeochemical Parameters (cont.)								
Iron (dissolved)	0.3	mg/L	1,200	0.1 U	0.1 U	0.106	0.22	70 U
Iron (total)	0.3	mg/L	1,400	0.1 U	0.1 U	0.1 U	0.1 U	70 U
Methane	- -	µg/L	20.0	109	154	95.7	81.7	6.00
Nitrate	10	mg/L	0.2 U	2	110	58	NA	NA
Nitrite as Nitrogen	1	mg/L	NA	1 U	0.2 U	1 U	NA	NA
Sulfate	250	mg/L	27.3	1 U	0.74	1 U	NA	NA
Total Organic Carbon	- -	mg/L	14.8	NA	0.5 U	0.74 U	NA	1.0
Field Parameters								
Specific Conductivity	- -	mS/cm	0.646	NA	1.23	0.947	1.029	465.2
Dissolved Oxygen	- -	mg/L	0.21	NA	0.19	2.14	2.15	1.39
Oxidation Reduction Potential	- -	mV	-110	NA	116.3	261.3	88.1	194.3
pH	- -	SU	7.81	NA	7.19	7.05	6.64	7.15
Temperature	- -	C	19.49	NA	13.5	17.67	18.6	20.8
Turbidity	- -	NTU	3.7	NA	2.22	0.86	NA	23.24

See notes on last page.

Table 4
Groundwater Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Notes:
1. * Indicates analyte is COC per the NYSDEC 2023 Amended Record of Decision.
2. Shading indicates that the result exceeds the NYSDEC TOGS 1.1.1 Water Quality Standard or Guidance Value (NYSDEC 1998).
3. - - Indicates standard or guidance value does not exist.

Acronyms and Abbreviations:
C - degrees Celsius
COC - constituent of concern
mg/L - milligrams per liter
mS/cm - milliSiemens per centimeter
mV - millivolts
NA - Not Applicable
ND - Not Detected
NTU - nephelometric turbidity units
NYSDEC - New York State Department of Environmental Conservation
SU - standard units
TOGS - Technical and Operational Guidance Series
ug/L - micrograms per liter

References:
NYSDEC. 1998. Division of Water *Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations*. October 22, 1993, reissued June 1998, and addended.

Laboratory Qualifiers:
D - Compound quantitated using a secondary dilution.
E - Indicates the reported concentration exceeds the instrument calibration range for the specific analysis.
J - Indicates that the analyte was detected at a concentration less than the practical quantitation limit (PQL).
n - Indicates laboratory does not hold National Environmental Laboratory Accreditation Program/The NELAC Institute (NELAP/TNI) accreditation for this analyte.
R - Indicates the sample result was rejected.
U - Indicates the constituent was not detected at the PQL. The value preceding the U indicates the PQL.
UB - Indicates the constituent was not detected at a concentration less than the PQL due to associated blank contamination.

See notes on last page.

Table 5
PFAS and 1,4-Dioxane Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Location ID:			MW-01		MW-04S		MW-17S	
Date Collected:	WQS	Units	10/21/20	08/14/24	10/21/20	08/12/24	10/21/20	08/14/24
Per- and Polyfluoroalkyl Substances								
6:2 Fluorotelomer sulfonic acid (6:2 FTSA)	- -	ng/L	0.55 U	0.55 U	0.74 J	0.55 U	0.55 U	0.55 U
8:2 Fluorotelomer sulfonic acid (8:2 FTSA)	- -	ng/L	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	- -	ng/L	0.5 U	0.50 U	0.5 U	0.50 U	0.5 U	0.50 U
N-Methylperfluoroocatane sulfonamidoacetic acid (MeFOSAA)	- -	ng/L	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 UJ
Perfluorobutane sulfonic acid (PFBS)	- -	ng/L	0.94 J	0.89 J	4.1 J	2.5 J	5.9	5.8
Perfluorobutanoic acid (PFBA)	- -	ng/L	8.9	14	64	54	14	14
Perfluorodecane sulfonic acid (PFDS)	- -	ng/L	0.3 U	0.30 U	0.38 J	0.30 U	0.3 U	0.30 U
Perfluorodecanoic acid (PFDA)	- -	ng/L	1.2 U	1.2 U	1.4 J	2.3 J	1.2 U	1.2 U
Perfluorododecanoic acid (PFDoA)	- -	ng/L	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
Perfluoroheptane sulfonic acid (PFHpS)	- -	ng/L	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U
Perfluoroheptanoic acid (PFHpA)	- -	ng/L	0.78 J	2.0 UB	48	35	3.1 J	4.6 J
Perfluorohexane sulfonic acid (PFHxS)	- -	ng/L	1.3 U	1.3 U	4.4 J	4.4 J	3 J	2.1 J
Perfluorohexanoic acid (PFHxA)	- -	ng/L	8.8 U	8.8 U	170	120 J+	8.8 U	19
Perfluorononanoic acid (PFNA)	- -	ng/L	1.1 U	1.1 U	4 J	13	1.1 U	1.1 U
Perfluorooctane sulfonamide (PFOSA)	- -	ng/L	0.52 U	0.52 U	0.52 U	0.52 U	0.52 U	0.52 UJ
Perfluorooctane sulfonic acid (PFOS)*	2.7	ng/L	0.44 U	0.72 J	12	10	1.8 J	3.2
Perfluorooctanoic acid (PFOA)*	6.7	ng/L	1.2 J	1.8 J	98	87 J+	3.4	7.3
Perfluoropentanoic acid (PFPeA)	- -	ng/L	1.8 J	3.5 J	180	86	7.2	29
Perfluorotetradecanoic acid (PFTeA)	- -	ng/L	2 U	2.0 U	2 U	2.0 U	2 U	2.0 U
Perfluorotridecanoic acid (PFTrDA)	- -	ng/L	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U
Perfluoroundecanoic acid (PFUdA)	- -	ng/L	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U
Semivolatile Organics								
1,4 Dioxane*	0.35	µg/L	0.027 U	0.035 U	39	12	0.36	0.37 J

See notes on last page.

Table 5
PFAS and 1,4-Dioxane Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Notes:
1. Groundwater samples analyzed by ALS Environmental of Rochester, New York.
2. 1,4-Dioxane was analyzed using USEPA Method 8270 using SIM mode low level detection methods.
3. Groundwater samples were analyzed for the 21 PFAS listed in NYSDEC's January 2020 guidance using USEPA Method 537M.
4. Groundwater screening criteria provided in NYSDEC's 2023 Addendum to TOGS 1.1.1 Water Quality Standard or Guidance Value (NYSDEC 1998).
5. Shaded results exceed the applicable screening values.

Acronyms and Abbreviations:
ng/L - nanograms per liter (or parts per trillion [ppt])
NYSDEC - New York State Department of Environmental Conservation
PFAS - per- and polyfluoroalkyl substances
SIM – simulated ion monitoring
TOGS - Technical and Operational Guidance Series
ug/L - micrograms per liter (or parts per billion[ppb])
USEPA - United States Protection Agency

Lab Qualifiers:
B - Analyte was also detected in the associated method blank.
J - Indicates an estimated value.
J+ - Indicates that the result is an estimated quantity, but the result may be biased high.
U - The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

References:
NYSDEC. 1998. Division of Water *Technical and Operational Guidance Series (1.1.1) Ambient* Water Quality Standards and Guidance Values and Groundwater Effluent Limitations. October 22, 1993, reissued June 1998, and addended.

Table 6
Soil Vapor and Indoor Air Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Samples:	NYSDOH Air Guideline	Units	Office Area Sample Locations									
			IA-1					IA-2				
Sample Date:	Values		6/13/10	3/23/14	2/28/23	2/14/24	2/14/25	6/13/10	3/23/14	2/28/23	2/14/24	2/14/25
Volatile Organic Compounds												
1,1,1-Trichloroethane	--	µg/m^3	0.061 J	0.16 U	0.039 U	0.041 U	0.036 U	14 U	0.17 U	0.036 U	0.039 U	0.042 U
1,1,2,2-Tetrachloroethane	--	µg/m^3	0.42 U	0.16 U	0.039 UJ	0.041 U	0.036 U	3.6 U	0.17 U	0.036 UJ	0.039 U	0.042 U
1,1,2 Trichloro-1,2,2-Trifluroethane	--	µg/m^3	0.7	0.54	0.43	0.36	0.52	0.74 J	0.53	0.44	0.34	0.51
1,1,2-Trichloroethane	--	µg/m^3	1.7 U	0.16 U	0.15 U	0.16 U	0.016 J	14 U	0.17 U	0.14 U	0.15 U	0.17 U
1,1-Dichloroethane	--	µg/m^3	1.3 U	0.16 U	0.039 U	0.041 U	0.036 U	11 U	0.17 U	0.036 U	0.039 U	0.042 U
1,1-Dichloroethene	--	µg/m^3	1.2 U	0.16 U	0.039 U	0.041 U	0.036 U	11 U	0.17 U	0.036 U	0.039 U	0.042 U
1,2,4-Trichlorobenzene	--	µg/m^3	NA	NA	0.077 UJ	0.081 U	0.13 J	NA	NA	0.072 UJ	0.077 U	0.11 J
1,2,4-Trimethylbenzene	--	µg/m^3	NA	NA	0.64 J	0.62	6.0 J	NA	NA	0.60 J	0.91	5.6 J
1,2-Dibromo-3-chloropropane	--	µg/m^3	NA	NA	0.15 U	0.16 U	0.15 UJ	NA	NA	0.14 U	0.15 U	0.17 UJ
1,2-Dibromoethane	--	µg/m^3	0.48 U	0.16 U	0.039 U	0.041 U	0.036 U	4.1 U	0.17 U	0.036 U	0.039 U	0.042 U
1,2-Dichloro-1,1,2,2-tetrafluoroethane	--	µg/m^3	NA	NA	NA	0.080 J	0.12	NA	NA	NA	0.079 J	0.092
1,2-Dichlorobenzene	--	µg/m^3	3.7 U	0.16 U	0.039 UJ	0.041 U	0.029 J	32 U	0.17 U	0.036 UJ	0.039 U	0.042 U
1,2-Dichloroethane	--	µg/m^3	0.15 J	0.16 U	0.058	0.058	0.095	11 U	0.12 J	0.060	0.055	0.083
1,2-Dichloropropane	--	µg/m^3	1.4 U	0.16 U	0.015 J	0.013 J	0.027 J	12 U	0.17 U	0.015 J	0.017 J	0.018 J
1,3,5-Trimethylbenzene	--	µg/m^3	NA	NA	0.20 J	0.24	1.4	NA	NA	0.17 J	0.33	1.3
1,3-Butadiene	--	µg/m^3	NA	NA	0.077 U	0.014 J	0.11	NA	NA	0.072 U	0.077 UJ	0.11
1,3-Dichlorobenzene	--	µg/m^3	3.7 U	0.16 U	0.039 UJ	0.041 U	0.020 J	32 U	0.17 U	0.036 UJ	0.039 U	0.042 U
1,4-Dichlorobenzene	--	µg/m^3	2.0 U	0.16 U	0.032 J	0.041 U	0.047	32 U	0.17 U	0.029 J	0.039 U	0.033 J
1,4-Dioxane	--	µg/m^3	NA	NA	0.026 J	0.16 U	0.15	NA	NA	0.025 J	0.043 J	0.14
2-Butanone (MEK)	--	µg/m^3	35	5.3 J	NA	NA	NA	400	350 D	NA	NA	NA
2-Hexanone	--	µg/m^3	0.31 J	0.79 U	NA	NA	NA	0.82 J	0.84 U	NA	NA	NA
4-Methyl 2 Pentanone	--	µg/m^3	0.30 J	0.79 U	NA	NA	NA	1.7 J	1.7	NA	NA	NA
Acetone	--	µg/m^3	22	10	170	140 J	130	91 J	430	300 D	170 J	130
Acroline	--	µg/m^3	NA	NA	0.50	0.35	0.66	NA	NA	0.49	0.35	0.66
Benzene	--	µg/m^3	0.60 J	0.42	0.61	0.53	3.0	2.3 J	0.65	0.57	0.78	3.0
Bromodichloromethane	--	µg/m^3	0.42 U	0.16 U	0.039 U	0.041 U	0.073 U	3.6 U	0.17 U	0.036 U	0.039 U	0.083 U
Bromoform	--	µg/m^3	3.2 U	0.79 U	NA	NA	NA	27 U	0.84 U	NA	NA	NA
Bromomethane	--	µg/m^3	1.2 U	0.16 U	0.026 J	0.024 J	0.041	10 U	0.17 U	0.026 J	0.023 J	0.037 J
Carbon Disulfide	--	µg/m^3	0.11 J	7.9 U	NA	NA	NA	0.45 J	8.4 U	NA	NA	NA
Carbon Tetrachloride	--	µg/m^3	0.62	0.46	0.39	0.32	0.44	1.7 U	0.22	0.41	0.31	0.40
Chlorobenzene	--	µg/m^3	1.4 U	0.16 U	0.15 U	0.023 J	0.084 J	12 U	0.17 U	0.015 J	0.027 J	0.081 J
Chloroethane	--	µg/m^3	1.6 U	0.16 U	0.015 J	0.041 U	0.024 J	14 U	0.17 U	0.014 J	0.039 U	0.042 U
Chloroform	--	µg/m^3	0.20 J	0.16 U	0.49	0.18	0.22	13 U	0.16 J	0.39	0.18	0.20

See notes on last page.

Table 6
Soil Vapor and Indoor Air Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Samples:	NYSDOH Air Guideline		Office Area Sample Locations									
			IA-1					IA-2				
Sample Date:	Values	Units	6/13/10	3/23/14	2/28/23	2/14/24	2/14/25	6/13/10	3/23/14	2/28/23	2/14/24	2/14/25
Volatile Organic Compounds												
Chloromethane	--	µg/m^3	1.3 J	0.62	0.30	0.32 J	1.1	2.9 J	0.53	0.27	0.29 J	0.85
cis-1,2-Dichloroethene	--	µg/m^3	1.2 U	0.16 U	0.039 U	0.041 U	0.072	11 U	0.17 U	0.010 J	0.039 U	0.081
cis-1,3-Dichloropropene	--	µg/m^3	2.8 U	0.79 U	0.077 U	0.081 U	0.036 UJ	24 U	0.84 U	0.072 U	0.077 U	0.042 UJ
Dibromochloromethane	--	µg/m^3	0.53 U	0.16 U	0.039 U	0.041 U	0.073 U	4.6 U	0.17 U	0.036 U	0.039 U	0.083 U
Dichlorodifluoromethane	--	µg/m^3	NA	NA	2.9	2.7	2.9	NA	NA	3.0	2.7	2.5
Ethylbenzene	--	µg/m^3	0.93 J	0.79 U	0.33 J	0.22	0.93 J	5.2 J	1.8	0.33 J	0.40	1.0 J
Hexachlorobutadiene	--	µg/m^3	NA	NA	0.15 U	0.16 U	0.73 U	NA	NA	0.14 U	0.15 U	0.83 U
m,p-Xylene	--	µg/m^3	2.8 J	0.79 U	1.5 J	0.78	4.6	16 J	5.7	1.4 J	1.6	4.3
Methyl tert-Butyl Ether	--	µg/m^3	2.2 U	0.16 U	0.039 U	0.041 U	0.036 U	19 U	0.17 U	0.036 U	0.039 U	0.042 U
Methylene Chloride	60	µg/m^3	0.58 J	0.42 J	0.35	0.25	0.49	1.2 J	0.71 J	0.36	0.26	0.39
Naphthalene	--	µg/m^3	NA	NA	0.22 J	0.26	1.3 J	NA	NA	0.23 J	0.13 J	1.1 J
o-Xylene	--	µg/m^3	0.98 J	0.79 U	0.64 J	0.34	1.9	5.4 J	1.7	0.59 J	0.60	1.8
Styrene	--	µg/m^3	1.0 J	0.79 U	0.19	0.22	0.80 J	3.8 J	0.91	0.18	0.19	0.73 J
Tetrachloroethene	30	µg/m^3	0.18 J	0.16 U	0.25	0.051	0.22	1.9 U	0.17 U	0.21	0.057	0.22
Toluene	--	µg/m^3	62	9.8	62 D	42	260 D	610	430 D	49 D	37	270 D
trans-1,2-Dichloroethene	--	µg/m^3	1.2 U	0.16 U	0.039 U	0.041 U	0.023 J	11 U	0.17 U	0.036 U	0.039 U	0.042 U
trans-1,3-Dichloropropene	--	µg/m^3	1.4 U	0.79 U	0.077 U	0.081 U	0.036 UJ	12 U	0.84 U	0.072 U	0.077 U	0.042 UJ
Trichloroethene	2	µg/m^3	0.17 U	0.16 U	0.024 J	0.041 U	0.027 J	1.4 U	0.17 U	0.036 U	0.039 U	0.019 J
Trichlorofluoromethane	--	µg/m^3	1.7 J	1.1	1.1	0.93	1.1	1.3 J	1.2	1.2	0.98	1.0
Vinyl Acetate	--	µg/m^3	0.43 J	7.9 U	NA	NA	NA	120 U	8.4 U	NA	NA	NA
Vinyl Chloride	--	µg/m^3	0.17 U	0.16 U	0.039 U	0.041 UJ	0.036 U	1.4 U	0.17 U	0.036 U	0.039 UJ	0.042 U

See notes on last page.

Table 6
Soil Vapor and Indoor Air Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Samples:	NYSDOH Air Guideline		Office Area Sample Locations (continued)					Warehouse Area Sample Locations				
			SS-1					IA-3				
Sample Date:	Values	Units	6/13/10	3/23/14	2/28/23	2/14/24	2/14/25	6/13/10	3/23/14	2/28/23	2/14/24	2/14/25
Volatile Organic Compounds												
1,1,1-Trichloroethane	--	µg/m^3	6.7	2.9	1.6	0.79	1.5	14 U	0.17 U	0.037 U	0.044 U	0.041 U
1,1,2,2-Tetrachloroethane	--	µg/m^3	0.24 U	0.17 U	0.38 UJ	0.037 U	0.036 U	3.6 U	0.17 U	0.37 UJ	0.044 U	0.041 U
1,1,2 Trichloro-1,2,2-Trifluroethane	--	µg/m^3	0.9	0.52	0.49	0.31	0.51	0.66 J	0.51	0.43	0.34	0.53
1,1,2-Trichloroethane	--	µg/m^3	0.95 U	0.17 U	1.5 U	0.15 U	0.15 U	14 U	0.17 U	0.15 U	0.18 U	0.018 J
1,1-Dichloroethane	--	µg/m^3	0.71 U	0.17 U	0.38 U	0.21	0.035 J	11 U	0.17 U	0.037 U	0.044 U	0.021 J
1,1-Dichloroethene	--	µg/m^3	0.70 U	0.17 U	0.38 U	0.037 U	0.036 U	11 U	0.17 U	0.037 U	0.044 U	0.041 U
1,2,4-Trichlorobenzene	--	µg/m^3	NA	NA	0.76 UJ	0.075 U	0.15 J	NA	NA	0.74 UJ	0.088 U	0.082 J
1,2,4-Trimethylbenzene	--	µg/m^3	NA	NA	2.0 J	1.0	4.2 J	NA	NA	1.5 UJ	1.8	3.8 J
1,2-Dibromo-3-chloropropane	--	µg/m^3	NA	NA	1.5 U	0.15 U	0.15 UJ	NA	NA	1.5 U	0.18 U	0.16 UJ
1,2-Dibromoethane	--	µg/m^3	0.27 U	0.17 U	0.38 U	0.037 U	0.036 U	4.1 U	0.17 U	0.037 U	0.044 U	0.041 U
1,2-Dichloro-1,1,2,2-tetrafluoroethane	--	µg/m^3	NA	NA	NA	0.096 J	0.090	NA	NA	NA	0.074 J	0.10
1,2-Dichlorobenzene	--	µg/m^3	2.1 U	0.17 U	0.38 UJ	0.035 J	0.026 J	32 U	0.17 U	0.37 UJ	0.044 U	0.025 J
1,2-Dichloroethane	--	µg/m^3	0.091 J	0.17 U	0.38 U	0.017 J	0.020 J	11 U	0.17 U	0.061	0.066	0.074
1,2-Dichloropropane	--	µg/m^3	0.81 U	0.17 U	0.38 U	0.037 U	0.073 U	12 U	0.17 U	0.014 J	0.013 J	0.025 J
1,3,5-Trimethylbenzene	--	µg/m^3	NA	NA	0.38 J	0.33	0.98	NA	NA	0.93 DJ	0.89	1.2
1,3-Butadiene	--	µg/m^3	NA	NA	0.76 U	0.075 UJ	0.073 U	NA	NA	0.074 U	0.088 UJ	0.083
1,3-Dichlorobenzene	--	µg/m^3	2.1 U	0.17 U	0.38 UJ	0.13	4.5	32 U	0.17 U	0.37 UJ	0.044 U	0.041
1,4-Dichlorobenzene	--	µg/m^3	0.19 J	0.17 U	0.38 U	0.043	0.064	32 U	0.17 U	0.37 U	0.044 U	0.035 J
1,4-Dioxane	--	µg/m^3	NA	NA	1.5 U	0.15 U	0.042 J	NA	NA	0.15 U	0.23	0.32
2-Butanone (MEK)	--	µg/m^3	3.5	5.4 J	NA	NA	NA	420	180 D	NA	NA	NA
2-Hexanone	--	µg/m^3	0.40 J	1.2	NA	NA	NA	0.78 J	0.83 U	NA	NA	NA
4-Methyl 2 Pentanone	--	µg/m^3	0.24 J	0.3 J	NA	NA	NA	1.2 J	0.92	NA	NA	NA
Acetone	--	µg/m^3	21	23	16 J	15 J	20	93 J	190	77	51 J	43
Acroline	--	µg/m^3	NA	NA	3.0 U	0.22 J	0.95	NA	NA	0.41	0.57	0.66
Benzene	--	µg/m^3	2.6	0.71	0.46 J	0.21	0.58	2.5 J	0.52	0.71	0.43	1.2
Bromodichloromethane	--	µg/m^3	0.24 U	0.17 U	0.38 U	0.037 U	0.073 U	3.6 U	0.17 U	0.037 U	0.044 U	0.081 U
Bromoform	--	µg/m^3	1.8 U	0.85 U	NA	NA	NA	27 U	0.83 U	NA	NA	NA
Bromomethane	--	µg/m^3	0.68 U	0.17 U	0.38 U	0.037 U	0.015 J	10 U	0.17 U	0.026 J	0.022 J	0.040 J
Carbon Disulfide	--	µg/m^3	1.5	1.8 J	NA	NA	NA	0.44 J	8.3 U	NA	NA	NA
Carbon Tetrachloride	--	µg/m^3	0.25	0.17 U	0.13 J	0.31	0.13	1.7 U	0.45	0.39	0.30	0.42
Chlorobenzene	--	µg/m^3	0.81 U	0.17 U	1.5 U	0.065 J	0.049 J	12 U	0.17 U	1.5 U	0.084 J	0.16 J
Chloroethane	--	µg/m^3	0.92 U	0.17 U	0.38 U	0.037 U	0.073	14 U	0.17 U	0.018 J	0.044 U	0.11
Chloroform	--	µg/m^3	0.081 J	0.17 U	1.5 U	0.058 J	0.047 J	13 U	0.17 U	0.16	0.17 J	0.15 J

See notes on last page.

Table 6
Soil Vapor and Indoor Air Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Samples:	NYSDOH Air Guideline		Office Area Sample Locations (continued)					Warehouse Area Sample Locations				
			SS-1					IA-3				
Sample Date:	Values	Units	6/13/10	3/23/14	2/28/23	2/14/24	2/14/25	6/13/10	3/23/14	2/28/23	2/14/24	2/14/25
Volatile Organic Compounds												
Chloromethane	--	µg/m^3	0.71 U	0.34 U	0.76 U	0.075 UJ	0.11 J	3.2 J	0.54	0.25	0.30 J	0.91
cis-1,2-Dichloroethene	--	µg/m^3	0.70 U	0.17 U	0.38 U	0.037 U	0.022 J	11 U	0.17 U	0.16	0.12	0.25
cis-1,3-Dichloropropene	--	µg/m^3	1.6 U	0.85 U	0.76 U	0.075 U	0.036 UJ	24 U	0.83 U	0.074 U	0.088 U	0.041 UJ
Dibromochloromethane	--	µg/m^3	0.30 U	0.17 U	0.38 U	0.037 U	0.073 U	4.6 U	0.17 U	0.037 U	0.044 U	0.081 U
Dichlorodifluoromethane	--	µg/m^3	NA	NA	45	71 D	32	NA	NA	2.2	2.2	2.0
Ethylbenzene	--	µg/m^3	1.0 J	0.47 J	0.89 J	0.39	0.88 J	5.4 J	1.1	1.2 DJ	1.0	1.9 J
Hexachlorobutadiene	--	µg/m^3	NA	NA	1.5 U	0.15 U	0.73 U	NA	NA	1.5 U	0.18 U	0.81 U
m,p-Xylene	--	µg/m^3	8.2	2.8	4.5 J	1.4	3.3	18 J	3.4	5.6 DJ	3.6	6.9
Methyl tert-Butyl Ether	--	µg/m^3	1.2 U	0.17 U	0.56	2.0	0.036 U	19 U	0.17 U	0.037 U	0.044 U	0.027 J
Methylene Chloride	60	µg/m^3	0.16 BJ	0.85 U	1.5 U	0.058 J	0.074 J	1.3 J	0.47 J	0.40	0.29	0.54
Naphthalene	--	µg/m^3	NA	NA	1.5 UJ	0.30	0.88 J	NA	NA	1.5 UJ	0.20	0.20 J
o-Xylene	--	µg/m^3	2.1	0.81 J	1.5 J	0.81	1.2	5.7 J	1.1	3.5 DJ	1.2	2.8
Styrene	--	µg/m^3	0.44 J	0.39 J	0.27 J	0.40	0.58 J	4.1 J	0.64 J	0.58 DJ	0.71	0.87 J
Tetrachloroethene	30	µg/m^3	24	11	5.6 J	2.5	7.2	1.9 U	0.17 U	0.11	0.21	0.25
Toluene	--	µg/m^3	15	2.7	6.2 J	21	66 D	650	250 D	360 D	390 D	170 EJ
trans-1,2-Dichloroethene	--	µg/m^3	0.70 U	0.17 U	0.38 U	0.037 U	0.036 U	11 U	0.17 U	0.017 J	0.044 U	0.034 J
trans-1,3-Dichloropropene	--	µg/m^3	0.79 U	0.85 U	0.76 U	0.075 U	0.036 UJ	12 U	0.83 U	0.074 U	0.088 U	0.041 UJ
Trichloroethene	2	µg/m^3	1.1	0.32	0.14 J	0.040	0.053 J	1.4 U	0.17 U	0.025 J	0.040 J	0.044
Trichlorofluoromethane	--	µg/m^3	3	1.1	1.1	0.86	0.94	1.5 J	1.1	1.1	0.97	1.0
Vinyl Acetate	--	µg/m^3	7.9 U	3.7 J	NA	NA	NA	7.0 J	7 J	NA	NA	NA
Vinyl Chloride	--	µg/m^3	0.095 U	0.17 U	0.38 U	0.037 UJ	0.036 U	1.4 U	0.17 U	0.037 U	0.044 UJ	0.022 J

See notes on last page.

Table 6
Soil Vapor and Indoor Air Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Samples:	NYSDOH Air Guideline		Warehouse Area Sample Locations (continued)									
			IA-4					IA-5				
Sample Date:	Values	Units	6/13/10	3/23/14	2/28/23	2/14/24	2/14/25	6/13/10	3/23/14	2/28/23	2/14/24	2/14/25
Volatile Organic Compounds												
1,1,1-Trichloroethane	--	µg/m^3	19 U	0.17 U	0.037 U	0.037 U	0.040 U	16 U	0.18 U	0.039 U	0.038 U	0.037 U
1,1,2,2-Tetrachloroethane	--	µg/m^3	4.7 U	0.17 U	0.37 UJ	0.037 U	0.040 U	4.0 U	0.18 U	0.39 UJ	0.038 U	0.037 U
1,1,2 Trichloro-1,2,2-Trifluroethane	--	µg/m^3	5.3 U	0.53	0.46	0.34	0.52	.60 J	0.55	0.47	0.31	0.51
1,1,2-Trichloroethane	--	µg/m^3	19 U	0.17 U	0.15 U	0.15 U	0.16 U	16 U	0.18 U	0.15 U	0.15 U	0.15 U
1,1-Dichloroethane	--	µg/m^3	14 U	0.17 U	0.037 U	0.037 U	0.019 J	12 U	0.18 U	0.039 U	0.038 U	0.037 U
1,1-Dichloroethene	--	µg/m^3	14 U	0.17 U	0.037 U	0.037 U	0.040 U	12 U	0.18 U	0.039 U	0.038 U	0.037 U
1,2,4-Trichlorobenzene	--	µg/m^3	NA	NA	0.75 UJ	0.075 U	0.080 UJ	NA	NA	0.77 UJ	0.076 U	0.074 UJ
1,2,4-Trimethylbenzene	--	µg/m^3	NA	NA	1.5 DJ	1.7	3.9 J	NA	NA	5.6 DJ	4.4	11 J
1,2-Dibromo-3-chloropropane	--	µg/m^3	NA	NA	1.5 U	0.15 U	0.16 UJ	NA	NA	1.5 U	0.15 U	0.15 UJ
1,2-Dibromoethane	--	µg/m^3	5.3 U	0.17 U	0.037 U	0.037 U	0.040 U	4.5 U	0.18 U	0.039 U	0.038 U	0.037 U
1,2-Dichloro-1,1,2,2-tetrafluoroethane	--	µg/m^3	NA	NA	NA	0.085 J	0.094	NA	NA	NA	0.079 J	0.087
1,2-Dichlorobenzene	--	µg/m^3	41 U	0.17 U	0.37 UJ	0.037 U	0.020 J	35 U	0.18 U	0.39 UJ	0.038	0.018 J
1,2-Dichloroethane	--	µg/m^3	14 U	0.17 U	0.062	0.070	0.067	12 U	0.18 U	0.072	0.070	0.071
1,2-Dichloropropane	--	µg/m^3	16 U	0.17 U	0.015 J	0.027 J	0.021 J	14 U	0.18 U	0.016 J	0.014 J	0.019 J
1,3,5-Trimethylbenzene	--	µg/m^3	NA	NA	0.65 DJ	0.94	1.2	NA	NA	1.9 DJ	1.6	3.2
1,3-Butadiene	--	µg/m^3	NA	NA	0.046 J	0.044 J	0.086	NA	NA	0.049 J	0.079 J	0.10
1,3-Dichlorobenzene	--	µg/m^3	41 U	0.17 U	0.37 UJ	0.037 U	0.040 U	35 U	0.18 U	0.39 UJ	0.038 U	0.037 U
1,4-Dichlorobenzene	--	µg/m^3	41 U	0.17 U	0.37 U	0.037 U	0.030 J	35 U	0.18 U	0.39 U	0.038 U	0.021 J
1,4-Dioxane	--	µg/m^3	NA	NA	0.15 U	0.25	0.35	NA	NA	0.15 U	0.34	0.44
2-Butanone (MEK)	--	µg/m^3	400	180	NA	NA	NA	450	590 D	NA	NA	NA
2-Hexanone	--	µg/m^3	1.1 J	0.64 J	NA	NA	NA	.81 J	0.91 U	NA	NA	NA
4-Methyl 2 Pentanone	--	µg/m^3	1.2 J	1.1	NA	NA	NA	2.4 J	3	NA	NA	NA
Acetone	--	µg/m^3	84 J	210	79	52 J	34	110 J	610	77	54 J	65
Acroline	--	µg/m^3	NA	NA	0.39	0.57	0.62	NA	NA	0.59	0.80	0.79
Benzene	--	µg/m^3	2.3 J	0.56	0.72	0.77	1.1	2.7 J	0.91	0.82	0.56	2.3
Bromodichloromethane	--	µg/m^3	4.7 U	0.17 U	0.037 U	0.037 U	0.080 U	4.0 U	0.18 U	0.039 U	0.038 U	0.074 U
Bromoform	--	µg/m^3	36 U	0.84 U	NA	NA	NA	30 U	0.91 U	NA	NA	NA
Bromomethane	--	µg/m^3	14 U	0.19	0.029 J	0.029 J	0.042	11 U	0.18 U	0.027 J	0.032 J	0.039
Carbon Disulfide	--	µg/m^3	0.46 J	8.4 U	NA	NA	NA	.59 J	9.1 U	NA	NA	NA
Carbon Tetrachloride	--	µg/m^3	2.2 U	0.45	0.42	0.33	0.41	1.9 U	0.44	0.44	0.31	0.42
Chlorobenzene	--	µg/m^3	16 U	0.17 U	1.5 U	0.088 J	0.18	14 U	0.18 U	1.5 U	0.11 J	0.23
Chloroethane	--	µg/m^3	18 U	0.17 U	0.015 J	0.037 U	0.034 J	15 U	0.18 U	0.027 J	0.020 J	0.021 J
Chloroform	--	µg/m^3	17 U	0.17 U	0.16	0.16	0.13 J	14 U	0.21	0.18	0.22	0.18

See notes on last page.

Table 6
Soil Vapor and Indoor Air Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Samples: / Sample Date:	NYSDOH Air Guideline Values	Units	Warehouse Area Sample Locations (continued)									
			IA-4					IA-5				
			6/13/10	3/23/14	2/28/23	2/14/24	2/14/25	6/13/10	3/23/14	2/28/23	2/14/24	2/14/25
Volatile Organic Compounds												
Chloromethane	--	µg/m^3	3.1 J	0.55	0.26	0.29 J	0.86	3.8 J	0.59	0.22	0.29 J	0.85
cis-1,2-Dichloroethene	--	µg/m^3	14 U	0.17 U	0.20	0.12	0.30	12 U	0.34	0.21	0.13	0.22
cis-1,3-Dichloropropene	--	µg/m^3	31 U	0.84 U	0.075 U	0.075 U	0.040 UJ	27 U	0.91 U	0.077 U	0.076 U	0.037 UJ
Dibromochloromethane	--	µg/m^3	6.0 U	0.17 U	0.037 U	0.037 U	0.080 U	5.0 U	0.18 U	0.039 U	0.038 U	0.074 U
Dichlorodifluoromethane	--	µg/m^3	NA	NA	2.4	2.2	1.9	NA	NA	2.4	2.0	1.8
Ethylbenzene	--	µg/m^3	4.5 J	1.1	1.0 DJ	1.2	2.0 J	14 J	5.4	2.6 DJ	1.6	5.7 J
Hexachlorobutadiene	--	µg/m^3	NA	NA	1.5 U	0.15 U	0.80 U	NA	NA	1.5 U	0.15 U	0.74 U
m,p-Xylene	--	µg/m^3	15 J	3.4	4.1 DJ	4.1	7.0	53	19	13 DJ	6.5	22
Methyl tert-Butyl Ether	--	µg/m^3	25 U	0.17 U	0.037 U	0.037 U	0.023 J	21 U	0.18 U	0.039 U	0.048	0.023 J
Methylene Chloride	60	µg/m^3	1.4 J	0.6 J	0.41	0.33	0.37	1.3 J	0.61 J	0.41	0.33	0.88
Naphthalene	--	µg/m^3	NA	NA	1.5 UJ	0.20	0.44 J	NA	NA	1.5 UJ	0.15 U	0.19 J
o-Xylene	--	µg/m^3	5.1 J	1.2	2.6 DJ	1.3	2.8	16 J	6.1	6.8 DJ	2.1	9.2
Styrene	--	µg/m^3	3.6 J	0.41 J	0.37 DJ	0.61	1.2 J	5.5 J	3.1	0.64 DJ	0.96	1.1 J
Tetrachloroethene	30	µg/m^3	2.5 U	0.25	0.14	0.18	0.30	2.1 U	0.18 U	0.11	0.17	0.24
Toluene	--	µg/m^3	640	240 D	380 D	430 D	170 EJ	710	620 D	360 D	450 D	150 EJ
trans-1,2-Dichloroethene	--	µg/m^3	14 U	0.17 U	0.021 J	0.037 U	0.027 J	12 U	0.18 U	0.021 J	0.038 U	0.043
trans-1,3-Dichloropropene	--	µg/m^3	16 U	0.84 U	0.075 U	0.075 U	0.040 UJ	13 U	0.91 U	0.077 U	0.076 U	0.037 UJ
Trichloroethene	2	µg/m^3	1.9 U	0.17 U	0.017 J	0.012 J	0.028 J	1.6 U	0.18 U	0.037 J	0.012 J	0.032 J
Trichlorofluoromethane	--	µg/m^3	1.4 J	1.2	1.2	0.93	0.97	1.7 J	1.2	1.1	0.88	0.98
Vinyl Acetate	--	µg/m^3	7.6 J	6.4 J	NA	NA	NA	5.4 J	5.1 J	NA	NA	NA
Vinyl Chloride	--	µg/m^3	1.9 U	0.17 U	0.037 U	0.037 UJ	0.040 U	1.6 U	0.18 U	0.039 U	0.038 UJ	0.037 U

See notes on last page.

Table 6
Soil Vapor and Indoor Air Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Samples:	NYSDOH Air Guideline	Units	Warehouse Area Sample Locations (continued)										
			SS-3					SS-4	SS-5				
Sample Date:	Values		6/13/10	3/23/14	2/28/23	2/14/24	2/14/25	6/13/10	6/13/10	3/23/14	2/28/23	2/14/24	2/14/25
Volatile Organic Compounds													
1,1,1-Trichloroethane	--	µg/m^3	5.7	0.63	0.25	0.21	0.31	0.20 J	1.1	1.7 U	0.13 J	0.078	0.20 U
1,1,2,2-Tetrachloroethane	--	µg/m^3	0.88 U	0.17 U	0.038 UJ	0.040 U	0.040 U	0.23 U	0.23 U	1.7 U	0.20 UJ	0.074 U	0.20 U
1,1,2 Trichloro-1,2,2-Trifluroethane	--	µg/m^3	1.0 J	0.56	0.47	0.32	0.51	0.76	0.9	1.7 U	0.49	0.26	0.52
1,1,2-Trichloroethane	--	µg/m^3	3.5 U	0.17 U	0.15 U	0.16 U	0.16 U	0.92 U	0.92 U	1.7 U	0.78 U	0.29 U	0.78 U
1,1-Dichloroethane	--	µg/m^3	2.6 U	0.31	0.031 J	0.25	0.061	0.69 U	0.69 U	1.7 U	0.21	0.23	0.20 U
1,1-Dichloroethene	--	µg/m^3	2.6 U	0.17 U	0.014 J	0.040 U	0.040 U	0.67 U	0.67 U	1.7 U	0.20 U	0.074 U	0.20 U
1,2,4-Trichlorobenzene	--	µg/m^3	NA	NA	0.077 UJ	0.079 U	0.069 J	NA	NA	NA	0.39 UJ	0.15 U	0.39 UJ
1,2,4-Trimethylbenzene	--	µg/m^3	NA	NA	1.1 J	1.6	1.9 J	NA	NA	NA	1.2 J	1.6	2.0 J
1,2-Dibromo-3-chloropropane	--	µg/m^3	NA	NA	0.15 U	0.16 U	0.16 UJ	NA	NA	NA	0.78 U	0.29 U	0.78 UJ
1,2-Dibromoethane	--	µg/m^3	1.0 U	0.17 U	0.038 U	0.040 U	0.040 U	0.26 U	0.26 U	1.7 U	0.20 U	0.074 U	0.20 U
1,2-Dichloro-1,1,2,2-tetrafluoroethane	--	µg/m^3	NA	NA	NA	0.076 J	0.089	NA	NA	NA	NA	0.078 J	0.084 J
1,2-Dichlorobenzene	--	µg/m^3	7.8 U	0.17 U	0.038 UJ	0.040 U	0.021 J	2.0 U	2.0 U	1.7 U	0.20 UJ	0.074 U	0.20 U
1,2-Dichloroethane	--	µg/m^3	2.6 U	0.17 U	0.016 J	0.031 J	0.022 J	0.69 U	0.25 J	1.7 U	0.20 U	0.074 U	0.20 U
1,2-Dichloropropane	--	µg/m^3	3.0 U	0.17 U	0.014 J	0.040 U	0.080 U	0.78 U	0.78 U	1.7 U	0.20 U	0.074 U	0.39 U
1,3,5-Trimethylbenzene	--	µg/m^3	NA	NA	0.26 J	0.62	0.68	NA	NA	NA	0.28 J	0.87	0.57 J
1,3-Butadiene	--	µg/m^3	NA	NA	0.077 U	0.079 UJ	0.080 U	NA	NA	NA	0.39 U	0.15 UJ	0.39 U
1,3-Dichlorobenzene	--	µg/m^3	7.8 U	0.17 U	0.038 UJ	0.098	6.4	2.0 U	2.0 U	1.7 U	0.20 UJ	0.099	5.6
1,4-Dichlorobenzene	--	µg/m^3	7.8 U	0.17 U	0.038 U	0.040 U	0.051	2.0 U	2.0 U	1.7 U	0.20 U	0.074 U	0.20 U
1,4-Dioxane	--	µg/m^3	NA	NA	0.13 J	0.10 J	0.039 J	NA	NA	NA	0.67 J	0.29 U	0.39 U
2-Butanone (MEK)	--	µg/m^3	7	2.8 J	NA	NA	NA	5.5	3.3	20 J	NA	NA	NA
2-Hexanone	--	µg/m^3	2.6 U	0.37 J	NA	NA	NA	0.29 J	0.38 J	8.3 U	NA	NA	NA
4-Methyl 2 Pentanone	--	µg/m^3	5.3 U	0.83 U	NA	NA	NA	0.16 J	0.24 J	2.7 J	NA	NA	NA
Acetone	--	µg/m^3	15 J	19	19	11 J	7.9	12	11	1,500	23	8.7 J	12 J
Acroline	--	µg/m^3	NA	NA	0.17 J	0.17 J	0.17	NA	NA	NA	1.6 U	0.20 J	0.78 U
Benzene	--	µg/m^3	4.4	0.34	0.87	0.20	0.30	0.54 U	10	1.3 J	2.0	0.23	0.44
Bromodichloromethane	--	µg/m^3	0.88 U	0.17 U	0.038 U	0.077	0.080 U	0.23 U	0.17 J	1.7 U	0.20 U	0.074 U	0.39 U
Bromoform	--	µg/m^3	6.7 U	0.83 U	NA	NA	NA	1.7 U	1.7 U	8.3 U	NA	NA	NA
Bromomethane	--	µg/m^3	2.5 U	0.17 U	0.038 U	0.013 J	0.040 U	0.66 U	0.66 U	1.7 U	0.20 U	0.074 U	0.20 U
Carbon Disulfide	--	µg/m^3	6.2	0.53 J	NA	NA	NA	0.47 J	11	8.6 J	NA	NA	NA
Carbon Tetrachloride	--	µg/m^3	0.38 J	0.24	0.29	0.60	0.28	0.58	0.48	1.7 U	0.36	0.56	0.34
Chlorobenzene	--	µg/m^3	3.0 U	0.17 U	0.044 J	0.078 J	0.066 J	0.78 U	0.78 U	1.7 U	0.78 U	0.11 J	0.086 J
Chloroethane	--	µg/m^3	3.4 U	0.17 U	0.038 U	0.040 U	0.028 J	0.89 U	0.89 U	1.7 U	0.20 U	0.074 U	0.20 U
Chloroform	--	µg/m^3	0.30 J	0.17 U	0.34	0.24	0.12 J	0.17 J	3.7	1.7 U	0.23 J	0.10 J	0.78 U

See notes on last page.

Table 6
Soil Vapor and Indoor Air Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Samples:	NYSDOH Air Guideline	Units	Warehouse Area Sample Locations (continued)										
			SS-3					SS-4	SS-5				
Sample Date:	Values		6/13/10	3/23/14	2/28/23	2/14/24	2/14/25	6/13/10	6/13/10	3/23/14	2/28/23	2/14/24	2/14/25
Volatile Organic Compounds													
Chloromethane	--	µg/m^3	0.52 J	0.33 U	0.077 U	0.066 J	0.058 J	0.69 U	0.69 U	3.3 U	0.39 U	0.15 UJ	0.091 J
cis-1,2-Dichloroethene	--	µg/m^3	1.2 J	0.25	0.19	0.038 J	0.065	0.67 U	0.67 U	1.7 U	0.20 U	0.026 J	0.20 U
cis-1,3-Dichloropropene	--	µg/m^3	5.9 U	0.83 U	0.077 U	0.079 U	0.040 UJ	1.5 U	1.5 U	8.3 U	0.39 U	0.15 U	0.20 UJ
Dibromochloromethane	--	µg/m^3	1.1 U	0.17 U	0.038 U	0.040 U	0.080 U	0.29 U	0.29 U	1.7 U	0.20 U	0.074 U	0.39 U
Dichlorodifluoromethane	--	µg/m^3	NA	NA	2.3	2.1	1.8	NA	NA	NA	2.3	2.0	1.8
Ethylbenzene	--	µg/m^3	1.8 J	0.64 J	0.81 J	0.80	0.88 J	0.13 J	5.9	8.3 U	1.3 J	1.1	0.86 J
Hexachlorobutadiene	--	µg/m^3	NA	NA	0.15 U	0.16 U	0.80 U	NA	NA	NA	0.78 U	0.29 U	3.9 U
m,p-Xylene	--	µg/m^3	19	2.8	3.8 J	3.3	3.8	0.74 J	44	8.3 U	6.5 J	4.0	3.2
Methyl tert-Butyl Ether	--	µg/m^3	4.6 U	0.17 U	0.12	0.040 U	0.040 U	1.2 U	1.2 U	1.7 U	1.4	2.2	0.20 U
Methylene Chloride	60	µg/m^3	0.27 BJ	0.83 U	0.048 J	0.10 J	0.12 J	0.58 U	0.58 U	8.3 U	0.12 J	0.062 J	0.10 J
Naphthalene	--	µg/m^3	NA	NA	0.088 J	0.20	0.36 J	NA	NA	NA	0.78 UJ	0.22 J	0.15 J
o-Xylene	--	µg/m^3	5.0 J	0.86	1.2 J	1.4	1.5	0.21 J	15	8.3 U	1.9 J	1.6	1.4
Styrene	--	µg/m^3	5.5 U	0.83 U	0.25	0.41	0.55 J	0.071 J	1.4 U	8.3 U	0.24 J	0.73	0.43 J
Tetrachloroethene	30	µg/m^3	230	43	6.2	4.8	9.7	3	9.8	1.7 U	0.71	0.61	0.62
Toluene	--	µg/m^3	26	2.2	6.4 B	140 D	170 D	4.7	43	8.4	40 B	230 D	300 D
trans-1,2-Dichloroethene	--	µg/m^3	2.6 U	0.17 U	0.038 U	0.040 U	0.040 U	0.67 U	0.67 U	1.7 U	0.20 U	0.074 U	0.20 U
trans-1,3-Dichloropropene	--	µg/m^3	2.9 U	0.83 U	0.077 U	0.079 U	0.040 UJ	0.77 U	0.77 U	8.3 U	0.39 U	0.15 U	0.20 UJ
Trichloroethene	2	µg/m^3	15	1	0.72	0.18	0.30	0.6	0.87	1.7 U	0.22	0.062 J	0.20 U
Trichlorofluoromethane	--	µg/m^3	1.7 J	1.2	1.2	0.98	0.97	1.8	1.7	1 J	1.2	0.96	0.87
Vinyl Acetate	--	µg/m^3	29 U	8.3 U	NA	NA	NA	7.7 U	7.7 U	83 U	NA	NA	NA
Vinyl Chloride	--	µg/m^3	.35 U	0.17 U	0.025 J	0.040 UJ	0.040 U	0.092 U	0.092 U	1.7 U	0.20 U	0.074 UJ	0.20 U

See notes on last page.

Table 6
Soil Vapor and Indoor Air Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Samples: / Sample Date:	NYSDOH Air Guideline Values	Units	Outdoor/Ambient Air				
			OA-1				
			6/13/10	3/23/14	2/28/23	2/14/24	2/14/25
Volatile Organic Compounds							
1,1,1-Trichloroethane	--	µg/m^3	0.054 J	0.15 U	0.036 U	0.035 U	0.037 U
1,1,2,2-Tetrachloroethane	--	µg/m^3	0.25 U	0.15 U	0.036 UJ	0.035 U	0.037 U
1,1,2 Trichloro-1,2,2-Trifluroethane	--	µg/m^3	0.66	0.55	0.50	0.45	0.53
1,1,2-Trichloroethane	--	µg/m^3	1.0 U	0.15 U	0.14 U	0.14 U	0.15 U
1,1-Dichloroethane	--	µg/m^3	0.76 U	0.15 U	0.036 U	0.035 U	0.037 U
1,1-Dichloroethene	--	µg/m^3	0.74 U	0.15 U	0.036 U	0.035 U	0.037 U
1,2,4-Trichlorobenzene	--	µg/m^3	NA	NA	0.072 UJ	0.070 U	0.044 J
1,2,4-Trimethylbenzene	--	µg/m^3	NA	NA	0.18 J	0.051 J	0.48 J
1,2-Dibromo-3-chloropropane	--	µg/m^3	NA	NA	0.14 U	0.14 U	0.15 UJ
1,2-Dibromoethane	--	µg/m^3	0.29 U	0.15 U	0.036 U	0.035 U	0.037 U
1,2-Dichloro-1,1,2,2-tetrafluoroethane	--	µg/m^3	NA	NA	NA	0.10 J	0.093
1,2-Dichlorobenzene	--	µg/m^3	2.2 U	0.15 U	0.036 UJ	0.035 U	0.037 U
1,2-Dichloroethane	--	µg/m^3	0.76 U	0.15 U	0.062	0.057	0.060
1,2-Dichloropropane	--	µg/m^3	0.86 U	0.15 U	0.016 J	0.013 J	0.020 J
1,3,5-Trimethylbenzene	--	µg/m^3	NA	NA	0.041 J	0.14 U	0.094 J
1,3-Butadiene	--	µg/m^3	NA	NA	0.072 U	0.070 UJ	0.026 J
1,3-Dichlorobenzene	--	µg/m^3	2.2 U	0.15 U	0.036 UJ	0.035 U	0.037 U
1,4-Dichlorobenzene	--	µg/m^3	0.051 BJ	0.15 U	0.036 U	0.035 U	0.018 J
1,4-Dioxane	--	µg/m^3	NA	NA	0.14 U	0.14 U	0.073 U
2-Butanone (MEK)	--	µg/m^3	2.1	0.47 J	NA	NA	NA
2-Hexanone	--	µg/m^3	0.38 J	0.74 U	NA	NA	NA
4-Methyl 2 Pentanone	--	µg/m^3	0.16 J	0.74 U	NA	NA	NA
Acetone	--	µg/m^3	13	2 J	3.1 J	3.1 J	5.5
Acroline	--	µg/m^3	NA	NA	0.11 J	0.12 J	0.17
Benzene	--	µg/m^3	0.39 J	0.42	0.62	0.28	0.80
Bromodichloromethane	--	µg/m^3	0.25 U	0.15 U	0.036 U	0.035 U	0.073 U
Bromoform	--	µg/m^3	1.9 U	0.74 U	NA	NA	NA
Bromomethane	--	µg/m^3	0.73 U	0.15 U	0.025 J	0.022 J	0.031 J
Carbon Disulfide	--	µg/m^3	0.037 J	7.4 U	NA	NA	NA
Carbon Tetrachloride	--	µg/m^3	0.58	0.47	0.43	0.36	0.41
Chlorobenzene	--	µg/m^3	0.86 U	0.15 U	0.14 U	0.14 U	0.022 J
Chloroethane	--	µg/m^3	0.98 U	0.15 U	0.015 J	0.011 J	0.026 J
Chloroform	--	µg/m^3	0.13 J	0.15 U	0.066 J	0.057 J	0.076 J

See notes on last page.

Table 6
Soil Vapor and Indoor Air Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Samples: / Sample Date:	NYSDOH Air Guideline Values	Units	Outdoor/Ambient Air				
			OA-1				
			6/13/10	3/23/14	2/28/23	2/14/24	2/14/25
Volatile Organic Compounds							
Chloromethane	--	µg/m^3	1	0.61	0.23	0.31 J	0.82
cis-1,2-Dichloroethene	--	µg/m^3	0.74 U	0.15 U	0.036 U	0.035 U	0.037 U
cis-1,3-Dichloropropene	--	µg/m^3	1.7 U	0.74 U	0.072 U	0.070 U	0.037 UJ
Dibromochloromethane	--	µg/m^3	0.32 U	0.15 U	0.036 U	0.035 U	0.073 U
Dichlorodifluoromethane	--	µg/m^3	NA	NA	2.4	2.1	1.8
Ethylbenzene	--	µg/m^3	0.13 J	0.74 U	0.19 J	0.038 J	0.24 J
Hexachlorobutadiene	--	µg/m^3	NA	NA	0.14 U	0.14 U	0.73 U
m,p-Xylene	--	µg/m^3	0.39 J	0.74 U	0.82 J	0.090 J	1.1
Methyl tert-Butyl Ether	--	µg/m^3	1.3 U	0.15 U	0.036 U	0.035 U	0.037 U
Methylene Chloride	60	µg/m^3	0.44 J	0.41 J	0.48	0.26	0.35
Naphthalene	--	µg/m^3	NA	NA	0.14 UJ	0.14 U	0.10 J
o-Xylene	--	µg/m^3	0.14 J	0.74 U	0.25 J	0.041 J	0.41
Styrene	--	µg/m^3	1.6 U	0.74 U	0.022 J	0.14 U	0.025 J
Tetrachloroethene	30	µg/m^3	0.090 J	0.15 U	0.036	0.027 J	0.070
Toluene	--	µg/m^3	0.87	0.37 J	1.8 B	0.48	4.4
trans-1,2-Dichloroethene	--	µg/m^3	0.74 U	0.15 U	0.036 U	0.035 U	0.037 U
trans-1,3-Dichloropropene	--	µg/m^3	0.85 U	0.74 U	0.072 U	0.070 U	0.037 UJ
Trichloroethene	2	µg/m^3	0.10 U	0.15 U	0.036 U	0.035 U	0.037 U
Trichlorofluoromethane	--	µg/m^3	1.2	1.2	1.2	1.0	1.0
Vinyl Acetate	--	µg/m^3	8.5 U	7.4 U	NA	NA	NA
Vinyl Chloride	--	µg/m^3	0.10 U	0.15 U	0.036 U	0.035 UJ	0.037 U

See notes on last page.

Table 6
Soil Vapor and Indoor Air Analytical Results
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Notes:
1. Shading indicates values exceed the NYSDOH air guideline values (NYSDOH 2006, 2024).

Acronyms and Abbreviations:
-- - NYSDOH air guideline value not established
µg/m^3 - micrograms per cubic meter
IA - indoor air sample
NA - not analyzed
NYSDOH - New York State Department of Health
OA - outdoor/ambient air sample
SS - sub-slab vapor sample

Laboratory Qualifiers:
B - Analyte detected in both sample and associated method blank.
D - The reported result is from a dilution.
J - Indicates the result is less than the quantitation limit but greater than the method detection limit. The result is an approximate value.
U - Indicates the compound was not detected at the indicated concentration.

References:
NYSDOH. 2006. Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York. October.
NYSDOH. 2024. Updates to Soil Vapor/Indoor Air Decision Matrices. February. Accessed online on March 28, 2024 (https://health.ny.gov/environmental/indoors/vapor_intrusion/update.htm).

Table 7
Well Construction Details
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Well ID	Date Completed	Well Diameter	Casing/Screen Type	Screen Slot Size (in)	Screen Length (ft)	Screened Interval (ft bgs)	Total Well Depth (ft bgs)	Measuring Point Elevation (ft amsl)
MW-01	4/23/2003	2	PVC	0.010	10	6-16	17.10	554.71
MW-02	4/17/2003	2	PVC	0.010	10	4-14	17.04	553.26
MW-03	4/17/2003	2	PVC	0.010	10	10-20	19.92	552.17
MW-04S	4/21/2003	2	PVC	0.010	10	6-16	15.54	552.37
MW-04D	4/21/2003	2	PVC	0.010	10	67-77.5	75.95	552.57
MW-05	4/14/2003	2	PVC	0.010	20	10.5-30.5	30.25	551.87
MW-06	4/15/2003	2	PVC	0.010	10	10-20	21.64	552.62
MW-07	4/23/2003	2	PVC	0.010	10	6.5-16.5	18.59	551.80
MW-08	4/24/2003	2	PVC	0.010	10	4.5-14.5	16.83	552.50
MW-09	4/16/2003	2	PVC	0.010	10	13.5-23.5	24.45	553.03
MW-10	4/16/2003	2	PVC	0.010	10	5-15	14.03	550.62
MW-11S	4/22/2003	2	PVC	0.010	10	6-16	20.08	554.07
MW-12S	4/23/2006	2	PVC	0.010	10	6-16	19.00	553.33
MW-12D	4/23/2006	2	PVC	0.010	10	61-71	72.99	553.66
MW-13S	4/23/2006	2	PVC	0.010	10	6-16	15.61	550.26
MW-13D	4/23/2006	2	PVC	0.010	10	65-75	76.55	550.75
MW-14S	4/23/2006	2	PVC	0.010	10	6-16	16.13	550.18
MW-15S	4/23/2006	2	PVC	0.010	10	6-16	18.32	553.20
MW-16S	4/23/2006	2	PVC	0.010	10	6-16	15.52	552.17
MW-16I	4/23/2006	2	PVC	0.010	10	43-53	51.03	552.02
MW-17S	4/23/2006	2	PVC	0.010	10	6-16	15.60	550.84
MW-17D	4/23/2006	2	PVC	0.010	10	52-62	64.63	550.79
MW-18	3/26/2014	2	PVC	0.010	10	10-20	18.92	552.25
MW-19	3/27/2014	2	PVC	0.010	10	5-15	21.99	552.51
MW-20	3/27/2014	2	PVC	0.010	10	5-15	19.36	551.44

Notes:
1. Elevations referenced to the 1988 North American Vertical Datum, surveyed December 19, 2013, and resurveyed October 21, 2020, following well repairs. MW-6 resurveyed August 2023 following additional well repairs.

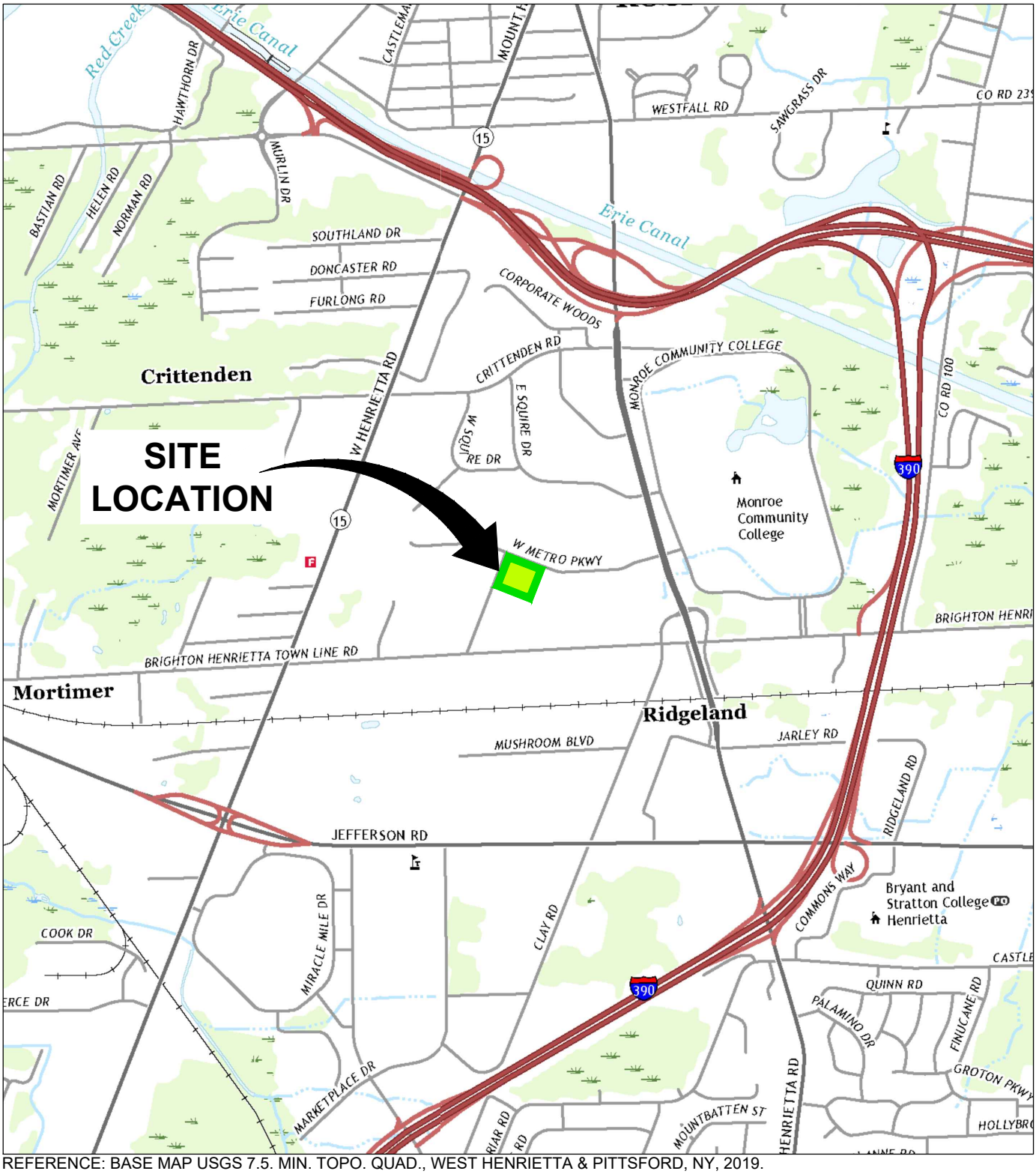
Acronyms and Abbreviations:
ft - feet
ft amsl - feet above mean sea level
ft bgs - feet below ground surface
in - inch
PVC - polyvinyl chloride

Table 8
Site-Specific Climate Vulnerability Evaluation
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Site/Remedy Assets	Potential Vulnerability/Hazard Assessment				Outcome[3]	Justification
	Flooding/ Flood Plain[1]	High Wind[2]	High Heat[1]	Extreme Cold[1]		
Site Assets (related to the Remedy)						
Institutional Control - Restricted Groundwater Usage	None	None	None	None	No further evaluation required	Groundwater usage at the Site is restricted by the New York State Department of Health or Monroe County Department of Health without necessary treatment (determined by aforementioned agencies).
Engineering Control - Site Cover	Low	None	None	None	Periodic Inspection	Site cover will be inspected annually per Site Management Plan and maintained as defined in the Site Management Plan.
Remedy Assets						
Monitoring Wells	Low	None	None	None	Periodic Inspection	Monitoring wells will be repaired, replaced, and/or decommissioned per the Site Management Plan.
Post-Remediation Media Monitoring						
Groundwater Monitoring	Low	Low	Low	Low	Coordinate/schedule work appropriately	Schedule work around potential severe weather events.
Soil Vapor Intrusion Monitoring	Low	Low	Low	Low	Coordinate/schedule work appropriately	Schedule work around potential severe weather events.
Transportation Network (roads for staff, sample submission, waste disposal)	Low	Low	Low	Low	Coordinate/schedule work appropriately	Schedule work around potential severe weather events.
Waste Management	Low	None	None	Low	Coordinate/schedule work appropriately	Use best management practices and manage waste in accordance with the Field Sampling Plan (Appendix H to the Site Management Plan). Schedule work around potential severe weather events.
Field Staff	Low	Low	Low	Low	Coordinate/schedule work appropriately	Use best management practices and Health and Safety Plan to address potential worker hazard. Schedule work around potential severe weather events.

Notes:
1. Climate Explorer (https://crt-climate-explorer.nemac.org).
2. The United States Environmental Protection Agency's Climate Resilience Evaluation and Awareness Tool (CREAT) (https://www.epa.gov/crwu/climate-resilience-evaluation-and-awareness-tool).
3. This climate screening and results will be updated during each Periodic Review Report or after any changes in the remedy or site conditions to determine if the Site's exposure to vulnerabilities has changed and to confirm that the Site is still resilient.

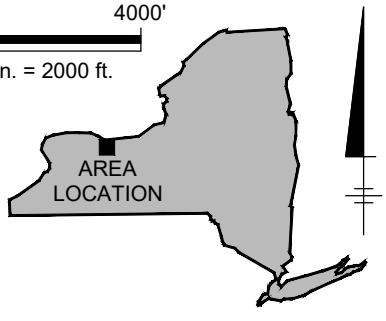
Figures



REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD., WEST HENRIETTA & PITTSFORD, NY, 2019.

0 2000' 4000'

Approximate Scale: 1 in. = 2000 ft.



NYSDEC SITE # 828150
235 METRO PARK BRIGHTON SITE
ROCHESTER, NEW YORK

SITE MANAGEMENT PLAN

SITE LOCATION MAP

ARCADIS

FIGURE 1

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Arcadis Logo.png

LEGEND:

- SITE BOUNDARY
- PARCEL BOUNDARY

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. AERIAL PHOTO PROVIDED BY MONROE COUNTY.GOV INTERACTIVE PARCEL MAP – 2023.

0 500' 1,000'

GRAPHIC SCALE

NYSDEC SITE # 828150
235 METRO PARK BRIGHTON SITE
ROCHESTER, NEW YORK
SITE MANAGEMENT PLAN

SITE SURROUNDING AREA

ARCADIS

FIGURE
2

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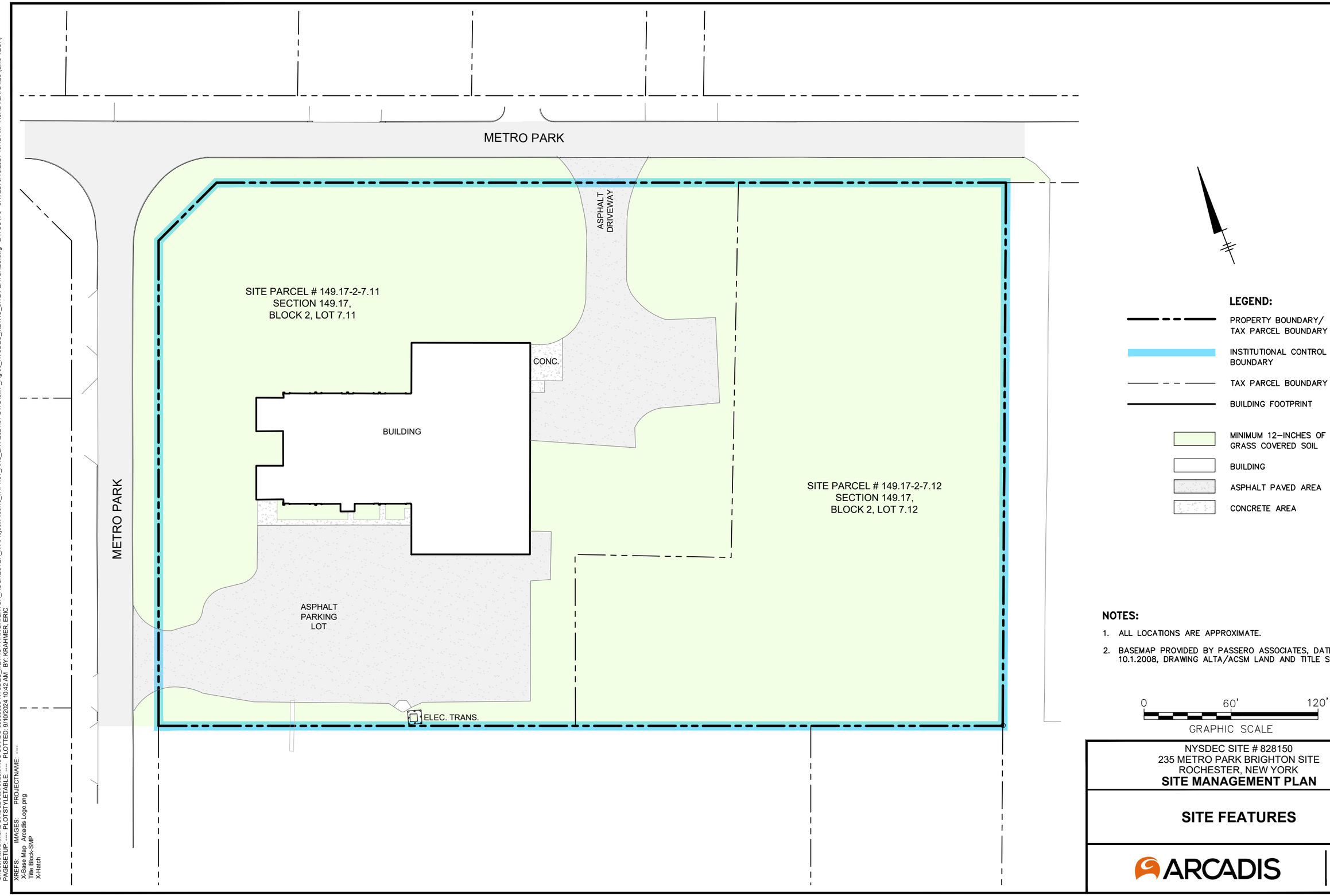

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. BASEMAP PROVIDED BY PASSERO ASSOCIATES, DATED 10.1.2008, DRAWING ALTA/ACSM LAND AND TITLE SURVEY.

0 60' 120'

GRAPHIC SCALE

NYSDEC SITE # 828150
235 METRO PARK BRIGHTON SITE
ROCHESTER, NEW YORK
SITE MANAGEMENT PLAN

SITE FEATURES

ARCADIS

FIGURE 3

C:\Users\ekrahmer\DOCACDocs\Arcadis ACC US\AUS-99999999-NYSDEC_METRO PARK BRIGHTON_ROCHESTER_NY\Project Files\10_WIP\10T_ARC_ENV\2024\01-DWG\SMP_Fig 03_NYSDEC_METRO_SITE FEATURES.dwg LAYOUT: 3 SAVED: 9/10/2024 10:42 AM ACADVER: 24.2S (LMS TECH)
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Title Block-SMP
X-Hatch

METRO PARK

METRO PARK

ASPHALT DRIVEWAY

CONC.

BUILDING

WAREHOUSE AREA

ASPHALT PARKING LOT

ELEC. TRANS.

A

A'

SV-2 SV-1 SV-6

MW-12S MW-12D MW-11S MW-09 MW-08 MW-07 MW-14S MW-13S MW-13D MW-20/SB-14 MW-10 MW-03 MW-15S MW-04D MW-04S MW-18 MW-16I MW-16S MW-17D MW-17S MW-01 MW-02 MW-05 MW-06

BH-1 BH-2 BH-3 BH-4 BH-5 BH-6 BH-7 BH-8 BH-9 BH-10 BH-11 BH-12 BH-13 BH-14 BH-15 BH-16 BH-17 BH-18 BH-19 BH-20 BH-21 BH-22 BH-23 BH-24 BH-25 BH-26 BH-27 BH-28 BH-29 BH-30 BH-101 BH-102 BH-103

SMPL-1 SMPL-2 SMPL-3 SMPL-4 SMPL-5 SMPL-6 SMPL-7 SMPL-8 SMPL-9 SMPL-10

SS-1 SS-2 SS-3 SS-4 SS-5 SS-6 SS-7 SS-8 SS-01 SS-02 SS-03 SS-06

IA-1 IA-2 IA-3 IA-4 IA-5 OA-1 X-1 X-2 X-3

GP-101 GP-102 GP-103 GP-104 GP-105 GP-201 GP-202 GP-203 GP-204 GP-205 GP-206

NW NE SW SE

LEGEND:

- A — A' GEOLOGICAL CROSS SECTION
- PROPERTY BOUNDARY
- TAX PARCEL BOUNDARY
- BUILDING FOOTPRINT
- MONITORING WELL LOCATION
- SOIL VAPOR AIR SAMPLE
- OUTDOOR AIR SAMPLE
- INDOOR AIR SAMPLE
- SUB-SLAB AIR SAMPLE
- SUBSURFACE SOIL SAMPLE (2000)
- SUBSURFACE SOIL SAMPLE (2002)
- SUB-SLAB SAMPLE
- SURFACE SOIL SAMPLE
- SOIL SAMPLE
- GRASS AREA
- BUILDING
- ASPHALT PAVED AREA
- CONCRETE AREA

NOTES:

1. MONITORING WELL LOCATIONS BASED ON OCTOBER 21, 2020 SURVEY COMPLETED BY FISHER ASSOCIATES. ALL OTHER LOCATIONS ARE APPROXIMATE.
2. BASEMAP PROVIDED BY PASSERO ASSOCIATES, DATED 10.1.2008, DRAWING ALTA/ACSM LAND AND TITLE SURVEY.

0 60' 120'

GRAPHIC SCALE

NYSDEC SITE # 828150
235 METRO PARK BRIGHTON SITE
ROCHESTER, NEW YORK
SITE MANAGEMENT PLAN

SAMPLE LOCATIONS

ARCADIS

FIGURE 4

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X-Hatch

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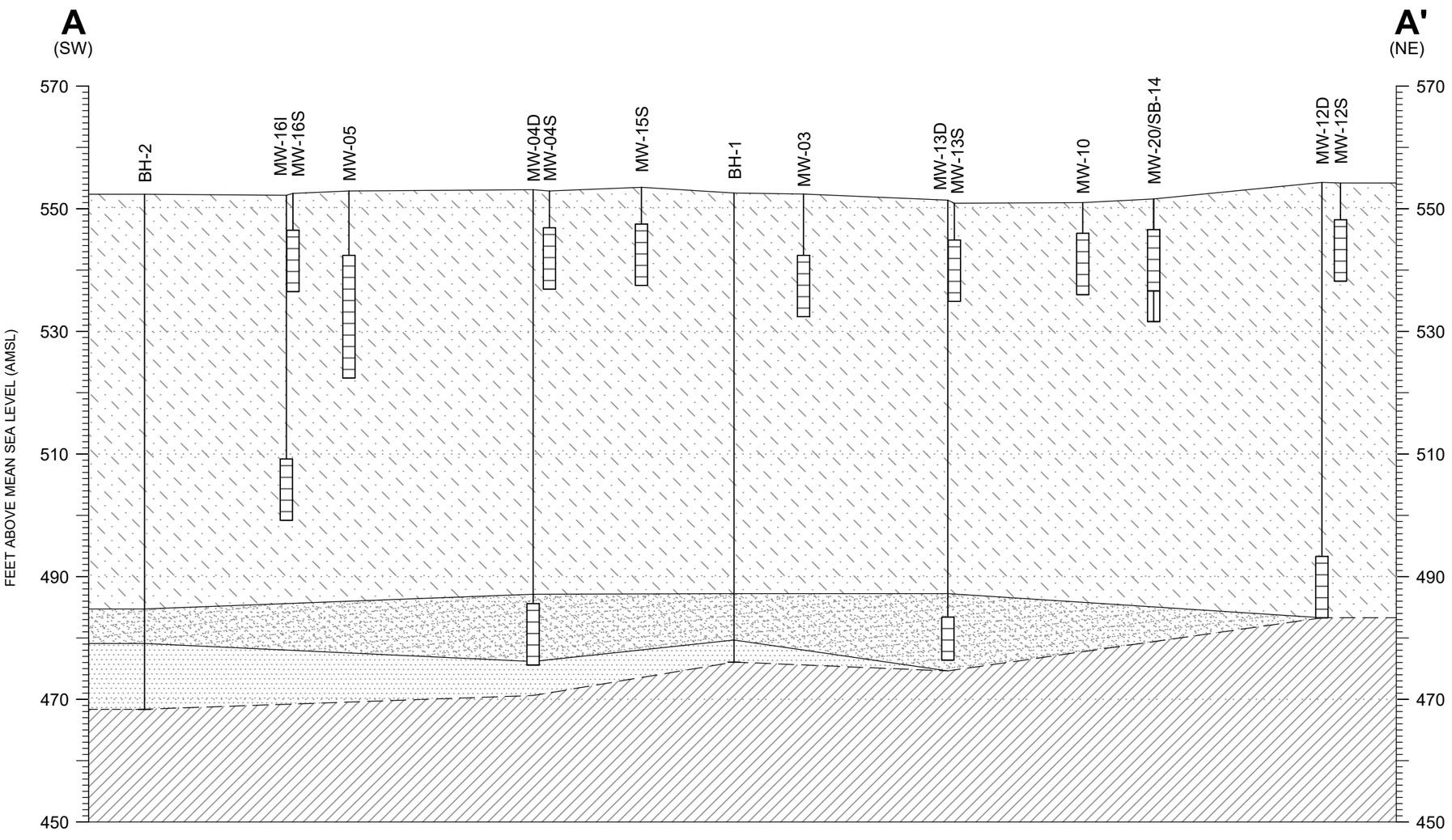
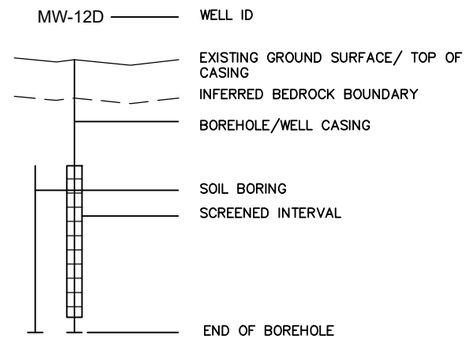
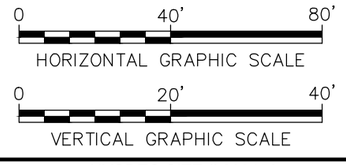


LEGEND:

- UNDIFFERENTIATED LACUSTRINE CLAY AND SILT
- UNDIFFERENTIATED SILTY SAND
- GLACIAL TILL – SILTY SAND
- BEDROCK – VERNON SHALE

WELL CONSTRUCTION:



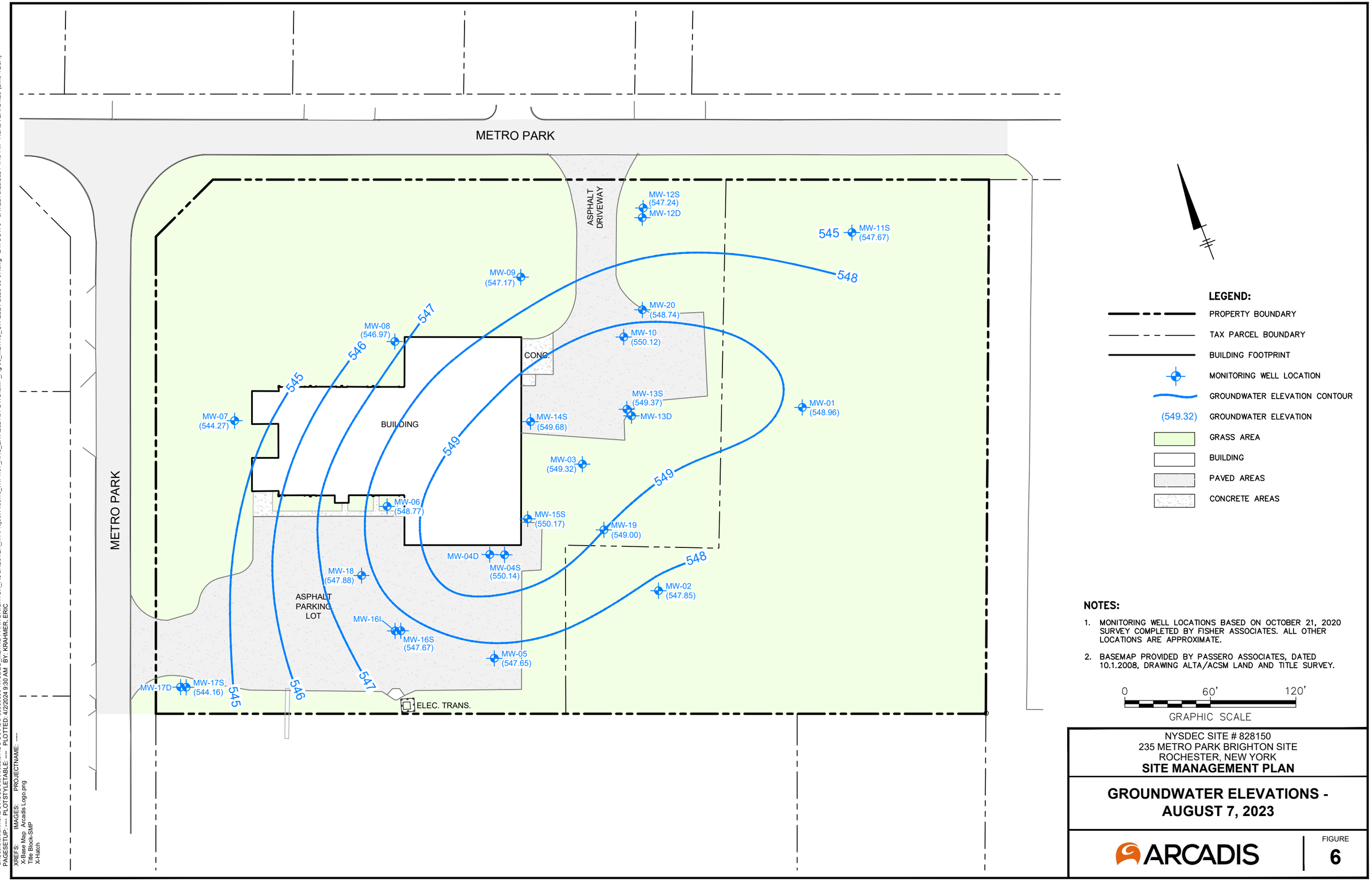


NYSDEC SITE # 828150
235 METRO PARK BRIGHTON SITE
ROCHESTER, NEW YORK
SITE MANAGEMENT PLAN

GEOLOGIC CROSS-SECTION A-A'

ARCADIS

FIGURE
5



LEGEND:

- PROPERTY BOUNDARY
- TAX PARCEL BOUNDARY
- BUILDING FOOTPRINT
- MONITORING WELL LOCATION
- GROUNDWATER ELEVATION CONTOUR
- (549.32) GROUNDWATER ELEVATION
- GRASS AREA
- BUILDING
- PAVED AREAS
- CONCRETE AREAS

NOTES:

1. MONITORING WELL LOCATIONS BASED ON OCTOBER 21, 2020 SURVEY COMPLETED BY FISHER ASSOCIATES. ALL OTHER LOCATIONS ARE APPROXIMATE.
2. BASEMAP PROVIDED BY PASSERO ASSOCIATES, DATED 10.1.2008, DRAWING ALTA/ACSM LAND AND TITLE SURVEY.

0 60' 120'

GRAPHIC SCALE

NYSDEC SITE # 828150
235 METRO PARK BRIGHTON SITE
ROCHESTER, NEW YORK
SITE MANAGEMENT PLAN

GROUNDWATER ELEVATIONS - AUGUST 7, 2023

ARCADIS

FIGURE 6

C:\Users\ekrahmer\DC\ACCDocs\Arcadis ACC US\AUS-9999999-NYSDEC_METRO PARK BRIGHTON_ROCHESTER_NY\Project Files\10_WIP\10T_ARC_ENV\2024\01-DWG\SMP_Fig 06_METRO_GW ELEV 2023-08-07.dwg LAYOUT: 6 SAVED: 3/28/2024 4:48 PM ACADVER: 24.2S (LMS TECH)
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X-Base Map Arcadis Logo.png
Title Block-SMP
X-Hatch

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X-Base Map Arcadis Logo.png
Title Block-SMP
X-Hatch

Surface-Smpl-8	
Date	9/17/2002
SVOCs	
Anthracene	0.13 J
Benzo(a)anthracene	0.53
Benzo(a)pyrene	0.51
Benzo(b)fluoranthene	0.56
Benzo(g,h,i)perylene	0.37 J
Benzo(k)fluoranthene	0.42
bis(2-Ethylhexyl)phthalate	0.075 J
Carbazole	0.11 J
Chrysene	0.61
Dibenzo(a,h)anthracene	0.092 J
Fluoranthene	1.5
Indeno(1,2,3-cd)pyrene	0.36 J
Phenanthrene	0.79
Pyrene	1.1
Inorganics	
Aluminum	11,400
Arsenic	4.4
Barium	76.7
Calcium	4,250
Chromium	16.6
Copper	9.6
Iron	17,900
Lead	17.3
Magnesium	3,300
Manganese	282
Nickel	12
Vanadium	24.4
Zinc	68.4

Surface-Smpl-1	
Date	9/17/2002
VOCs	
Acetone	0.046 J
SVOCs	
Anthracene	0.068 J
Benzo(a)anthracene	0.32 J
Benzo(a)pyrene	0.37 J
Benzo(b)fluoranthene	0.42
Benzo(g,h,i)perylene	0.25 J
Benzo(k)fluoranthene	0.22 JH
bis(2-Ethylhexyl)phthalate	0.060 J
Chrysene	0.37 J
Dibenzo(a,h)anthracene	0.056 J
Fluoranthene	0.9
Indeno(1,2,3-cd)pyrene	0.24 J
Phenanthrene	0.42
Pyrene	0.72
Inorganics	
Aluminum	14,800
Arsenic	4.9
Barium	106
Calcium	12,400
Chromium	17.6
Copper	50.1
Iron	21,300
Lead	25.9
Magnesium	7,050
Manganese	435
Nickel	15.6
Potassium	1,260
Vanadium	29
Zinc	345

Surficial-NW	
Date	2/23/2006
SVOCs	
Acenaphthene	0.25 J
Anthracene	0.91
Benzo(a)anthracene	**2.9**
Benzo(a)pyrene	2.0
Benzo(b)fluoranthene	**3.0**
Benzo(g,h,i)perylene	0.28 J
Benzo(k)fluoranthene	1
Carbazole	0.75
Chrysene	**3.3**
Dibenzo(a,h)anthracene	0.5
Dibenzofuran	0.14 J
Di-n-Butylphthalate	0.49
Fluoranthene	9.1 D
Fluorene	0.35 J
Indeno(1,2,3-cd)pyrene	1.7
Naphthalene	0.059 D
Phenanthrene	6.4 D
Phenol	0.33
Pyrene	6.1 D

Surficial-E	
Date	2/22/2006
SVOCs	
Acenaphthene	0.018 J
Anthracene	0.066 J
Benzo(a)anthracene	0.38 J
Benzo(a)pyrene	0.36 J
Benzo(b)fluoranthene	0.8
Benzo(g,h,i)perylene	0.066 J
Benzo(k)fluoranthene	0.84
Carbazole	0.054 J
Chrysene	0.53
Dibenzo(a,h)anthracene	0.098 J
Fluoranthene	0.91
Fluorene	0.020 J
Indeno(1,2,3-cd)pyrene	0.36 J
Phenanthrene	0.42 J
Pyrene	0.85

Surface-Smpl-7	
Date	9/17/2002
SVOCs	
Anthracene	0.84 J
Benzo(a)anthracene	**4.1**
Benzo(a)pyrene	5.0
Benzo(b)fluoranthene	**5.1**
Benzo(g,h,i)perylene	4.2
Benzo(k)fluoranthene	**3.4 J**
bis(2-Ethylhexyl)phthalate	3.4 J
Carbazole	0.55 J
Chrysene	**5.0**
Dibenzo(a,h)anthracene	0.86 J
Fluoranthene	12
Indeno(1,2,3-cd)pyrene	3.8
Phenanthrene	5.4
Pyrene	9.5
Inorganics	
Aluminum	6,500
Arsenic	2.5
Calcium	11,300
Chromium	9.6
Copper	13.7
Iron	10,600
Lead	19.1
Magnesium	5,410
Manganese	268
Vanadium	14.7
Zinc	65.9

Surface-Smpl-2	
Date	9/17/2002
PCBs	
Aroclor-1254	0.084
VOCs	
Acetone	0.018 J
SVOCs	
Fluoranthene	0.053 J
Pyrene	0.050 J
Inorganics	
Aluminum	9,560
Arsenic	4.1
Barium	76.9
Calcium	40,800
Chromium	11
Copper	13.8
Iron	16,300
Lead	12.3
Magnesium	8,330
Manganese	465
Nickel	10.2
Vanadium	19.4
Zinc	72.6

Surficial-SW	
Date	2/22/2006
SVOCs	
Acenaphthene	0.038 J
Anthracene	0.16 J
Benzo(a)anthracene	0.83
Benzo(a)pyrene	0.72
Benzo(b)fluoranthene	1.2
Benzo(g,h,i)perylene	0.13 J
Benzo(k)fluoranthene	0.30 J
Carbazole	0.13 J
Chrysene	0.99
Dibenzo(a,h)anthracene	0.20 J
Dibenzofuran	0.018 J
Fluoranthene	1.7
Fluorene	0.042 J
Indeno(1,2,3-cd)pyrene	0.67
Phenanthrene	0.8
Phenol	**500**
Pyrene	1.6

Surface-Smpl-10	
Date	9/17/2002
VOCs	
Chloroform	0.0030 J
SVOCs	
Anthracene	0.048 J
Benzo(a)anthracene	0.37 J
Benzo(a)pyrene	0.55
Benzo(b)fluoranthene	0.66
Benzo(g,h,i)perylene	0.64
Benzo(k)fluoranthene	0.4
bis(2-Ethylhexyl)phthalate	0.071 J
Carbazole	0.057 J
Chrysene	0.59
Dibenzo(a,h)anthracene	0.12 J
Fluoranthene	1.1
Indeno(1,2,3-cd)pyrene	0.54
Phenanthrene	0.34 J
Pyrene	0.84
Inorganics	
Aluminum	6,740
Arsenic	2.8
Barium	61
Calcium	54,900
Chromium	10.1
Copper	10.1
Iron	13,500
Lead	21.5
Magnesium	23,800
Manganese	550
Nickel	10.9
Vanadium	16.9
Zinc	73.5

Surface-Smpl-9	
Date	9/17/2002
VOCs	
Acetone	**0.057 J**
SVOCs	
Anthracene	0.066 J
Benzo(a)anthracene	0.37 J
Benzo(a)pyrene	0.46
Benzo(b)fluoranthene	0.58
Benzo(g,h,i)perylene	0.40 J
Benzo(k)fluoranthene	0.34 J
bis(2-Ethylhexyl)phthalate	0.13 J
Butylbenzylphthalate	0.12 J
Carbazole	0.064 J
Chrysene	0.53
Dibenzo(a,h)anthracene	0.091 J
Di-n-Butylphthalate	0.054 J
Fluoranthene	0.1
Indeno(1,2,3-cd)pyrene	0.47 J
Phenanthrene	0.46
Pyrene	0.87
Inorganics	
Aluminum	13,100
Arsenic	3.7
Barium	87.2
Calcium	6,010
Chromium	28.6
Copper	12.5
Iron	19,000
Lead	20.5
Magnesium	3,950
Manganese	309
Nickel	13.7
Potassium	1,420
Vanadium	25.3
Zinc	81.6

Surface-Smpl-5	
Date	9/17/2002
SVOCs	
Acetophenone	0.065 J
Anthracene	0.12 J
Benzo(a)anthracene	0.88
Benzo(a)pyrene	1.4
Benzo(b)fluoranthene	1.7
Benzo(g,h,i)perylene	1.5
Benzo(k)fluoranthene	1
bis(2-Ethylhexyl)phthalate	0.068 J
Carbazole	0.15 J
Chrysene	**1.5**
Dibenzo(a,h)anthracene	0.28 J
Fluoranthene	3
Indeno(1,2,3-cd)pyrene	1.3
Phenanthrene	0.94
Pyrene	2.6
Inorganics	
Aluminum	12,400
Arsenic	5.6
Barium	97.1
Calcium	18,600
Chromium	15.9
Cobalt	12.5
Copper	15.3
Iron	24,400
Lead	29
Magnesium	8,870
Manganese	938
Nickel	17.3
Vanadium	31.1
Zinc	98.2

Surface-Smpl-4	
Date	9/17/2002
VOCs	
Acetone	0.019 J
SVOCs	
Benzo(a)anthracene	0.11 J
Benzo(a)pyrene	0.11 J
Benzo(b)fluoranthene	0.13 J
Benzo(g,h,i)perylene	0.079 J
Benzo(k)fluoranthene	0.076 J
bis(2-Ethylhexyl)phthalate	0.039 J
Chrysene	0.11 J
Fluoranthene	0.22 J
Indeno(1,2,3-cd)pyrene	0.078 J
Phenanthrene	0.093 J
Pyrene	0.20 J
Inorganics	
Aluminum	13,700
Arsenic	3.8
Barium	108
Calcium	15,200
Chromium	18
Copper	13.8
Iron	21,200
Lead	11.9
Magnesium	4,190
Manganese	310
Mercury	0.4
Nickel	16.9
Potassium	1,190
Vanadium	28.1
Zinc	77

Surface-Smpl-3	
Date	9/17/2002
PCBs	
Aroclor-1254	0.097
VOCs	
Acetone	0.020 J
Inorganics	
Aluminum	6,370
Arsenic	3.4
Barium	47.8
Calcium	111,000
Chromium	8.6
Copper	13.7
Iron	11,500
Lead	13.4
Magnesium	13,100
Manganese	366
Nickel	10.3
Vanadium	14.6
Zinc	110

Surface-Smpl-6	
Date	9/17/2002
VOCs	
Acetone	0.0090 J
SVOCs	
Anthracene	0.12 J
Benzo(a)anthracene	0.75
Benzo(a)pyrene	0.81 J
Benzo(b)fluoranthene	0.84 J
Benzo(g,h,i)perylene	0.78 J
Benzo(k)fluoranthene	0.52 J
Carbazole	0.073 J
Chrysene	0.86
Dibenzo(a,h)anthracene	0.21 J
Fluoranthene	1.6
Indeno(1,2,3-cd)pyrene	0.76 J
Phenanthrene	0.47 J
Pyrene	1.1
Inorganics	
Aluminum	928
Arsenic	3.5
Cadmium	2.3
Calcium	133,000
Chromium	10
Copper	10.3
Iron	9,880
Lead	39.1
Magnesium	80,100
Manganese	296
Zinc	1,120

SMPL-8
SMPL-7
NW
E
SW
SMPL-10
SMPL-9
SMPL-1
SMPL-3
SMPL-2
SMPL-4
SMPL-6
SMPL-5
CONC.
BUILDING
ELEC. T
ARK

LEGEND:

- PROPERTY BOUNDARY
- TAX PARCEL BOUNDARY
- BUILDING FOOTPRINT
- SURFACE SOIL SAMPLE
- GRASS AREA
- BUILDING
- ASPHALT PAVED AREA
- CONCRETE AREA

NOTES:

1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER KILOGRAM (mg/kg).
2. D – COMPOUND QUANTITATED USING A SECONDARY DILUTION.
3. J – QUALIFIER INDICATES ESTIMATED VALUE.
4. H – DATA QUALIFIER DESCRIPTION UNKNOWN.
5. BOLD CONCENTRATIONS EXCEED 6NYCRR PART 375 SOIL CLEANUP OBJECTIVES FOR PROTECTION OF GROUNDWATER.
6. GRAY SHADED CONCENTRATIONS EXCEED 6NYCRR PART 375 COMMERCIAL USE SOIL CLEANUP OBJECTIVES.
7. ABBREVIATIONS:
   - 7.1. PCBs – POLYCHLORINATED BIPHENYLS
   - 7.2. SVOCs – SEMI–VOLATILE ORGANIC COMPOUNDS
   - 7.3. VOCs – VOLATILE ORGANIC COMPOUNDS
8. ALL LOCATIONS ARE APPROXIMATE.
9. BASEMAP PROVIDED BY PASSERO ASSOCIATES, DATED 10.1.2008, DRAWING ALTA/ACSM LAND AND TITLE SURVEY.

0 60' 120'

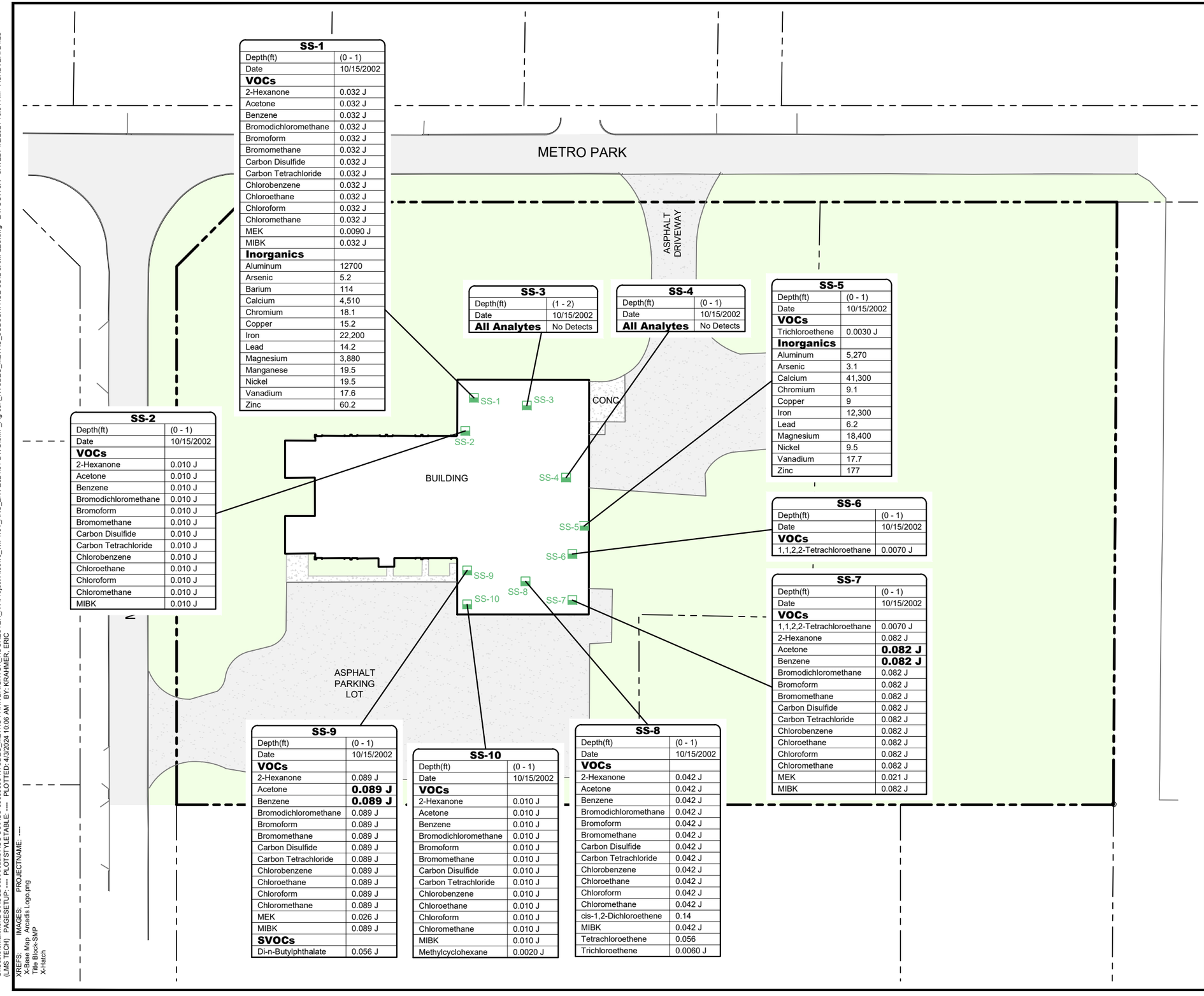
GRAPHIC SCALE

NYSDEC SITE # 828150
235 METRO PARK BRIGHTON SITE
ROCHESTER, NEW YORK
SITE MANAGEMENT PLAN

DETECTED SURFACE SOIL ANALYTICAL RESULTS

ARCADIS

FIGURE 7



SS-1	
Depth(ft)	(0 - 1)
Date	10/15/2002
VOCs	
2-Hexanone	0.032 J
Acetone	0.032 J
Benzene	0.032 J
Bromodichloromethane	0.032 J
Bromoform	0.032 J
Bromomethane	0.032 J
Carbon Disulfide	0.032 J
Carbon Tetrachloride	0.032 J
Chlorobenzene	0.032 J
Chloroethane	0.032 J
Chloroform	0.032 J
Chloromethane	0.032 J
MEK	0.0090 J
MIBK	0.032 J
Inorganics	
Aluminum	12700
Arsenic	5.2
Barium	114
Calcium	4,510
Chromium	18.1
Copper	15.2
Iron	22,200
Lead	14.2
Magnesium	3,880
Manganese	19.5
Nickel	19.5
Vanadium	17.6
Zinc	60.2

SS-2	
Depth(ft)	(0 - 1)
Date	10/15/2002
VOCs	
2-Hexanone	0.010 J
Acetone	0.010 J
Benzene	0.010 J
Bromodichloromethane	0.010 J
Bromoform	0.010 J
Bromomethane	0.010 J
Carbon Disulfide	0.010 J
Carbon Tetrachloride	0.010 J
Chlorobenzene	0.010 J
Chloroethane	0.010 J
Chloroform	0.010 J
Chloromethane	0.010 J
MIBK	0.010 J

SS-3	
Depth(ft)	(1 - 2)
Date	10/15/2002
All Analytes	No Detects

SS-4	
Depth(ft)	(0 - 1)
Date	10/15/2002
All Analytes	No Detects

SS-5	
Depth(ft)	(0 - 1)
Date	10/15/2002
VOCs	
Trichloroethene	0.0030 J
Inorganics	
Aluminum	5,270
Arsenic	3.1
Calcium	41,300
Chromium	9.1
Copper	9
Iron	12,300
Lead	6.2
Magnesium	18,400
Nickel	9.5
Vanadium	17.7
Zinc	177

SS-6	
Depth(ft)	(0 - 1)
Date	10/15/2002
VOCs	
1,1,2,2-Tetrachloroethane	0.0070 J

SS-7	
Depth(ft)	(0 - 1)
Date	10/15/2002
VOCs	
1,1,2,2-Tetrachloroethane	0.0070 J
2-Hexanone	0.082 J
Acetone	**0.082 J**
Benzene	**0.082 J**
Bromodichloromethane	0.082 J
Bromoform	0.082 J
Bromomethane	0.082 J
Carbon Disulfide	0.082 J
Carbon Tetrachloride	0.082 J
Chlorobenzene	0.082 J
Chloroethane	0.082 J
Chloroform	0.082 J
Chloromethane	0.082 J
MEK	0.021 J
MIBK	0.082 J

SS-8	
Depth(ft)	(0 - 1)
Date	10/15/2002
VOCs	
2-Hexanone	0.042 J
Acetone	0.042 J
Benzene	0.042 J
Bromodichloromethane	0.042 J
Bromoform	0.042 J
Bromomethane	0.042 J
Carbon Disulfide	0.042 J
Carbon Tetrachloride	0.042 J
Chlorobenzene	0.042 J
Chloroethane	0.042 J
Chloroform	0.042 J
Chloromethane	0.042 J
cis-1,2-Dichloroethene	0.14
MIBK	0.042 J
Tetrachloroethene	0.056
Trichloroethene	0.0060 J

SS-9	
Depth(ft)	(0 - 1)
Date	10/15/2002
VOCs	
2-Hexanone	0.089 J
Acetone	**0.089 J**
Benzene	**0.089 J**
Bromodichloromethane	0.089 J
Bromoform	0.089 J
Bromomethane	0.089 J
Carbon Disulfide	0.089 J
Carbon Tetrachloride	0.089 J
Chlorobenzene	0.089 J
Chloroethane	0.089 J
Chloroform	0.089 J
Chloromethane	0.089 J
MEK	0.026 J
MIBK	0.089 J
SVOCs	
Di-n-Butylphthalate	0.056 J

SS-10	
Depth(ft)	(0 - 1)
Date	10/15/2002
VOCs	
2-Hexanone	0.010 J
Acetone	0.010 J
Benzene	0.010 J
Bromodichloromethane	0.010 J
Bromoform	0.010 J
Bromomethane	0.010 J
Carbon Disulfide	0.010 J
Carbon Tetrachloride	0.010 J
Chlorobenzene	0.010 J
Chloroethane	0.010 J
Chloroform	0.010 J
Chloromethane	0.010 J
MIBK	0.010 J
Methylcyclohexane	0.0020 J

LEGEND:

- PROPERTY BOUNDARY
- TAX PARCEL BOUNDARY
- BUILDING FOOTPRINT
- SUB-SLAB SAMPLE
- GRASS AREA
- BUILDING
- ASPHALT PAVED AREA
- CONCRETE AREA

NOTES:

1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER KILOGRAM (mg/kg).
2. J – QUALIFIER INDICATES ESTIMATED VALUE.
3. BOLD CONCENTRATIONS EXCEED 6NYCRR PART 375 SOIL CLEANUP OBJECTIVES FOR PROTECTION OF GROUNDWATER.
4. GRAY SHADED CONCENTRATIONS EXCEED 6NYCRR PART 375 COMMERCIAL USE SOIL CLEANUP OBJECTIVES.
5. THE LOCATION FOR SUB-SLAB SAMPLE SS-11 IS UNKNOWN. PLEASE REFER TO SMP TABLE 3 FOR THE ANALYTICAL DATA.
6. ABBREVIATIONS:
   - 6.1. MEK – METHYL ETHYL KETONE (MEK, 2-BUTANONE)
   - 6.2. MIBK – METHYL ISOBUTYL KETONE (MIBK, 4-METHYL-2-PENTANONE)
   - 6.3. SVOCs – SEMI-VOLATILE ORGANIC COMPOUNDS
   - 6.4. VOCs – VOLATILE ORGANIC COMPOUNDS
7. ALL LOCATIONS ARE APPROXIMATE.
8. BASEMAP PROVIDED BY PASSERO ASSOCIATES, DATED 10.1.2008, DRAWING ALTA/ACSM LAND AND TITLE SURVEY.

0 60' 120'

GRAPHIC SCALE

NYSDEC SITE # 828150
235 METRO PARK BRIGHTON SITE
ROCHESTER, NEW YORK
SITE MANAGEMENT PLAN

DETECTED SUBSURFACE SOIL ANALYTICAL RESULTS - SUB-SLAB SAMPLE LOCATIONS

ARCADIS

FIGURE
8a

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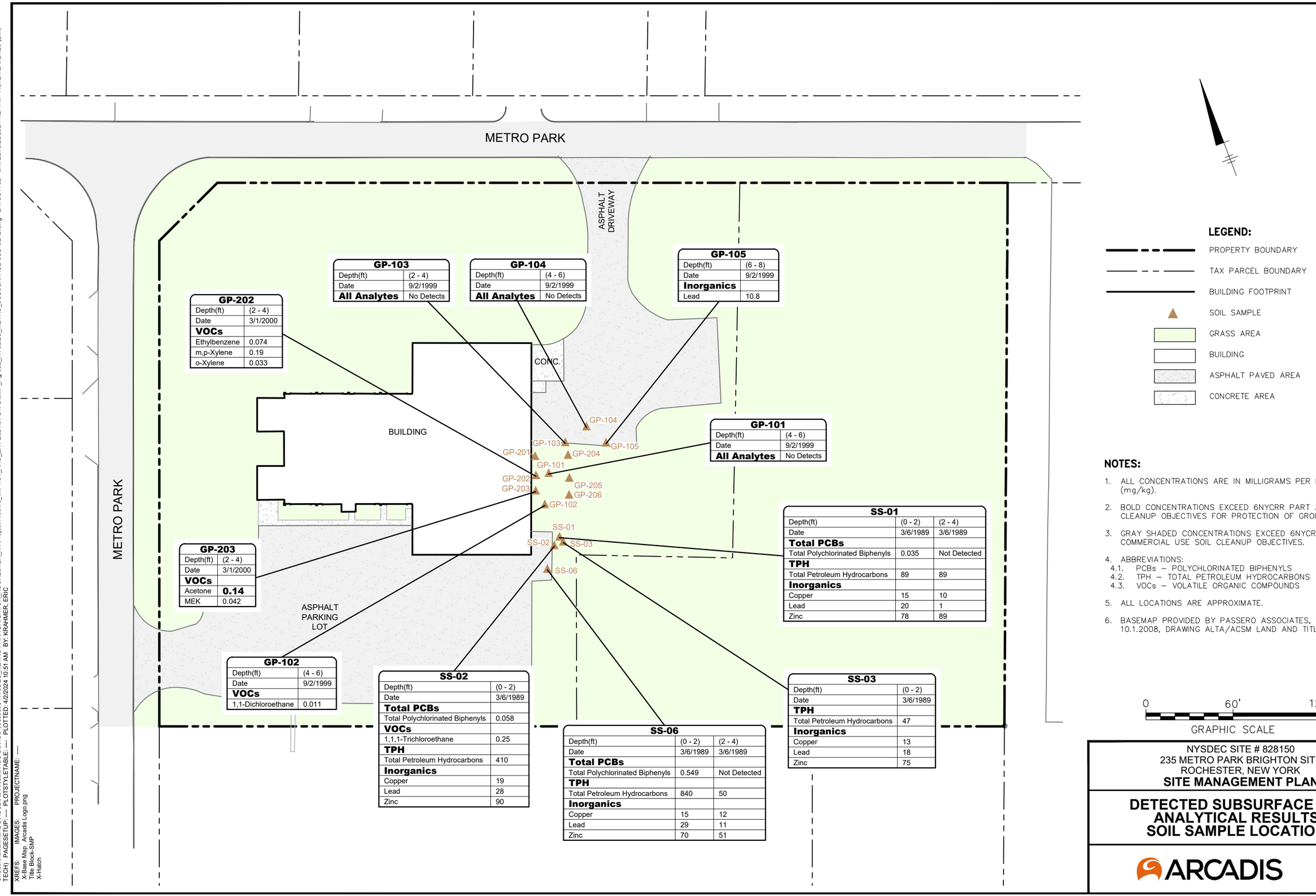
X-Base Map Arcadis Logo.png
Title Block-SMP
X-Hatch



NOTES:

1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER KILOGRAM (mg/kg).
2. BOLD CONCENTRATIONS EXCEED 6NYCRR PART 375 SOIL CLEANUP OBJECTIVES FOR PROTECTION OF GROUNDWATER.
3. GRAY SHADED CONCENTRATIONS EXCEED 6NYCRR PART 375 COMMERCIAL USE SOIL CLEANUP OBJECTIVES.
4. ABBREVIATIONS:
   - 4.1. PCBs – POLYCHLORINATED BIPHENYLS
   - 4.2. TPH – TOTAL PETROLEUM HYDROCARBONS
   - 4.3. VOCs – VOLATILE ORGANIC COMPOUNDS
5. ALL LOCATIONS ARE APPROXIMATE.
6. BASEMAP PROVIDED BY PASSERO ASSOCIATES, DATED 10.1.2008, DRAWING ALTA/ACSM LAND AND TITLE SURVEY.

NYSDEC SITE # 828150
235 METRO PARK BRIGHTON SITE
ROCHESTER, NEW YORK
SITE MANAGEMENT PLAN

DETECTED SUBSURFACE SOIL ANALYTICAL RESULTS - SOIL SAMPLE LOCATIONS

ARCADIS

FIGURE
8b

C:\Users\ekrahmer\DOCACCDocs\Arcadis ACC US\AUS-99999999-NYSDEC_METRO PARK BRIGHTON_ROCHESTER_NY\Project Files\10_WIP\10T_ARC_ENV\2024\01-DWG\SMP_Fig 08B_NYSDEC_METRO_SUBSURFACE SUB-SLAB.dwg LAYOUT: 8B SAVED: 3/28/2024 4:27 PM ACADVER: 24.2S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 4/2/2024 10:51 AM BY: KRAHMER, ERIC
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IMAGES:
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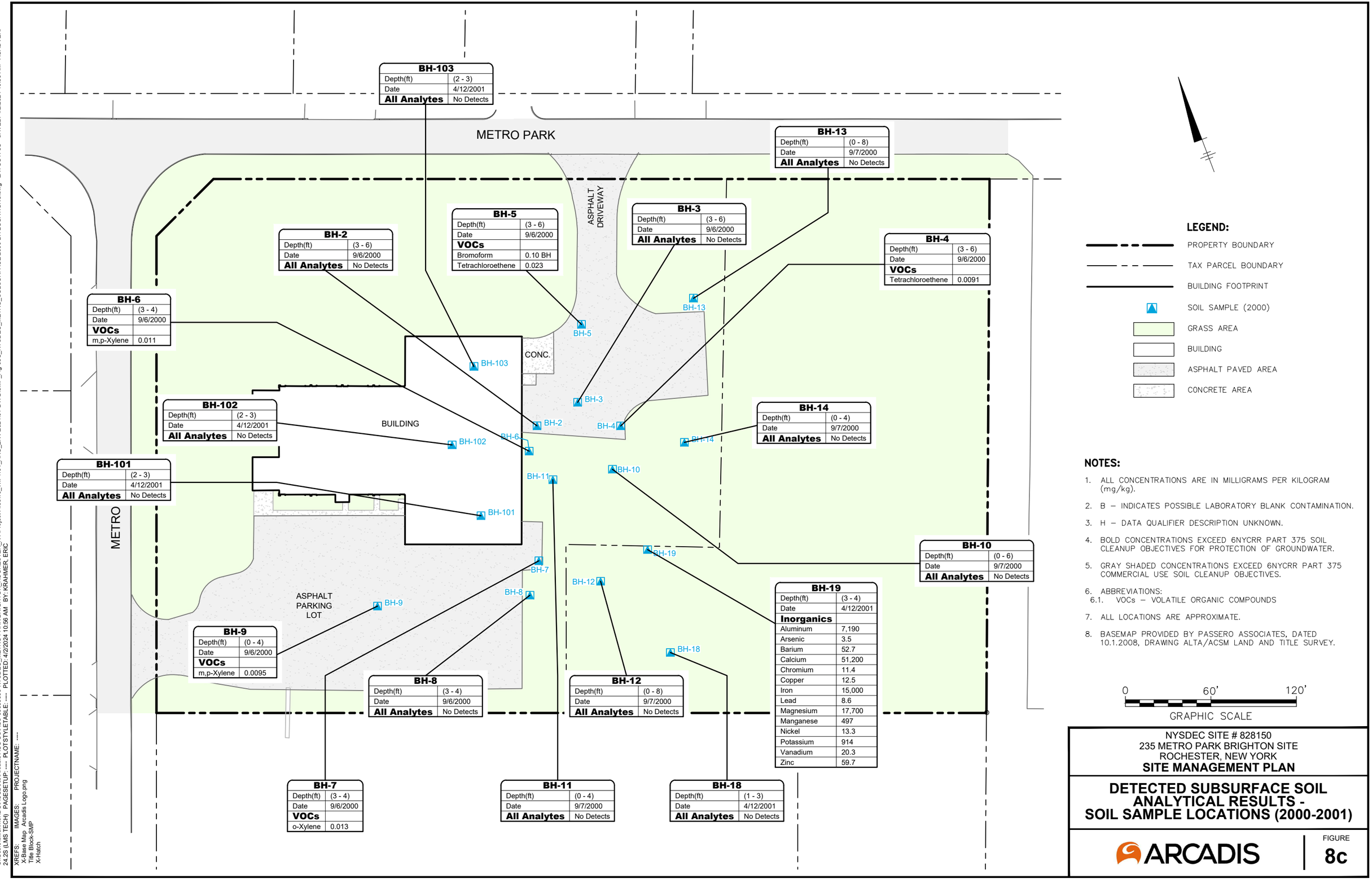

NYSDEC SITE # 828150
235 METRO PARK BRIGHTON SITE
ROCHESTER, NEW YORK
SITE MANAGEMENT PLAN

DETECTED SUBSURFACE SOIL ANALYTICAL RESULTS - SOIL SAMPLE LOCATIONS (2000-2001)

ARCADIS

FIGURE
8c

C:\Users\ekrahmer\DOCACCDocs\Arcadis ACC US\AUS-99999999-NYSDEC_METRO PARK BRIGHTON_ROCHESTER_NY\Project Files\10_WIP\10T_ARC_ENV\2024\01-DWG\SMP_Fig 08C_NYSDEC_METRO_SUBSURFACE 2000 BH LOCATIONS.dwg LAYOUT: 8C SAVED: 4/2/2024 10:55 AM ACADVER: 24.2S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: ---- PLOTTED: 4/2/2024 10:56 AM BY: KRAHMER, ERIC
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BH-3

Depth(ft)	(12 - 14)
Date	10/9/2002
Inorganics	
Aluminum	5,870
Arsenic	2.3
Barium	56.4
Calcium	57,500
Chromium	10.8
Copper	10.8
Iron	13,500
Lead	7.3
Magnesium	17,400
Manganese	421
Nickel	12.2
Potassium	1,120
Vanadium	18.4
Zinc	50.8

BH-4

Depth(ft)	(11 - 12)
Date	10/9/2002
VOCs	
1,1,2-trichloro-1,2,2-trifluoroethane	0.01
MEK	0.011

BH-6

Depth(ft)	(12 - 13)
Date	10/9/2002
VOCs	
1,1,2,2-Tetrachloroethane	0.0070 J
Acetone	0.012 J
Tetrachloroethene	0.056

BH-8

Depth(ft)	(8 - 11)
Date	10/9/2002
VOCs	
Tetrachloroethene	0.056
Trichloroethene	0.0040 J

BH-9

Depth(ft)	(19 - 22)
Date	10/9/2002
VOCs	
Inorganics	
Aluminum	3,470
Arsenic	2.10 B
Barium	36.5 B
Calcium	60,200
Chromium	8.2
Copper	8.9
Iron	10,400
Lead	6.8
Magnesium	20,800
Manganese	356
Nickel	7.90 B
Potassium	903
Vanadium	14.3
Zinc	32.2

BH-14

Depth(ft)	(4 - 5)
Date	10/10/2002
VOCs	
Methylene Chloride	0.0040 J
SVOCs	
Di-n-Butylphthalate	0.068 J
Inorganics	
Aluminum	6,170
Arsenic	2.6
Barium	52.5
Calcium	65,100
Chromium	10.9
Copper	10.2
Iron	13,900
Lead	6.7
Magnesium	19,200
Manganese	407
Nickel	11.5
Potassium	1,150
Vanadium	20.4
Zinc	60

BH-1

Depth(ft)	(4 - 6)
Date	10/9/2002
Inorganics	
Aluminum	4,750
Arsenic	3.3
Barium	39.5 B
Calcium	53,100
Chromium	8.3
Copper	10.7
Iron	13,000
Lead	10.7
Magnesium	18,400
Manganese	303
Nickel	8.70 B
Potassium	732 B
Vanadium	17.6
Zinc	65.6

BH-5

Depth(ft)	(4 - 5)
Date	10/9/2002
All Analytes	No Detects

BH-7

Depth(ft)	(11 - 15)
Date	10/9/2002
VOCs	
1,1,2,2-Tetrachloroethane	0.0070 J

BH-13

Depth(ft)	(19 - 20)
Date	10/10/2002
VOCs	
Acetone	0.013 J

BH-2

Depth(ft)	(4 - 6)
Date	10/9/2002
All Analytes	No Detects

BH-10

Depth(ft)	(10 - 11)
Date	10/10/2002
VOCs	
Acetone	0.012 J
Methylcyclohexane	0.0020 J

BH-15

Depth(ft)	(29 - 30)
Date	10/10/2002
VOCs	
Acetone	0.010 J

BH-12

Depth(ft)	(8 - 9)
Date	10/10/2002
VOCs	
1,1,1-Trichloroethane	0.0050 J
1,1-Dichloroethene	0.0020 J

BH-18

Depth(ft)	(3 - 4)
Date	10/10/2002
VOCs	
Acetone	0.0090 J

BH-16

Depth(ft)	(4 - 5)
Date	10/10/2002
SVOCs	
Di-n-Butylphthalate	0.040 J
Inorganics	
Aluminum	5,060
Arsenic	**39.5**
Barium	59.5
Calcium	59,300
Chromium	9.1
Copper	11
Iron	12,000
Lead	7.7
Magnesium	16,600
Manganese	490
Nickel	11.7
Potassium	784 B
Vanadium	16.5
Zinc	45.7

BH-11

Depth(ft)	(4 - 5)
Date	10/10/2002
VOCs	
Methylene Chloride	0.0040 J

BH-17

Depth(ft)	(3 - 4)
Date	10/10/2002
VOCs	
Tetrachloroethene	0.0040 J

BH-20

Depth(ft)	(3 - 4)
Date	10/10/2002
All Analytes	No Detects

BH-30

Depth(ft)	(5 - 6)
Date	10/10/2002
All Analytes	No Detects

BH-27

Depth(ft)	(1 - 2)
Date	10/10/2002
VOCs	
Acetone	0.019 J

BH-19

Depth(ft)	(3 - 4)
Date	10/10/2002
Inorganics	
Aluminum	7,190
Arsenic	3.5
Barium	52.7
Calcium	51,200
Chromium	11.4
Copper	12.5
Iron	15,000
Lead	8.6
Magnesium	17,700
Manganese	497
Nickel	13.3
Potassium	914
Vanadium	20.3
Zinc	59.7

BH-21

Depth(ft)	(4 - 5)
Date	10/10/2002
All Analytes	No Detects

BH-22

Depth(ft)	(4 - 5)
Date	10/10/2002
VOCs	
Acetone	0.010 J
Toluene	0.0040 J

BH-26

Depth(ft)	(2 - 3)	(7 - 8)	(9 - 10)
Date	10/10/2002	10/10/2002	10/10/2002
VOCs			
Acetone	0.019 J	Not Detected	Not Detected
cis-1,2-Dichloroethene	Not Detected	0.026	0.015
Trichloroethene	Not Detected	Not Detected	0.0090 J

BH-28

Depth(ft)	(2 - 3)
Date	10/10/2002
VOCs	
Acetone	**0.12 B**
MEK	0.034 J

BH-23

Depth(ft)	(11 - 12)
Date	10/10/2002
VOCs	
Acetone	0.022 J
Toluene	0.011 J

BH-29

Depth(ft)	(1 - 2)
Date	10/10/2002
VOCs	
Acetone	0.012 J

BH-25

Depth(ft)	(2 - 3)
Date	10/10/2002
VOCs	
Acetone	0.015 J

BH-24

Depth(ft)	(3 - 4)
Date	10/10/2002
VOCs	
Acetone	0.022 J

BH-1 BH-2 BH-3 BH-4 BH-5 BH-6 BH-7 BH-8 BH-9 BH-10 BH-11 BH-12 BH-13 BH-14 BH-15 BH-16 BH-17 BH-18 BH-19 BH-20 BH-21 BH-22 BH-23 BH-24 BH-25 BH-26 BH-27 BH-28 BH-29 BH-30

ASPHALT DRIVEWAY
CONC.
BUILDING
METRO PARK
ASPHALT PARKING LOT
ELEC. TRANS.

LEGEND:

- PROPERTY BOUNDARY
- TAX PARCEL BOUNDARY
- BUILDING FOOTPRINT
- SOIL SAMPLE (2002)
- GRASS AREA
- BUILDING
- ASPHALT PAVED AREA
- CONCRETE AREA

NOTES:

1. ALL CONCENTRATIONS ARE IN MILLIGRAMS PER KILOGRAM (mg/kg).
2. B – INDICATES POSSIBLE LABORATORY BLANK CONTAMINATION.
3. J – QUALIFIER INDICATES ESTIMATED VALUE.
4. BOLD CONCENTRATIONS EXCEED 6NYCRR PART 375 SOIL CLEANUP OBJECTIVES FOR PROTECTION OF GROUNDWATER.
5. GRAY SHADED CONCENTRATIONS EXCEED 6NYCRR PART 375 COMMERCIAL USE SOIL CLEANUP OBJECTIVES.
6. ABBREVIATIONS:
   - 6.1. MEK – METHYL ETHYL KETONE (MEK, 2–BUTANONE)
   - 6.2. SVOCs – SEMI–VOLATILE ORGANIC COMPOUNDS
   - 6.3. VOCs –VOLATILE ORGANIC COMPOUNDS
7. ALL LOCATIONS ARE APPROXIMATE.
8. BASEMAP PROVIDED BY PASSERO ASSOCIATES, DATED 10.1.2008, DRAWING ALTA/ACSM LAND AND TITLE SURVEY.

0 60' 120'

GRAPHIC SCALE

NYSDEC SITE # 828150
235 METRO PARK BRIGHTON SITE
ROCHESTER, NEW YORK
SITE MANAGEMENT PLAN

DETECTED SUBSURFACE SOIL ANALYTICAL RESULTS - SOIL SAMPLE LOCATIONS (2002)

ARCADIS

FIGURE **8d**

MW-04D	
Date	8/13/2024
VOCs (µg/L)	
1,1,1-Trichloroethane	2.3 J
1,1-Dichloroethane	53
1,1-Dichloroethene	14
cis-1,2-Dichloroethene	480
Tetrachloroethene	2.3 J
Toluene	0.54 J
trans-1,2-Dichloroethene	4.2
Trichloroethene	400
Vinyl chloride	23
Biogeochemical	
Alkalinity (as CaCO3) (mg/L)	146
Ethane (µg/L)	1.3 J
Methane (µg/L)	49
Sulfate (mg/L)	80.9
Total Organic Carbon (mg/L)	4.2

MW-14S	
Date	8/12/2024
VOCs (µg/L)	
1,1,1-Trichloroethane	3.6
1,1-Dichloroethane	6.3
1,1-Dichloroethene	13
cis-1,2-Dichloroethene	5.9
Methyl-tert-butylether	0.26 J
trans-1,2-Dichloroethene	0.38 J
Vinyl chloride	0.29 J
Biogeochemical	
Alkalinity (as CaCO3) (mg/L)	287
Iron (total) (mg/L)	240
Methane (µg/L)	3.6 J
Nitrate-N (mg/L)	0.3 J
Sulfate (mg/L)	81.5
Total Organic Carbon (mg/L)	2.0

MW-12S	
Date	8/14/2024
All Analytes	No Detects

MW-20	
Date	8/13/2024
VOCs (µg/L)	
cis-1,2-Dichloroethene	4.7
Tetrachloroethene	1200 DJ
Trichloroethene	22
Biogeochemical	
Alkalinity (as CaCO3) (mg/L)	472
Methane (µg/L)	6.0
Total Organic Carbon (mg/L)	1.0

MW-10	
Date	8/12/2024
VOCs (µg/L)	
1,4-Dichlorobenzene	0.20 J
cis-1,2-Dichloroethene	4.1
Tetrachloroethene	62
Trichloroethene	5.8
Biogeochemical	
Alkalinity (as CaCO3) (mg/L)	417
Iron (total) (mg/L)	260
Nitrate-N (mg/L)	0.3 J
Sulfate (mg/L)	77
Total Organic Carbon (mg/L)	2.6

MW-06	
Date	8/13/2024
VOCs (µg/L)	
1,1,1-Trichloroethane	0.56 J
Tetrachloroethene	0.73 J
Biogeochemical	
Alkalinity (as CaCO3) (mg/L)	272
Nitrate-N (mg/L)	3.2
Sulfate (mg/L)	59.7
Total Organic Carbon (mg/L)	1.6

MW-13S	
Date	8/12/2024
VOCs (µg/L)	
1,4-Dichlorobenzene	0.21 J
Trichloroethene	0.84 J
Biogeochemical	
Alkalinity (as CaCO3) (mg/L)	515
Iron (total) (mg/L)	140
Nitrate-N (mg/L)	0.5 J
Sulfate (mg/L)	143
Total Organic Carbon (mg/L)	1.2

MW-19	
Date	8/13/2024
VOCs (µg/L)	
cis-1,2-Dichloroethene	1.9
Trichloroethene	0.55 J
Biogeochemical	
Alkalinity (as CaCO3) (mg/L)	326
Iron (dissolved) (mg/L)	1,200
Iron (total) (mg/L)	1,400
Methane (µg/L)	20
Sulfate (mg/L)	27.3
Total Organic Carbon (mg/L)	14.8

MW-02	
Date	8/14/2024
All Analytes	No Detects

MW-16I	
Date	8/14/2024
VOCs (µg/L)	
1,1-Dichloroethane	0.46 J
cis-1,2-Dichloroethene	2.8
Biogeochemical	
Alkalinity (as CaCO3) (mg/L)	257
Iron (total) (mg/L)	500
Nitrate-N (mg/L)	0.3 J
Sulfate (mg/L)	35.0
Total Organic Carbon (mg/L)	2.3

MW-16S	
Date	8/13/2024
VOCs (µg/L)	
1,1-Dichloroethane	29
1,1-Dichloroethene	4.8
Benzene	0.52 J
cis-1,2-Dichloroethene	310
Methyl-tert-butylether	0.91 J
trans-1,2-Dichloroethene	8.2
Trichloroethene	23
Vinyl chloride	68
Biogeochemical	
Alkalinity (as CaCO3) (mg/L)	401
Ethane (µg/L)	0.94 J
Iron (total) (mg/L)	480
Methane (µg/L)	120
Sulfate (mg/L)	96.5
Total Organic Carbon (mg/L)	3.9

MW-17S	
Date	8/14/2024
All Analytes	No Detects

MW-05	
Date	8/13/2024
VOCs (µg/L)	
1,1-Dichloroethane	1.3
1,1-Dichloroethene	0.26 J
cis-1,2-Dichloroethene	0.58 J
Methyl-tert-butylether	0.34 J
Biogeochemical	
Alkalinity (as CaCO3) (mg/L)	414
Iron (dissolved) (mg/L)	330
Iron (total) (mg/L)	480
Methane (µg/L)	9.8
Sulfate (mg/L)	136
Total Organic Carbon (mg/L)	2.3

MW-04S	
Date	8/12/2024
VOCs (µg/L)	
1,1,1-Trichloroethane	17
1,1-Dichloroethane	67
1,1-Dichloroethene	43
cis-1,2-Dichloroethene	2,200 DJ
trans-1,2-Dichloroethene	12
Trichloroethene	580
Vinyl chloride	82
Biogeochemical	
Alkalinity (as CaCO3) (mg/L)	322
Ethane (µg/L)	3.2 J
Iron (total) (mg/L)	5,400
Methane (µg/L)	140
Sulfate (mg/L)	101
Total Organic Carbon (mg/L)	3.4

MW-15S	
Date	8/13/2024
VOCs (µg/L)	
1,1,1-Trichloroethane	0.93 J
1,1-Dichloroethane	12
1,1-Dichloroethene	1.1
cis-1,2-Dichloroethene	60
trans-1,2-Dichloroethene	4.5
Trichloroethene	18
Vinyl chloride	4.4
Biogeochemical	
Alkalinity (as CaCO3) (mg/L)	295
Iron (total) (mg/L)	100
Methane (µg/L)	12
Sulfate (mg/L)	33.6
Total Organic Carbon (mg/L)	3.0

METRO PARK

METRO PARK

ASPHALT DRIVEWAY

ASPHALT PARKING LOT

BUILDING

CONC.

ELEC. TRANS.

MW-01 MW-02 MW-03 MW-04D MW-04S MW-05 MW-06 MW-07 MW-08 MW-09 MW-10 MW-11S MW-12D MW-12S MW-13D MW-13S MW-14S MW-15S MW-16I MW-16S MW-17D MW-17S MW-18 MW-19 MW-20

LEGEND:

- PROPERTY BOUNDARY
- TAX PARCEL BOUNDARY
- BUILDING FOOTPRINT
- MONITORING WELL LOCATION
- GRASS AREA
- BUILDING
- ASPHALT PAVED AREA
- CONCRETE AREA

NOTES:

1. CONCENTRATIONS ARE IN MILLIGRAMS PER LITER (mg/L) AND MICROGRAMS PER LITER (µg/L), AS NOTED.
2. GRAY SHADED CONCENTRATIONS EXCEED THE NYSDEC TOGS 1.1.1 WATER QUALITY STANDARD OR GUIDANCE VALUE.
3. ABBREVIATIONS:
   - D – COMPOUND QUANTITATED UTILIZING A SECONDARY DILUTION
   - J – QUALIFIER INDICATES ESTIMATED VALUE
   - MIBK – METHYL ISOBUTYL KETONE (MIBK, 4–METHYL–2–PENTANONE)
   - VOCs – VOLATILE ORGANIC COMPOUNDS
5. MONITORING WELL LOCATIONS BASED ON OCTOBER 21, 2020 SURVEY COMPLETED BY FISHER ASSOCIATES. ALL OTHER LOCATIONS ARE APPROXIMATE.
6. BASEMAP PROVIDED BY PASSERO ASSOCIATES, DATED 10.1.2008, DRAWING ALTA/ACSM LAND AND TITLE SURVEY.

0 60' 120'

GRAPHIC SCALE

NYSDEC SITE # 828150
235 METRO PARK BRIGHTON SITE
ROCHESTER, NEW YORK
SITE MANAGEMENT PLAN

DETECTED GROUNDWATER ANALYTICAL RESULTS - AUGUST 2024

ARCADIS

FIGURE 9

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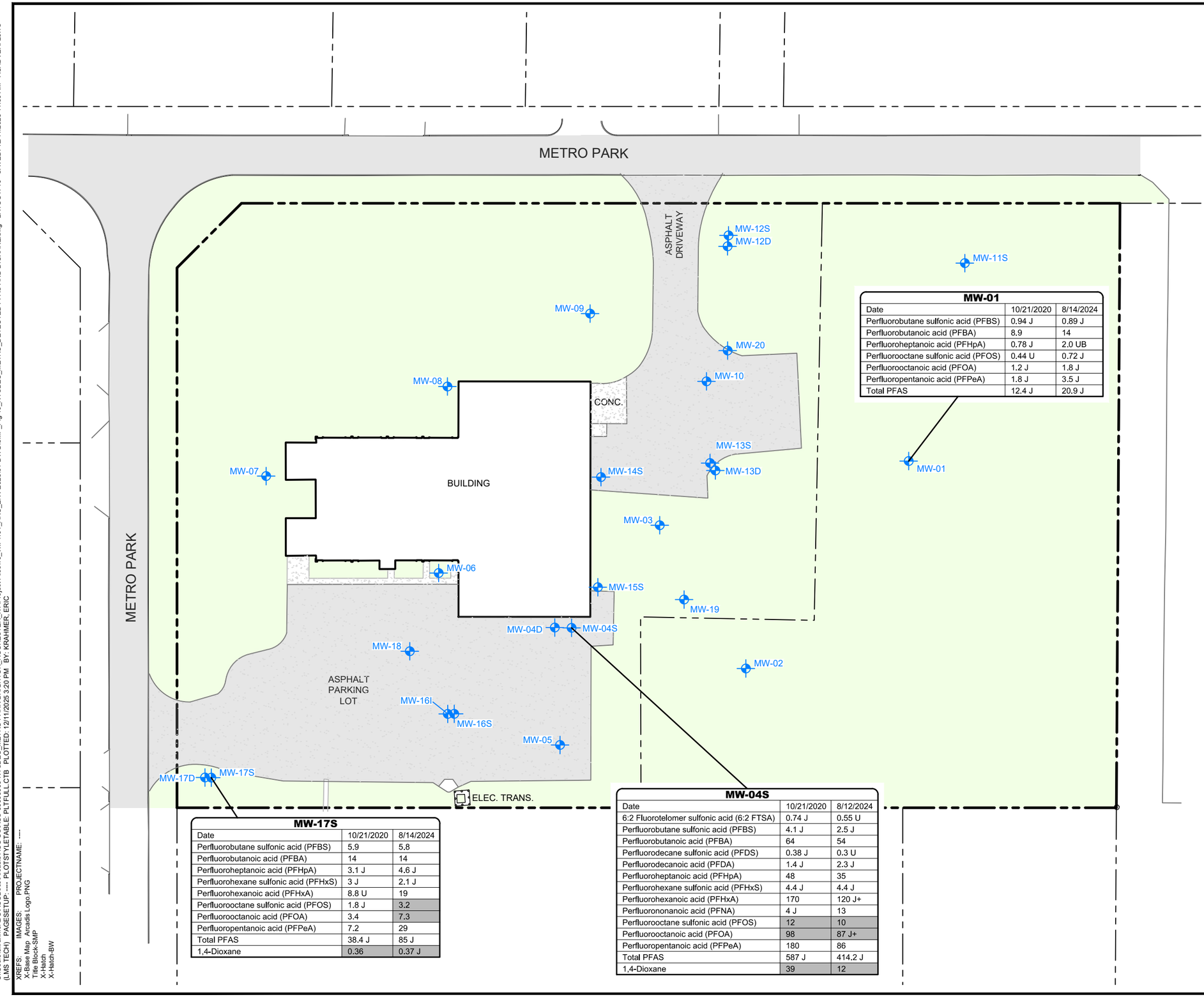


MW-01		
Date	10/21/2020	8/14/2024
Perfluorobutane sulfonic acid (PFBS)	0.94 J	0.89 J
Perfluorobutanoic acid (PFBA)	8.9	14
Perfluoroheptanoic acid (PFHpA)	0.78 J	2.0 UB
Perfluorooctane sulfonic acid (PFOS)	0.44 U	0.72 J
Perfluorooctanoic acid (PFOA)	1.2 J	1.8 J
Perfluoropentanoic acid (PFPeA)	1.8 J	3.5 J
Total PFAS	12.4 J	20.9 J

MW-17S		
Date	10/21/2020	8/14/2024
Perfluorobutane sulfonic acid (PFBS)	5.9	5.8
Perfluorobutanoic acid (PFBA)	14	14
Perfluoroheptanoic acid (PFHpA)	3.1 J	4.6 J
Perfluorohexane sulfonic acid (PFHxS)	3 J	2.1 J
Perfluorohexanoic acid (PFHxA)	8.8 U	19
Perfluorooctane sulfonic acid (PFOS)	1.8 J	3.2
Perfluorooctanoic acid (PFOA)	3.4	7.3
Perfluoropentanoic acid (PFPeA)	7.2	29
Total PFAS	38.4 J	85 J
1,4-Dioxane	0.36	0.37 J

MW-04S		
Date	10/21/2020	8/12/2024
6:2 Fluorotelomer sulfonic acid (6:2 FTSA)	0.74 J	0.55 U
Perfluorobutane sulfonic acid (PFBS)	4.1 J	2.5 J
Perfluorobutanoic acid (PFBA)	64	54
Perfluorodecane sulfonic acid (PFDS)	0.38 J	0.3 U
Perfluorodecanoic acid (PFDA)	1.4 J	2.3 J
Perfluoroheptanoic acid (PFHpA)	48	35
Perfluorohexane sulfonic acid (PFHxS)	4.4 J	4.4 J
Perfluorohexanoic acid (PFHxA)	170	120 J+
Perfluorononanoic acid (PFNA)	4 J	13
Perfluorooctane sulfonic acid (PFOS)	12	10
Perfluorooctanoic acid (PFOA)	98	87 J+
Perfluoropentanoic acid (PFPeA)	180	86
Total PFAS	587 J	414.2 J
1,4-Dioxane	39	12

LEGEND:

- PROPERTY BOUNDARY
- TAX PARCEL BOUNDARY
- BUILDING OUTLINE
- MONITORING WELL LOCATION
- GRASS AREA
- BUILDING
- ASPHPALT PAVED AREA
- CONCRETE AREA

NOTES:

1. PFAS CONCENTRATIONS ARE IN NANOGRAMS PER LITER (ng/L). 1,4–DIOXANE CONCENTRATIONS ARE IN MICROGRAMS PER LITER (µg/L).
2. ABBREVIATIONS:
   - B = QUALIFIER INDICATES THE ANALYTE WAS ALSO DETECTED IN THE ASSOCIATED METHOD BLANK
   - J = QUALIFIER INDICATES AS ESTIMATED VALUE
   - J+ = QUALIFIER INDICATES THAT THE RESULT IS AN ESTIMATED QUANTITY, BUT THE RESULT MAY BE BIASED HIGH
   - U = QUALIFIER INDICATES THE COMPOUND WAS ANALYZED FOR BUT NOT DETECTED. THE ASSOCIATED VALUE IS THE COMPOUND QUANTITATION LIMIT
3. GRAY SHADED CONCENTRATIONS EXCEED THE NYSDEC TOGS 1.1.1 WATER QUALITY STANDARD OR GUIDANCE VALUE.
4. MONITORING WELL LOCATIONS BASED ON OCTOBER 21, 2020 SURVEY COMPLETED BY FISHER ASSOCIATES. ALL OTHER LOCATIONS ARE APPROXIMATE.
5. BASEMAP PROVIDED BY PASSERO ASSOCIATES, DATED 10.1.2008, DRAWING ALTA/ACSM LAND AND TITLE SURVEY.

0 60' 120'

GRAPHIC SCALE

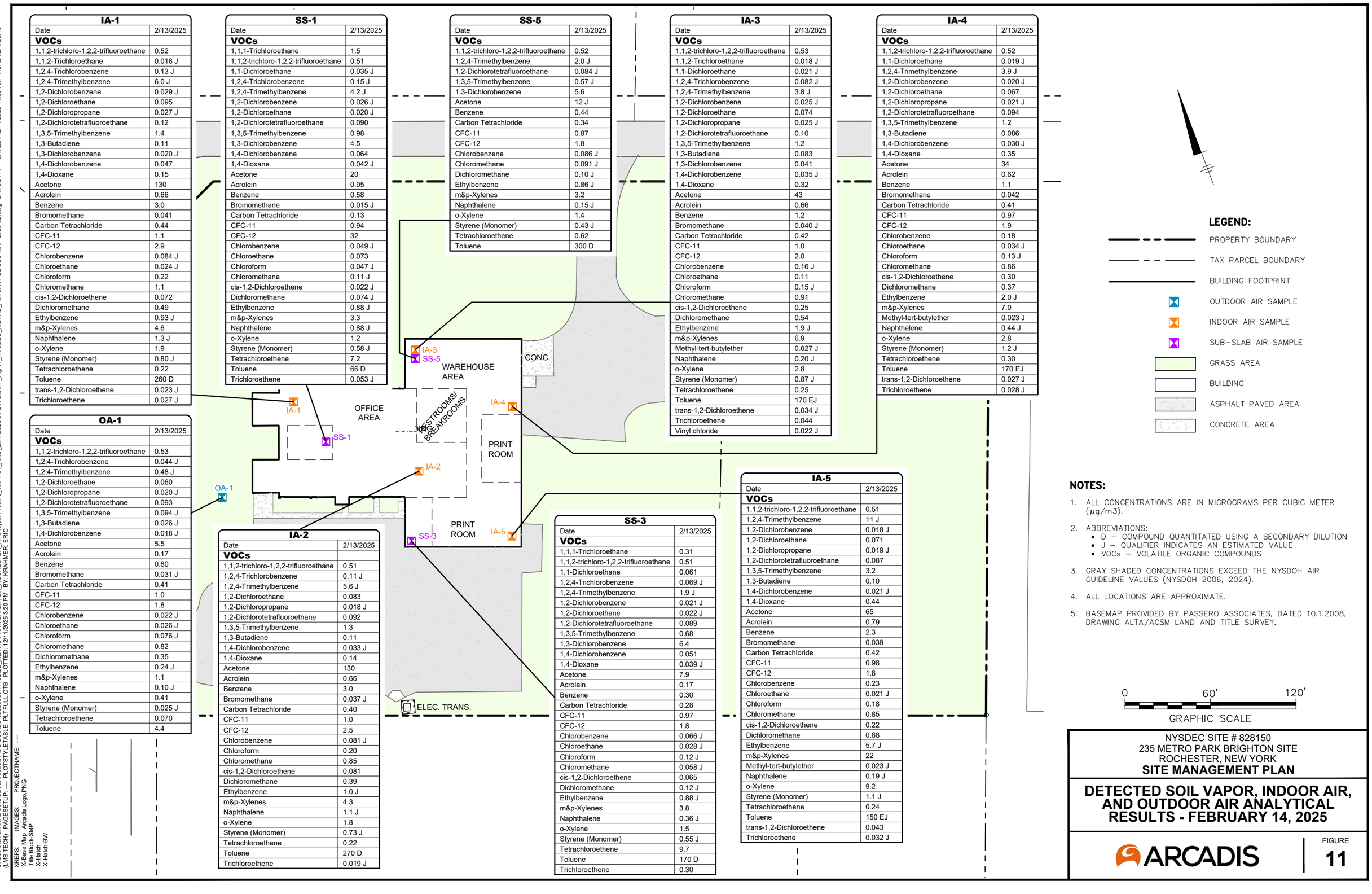
NYSDEC SITE # 828150
235 METRO PARK BRIGHTON SITE
ROCHESTER, NEW YORK
SITE MANAGEMENT PLAN

DETECTED PFAS and 1,4-DIOXANE ANALYTICAL RESULTS

ARCADIS

FIGURE
10

C:\Users\ekrahmer\DCACCDocs\Arcadis ACC US\AUS-99999999-NYSDEC_METRO PARK BRIGHTON_ROCHESTER_NY\Project Files\10_WIP\10T_ARC_ENV\2025\01-DWG\SMP_Fig 10_NYSDEC_METRO_DETECTED PFAS AND DIOXANE.dwg LAYOUT: 10 SAVED: 12/11/2025 11:30 AM ACADVER: 25.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 12/11/2025 3:20 PM BY: KRAHMER, ERIC
XREFS: IMAGES: PROJECTNAME: ----
X-Base Map Arcadis Logo.PNG
Title Block-SMP
X-Hatch
X-Hatch-BW



IA-1	
Date	2/13/2025
VOCs	
1,1,2-trichloro-1,2,2-trifluoroethane	0.52
1,1,2-Trichloroethane	0.016 J
1,2,4-Trichlorobenzene	0.13 J
1,2,4-Trimethylbenzene	6.0 J
1,2-Dichlorobenzene	0.029 J
1,2-Dichloroethane	0.095
1,2-Dichloropropane	0.027 J
1,2-Dichlorotetrafluoroethane	0.12
1,3,5-Trimethylbenzene	1.4
1,3-Butadiene	0.11
1,3-Dichlorobenzene	0.020 J
1,4-Dichlorobenzene	0.047
1,4-Dioxane	0.15
Acetone	130
Acrolein	0.66
Benzene	3.0
Bromomethane	0.041
Carbon Tetrachloride	0.44
CFC-11	1.1
CFC-12	2.9
Chlorobenzene	0.084 J
Chloroethane	0.024 J
Chloroform	0.22
Chloromethane	1.1
cis-1,2-Dichloroethene	0.072
Dichloromethane	0.49
Ethylbenzene	0.93 J
m&p-Xylenes	4.6
Naphthalene	1.3 J
o-Xylene	1.9
Styrene (Monomer)	0.80 J
Tetrachloroethene	0.22
Toluene	260 D
trans-1,2-Dichloroethene	0.023 J
Trichloroethene	0.027 J

OA-1	
Date	2/13/2025
VOCs	
1,1,2-trichloro-1,2,2-trifluoroethane	0.53
1,2,4-Trichlorobenzene	0.044 J
1,2,4-Trimethylbenzene	0.48 J
1,2-Dichloroethane	0.060
1,2-Dichloropropane	0.020 J
1,2-Dichlorotetrafluoroethane	0.093
1,3,5-Trimethylbenzene	0.094 J
1,3-Butadiene	0.026 J
1,4-Dichlorobenzene	0.018 J
Acetone	5.5
Acrolein	0.17
Benzene	0.80
Bromomethane	0.031 J
Carbon Tetrachloride	0.41
CFC-11	1.0
CFC-12	1.8
Chlorobenzene	0.022 J
Chloroethane	0.026 J
Chloroform	0.076 J
Chloromethane	0.82
Dichloromethane	0.35
Ethylbenzene	0.24 J
m&p-Xylenes	1.1
Naphthalene	0.10 J
o-Xylene	0.41
Styrene (Monomer)	0.025 J
Tetrachloroethene	0.070
Toluene	4.4

SS-1	
Date	2/13/2025
VOCs	
1,1,1-Trichloroethane	1.5
1,1,2-trichloro-1,2,2-trifluoroethane	0.51
1,1-Dichloroethane	0.035 J
1,2,4-Trichlorobenzene	0.15 J
1,2,4-Trimethylbenzene	4.2 J
1,2-Dichlorobenzene	0.026 J
1,2-Dichloroethane	0.020 J
1,2-Dichlorotetrafluoroethane	0.090
1,3,5-Trimethylbenzene	0.98
1,3-Dichlorobenzene	4.5
1,4-Dichlorobenzene	0.064
1,4-Dioxane	0.042 J
Acetone	20
Acrolein	0.95
Benzene	0.58
Bromomethane	0.015 J
Carbon Tetrachloride	0.13
CFC-11	0.94
CFC-12	32
Chlorobenzene	0.049 J
Chloroethane	0.073
Chloroform	0.047 J
Chloromethane	0.11 J
cis-1,2-Dichloroethene	0.022 J
Dichloromethane	0.074 J
Ethylbenzene	0.88 J
m&p-Xylenes	3.3
Naphthalene	0.88 J
o-Xylene	1.2
Styrene (Monomer)	0.58 J
Tetrachloroethene	7.2
Toluene	66 D
Trichloroethene	0.053 J

IA-2	
Date	2/13/2025
VOCs	
1,1,2-trichloro-1,2,2-trifluoroethane	0.51
1,2,4-Trichlorobenzene	0.11 J
1,2,4-Trimethylbenzene	5.6 J
1,2-Dichloroethane	0.083
1,2-Dichloropropane	0.018 J
1,2-Dichlorotetrafluoroethane	0.092
1,3,5-Trimethylbenzene	1.3
1,3-Butadiene	0.11
1,4-Dichlorobenzene	0.033 J
1,4-Dioxane	0.14
Acetone	130
Acrolein	0.66
Benzene	3.0
Bromomethane	0.037 J
Carbon Tetrachloride	0.40
CFC-11	1.0
CFC-12	2.5
Chlorobenzene	0.081 J
Chloroform	0.20
Chloromethane	0.85
cis-1,2-Dichloroethene	0.081
Dichloromethane	0.39
Ethylbenzene	1.0 J
m&p-Xylenes	4.3
Naphthalene	1.1 J
o-Xylene	1.8
Styrene (Monomer)	0.73 J
Tetrachloroethene	0.22
Toluene	270 D
Trichloroethene	0.019 J

SS-5	
Date	2/13/2025
VOCs	
1,1,2-trichloro-1,2,2-trifluoroethane	0.52
1,2,4-Trimethylbenzene	2.0 J
1,2-Dichlorotetrafluoroethane	0.084 J
1,3,5-Trimethylbenzene	0.57 J
1,3-Dichlorobenzene	5.6
Acetone	12 J
Benzene	0.44
Carbon Tetrachloride	0.34
CFC-11	0.87
CFC-12	1.8
Chlorobenzene	0.086 J
Chloromethane	0.091 J
Dichloromethane	0.10 J
Ethylbenzene	0.86 J
m&p-Xylenes	3.2
Naphthalene	0.15 J
o-Xylene	1.4
Styrene (Monomer)	0.43 J
Tetrachloroethene	0.62
Toluene	300 D

SS-3	
Date	2/13/2025
VOCs	
1,1,1-Trichloroethane	0.31
1,1,2-trichloro-1,2,2-trifluoroethane	0.51
1,1-Dichloroethane	0.061
1,2,4-Trichlorobenzene	0.069 J
1,2,4-Trimethylbenzene	1.9 J
1,2-Dichlorobenzene	0.021 J
1,2-Dichloroethane	0.022 J
1,2-Dichlorotetrafluoroethane	0.089
1,3,5-Trimethylbenzene	0.68
1,3-Dichlorobenzene	6.4
1,4-Dichlorobenzene	0.051
1,4-Dioxane	0.039 J
Acetone	7.9
Acrolein	0.17
Benzene	0.30
Carbon Tetrachloride	0.28
CFC-11	0.97
CFC-12	1.8
Chlorobenzene	0.066 J
Chloroethane	0.028 J
Chloroform	0.12 J
Chloromethane	0.058 J
cis-1,2-Dichloroethene	0.065
Dichloromethane	0.12 J
Ethylbenzene	0.88 J
m&p-Xylenes	3.8
Naphthalene	0.36 J
o-Xylene	1.5
Styrene (Monomer)	0.55 J
Tetrachloroethene	9.7
Toluene	170 D
Trichloroethene	0.30

IA-3	
Date	2/13/2025
VOCs	
1,1,2-trichloro-1,2,2-trifluoroethane	0.53
1,1,2-Trichloroethane	0.018 J
1,1-Dichloroethane	0.021 J
1,2,4-Trichlorobenzene	0.082 J
1,2,4-Trimethylbenzene	3.8 J
1,2-Dichlorobenzene	0.025 J
1,2-Dichloroethane	0.074
1,2-Dichloropropane	0.025 J
1,2-Dichlorotetrafluoroethane	0.10
1,3,5-Trimethylbenzene	1.2
1,3-Butadiene	0.083
1,3-Dichlorobenzene	0.041
1,4-Dichlorobenzene	0.035 J
1,4-Dioxane	0.32
Acetone	43
Acrolein	0.66
Benzene	1.2
Bromomethane	0.040 J
Carbon Tetrachloride	0.42
CFC-11	1.0
CFC-12	2.0
Chlorobenzene	0.16 J
Chloroethane	0.11
Chloroform	0.15 J
Chloromethane	0.91
cis-1,2-Dichloroethene	0.25
Dichloromethane	0.54
Ethylbenzene	1.9 J
m&p-Xylenes	6.9
Methyl-tert-butylether	0.027 J
Naphthalene	0.20 J
o-Xylene	2.8
Styrene (Monomer)	0.87 J
Tetrachloroethene	0.25
Toluene	170 EJ
trans-1,2-Dichloroethene	0.034 J
Trichloroethene	0.044
Vinyl chloride	0.022 J

IA-5	
Date	2/13/2025
VOCs	
1,1,2-trichloro-1,2,2-trifluoroethane	0.51
1,2,4-Trimethylbenzene	11 J
1,2-Dichlorobenzene	0.018 J
1,2-Dichloroethane	0.071
1,2-Dichloropropane	0.019 J
1,2-Dichlorotetrafluoroethane	0.087
1,3,5-Trimethylbenzene	3.2
1,3-Butadiene	0.10
1,4-Dichlorobenzene	0.021 J
1,4-Dioxane	0.44
Acetone	65
Acrolein	0.79
Benzene	2.3
Bromomethane	0.039
Carbon Tetrachloride	0.42
CFC-11	0.98
CFC-12	1.8
Chlorobenzene	0.23
Chloroethane	0.021 J
Chloroform	0.18
Chloromethane	0.85
cis-1,2-Dichloroethene	0.22
Dichloromethane	0.88
Ethylbenzene	5.7 J
m&p-Xylenes	22
Methyl-tert-butylether	0.023 J
Naphthalene	0.19 J
o-Xylene	9.2
Styrene (Monomer)	1.1 J
Tetrachloroethene	0.24
Toluene	150 EJ
trans-1,2-Dichloroethene	0.043
Trichloroethene	0.032 J

IA-4	
Date	2/13/2025
VOCs	
1,1,2-trichloro-1,2,2-trifluoroethane	0.52
1,1-Dichloroethane	0.019 J
1,2,4-Trimethylbenzene	3.9 J
1,2-Dichlorobenzene	0.020 J
1,2-Dichloroethane	0.067
1,2-Dichloropropane	0.021 J
1,2-Dichlorotetrafluoroethane	0.094
1,3,5-Trimethylbenzene	1.2
1,3-Butadiene	0.086
1,4-Dichlorobenzene	0.030 J
1,4-Dioxane	0.35
Acetone	34
Acrolein	0.62
Benzene	1.1
Bromomethane	0.042
Carbon Tetrachloride	0.41
CFC-11	0.97
CFC-12	1.9
Chlorobenzene	0.18
Chloroethane	0.034 J
Chloroform	0.13 J
Chloromethane	0.86
cis-1,2-Dichloroethene	0.30
Dichloromethane	0.37
Ethylbenzene	2.0 J
m&p-Xylenes	7.0
Methyl-tert-butylether	0.023 J
Naphthalene	0.44 J
o-Xylene	2.8
Styrene (Monomer)	1.2 J
Tetrachloroethene	0.30
Toluene	170 EJ
trans-1,2-Dichloroethene	0.027 J
Trichloroethene	0.028 J

LEGEND:

- PROPERTY BOUNDARY
- TAX PARCEL BOUNDARY
- BUILDING FOOTPRINT
- OUTDOOR AIR SAMPLE
- INDOOR AIR SAMPLE
- SUB-SLAB AIR SAMPLE
- GRASS AREA
- BUILDING
- ASPHALT PAVED AREA
- CONCRETE AREA

NOTES:

1. ALL CONCENTRATIONS ARE IN MICROGRAMS PER CUBIC METER (µg/m3).
2. ABBREVIATIONS:
   - D – COMPOUND QUANTITATED USING A SECONDARY DILUTION
   - J – QUALIFIER INDICATES AN ESTIMATED VALUE
   - VOCs – VOLATILE ORGANIC COMPOUNDS
3. GRAY SHADED CONCENTRATIONS EXCEED THE NYSDOH AIR GUIDELINE VALUES (NYSDOH 2006, 2024).
4. ALL LOCATIONS ARE APPROXIMATE.
5. BASEMAP PROVIDED BY PASSERO ASSOCIATES, DATED 10.1.2008, DRAWING ALTA/ACSM LAND AND TITLE SURVEY.

0 60' 120'

GRAPHIC SCALE

NYSDEC SITE # 828150
235 METRO PARK BRIGHTON SITE
ROCHESTER, NEW YORK
SITE MANAGEMENT PLAN

DETECTED SOIL VAPOR, INDOOR AIR, AND OUTDOOR AIR ANALYTICAL RESULTS - FEBRUARY 14, 2025

ARCADIS

FIGURE
11

C:\Users\ekrahmer\DC\ACCDocs\Arcadis ACC US\AUS-99999998-NYSDEC_METRO PARK BRIGHTON_ROCHESTER_NY\Project Files\10_WIP\10T_ARC_ENV\2025\01-DWG\SMP_Fig 11_NYSDEC_METRO_AIR SAMPLE LOC MAP 2025-02.dwg LAYOUT: 11 SAVED: 12/11/2025 11:30 AM ACADVER: 25.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 12/11/2025 3:20 PM BY: KRAHMER, ERIC
XREFS: IMAGES: PROJECTNAME: ----
X-Base Map Arcadis Logo.PNG
Title Block-SMP
X-Hatch
X-Hatch-BW

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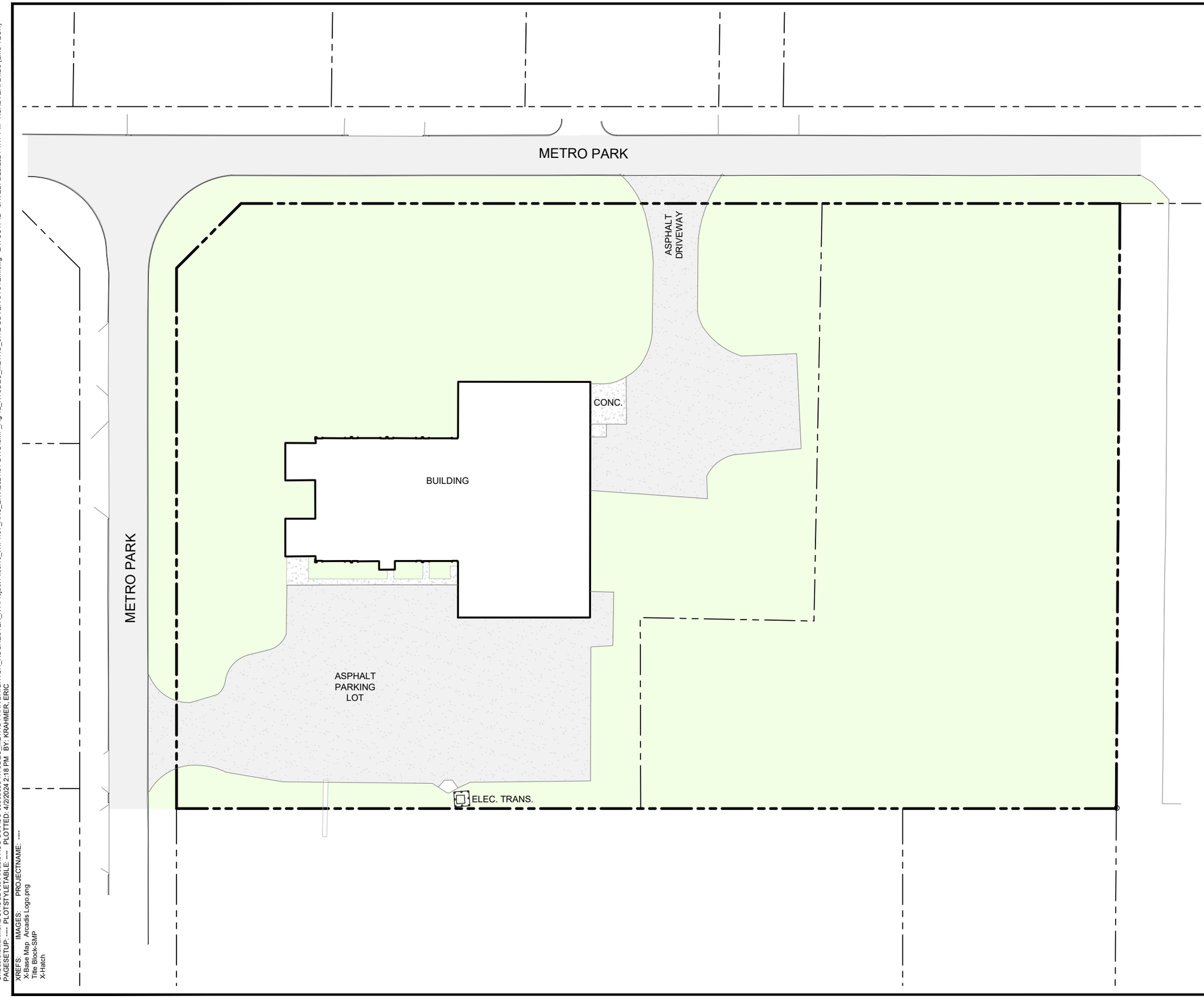
X-Base Map Arcadis Logo.png
Title Block-SMP
X-Hatch



LEGEND:

- PROPERTY BOUNDARY
- TAX PARCEL BOUNDARY
- BUILDING FOOTPRINT
- MINIMUM 12–INCHES OF GRASS COVERED SOIL
- BUILDING
- ASPHALT PAVED AREA
- CONCRETE AREA

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. BASEMAP PROVIDED BY PASSERO ASSOCIATES, DATED 10.1.2008, DRAWING ALTA/ACSM LAND AND TITLE SURVEY.

0 60' 120'

GRAPHIC SCALE

NYSDEC SITE # 828150
235 METRO PARK BRIGHTON SITE
ROCHESTER, NEW YORK
SITE MANAGEMENT PLAN

SITE COVER SYSTEM

ARCADIS

FIGURE
12

Appendix A

Environmental Easement

MONROE COUNTY – STATE OF NEW YORK

JAMIE ROMEO, COUNTY CLERK
39 W. MAIN ST, ROOM 101
ROCHESTER, NEW YORK 14614

COUNTY CLERK'S RECORDING PAGE

THIS PAGE IS PART OF THE DOCUMENT – DO NOT DETACH

BOOK/PAGE: 13149 / 734
INSTRUMENT #: 202503358843

Receipt#: 4413332
Clerk: JI
Rec Date: 11/26/2025 02:10:56 PM
Doc Grp: D
Descrip: EASEMENT AGREEMENT
Num Pgs: 11
Rec'd Frm: KENSINGTON VANGUARD NLS LLC - NY

Party1: 235 METRO PARK ASSOCIATES LLC
Party2: NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Town: BRIGHTON - 262000

Recording:	
Cover Page	5.00
Recording Fee	70.00
Cultural Ed	14.25
Records Management - Coun	1.00
Records Management - Stat	4.75
TP584	5.00
Sub Total:	100.00
Transfer Tax	
Transfer Tax - State	0.00
Sub Total:	0.00
Total:	100.00

**** NOTICE: THIS IS NOT A BILL ****

***** Transfer Tax *****
Transfer Tax #: 6443
Transfer Tax
Consideration: 0.00

Total: 0.00

State of New York

MONROE COUNTY CLERK'S OFFICE
WARNING – THIS SHEET CONSTITUTES THE CLERKS ENDORSEMENT, REQUIRED BY SECTION 317-a(5) & SECTION 319 OF THE REAL PROPERTY LAW OF THE STATE OF NEW YORK. DO NOT DETACH OR REMOVE

Record and Return To:

ELECTRONICALLY RECORDED BY CSC

JAMIE ROMEO

MONROE COUNTY CLERK

ENVIRONMENTAL EASEMENT GRANTED PURSUANT TO ARTICLE 71, TITLE 36 OF THE NEW YORK STATE ENVIRONMENTAL CONSERVATION LAW

THIS INDENTURE made this 14th day of Nov, 2025, between Owner, 235 Metro Park Associates LLC, having an office at 350 Allens Creek Road, Rochester, NY 14618, County of Monroe, State of New York (the "Grantor"), and The People of the State of New York (the "Grantee"), acting through their Commissioner of the Department of Environmental Conservation (the "Commissioner", or "NYSDEC" or "Department" as the context requires) with its headquarters located at 625 Broadway, Albany, New York 12233,

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to encourage the remediation of abandoned and likely contaminated properties ("sites") that threaten the health and vitality of the communities they burden while at the same time ensuring the protection of public health and the environment; and

WHEREAS, the Legislature of the State of New York has declared that it is in the public interest to establish within the Department a statutory environmental remediation program that includes the use of Environmental Easements as an enforceable means of ensuring the performance of operation, maintenance, and/or monitoring requirements and the restriction of future uses of the land, when an environmental remediation project leaves residual contamination at levels that have been determined to be safe for a specific use, but not all uses, or which includes engineered structures that must be maintained or protected against damage to perform properly and be effective, or which requires groundwater use or soil management restrictions; and

WHEREAS, the Legislature of the State of New York has declared that Environmental Easement shall mean an interest in real property, created under and subject to the provisions of Article 71, Title 36 of the New York State Environmental Conservation Law ("ECL") which contains a use restriction and/or a prohibition on the use of land in a manner inconsistent with engineering controls which are intended to ensure the long term effectiveness of a site remedial program or eliminate potential exposure pathways to hazardous waste or petroleum; and

WHEREAS, Grantor, is the owner of real property located at the address of 235 Metro Park in the Town of Brighton, County of Monroe and State of New York, known and designated on the tax map of the County Clerk of Monroe as tax map parcel number: Section 149.17 Block 02 Lot 7.11, and Section 149.71 Block 02 Lot 7.12 being the same as that property conveyed to Grantor by deed dated September 20, 2004 and recorded in the Monroe County Clerk's Office in Liber and Page Book 1046, Page 0638. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 5 +/- acres, and is hereinafter more fully described in the Land Title Survey dated June 24, 2022 prepared by Mark W. Eltz, which will be attached to the Site Management Plan. The Controlled Property description is set forth in and attached hereto as Schedule A; and

WHEREAS, the Department accepts this Environmental Easement in order to ensure the protection of public health and the environment and to achieve the requirements for remediation established for the Controlled Property until such time as this Environmental Easement is extinguished pursuant to ECL Article 71, Title 36; and

NOW THEREFORE, in consideration of the mutual covenants contained herein and the terms and conditions of Order on Consent Index Number: B8-0778-08-03A, Grantor conveys to Grantee a permanent Environmental Easement pursuant to ECL Article 71, Title 36 in, on, over, under, and upon the Controlled Property as more fully described herein ("Environmental Easement").

1. Purposes. Grantor and Grantee acknowledge that the Purposes of this Environmental Easement are: to convey to Grantee real property rights and interests that will run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of this Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of operation, maintenance, and/or monitoring requirements; and to ensure the restriction of future uses of the land that are inconsistent with the above-stated purpose.

2. Institutional and Engineering Controls. The controls and requirements listed in the Department approved Site Management Plan ("SMP") including any and all Department approved amendments to the SMP are incorporated into and made part of this Environmental Easement. These controls and requirements apply to the use of the Controlled Property, run with the land, are binding on the Grantor and the Grantor's successors and assigns, and are enforceable in law or equity against any owner of the Controlled Property, any lessees and any person using the Controlled Property.

A. (1) The Controlled Property may be used for:

Commercial as described in 6 NYCRR Part 375-1.8(g)(2)(iii) and Industrial as described in 6 NYCRR Part 375-1.8(g)(2)(iv)

(2) All Engineering Controls must be operated and maintained as specified in the Site Management Plan (SMP);

(3) All Engineering Controls must be inspected at a frequency and in a manner defined in the SMP;

(4) The use of groundwater underlying the property is prohibited without necessary water quality treatment as determined by the NYSDOH or the Monroe County Department of Health to render it safe for use as drinking water or for industrial purposes, and the user must first notify and obtain written approval to do so from the Department;

(5) Groundwater and other environmental or public health monitoring must be performed as defined in the SMP;

(6) Data and information pertinent to Site Management of the Controlled Property must be reported at the frequency and in a manner defined in the SMP;

(7) All future activities on the property that will disturb remaining contaminated material must be conducted in accordance with the SMP;

(8) Monitoring to assess the performance and effectiveness of the remedy must be performed as defined in the SMP;

(9) Operation, maintenance, monitoring, inspection, and reporting of any mechanical or physical components of the remedy shall be performed as defined in the SMP;

(10) Access to the site must be provided to agents, employees or other representatives of the State of New York with reasonable prior notice to the property owner to assure compliance with the restrictions identified by this Environmental Easement.

B. The Controlled Property shall not be used for Residential or Restricted Residential purposes as defined in 6NYCRR 375-1.8(g)(2)(i) and (ii), and the above-stated engineering controls may not be discontinued without an amendment or extinguishment of this Environmental Easement.

C. The SMP describes obligations that the Grantor assumes on behalf of Grantor, its successors and assigns. The Grantor's assumption of the obligations contained in the SMP which may include sampling, monitoring, and/or operating a treatment system, and providing certified reports to the NYSDEC, is and remains a fundamental element of the Department's determination that the Controlled Property is safe for a specific use, but not all uses. The SMP may be modified in accordance with the Department's statutory and regulatory authority. The Grantor and all successors and assigns, assume the burden of complying with the SMP and obtaining an up-to-date version of the SMP from:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, New York 12233
Phone: (518) 402-9553

D. Grantor must provide all persons who acquire any interest in the Controlled Property a true and complete copy of the SMP that the Department approves for the Controlled Property and all Department-approved amendments to that SMP.

E. Grantor covenants and agrees that until such time as the Environmental Easement is extinguished in accordance with the requirements of ECL Article 71, Title 36 of the ECL, the property deed and all subsequent instruments of conveyance relating to the Controlled Property shall state in at least fifteen-point bold-faced type:

This property is subject to an Environmental Easement held by the New York State Department of Environmental Conservation pursuant to Title 36 of Article 71 of the Environmental Conservation Law.

F. Grantor covenants and agrees that this Environmental Easement shall be incorporated in full or by reference in any leases, licenses, or other instruments granting a right to use the Controlled Property.

G. Grantor covenants and agrees that it shall, at such time as NYSDEC may require, submit to NYSDEC a written statement by an expert the NYSDEC may find acceptable certifying under penalty of perjury, in such form and manner as the Department may require, that:

(1) the inspection of the site to confirm the effectiveness of the institutional and engineering controls required by the remedial program was performed under the direction of the individual set forth at 6 NYCRR Part 375-1.8(h)(3).

(2) the institutional controls and/or engineering controls employed at such site:

(i) are in-place;

(ii) are unchanged from the previous certification, or that any identified changes to the controls employed were approved by the NYSDEC and that all controls are in the Department-approved format; and

(iii) that nothing has occurred that would impair the ability of such control to protect the public health and environment;

(3) the owner will continue to allow access to such real property to evaluate the continued maintenance of such controls;

(4) nothing has occurred that would constitute a violation or failure to comply with any site management plan for such controls;

(5) the report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

(6) to the best of his/her knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and

(7) the information presented is accurate and complete.

3. Right to Enter and Inspect. Grantee, its agents, employees, or other representatives of the State may enter and inspect the Controlled Property in a reasonable manner and at reasonable times to assure compliance with the above-stated restrictions.

4. Reserved Grantor's Rights. Grantor reserves for itself, its assigns, representatives, and successors in interest with respect to the Property, all rights as fee owner of the Property, including:

A. Use of the Controlled Property for all purposes not inconsistent with, or limited by the terms of this Environmental Easement;

B. The right to give, sell, assign, or otherwise transfer part or all of the underlying fee interest to the Controlled Property, subject and subordinate to this Environmental Easement;

5. Enforcement

A. This Environmental Easement is enforceable in law or equity in perpetuity by Grantor, Grantee, or any affected local government, as defined in ECL Section 71-3603, against the owner of the Property, any lessees, and any person using the land. Enforcement shall not be defeated because of any subsequent adverse possession, laches, estoppel, or waiver. It is not a

defense in any action to enforce this Environmental Easement that: it is not appurtenant to an interest in real property; it is not of a character that has been recognized traditionally at common law; it imposes a negative burden; it imposes affirmative obligations upon the owner of any interest in the burdened property; the benefit does not touch or concern real property; there is no privity of estate or of contract; or it imposes an unreasonable restraint on alienation.

B. If any person violates this Environmental Easement, the Grantee may revoke the Certificate of Completion with respect to the Controlled Property.

C. Grantee shall notify Grantor of a breach or suspected breach of any of the terms of this Environmental Easement. Such notice shall set forth how Grantor can cure such breach or suspected breach and give Grantor a reasonable amount of time from the date of receipt of notice in which to cure. At the expiration of such period of time to cure, or any extensions granted by Grantee, the Grantee shall notify Grantor of any failure to adequately cure the breach or suspected breach, and Grantee may take any other appropriate action reasonably necessary to remedy any breach of this Environmental Easement, including the commencement of any proceedings in accordance with applicable law.

D. The failure of Grantee to enforce any of the terms contained herein shall not be deemed a waiver of any such term nor bar any enforcement rights.

6. Notice. Whenever notice to the Grantee (other than the annual certification) or approval from the Grantee is required, the Party providing such notice or seeking such approval shall identify the Controlled Property by referencing the following information:

County, NYSDEC Site Number, NYSDEC Brownfield Cleanup Agreement, State Assistance Contract or Order Number, and the County tax map number or the Liber and Page or computerized system identification number.

Parties shall address correspondence to:

Site Number: 828150
Office of General Counsel
NYSDEC
625 Broadway
Albany New York 12233-5500

With a copy to:

Site Control Section
Division of Environmental Remediation
NYSDEC
625 Broadway
Albany, NY 12233

All notices and correspondence shall be delivered by hand, by registered mail or by Certified mail and return receipt requested. The Parties may provide for other means of receiving and communicating notices and responses to requests for approval.

7. Recordation. Grantor shall record this instrument, within thirty (30) days of execution of this instrument by the Commissioner or her/his authorized representative in the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

8. Amendment. Any amendment to this Environmental Easement may only be executed by the Commissioner of the New York State Department of Environmental Conservation or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

9. Extinguishment. This Environmental Easement may be extinguished only by a release by the Commissioner of the New York State Department of Environmental Conservation, or the Commissioner's Designee, and filed with the office of the recording officer for the county or counties where the Property is situated in the manner prescribed by Article 9 of the Real Property Law.

10. Joint Obligation. If there are two or more parties identified as Grantor herein, the obligations imposed by this instrument upon them shall be joint and several.

11. Consistency with the SMP. To the extent there is any conflict or inconsistency between the terms of this Environmental Easement and the SMP, regarding matters specifically addressed by the SMP, the terms of the SMP will control.

Remainder of Page Intentionally Left Blank

IN WITNESS WHEREOF, Grantor has caused this instrument to be signed in its name.

235 Metro Park Associates LLC:

By: _____

Print Name: Doug Musinger

Title: Trustee Date: 11/6/25
Authorized Representative

Grantor's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF Monroe)

On the 6th day of November in the year 2025, before me, the undersigned, personally appeared Douglas Musinger, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
Notary Public - State of New York

DONALD W. O'BRIEN
Notary Public, State of New York
Qualified in Yates County
No. 02OB4750856
Commission Expires June 18, 2026

THIS ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting by and Through the Department of Environmental Conservation as Designee of the Commissioner,

By: _____
Janet Brown, Assistant Director
Division of Environmental Remediation

Grantee's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF ALBANY)

On the 14th day of November, in the year 2025 before me, the undersigned, personally appeared Janet Brown, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/ executed the same in his/her/ capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his/her/ signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public - State of New York

Cheryl A. Salem
Notary Public State of New York
Registration No. 01SA0002177
Qualified in Albany County
My Commission Expires March 3, 2027

SCHEDULE "A" PROPERTY DESCRIPTION

Environmental Easement Description:

ALL THAT PIECE OR PARCEL OF LAND SITUATE IN THE TOWN OF BRIGHTON, COUNTY OF MONROE AND STATE OF NEW YORK, BEING PART OF TOWN LOT 64, AND BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE EASTERLY RIGHT OF WAY OF METRO PARK (60' WIDE). SAID POINT BEING 1093.90 FEET AS MEASURED ALONG SAID EASTERLY RIGHT OF WAY AND PROJECTED TO THE CENTERLINE OF BRIGHTON-HENRIETTA TOWN LINE ROAD; THENCE

S69° 26'38" E, A DISTANCE OF 582.32 FEET TO A POINT ON THE EASTERLY LINE OF SAID TOWN LOT 64; THENCE

N 20° 54' 04" E ALONG THE EASTERLY LINE OF TOWN LOT 64, A DISTANCE OF 374.71 FEET TO A POINT ON THE SOUTHERLY RIGHT OF WAY OF METRO PARK (60' WIDE); THENCE

N 69° 26' 38" W ALONG SAID SOUTHERLY RIGHT OF WAY OF METRO PARK, A DISTANCE OF 544.58 FEET TO AN ANGLE POINT; THENCE

S 65° 33' 22" W CONTINUING ALONG SAID SOUTHERLY RIGHT OF WAY OF METRO PARK, A DISTANCE OF 56.57 FEET TO A POINT ON THE EASTERLY RIGHT OF WAY OF METRO PARK; THENCE

S 20° 33' 22" W ALONG SAID EASTERLY RIGHT OF WAY OF METRO PARK, A DISTANCE OF 334.70 FEET TO THE POINT OF BEGINNING.

INTENDING TO DESCRIBE THE PARCEL OF LAND BEING 5.00 ACRES (217,819 SQ. FT.) MORE OF LESS.

Deed Description (LIBER 10046 OF DEEDS PAGE 638):

ALL THAT TRACT OR PARCEL OF LAND SITUATE IN THE TOWN OF BRICHTON, COUNTY OF MONROE AND STATE OF NEW YORK, BEING PART OF LOT 64 IN SAID TOWN AND COUNTY, BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT, SAID POINT BEING ON THE EASTERLY HIGHWAY BOUNDARY LINE OF THE PROPOSED NORTH-SOUTH ROAD, AS SHOWN ON A SUBDIVISION MAP FILED IN THE MONROE COUNTY CLERK'S OFFICE IN LIBER 178 OF MAPS, PAGE 35, SAID POINT BEING 1093.90 FEET AS MEASURED ALONG SAID RIGHT OF WAY AND PROJECTED TO THE CENTERLINE OF BRIGHTON-HENRIETTA TOWN LINE ROAD; THENCE EASTERLY ALONG A LINE MAKING AN INTERIOR ANGLE OF 90° WITH THE SAID EASTERLY HIGHWAY BOUNDARY LINE A DISTANCE OF 582.32 FEET TO A POINT IN THE EASTERLY LINE OF SAID TOWN LOT 64, A DISTANCE OF 374.71 FEET TO A POINT IN THE SOUTH LINE OF A PROPOSED

EAST-WEST ROAD SHOWN ON SAID MAP:
THENCE WESTERLY ALONG THE SOUTH LIE OF SAID EAST-WEST ROAD AND MAKING AN INTERIOR ANGLE OF 89° 39' 18" WITH THE LAST COURSE A DISTANCE OF 544.38 FEET TO A POINT; THENCE SOUTH 65° 44' 56" WEST ALONG A LINE CONNECTING SAID EAST-WEST ROAD WITH A PROPOSED NORTH-SOUTH ROAD SHOWN ON SAID MAP AND MAKING AN INTERIOR ANGLE OF 1350 WITH THE LAST COURSE A DISTANCE OF 36.37 FEET TO A POINT IN THE EAST LINE OF SAID NORTH-SOUTH ROAD; THENCE SOUTH ALONG THE EAST LINE OF SAID NORTH-SOUTH ROAD MAKING AN INTERIOR ANGLE OF 135° WITH THE LAST COURSE A DISIANCE OF 334.70 FEET TO THE POINT OF BEGINNING.

THE PROPOSED NORTH-SOUTH ROAD AND EAST-WEST ROAD IS NOW KNOWN AS METRO PARK.

MONROE COUNTY – STATE OF NEW YORK

JAMIE ROMEO, COUNTY CLERK
39 W. MAIN ST, ROOM 101
ROCHESTER, NEW YORK 14614

COUNTY CLERK'S RECORDING PAGE

THIS PAGE IS PART OF THE DOCUMENT – DO NOT DETACH

BOOK/PAGE: 13171 / 124
INSTRUMENT #: 202603386317

Receipt#: 4457179
Clerk: ED
Rec Date: 02/20/2026 03:27:02 PM
Doc Grp: D
Descrip: EASEMENT AGREEMENT
Num Pgs: 8
Rec'd Frm: TV UNI NATIONAL UNINSURED SERVICES-13410

Party1: 235 METRO PARK ASSOCIATES LLC
Party2: PEOPLE OF THE STATE OF NEW YORK ACTING THROUGH THEIR COMMISSIONER OF THE
Town: BRIGHTON - 262000

Recording:	
Cover Page	5.00
Recording Fee	55.00
Cultural Ed	14.25
Records Management - Coun	1.00
Records Management - Stat	4.75
TP584	5.00
Sub Total:	85.00
Transfer Tax	
Transfer Tax - State	0.00
Sub Total:	0.00
Total:	85.00

**** NOTICE: THIS IS NOT A BILL ****

***** Transfer Tax *****
Transfer Tax #: 10099
Transfer Tax Consideration: 0.00

Total: 0.00

State of New York

MONROE COUNTY CLERK'S OFFICE
WARNING – THIS SHEET CONSTITUTES THE CLERKS ENDORSEMENT, REQUIRED BY SECTION 317-a(5) & SECTION 319 OF THE REAL PROPERTY LAW OF THE STATE OF NEW YORK. DO NOT DETACH OR REMOVE

Record and Return To:

ELECTRONICALLY RECORDED BY SIMPLIFILE

JAMIE ROMEO

MONROE COUNTY CLERK

AMENDMENT TO ENVIRONMENTAL EASEMENT

This Amendment to Environmental Easement is made as of this 9th day of February, 2026, by and between The People of the State of New York, acting through their Commissioner of the Department of Environmental Conservation ("NYSDEC" or the "Department") with its headquarters located at 625 Broadway, Albany, New York 12233, and 235 Metro Park Associates LLC (the "Grantor") with its offices located at 350 Allens Creek Road, Rochester, NY 14618.

RECITALS

1. Grantor, 235 Metro Park Associates LLC, is the owner of real property located at the address of 235 Metro Park in the Town of Brighton, County of Monroe and State of New York, known and designated on the tax map of the County Clerk of Monroe as tax map parcel number: Section 149.17 Block 02 Lot 7.11 & 7.12, being the same as that property conveyed to Grantor by deed dated September 20, 2004 and recorded in the Monroe County Clerk's Office in Liber and Page 1046/0638.

2. The property referenced above comprises approximately 5 +/- acres, and is hereinafter more fully described in Exhibit A.

3. The Department and Grantor entered into that certain Environmental Easement (the "Easement Agreement") dated as of November 14, 2025 and recorded in the County Clerk's Office as Liber and Page 13149/734. Capitalized terms used herein without definition have the meanings ascribed to them in the Environmental Easement Agreement.

4. Pursuant to Section 1, 2, 3, 4, and 5 of the Easement Agreement, Grantor granted the Department rights and interests that run with the land in perpetuity in order to provide an effective and enforceable means of encouraging the reuse and redevelopment of the Controlled Property at a level that has been determined to be safe for a specific use while ensuring the performance of maintenance, monitoring or operation requirements; and to ensure the potential restriction of future uses of the land that are inconsistent with the stated purpose.

5. **The Easement Agreement dated November 14, 2025 erroneously stated, in the 4th WHEREAS paragraph, that the tax map parcel number is Section 149.71 Block 02 Lot 7.12.**

6. This Amendment to Environmental Easement is filed solely in order to correct a mutual mistake between the Department and Grantor relating to the tax map parcel number in the 4th WHEREAS paragraph to that Environmental Easement dated November 14, 2025 and recorded in the in the County Clerk's Office as Liber and Page 13149/734.

7. Pursuant to Section 8 of the Easement Agreement, the Department agrees to amend the Easement Agreement in the manner prescribed by Article 9 of the Real Property Law.

AMENDMENT OF ENVIRONMENTAL EASEMENT

A. The above recitals are hereby incorporated into this Amendment of Environmental Easement.

B. The Department and Grantor hereby agree that the 4th WHEREAS paragraph of the Environmental Easement is hereby amended to read as follows:

"**WHEREAS**, Grantor, is the owner of real property located at the address of 235 Metro Park in the Town of Brighton, County of Monroe and State of New York, known and designated on the tax map of the County Clerk of Monroe as tax map parcel number: Section 149.17 Block 02 Lot 7.11, and Section 149.17 Block 02 Lot 7.12 being the same as that property conveyed to Grantor by deed dated September 20, 2004 and recorded in the Monroe County Clerk's Office in Liber and Page Book 1046, Page 0638. The property subject to this Environmental Easement (the "Controlled Property") comprises approximately 5 +/- acres, and is hereinafter more fully described in the Land Title Survey dated June 24, 2022 prepared by Mark W. Eltz, which will be attached to the Site Management Plan. The Controlled Property description is set forth in and attached hereto as Schedule A; and"

C. All other terms of the November 14, 2025 Environmental Easement shall remain in effect.

D. This Amendment of Environmental Easement inures to and binds the parties hereto and their respective successors and assigns.

E. This Amendment of Environmental Easement shall be governed by and interpreted in accordance with the laws of the State of New York.

IN WITNESS WHEREOF, Grantor has caused this Amendment to Environmental Easement to be signed in its name.

235 Metro Park Associates LLC:

By: _____

Print Name: Doug Musinger

Title: Authorized Representative Date: 1/12/26

Grantor's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF Monroe)

On the 16th day of January, in the year 2026, before me, the undersigned, personally appeared Doug Mussenden personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity, and that by his signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

Notary Public – State of New York

W. STEPHEN TIERNEY
Notary Public, State of New York
Qualified in Monroe County
No. 02TI4784122
Commission Expires August 15, 2028

W. STEPHEN TIERNEY
Notary Public, State of New York
Qualified in Monroe County
No. 02TI4784122
Commission Expires August 15, 2028

THIS AMENDMENT OF THE ENVIRONMENTAL EASEMENT IS HEREBY ACCEPTED BY THE PEOPLE OF THE STATE OF NEW YORK, Acting By and Through the Department of Environmental Conservation as Designee of the Commissioner,

By: _____
Andrew O. Guglielmi, Director
Division of Environmental Remediation

Grantee's Acknowledgment

STATE OF NEW YORK)
) ss:
COUNTY OF ALBANY)

On the 9th day of February in the year 2026 before me, the undersigned, personally appeared Andrew O. Guglielmi, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that he executed the same in his capacity as Designee of the Commissioner of the State of New York Department of Environmental Conservation, and that by his signature on the instrument, the individual, or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public - State of New York

Cheryl A. Salem
Notary Public State of New York
Registration No. 01SA0002177
Qualified In Albany County
My Commission Expires March 3, 2027

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ANGLE OF 90° WITH THE SAID EASTERLY HIGHWAY BOUNDARY LINE A DISTANCE OF 582.32 FEET TO A POINT IN THE EASTERLY LINE OF SAID TOWN LOT 64, A DISTANCE OF 374.71 FEET TO A POINT IN THE SOUTH LINE OF A PROPOSED EAST-WEST ROAD SHOWN ON SAID MAP:

THENCE WESTERLY ALONG THE SOUTH LINE OF SAID EAST-WEST ROAD AND MAKING AN INTERIOR ANGLE OF 89° 39' 18" WITH THE LAST COURSE A DISTANCE OF 544.38 FEET TO A POINT; THENCE SOUTH 65° 44' 56" WEST ALONG A LINE CONNECTING SAID EAST-WEST ROAD WITH A PROPOSED NORTH-SOUTH ROAD SHOWN ON SAID MAP AND MAKING AN INTERIOR ANGLE OF 1350 WITH THE LAST COURSE A DISTANCE OF 36.37 FEET TO A POINT IN THE EAST LINE OF SAID NORTH-SOUTH ROAD; THENCE SOUTH ALONG THE EAST LINE OF SAID NORTH-SOUTH ROAD MAKING AN INTERIOR ANGLE OF 135° WITH THE LAST COURSE A DISTANCE OF 334.70 FEET TO THE POINT OF BEGINNING.

THE PROPOSED NORTH-SOUTH ROAD AND EAST-WEST ROAD IS NOW KNOWN AS METRO PARK.

TP-584.2 (10/96)

Recording Office Time Stamp

MONROE COUNTY CLERK'S OFFICE
RECORDED
02/20/2026 03:27:02 PM
Jamie Romeo, County Clerk

Real Estate Transfer Tax Return For Public Utility Companies' and Governmental Agencies' Easements and Licenses

This form may only be used by public utility companies regulated by the Public Service Commission and governmental agencies for the recording of easements and licenses where the consideration for the grant of such easement or license is $500.00 or less.

Name of grantee (public utility company or governmental agency) NYSDEC - Brian Ratskow

Federal employer identification number (If applicable) 14-6001320

Address of grantee 625 Broadway, Albany NY 12233

Name and telephone number of person to contact 5184028393

Name(s) of Grantor Of Easement or License	Address of Property	Consideration Given For Easement or License
1. 235 Metro Park Associates LLC	235 Metro Park, Brighton, NY	$0.00
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		
11.		
12.		
13.		
14.		
15.		

If more than fifteen conveyances are to be recorded, attach a schedule of such other conveyances.

Signature of Grantee

I certify that the grantee is a public utility regulated by the Public Service Commission or is a governmental agency and the grantee of the easements and/or licenses above; that it is true to the best knowledge of the grantee that the granting of each such easement and/or license is exempt from Real Estate Transfer Tax imposed by Article 31 of the Tax Law by reason that each such conveyance is for a consideration of five hundred dollars or less and/or the conveyance is being made to a governmental agency.

Andrew Guglielmi
Brian Ratskow
Name of grantee

Signature of partner, officer of corporation, governmental official, etc.

Director of Environmental Remediation
Title

$0.00 | 02/20/2026 | # 10099

Appendix B

Site Contact List

Appendix B
Site Contact List
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Name/Affiliation	Address	Contact Information
Remedial Party: Fischbach, LLC		
Laura Duhamel Company Representative	Office of the Corporate Secretary – Attn. R Tait 1271 Avenue of the Americas, 11th Floor New York, New York 10020	T: 859-325-1772 Laura.Duhamel@aig.com
Julie Diebenow Senior Technical Services Manager	Office of the Corporate Secretary – Attn. R Tait 1271 Avenue of the Americas, 11th Floor New York, New York 10020	T: 208-343-0303 Julie.Diebenow@aig.com
Remedial Party Attorney: Akerman, LLP		
Matthew Schroeder Fischbach Counsel	2001 Ross Avenue, Suite 3600 Dallas, Texas 75201	T: 214-720-4362 Matt.Schroeder@akerman.com
Richard Leland Fischbach Counsel	1251 Avenue of the Americas, 37th Floor New York, New York 10020	T: 212-259-6417 Richard.Leland@akerman.com
Remedial Party Consultant: Arcadis		
Moh Mohiuddin Consultant Professional Engineer, Remedial Engineer, Qualified Environmental Professional	50 Millstone Road, East Windsor, New Jersey 08520	T: 732-661-3816 Moh.mohiuddin@arcadis.com
Nicholas Beyrle Consultant Project Manager	100 Chestnut Street, Suite 1020 Rochester, New York 14604	T: 585-662-4044 Nicholas.Beyrle@arcadis.com
NYSDEC DER		
Charlotte Theobald Project Manager	6274 East Avon-Lima Road Avon, New York 14414	T: 585-226-5354 Charlotte.Theobald@dec.ny.gov
David Pratt, P.E. Regional HWR Remedial Engineer	6274 East Avon-Lima Road Avon, New York 14414	T: 585-226-5449 David.Pratt@dec.ny.gov
Kelly Lewandowski Site Control	625 Broadway Albany, New York 12233	T: 518-402-9569 Kelly.Lewandowski@dec.ny.gov
New York State Department of Health (NYSDOH)		
Julia Kenney Project Manager	Empire Plaza Corning State Plaza Albany, NY 12233-0001	T:518-402-7873 Julia.Kenney@health.ny.gov
Site Owner		
James Goldberg Property Owner 235 Metro Park Associates, LLC	235 Metro Park Rochester, New York 14623	T: 585-442-2092 JEGoldberg130@gmail.com

Appendix C

Responsibilities of Owner and Remedial Party

Appendix C
Responsibilities of Owner and Remedial Party
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

1. RESPONSIBILITIES

The responsibilities for implementing the Site Management Plan (SMP) for the 235 Metro Park Brighton Site (site), NYSDEC Site Number 828150, are divided between the site owner and a Remedial Party, as defined below. The owner is currently listed as:

Owner: 235 Metro Park Associates, LLC

Contact: Mr. James Goldberg
235 Metro Park
Rochester, New York 14623
Telephone: 585-442-2092
Email: JEGoldberg130@gmail.com

Solely for the purposes of this document and based upon the facts related to a particular site and the remedial program being carried out, the term Remedial Party ("RP") refers to any of the following: certificate of completion holder, volunteer, applicant, responsible party, and, in the event the New York State Department of Environmental Conservation ("NYSDEC") is carrying out remediation or site management, the NYSDEC and/or an agent acting on its behalf. The RP is:

RP: Fischbach, LLC (Fischbach)

Contact: Ms. Laura Duhamel
1271 Avenue of the Americas
Office of the Corporate Secretary – Attn. R Tait
11th Floor
New York, New York 10020
Telephone: 859-325-1772
Email: Laura.Duhamel@aig.com

Nothing on this page shall supersede the provisions of an Environmental Easement, Consent Order, Consent Decree, agreement, or other legally binding document that affects rights and obligations relating to the site.

1.1. Site Owner's Responsibilities

1) The owner shall follow the provisions of the SMP as they relate to future construction and excavation activities at the site.
2) In accordance with a periodic time frame determined by the NYSDEC, the owner shall periodically certify, in writing, that all Institutional Controls set forth in an Environmental Easement remain in place and continue to be complied with. The owner shall provide a written certification to the RP, upon the RP's request, in order to allow the RP to include the certification in the site's Periodic Review Report (PRR) certification to the NYSDEC.
3) In the event the site is delisted, the owner remains bound by the Environmental Easement and shall submit, upon request by the NYSDEC, a written certification that the Environmental Easement is still in place and has been complied with.
4) The owner shall grant access to the site to the RP and the NYSDEC and its agents for the purposes of performing activities required under the SMP and assuring compliance with the SMP.

5) The owner is responsible for assuring the security of the remedial components located on its property to the best of its ability. If damage to the remedial components or vandalism is evident, the owner shall notify the site's RP and the NYSDEC project manager in accordance with the timeframes indicated in Section 1.3 (Notifications) of the SMP.

6) If some action or inaction by the owner adversely impacts the site, the owner must notify the site's RP and the NYSDEC project manager in accordance with the time frame indicated in Section 1.3 (Notifications) of the SMP and coordinate the performance of necessary corrective actions with the RP.

7) The owner must notify the RP and the NYSDEC project manager of any change in ownership of the site property (identifying the tax map numbers in any correspondence) and provide contact information for the new owner of the site properties. The SMP and 6 NYCRR Part 375-1.11(d) contain notification requirements applicable to any construction or activity changes and changes in ownership. Among with the notification requirements is the following:

   - Sixty (60) days prior written notification must be made to the NYSDEC. Notification is to be submitted to the NYSDEC Division of Environmental Remediation's Site Control Section.
   - Notification requirements for a change in use are detailed in Section 1.3 of the SMP. A change of use includes, but is not limited to, any activity that may increase direct human or environmental exposure (e.g., day care, school, or park). A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html.

8) The owner will conduct mowing on behalf of the RP. The RP remains ultimately responsible for maintaining the engineering controls.

9) In accordance with the tenant notification law, within 15 days of receipt, the owner must supply a copy of any vapor intrusion data, that is produced with respect to structures and that exceeds NYSDOH or OSHA guidelines on the site, whether produced by the NYSDEC, RP, or owner, to the tenants on the property. The owner must otherwise comply with the tenant and occupant notification provisions of Environmental Conservation Law Article 27, Title 24.

1.2 Remedial Party's Responsibilities

1) The RP must follow the SMP provisions regarding any construction and/or excavation it undertakes at the site including any ground intrusive activities that breaches or alters the site's cover system.

2) The RP shall report to the NYSDEC project manager, all activities required for remediation, operation, maintenance, monitoring, and reporting. Such reporting includes, but is not limited to, periodic review reports and certifications, electronic data deliverables, corrective action work plans and reports, and updated SMPs.

3) Before accessing the site property to undertake a specific activity, the RP shall provide the owner advance notification that shall include an explanation of the work expected to be completed. The RP shall provide to (i) the owner, upon the owner's request, (ii) the NYSDEC project manager, and (iii) other entities, if required by the SMP, a copy of any data generated during the site visit and/or any final report produced.

4) If the NYSDEC project manager determines that an update of the SMP is necessary, the RP shall update the SMP and obtain final approval from the NYSDEC project manager. Within 5 business days after NYSDEC project manager's approval, the RP shall submit a copy of the approved SMP to the owner(s).

5) The RP shall notify the NYSDEC project manager and the owner of any changes in RP ownership and/or control and of any changes in the party/entity responsible for the operation, maintenance, and monitoring of and reporting with respect to any remedial system (Engineering Controls). The RP shall provide contact information for the new party/entity. Such activity constitutes a Change of Use pursuant to 375-1.11(d) and requires 60-days prior notice to the NYSDEC. A 60-Day Advance Notification Form and Instructions are found at http://www.dec.ny.gov/chemical/76250.html.
6) The RP shall notify the NYSDEC project manager of any damage to or modification of the systems as required under Section 1.3 (Notifications) of the SMP.
7) Prior to a change in use that impacts the remedial system or requirements and/or responsibilities for implementing the SMP, the RP shall submit to the NYSDEC project manager for approval of an amended SMP.
8) Any change in use, change in ownership, change in site classification (e.g., delisting), reduction or expansion of remediation, and other significant changes related to the site may result in a change in responsibilities and, therefore, necessitate an update to the SMP and/or updated legal documents. The RP shall contact the NYSDEC project manager to discuss the need to update such documents.

Change in RP ownership and/or control and/or site ownership does not affect the RP's obligations with respect to the site unless a legally binding document executed by the NYSDEC releases the RP of its obligations. Future site owners and RPs and their successors and assigns are required to carry out the activities set forth above.

Appendix D

Boring Logs and Well Construction Logs

Appendix D
Boring Logs and Well Construction Logs
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Please note that after an extensive historical records and document search, the following boring logs could not be located for inclusion into this Appendix.

Boring ID	Year Installed
GP-101	1999
GP-102	1999
GP-103	1999
GP-104	1999
GP-105	1999
GP-201	2000
GP-202	2000
GP-203	2000
GP-204	2000
GP-205	2000
GP-206	2000
BH-2	2000
BH-3	2000
BH-4	2000
BH-5	2000
BH-6	2000
BH-7	2000
BH-8	2000
BH-9	2000
BH-10	2000
BH-11	2000
BH-12	2000
BH-13	2000
BH-14	2000
BH-18	2001
BH-19	2001
BH-101	2001
BH-102	2001
BH-103	2001
SS-6	2002
SS-8	2002
SS-9	2002
SS-10	2002
SS-11	2002
BH-18	2002
BH-24	2002

BORING

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REPORT

SHEET 1 OF 1

DATE STARTED : 3/6/89	DATE FINISHED : 3/6/89	BORING No. 1
CLIENT : FISCHBACH PROPERTIES		PROJECT No : 613-1
PROJECT NAME & LOCATION : T. H. GREEN PHASE I ; E. BRIGHTON, NY		
REMARKS: SOIL SAMPLES ALLOWED TO SIT (COVERED) ~30 MIN. AT APPROX. 70°F PRIOR TO SCREENING WITH TIP II PID.		
DRILLING CONTRACTOR : MARCOR	DRILLER : RANDY	DRILLER :

EQUIPMENT :	CASING :	SOIL SAMPLER : SPLIT SPOON	SOIL SAMPLER :	CORE BARREL	AUGER	MON. WELL (MW) PIPE	MON. WELL (MW) CAP	DRILL RIG AND METHOD
TYPE :	-	STD	-	-	HSA	-	-	CANTERRA CT 150 HSA
SIZE :	-	2" x 2"	-	-	6¼"	-	-	
HAMMER WT / FALL	-	140 / 30	-	BIT -				

SURFACE ELEVATION : 552 E FROM SITE PLAN

SURFACE CONDITIONS : FROZEN GRAVEL

WATER LEVEL AT FT. AFTER HRS. FT. AFTER HRS.

DEPTH BELOW GRADE	OVA READINGS	SAMPLE TYPE AND No.	SAMPLE DEPTH (FROM – TO)	BLOWS / 6" OR CORE TIME	STRATA DEPTH / ELEV.	DESCRIPTION AND REMARKS TRACE =0–10% LITTLE=10–20% SOME=20–30% AND=35–50%	MONITORING WELL CONSTRUCTION
						2" CRS GRAVEL @ SFC.	
	836	SS-1	0-2.0	5/7/21/12/5		PRP-GRY CLAY, TRACE SILT.	
	32.7	SS-2	2.0-4.0	8/10/15/15		PRP-GRY CLAY, TRACE SILT.	
5							
	14.1	SS-3	4.0-6.0	11/11/12/16		PRP-GRY CLAY, SOME SILT. OCCASIONAL BRN-ORG F-SAND AND SILT LENSES.	
	18.0	SS-4	6.0-8.0	10/19/23/27		SAME AS SS-3, BUT WITH TRACE BLK GRVL IN CLAY, MOIST.	
10	21.5	SS-5	8.0-10.0	14/18/19/24		BRWN-ORG SILT AND CLY, LITTLE F-C SND, TRACE GRAVEL, MOIST.	
	26.2	SS-6	10.0-12.0	11/17/25/27		SAME AS ABOVE.	
						EOB @ 12.0	
15							

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REPORT

SHEET 1 OF 1

DATE STARTED : 3/6/89	DATE FINISHED : 3/6/89	BORING No. 2
CLIENT : FISCHBACH PROPERTIES		PROJECT No : 613-1
PROJECT NAME & LOCATION : T.H. GREEN, BRIGHTON NY ; PHASE I INVESTIG.		
REMARKS: SOIL SAMPLES STAND 30 MIN @~70°F BEFORE TIP SCREENING		
DRILLING CONTRACTOR : MARLOR	DRILLER : RANDY SHEFFER	DRILLER : TERRY SWAN

EQUIPMENT :	CASING :	SOIL SAMPLER : SPLIT SPOON	SOIL SAMPLER : –	CORE BARREL	AUGER	MON. WELL (MW) PIPE	MON. WELL (MW) CAP	DRILL RIG AND METHOD
TYPE :	–	STD	–	–	HS	–	–	CANTERRA CT 150 DRIVING SPOONS
SIZE :	–	2' x 2"	–	–	–	–	–	
HAMMER WT / FALL	–	140 / 30	–	BIT –				

SURFACE ELEVATION : 552 E (SITE PLAN)

SURFACE CONDITIONS : FROZEN GRAVEL

WATER LEVEL AT – FT. AFTER HRS. FT. AFTER HRS.

DEPTH BELOW GRADE	OVA READINGS	SAMPLE TYPE AND No.	SAMPLE DEPTH (FROM – TO)	BLOWS / 6" OR CORE TIME	STRATA DEPTH / ELEV.	DESCRIPTION AND REMARKS TRACE =0–10% LITTLE=10–20% SOME=20–30% AND=35–50%	MONITORING WELL CONSTRUCTION
						2" GRAVEL.	
	10.5	SS-1	0-2.0	6/5/24/6/10		PRP-GRY CLAY, TRACE SILT, TRACE F-SAND LENSES,	
	4.1	SS-2	2.0-4.0	9/11/19/21		SAME.	
5							
	0.6	SS-3	4.0-6.0	5/14/19/18		SAME, GRADING TO BRN-ORG SILT, TRACE CLAY, TRACE F-SAND.	
						EOB @ 6.0	
10							

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REPORT

SHEET 1 OF 1

DATE STARTED : 3/6/89	DATE FINISHED : 3/6/89	BORING No. 3
CLIENT : FISCHBACH PROPERTIES		PROJECT No : 613-1
PROJECT NAME & LOCATION : T.H. GREEN BRIGHTON, NY ; PHASE I INVESTIG.		
REMARKS: TIP SCREENING AFTER 30 MIN - 70°F HEADSPACE.		
DRILLING CONTRACTOR : MARCOR	DRILLER : RANDY SHEFFER	DRILLER : TERRY SWAN

EQUIPMENT :	CASING :	SOIL SAMPLER : SPLIT SPOON	SOIL SAMPLER : -	CORE BARREL	AUGER	MON. WELL (MW) PIPE	MON. WELL (MW) CAP	DRILL RIG AND METHOD
TYPE :	-	STD	-	-	-	-	-	CANTERRA CT150 DRIVING SPOONS
SIZE :	-	2' x 2"	-	-	-	-	-	
HAMMER WT / FALL	-	140/30	-	BIT	-			

SURFACE ELEVATION : 552 E (FROM SITE PLAN)

SURFACE CONDITIONS : FROZEN GRAVEL

WATER LEVEL AT FT. AFTER HRS. FT. AFTER HRS.

DEPTH BELOW GRADE	OVA READINGS	SAMPLE TYPE AND No.	SAMPLE DEPTH (FROM - TO)	BLOWS / 6" OR CORE TIME	STRATA DEPTH / ELEV.	DESCRIPTION AND REMARKS TRACE =0-10% LITTLE=10-20% SOME=20-30% AND=35-50%	MONITORING WELL CONSTRUCTION
						4" GRAVEL	
	14.0	SS-1	0-2.0	63/29/9/12		BLK-GRY CLY, TRACE M-C SAND, TRACE GRAVEL.	
	18.4	SS-2	2.0-4.0			SAME.	
5						EOB @ 4.0	

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REPORT

SHEET 1 OF 1

DATE STARTED : 3/6/89	DATE FINISHED : 3/6/89	BORING No. 4
CLIENT : FISCHBACH PROPERTIES		PROJECT No : 613-1
PROJECT NAME & LOCATION : T. H. GREEN PHASE I INVEST. ; E. BRIGHTON, NY		
REMARKS: TIP II PID SCREENING SS's / 30 min set @ 70°F		

DRILLING CONTRACTOR : MARCOR	DRILLER : RANDY SCHEFFER	DRILLER :

EQUIPMENT :	CASING :	SOIL SAMPLER : SPLIT SPOON	SOIL SAMPLER :	CORE BARREL	AUGER	MON. WELL (MW) PIPE	MON. WELL (MW) CAP	DRILL RIG AND METHOD
TYPE :	-	STD	-	-	-	-	-	CANTERA CT150 DRIVING SPOONS
SIZE :	-	2' x 2"	-	-	-	-	-	
HAMMER WT / FALL	-	130/4	-	BIT	-			

SURFACE ELEVATION : 552 E

SURFACE CONDITIONS : FROZEN Gravel

WATER LEVEL AT FT. AFTER HRS. FT. AFTER HRS.

DEPTH BELOW GRADE	OVA READINGS	SAMPLE TYPE AND No.	SAMPLE DEPTH (FROM - TO)	BLOWS / 6" OR CORE TIME	STRATA DEPTH / ELEV.	DESCRIPTION AND REMARKS TRACE =0-10% LITTLE=10-20% SOME=20-30% AND=35-50%	MONITORING WELL CONSTRUCTION
						4" GRAVEL.	
	6.2	SS-1	0-2.0			PRP-GRY CLY, TRACE SILT, TRACE GRAVEL.	
						EOB @ 2.0	
5						(2.0 - 4.0 N. RECOV.)	

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REPORT

SHEET 1 OF 1

DATE STARTED : 3/6/89	DATE FINISHED : 3/6/89	BORING No. 5
CLIENT : FISCHBACH PROPERTIES		PROJECT No : 613-1
PROJECT NAME & LOCATION : T.H. GREEN BRIGHTON NY ; PHASE 1 INVESTIGATION		
REMARKS: TIP SCREENING SOILS : 30 MIN @ ~ 70°F .		
DRILLING CONTRACTOR : MARCOR	LOGGED BY:	DRILLER :

EQUIPMENT :	CASING :	SOIL SAMPLER : SPLIT SPOON	SOIL SAMPLER : –	CORE BARREL	AUGER	MON. WELL (MW) PIPE	MON. WELL (MW) CAP	DRILL RIG AND METHOD
TYPE :	–	STD	–	–	–	–	–	CANTERRA CT-50 DRIVING SPOONS
SIZE :	–	2' x 2"	–	–	–	–	–	
HAMMER WT / FALL	–	140/30	–	BIT –				

SURFACE ELEVATION : 552 E

SURFACE CONDITIONS : Frozen Gravel.

WATER LEVEL AT FT. AFTER HRS. FT. AFTER HRS.

DEPTH BELOW GRADE	OVA READINGS	SAMPLE TYPE AND No.	SAMPLE DEPTH (FROM – TO)	SAMPLE MOISTURE CONTENT	SAMPLE RECOVERY	BLOWS / 6" OR CORE TIME	STRATA DEPTH / ELEV.	DESCRIPTION AND REMARKS TRACE=0–10% LITTLE=10–20% SOME=20–30% AND=35–50%
0								5" Gravel.
	9.9	SS-1	0-2.0				29/12/13/9	GRY CLAY, TRACE GRAVEL.
	10.1	SS-2	2.0-4.0				14/17/33/31	BRWN-ORG CLAY, TRACE SILT (MOIST)
5								
10								
15								
20								

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REPORT

SHEET 1 OF 1

DATE STARTED : 3/6/89	DATE FINISHED : 3/6/89	BORING No. 6
CLIENT : FISCHBACH PROPERTIES		PROJECT No : 613-1
PROJECT NAME & LOCATION : T.H. GREEN BRIGHTON NY ; PHASE I INVESTIG.		
REMARKS: TIP SCREENING COVERED SOILS · 30 MIN @ ~70°F		
DRILLING CONTRACTOR : MARCOR	DRILLER : RANDY SHEFFER	DRILLER : TERRY SWANN

EQUIPMENT :	CASING :	SOIL SAMPLER : SPLIT SPOON	SOIL SAMPLER : –	CORE BARREL	AUGER	MON. WELL (MW) PIPE	MON. WELL (MW) CAP	DRILL RIG AND METHOD
TYPE :	–	STD	–	–	–	–	–	CANTERRA CT150 DRIVING SPOONS
SIZE :	–	2"x2"	–	–	–	–	–	
HAMMER WT / FALL	–	140/30		BIT –				

SURFACE ELEVATION : 552 E (FROM SITE PLAN)

SURFACE CONDITIONS : FROZEN GRAVEL

WATER LEVEL AT 3.9 FT. AFTER 0 HRS. FT. AFTER HRS.

DEPTH BELOW GRADE	OVA READINGS	SAMPLE TYPE AND No.	SAMPLE DEPTH (FROM – TO)	BLOWS / 6" OR CORE TIME	STRATA DEPTH / ELEV.	DESCRIPTION AND REMARKS TRACE =0–10% LITTLE=10–20% SOME=20–30% AND=35–50%	MONITORING WELL CONSTRUCTION
						GRAVEL 8 IN.	
	16.6	SS-1	0-2.0	24/9/11/11		BLK-GRY CLY AND GRY GRAVEL.	
	13.4	SS-2	2.0-4.0	5/13/24/22		BRN-ORG SILT, TRACE F-SAND, TRACE CLY,	
5						EOB @ 4.0	
						6 IN STDG. H_2O UPON COMPLETION.	

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REPORT

SHEET 1 OF 1

DATE STARTED : 3/6/89	DATE FINISHED : 3/6/89	BORING No. 7
CLIENT : FISCHBACH PROPERTIES		PROJECT No : 613-1

PROJECT NAME & LOCATION : T.H. GREEN, BRIGHTON NY : PHASE I INVESTIG.

REMARKS: TIP SCREENING SOILS : 30 MIN @ -70°F.
Boring location is 16 FT W OF underground gasoline tanks.

DRILLING CONTRACTOR : MARCOR | DRILLER : R. Sheffa | DRILLER : T. Sciam

EQUIPMENT :	CASING :	SOIL SAMPLER : SPLIT SPOON	SOIL SAMPLER : -	CORE BARREL	AUGER	MON. WELL (MW) PIPE	MON. WELL (MW) CAP	DRILL RIG AND METHOD
TYPE :	-	STD	-	-	HSA	-	-	CANTERRA CT150
SIZE :	-	2' x 2"	-	-	6 1/4"	-	-	
HAMMER WT / FALL	-	140/30	-	BIT -				HSA

SURFACE ELEVATION : 552 E (FROM SITE PLAN)

SURFACE CONDITIONS : GRASS

WATER LEVEL AT FT. AFTER HRS. FT. AFTER HRS.

DEPTH BELOW GRADE	OVA READINGS	SAMPLE TYPE AND No.	SAMPLE DEPTH (FROM - TO)	BLOWS / 6" OR CORE TIME	STRATA DEPTH / ELEV.	DESCRIPTION AND REMARKS TRACE =0-10% LITTLE=10-20% SOME=20-30% AND=35-50%	MONITORING WELL CONSTRUCTION
	1.7	SS-1	0-2	4/6/9/8		N.R.	
	1.2	SS-2	2-4	3/9/10/-		BRN CLY, SOME SILT, TRACE C SAND (FILL?)	
5							
	1.3	SS-3	4-6	8/11/26/25		BRN CLY, SOME SILT, TRACE M-C SAND, TRACE GRAVEL	
	1.5	SS-4	6-8	19/9/65/R		N.R.	
10	0.4	SS-5	8-10	9/13/18/27		SAME AS SS-3	
	0.0	SS-6	10-12	14/26/43/42		SAME	
	1.3	SS-7	12-14	10/15/26/22		SAME	
	1.2	SS-8	14-16	9/14/18/21		SAME, W/ MOIST SILT LENSES	
						EOB @ 16.0	

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
10-8-02

Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH-1 -0'-4'	f-m dry tan SAND w/ tr gravel	0
-4'-8'	moist tan cohesive SILT/CLAY w/tr gravel	0
-8'-12'	↓ same to 12'	0

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
10-8-02

Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH-2-0'-4'	dry tan f-m SAND w/ tr gravel, silt	0
-4'-8'	moist cohesive tan SILT/CLAY w/ tr f sand, gravel	0
-8'-12'	↓ same to 12'	0

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
10-8-02

Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH-3 -0'-4'	tan f-m dry loose SAND w/ tr gravel	0
-4'-8'	dry f SAND/SILT w/ tr c. sand, gravel	0
-8'-12'	fine cohesive SILT/CLAY w/ tr gravel	0
-12'-16'		0

↓

same to 16'

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
10-8-02

Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH-4 -0'-4'	dry tan brn m SAND w/ tr f sand, gravel	0
-4'-8'	4-6' same as above	0
	cohesive f SILT/CLAY	
-8'-12'	w/ tr gravel	0
12'-14'	↓	0
	same to 14'.	

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
10-8-02

Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH -5 -0'-4'	dry brn m SAND w/ tr f sand, gravel	0
-4'-8'	4'-6' Same as above, cohesive SILT/CLAY w/ tr gravel	0
-8'-12'	↓	0
12'-14'		0

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
10-8-02

Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH - 6 -0'-4'	f brn SAND w/ tr m sand, silt, clay, gravel	0
-4'-8'	moist tan f SAND w/ tr silt, clay, gravel	0
-8'-12'	moist cohesive SILT w/ tr clay f sand, gravel, coarser moist SAND @ 12'-13'	0

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
10-8-02

Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH-7-0'-4'	dry grey gravel fill, dry tan m SAND w/ tr silt	0
-4'-8'	dry-moist tan SILT w/ tr clay	0
8'-11'	Same w/ Varying traces of gravel, rx frags, f sand	0
11-14		0
14-16		0
16-20		0

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
10-8-02

Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH -~~8~~ -0'-4'	moist f SAND w/ tr gravel, m sand	0
-4'-8'	moist-wet f-m br SAND w/ tr gravel	0
-8'-~~12~~ 11'	wet f-m SAND w/ tr gravel	0
11-14	↓	0
14-16	↓	0

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
10-8-02

Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH-9 -0'-4'	f SAND/SILT w/ rx frags	0
	f dry m brn SAND w/ tr gravel	
-4'-8'	f-m br SAND w/ tr silt, gravel	0
-8'-11'	tight m SAND/SILT w/ tr clay, gravel	0
11'-14'	moist f SILT/CLAY w/ tr f sand, gravel	0
14'-16'	brn SILT w/ some f sand, tr clay, gravel	0
16'-19'	moist grey SILT w/ tr f sand, gravel	0
19'-22'	wet " " " " "	0
22-24	wet-sat f-m gr SAND w/ trace clay, gravel	0
24-26	sat m SAND to 25', moist f SAND w/ tr silt, clay	0
26-28 28-30	sat f-m SAND w/ tr silt, clay	0

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
10-9-02

Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH - 10 0'-4'	dry tan c SAND/GRAVEL fill, grey moist f SAND w/ tr silt, gravel	0
-4'-8'	moist grey-tan f SAND/SILT w/ tr gravel	0
-8'-10	same as above	0
10-11	wet m SAND horizon	0
11-12	cohesive SILT/CLAY w/ tr f sand, gravel	0

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
10-9-02

Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH-11-0'-4'	dry tan m SAND w/ tr gravel	0
	moist tan SILT w/ tr f sand,	
-4'-8'	gravel	0
-8'-12'	same ↓	0

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
10-9-02

Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH - 12 0'-4'	dry-moist w/ tan SAND	0
	moist tan SILT w/ tr clay, gravel	0
-4'-8'	moist-wet SILT w/ m SAND @ 8'-9'	0
-8'-12'	moist tan SILT w/ tr clay, gravel	0
12-14		

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
10-9-02

Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH - B3-0'-4'	dry tan loose m SAND w/ tr silt	0
-4'-8'	↓ 5' cohesive SILT/CLAY w/ tr gravel	0
-8'-12'		
	↓ 18'	
19-20'	saturated f-m SAND	0

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
10-9-02

Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH #4 -0'-4'	dry-moist f tan SAND w/ tr gravel	0
-4'-8'	cohesive f [redacted] SILT/CLAY w/ tr gravel	
-8'-12'		

↓ 19'

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
10-9-02

Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH - 15 0'-4'	f tan SAND w/ tr gravel	0
4'-8'	tan-grey SILT/CLAY w/ tr gravel	0
-8'-12'		0
12-16		
16-20		
20-24		
24-28		
28-30		

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
10-9-02

Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH - 16-0'-4'	loose dry m tan SAND w/ tr gravel	0.
-4'-8'	same to 5', SILT/CLAY w/ tr gravel	0
-8'-12'		0
12-16'		0

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
10-9-02

Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH - 170'-4'	dry m grey-tan SAND w/ tr gravel	0
-4'-8'	tan-grey SILT/CLAY w/ tr gravel	0
-8'-12'	↓	0
12-16	↓	0

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
October 8,9 2002
Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH -19 -0'-4'	dk tan m SAND	0
-4'-8'	4 till cohesive CLAY/SILT w/ tr gravel	
8 - 11		

Soil Sample Collected for Analysis:

	Description	PID
BH -20-0'-4'	dk tan m SAND	
-4'-8'	till as above	
8-11		

Soil Sample Collected for Analysis:

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
October 8,9 2002
Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH-21-0'-4' 5'	Broken stone/clay in SAND w/ fr gravel	0
5 -4'-8' 5'	fill, loose @ top sample last	

Soil Sample Collected for Analysis: BH21-4'-5' VOA, PCB

Oct 10, 2002

	Description	PID
BH-22-0'-4' 2	surf gravel fill to 1.5 feet BGS	0
2 3 4 -4'-8'	tan SILT/CLAY fill w/ fr gravel loose in top sample last	

Soil Sample Collected for Analysis: BH22-4'-5' VOA, PCB

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
October 8,9 2002 Oct 10, 2002
Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH -~~23~~-0'-4'	6" broken stone/gravel fill unit w/ tr gravel to 10.5' BGS	0
-4'-8'		
8-11	X 10.5-12' saturated c SAND w/gravel	
11-13	12-13 till	11

Soil Sample Collected for Analysis: BH 23 - 11-12 VOA, PCB

	Description	PID
BH -~~24~~-0'-4'	gravel + c SAND fill	0
	4 till ± gravel	
-4'-8'		
8-10		
10-12		

Soil Sample Collected for Analysis:

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
October 8,9 2002 Oct 10, 2005
Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH -25-0'-4'	dry gravel / cSAND	0
-4'-8'	till	

Soil Sample Collected for Analysis: BH 25 - 2'-3'
VOA, PCB

	Description	PID
BH -26-0'-4'	gravel / cSAND, fill @ 3'	
-4'-8'	9-10 saturated gravel	
	till	

Soil Sample Collected for Analysis: BH 26' 2-3 3-4 VOA
BH 26-4-5 - FULL TCL/TAL
BH 26-9-10 VOA

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
October ~~8~~9 2002 Oct 10, 2002
Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH -~~2~~3-0'-4'	gravel/cSAND to 2' fill	0
-4'-8'	SILT/CLAY 12'	

Soil Sample Collected for Analysis:

	Description	PID
BH -~~2~~3-0'-~~4~~3'	cSAND gravel 3" fill	0
-4'-8'	3 fill SILT/CLAY 12	

Soil Sample Collected for Analysis:

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
October 8/9 2002 Oct. 10, 2002
Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
BH-29-0'-4'	well-sorted m SAND, @ 2'	0
	fill	
-4'-8'	SILT/CLAY	
	10	

Soil Sample Collected for Analysis: BH 29 - 1'-2'
VOA, PCB

	Description	PID
BH-30-0'-4'	clean m SAND w/ tr gravel to 5" BGS; fill	0
-4'-8'	much wetter here, sampled 5'-6' wet interval	
7'-10'	chunks till 5	
	10	

Soil Sample Collected for Analysis: BH30 - 5'-6'
VOA, PCB

Sub Slab 10-15-02

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

Sub Slab Samples
SS - #

PHASE II GEOPROBE
October ~~8,9~~ 2002 10-15-02 North Eagle Drilling
Geoprobe sampling (~~Marcor Environmental~~ sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

	Description	PID
~~SS~~ -1		
~~BH~~ - -0'-4'	c fill SAND immediately on top of fill unit.	0 above bkg
-4'-8'		

Soil Sample Collected for Analysis: SS-1-0'-1' full TAL/TCL

	Description	PID
SS-2, SS-3		
~~BH~~ - -0'-4'	Same as above	background
-4'-8'		

Soil Sample Collected for Analysis: SS2-0'-1' VOA, PCB SS3-0-1 VOA, PCB

Sub Slab 10-15-02

FISCHBACH & MOORE VCA
NYSDEC Site #V00492-8

PHASE II GEOPROBE
October 8,9 2002 10-15-02
Geoprobe sampling (Marcor Environmental sub-contractor) with soil headspace screening with Thermal Environmental Instruments Model 580B photoionization detector (PID) of soil headspace:

SE corner

SS7' Description PID

BH - -0'-4' m-c fill sand w/ gravel

fill

-4'-8'

Soil Sample Collected for Analysis:

SS 4, 5 Description PID

BH - -0'-4'

SAME

-4'-8'

Soil Sample Collected for Analysis:

Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Target Drilling
Date: 4/23/03

Hole #: MW-1(MW-01)
Project #: 20121.10H
Driller: Siragusa
Inspector: Morton

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		1	2	6	6	0	0-2	6? top soil, tan silt with trace medium Sand
		7	8	11	11	0	2-4	tan silt trace medium Sand
		5	8	9	11	0	4-6	tan silt trace medium Sand with trace gravel
		3	5	10	9	0	6-8	Fine SAND some silt, trace gravel
		10	15	25	26	0	8-10	Fine SAND some silt, trace gravel with rock fragments
		8	13	19	22	0	10-12	Fine SAND some silt, trace gravel with rock fragments
		75	17	20	27	0	12-14	Fine SAND some silt, trace gravel with rock fragments
		12	17	24	28	0	14-16	Fine SAND some silt, trace gravel with rock fragments

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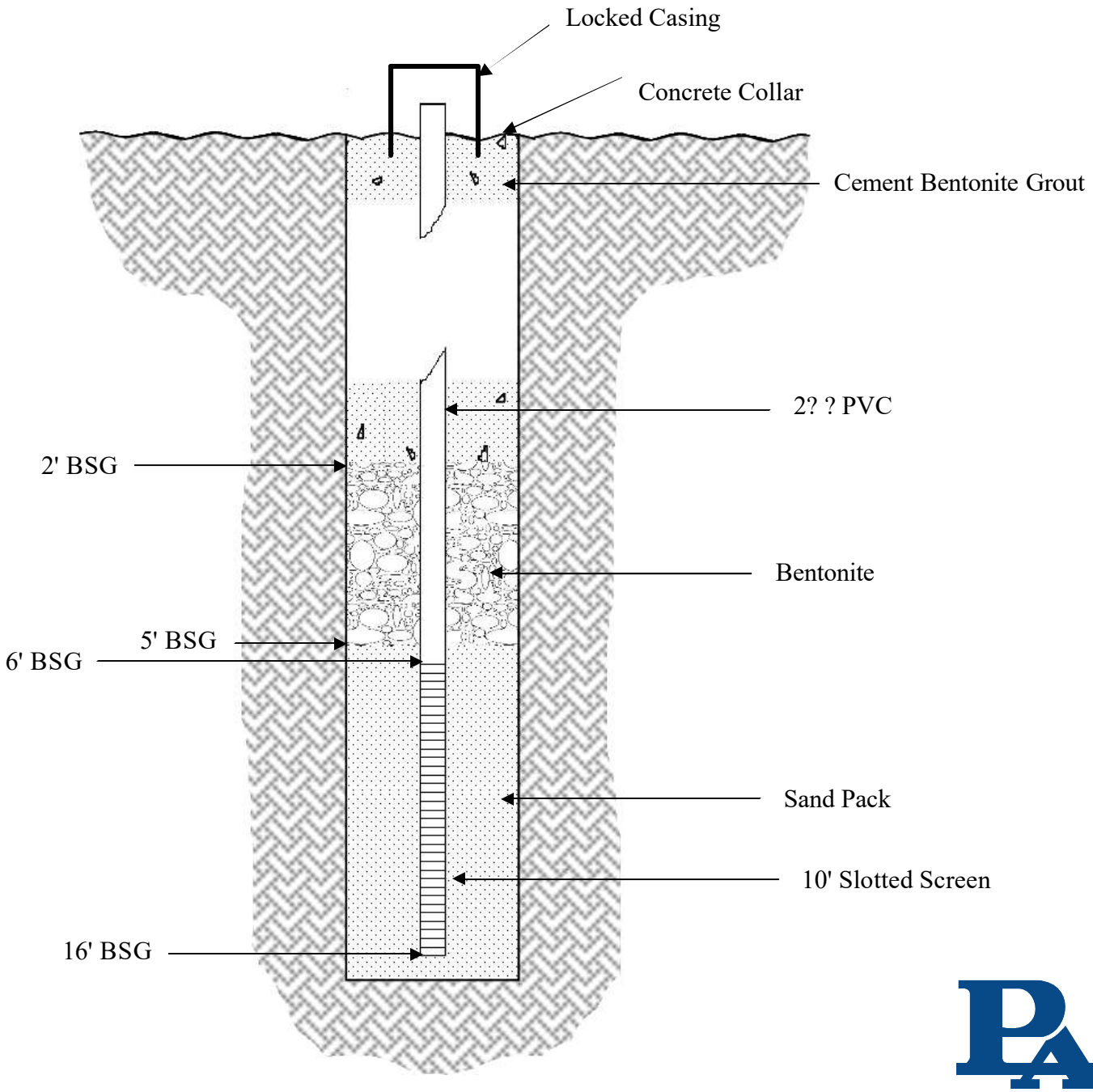
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-1 (MW-01)



Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Target Drilling
Date: 4/17/03

Hole #: MW-2 (MW-02)
Project #: 20121.10H
Driller: Siragusa
Inspector: Morton

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		7	7	8	12	0	0-2	4? top soil/gravel, SILT some fine sand trace clay and gravel
		9	13	23	26	0	2-4	SILT some fine sand trace clay and gravel
		9	10	11	18	0	4-6	Moist tan SILT trace clay, fine sand and gravel.
		7	8	12	14	0	6-8	At 7', saturated coarse SAND with gravel layer, fine sand trace silt, clay
		12	18	27	33	0	8-10	Dry tan CLAY trace fine sand
		12	20	34	38	0	10-12	Dry tan CLAY trace fine sand
		17	22	27	44	0	12-14	Dry tan CLAY trace fine sand

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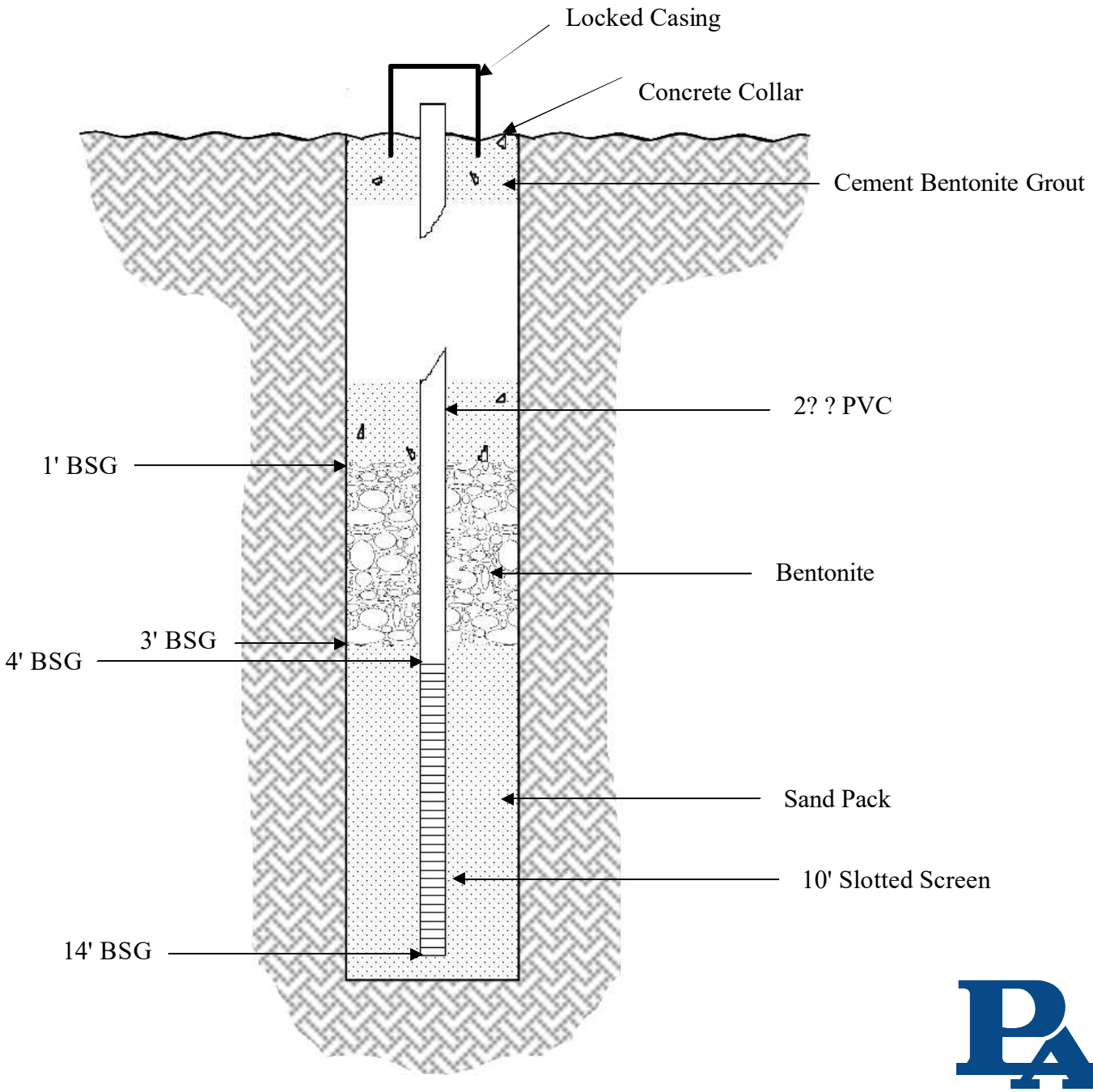
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-2 (MW-02)



Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Target Drilling
Date: 4/17/03

Hole #: MW-3 (MW-03)
Project #: 20121.10H
Driller: Siragusa
Inspector: Morton

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		8	7	6	10	0	0-2	6? dry fill, dry SILT/CLAY with fine sand
		8	11	15	15	0	2-4	dry SILT/CLAY with fine sand
		8	10	11	15	0	4-6	dry SILT/CLAY with fine sand
		6	12	10	10	0	6-8	dry SILT/CLAY with fine sand with trace gravel, rock fragments
		9	9	11	14	0	8-10	Moist-wet SILT/CLAY with fine sand with trace gravel, rock fragments
		8	11	12	12	0	10-12	Moist-wet SILT/CLAY with fine sand with trace gravel, rock fragments
		12	15	16	17	0	12-14	Moist-wet SILT/CLAY with fine sand with trace gravel, rock fragments
		7	7	11	11	0	14-16	Wet SILT some clay, trace fine sand trace gravel
		6	10	8	10		16-18	Wet SILT some clay, trace fine sand, trace gravel, poor recovery with stone jammed
		4	11	12	12		18-20	Wet SILT some clay, trace fine sand, trace gravel

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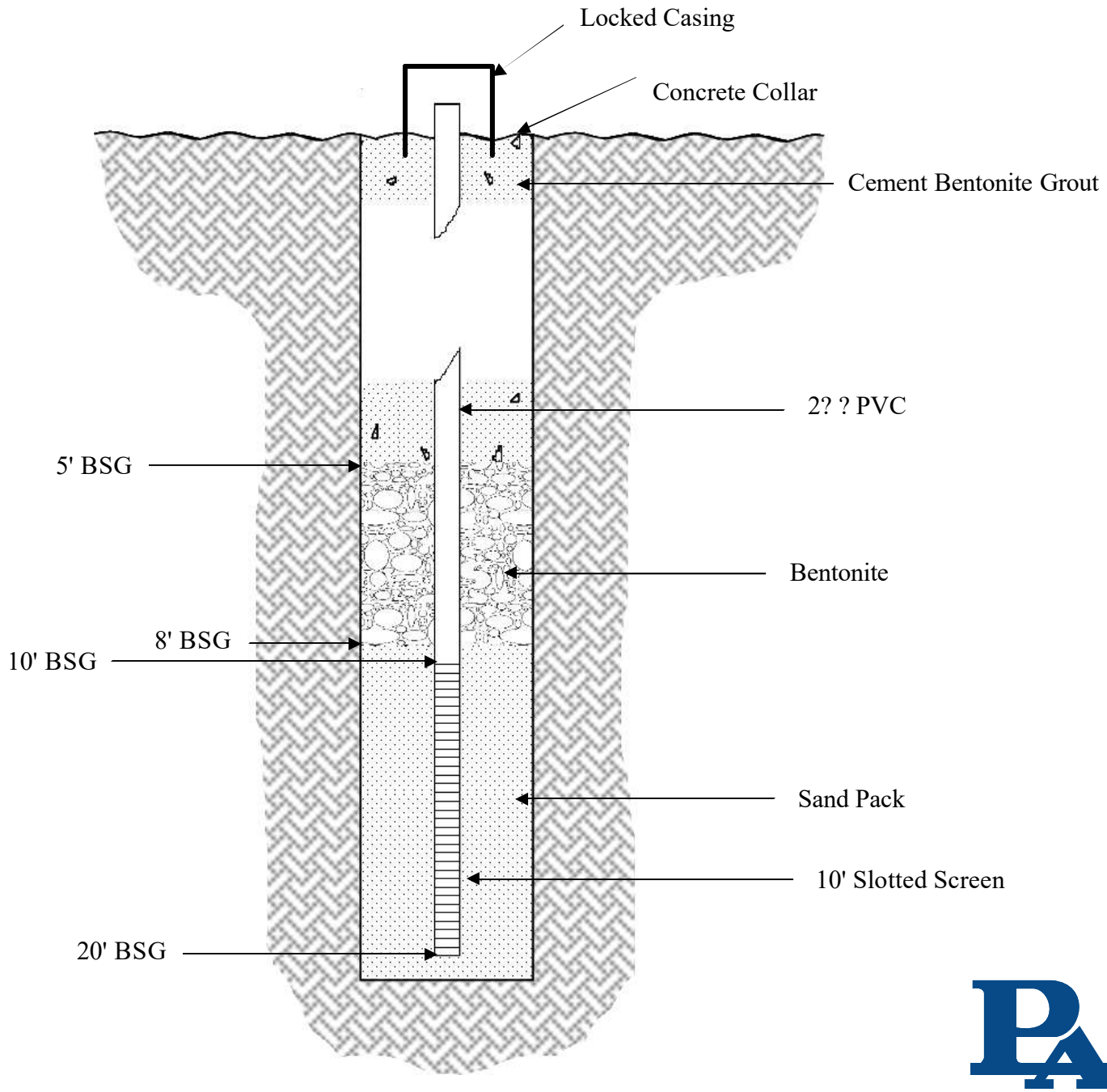
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-3 (MW-03)



Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Target Drilling
Date: 4/21/03

Hole #: MW-4S (MW-04S)
Project #: 20121.10H
Driller: Siragusa
Inspector: Morton

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
						0		Augured through asphalt and 1foot of broken stone
			3	4	5	0	1-2.5	SILT trace fine sand
			7	7	8	0	2.5-4	SILT trace fine sand
		10	12	13	17	0	4-6	SILT some clay, trace fine sand
		8	12	13	13	0	6-8	Moist SILT trace clay, fine sand
		10	10	10	12	0	8-10	Moist-wet SILT some fine sand trace gravel
		6	8	12	14	0	10-12	Moist SILT some clay trace fine sand
		12	14	16	17	0	12-14	Moist SILT some clay trace fine sand trace gravel
		6	7	8	12		14-16	Moist SILT some clay trace fine sand trace gravel

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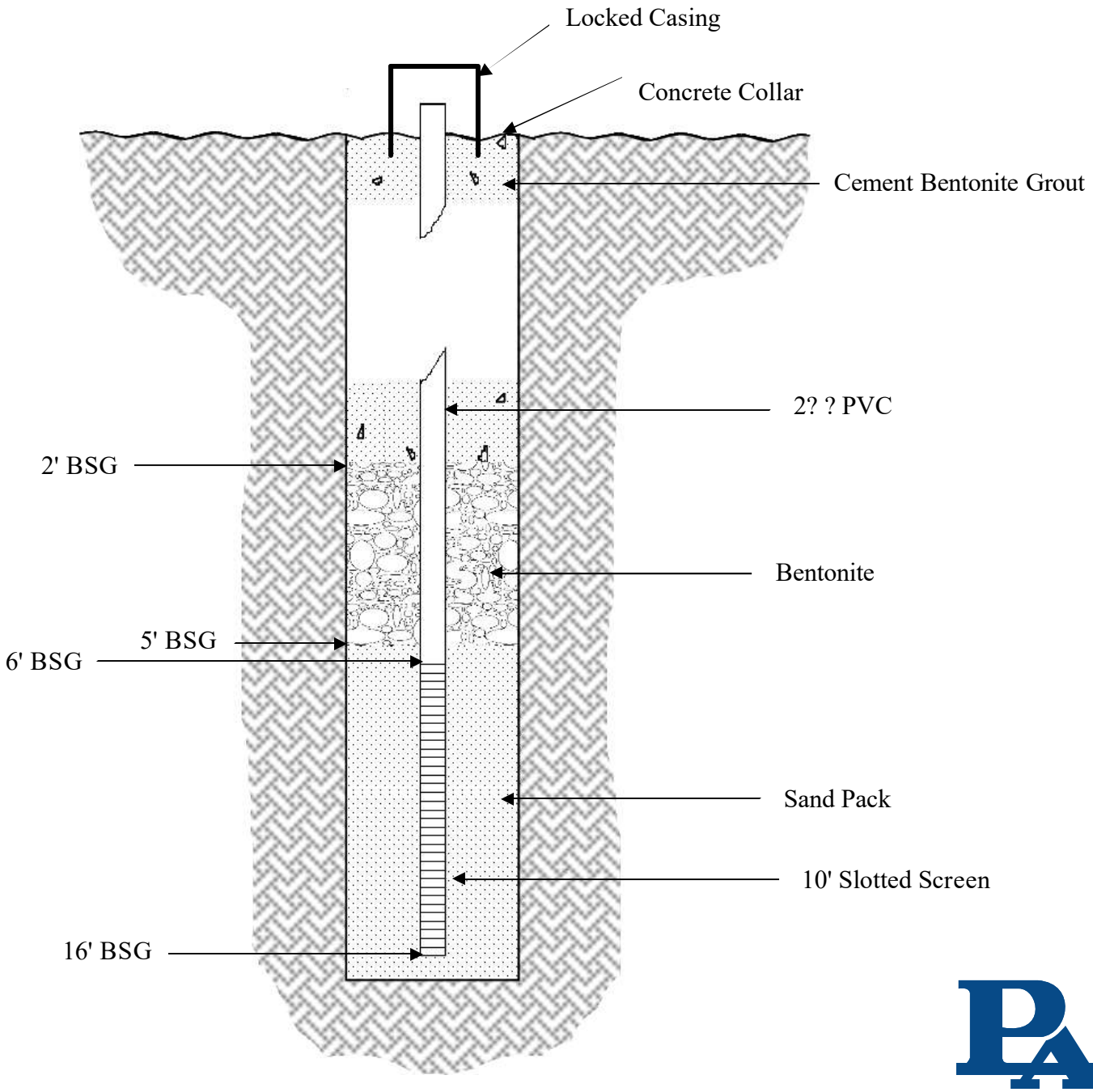
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-4S (MW-04S)



Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Target Drilling
Date: 4/21/03

Hole #: MW-4D (MW-04D)
Project #: 20121.10H
Driller: Siragusa
Inspector: Morton

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		12	13	15		0	20-21.5	No recovery
		8	9	8		0	21.5-23.0	Moist fine SAND trace silt, clay, gravel
		8	14	14		0	25-26.5	Moist fine SAND trace silt, clay, gravel
		7	6	10		0	30-31.5	Plastic SILT/CLAY trace fine sand, gravel
		5	7	13		0	35-36.5	SILT trace clay, fine sand, gravel
		8	8	10		0	40-41.5	SILT trace clay, fine sand, gravel
		5	8	8		0	45-46.5	Poor recovery, SILT trace clay, fine sand, gravel
		7	7	13		0	50-51.5	SILT trace clay, fine sand, gravel
		7	7	8			55-56.5	SILT trace clay, fine sand, gravel
		3	7	7			60-61.5	Plastic CLAY

Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Target Drilling
Date: 4/21/03

Hole #: MW-4D (MW-04D)
Project #: 20121.10H
Driller: Siragusa
Inspector: Morton

0	C	BLOWS ON SAMPLER 0? 6?	6? 12?	12? 18?	18? 24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
						0	65-66.5	Saturated fine to medium SAND trace fine sand, silt, clay, rock fragments
			8	7	20	0	70-71.5	Saturated fine to medium sand trace gravel
			20	20	23	0	75-76.5	Saturated fine to medium sand trace gravel

Total Depth 77' 10?

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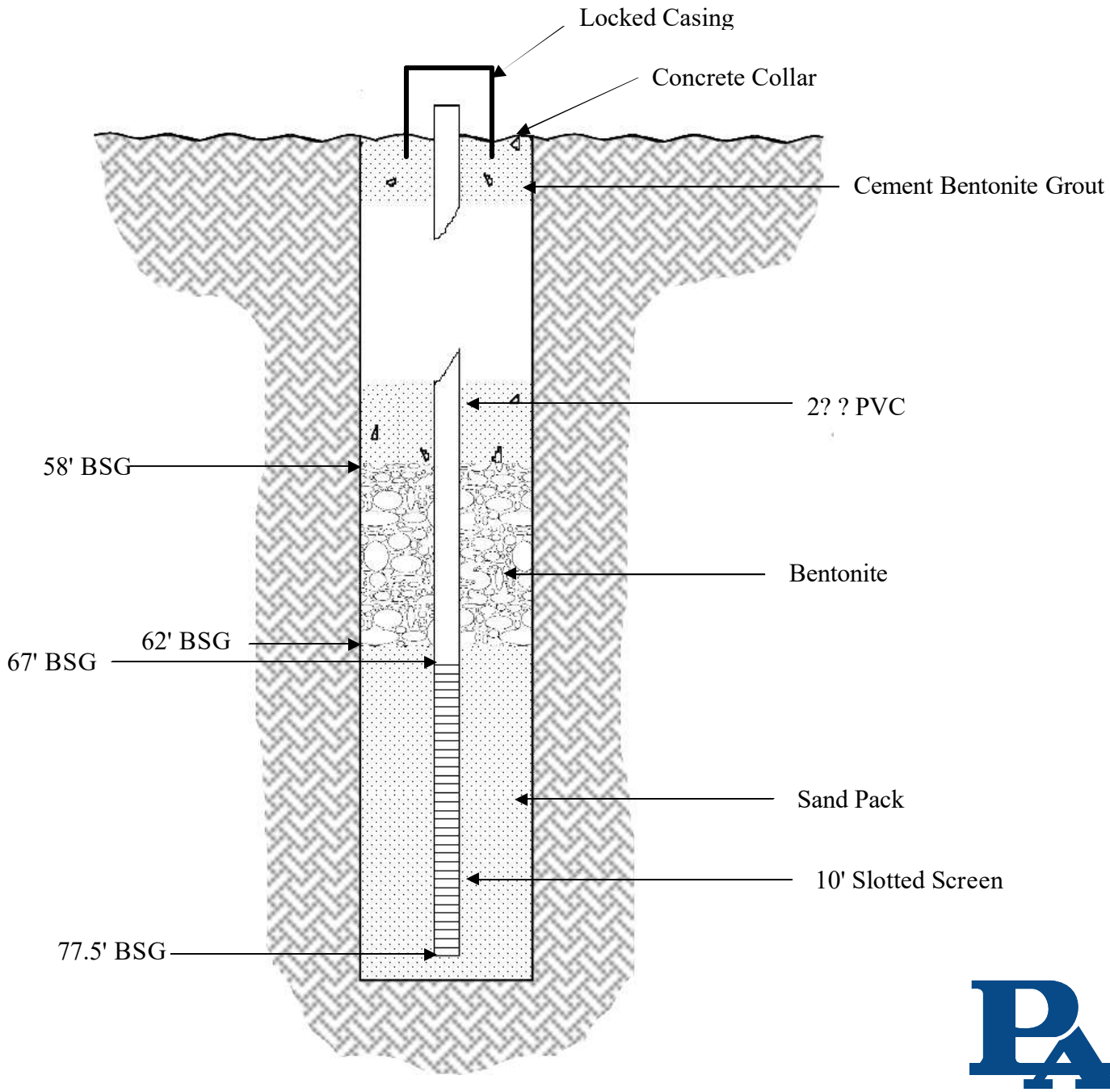
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-4D (MW-04D)



Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Target Drilling
Date: 4/14/03

Hole #: MW-5 (MW-05)
Project #: 20121.10H
Driller: Siragusa
Inspector: Morton

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		5	9	7		0	1-2'6?	2'6? Asphalt, crushed stone for 6?
						0	2'6?-4	4' moist SILT trace clay
		9	10	11	12	0	4-6	6' moist fine SAND trace silt, trace clay
		6	7	12	12	0	6-8	moist fine SAND trace silt, trace clay
		6	7	12	16	0	8-10	Moist-dry SILT trace fine sand, clay, trace gravel
		6	9	17	17	0	10-12	Two inches of wet fine SAND to Moist SILT, trace clay, trace gravel
		15	18	18	18	0	12-14	CLAY some silt, trace fine sand, trace gravel
		10	9	13	16	0	14-16	No recovery
		12	12	14	16	0	16-18	CLAY trace fine sand, trace silt, trace gravel
		26	9	10	10	0	18-20	Two inches of recovery, spoon was pushing rock fragment, CLAY trace fine sand, silt, trace gravel

Subject Site: Fischbach & Moore VCA **Client:** 235 Metro Park Associates **Contractor:** Target Drilling **Date:** 4/14/03	**Hole #:** MW-5 (MW-05) **Project #:** 20121.10H **Driller:** Siragusa **Inspector:** Morton

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		3	7	9	9	0	20-22	Moist fine SAND trace silt, clay, gravel
		7	7	9	10	0	22-24	Moist fine SAND some silt trace clay moist CLAY trace fine sand , silt
		64/6?					24-26	Six inches of recovery, Moist fine SAND some silt trace clay to moist CLAY trace fine sand , silt
		7	8	11	17	0	26-28	Moist SILT some clay, trace fine sand, trace gravel
		7	9	12	10	0	28-30	Moist fine red SAND some silt, trace clay, trace gravel
		5	11	8	8	0	30-32	Moist-wet fine SAND some silt, trace clay, trace gravel, rock fragments

Based on several small seams of saturation, no defined groundwater table

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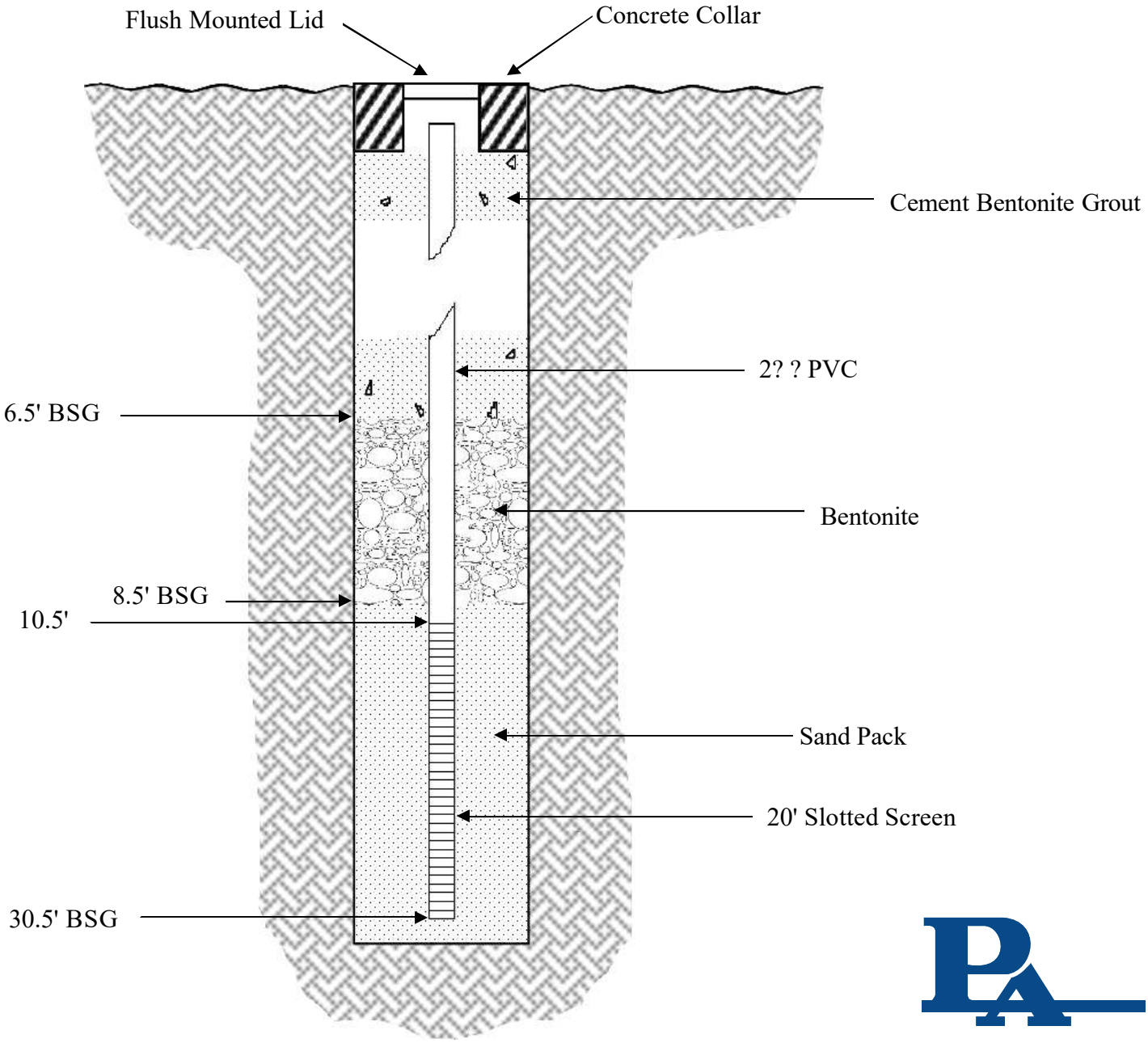
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-5 (MW-05)



Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Target Drilling
Date: 4/15/03

Hole #: MW-6 (MW-06)
Project #: 20121.10H
Driller: Siragusa
Inspector: Morton

0	C	BLOWS ON SAMPLER 0? 6?	6? 12?	12? 18?	18? 24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		1	2	1	2	0	0-2	4? topsoil, 2?coarse fill SAND, fine SAND some clay, trace silt, trace gravel
		4	6	13	22	0	2-4	Fine SAND some clay, trace silt, trace gravel
		Grinding no sample					4-6	
		15	14	11	12	0	6-8	Pushed rock 4? recovery fine SAND some clay, trace silt, trace gravel
		14	12	22	20	0	8-10	No recovery
		8	10	12	13	0	10-12	Moist fine SAND trace silt, clay , gravel
		12	18	20	22	0	12-14	Wet fine SAND trace silt, trace clay, trace gravel over dry CLAY trace silt, fine sand, trace gravel
		9	11	15	15	0	14-16	Wet fine SAND trace silt, trace clay, trace gravel over dry CLAY trace silt, fine sand, trace gravel
		8	9	13	12	0	16-18	Saturated fine SAND some silt, over CLAY trace fine sand, trace gravel
		4	8	11	11	0	18-20	Saturated fine SAND some silt, over CLAY trace fine sand, trace gravel

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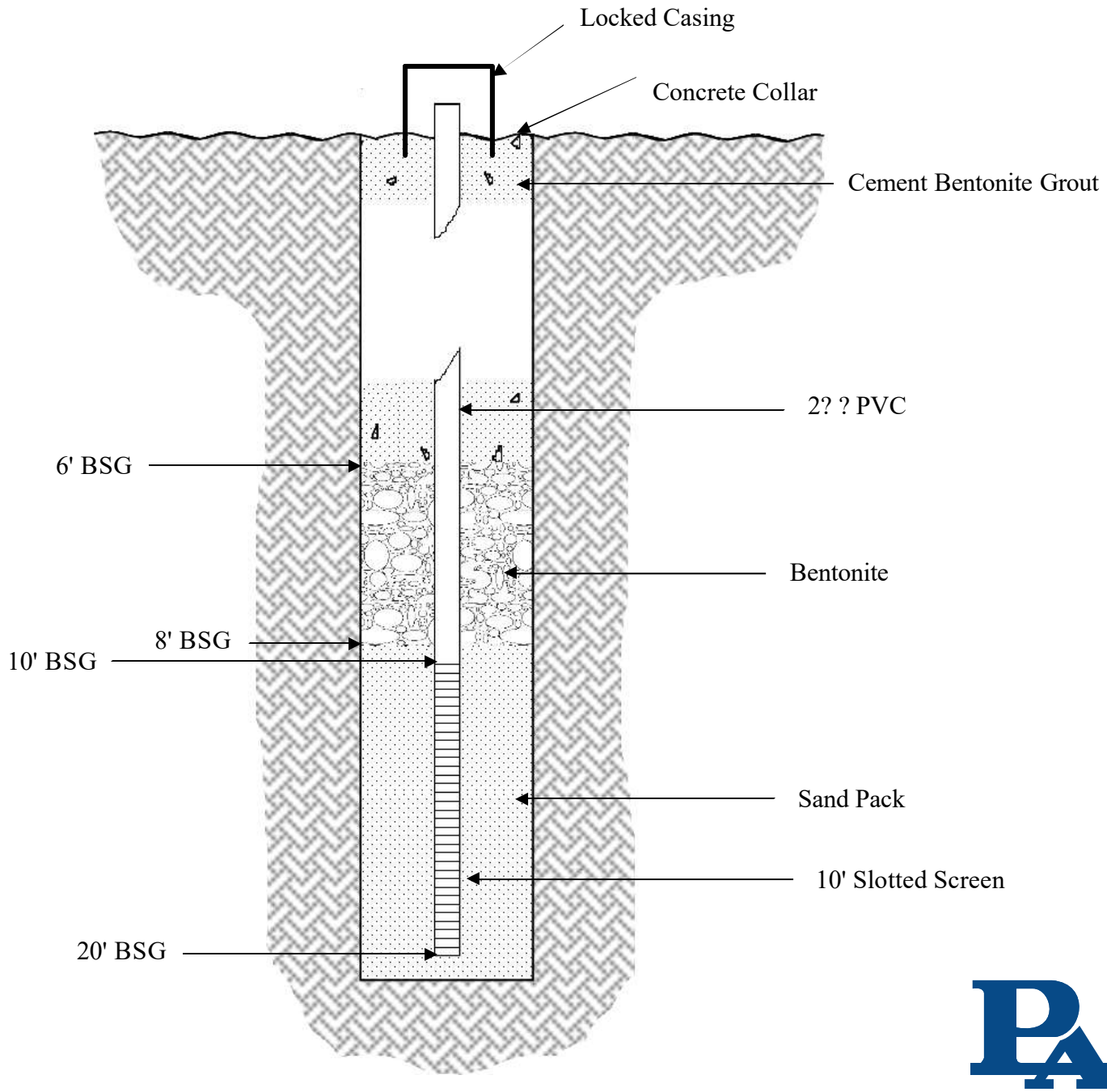
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-6 (MW-06)



Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Target Drilling
Date: 4/23/03

Hole #: MW-7 (MW-07)
Project #: 20121.10H
Driller: Siragusa
Inspector: Morton

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		2	4	5	6	0	0-2	6? topsoil, SILT trace fine sand, trace clay
		8	9	15	13	0	2-4	SILT trace fine sand, trace clay
		2	4	8	10	0	4-6	SILT trace fine sand, trace clay
		4	7	6	11	0	6-8	@ 8', fine SAND some silt, trace clay
		7	9	10	14	0	8-10	fine SAND some silt, trace clay
		5	9	13	14	0	10-12	fine SAND some silt, trace clay
		5	9	13	14	0	12-14	Silt saturated fine SAND @13'
							14-16	Cobble, no recovery

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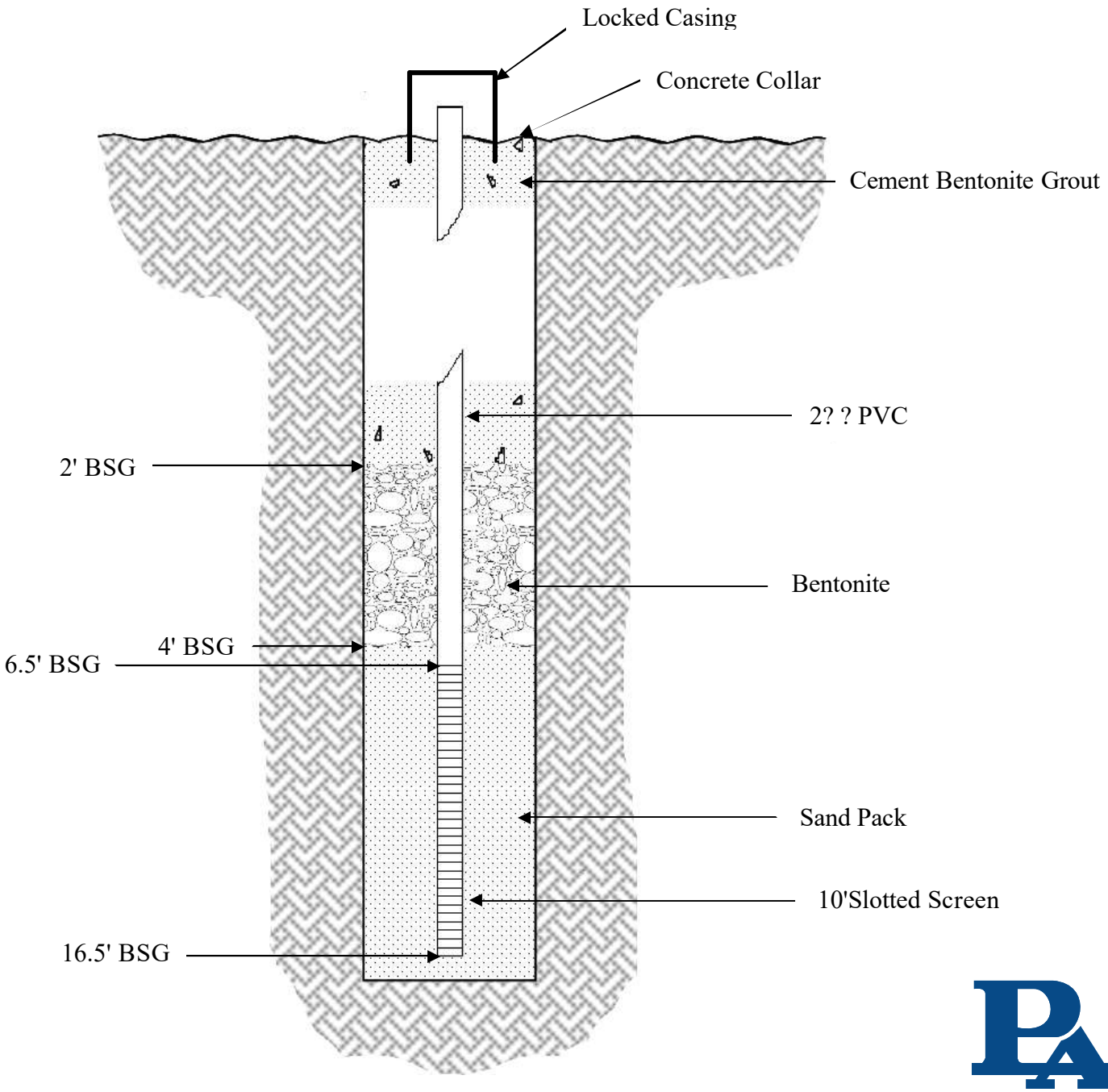
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-7 (MW-07)



Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Target Drilling
Date: 4/24/03

Hole #: MW-8 (MW-08)
Project #: 20121.10H
Driller: Siragusa
Inspector: Morton

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		1	3	6	5	0	0-2	6? topsoil, SILT some fine sand, trace gravel
		5	6	8	6	0	2-4	SILT some fine sand, trace gravel
		9	9	12	14	0	4-6	Saturated fine SAND 4'-5', fine SAND trace SILT
		6	10	14	15	0	6-8	SILT trace fine sand
		15	20	20	35	0	8-10	Saturated fine to medium SAND @ 9'-10'
		8	15	18	26	0	10-12	Moist-wet SILT trace fine sand, gravel, clay
		17	14	16	17	0	12-14	Moist-wet SILT trace fine sand, gravel, clay

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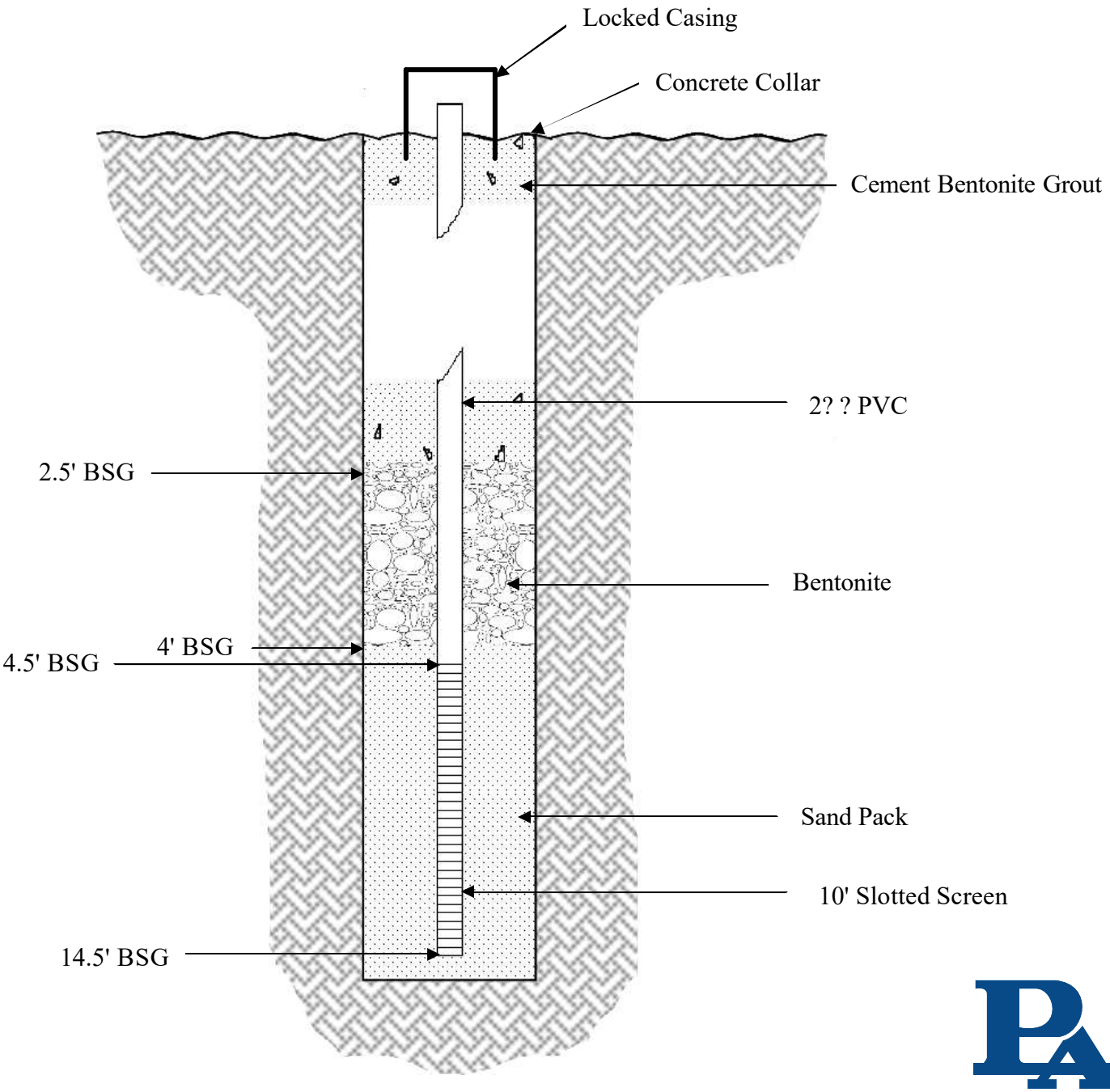
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-8 (MW-08)



Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Target Drilling
Date: 4/16/03

Hole #: MW-9 (MW-09)
Project #: 20121.10H
Driller: Siragusa
Inspector: Morton

0	C	BLOWS ON SAMPLER 0? 6?	6? 12?	12? 18?	18? 24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		1	2	5	5	0	0-2	12? topsoil, fine SAND trace silt
		7	9	13	14	0	2-4	Fine SAND some silt, trace clay, gravel
		9	17	18	20	0	4-6	Fine SAND some silt, trace clay, gravel
		18	12	13	20	0	6-8	SILT trace fine, sand, clay, gravel
		19	18	22	35	0	8-10	SILT trace fine, sand, clay, gravel
		10	12	18	36	0	10-12	Moist, SILT trace fine, sand, clay, gravel
		15	17	25	21	0	12-14	Moist, SILT trace fine sand, trace clay, trace gravel
		4	5	7	9	0	14-16	Moist CLAY some silt, trace fine sand, rock fragments
		11	11	11	11	0	16-18	Moist CLAY some silt, trace fine sand, rock fragments
		5	5	5	8	0	18-20	Moist CLAY some silt, trace fine sand, rock fragments, trace gravel

Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Target Drilling
Date: 4/16/03

Hole #: MW-9 (MW-09)
Project #: 20121.10H
Driller: Siragusa
Inspector: Morton

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		8	5	6	8	0	20-22	Moist CLAY some silt, trace fine sand, rock fragments, trace gravel
		6	9	8	9	0	22-24	Moist CLAY some silt, trace fine sand, rock fragments, trace gravel

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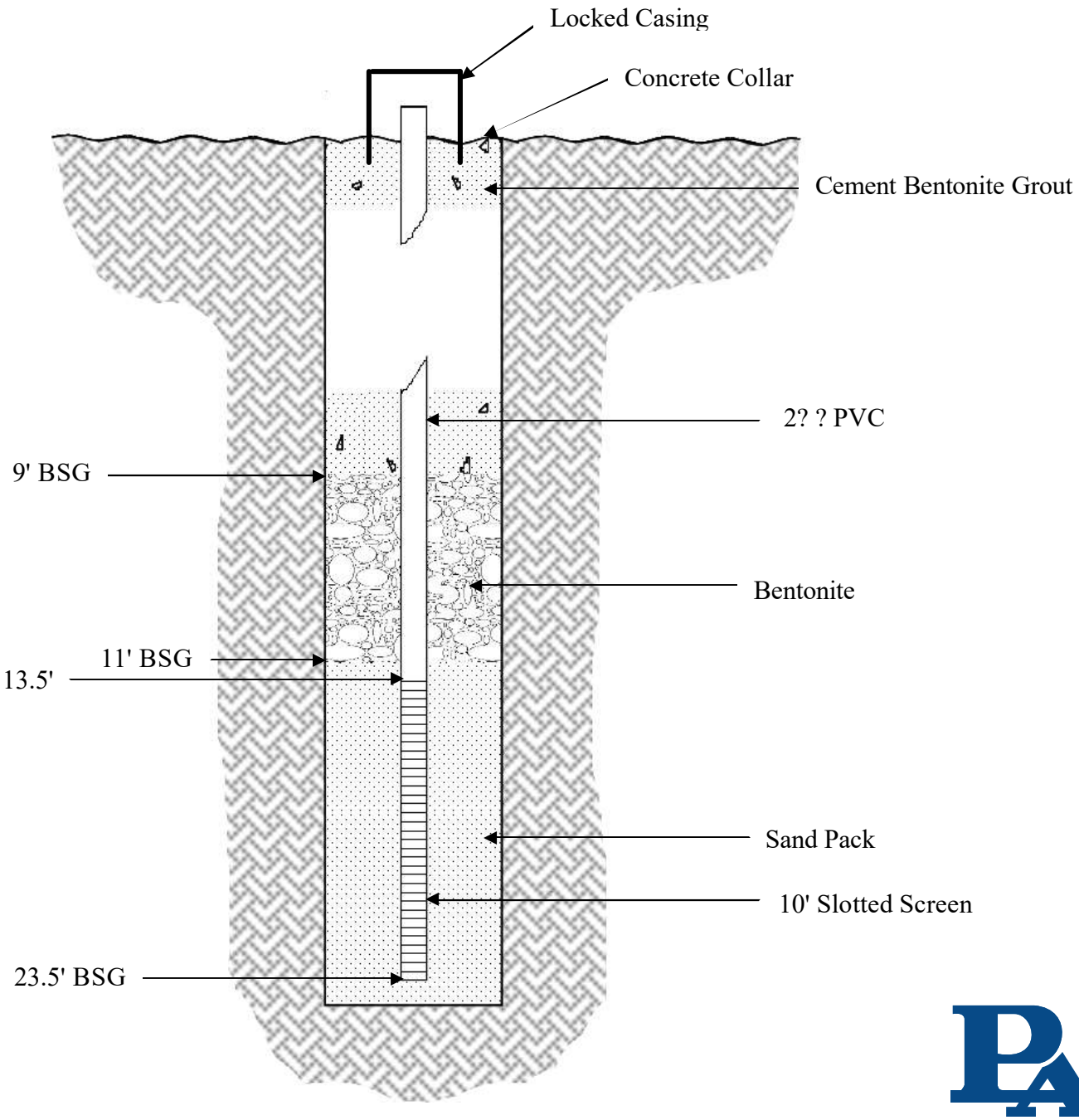
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-9 (MW-09)



Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Target Drilling
Date: 4/16/03

Hole #: MW-10
Project #: 20121.10H
Driller: Siragusa
Inspector: Morton

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		10	10	17	18	0	0-2	12? broken stone, sub base
		10	9	12	14	0	2-4	SILT trace clay, trace fine sand, trace gravel
		14	18	19	19	0	4-6	Damp loose fine SAND trace silt
		8	9	13	14	0	6-8	Damp loose fine SAND trace silt
						0	8-10	No recovery
		18	29	50/5		0	10-11.5	~10'Saturated coarse SAND with fine to medium sand, silt, over dry clay some silt, some fine sand, trace gravel
		11	23	55	24	0	12-14	Saturated coarse SAND with fine to medium sand, trace silt, over dry CLAY some silt, fine sand, gravel

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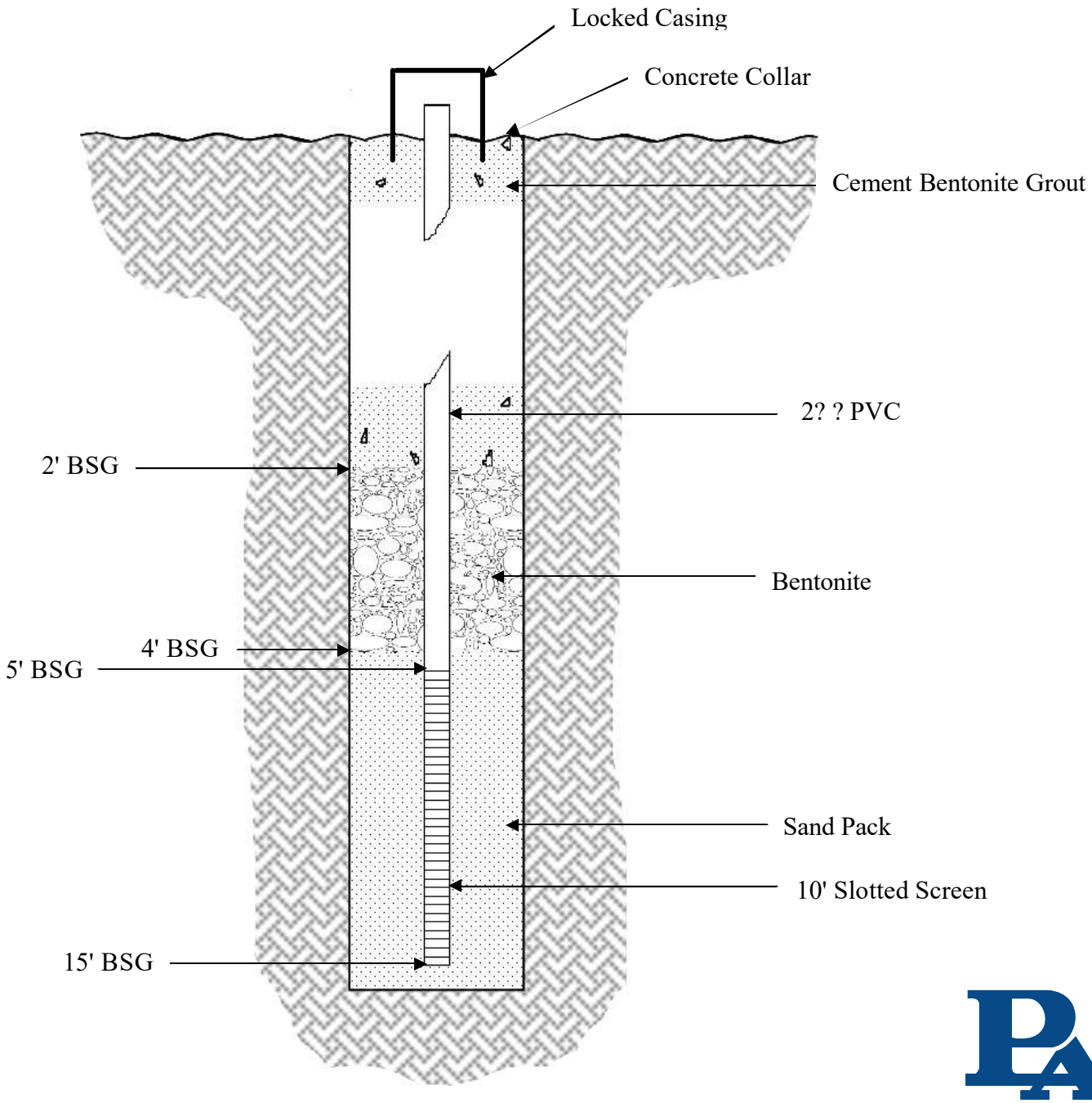
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-10



Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Target Drilling
Date: 4/22/03

Hole #: MW-11S
Project #: 20121.10H
Driller: Siragusa
Inspector: Morton

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		2	3	5	7	0	0-2	Topsoil, moist SILT and fine sand
		5	7	9	11	0	2-4	Fine SAND with silt, trace caly
		6	11	11	12	0	4-6	Moist-wet SILT/CLAY trace gravel
		5	8	11	12	0	6-8	Moist SILT trace clay, trace gravel
		9	12	15	18	0	8-10	Moist SILT trace clay, trace gravel
		10	22	26	37	0	10-12	Moist SILT/CLAY mix stone/gravel
		7	11	11	10	0	12-14	Moist SILT/CLAY mix trace brown/gold sand trace gravel

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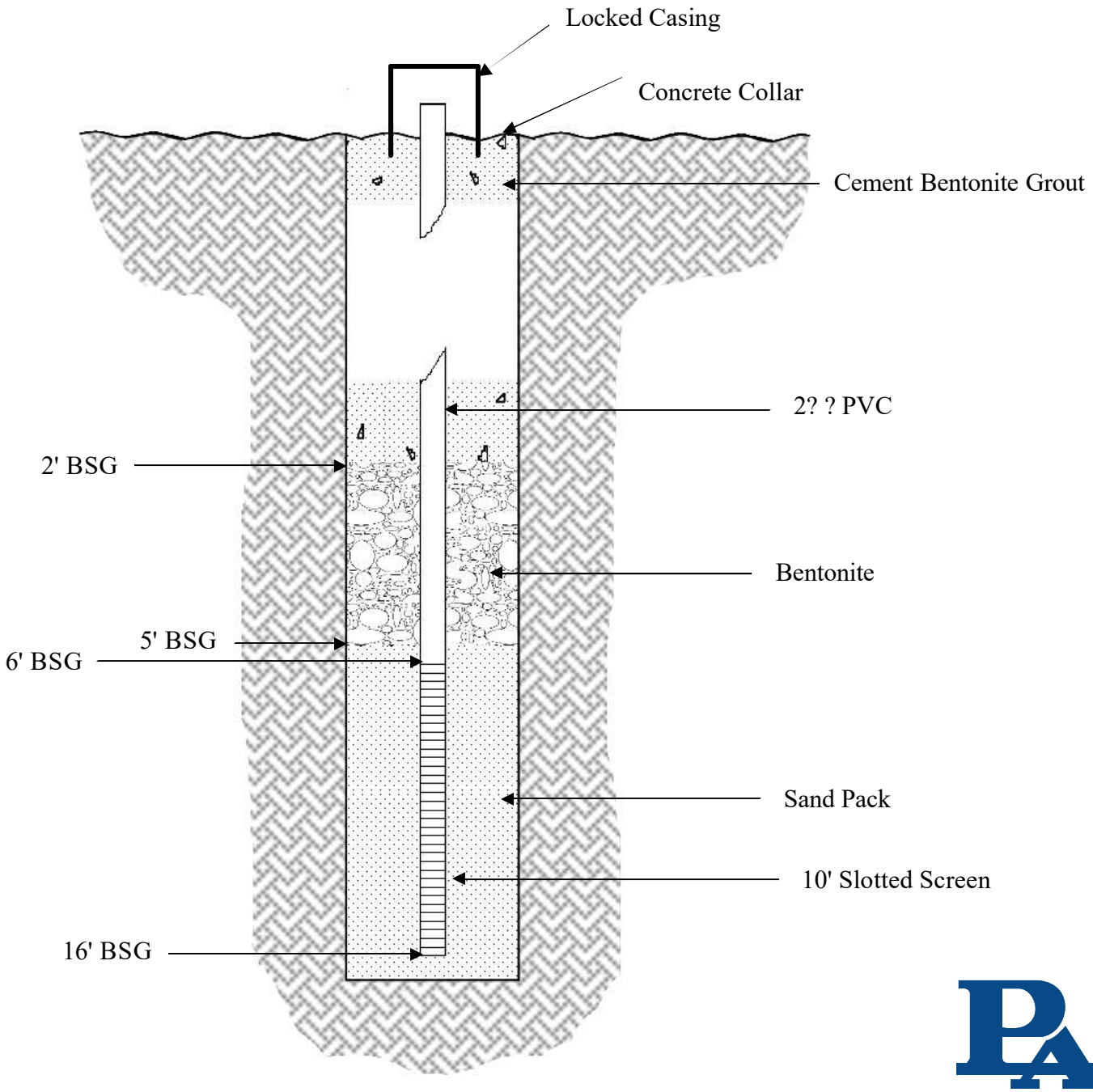
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-11S



Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Natures Way Environmental
Date: 4/23/06

Hole #: MW-12S
Project #: 20121.10H
Inspector: Passero.

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		2	3	5	8	0	0-2	Topsoil, moist SILT clay trace sand
		9	13	17	20	0	2-4	CLAY/SILT trace sand, trace gravel
		6	10	13	18	0	4-6	Moist SILT/CLAY till
		2	12	12	17	0	6-8	Moist SILT/CLAY till
		9	14	18	26	0	8-10	Moist SILT/CLAY till
		11	16	20	22	0	10-12	Moist SILT/CLAY till
		7	11	22	20	0	12-14	Moist SILT/CLAY till
		5	8	9	10	0	14-16	Moist SILT/CLAY till

Screen from 16'-6', sand to 11?, bentonite 3' to 5', cement grout to surface

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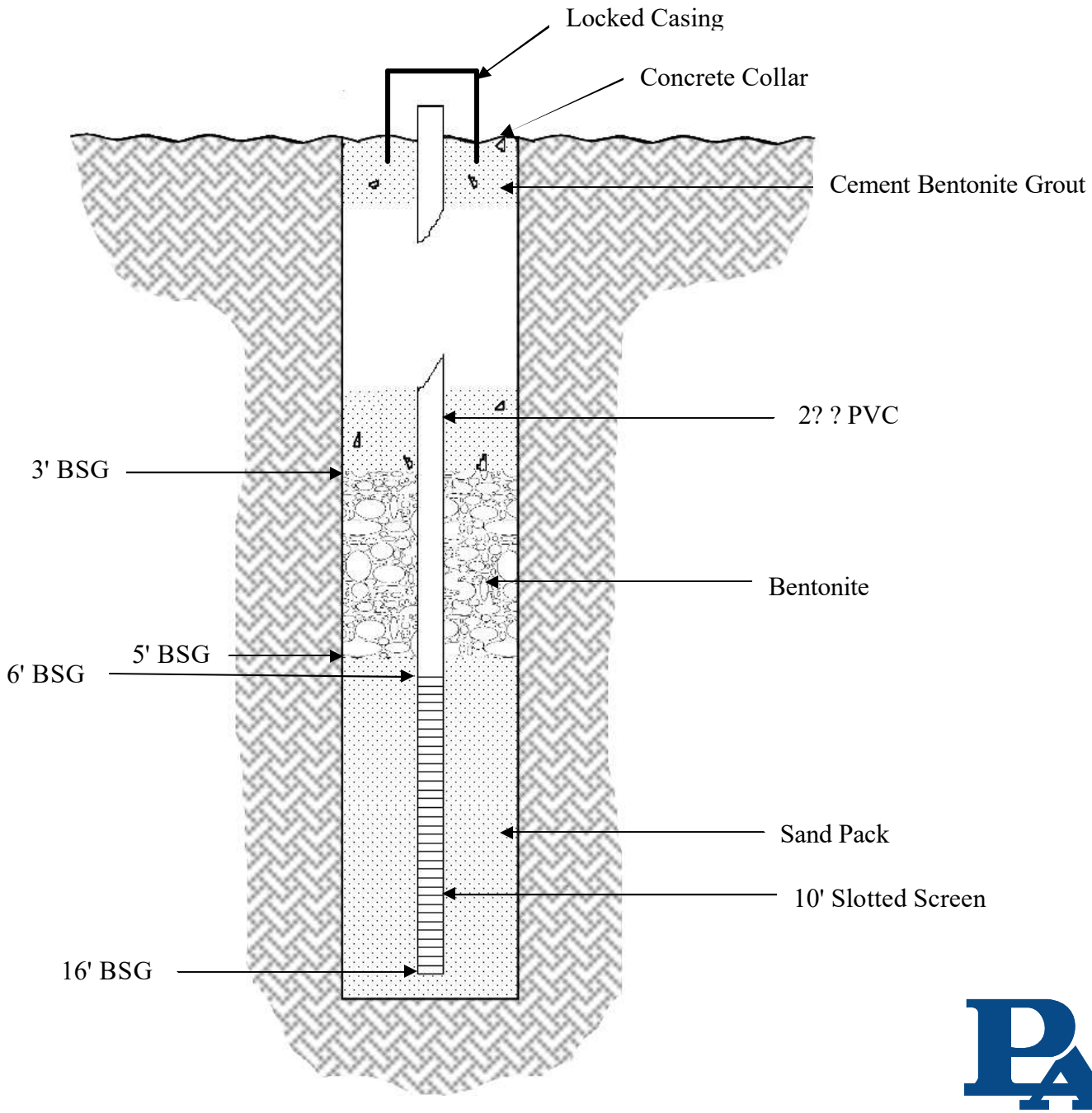
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-12S



Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Natures Way Environmental
Date: 4/23/06

Hole #: MW-12D
Project #: 20121.10H
Inspector: Passero.

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		5	7	7	9	0	16-18	Moist SILT/CLAY, till
		5	5	7	7	0	18-20	Moist SILT/CLAY, till
		3	4	7	8	0	20-22	Moist SILT/CLAY
		3	5	8	9	0	22-24	Moist SILT/CLAY
		5	6	10	10	0	24-26	Moist SILT/CLAY
		4	6	8	11	0	26-28	Moist SILT/CLAY
		10	11	11	12	0	28-30	Moist SILT/CLAY
		4	7	7	11	0	30-32	Moist SILT/CLAY
		8	12	14	16	0	32-34	Moist SILT/CLAY
		10	9	11	15	0	34-36	Moist SILT/CLAY

Sampling from 16' to 66', drilled to 71' Because of difficulties with well installation a 3? pre-packed sand 10' screen pipe to 71' and then installed 2? pvc pipe to 3? above grade. (see schematic)

Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Natures Way Environmental
Date: 4/23/06

Hole #: MW-12D
Project #: 20121.10H
Inspector: Passero

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		12	10	10	12	0	36-38	Moist SILT/CLAY till
		4	7	8	9	0	38-40	Moist SILT/CLAY till
		5	7	8	8	0	40-42	Moist SILT/CLAY till
		12	14	16	15	0	42-44	Moist SILT/CLAY till
		8	13	14	14	0	44-46	Moist SILT/CLAY till
		15	15	12	14	0	46-48	Moist SILT/CLAY till
		9	6	8	9	0	48-50	Moist SILT/CLAY till
		6	9	13	14	0	50-52	Moist SILT/CLAY till
		10	10	11	13	0	52-54	No recovery
		8	10	10	13	0	54-56	Moist SILT/CLAY till

Sampling from 16' to 66', drilled to 71' Because of difficulties with well installation a 3? pre-packed sand 10' screen pipe to 71' and then installed 2? pvc pipe to 3? above grade. (see schematic)

Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Natures Way Environmental
Date: 4/23/06

Hole #: MW-12D
Project #: 20121.10H
Inspector: Passero

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		14	15	8	9	0	56-58	Moist SILT/CLAY, till
		3	4	4	4	0	58-60	Moist plastic CLAY
		4	3	3	5	0	60-62	Wet TILL
		2	3	5	6	0	62-64	Wet plastic CLAY
		4	6	7	8	0	64-66	Wet plastic CLAY
						0	66-68	Auger only no sample
						0	68-70	Auger only no sample
						0	70-72	Auger refusal at 71'

Sampled to 66' drilled to 71' Because of difficulties with well installation a 3? pre-packed sand 10' screen pipe to 71' and then installed 2? pvc pipe to 3? above grade. (see schematic)

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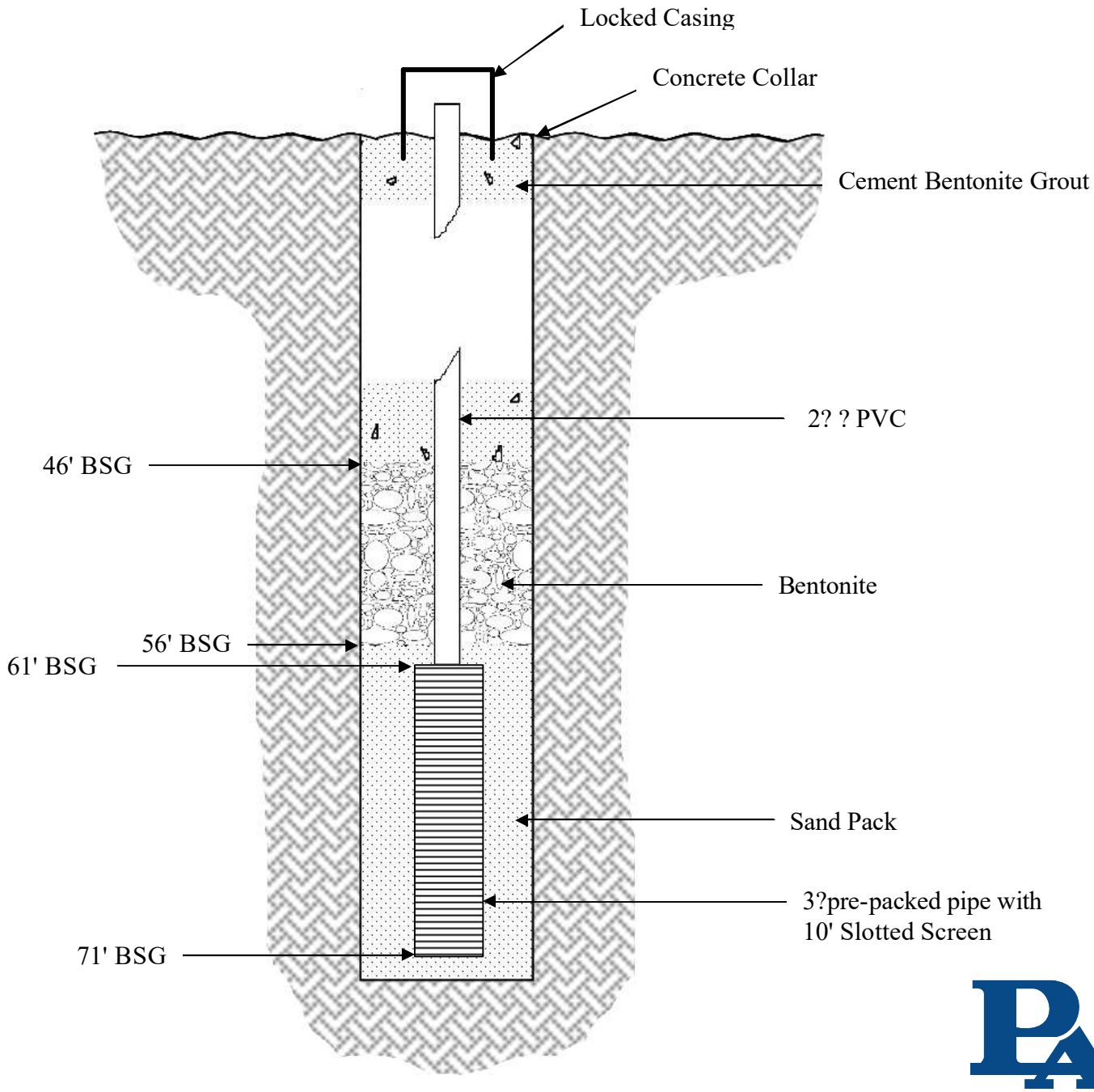
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-12D



Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Natures Way Environmental
Date: 4/23/06

Hole #: MW-13S
Project #: 20121.10H
Inspector: Passero

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		1	4	18	22	0	0-2	3? Topsoil, moist SAND trace clay, trace gravel
		6	7	10	11	0	2-4	Moist CLAY, with sand trace silt
		3	8	14	48	0	4-6	Moist CLAY, with sand and silt trace gravel
		6	9	14	18	0	6-8	CLAY with sand trace gravel
		14	19	25	28	0	8-10	No recovery
		13	22	27	30	0	10-12	Gray CLAY/SILT till
		23	14	31	14	0	12-14	Moist SILT till
		19	11	13	12	0	14-16	Moist SILT till

Screen from 16'-6', sand to 11?, bentonite to 2.5' cement grout to surface

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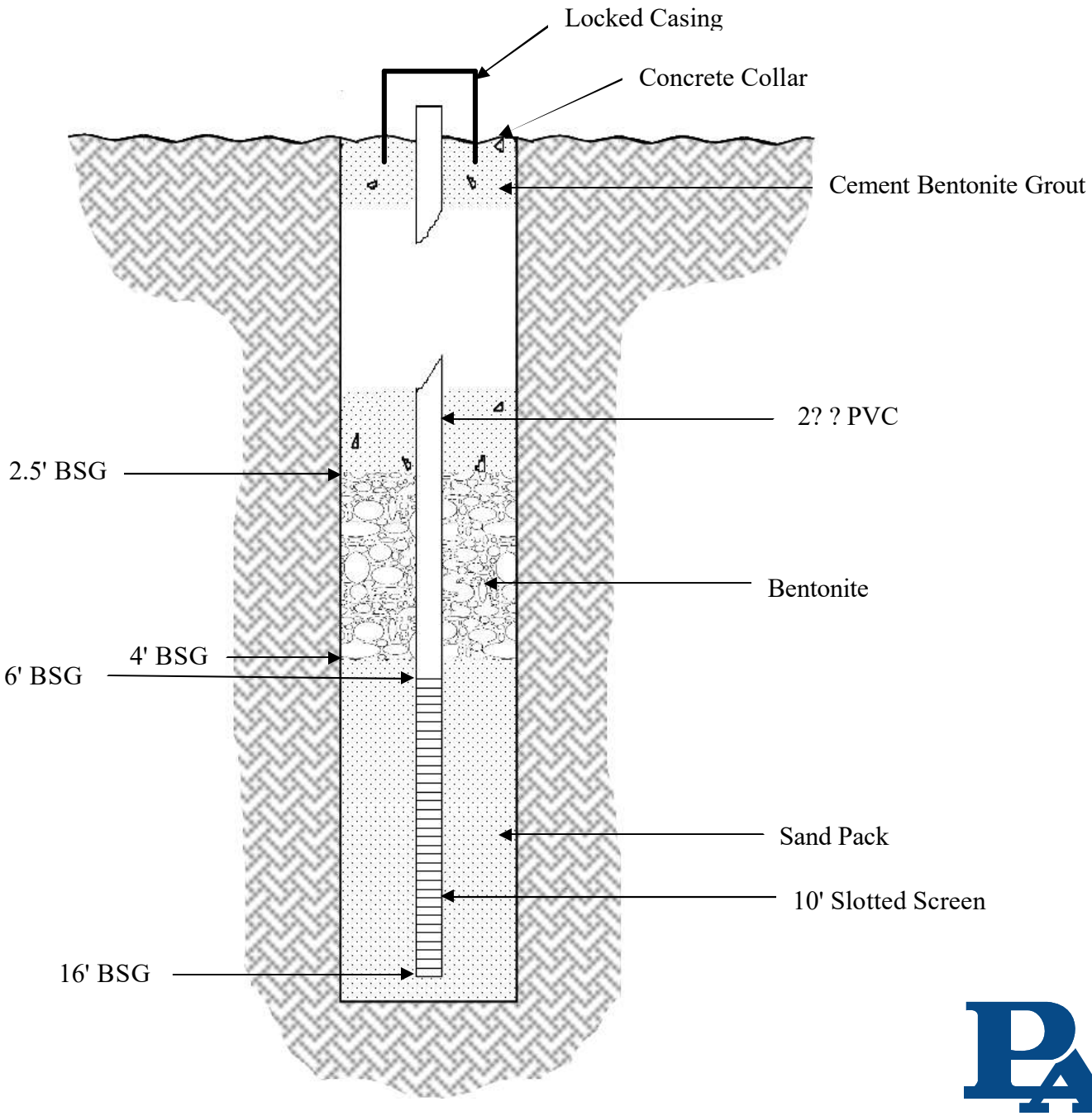
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-13S



Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Natures Way Environmental
Date: 4/23/06

Hole #: MW-13D
Project #: 20121.10H
Inspector: Passsero.

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		9	9	10	10	0	16-18	Moist SILT till, trace gravel
		6	8	10	11	0	18-20	Moist SILT till, trace gravel
		6	10	18	26	0	20-22	Moist SILT till, trace gravel
		6	10	13	20	0	22-24	Moist SILT till, trace gravel
		20	15	15	16	0	24-26	Moist SILT till, some gravel
		7	8	9	10	0	26-28	Moist SILT till, some gravel
		11	12	8	8	0	28-30	Moist SILT till, some gravel
		20	16	14	13	0	30-32	Moist SILT till, some gravel
		10	5	7	8		32-34	Moist SILT till, some gravel
		7	11	12	12		34-36	Moist SILT till, some gravel

Screen from 16'-6', sand to 11?, bentonite to 2.5' cement grout to surface. Soil sample at 7'

Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Natures Way Environmental
Date: 4/23/06

Hole #: MW-13D
Project #: 20121.10H
Inspector: Passero

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		15	9	10	10	0	36-38	Moist SILT till
		16	15	15	18	0	38-40	Moist SILT till
		17	18	17	18	0	40-42	Moist SILT till
		13	6	13	16	0	42-44	Moist SILT till
		36	13	12	12	0	44-46	Moist SILT till
		32	15	16	16	0	46-48	Moist SILT till
		30	9	11	12	0	48-50	Moist SILT till
		20	15	18	17	0	50-52	Moist SILT till
		10	11	11	12		52-54	Moist SILT till
		10	9	10	11		54-56	Moist SILT till

Screen from 16'-6', sand to 11?, bentonite to 2.5' cement grout to surface

Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Natures Way Environmental
Date: 4/23/06

Hole #: MW-13D
Project #: 20121.10H
Inspector: Passero

0	C	BLOWS ON SAMPLER 0? 6?	6? 12?	12? 18?	18? 24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		10	10	8	8	0	56-58	Moist SILT till
		12	7	6	6	0	58-60	Poor recovery, Moist SILT/CLAY till, trace gravel
		15	6	6	5	0	60-62	Moist SILT till
		5	7	6	8	0	62-64	Moist CLAY/SILT till
		99	32	25	28	0	64-66	No recovery
		167	49	30	18	0	66-68	Wet SAND with silt
		12	9	11	16	0	68-70	Wet SAND with silt
		53	65	100/ 5		0	70-72	Wet Sand trace silt
								Auger only
								Refusal ate75.3'

Pre-packed 3?slotted screen at 75'

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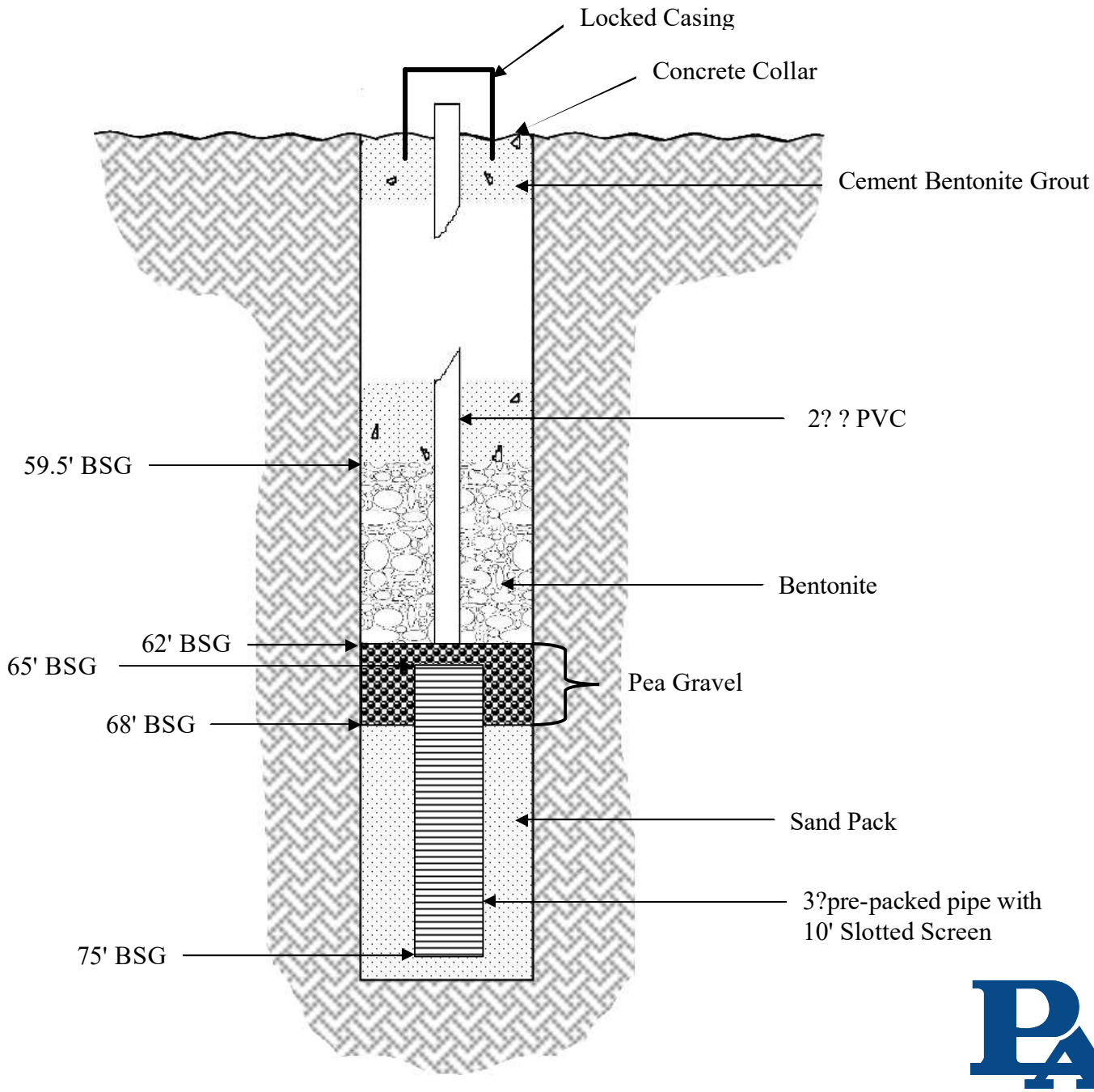
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-13D



Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Natures Way Environmental
Date: 4/23/06

Hole #: MW-14S
Project #: 20121.10H
Inspector: Passero

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
				11	13	0	0-2	Gravel, asphalt at 4?
		7	8	13	15	0	2-4	2? gravel to CLAY with sand, trace silt
		9	45	10	13	0	4-6	Medium SAND with clay, trace silt
		45	17	23	26	0	6-8	Moist medium SAND with clay, trace gravel
		7	11	13	17	0	8-10	Medium SAND with clay, trace silt, trace gravel
		6	10	14	14	0	10-12	SILT/CLAY till
		5	8	15	13	0	12-14	SILT/CLAY till
		25		50/3		0	14-16	SILT/CLAY till. Refusal at 16'

Screen from 16'-6', sand to 11?, bentonite to 2.5' cement grout to surface

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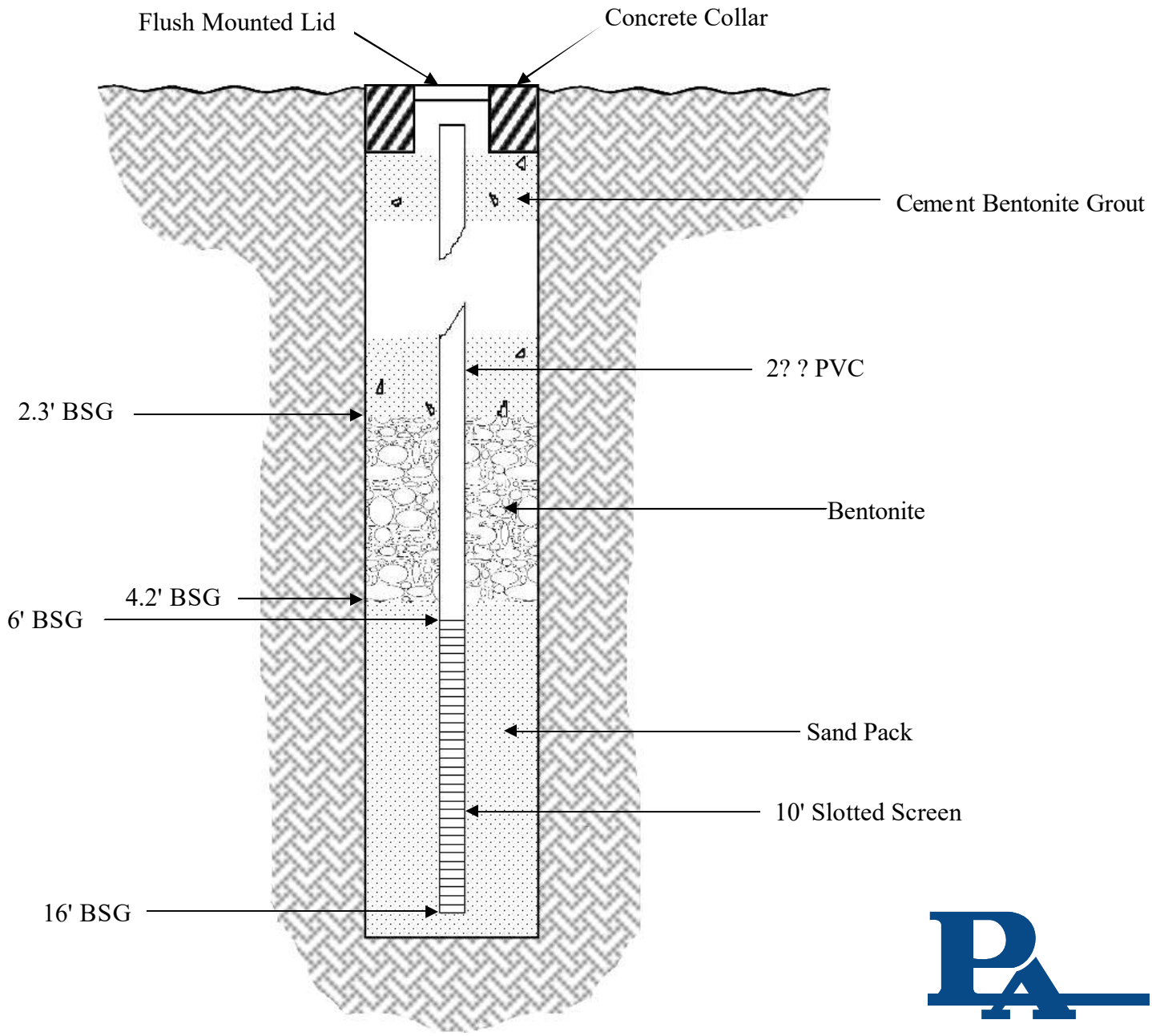
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-14S



Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Natures Way Environmental
Date: 4/23/06

Hole #: MW-15S
Project #: 20121.10H
Inspector: Passero

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		5	6	3	12	0	0-2	CLAY with gravel
		5	7	6	7	0	2-4	CLAY till
		3	10	9	10	0	4-6	CLAY till
		8	12	12	13	0	6-8	CLAY till
		5	14	17	13	0	8-10	CLAY till
		7	11	7	13	4.3	10-12	CLAY till with medium sand
		6	11	12	13	0	12-14	CLAY till, to CLAY with medium sand
		6	11	20	13	0	14-16	CLAY till

Screen from 16'-6', sand to 11?, bentonite to 2.5' cement grout to surface

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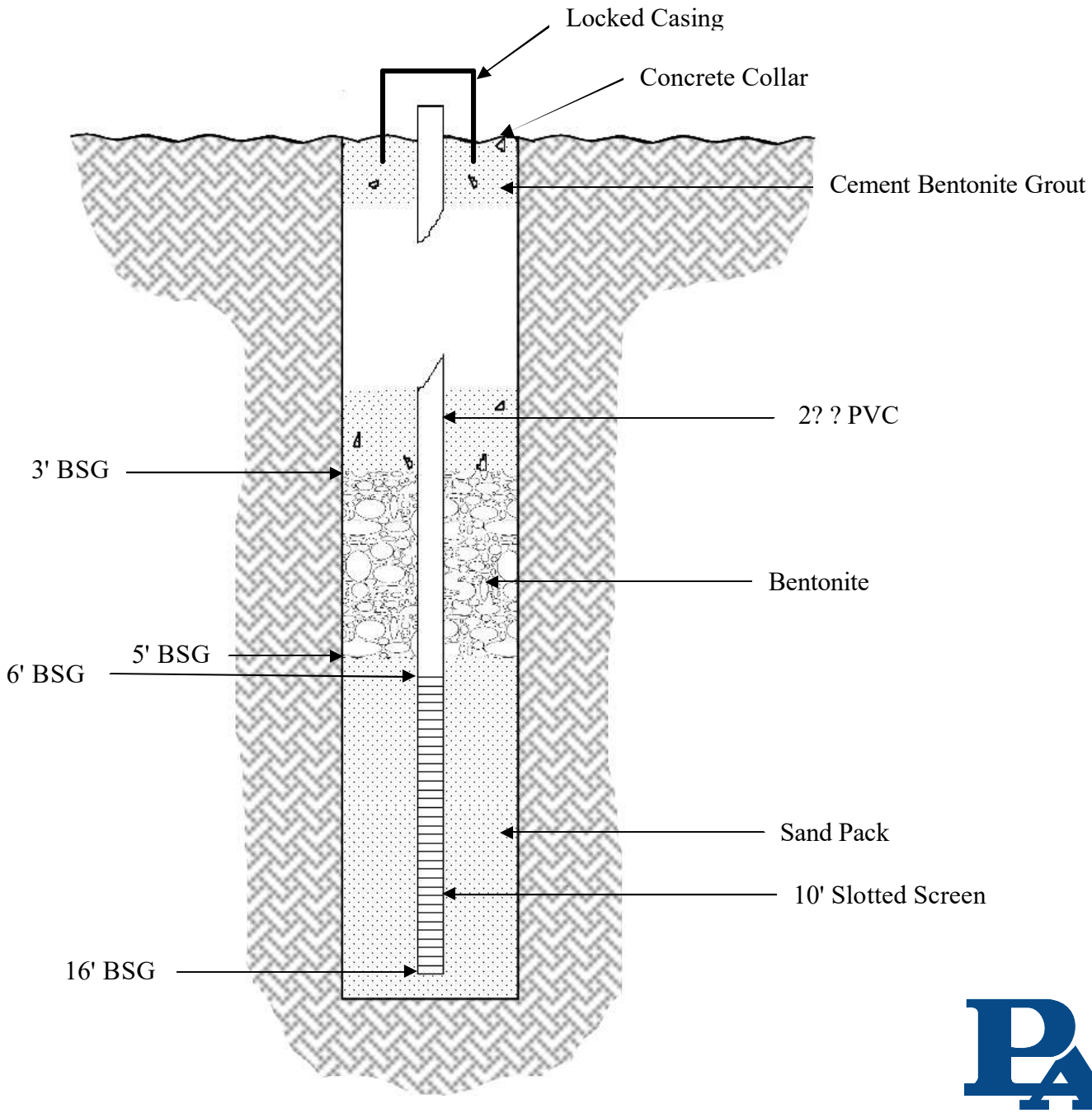
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-15S



Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Natures Way Environmental
Date: 4/23/06

Hole #: MW-16S
Project #: 20121.10H
Inspector: Passero

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		10	12	14	9	0	0-2	No recovery
		10	12	14	9	0	2-4	SILT/CLAY till
		6	8	9	10	0	4-6	SILT/CLAY till
		7	10	12	10	0	6-8	SILT/CLAY till
		4	6	10	12	0	8-10	SILT/CLAY till
		5	7	9	14	0	10-12	SAND with clay
		5	8	12	17	0	12-14	CLAY with s medium and
		10	10	10	10	0	14-16	SAND with clay

Screen from 16'-6', sand to 11?, bentonite to 2.5' cement grout to surface

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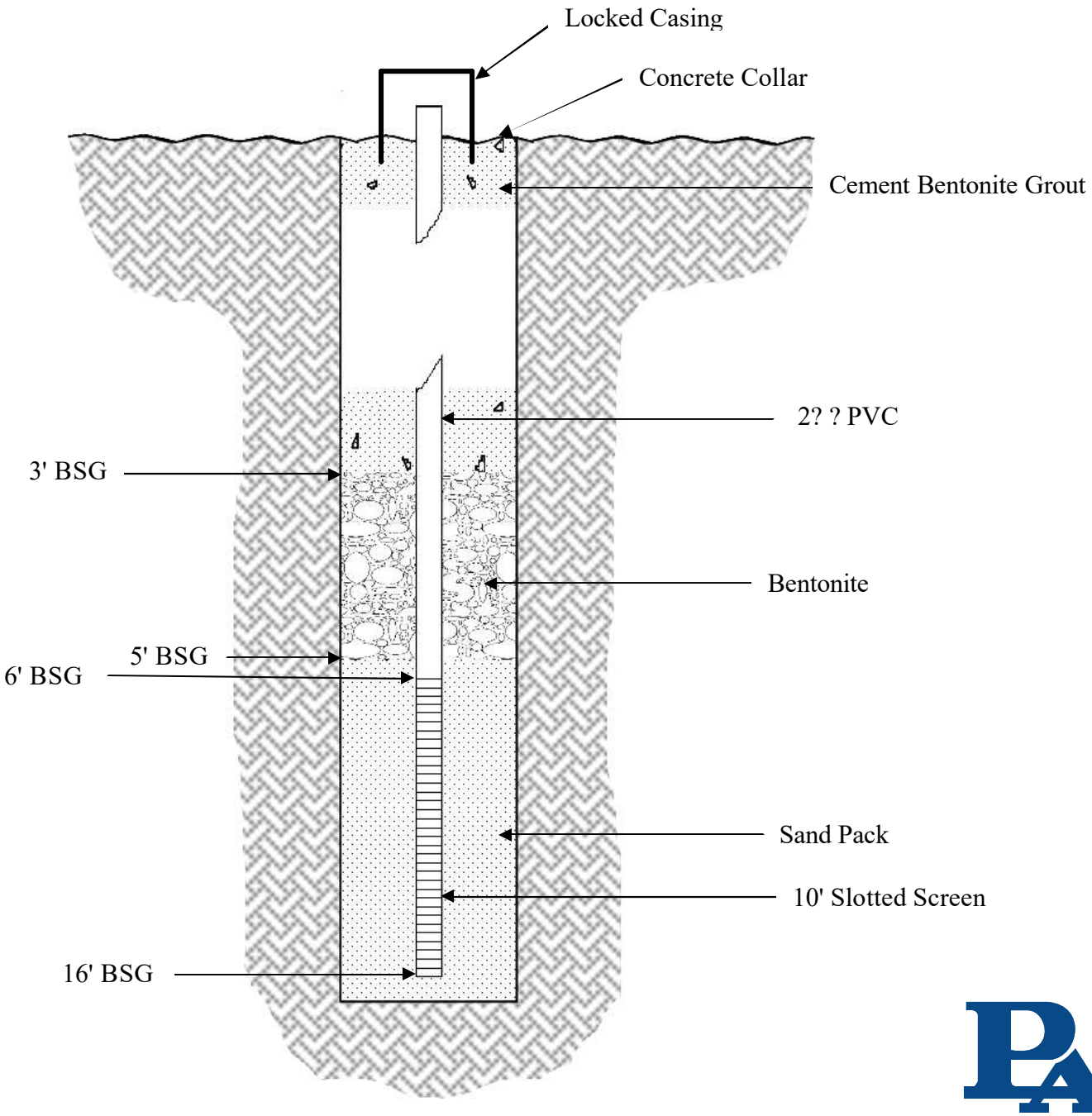
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-16S



Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Natures Way Environmental
Date: 4/23/06

Hole #: MW-16I
Project #: 20121.10H
Inspector: Passero

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		5	5	6	9	0	16-18	SILT/CLAY till
		4	5	8	10	0	18-20	SILT/CLAY till
		2	4	6	8	0	20-22	SILT/CLAY till
		5	10	15	10	0	22-24	SILT/CLAY till
		3	5	7	9	0	24-26	SILT/CLAY till
		3	4	6	6	0	26-28	SILT/CLAY till
		3	3	5	5	0	28-30	SILT/CLAY till
		3	11	11	13	0	30-32	SILT/CLAY till
		3	5	5	7	0	32-34	SILT/CLAY till
		4	4	8	7	0	34-36	CLAY

Screen from 16'-6', sand to 11?, bentonite to 2.5' cement grout to surface

Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Natures Way Environmental
Date: 4/23/06

Hole #: MW-16I
Project #: 20121.10H
Inspector: Passero

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		5	5	5	4	0	36-38	SILT/CLAY till
		3	4	8	16	0	38-40	SILT/CLAY till
		12	9	12	11	0	40-42	SILT/CLAY till
		3	2	4	7	0	42-44	CLAY
		6	8	4	5	0	44-46	CLAY
		3	2	4	6	0	46-48	CLAY
		12	12	22	12	0	48-50	SILT/CLAY till
		20	8	6	12	0	50-52	CLAY
		5	4	8	8	0	52-53	CLAY

Screen from 16'-6', sand to 11?, bentonite to 2.5' cement grout to surface

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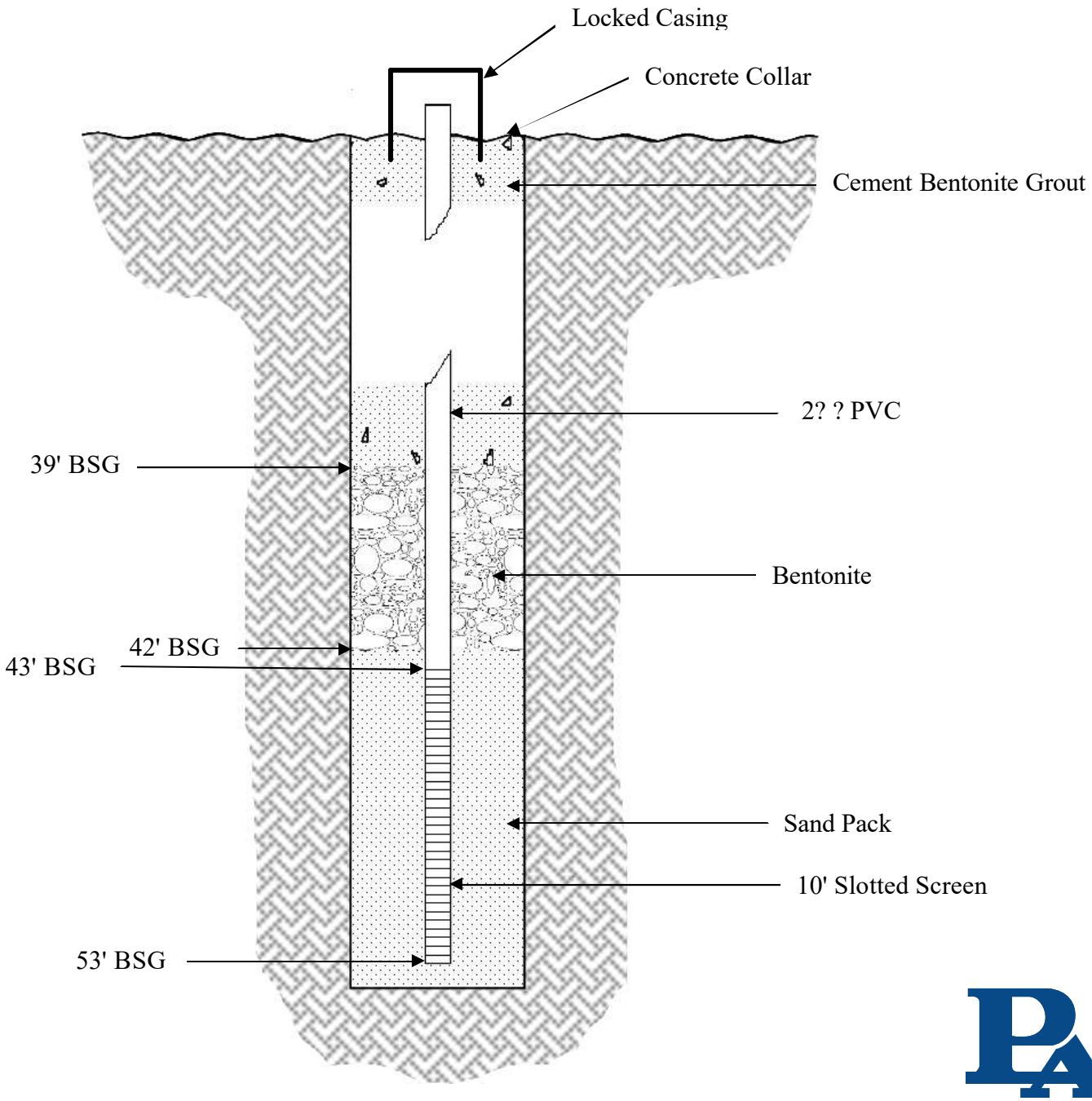
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-16I



Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Natures Way Environmental
Date: 4/23/06

Hole #: MW-17S
Project #: 20121.10H
Inspector: Passero

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		3	7	15	48	0	0-2	Top soil to SAND with silt
		7	9	10	14	0	2-4	SAND with silt
		9	8	9	15	0	4-6	SILT/CLAY till
		4	11	17	17	0	6-8	SILT/CLAY till
		5	16	25	30	0	8-10	Medium SAND with clay
		12	12	18	35	0	10-12	CLAY with medium sand trace gravel
		7	15	18	22	0	12-14	SILT to CLAY
		4	6	10	10	0	14-16	CLAY

Screen from 16'-6', sand to 11?, bentonite to 2.5' cement grout to surface

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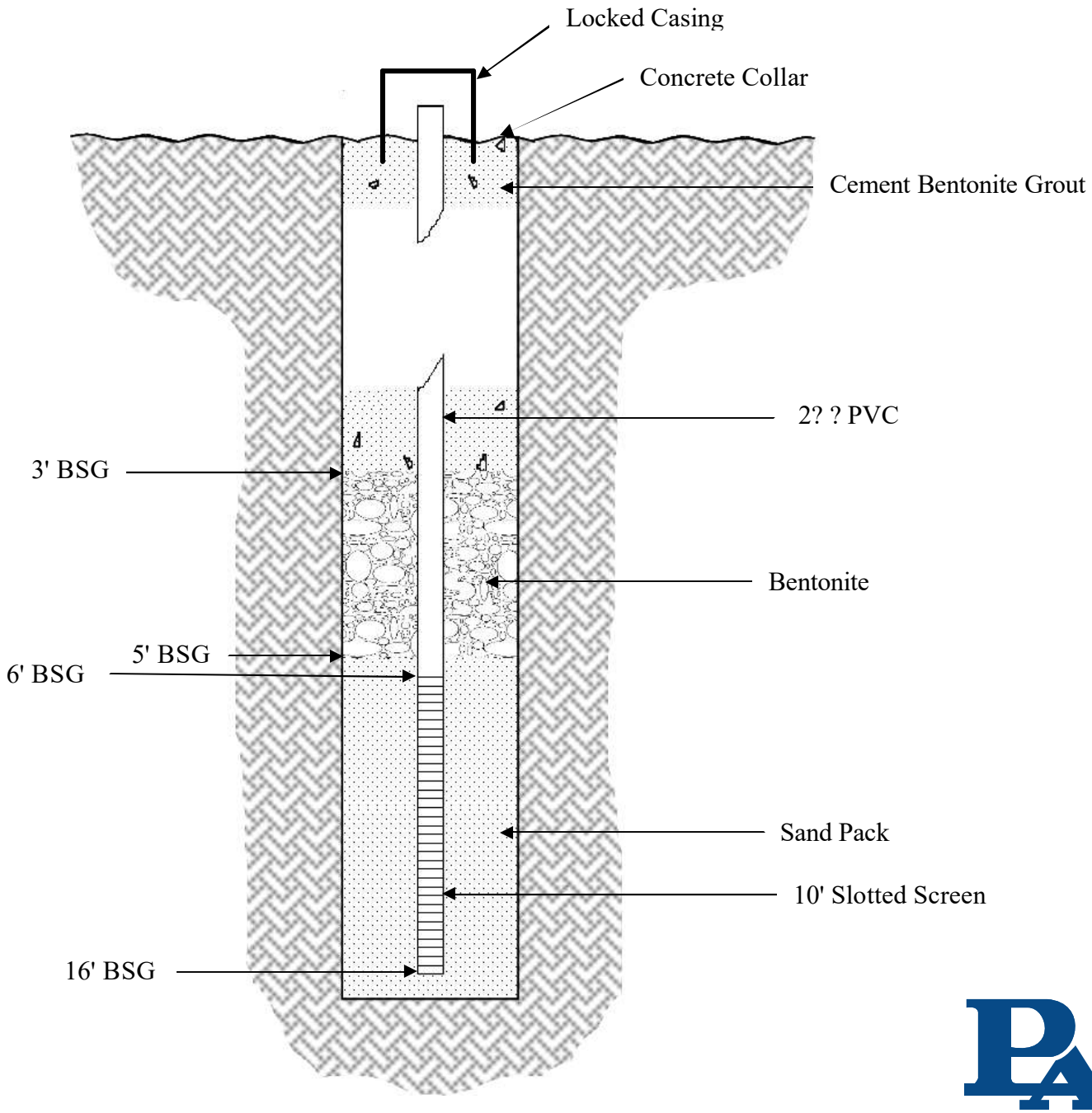
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-17S



Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Natures Way Environmental
Date: 4/23/06

Hole #: MW-17D
Project #: 20121.10H
Inspector: Passero.

0	C	BLOWS ON SAMPLER 0? 6?	6? 12?	12? 18?	18? 24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		4	5	6	8	0	16-18	SILT/CLAY till
		4	6	8	10	0	18-20	SILT/CLAY till
		2	4	6	7	0	20-22	SILT/CLAY till
		7	10	15	12	0	22-24	SILT/CLAY till
		3	5	6	9	0	24-26	SILT/CLAY till
		3	5	6	6	0	26-28	SILT/CLAY till
		2	3	3	5	0	28-30	SILT/CLAY till
		5	10	13	13	0	30-32	SILT/CLAY till
		3	4	5	5	0	32-34	SILT/CLAY till
		3	3	8	6	0	34-36	CLAY

Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Natures Way Environmental
Date: 4/23/06

Hole #: MW-17D
Project #: 20121.10H
Inspector: Passero.

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		3	3	4	4	0	36-38	SILT/CLAY till
		4	4	8	15	0	38-40	SILT/CLAY till
		13	9	8	11	0	40-42	SILT/CLAY till
		2	2	4	6	0	42-44	CLAY
				4	5	0	44-46	CLAY
		3	2	3	3	0	46-48	CLAY
		10	11	20	17	0	48-50	SILT/CLAY till
		26	8	7	10	0	50-52	CLAY
		4	4	7	7		52-54	CLAY
				3	4		54-56	CLAY

Subject Site: Fischbach & Moore VCA
Client: 235 Metro Park Associates
Contractor: Natures Way Environmental
Date: 4/23/06

Hole #: MW-17D
Project #: 20121.10H
Inspector: Passero.

0	C	BLOWS ON SAMPLER 0?/6?	6?/12?	12?/18?	18?/24?	SAMPLE PID	DEPTH (ft)	SOIL AND ROCK INFORMATION REMARKS
		5	4	7		0	56-58	CLAY
		5	50/1			0	58-60	SILT/CLAY till
		7	50/3			0	60-62	SILT/CLAY till

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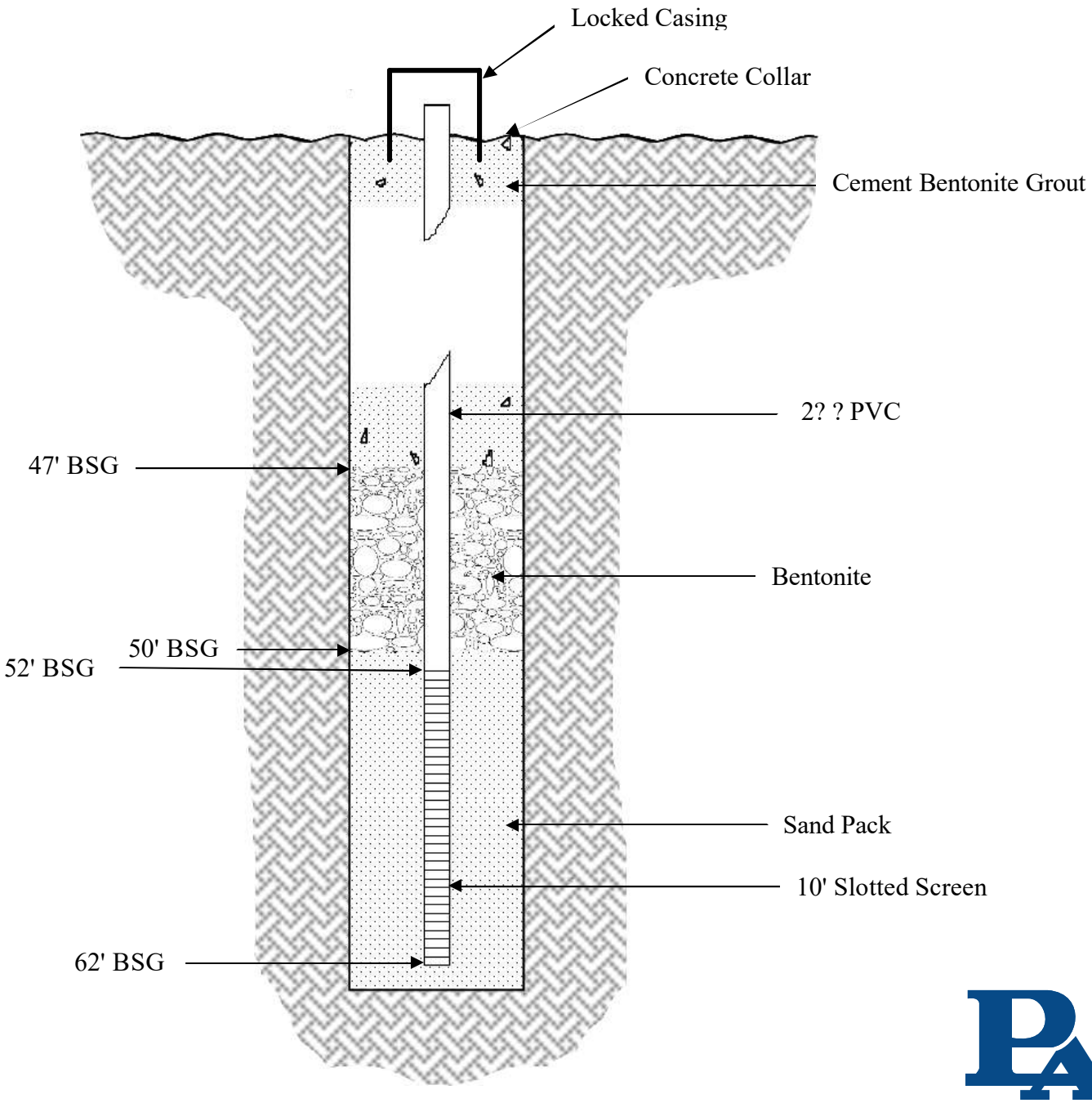
SCHEMATIC DIAGRAM
PROJECT NAME 235 Metro Park
PROJECT # 20121.26
MONITORING WELL # MW-17D



Date Start/Finish: 3/26/14
Drilling Company: Zebra Environmental
Driller's Name: Jason Frederick/Eric Pope
Drilling Method: Direct Push/HSA
Sampling Method: 4' Acetate Liner
Rig Type: Track-Mounted Geoprobe Rig
Auger Size: 4.25" ID

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 16' bgs
Surface Elevation: NA

Descriptions By: Paolo Filippetti

Well/Boring ID: **SB-08 (MW-18)**

Client: Chartis

Location: 235 Metro Park Brighton Site
Site No. 828150
Brighton, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	0	1	0-0.3	NA	NA		ASPHALT.	
		2	0.3-1	NA	NA		Gray SAND and GRAVEL.	
		3	1-2	NA	NA			
		4	2-4	NA	0.3		Gray and Brown SILT and CLAY, trace fine Gravel.	
5	-5	5	4-8	NA	0.5		Brown fine SAND and SILT, trace fine Gravel, saturated at 6' bgs.	
		6	8-9	NA	7.9		Brown SILT, some fine Sand, trace fine Gravel.	Borehole backfilled with Bentonite to grade.
		7	9-10	NA	NA		Brown SILT and CLAY, some fine to medium Gravel.	
10	-10	8	10-12	NA	24.5			
		9	12-14	NA	24.5			
		10	14-15	NA	13.6		Brown SILT and CLAY, some fine to coarse Gravel.	
15	-15	11	15-16	NA	13.6		Gray SILT and CLAY, some fine to coarse Gravel.	

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Remarks: Lithologic descriptions for MW-18
ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level, ID = Inside Diameter.

Date Start/Finish: 3/26/14
Drilling Company: Zebra Environmental
Driller's Name: Jason Frederick/Eric Pope
Drilling Method: HSA
Sampling Method: NA
Rig Type: Track-Mounted Geoprobe Rig
Auger Size: 4.25" ID

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 20' bgs
Surface Elevation: NA

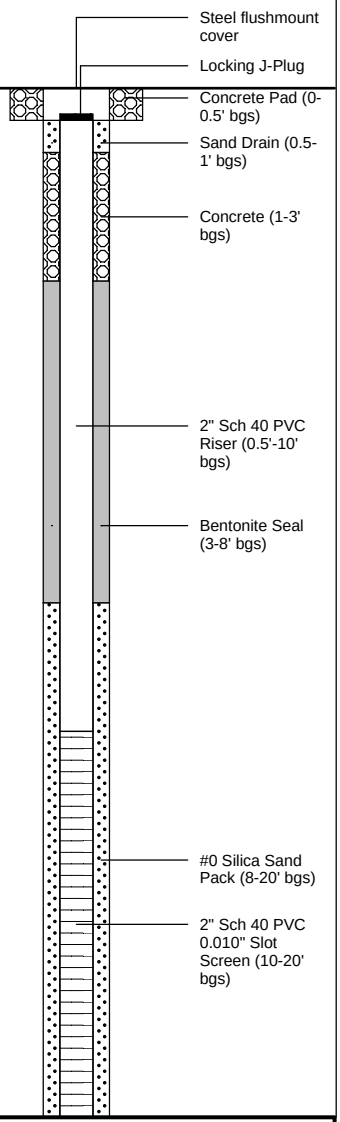
Descriptions By: Paolo Filippetti

Well/Boring ID: **MW-18**

Client: Chartis

Location: 235 Metro Park Brighton Site
Site No. 828150
Brighton, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	0	NA	NA	NA	NA		Lithologic Descriptions not recorded. Location drilled without sampling to termination depth. Refer to soil boring SB-08 for lithologic information.	
5	-5							
10	-10							
15	-15							



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Client: Chartis

Well/Boring ID: MW-18

Borehole Depth: 20' bgs

Site Location:
235 Metro Park Brighton Site
Site No. 828150
Brighton, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
20 -20							#0 Silica Sand Pack (8-20' bgs); 2" Sch 40 PVC 0.010" Slot Screen (10-20' bgs)
25 -25							
30 -30							
35 -35							

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Remarks: ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level, ID = Inside Diameter.

Date Start/Finish: 3/26/14
Drilling Company: Zebra Environmental
Driller's Name: Jason Frederick/Eric Pope
Drilling Method: Direct Push/HSA
Sampling Method: 4' Acetate Liner
Rig Type: Track-Mounted Geoprobe Rig
Auger Size: 4.25" ID

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 16' bgs
Surface Elevation: NA

Descriptions By: Paolo Filippetti

Well/Boring ID: **SB-05 (MW-19)**

Client: Chartis

Location: 235 Metro Park Brighton Site
Site No. 828150
Brighton, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
0 / 0	1	0-2	NA	NA		Gray SAND and fine to coarse GRAVEL.	
	2	2-4	NA	0.0		Light brown fine SAND and SILT, trace fine Gravel.	
5 / -5	3	4-7	NA	0.4		Brown SILT and CLAY, trace fine Gravel, saturated at 7' bgs.	
	4	7-10	NA	6.4		Brown SILT , some fine Sand, little fine to coarse Gravel.	Borehole backfilled with Bentonite to grade.
10 / -10	5	10-13	NA	2.6		Brown SILT and CLAY, little fine to medium Gravel.	
	6	13-15	NA	1.4		Brown SILT and CLAY, little fine to coarse Gravel.	
15 / -15	7	15-16	NA	1.8		Brown SILT, little Clay, trace fine Gravel.	

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Remarks: Lithologic descriptions for MW-19
ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level, ID = Inside Diameter.

Date Start/Finish: 3/27/14
Drilling Company: Zebra Environmental
Driller's Name: Jason Frederick/Eric Pope
Drilling Method: HSA
Sampling Method: NA
Rig Type: Track-Mounted Geoprobe Rig
Auger Size: 4.25" ID

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 20' bgs
Surface Elevation: NA

Descriptions By: Paolo Filippetti

Well/Boring ID: **MW-19**

Client: Chartis

Location: 235 Metro Park Brighton Site
Site No. 828150
Brighton, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	0	NA	NA	NA	NA		Lithologic Descriptions not recorded. Location drilled without sampling to termination depth. Refer to soil boring SB-05 for lithologic information.	Locking J-Plug; 2" Sch 40 PVC Riser (2.9' ags-5' bgs); Concrete Pad (0-0.5' bgs); Bentonite Seal (1-3' bgs); #0 Silica Sand Pack (3-15' bgs); 2" Sch 40 PVC 0.010" Slot Screen (5-15' bgs); Bentonite (15-20' bgs)
5	-5							
10	-10							
15	-15							

Remarks: ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level, ID = Inside Diameter.

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Client: Chartis

Well/Boring ID: **MW-19**

Borehole Depth: 20' bgs

Site Location:
235 Metro Park Brighton Site
Site No. 828150
Brighton, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
							Sump (15-20' bgs); Bentonite (15-20' bgs)
20 -20							
25 -25							
30 -30							
35 -35							

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Remarks: ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level, ID = Inside Diameter.

Date Start/Finish: 3/26/14
Drilling Company: Zebra Environmental
Driller's Name: Jason Frederick/Eric Pope
Drilling Method: Direct Push/HSA
Sampling Method: 4' Acetate Liner
Rig Type: Track-Mounted Geoprobe Rig
Auger Size: 4.25" ID

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 16' bgs
Surface Elevation: NA

Descriptions By: Paolo Filippetti

Well/Boring ID: **SB-11 (MW-20)**

Client: Chartis

Location: 235 Metro Park Brighton Site
Site No. 828150
Brighton, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	0	1	0-0.3	NA	NA		ASPHALT.	
		2	0.3-1	NA	NA		Gray SAND and GRAVEL.	
		3	1-4	NA	0.0		Gray SILT and CLAY, trace fine Gravel, dry. Most at 4' bgs.	
5	-5	4	4-6	NA	NA		Brown fine to medium SAND, trace fine Gravel, moist 4-4.5' bgs, saturated below 4.5' bgs.	
		5	6-8	NA	1.8		Brown SILT and CLAY, some fine to medium Gravel, trace fine Sand.	
		6	8-10	NA	1.2		Brown SILT, some fine to medium Gravel, trace brown fine Sand, medium stiff.	Borehole backfilled with Bentonite to grade.
10	-10	7	10-12	NA	NA		NO RECOVERY.	
		8	12-14	NA	0.0		Light gray SILT, some fine to medium Gravel, trace Clay, very stiff.	
15	-15	9	14-16	NA	0.0			

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Remarks: Lithologic descriptions for MW-20
ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level, ID = Inside Diameter.

Date Start/Finish: 3/27/14
Drilling Company: Zebra Environmental
Driller's Name: Jason Frederick/Eric Pope
Drilling Method: HSA
Sampling Method: NA
Rig Type: Track-Mounted Geoprobe Rig
Auger Size: 4.25" ID

Northing: NA
Easting: NA
Casing Elevation: NA

Borehole Depth: 20' bgs
Surface Elevation: NA

Descriptions By: Paolo Filippetti

Well/Boring ID: **MW-20**

Client: Chartis

Location: 235 Metro Park Brighton Site
Site No. 828150
Brighton, New York

DEPTH	ELEVATION	Sample Run Number	Sample/Int/Type	Recovery	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
0	0	NA	NA	NA	NA		Lithologic Descriptions not recorded. Location drilled without sampling to termination depth. Refer to soil boring SB-11 for lithologic information.	Steel flushmount cover; Locking J-Plug; Concrete Pad (0-0.5' bgs); Sand Drain (0.5-1' bgs); Bentonite Seal (1-3' bgs); #0 Silica Sand Pack (3-15' bgs); 2" Sch 40 PVC 0.010" Slot Screen (5-15' bgs); Bentonite (15-20' bgs)
5	-5							
10	-10							
15	-15							

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Remarks: ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level, ID = Inside Diameter.

Client: Chartis

Well/Boring ID: **MW-20**

Borehole Depth: 20' bgs

Site Location:
235 Metro Park Brighton Site
Site No. 828150
Brighton, New York

DEPTH / ELEVATION	Sample Run Number	Sample/Int/Type	Recovery	PID Headspace (ppm)	Geologic Column	Stratigraphic Description	Well/Boring Construction
20 -20							Sump (15-20' bgs); Bentonite (15-20' bgs)
25 -25							
30 -30							
35 -35							

Remarks: ags = above ground surface; bgs = below ground surface; NA = Not Applicable/Available; AMSL = Above Mean Sea Level, ID = Inside Diameter.

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OVERBURDEN BOREHOLE LOG

MALCOLM PIRNIE

Borehole No.: BH-1

Project : 235 Metro Park
Project No.: 4124-094
Client:
Location: Brighton, NY

Surface Elev.: 553 est.
Ref. Elev.:
Contractor: Nothnagle Drilling Co.
Driller: Ken Almeter
Rig Type: CME 85

Date Started: 6/14/10
Date Finished: 6/15/10
Drilling Method: 4 1/4 HSA
Water Depth (bgs):
Logged By: D. Symonds

Depth (BGS)	Sample ID	Sample Type	Blows / 6 inches	Recovery / Length (ft.)	USCS Classification	Lithology Description and Remarks *Density/Consistency, Color, Plasticity, Soil Types, Texture, Fabric, Bedding, Moisture, Other Characteristics*	Moisture *(dry, moist, wet, saturated)*	PID Scan (ppm)	PID Headspace (ppm)
0	S-1	2" SS	5	1.6 / 2	SW-SM	TOP OF LACUSTRINE SILT/CLAY DEPOSITS	Dry	0.0	
			8			Grayish Brown, Med loose top soil, Gravel		0.0	
1			8			Grayish Brown, Med loose sand w/silt (Orange/oxidized)		0.0	
			8			Light Brown, Sand & Gravel		0.0	
2	S-2	2" SS	4	1.3 / 2	SW-SM	Grayish Brown (light olive Mottling) well-graded sand with silt med dens	Dry	0.0	
			5					0.0	
3			7					0.0	
			8					0.0	
4	S-3	2" SS	4	1.3 / 2	SM	Brownish Gray, Dense, Blochy Silty Sand with Gravel Rounded	Dry	0.0	
			7			(Light Olive Mottling)			
5			8			Light Brown, Med Dense Silty Sand w/Gravel Rounded			
			8				Moist	0.0	
6	S-4	2" SS	2	2.0 / 2	SM	6' Orange Oxidation	Moist	0.0	
			3			Light Orangish Brown, Med Dense Silty Sand w/trace Gravel <1" diam		0.0	
7			6						
			5					0.0	
8	S-5	2" SS	5	2.0 / 2	SM	Light Brown, Dense, Silty Sand w/Trace Gravel < 0.5 diam. Rounded	Moist	0.0	
			6					0.0	
9			10					0.0	
			11					0.0	
10	S-6	2" SS	9	1.8 / 2	SC	Light Brown, Dense, Clayey Sand w/ Traces Rounded Gravel < 0.50 diam	Wet	0.0	
			10					0.0	
11			11					0.0	
			15					0.0	
12	S-7	2" SS	6	1.6 / 2	SM	Light Brown, Dense, Silty Sand w/Angular Gravel <0.5" Diam	Moist	0.0	
			11			(Orange Oxidation Staining)		0.0	
13			13			Angular Parting, 30% angle (Orange Staining Along Parting)		0.0	
			16					0.0	
14	S-8	2" SS	1	0.8 / 2	SC	Light Brown, Moist, Med. Dense, Clay Sand w/Gravel (SubAngular)	Moist	0.0	
			2			< .20" Diam		0.0	
15			3					0.0	
			6					0.0	

Notes:

MALCOLM PIRNIE

Borehole No.: BH-1

Project : 235 Metro Park
Project No.: 4124-094
Client:
Location: Brighton, NY

Surface Elev.: 553 est.
Ref. Elev.:
Contractor: Nothnagle Drilling Co.
Driller: Ken Almeter
Rig Type: CME 85

Date Started: 6/14/10
Date Finished: 6/15/10
Drilling Method: 4 1/4 HSA
Water Depth (bgs):
Logged By: D. Symonds

Depth (BGS)	Sample ID	Sample Type	Blows / 6 inches	Recovery / Length (ft.)	USCS Classification	Lithology Description and Remarks *Density/Consistency, Color, Plasticity, Soil Types, Texture, Fabric, Bedding, Moisture, Other Characteristics*	Moisture *(dry, moist, wet, saturated)*	PID Scan (ppm)	PID Headspace (ppm)
16	S-9	2" SS	11	2	SM	Grayish Brown, Med Dense, Silty Sand & Gravel (Rounded) <1" Dia.	Moist	0.0	
			6			(Orange Oxidation Staining)		0.0	
17			10			Brownish Gray, Med Dense, Silty Sand w/Trace Rounded		0.0	
			10	2		& Subangular Gravel <0.5"		0.0	
18	S-10	2" SS	3	1.4	SM	Brownish Gray, Med Dense, Silty Sand w/Gravel (SubAngular) <0.5" Diam	Wet	0.0	
			6					0.0	
19			11					0.0	
			12	2				0.0	
20	S-11	2" SS	2	2.0	SM	20-20.5' Brownish Gray, Loose Silty Sand w/Sub Rounded Gravel	Wet	0.0	
			2					0.0	
21			8			20.5-21 Brownis Gray, Very Loose Silty Sand, Homogenius	Sat	0.0	
			8	2		21-22 Brownish Gray, Med Dense, Silty Sand w/Sub Angular Gravel	Wet	0.0	
22	S-12	2" SS	9	1.7	SC	Brownish Gray, Med Dense, Clayey Sand w/Sub Rounded Gravel <1.0 " Daim	Wet	0.0	
			4					0.0	
23			9			23' Trace Light Olive Staining		0.0	
			8	2				0.0	
24	S-13	2" SS	2	1.4	CL	Brownish Gray, Med Dense, Sandy Lean Clay w/Sub Angular Gravel	Wet	0.0	
			4			(Med Placticty)		0.0	
25			5					0.0	
			10	2				0.0	
26	S-14	2" SS	5	0.8	CL	Brownish Gray, Stiff Sandy Lean Clay w/Tace Sub Angular Gravel < 0.5 Diam	Wet	0.0	
			8			(High Plasticity)		0.0	
27			10					0.0	
			9	2				0.0	
28	S-15	2" SS	2	0.5	CL	Brownish Gray, Soft, Sandy ? Clay w/Trace Gravel (Sub Angular) < 0.2 Diam	Wet	0.0	
			3			(High Plasticity)			
29			5					0.0	
			6	2					
30	S-16	2" SS	2	2.0	CL	Brownish Gray, Med Stiff Sandy Lean Clay w/Trace Gravel Sub Angular < 0.2 Dia	Wet	0.0	
			3			(High Plasticity)			
31			5					0.0	
			7	2					

Notes:

OVERBURDEN BOREHOLE LOG

MALCOLM PIRNIE

Borehole No.: BH-1

Project : 235 Metro Park
Project No.: 4124-094
Client:
Location: Brighton, NY

Surface Elev.: 553 est.
Ref. Elev.:
Contractor: Nothnagle Drilling Co.
Driller: Ken Almeter
Rig Type: CME 85

Date Started: 6/14/10
Date Finished: 6/15/10
Drilling Method: 4 1/4 HSA
Water Depth (bgs):
Logged By: D. Symonds

Depth (BGS)	Sample ID	Sample Type	Blows / 6 inches	Recovery / Length (ft.)	USCS Classification	Lithology Description and Remarks *Density/Consistency, Color, Plasticity, Soil Types, Texture, Fabric, Bedding, Moisture, Other Characteristics*	Moisture *(dry, moist, wet, saturated)*	PID Scan (ppm)	PID Headspace (ppm)
32	S-17	2" SS	2	0.4	CL	Brownish Gray, Soft, Sandy Lean Clay w/Gravel Sub Angular	Wet	0.0	
			3			(High Plasticity)		0.0	
33			5					0.0	
			7	2					
34	S-18	2" SS	2	2.0	CL	Brownish Gray, Med-Stiff Sandy Lean Clay w/Sub Angular Gravel	Moist	0.0	
			3			(Med Plasticity)		0.0	
35			6					0.0	
			6	2					
36	S-19	2" SS	11	2.0	CL	Brownish Gray, Stiff, Sandy Lean Clay w/SubAngular Gravel	Moist	0.0	
			7			(High Plasticity)			
37			9						
			8	2				0.0	
38	S-20	2" SS	3	2.0	CL	Brownish Gray, Med-Stiff Sandy Lean Clay w/Sub Angular Gravel < 0.5' Diam	Moist	0.0	
			8			(Med Plasticity)			
39			9						
			10	2				0.0	
40	S-21	2" SS	3	0.5	CL	Brownish Gray, Med Stiff, Sandy Lean Clay w/Sub Angular Gravel <1.0" Diam	Moist	0.0	
			8			(Med Plasticity)			
41			9						
			9	2				0.0	
42	S-22	2" SS	3	1.5	CL	42-43.5 -Same as Above Gravel < 0.5" Diam	Moist	0.0	
			7						
43			9			43.5-43.8 Dark Gray, Loose, Coarse Gravel w/Trace Sand			
			12	2		43.8-44 Brownish Gray Med Stiff, Sandy Lean Clay w/Sub Angular Gravel		0.0	
44	S-23	2" SS	2	2.0	CL	Brownish Gray, Med Stiff to Soft, Sandy Lean Clay w/Sub Angular Gravel < 0.5" Diam	Moist	0.0	
			3						
45			6			(Increasing Plasticity from 44'-46')			
			2	2			Wet	0.0	
46	S-24	2" SS	5	2.0	CL	46-47 Brownish Gray Soft, Sandy, Lean Clay w/Small Sub Angular Gravel <0.10" Diam	Wet	0.0	
			8						
47			8			47-48 Brownish Gray, Med Stiff, Sandy Lean Clay w/Large Sub Angular			
			8	2		Gravel Same >1.0" Diam	Moist	0.0	

Notes:

OVERBURDEN BOREHOLE LOG

MALCOLM PIRNIE

Borehole No.: BH-1

Project : 235 Metro Park
Project No.: 4124-094
Client:
Location: Brighton, NY

Surface Elev.: 553 est.
Ref. Elev.:
Contractor: Nothnagle Drilling Co.
Driller: Ken Almeter
Rig Type: CME 85

Date Started: 6/14/10
Date Finished: 6/15/10
Drilling Method: 4 1/4 HSA
Water Depth (bgs):
Logged By: D. Symonds

Depth (BGS)	Sample ID	Sample Type	Blows / 6 inches	Recovery / Length (ft.)	USCS Classification	Lithology Description and Remarks *Density/Consistency, Color, Plasticity, Soil Types, Texture, Fabric, Bedding, Moisture, Other Characteristics*	Moisture *(dry, moist, wet, saturated)*	PID Scan (ppm)	PID Headspace (ppm)
48	S-25	2" SS	4	2.0	CL	Gray-Brown, Stiff Clay, Some Silt, tr fine Gravel, tr Sand, Moderate plasticity	Wet	0.0	
			7					0.0	
49			7					0.0	
			9	2				0.0	
50	S-26	2" SS	3	2.0	CL	Clay as above	Wet	0.0	
			4					0.0	
51			4					0.0	
			5	2				0.0	
52	S-27	2" SS	3	2.0	CL	Clay as above at 52.5' 1/2" layer of fractured sandstone rock (flat rocks	Wet	0.0	
			6			Approx. 30° angle)		0.0	
53			7					0.0	
			9	2				0.0	
54	S-28	2" SS	1	2.0	CL	Gray-Brown, Soft Clay, Trace Silt, Trace Gravel 0.5" Diam	Wet	0.0	
			2			Med Plasticity		0.0	
55			5					0.0	
			5	2				0.0	
56	S-29	2" SS	2	2.0	CL	Gray-Brown, Soft Clay, High Plasticity	Wet	0.0	
			3					0.0	
57			4					0.0	
			4	2				0.0	
58	S-30	2" SS	1	2.0	CL	Gray-Brown, Very Soft Clay, (High Plasticity)	Wet	0.0	
			1			From 58'-59' thin reddish brown Staining/Layering		0.0	
59			2			at 59.5' approx. 0.1 ft. layer of silt (Wet)		0.0	
			5	2				0.0	
60	S-31	2" SS	1	2.0	CL	Gray-Brown, Very Soft Clay, (High Plasticity)	Wet	0.0	
			1			Alternating Consistancies 60-62 Soft, Very Soft, Soft			
61			2			(at 60.5' Med Reddish Brown color approx 6" thick)			
			5	2				0.0	
62	S-32	2" SS		2.0	CL	Gray-Brown, Very Soft Clay, (High Plasticity)	Wet	0.0	
								0.0	
63						Alternating (Stratified) Color Layer (Med Reddish-Brown)		0.0	
			4	2				0.0	

Notes:

OVERBURDEN BOREHOLE LOG

MALCOLM PIRNIE

Borehole No.: BH-1

Project : 235 Metro Park
Project No.: 4124-094
Client:
Location: Brighton, NY

Surface Elev.: 553 est.
Ref. Elev.:
Contractor: Nothnagle Drilling Co.
Driller: Ken Almeter
Rig Type: CME 85

Date Started: 6/14/10
Date Finished: 6/15/10
Drilling Method: 4 1/4 HSA
Water Depth (bgs):
Logged By: D. Symonds

Depth (BGS)	Sample ID	Sample Type	Blows / 6 inches	Recovery / Length (ft.)	USCS Classification	Lithology Description and Remarks *Density/Consistency, Color, Plasticity, Soil Types, Texture, Fabric, Bedding, Moisture, Other Characteristics*	Moisture *(dry, moist, wet, saturated)*	PID Scan (ppm)	PID Headspace (ppm)
64	S-33	2" SS	1	2.0	CL	64-64.5 Gray Brown, Very Soft Clay (High Plasticity) Alt. Layers	Wet	0.0	
			1					0.0	
65			1		SM	TOP OF GLACIAL OUTWASH DEPOSITS	Wet	0.0	
			1	2		64.5-66 Gray-Brown, Very Loose Silty Sand w/Gravel	Sat	0.0	
66	S-34	2" SS	2	1.0	SM		Sat	0.0	
			3			Sand as above		0.0	
67			6					0.0	
			6	2				0.0	
68	S-35	2" SS	2	2.0	SM		Sat	0.0	
			3			Sand as above (some coarser (< 0.20) Blue Stone Gravel)		0.0	
69			5					0.0	
			5	2				0.0	
70	S-36	2" SS	6	1.5	GP/ GM	Gray-Brown, Loose Poorly Graded Gravelw/Silt and Sand Gravel <1.0" Diam.	Sat	0.0	
			7					0.0	
71			9					0.0	
			11	2		at 71.8 Encountered Gray Brown Silty Sand		0.0	
72	S-37	2" SS	12	2.0	SM	72-73 Silty Sand as above (Sat) (Med Dense)	Sat	0.0	
			18					0.0	
73			28		SM-TILL	TOP OF GLACIAL TILL	Sat	0.0	
			100/3	1.7		73-74 Gray Brown, Very Dense, Silty Sand	Moist	0.0	
74	S-38	2" SS	29	1.0	SW-TILL	Gray Brown, Very Dense Sand	Moist	0.0	
			69					0.0	
75			100/2					0.0	
				1.1				0.0	
76	S-39	2" SS	100/6		SW-	Gray Brown, Very Dense Sand	Moist	0.0	
					SHALE	TOP OF BEDROCK		0.0	
77			2			Refusal at 76.5 Bedrock		0.0	
				.5				0.0	
78									
79									

Notes:

OVERBURDEN BOREHOLE LOG

MALCOLM PIRNIE

Borehole No.: BH-2

Project : 235 Metro Park
Project No.: 4124-094
Client:
Location: Brighton, NY

Surface Elev.: 552.5 est.
Ref. Elev.:
Contractor: Nothnagle Drilling Co.
Driller: Ken Almeter
Rig Type: CME 85

Date Started: 6/14/10
Date Finished: 6/15/10
Drilling Method: 4 1/4 HSA
Water Depth (bgs):
Logged By: D. Symonds

Depth (BGS)	Sample ID	Sample Type	Blows / 6 inches	Recovery / Length (ft.)	USCS Classification	Lithology Description and Remarks *Density/Consistency, Color, Plasticity, Soil Types, Texture, Fabric, Bedding, Moisture, Other Characteristics*	Moisture *(dry, moist, wet, saturated)*	PID Scan (ppm)	PID Headspace (ppm)
0	S-1	2 " SS	18	0.4		Asphalt	Dry	0.0	
			2					0.0	
1			1	2				0.0	
			3					0.0	
2	S-2	2 " SS	6	1.6	SM	Grayish Brown, Med Dense, Sand w/Silt Trace Gravel	Dry	0.0	
			7			(Light Olive Mottling)		0.0	
3			11	2				0.0	
			12					0.0	
4	S-3	2 " SS	6	1.6	SM	Light Brown, Med Dense, Silty Sand w/ Gravel Angular < 1.0" Diam	Dry	0.0	
			9					0.0	
5			10	2				0.0	
			11					0.0	
6	S-4	2 " SS	5	1.4	SM	Light Brown, Med Dense, Silty Sand w/Angular & Sub Angular Gravel < 1.0" Diar	Moist	0.0	
			7					0.0	
7			8	2				0.0	
			13					0.0	
8	S-5	2 " SS	16	1.0	SM	Light Brown, Dense, Silty Sand w/Angular Gravel < 1.0" Diam	Dry	0.0	
			19					0.0	
9			14	2		Layer of fractured rock @ 9'		0.0	
			20					0.0	
10	S-6	2 " SS	4	1.8	SM	Light Brown, Dense, Silty Sand w/Angular Gravel (Black and Gray)	Dry	0.0	
			9					0.0	
11			11	2				0.0	
			21					0.0	
12	S-7	2 " SS	7	1.0	SM	Light Brown, Med Dense, Silty Sand w/ Angular Gravel < 0.4" Diam	Moist	0.0	
			12					0.0	
13			17	2		Gravel (Olive Green, Black, Grey color)		0.0	
			20					0.0	
14	S-8	2 " SS	6	2.0	SM	Grayish Brown, Med Dense, Silty Sand w/Gravel < 0.4" Diam	Dry	0.0	
			7			Gravel (Black, Olive color)(Angular/Sub Angular)		0.0	
15			7	2		at 14.5' Sand Layer <0.02" Thick w/Orange Oxidation		0.0	
			8					0.0	

Notes:

MALCOLM PIRNIE

Borehole No.: BH-2

Project : 235 Metro Park
Project No.: 4124-094
Client:
Location: Brighton, NY

Surface Elev.: 552.5 est.
Ref. Elev.:
Contractor: Nothnagle Drilling Co.
Driller: Ken Almeter
Rig Type: CME 85

Date Started: 6/14/10
Date Finished: 6/15/10
Drilling Method: 4 1/4 HSA
Water Depth (bgs):
Logged By: D. Symonds

Depth (BGS)	Sample ID	Sample Type	Blows / 6 inches	Recovery / Length (ft.)	USCS Classification	Lithology Description and Remarks *Density/Consistency, Color, Plasticity, Soil Types, Texture, Fabric, Bedding, Moisture, Other Characteristics*	Moisture *(dry, moist, wet, saturated)*	PID Scan (ppm)	PID Headspace (ppm)
16	S-9	2 " SS	6	0.4		No Recovery			
			7						
17			8						
			13	2					
18	S-10	2 " SS	6	1.6	SM	Light Brown/Grayish Brown, Med Dense, Sily Sand w/Sub Round Gravel < 0.5" D	dry	0.0	
			11			at 18.5-18.8 Fractured Sandstone Rock Layer		0.0	
19			11					0.0	
			15	2				0.0	
20	S-11	2 " SS	5	1.6	SP/SC	Brownish Gray, Med Dense, Sand w/Clay and Gravel Sub Angular < 1.0" Diam	moist	0.0	
			6					0.0	
21			11					0.0	
			12	2				0.0	
22	S-12	2 " SS	2	1.4	CL	Brownish Gray, Soft Sand Clay w/Gravel (Sub Angular) from .5"-1.0" Diam	moist	0.0	
			3			(Med Plasticity)		0.0	
23			5					0.0	
			7	2				0.0	
24	S-13	2 " SS	6	1.0	CL	Brownish Gray, Med Stiff, Sandy Clay w/Sub Angular Gravel	moist	0.0	
			7			(Med Plasticity) (0.5" diam)		0.0	
25			7					0.0	
			7	2				0.0	
26	S-14	2 " SS	2	1.8	CL	Brownish Gray, Med Dense, Sandy Clay w/Angular Gravel <0.5" diam	moist	0.0	
			3					0.0	
27			4					0.0	
			7	2				0.0	
28	S-15	2 " SS	3	1.0	CL	(No Recovery) Clay as above (Gravel in end of spoon)	wet	0.0	
			5					0.0	
29			7					0.0	
			9	2				0.0	
30	S-16	2 " SS	8	2.0	CL	Brownish Gray	wet	0.0	
			9					0.0	
31			11					0.0	
			15	2				0.0	

Notes:

MALCOLM PIRNIE

Borehole No.: BH-2

Project : 235 Metro Park
Project No.: 4124-094
Client:
Location: Brighton, NY

Surface Elev.: 552.5 est.
Ref. Elev.:
Contractor: Nothnagle Drilling Co.
Driller: Ken Almeter
Rig Type: CME 85

Date Started: 6/14/10
Date Finished: 6/15/10
Drilling Method: 4 1/4 HSA
Water Depth (bgs):
Logged By: D. Symonds

Depth (BGS)	Sample ID	Sample Type	Blows / 6 inches	Recovery / Length (ft.)	USCS Classification	Lithology Description and Remarks *Density/Consistency, Color, Plasticity, Soil Types, Texture, Fabric, Bedding, Moisture, Other Characteristics*	Moisture *(dry, moist, wet, saturated)*	PID Scan (ppm)	PID Headspace (ppm)
32	S-17	2 " SS	7	1.4	SC	Brownish Gray, Med Stiff, Sandy Clay w/Angular Gravel up to 1.0" Diam	wet	0.0	
			8			at 33' Gravel (Coarse)		0.0	
33			10			Layer ~ 2" Thick mixed with clay		0.0	
			8	2				0.0	
34	S-18	2 " SS	5	1.7	SC	Brownish Gray, Soft to Stiff Sandy Clay w/ Sub Angular Gravel	wet	0.0	
			4			(~ 0.5 to 1.5 in dia.)		0.0	
35			3			(High Plasticity)		0.0	
			2	2				0.0	
36	S-19	2 " SS	2	1.8	SC	Brownish Gray, Soft to Stiff, Sandy Clay w/ Sub Rounded Gravel <1.0" diam	wet	0.0	
			3			(High Plasticity)		0.0	
37			7					0.0	
			8	2				0.0	
38	S-20	2 " SS	5	1.5	SC	Grayish Brown, Loose, Sand	wet	0.0	
			7			(Saturated)		0.0	
39			9					0.0	
			9	2				0.0	
40	S-21	2 " SS	2	1.7	SC	Grayish Brown, Soft Sandy Clay w/Subangular Gravel (< 0.8" Diam)	wet	0.0	
			4					0.0	
41			5			(High Plasticity)		0.0	
			5	2				0.0	
42	S-22	2 " SS	2	1.0	SC	Gray brown, soft - med stiff Sandy CLAY with subrounded Gravel and angular Gravel <0.8" dia.	wet	0.0	
			3					0.0	
43			5					0.0	
			7	2				0.0	
44	S-23	2 " SS	5	1.0	SC	Grayish brown, med stiff Sandy CLAY w/ angular Gravel and small subrounded Gravel 0.2" - 1" dia	wet	0.0	
			8					0.0	
45			9					0.0	
			15	2				0.0	
46	S-24			1.5		No sample collected			
47									
				2					

Notes:

MALCOLM PIRNIE

Borehole No.: BH-2

Project : 235 Metro Park
Project No.: 4124-094
Client:
Location: Brighton, NY

Surface Elev.: 552.5 est.
Ref. Elev.:
Contractor: Nothnagle Drilling Co.
Driller: Ken Almeter
Rig Type: CME 85

Date Started: 6/14/10
Date Finished: 6/15/10
Drilling Method: 4 1/4 HSA
Water Depth (bgs):
Logged By: D. Symonds

Depth (BGS)	Sample ID	Sample Type	Blows / 6 inches	Recovery / Length (ft.)	USCS Classification	Lithology Description and Remarks *Density/Consistency, Color, Plasticity, Soil Types, Texture, Fabric, Bedding, Moisture, Other Characteristics*	Moisture *(dry, moist, wet, saturated)*	PID Scan (ppm)	PID Headspace (ppm)
48	S-25	2 " SS	5	1.8	SC	Grayish brown, med stiff Sandy CLAY w/ subangular Gravel < 1" dia (Olive	wet	0.0	
			7			Green Gravel)		0.0	
49			8			@ 48.5' Gray-brown to red brown stiff Clay w/ subround Gravel <0.5"		0.0	
			8	2				0.0	
50	S-26	2 " SS	2	2	CL	Grayish Brown, soft CLAY, tr. Silt, tr. Subround Gravel <0.2" (high Plasticity)	Wet	0.0	
			3					0.0	
51			5					0.0	
			6	2				0.0	
52	S-27	2 " SS	2	2	CL	Grayish Brown, Soft, Clay (Trace Silt)	Wet	0.0	
			4			(High Plasticity)		0.0	
53			7			@ 53.5' tr subround Gravel <0.2"		0.0	
			8	2				0.0	
54	S-28	2 " SS	3	0.4	CL	Grayish brown, soft CLAY, tr. Silt, high plasticity	Wet	0.0	
			4					0.0	
55			4					0.0	
			6	2				0.0	
56	S-29	2 " SS	3	1.0	CL	Clay as Above	Wet	0.0	
			6					0.0	
57			7					0.0	
			9	2				0.0	
58	S-30	2 " SS	5	2.0	CL	Clay as Above/Med Stiff	Wet	0.0	
			7					0.0	
59			11					0.0	
			7	2				0.0	
60	S-31	2 " SS	1	2.0	CL	Grayish Brown, Med Reddish Brown, Very Soft, Clay	Wet	0.0	
			1			Alt. Color layers ~ 6" thick		0.0	
61			1			Gray Brown to Red Brown		0.0	
			1	2		(High Plasticity)		0.0	
62	S-32	2 " SS	1	2.0	CL	Grayish Brown (w/Med Reddish Brown Layers) ~ 0.20" Diam	Wet	0.0	
			1			Very Soft Clay (High Plasticity)		0.0	
63			1					0.0	
			1	2				0.0	
64	S-33	2 " SS	8	2.0	CL	Grayish & Reddish Brown, Stiff, Clay w/25% Sand Matrix	Wet	0.0	
			12			Stiff to Very Soft		0.0	
65			30					0.0	
			51	2				0.0	

Notes:

OVERBURDEN BOREHOLE LOG

MALCOLM PIRNIE

Borehole No.: BH-2

Project : 235 Metro Park
Project No.: 4124-094
Client:
Location: Brighton, NY

Surface Elev.: 552.5 est.
Ref. Elev.:
Contractor: Nothnagle Drilling Co.
Driller: Ken Almeter
Rig Type: CME 85

Date Started: 6/14/10
Date Finished: 6/15/10
Drilling Method: 4 1/4 HSA
Water Depth (bgs):
Logged By: D. Symonds

Depth (BGS)	Sample ID	Sample Type	Blows / 6 inches	Recovery / Length (ft.)	USCS Classification	Lithology Description and Remarks *Density/Consistency, Color, Plasticity, Soil Types, Texture, Fabric, Bedding, Moisture, Other Characteristics*	Moisture *(dry, moist, wet, saturated)*	PID Scan (ppm)	PID Headspace (ppm)
66	S-34	2 " SS	21	0.8	CL	Grayish Brown, Med Stiff, Clay w/ Trace Sand & Trace Gravel	Wet	0.0	
			41			Gravel Layer (Fractured Rock) Angular ~ 4" Thick		0.0	
67			10					0.0	
			4	2				0.0	
68	S-35	2 " SS	2	0		TOP OF GLACIAL OUTWASH DEPOSITS			
			3			No Recovery			
69			4						
			4	2					
70	S-36	2 " SS	7	2.0	SM	Gray Brown, Loose to Dense, Silty Sands w/Sub Rounded Gravel		0.0	
			13			at 71.5' Sand Become Dense	Sat	0.0	
71			21			(Sample Collected)		0.0	
			36	2			Moist	0.0	
72	S-37	2 " SS	9	2.0	SM	Gray Brown, Dense to Very Densem Silty Sands & Gravel		0.0	
			26			(Sub Angular Gravel) <0.5" Diam	Wet	0.0	
73			100/2					0.0	
				2				0.0	
74	S-38	2 " SS	31	1.3	SM-Till	TOP OF GLACIAL TILL		0.0	
			57			Gray Brown, Very Dense, Silty Fine Sand (Dry) (Till)	Dry	0.0	
75			100			(Med Dry Stregnth)		0.0	
			45	2				0.0	
76	S-39	2 " SS	48	1.0	SM-Till	Gray Brown, Med Dense to Very Dense, Silty Fine Sand (Till)		0.0	
			100				Moist	0.0	
77			6			(Lodgement Till)		0.0	
				2				0.0	
78	S-40	2 " SS	38	1.6	SM-Till	Gray Brown, Very Dense, Silty Fine Sand (Till)		0.0	
			99			w/Trace Fractured Bedrock at 80'	Moist	0.0	
79			100/5			(Lodgement Till) (Olive Green, Blue Rock)		0.0	
				2				0.0	
80	S-41	2 " SS	79	1.3	SM-Till	Silty Fine Sand (Till) As Above		0.0	
			100/5			W/Trace Fractured Bedrock	Moist	0.0	
81						(Lodgement Till) (Olive Green, Blue Rock)		0.0	
				2				0.0	

Notes:

OVERBURDEN BOREHOLE LOG

MALCOLM PIRNIE

Borehole No.: BH-2

Project : 235 Metro Park
Project No.: 4124-094
Client:
Location: Brighton, NY

Surface Elev.: 552.5 est.
Ref. Elev.:
Contractor: Nothnagle Drilling Co.
Driller: Ken Almeter
Rig Type: CME 85

Date Started: 6/14/10
Date Finished: 6/15/10
Drilling Method: 4 1/4 HSA
Water Depth (bgs):
Logged By: D. Symonds

Depth (BGS)	Sample ID	Sample Type	Blows / 6 inches	Recovery / Length (ft.)	USCS Classification	Lithology Description and Remarks *Density/Consistency, Color, Plasticity, Soil Types, Texture, Fabric, Bedding, Moisture, Other Characteristics*	Moisture *(dry, moist, wet, saturated)*	PID Scan (ppm)	PID Headspace (ppm)
82	S-42	2 " SS	47	2	ML-Till		Moist	0.0	
			67			Gray Brown, Very Dense, Silt w/Angular Gravel (Fractured Bedrock) <1.0" Diam		0.0	
83			84			(Olive Green & Blue Gray Rocks)		0.0	
			103	2		(Lodgement Till)		0.0	
84	S-43	2 " SS	100/2	2"	SHALE	TOP OF BEDROCK	Moist	0.0	
						Olive Green/Med Blueish Gray Bedrock			
						Refusal 84'			

Notes:

Appendix E

Excavation Work Plan

Fischbach, LLC

Excavation Work Plan

235 Metro Park Brighton Site
Rochester, New York
Site No. 828150

December 2025

Excavation Work Plan

235 Metro Park Brighton Site
Rochester, New York
Site No. 828150

December 2025

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Acronyms and Abbreviations

CAMP	Community Air Monitoring Plan
CFR	Code of Federal Regulations
DER	Division of Environmental Remediation
DER-10	Division of Environmental Remediation “Technical Guidance for Site Investigation and Remediation”
EWP	Excavation Work Plan
NYCRR	New York Codes, Rules, and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PE	Professional Engineer
PFAS	per- and polyfluoroalkyl substances
Site	235 Metro Park Site, Town of Brighton, Rochester, New York
SMP	Site Management Plan

This Excavation Work Plan (EWP) has been prepared as an appendix to the December 2025 Site Management Plan (SMP) to support future intrusive (i.e., subsurface, breaching of the cover system) activities at the 235 Metro Park Site located in the Town of Brighton, Rochester, New York (hereinafter referred to as the "Site").

1 Notification

At least 15 days prior to the start of any activity that is anticipated to encounter remaining contamination or breach or alter the Site's cover system, the Site owner or their representative will notify the New York State Department of Environmental Conservation (NYSDEC) contacts listed in the table below. Table 1 includes contact information for the above notification. The information on this table will be updated as necessary to provide accurate contact information. A full listing of site-related contact information is provided in Section 1.3 and Appendix B of the SMP.

*Table 1-1: Notifications**

NYSDEC		
Charlotte Theobald Project Manager	6274 East Avon-Lima Road Avon, New York 14414	T: 585-226-5354 Charlotte.Theobald@dec.ny.gov
David Pratt, P.E.	6274 East Avon-Lima Road Avon, New York 14414	T: 585-226-5449 David.Pratt@dec.ny.gov
Kelly Lewandowski Site Control	625 Broadway Albany, New York 12233	T: 518-402-9569 Kelly.Lewandowski@dec.ny.gov

* Note: Notifications are subject to change and will be updated as necessary.

This notification will include:

- A detailed description of the work to be performed, including the location and areal extent of excavation, plans/drawings for site re-grading, intrusive elements or utilities to be installed below the soil cover, estimated volumes of contaminated soil to be excavated, any modifications of truck routes, and any work that may impact an engineering control;
- A summary of environmental conditions anticipated to be encountered in the work areas, including the nature and concentration levels of contaminants of concern, potential presence of grossly contaminated media, and plans for any pre-construction sampling;
- A schedule for the work, detailing the start and completion of all intrusive work, and submittals (e.g., reports) to the NYSDEC documenting the completed intrusive work;
- A summary of the applicable components of this EWP;
- A statement that the work will be performed in compliance with this EWP and 29 Code of Federal Regulations (CFR) 1910.120 and 29 CFR 1926 Subpart P;
- A copy of the contractor's health and safety plan, in electronic format, if it differs from the Health and Safety Plan provided in Appendix F of this SMP;
- Identification of disposal facilities for potential waste streams; and
- Identification of sources of any anticipated backfill, along with the required request to import form and all supporting documentation including, but not limited to, chemical testing results.

The NYSDEC project manager will review the notification and may impose additional requirements for the excavation that are not listed in this EWP. The alteration, restoration and modification of engineering controls must conform with Article 145 Section 7209 of the Education Law regarding the application professional seals and alterations.

2 Soil Screening Methods

Visual, olfactory, and instrument-based (e.g., photoionization detector) soil screening will be performed during all excavations into known or potentially contaminated material (remaining contamination) or a breach of the cover system. A qualified environmental professional as defined in 6 New York Codes, Rules, and Regulations (NYCRR) Part 375, a Professional Engineer (PE) who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State will perform the screening. Soil screening will be performed when invasive work is done and will include all excavation and invasive work performed during development, such as excavations for foundations and utility work, after issuance of the certificate of completion. All soil/fill material from beneath the cover system will be field screened using a photoionization detector or similar equipment. A screening level of 10 parts per million will be used to segregate excavated soil/fill material.

Soils/fill material will be segregated based on previous environmental data and field screening results into material that requires offsite disposal and material that requires testing to determine if the material can be reused onsite as soil beneath a cover or if the material can be used as cover soil. Further discussion of offsite disposal of materials and onsite reuse is provided in Section 6 and Section 7, respectively, of this EWP.

3 Soil Staging Methods

Soil stockpiles will be continuously encircled with a berm and/or silt fence. Hay bales will be used as needed near catch basins, surface waters, and other discharge points.

Stockpiles will be kept covered at all times with appropriately anchored tarps. Stockpiles will be staged on and covered with a minimum of 12 mil poly sheeting or equivalent material. Stockpiles will be routinely inspected, and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected by the qualified environmental professional as defined by 6 NYCRR Part 375 at a minimum once each week and after every storm event. Results of inspections will be recorded in a logbook and maintained onsite and available for inspection by the NYSDEC.

4 Materials Excavation and Load-Out

A qualified environmental professional as defined in 6 NYCRR Part 375, a PE who is licensed and registered in New York State, or a qualified person who directly reports to a PE who is licensed and registered in New York State will oversee (i.e., be onsite) all invasive work and the excavation and load-out of all excavated material.

The owner of the property and remedial party (if applicable) and its contractors are responsible for safe execution of all invasive and other work performed under this EWP.

The presence of utilities and easements on the Site will be investigated by the qualified environmental professional. It will be determined whether a risk or impediment to the planned work under this SMP is posed by

the utilities or easements on the Site. A site utility stakeout will be completed for all utilities prior to any ground intrusive activities at the Site.

Loaded vehicles leaving the Site will be appropriately lined, tarped, securely covered, manifested, and placarded in accordance with appropriate Federal, State, local, and New York State Department of Transportation requirements (and all other applicable transportation requirements). Trucks transporting contaminated soil must have either tight-fitting opaque covers that are secured on the sides and/or back, or opaque covers that are locked on all sides.

A truck wash will be operated onsite, as appropriate. The qualified environmental professional will be responsible for ensuring that all outbound trucks will be washed at the truck wash before leaving the Site until the activities performed under this section are complete. Truck wash waters will be collected and disposed of offsite at a permitted facility in an appropriate manner. See Section 8 – Fluids Management for additional details.

Locations where vehicles enter or exit the Site shall be inspected daily for evidence of offsite soil tracking.

The qualified environmental professional will be responsible for ensuring that all egress points for truck and equipment transport from the Site are clean of dirt and other materials derived from the Site during intrusive excavation activities. Cleaning of the adjacent streets will be performed as needed to maintain a clean condition with respect to site-derived materials. Material accumulated from the street cleaning and egress cleaning activities will be disposed offsite at a permitted landfill facility in accordance with all applicable local, State, and Federal regulations. See Section 6 – Materials Disposed Offsite for additional details.

5 Materials Transported Offsite

All transport of materials will be performed by licensed haulers in accordance with appropriate local, State, and Federal regulations, including 6 NYCRR Part 364. Haulers will be appropriately licensed and trucks properly placarded.

Material transported by trucks exiting the Site will be secured with either tight-fitting opaque covers that are secured on the sides and/or back, or opaque covers that are locked on all sides. Loose-fitting, canvas-type truck covers will be prohibited. If loads contain wet material capable of producing free liquid, truck liners will be used.

Truck transport routes are shown on Figure 1 and as follows (from the commercial site access point):

- Turn right onto Metro Park;
- Turn left or right onto East Henrietta Road (Route 15A); and
- Proceed North or South on I-390, as desired.

All trucks loaded with site materials will exit the vicinity of the Site using only this approved truck route. This is the most appropriate route and takes into account: (a) limiting transport through residential areas and past sensitive sites; (b) use of city mapped truck routes; (c) prohibiting offsite queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; (f) overall safety in transport; and (g) community input (where necessary).

Trucks will be prohibited from stopping and idling in the neighborhood outside of the project site.

Egress points for truck and equipment transport from the Site will be kept clean of dirt and other materials during site remediation and development. See Section 4 Material Excavation and Load-Out and Section 6 Materials

Disposal Offsite for additional details. Queuing of trucks will be performed onsite in order to minimize offsite disturbance. Offsite queuing will be prohibited.

6 Materials Disposal Offsite

All material excavated and removed from the Site will be treated as contaminated and regulated material and will be transported and disposed offsite in a permitted facility in accordance with all local, State, and Federal regulations. If disposal of material from this Site is proposed for unregulated offsite disposal (i.e., clean soil removed for development purposes), a formal request with an associated plan will be made to the NYSDEC project manager. Unregulated offsite management of materials from this Site will not occur without prior formal NYSDEC project manager approval.

Offsite disposal locations for excavated soils will be identified in the pre-excavation notification. This will include estimated quantities and a breakdown by class of disposal facility if appropriate (e.g., hazardous waste disposal facility, solid waste landfill, petroleum treatment facility, construction and demolition debris recovery facility). Actual disposal quantities and associated documentation will be reported to the NYSDEC project manager in the subsequent Periodic Review Report. This documentation will include, but will not be limited to: waste profiles, test results, facility acceptance letters, manifests, bills of lading, and facility receipts.

Non-hazardous historic fill and contaminated soils taken offsite will be handled consistent with 6 NYCRR Parts 360, 361, 362, 363, 364, and 365. Material that does not meet Unrestricted soil cleanup objectives is prohibited from being taken to a New York State construction and demolition debris recovery facility (6 NYCRR Subpart Part 361-5 registered or permitted Facility).

7 Materials Reuse Onsite

The qualified environmental professional, as defined in 6 NYCRR Part 375, will ensure that procedures defined for materials reuse in this SMP are followed and that unacceptable material (i.e., contaminated) does not remain onsite. Contaminated onsite material, including historic fill and contaminated soil, that is acceptable for reuse onsite will be placed below the demarcation layer or impervious surface and will not be reused within the cover system or within landscaping berms. Contaminated onsite material may only be used beneath the site cover as backfill for subsurface utility lines with prior approval from the NYSDEC project manager.

Proposed materials for reuse onsite must be sampled for full suite analytical parameters, including per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. The sampling frequency will be in accordance with the NYSDEC's Division of Environmental Remediation (DER) "Technical Guidance for Site Investigation and Remediation" (DER-10) Table 5.4(e)10, unless prior approval is obtained from the NYSDEC project manager for modification of the sampling frequency. The analytical results of soil/fill material testing must meet the site use criteria presented in DER-10 Appendix 5 – Allowable Constituent Levels for Imported Fill or Soil for all constituents listed, and the NYSDEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (April 2023 or date of current version, whichever is later) guidance values. Approvals for modifications to the analytical parameters must be obtained from the NYSDEC project manager prior to the sampling event.

Soil/fill material for onsite reuse will be segregated and staged as described in Sections 2 and 3 of this EWP. The anticipated size and location of stockpiles will be provided in the 15-day notification to the NYSDEC project

manager. Stockpile locations will be based on the location of site excavation activities and proximity to nearby site features. Material reuse onsite will comply with requirements of NYSDEC DER-10 Section 5.4(e)4. Any modifications to the requirements of DER-10 Section 5.4(e)4 must be approved by the NYSDEC project manager prior to reuse onsite.

Any demolition material proposed for reuse onsite will be sampled for asbestos, and the results will be reported to the NYSDEC project manager for acceptance. Concrete crushing or processing onsite will not be performed without prior NYSDEC project manager approval. Organic matter (e.g., wood, roots, stumps) or other solid waste derived from clearing and grubbing of the site may only be reused on-site with written approval from the NYSDEC project manager.

8 Fluids Management

All liquids to be removed from the Site, including but not limited to excavation dewatering; decontamination waters; and groundwater monitoring well purge and development waters, will be handled, transported, and disposed offsite at a permitted facility in accordance with applicable local, State, and Federal regulations. Dewatering, purge, and development fluids will not be recharged back to the land surface or subsurface of the Site, and will be managed offsite at a permitted facility, unless prior approval is obtained from NYSDEC project manager.

Discharge of water generated during large-scale construction activities to surface waters (i.e., a local pond, stream, or river) will be performed under a State Pollutant Discharge Elimination System permit.

9 Cover System Restoration

After the completion of soil removal and any other invasive activities (breaching the cover system), the cover system will be restored in a manner that complies with the Amended Record of Decision. This existing cover system is comprised of a minimum of 12 inches of clean soil, asphalt pavement (an approximate 36,500 square foot asphalt parking lot), and concrete sidewalks and concrete building (an approximate 20,000 square foot building with a concrete foundation). If the type of cover system changes from that which exists prior to the excavation (i.e., a soil cover is replaced by asphalt), this will constitute a modification of the cover element of the remedy and the upper surface of the remaining contamination. The demarcation layer, consisting of orange snow fencing material, white geotextile or equivalent material will be placed to provide a visual reference to the top of the remaining contamination zone, the zone that requires adherence to special conditions for disturbance of remaining contaminated soils defined in this SMP. A figure showing the modified surface will be included in the subsequent Periodic Review Report and in an updated SMP. The alteration, restoration and modification of engineering controls must conform with Article 145 Section 7209 of the Education Law regarding the application professional seals and alterations.

10 Backfill from Offsite Sources

All materials proposed for import onto the Site will be approved by the qualified environmental professional, as defined in 6 NYCRR Part 375, and will be in compliance with provisions in this SMP prior to receipt at the Site. A Request to Import/Reuse Fill or Soil form, which can be found at http://www.dec.ny.gov/regulations/67386.html,

will be prepared and submitted to the NYSDEC project manager allowing a minimum of 5 business days for review. A copy of the form is presented in Appendix J of the SMP.

Material from industrial sites, spill sites, or other environmental remediation sites or potentially contaminated sites will not be imported to the Site.

All imported soils will meet the backfill and cover soil quality standards established in 6 NYCRR 375-6.7(d) and DER-10 Appendix 5 for commercial use. Based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria, the resulting soil quality standards are listed in Table 1 and Appendix 5 of DER-10. Soils that meet ‘‘general’ fill requirements under 6 NYCRR Part 360.13, but do not meet backfill or cover soil objectives for this Site, will not be imported onto the Site without prior approval by the NYSDEC project manager. Soil material will be sampled for the full suite of analytical parameters, including PFAS and 1,4-dioxane. Sampling frequency will be in accordance with DER-10 Table 5.4(e)10 unless prior approval is obtained from the NYSDEC project manager for modification of the sampling frequency. Solid waste will not be imported onto the Site.

Trucks entering the Site with imported soils will be securely covered with tight-fitting covers. Imported soils will be stockpiled separately from excavated materials and covered to prevent dust releases.

11 Stormwater Pollution Prevention

Barriers and hay bale checks will be installed and inspected by the qualified environmental professional once a week and after every storm event. Results of inspections will be recorded in a logbook and maintained at the Site and available for inspection by the NYSDEC. All necessary repairs shall be made immediately such as:

- Accumulated sediments will be removed as required to keep the barrier and hay bale check functional.
- All undercutting or erosion of the silt fence toe anchor shall be repaired immediately with appropriate backfill materials.
- Manufacturer's recommendations will be followed for replacing silt fencing damaged due to weathering.

Erosion and sediment control measures identified in the SMP shall be observed to ensure that they are operating correctly. Where discharge locations or points are accessible, they shall be inspected to ascertain whether erosion control measures are effective in preventing significant impacts to receiving waters.

Silt fencing or hay bales will be installed around the entire perimeter of the construction area.

12 Excavation Contingency Plan

If underground tanks or other previously unidentified contaminant sources are found during post-remedial subsurface excavations or development-related construction, excavation activities will be suspended until sufficient equipment is mobilized to address the condition. The NYSDEC project manager will be promptly notified of the discovery.

Sampling will be performed on product, sediment, and surrounding soils, etc., as necessary, to determine the nature of the material and proper disposal method. Chemical analysis will be performed for a full list of analytes (i.e., target analyte list metals, target compound list volatiles and semi-volatiles [including 1,4-dioxane], target compound list pesticides and polychlorinated biphenyls, and PFAS), unless the Site history and previous

sampling results provide a sufficient justification to limit the list of analytes. In this case, a reduced list of analytes will be proposed to the NYSDEC project manager for approval prior to sampling. Any tanks will be closed as per NYSDEC regulations and guidance.

Identification of unknown or unexpected contaminated media identified by screening during invasive site work will be promptly communicated by phone within 2 hours to NYSDEC's project manager. Reportable quantities of petroleum product will also be reported to the NYSDEC spills hotline. These findings will be also included in the subsequent Periodic Review Report.

13 Community Air Monitoring Plan

A figure showing the location of air sampling stations based on generally prevailing wind conditions is provided as Figure 2. Air monitoring station locations shall be determined based on wind directions at the beginning of each shift. These locations will be adjusted on a daily or more frequent basis based on actual wind directions to provide an upwind and at least two downwind monitoring stations.

Exceedances of action levels listed in the Community Air Monitoring Plan (CAMP), included as Appendix G to the SMP, will be reported to the NYSDEC and New York State Department of Health (NYSDOH) project managers.

13.1 Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures

When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for volatile organic compounds and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total volatile organic compound concentrations opposite the walls of occupied structures or next to intake vents exceed 1 part-per-million, monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre-determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.
- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 micrograms per cubic meter, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 micrograms per cubic meter or less at the monitoring point.
- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

13.2 Special Requirements for Indoor Work with Co-Located Residences or Facilities

Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under “Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures” except that in this instance “nearby/occupied structures” would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings, conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g. weekends or evenings) when building occupancy is at a minimum.

14 Odor Control Plan

This odor control plan is capable of controlling emissions of nuisance odors offsite and onsite. Specific odor control methods to be used on a routine basis, will include water, bioSolve, and/or foam. If nuisance odors are identified at the site boundary, or if odor complaints are received, work will be halted, and the source of odors will be identified and corrected. Work will not resume until all nuisance odors have been abated. The NYSDEC and NYSDOH project managers will be notified of all odor events and of any other complaints about the project activities. Implementation of all odor controls, including the halt of work, is the responsibility of the remedial party’s Remediation Engineer, and any measures that are implemented will be discussed in the subsequent Periodic Review Report.

All necessary means will be employed to prevent on and offsite nuisances. At a minimum, these measures will include: (a) limiting the area of open excavations and size of soil stockpiles; (b) shrouding open excavations with tarps and other covers; and (c) using foams to cover exposed odorous soils. If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include: (d) direct load-out of soils to trucks for offsite disposal; (e) use of chemical odorants in spray or misting systems; and (f) use of staff to monitor odors in surrounding neighborhoods.

If nuisance odors develop during intrusive work that cannot be corrected, or where the control of nuisance odors cannot otherwise be achieved due to onsite conditions or close proximity to sensitive receptors, odor control will be achieved by sheltering the excavation and handling areas in a temporary containment structure equipped with appropriate air venting/filtering systems.

15 Dust Control Plan

Particulate monitoring must be conducted according to the CAMP provided in Section 13 and in Appendix G to the SMP. If particulate levels at the Site exceed the thresholds listed in the CAMP or if airborne dust is observed on the Site or leaving the Site, the dust suppression techniques listed below will be employed. The remedial party will also take measures listed below to prevent dust production on the Site.

A dust suppression plan that addresses dust management during invasive onsite work will include, at a minimum, the items listed below:

- Dust suppression will be achieved using a dedicated onsite water truck for road wetting. The truck will be equipped with a water cannon capable of spraying water directly onto off-road areas, including excavations and stockpiles.
- Clearing and grubbing of larger areas will be done in stages to limit the area of exposed, non-vegetated soils vulnerable to dust production.
- Gravel will be used on roadways to provide a clean and dust-free road surface.
- Onsite roads will be limited in total area to minimize the area required for water truck sprinkling.
- Travel speeds over haul roads will be limited.
- The number and size of excavation areas open at one time will be limited.
- Excavation and materials in onsite staging areas will be covered with polyethylene sheeting.

16 Other Nuisances

A plan for rodent control will be developed and utilized by the contractor prior to and during Site clearing and grubbing and during all remedial work.

A plan will be developed and utilized by the contractor for all remedial work to ensure compliance with local noise control ordinances.

Tables

Table 1
Soil Quality Standards
Excavation Work Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Sample ID: Sample Depth (ft bgs): Sample Date:	Units	6 NYCRR Part 375 Commercial Soil Cleanup Objectives
Volatile Organic Compounds		
1,1,1-Trichloroethane	mg/kg	500
1,1-Dichloroethane	mg/kg	240
1,1-Dichloroethene	mg/kg	500
1,2-Dichlorobenzene	mg/kg	500
1,2-Dichloroethane	mg/kg	30
cis-1,2-Dichloroethene	mg/kg	500
trans-1,2-Dichloroethene	mg/kg	500
1,3-Dichlorobenzene	mg/kg	280
1,4-Dichlorobenzene	mg/kg	130
1,4-Dioxane	mg/kg	130
Acetone	mg/kg	500
Benzene	mg/kg	44
Butylbenzene	mg/kg	500
Carbon Tetrachloride	mg/kg	22
Chlorobenzene	mg/kg	500
Chloroform	mg/kg	350
Ethylbenzene	mg/kg	390
Hexachlorobenzene	mg/kg	6
Methyl ethyl ketone (MEK, 2-butanone)	mg/kg	500
Methyl tert-butyl ether	mg/kg	500
Methylene Chloride	mg/kg	500
n-Propylbenzene	mg/kg	500
sec-Butylbenzene	mg/kg	500
tert-Butylbenzene	mg/kg	500
Tetrachloroethene	mg/kg	150
Toluene	mg/kg	500
Trichloroethene	mg/kg	200
1,2,4-Trimethylbenzene	mg/kg	190
1,3,5- Trimethylbenzene	mg/kg	190
Vinyl Chloride	mg/kg	13
Xylenes	mg/kg	500
Semivolatile Organic Compounds		
Acenaphthene	mg/kg	500
Acenapthylene	mg/kg	500
Anthracene	mg/kg	500
Benzo(a)anthracene	mg/kg	5.6
Benzo(a)pyrene	mg/kg	1
Benzo(b)fluoranthene	mg/kg	5.6
Benzo(g,h,i)perylene	mg/kg	500
Benzo(k)fluoranthene	mg/kg	56
Chrysene	mg/kg	56
Dibenzo(a,h)anthracene	mg/kg	0.56
Fluoranthene	mg/kg	500
Fluorene	mg/kg	500
Indeno(1,2,3-cd)pyrene	mg/kg	5.6
m-Cresol	mg/kg	500

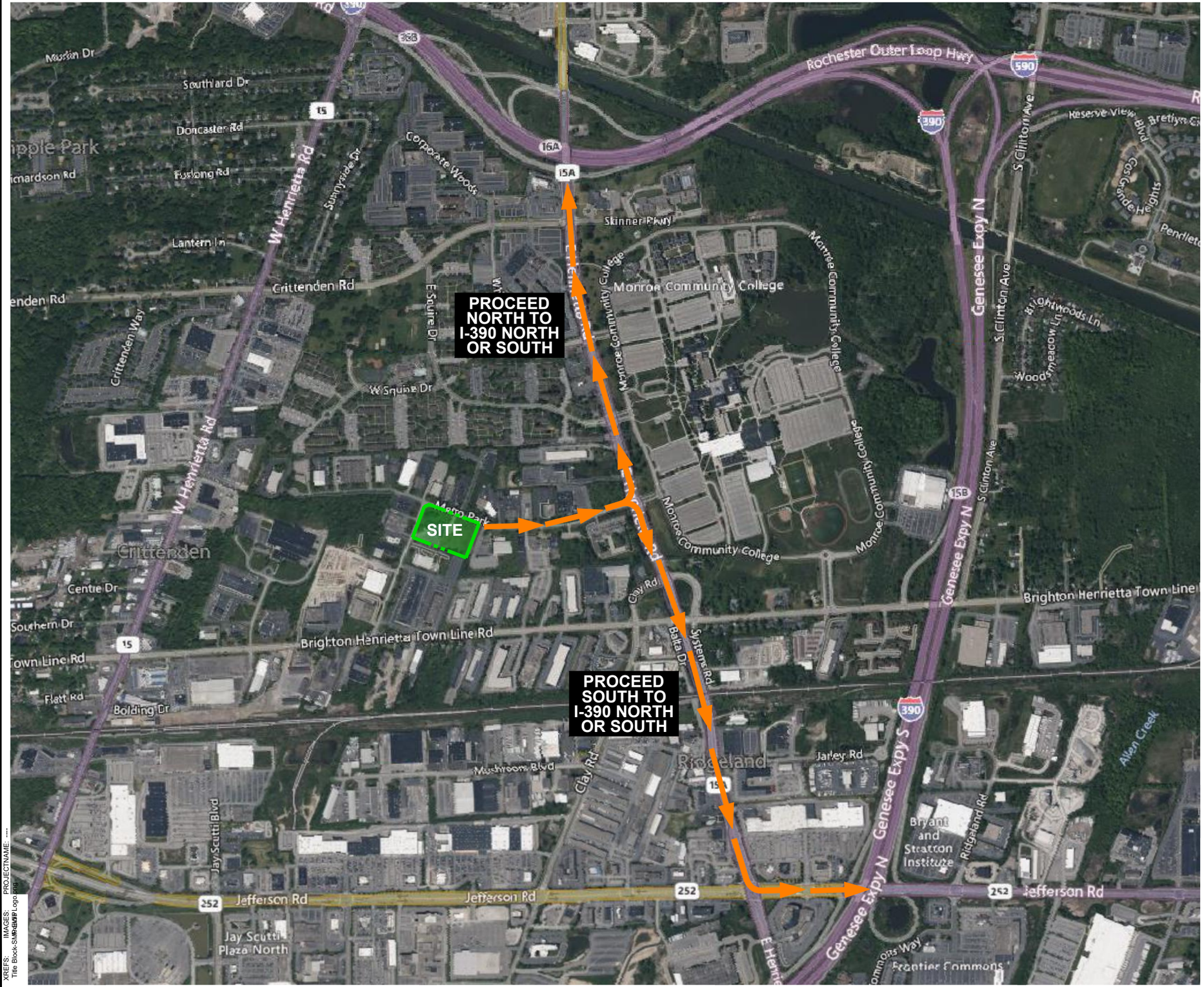
See notes last page.

Table 1
Soil Quality Standards
Excavation Work Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Sample ID: Sample Depth (ft bgs): Sample Date:	Units	6 NYCRR Part 375 Commercial Soil Cleanup Objectives
Semivolatile Organic Compounds (continued)		
Naphthalene	mg/kg	500
o-Cresol	mg/kg	500
p-Cresol	mg/kg	500
Pentachlorophenol	mg/kg	6.7
Phenanthrene	mg/kg	500
Phenol	mg/kg	500
Pyrene	mg/kg	500
Polychlorinated Biphenyls		
Total PCBs	mg/kg	1
Pesticides/Herbicides		
2,4,5-TP Acid (Silvex)	mg/kg	500
4,4'-DDE	mg/kg	62
4,4'-DDT	mg/kg	47
4,4'-DDD	mg/kg	92
Aldrin	mg/kg	0.68
alpha-BHC	mg/kg	3.4
beta-BHC	mg/kg	3
Chlordane (alpha)	mg/kg	24
delta-BHC	mg/kg	500
Dibenzofuran	mg/kg	350
Dieldrin	mg/kg	1.4
Endosulfan I	mg/kg	200
Endosulfan II	mg/kg	200
Endosulfan sulfate	mg/kg	200
Endrin	mg/kg	89
Heptachlor	mg/kg	15
Lindane	mg/kg	9.2
Inorganics		
Arsenic	mg/kg	16
Barium	mg/kg	400
Beryllium	mg/kg	590
Cadmium	mg/kg	9.3
Chromium, hexavalent	mg/kg	400
Chromium, trivalent	mg/kg	1500
Copper	mg/kg	270
Total Cyanide	mg/kg	27
Lead	mg/kg	1,000
Manganese	mg/kg	10,000
Total Mercury	mg/kg	2.8
Nickel	mg/kg	310
Selenium	mg/kg	1500
Silver	mg/kg	1500
Zinc	mg/kg	10,000

Notes:
ft bgs - feet below ground surface
mg/kg - milligrams per kilograms
NYCRR - New York Codes, Rules and Regulations

Figures



LEGEND:

- SITE BOUNDARY
- TRANSPORT ROUTE

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. AERIAL PHOTO PROVIDED BY MICROSOFT DISTRIBUTION AIRBUS DS, 2024 TOMTOM.

0 1,000' 2,000'

GRAPHIC SCALE

NYSDEC SITE # 828150
235 METRO PARK BRIGHTON SITE ROCHESTER, NEW YORK
**SITE MANAGEMENT PLAN-
EXCAVATION WORK PLAN**

TRANSPORT ROUTES

ARCADIS

FIGURE
1

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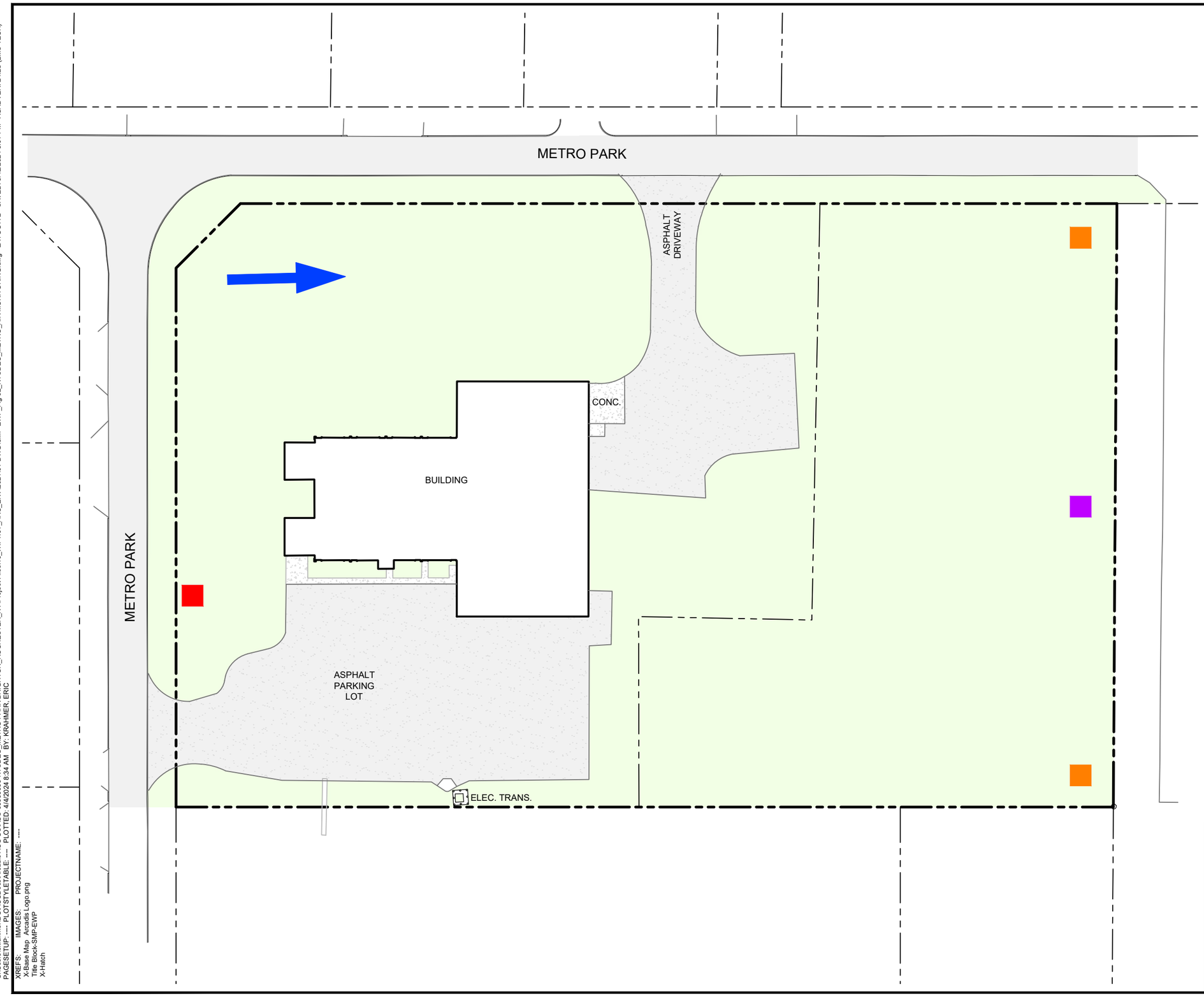
Title Block-SMP-EWP.dwg Arcadis Logo.jpg



LEGEND:

- PROPERTY BOUNDARY
- TAX PARCEL BOUNDARY
- BUILDING OUTLINE
- GRASS AREA
- BUILDING
- ASPHALT PAVED AREA
- CONCRETE AREA
- UPWIND AIR MONITORING STATION
- DOWNWIND AIR MONITORING STATION (IF ONE DOWNWIND STATION USED)
- DOWNWIND AIR MONITORING STATION (IF TWO DOWNWIND STATIONS USED)
- PREVAILING WIND DIRECTION

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. BASEMAP PROVIDED BY PASSERO ASSOCIATES, DATED 10.1.2008, DRAWING ALTA/ACSM LAND AND TITLE SURVEY.

0 60' 120'

GRAPHIC SCALE

NYSDEC SITE # 828150
235 METRO PARK BRIGHTON SITE ROCHESTER, NEW YORK
**SITE MANAGEMENT PLAN-
EXCAVATION WORK PLAN**

AIR MONITORING STATIONS BASED ON PREVAILING WIND CONDITIONS

ARCADIS

FIGURE
2

C:\Users\ekrahmer\DCACCDocs\Arcadis ACC US\AUS-99999999-NYSDEC_METRO PARK BRIGHTON_ROCHESTER_NY\Project Files\10_WIP\10T_ARC_ENV\2024\01-DWG\SMP-EWP_Fig 02_NYSDEC_METRO_AIR MONITORING.dwg LAYOUT: 2 SAVED: 3/12/2024 5:01 PM ACADVER: 24.2S (LMS TECH)
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Title Block-SMP-EWP
X-Hatch

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Rochester
New York 14604
Phone: 585 385 0090
Fax: 585 546 1973
www.arcadis.com

Appendix F

Health and Safety Plan

Site Specific Health and Safety Plan

Revision 19 a

Project Name:	Fischbach - Metro Park 235 Metro Park Brighton Site Rochester, New York
Project Number:	30135590
Client Name:	Fischbach, LLC
Date:	7/14/2022
HASP Expires	7/14/2023
Revision:	

Approvals:

HASP Developer: Kaitlyn Fleming

Project Manager: Ben Girard

HASP Reviewer: Veronica Bean

HASP Reviewer Name Typed

HASP Reviewer Signature (handwritten or digital signature)

Emergency Information

Site Address: 235 Metro Park Brighton Site
Rochester, NY

Emergency Phone Numbers:

Emergency (fire, police, ambulance)		911
Emergency (facility specific, if applicable):		
Rochester Police Dept. (non-emergency)		585-428-6720
Emergency Other (specify):		
Primary Client Contact:	Laura Duhamel	859-734-7471
WorkCare (non-life-threatening injury/illness):		1-888-449-7787
Project H&S:	Nicholas Beyrle	585-662-4044
Task Manager:	Ryan Clare	585-662-4057
Project Manager:	Nicholas Beyrle	585-662-4044
H&S Specialist:	Alec MacAdam	720-454-0948
Area H&S Director:	Andrew McDonald	410-200-3752

Hospital Name and Address: Strong Memorial Hospital
601 Elmwood Ave
Rochester, New York 14642

Hospital Phone Number: 585-275-2100

Supplemental Client Contact Information:

Other Important Phone Numbers:

Poison Control Center	1-800-222-1222
Nat. Response Ctr. (spills in reportable quantities)	1-800-424-8802
U.S. Coast Guard (spills to water)	1-800-424-8802

Incident Reporting Protocol Within Arcadis

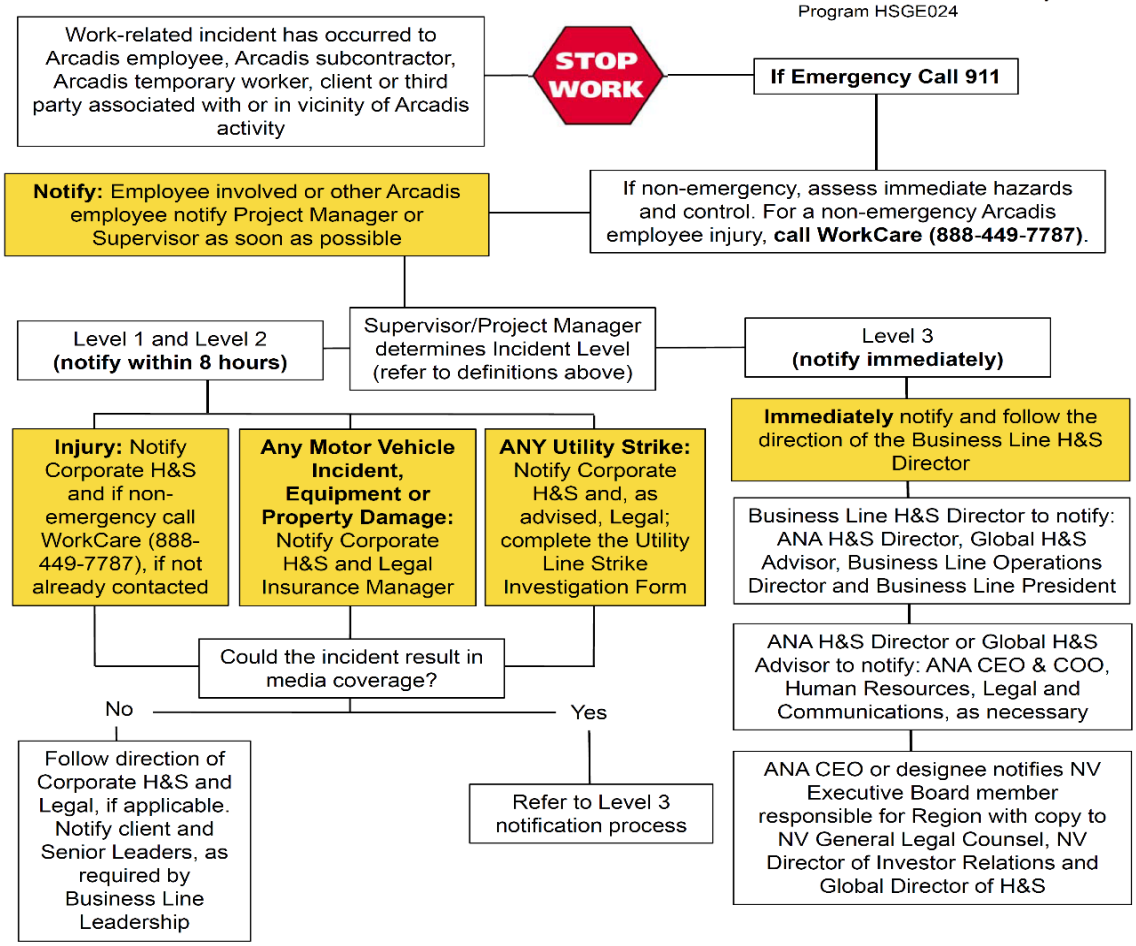
Incident Levels

Level 1: First aid/self-treated, work-related injury (contact WorkCare as soon as possible); minor property or equipment damage (less than or equal to $100); vehicle loss event* (no injuries, no third-party involvement or other vehicle involvement).

Level 2: Professional Medical Treatment (if non-emergency injury or illness, employee must contact WorkCare as soon as possible); moderate property or equipment damage (greater than $100 but less than or equal to $5,000); ANY utility strike incident, any motor vehicle accident* (including injury or third-party involvement).

Level 3: Immediately report fatality, severe or catastrophic injury and/or overnight hospitalization required; significant property or equipment damage (greater than $5,000); missing person or incident that generates media coverage.

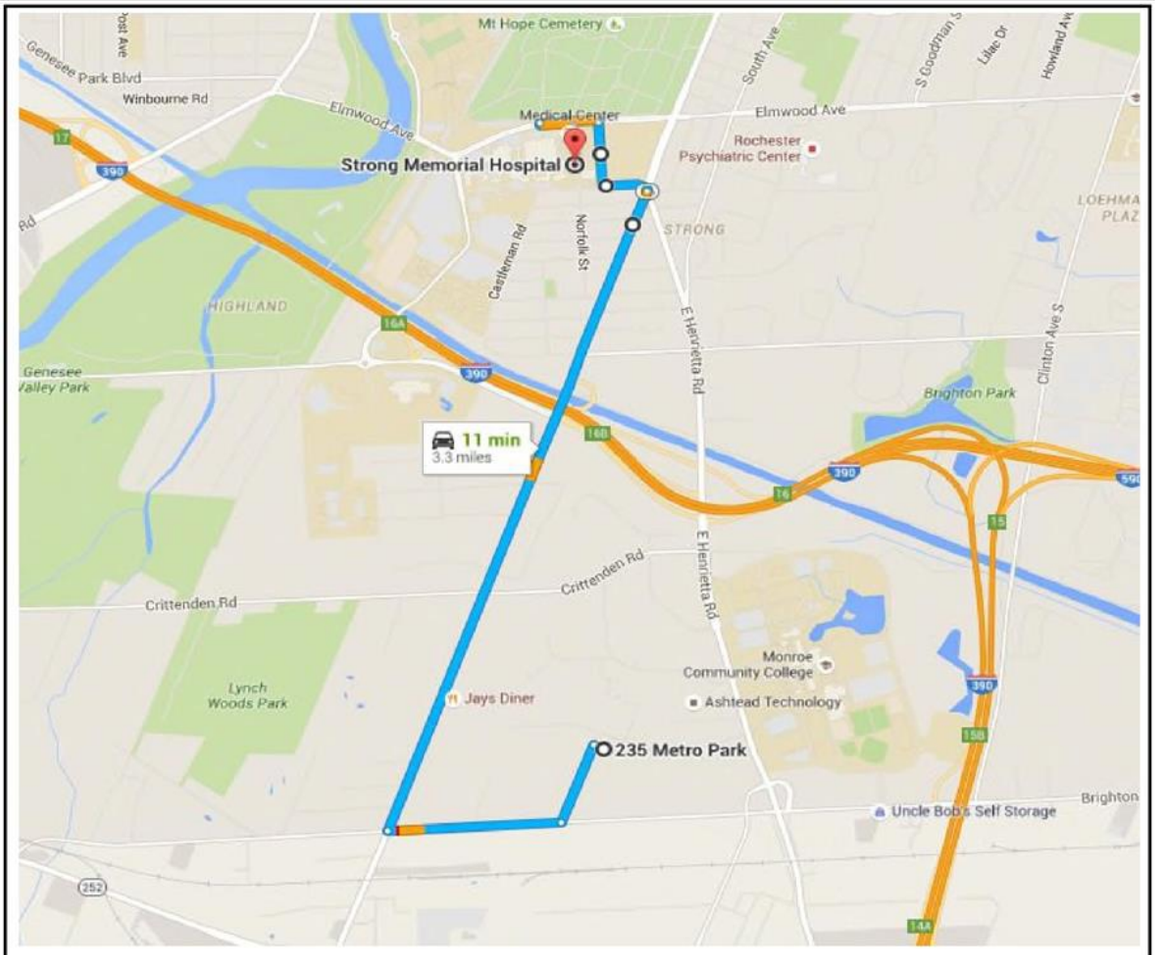
* Refer to Motor Vehicle Safety Program HSGE024



Client Incident Reporting Protocol

1 Dial 911/Facility Emergency Number/WorkCare as applicable
2 Contact PM/Supervisor Nicholas Beyrle
3 Contact Coporate H&S Andrew McDonald
4 Contact Client Laura Duhamel

Route to the Hospital



235 Metro Park

Rochester, NY 14623

1. Head south on Metro Park toward Brighton Henrietta Town Line Rd — 0.2 mi
2. Turn right onto Brighton Henrietta Town Line Rd — 0.5 mi
3. Turn right onto NY-15 N/W Henrietta Rd
   Continue to follow NY-15 N — 2.0 mi
4. Turn left onto Crittenden Blvd — 0.1 mi
5. Turn right onto East Drive — 0.2 mi
6. Turn left onto Elmwood Ave — 0.2 mi
7. Make a U-turn
   Destination will be on the right — 0.1 mi

Strong Memorial Hospital

601 Elmwood Avenue, Rochester, NY 14642

Site Type

The project site is an active facility with the following attributes:

Buildings	
Commercial	
Parking Lot/Private Drive (NON ROW)	

Work in parking lots will require preparation of a Non-ROW Traffic Safety Plan.

Surrounding Land Use and Topography

Site is located in a business park and is mostly topographically flat.

Simultaneous Operations (SimOps)

Planned Arcadis site work will not be in proximity to SimOps work activities performed by non Arcadis employees or subcontractors. Arcadis will initiate stop work and evaluate the work activities through the JSA process if during the course of work a SimOps activity is identified that could reasonably affect health and safety of Arcadis employees and subcontractors.

Site Background

Site background is presented in the project work plan located in the Rochester, NY office.

Project Tasks

The following tasks are identified for this project:

1	Monitor well - Well sounding, water level or product measurements using probes, tapes or downhole water parameter measurements
2	Sampling - Well sampling using bailers
3	Sampling - Well sampling using peristaltic pumps
4	Sampling - Well sampling using pumps requiring pump installation/removal
5	Sampling - Non-pressurized or passive air sampling using summa canisters, sample canisters, tedlar bags, or passive collection device
6	Driving - Motor vehicles

The following documents and/or plans associated with the above task(s) are required and attached:
Not Applicable- Current Arcadis COVID-19 Prevention Recommendations and Guidance

[X] Required Checklists/Work Forms

- *Tailgate Safety Briefing Form*
- *Vehicle Inspection Checklist*

[ ] Required Permits

- *Not Applicable*

[X] Required H&S Standards

- *Motor Vehicle Safety Program_ARC HSGE024*
- *Personal Protective Equipment_ARC HSGE015*
- *Stop Work Authority_ARC HSGE009*

Short Service Employees (SSEs)

SSEs (employees who are employed with Arcadis for less than 1 year or are Inexperienced Workers) have the potential to work on this project. If SSEs are utilized, the project team working in conjunction with the SSE's administrative supervisor will ensure requirements of ARC HSGE019 "Short Service Employees" are completed. SSE's will be identified on the project Tailgate Safety Meeting Form.

Roles and Responsibilities

	Name	Role	Short Service Employee
1	Nicholas (Klaus) Beyrle	Project Manager (PM)	No
2	Nicholas (Klaus) Beyrle	Associate Project Manager (APM)	No
3	Ryan Clare	Task Manager	No
4	Ryan Clare	Field Technical Lead	No
5	Ryan Clare	Site Safety Officer (SSO) (HAZWOPER)	No
6	Adam Svensson	Field Staff	No
7	Kaitlyn Fleming	Field Staff	No

Training

All Arcadis employees are required to have the following training to be on site:

- H&S Program Orientation (non-certificat
- HAZCOM GHS/EAP (non-certificate)
- Defensive Driving - Smith On-Line
- Hazwoper 40-Hour
- Hazwoper 8-Hour Annual Refresher
- Client specific:
- Other:

Selected Arcadis employees are required to have the following additional training:

	Names or Numbers from above
BBP (Bloodborne Pathogens)	5
First Aid/CPR	5
DOT HazMat #1	4, 6, 7
None	
None	
None	
None	
Other:	

The Arcadis Fundamental H&S Principles

Staff working on any of the task(s) listed above must utilize the six Arcadis Fundamental H&S Principles to ensure work is conducted safely. These principles include: 1) Use of TRACK, 2) H&S Planning, 3) Stop Work Authority, 4) "If Not Me Then Who", 5) Stewardship, and 6) Incident Reporting. Every project team member plays an important role in project health and safety. This is more than just having a HASP, training, or PPE. Proactive staff engagement with these principles is critical to a safe work environment.

General Task Hazard Assessment and Risk Control (HARC)

General:	Site-Wide

The 12 hazard category HARC ratings are not available in this General THA. The mitigated and unmitigated ratings for the hazards presented are based on the Risk Assessment Matrix below. Modify hazards and ratings as necessary to meet project needs.

Risk Assessment Matrix		Likelihood Ratings			
Consequences Ratings		A	B	C	D
People	Property	0 Almost Impossible	1 Possible but Unlikely	2 Likely to Happen	3 Almost Certain to Happen
1-Slight or No Health Effect	Slight or No Damage	0-Low	1-Low	2-Low	3-Low
2-Minor Health Effect	Minor Damage	0-Low	2-Low	4-Medium	6-Medium
3-Major Health Effect	Local Damage	0-Low	3-Low	6-Medium	9-High
4-Fatalities	Major Damage	0-Low	4-Medium	8-High	12-High

Hazard #1

Driving - On road - Injury or vehicle damage from motor vehicle accident or incident

Suggested FHSHB Ref: 3.4
Overall Unmitigated Risk: HIGH
Mitigated Risk: MEDIUM
Comments: Use Smith System "5-Keys" when driving. See Driving JSA for details.

To mitigate this hazard, use TRACK and the following:
Smith System (on line)
JSAs

Hazard #2

Driving - Driver - Injury, death or property damage due to driver distraction, fatigue, etc.

Suggested FHSHB Ref: 3.4, 3.21
Overall Unmitigated Risk: HIGH
Mitigated Risk: LOW
Comments: Use route planning. Keep eyes moving while driving. See Driving JSA.

To mitigate this hazard, use TRACK and the following:
Smith System (on line)
Driver awareness and use of stop work authority

Hazard #3

Biological - skin/eye irritation or damage from poisonous plants

Suggested FHSHB Ref: 3.17.11
Overall Unmitigated Risk: LOW
Mitigated Risk: LOW
Comments: Use skin pre-treatment lotions when available.

To mitigate this hazard, use TRACK and the following:
See HASP Tick/Poisonous Plant Section
Job Briefing/Site Awareness

Hazard #4

Biological - bites or stings from exposure to insects or arachnids

Suggested FHSHB Ref: 3.17: 2,3,7,8,9,10
Overall Unmitigated Risk: LOW
Mitigated Risk: LOW
Comments: Do body check daily. For ticks see also HASP Tick/Poisonous Plant section

To mitigate this hazard, use TRACK and the following:
PPE (see HASP "PPE" section)
Job Briefing/Site Awareness

Hazard #5

Biological - cuts, scrapes, skin/eye puncture from exposure to physically damaging plants

Suggested FHSHB Ref: 3.17.11
Overall Unmitigated Risk: MEDIUM
Mitigated Risk: LOW
Comments:

To mitigate this hazard, use TRACK and the following:
Job Briefing/Site Awareness
PPE (see HASP "PPE" section)

General Task HARC (continued)

Hazard #6		
Environmental - Thermal stress - Injury or illness from heat or cold		
Suggested FHSHB Ref:	3.16	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Field H&S Handbook (see ref. above)
Mitigated Risk:	LOW	JSAs
Comments:	Use job rotation or rest breaks. Stay hydrated and eat regularly.	
Hazard #7		
Environmental - Inclement weather -Injury or equipment damage from inclement weather		
Suggested FHSHB Ref:	3.12	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Weather Monitoring
Mitigated Risk:	LOW	Cont./Emerg. Planning
Comments:	Use 30/30 rule for lightning. See FHSHB for details.	
Hazard #8		
Motion - Musculoskeletal - Injury from lifting, twisting , stooping, or awkward body positions		
Suggested FHSHB Ref:	3.29.1	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Engineering Controls (specify in comments)
Mitigated Risk:	LOW	Admin. Controls (specify in comments)
Comments:	Use proper lifting techniques. Use job rotation when applicable. See FHSHB for details.	
Hazard #9		
Motion - Musculoskeletal - Injury from repeated work activity or body motion		
Suggested FHSHB Ref:	3.29.2	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Engineering Controls (specify in comments)
Mitigated Risk:	LOW	Admin. Controls (specify in comments)
Comments:	Use proper lifting techniques. Use job rotation when applicable. See FHSHB for details.	
Hazard #10		
Gravity - Falls - Injury due to slips and trips		
Suggested FHSHB Ref:	3.26.4, 4.11	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	Housekeeping
Comments:	Use footwear appropriate for site conditions, plan routes and do not hurry while walking.	

Task Specific HARC

Task 1:	Monitor well - Well sounding, water level or product measurements using probes, ta

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: 3.9

Biological*	L	Chemical	L	Driving*	-	Electrical	-
Environmental*	L	Gravity*	M	Mechanical	-	Motion*	L
Personal Safety	-	Pressure	L	Radiation	-	Sound	L

* *Hazard rating, if present, excludes General THA hazards in this category.*

Hazard #1

Personal safety - Fatigue - Injury or illness caused while working when fatigued

Suggested FHSHB Ref:	3.21	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Job Briefing/Site Awareness
Mitigated Risk:	LOW	Admin. Controls (specify in comments)
Comments:	Maintain proper rest and hydration before, during, and after work.	

Hazard #2

Mechanical - Pinch point - Injury by pinching of body part in mechanical process

Suggested FHSHB Ref:	3.27.4	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	Site Awareness
Comments:	Wear gloves when removing and placing well lids.	

Hazard #3

Chemical - liquids, skin or eye irritation/damage/allergy

Suggested FHSHB Ref:	Fischbach, LLC	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	Wear eye protection; wear nitrile gloves; look away from well when accessing.	

Task Specific HARC (continued)

Task 3:	Sampling - Well sampling using bailers

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: 3.9

Biological*	L	Chemical	M	Driving*	-	Electrical	-
Environmental*	M	Gravity*	M	Mechanical	-	Motion*	M
Personal Safety	L	Pressure	L	Radiation	-	Sound	L

Hazard #1

Chemical- liquids - injury or illness from skin absorption

Suggested FHSHB Ref:	3.9, 3.22, 3.30, 3.33	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	PPE (see HASP "PPE" section)
Mitigated Risk:	LOW	JSAs
Comments:	Sample containers contain acid preservatives. Wear nitrile gloves and safety glasses.	

Task Specific HARC (continued)

Task 4:	Sampling - Well sampling using peristaltic pumps								
HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low):							FHSHB Ref:		3.9
Biological*	L	Chemical	M	Driving*	-	Electrical	L		
Environmental*	L	Gravity*	L	Mechanical	-	Motion*	L		
Personal Safety	L	Pressure	L	Radiation	-	Sound	L		

Hazard #1

Chemical- liquids - injury or illness from skin absorption

Suggested FHSHB Ref:	3.9, 3.22, 3.30, 3.33	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	PPE (see HASP "PPE" section)
Comments:	Sample containers contain acid preservatives. Wear nitrile gloves and safety glasses.	

Hazard #2

Driving - Off road - Injury or vehicle damage from object impact/vehicle rollover/improper load securement

Suggested FHSHB Ref:	3.4.2.1	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	HIGH	JSAs
Mitigated Risk:	LOW	Smith System (on line)
Comments:	Driving in saturated grass/soil areas can result in getting vehicle stuck. Perform site assessment to observe condition of ground before entering with field vehicle.	

Task Specific HARC (continued)

Task 5:	Sampling - Well sampling using pumps requiring pump installation/removal

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: 3.9

Biological*	L	Chemical	M	Driving*	-	Electrical	L
Environmental*	M	Gravity*	M	Mechanical	L	Motion*	M
Personal Safety	L	Pressure	L	Radiation	-	Sound	M

Hazard #1

Electrical - Housekeeping - Injury or property damage due to frayed wiring, improperly mounted wiring, missing

Suggested FHSHB Ref:	3.25	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	JSAs
Mitigated Risk:	LOW	HASP
Comments:	Equipment inspection; proper training to use equipment.	

Task Specific HARC (continued)

Task 6:	Sampling - Non-pressurized or passive air sampling using summa canisters, sample canisters, tedlar bags, or passive collection device

HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low): FHSHB Ref: 3.9

Biological*	L	Chemical	L	Driving*	-	Electrical	-
Environmental*	-	Gravity*	L	Mechanical	-	Motion*	L
Personal Safety	-	Pressure	-	Radiation	-	Sound	L

Hazard #1

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	2.5, 3.22	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Site Awareness
Mitigated Risk:	LOW	Engineering Controls (specify in comments)
Comments:	Be aware of moving traffic around the site. Self Awareness.	

Task Specific HARC (continued)

Task 7:	Driving - Motor vehicles							
HARC Unmitigated Hazard Types (H-High, M-Medium, L-Low):						FHSHB Ref:		3.4
Biological*	-	Chemical	-	Driving*	H	Electrical	-	
Environmental*	-	Gravity*	-	Mechanical	-	Motion*	-	
Personal Safety	L	Pressure	-	Radiation	-	Sound	L	

Hazard #1

Motion - Struck by - Bodily injury from impact with moving object

Suggested FHSHB Ref:	2.5, 3.22	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Engineering Controls (specify in comments)
Mitigated Risk:	LOW	Site Awareness
Comments:	Wear hi-visibility clothing; delineate work area with traffic cones	

Hazard #2

Mechanical - Pinch point - Injury by pinching of body part in mechanical process

Suggested FHSHB Ref:	3.27.4	To mitigate this hazard, use TRACK and the following:
Overall Unmitigated Risk:	MEDIUM	Machine Guarding
Mitigated Risk:	LOW	Site Awareness
Comments:	TRACK; take time with common tasks (opening/closing vehicle doors and hood)	

Hazard Communication (HAZCOM)/Global Harmonization System (GHS)

[ ] HAZCOM/GHS for this project is managed by the client or general contractor

List the chemicals anticipated to be used by Arcadis on this project per HAZCOM/GHS requirements.
(Modify quantities as needed)

	Preservatives	Qty
[ ]	Not applicable	
[X]	Hydrochloric acid	<500 ml
[X]	Nitric acid	<500 ml
[X]	Sulfuric acid	<500 ml
[X]	Sodium hydroxide	<500 ml
[X]	Zinc acetate	<500 ml
[ ]	Ascorbic acid	<500 ml
[ ]	Acetic acid	<500 ml
[ ]	Isopropyl alcohol	< 4 gal.
[ ]	Formalin (<10%)	< 4 gal.
[ ]	Methanol	<500 ml
[ ]	Sodium bisulfate	<500 ml

	Decontamination	Qty
[ ]	Not applicable	
[X]	Alconox	≤ 5 lbs
[ ]	Liquinox	≤ 1 gal
[ ]	Acetone	≤ 1 gal
[ ]	Methanol	≤ 1 gal
[ ]	Hexane	≤ 1 gal
[X]	Isopropyl alcohol	≤ 4 gal
[ ]	Nitric acid	≤ 1 L
[ ]	Other:	

	Calibration	Qty.
[ ]	Not applicable	
[X]	Isobutylene/air	1 cyl
[ ]	Methane/air	1 cyl
[ ]	Pentane/air	1 cyl
[ ]	Hydrogen/air	1 cyl
[ ]	Propane/air	1 cyl
[ ]	Hydrogen sulfide/air	1 cyl
[ ]	Carbon monoxide/air	1 cyl
[X]	pH standards (4,7,10)	≤ 1 gal
[X]	Conductivity standards	≤ 1 gal
[X]	Other:	
	ORP, Auto Cal, Turbidity	≤ 1 gal

	Fuels	Qty.
[X]	Not applicable	
[ ]	Gasoline	≤ 5 gal
[ ]	Diesel	≤ 5 gal
[ ]	Kerosene	≤ 5 gal
[ ]	Propane	1 cyl
[ ]	Other:	

	Kits	Qty.
[X]	Not applicable	
[ ]	Hach (specify):	1 kit
[ ]	DTECH (specify):	1 kit
[ ]	Other:	1 kit

	Remediation	Qty.
[X]	Not applicable	
[ ]		
[ ]		
[ ]		
[ ]		
[ ]		

	Other:	Qty.
[ ]	Not applicable	
[X]	Spray paint	≤ 6 cans
[ ]	WD-40	≤ 1 can
[ ]	Pipe cement	≤ 1 can
[ ]	Pipe primer	≤ 1 can
[ ]	Mineral spirits	≤ 1 gal

	DOT(1):	Qty.
[ ]	MOT eligible soils	
[ ]	MOT eligible water	
[ ]	MOT eligible solids	
[ ]	MOT eligible liquids	
[ ]		
[ ]		
[ ]		

(1) Attach applicable Materials of Trade (MOT) generic shipping determination. SDS not generally applicable to this category.

SDSs for this project are attached to this HASP.

Air Monitoring

X	There are no atmospheric chemical, radiological, or particulate hazards on this project requiring air monitoring.
	Air monitoring is the responsibility of the client or subcontractor.

Constituents of Interest:

Time Weighted Averages (TWAs) are ACGIH 8-Hr Threshold Limit Values (TLVs) unless noted.

TCE			
TWA	10 ppm	LEL/UEL (%):	8/10.5
STEL	25 ppm	VD (Air = 1):	NA
IDLH	1000 ppm, NIOSH	VP (mmHg):	58

PCE			
TWA	25 ppm	LEL/UEL (%):	NA/NA
STEL	100 ppm	VD (Air = 1):	NA
IDLH	150 ppm, NIOSH	VP (mmHg):	14

cis 1,2-Dichloroethene			
TWA	200 ppm	LEL/UEL (%):	5.6/12.8
STEL	NA	VD (Air = 1):	NA
IDLH	1000 ppm, NIOSH	VP (mmHg):	180-265

TWA - Time Weighted Average (ACGIH TLV unless noted)
STEL - Short Term Exposure Limit
IDLH - Immediately Dangerous to Life and Health
LEL/UEL - Lower /Upper Explosive Limit
RGD - Relative Gas Density
VP - Vapor Pressure

Notes:

Required Monitoring Instruments, Action Levels and Monitoring Frequency

Gray fields below are not automated. Make necessary selections from drop down menus.

Photoionization Detector — Select Lamp: 10.6 eV

Computed action levels (PID units) (1):			Computed action levels have been manually adjusted.
<	16.7	Continue working	
	16.7 - 33.5	Levels sustained > 5 minutes, monitor continuously and review engineering controls and PPE. Proceed with caution.	
>	33.5000	Stop work and contact SSO	

(1) Computed action levels are for PIDs which have not been programmed to correct TLVs for specific constituents or mixtures.

Particulate/Aerosol monitoring is required.

Action levels are in mg/m3			Computed action levels have been manually adjusted.
<	1.5	Continue working	
	1.5 - 3	Levels sustained > 5 minutes, monitor continuously and review engineering controls and PPE. Proceed with caution.	
>	3	Stop work and contact SSO	

Breathing zone air monitoring using the above instruments will be performed at the following frequency:

15 Minute intervals

Data logging instruments are preferred for this monitoring frequency. Staff using these instruments must be trained in data logging procedures for the actual instrument(s) used. Data logging results must be backed up daily. If manually logging, all results (including non detects) must be documented.

Multigas (including LEL/O2 and Hg vapor) monitoring is not required.

LEL/O2 Meter	0-5% LEL	Continue work
LEL/O2 Monitoring Not Required	>5-10% LEL	Continually monitor, review engineering controls, proceed with caution
	>10% LEL	Stop work, evacuate, contact SSO
	19.5%-23.5% O2	Normal, continue work
	<19.5% O2	O2 deficient, stop work, evacuate, contact SSO
	>23.5% O2	O2 enriched, stop work, evacuate, contact SSO

Additional Gas/Vapor Monitoring is Not Required

		1/2 TLV	Stop Work Action Level	Comments
☐	Ammonia	12.5 ppm	25 ppm	
☐	Carbon dioxide	2500 ppm	5000 ppm	
☐	Carbon monoxide	12.5 ppm	25 ppm	
☐	Chlorine	0.05 ppm	0.1 ppm	
☐	Hydrogen cyanide	2.35 ppm (skin)	4.7 ppm* (skin)	
☐	Hydrogen sulfide	0.5 ppm	1 ppm	
☐	Nitrogen dioxide	0.1 ppm	0.2 ppm	
☐	Phosphine	0.025 ppm	0.05 ppm	
☐	Sulfur dioxide	0.125 ppm	0.25* ppm	
☐	Mercury vapor	0.0125 mg/m3	0.025 mg/m3	

* Ceiling or STEL value

All air-monitoring instruments must be calibration checked daily, if used, per manufacturer's instructions. Calibration checks, including calibration gases used, must be documented.

Compound specific monitoring using indicator tubes or chips is not required.

Indicator:		≤TWA	Continue work
☐ Tube	☐ Chip	>TWA	Stop work, review engineering controls and PPE, contact SSO
Compound(s):			

Indicator tube/chip monitoring frequency: Not applicable

Air Monitoring Acronyms and Definitions

Arcadis Acronym	*Meaning*	*Definition*
	Action Levels	
A	Arcadis Specific TWA	An Arcadis administrative TWA.
c	Ceiling (TLV-C)	The concentration that shall not be exceeded during any part of the working exposure.
i	Inhalable	Particles that enter the respiratory system via the nose or mouth.
IDLH	Immediately Dangerous to Life and Health	The exposure concentration which is likely to cause significant injury/illness or death.
PEL	Permissible Exposure Limit (OSHA)	OSHA exposure limit and is legally enforceable in the United States.
r	Respirable	The portion of inhalable particles that enter the deepest part of the lung, the nonciliated alveoli.
REL	Recommended Exposure Limit (NIOSH)	The NIOSH TWA for an exposure up to a 10-hour workday during a 40-hour work week.
s	Skin	Potential for dermal absorption
se	Sensitizer	Potential for dermal or respirable sensitization resulting from the interaction of an absorbed agent.
STEL	Short Term Exposure Limit (TLV-STEL)	Usually a 15-minute TWA exposure that should not be exceeded at any time during the workday, even if the 8-hour TWA is within the TLV,PEL, or REL TWAs.
TLV	Threshold Limit Value (ACGIH)	The ACGIH TWA for an exposure up to a 8-hour workday during a 40-hour work week.
TWA	Time Weighted Average (TLV-TWA)	Time-weighted average exposure concentration for a conventional 8-hour (TLV,PEL) or up to 10-hour (REL) workday and a 40-hour week.
	Chemical and Physical Properties	
IP	Ionization Potential	Ionization potential, eV (electron volts) [Ionization potentials are given as a guideline for the selection of photoionization detector lamps used in some direct-reading instruments.]
LEL	Lower Explosive Limit	The minimum concentration of a vapor in air below which propagation of a flame will not occur in the presence of an ignition source.
UEL	Upper Explosive Limit	The maximum concentration of a vapor in air below which propagation of a flame will not occur in the presence of an ignition source.
RGD	Relative Gas Densit	Weight of a vapor or gas compared to an equal volume of air (air = 1). If greater than 1.0, the vapor or gas is heavier than air and will concentrate in the low places. If less than 1.0, the vapor or gas will rise.

Units		
eV	Electron volt	A unit of energy equal to the energy acquired by an electron falling through a potential difference of one volt.
m	mg/m3	Milligrams per cubic meter
p	ppm	Parts per million
Organizations/Agencies		
ACGIH	American Conference of Governmental Industrial Hygienists	
NIOSH	National Institute for Occupational Safety and Health	
OSHA	Occupational Safety and Health Administration	

Tick and Poisonous Plant Hazards

For all projects with outdoor work, biological hazards must be addressed in the tailgate safety meeting each day. The following controls must be used to mitigate biological hazards while working and must also be discussed in the tailgate safety meeting. For low risk situations, the discussion must include exposure to weeds/vegetation near fences, buildings, etc.

Controlling Tick Hazards

Risk Guide for Ticks:

Low	Paved areas; parking lots; well manicured lawns and fields; no work taking place within 15 feet of vegetated areas; work in REGIONS with no tick populations; sub-freezing temperatures, snow or ice cover on ground.*
Medium	Brush hogged fields, wetlands, and grasslands; forested areas with little undergrowth; weeds less than knee height; moderately dense foliage; sporadic or moderately vegetated shaded areas; average leaf accumulation and decaying material on the ground; work taking place in fields after application of insecticide; work in REGIONS with a recognized moderate tick populations; outdoor work during spring, summer and fall months.*
High	Uncut fields, wetlands, forested areas, and grasslands; weeds taller than knee height; heavy dense foliage; heavily vegetated shaded areas; excessive accumulations of leaves and decaying material on the ground; work in REGIONS with recognized heavy tick populations; areas with posted tick hazard warnings; outdoor work during spring, summer and fall months.*

*Cold weather does not eliminate risk of exposure to deer ticks as they may be active all year in areas that experience subfreezing temperatures.

Ticks are ranked as a **Low** risk for this project

Care should be taken to avoid walking through or working in tall grasses, overgrown or bushy vegetation to the extent reasonable and practical. No single control is effective against ticks.

Select required controls below:

Engineering Controls

- [X] Mowing of work area
- [ ] Clearing overgrown vegetation
- [ ] Pesticide application
- [ ] Other: _____

Administrative Controls

- [X] Complete tick check morning/evening
- [ ] Scheduled tick check: _____
- [X] Inspect backpacks, equipment cases, etc. daily
- [X] Vehicle cab - maintain good housekeeping
- [ ] Other: _____

Personal Protective Equipment

- [X] Light colored clothing
- [ ] Light colored hat/hardhat
- [ ] Pants tucked in boots
- [ ] Shirt tucked into pants
- [ ] Long sleeved shirt and long pants
- [ ] White Tyvek pants
- [ ] White coveralls/Tyvek
- [ ] Taped cuffs/pant legs
- [ ] Tick gators
- [ ] Double sided tape/duct tape sticky side out
- [ ] Insect mesh/netting for face/head or whole body suit
- [ ] Other: _____

Repellents

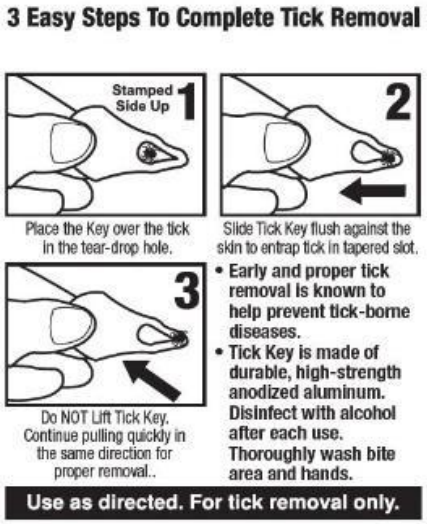
- [X] Repellents will not be used
- [ ] Permethrin impregnated clothing (purchased)
- [ ] Permethrin (0.5% self applied/treated to clothing)
- [ ] Deet 20-40% applied to skin
- [ ] Other: _____

If repellents are not used, additional PPE controls must be considered.

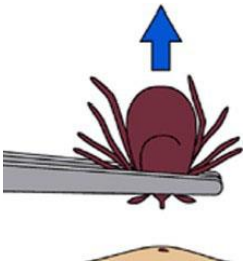
Tick Removal and First Aid

Ticks removed within 24 hours of embedment represent a very low risk for adverse outcomes. Perform tick checks as directed above. To properly remove a tick:

Using a Tick Removal Tool



Using Tweezers



1) Use point tip tweezers, if available, to reduce potential of crushing the ticks body
2) Grasp the tick as close to skin as possible
3) Pull upward with even pressure.

Do not crush tick with fingers

After removal, wash affected area with alcohol or iodine. Wash hands thoroughly after removal.
Document date/time of the removal in field notes, field form or H&S app.
If rash or fever develops, call WorkCare

Poisonous Plants (Poison Ivy, Poison Oak, Poison Sumac)

All work outdoors, regardless of time of year, must address poisonous plant hazards and controls in the tailgate safety meeting. For low risk projects, the discussion should consider potential vegetation exposure near fences, buildings, work near trees, etc.

Controlling Exposure to Poisonous Plants

Poisonous Plants are ranked as a **Low** risk on this project

Select required controls below:

Engineering Controls

- [X] Not applicable
- [ ] Mowing of work area
- [ ] Clearing overgrown vegetation
- [ ] Herbicide application
- [ ] Other: _____

Administrative Controls

- [ ] Identify and avoid (see ID Quick Guide below)
- [ ] Watch for signs or symptoms of exposure
- [ ] Vehicle cab - maintain good housekeeping
- [ ] Other: _____

Personal Protective Equipment

- [ ] Gloves
- [ ] Hat/hardhat/head covering
- [ ] Pants tucked in boots
- [ ] Shirt tucked into pants
- [ ] Long sleeved shirt and long pants
- [ ] White coveralls/Tyvek
- [ ] Taped cuffs/pant legs
- [ ] Dust mask (during burning activities, etc.)
- [ ] Other: _____

Repellents

X	Repellents will not be used
	Barrier creams
	Other: _____

Skin Decontamination

	Wash with post-exposure soap and water
	Wash with soap and water (use hot water if available)
	Hot shower at end of day
	Other: _____

Equipment Decontamination

Due to the low risk associated with poisonous plants on this project, portable equipment and tools may still have a potential to be contaminated with urushiol (the oil that causes allergic reactions and dermatitis in poisonous plants covered by this plan). It is recommend to decontaminate handles, grips, and hand holds of tools and equipment with post-exposure soap and water or alcohol spray (if safe to do so for the equipment/tool being decontaminated) as a best practice.

Clothing Decontamination

Wash work clothing in hot water separate from other clothing. Even though there is a low risk for poisonous plants on this project, work boots should be considered potentially contaminated with urushiol. Decontaminate with post-exposure soap and water or hot soap and water. If safe for the boot, consider spraying with alcohol spray of post exposure soap is not available.

First Aid

If skin irritation or other signs of allergic reaction develops contact WorkCare for assistance. Document date and time of exposure, if known, in field notes, field form or H&S app.

Identification Quick Guide

Ticks:

American Dog Tick

Blacklegged (Deer) Tick

Brown Dog Tick

Groundhog Tick

Gulf Coast Tick

Lone Star Tick

Rocky Mountain Wood Tick

Soft Tick

Poison Ivy:

Poison Oak:

Poison Sumac:

For other biological hazards, address the hazards and controls in the JSA for the work task.

Personal Protective Equipment (PPE)

See JSA or Permit for the task being performed for required PPE. If work is not conducted under a JSA or Permit, refer to the governing document for PPE requirements. At a minimum, the following checked PPE is required for all tasks during field work (outside of field office trailers and vehicles) not covered by a JSA or Permit on this project:

Minimum PPE required to be worn by all staff on project:

						Specify Type:
	Hard hat		Snake chaps/guards		Coveralls:	
X	Safety glasses		Briar chaps		Apron:	
	Safety goggles		Chainsaw chaps	X	Chem. resistant gloves:	Nitrile
	Face shield		Sturdy boot		Gloves other:	
	Hearing protection	X	Steel or comp. toe boot		Chemical boot:	
	Rain suit		Metatarsal boot		Boot other:	
	Other:			X	Traffic vest, shirt or coat:	Class II
					Life vest:	

Task specific PPE:
Comments:

Medical Surveillance

All Arcadis employees performing field work will be required to be current in HAZWOPER medical surveillance.

Hazardous Materials Shipping and Transportation

A shipping determination package has been prepared, reviewed and is attached to this HASP.

Traffic Safety and Traffic Safety Plans (TSPs)

All or portions of the project work will be conducted in a parking lot and/or private roadway. A Non-ROW TSP addressing this work is attached to this HASP.

Arcadis Commercial Motor Vehicles (CMVs)

CMVs operated by Arcadis employees on public roadways will not be utilized on this project. Arcadis defines a CMV as any single vehicle with a gross vehicle weight rating (GVWR) ≥10,001 pounds or a truck and trailer combination with a combined GVWR ≥10,001 pounds (GVWR of truck + GVWR of trailer = ≥10,001 pounds).

Site Control

The scope of work on this project does not require use of site control.

Decontamination

The scope of work does not require implementation of decontamination protocols.

Sanitation

The project scope is a mobile work operation. The project field team will have reasonable access to restroom facilities within 10 minutes of the work area where the mobile work activity is actively taking place. Potable water will be carried by the field team in the vehicle used for the project. Unless alternate requirements are stipulated in a plan supplement (i.e. Heat Injury and Illness Prevention Plan), permit or JSA, bottled or water coolers with potable water will be provided to project workers at 1 gallon/worker/day.

Safety Briefings

Arcadis will lead all safety briefings on this project and will document the safety briefing on a Tailgate Safety Briefing form or logbook. Safety briefings will be conducted once at the beginning of each work day unless the Site Safety Officer deems more frequent safety briefings will be required based on work being conducted. All project workers, including Arcadis subcontractors, will be required to attend the safety briefing. Site visitors and project workers not on duty during the morning safety briefing will receive the safety briefing upon their arrival onto the project site for the day.

The safety briefing will also address COVID-19 prevention protocols to be used on site as described in current Arcadis recommendations and guidance.

Employee Health and Safety Engagement

The CPM or APM is responsible for reviewing and establishing H&S engagement goals for the project. These goals are summarized below.

Hazard Observations (via H&S App or TIP) required at the following frequency on this project:

1 Per Event

Close Call reporting (via H&S app) goals for this project:

As Needed

Other (specify):

Safety Equipment and Supplies

Safety equipment/supply requirements are addressed in the JSA or Permit for the task being performed. If work is not performed under a JSA or Permit, the following safety equipment is required to be present on site in good condition unless otherwise noted (Check all that apply):

X	First aid kit		Insect repellent:
X	Bloodborne pathogens kit	X	Sunscreen
	Fire extinguisher		Air horn
	Eyewash (ANSI compliant)		Traffic cones
X	Eyewash (bottle)		2-way radios
X	Drinking water		Heat stress monitor
	Other:	X	See Tick and Poisonous Plant Hazards section for addtional equipment/supply information.

International Travel

International travel is not required for this project.

Spill Control and Containment

Spill control and containment protocols, including required equipment and supplies, are located in the project work plan governing work on this project.

Use of Electronic Devices in Areas of Increased Safety Risk

The intent of this section is to ensure use of standard computer tablets, laptops, or cell phones (collectively referred to in this HASP as a digital device) is performed in a manner that is effective in preventing or mitigating injury to the user of the digital device.

Use of electronic devices in an active parking lot must be addressed in the Non-ROW TSP. Use of Non-ROW short-term traffic controls in situations where digital data collection or documentation is conducted should be avoided unless spotter options are utilized. When practical, use project vehicle as shield in parking lots.

Electronic device use and distractions to be discussed and documented in the job briefing/safety briefing.

Signatures

I have read, understand and agree to abide by the requirements presented in this health and safety plan. I understand that I have the absolute right to stop work if I recognize an unsafe condition affecting my work until corrected.

Printed Name	Signature	Date

Add additional sheets if necessary

You have an absolute right to STOP WORK if unsafe conditions exist!

Attachment A
COVID-19 Prepardness,
Response, and Continuity Plan

Arcadis Field and Embedded Staff COVID-19 Guidance

16 February 2022

Version Control

Revision No.	Date Issued	Description
1	3/17/20	Original document.
2	3/20/20	Added guidance for multiple occupants traveling in the same vehicle.
3	3/24/20	Updated introduction to include links to Orange Line information; added requirement of Arcadis COVID-19 Health Screening Self-Assessment Questionnaires; moved client questionnaire section forward in the document; and made minor updates to the social distancing, vehicle/transportation, lodging and equipment sections.
4	3/30/20	Updated social distancing section to include CDC “close contact” definition; added section for work in team settings; added AirBnB to lodging discussion.
5	4/2/20	Document template updated and sections rearranged; updated Hand Hygiene section; updated Cleaning of Frequently Touched Surfaces section; updated close contact definition; added section on PPE; added section for Traveling Between States, Provinces and Territories; added section for Construction/Construction Management; added section on Post-Shift Work
6	4/3/20	Added Appendix D – Interim Guidance for the Use of Face Coverings; Updated links, Section 2.3 added bullet to avoid sharing tools and equipment unless cleaned; Section 4.7.2 updated with a bullet for maintaining social distancing at choke points; Section 4.8 added section for Face Coverings and guidance in Appendix D.
7	4/10/20	Added Section 2.8 Other Considerations for journey and emergency action planning; Section 4.6 updated with current information regarding COVID-19 in sewage; Section 4.8 and Appendix D updated to include CDC’s recommends of wearing cloth face coverings in public settings where other social distancing measures are difficult to maintain.
8	4/13/20	Revised Section 2.6 by adding information about gloves being required in some jurisdictions; revised Section 4.8 and Appendix D with latest CDC and Health Canada guidance information.
9	4/20/20	Revised Section 2.1 to discuss both digital and hardcopy COVID-19 Health Screening Self-Assessment Questionnaires; revised Section 2.3.1 to include instructions on alcohol-based hand sanitizer use.
10	4/26/20	Revised Section 2.1 by adding the definition of fever and process for elevated temperature; revised section 2.4 by adding a reminder to understand the appropriate uses and limitations of the disinfectant; revised Section 2.6 by adding link to PPE request form and email address; Section 3.1 added link to “Locations with Travel Restrictions”

Revision No.	Date Issued	Description
		dashboard; revised Section 3.2 to consider face coverings when multiple occupants are riding in a single vehicle; revised Section 4.2 adding critical infrastructure/essential worker language; updated hyperlinks
11	5/1/20	Section 1 revised with latest symptoms of COVID-19; Section 2.5 reinforced Stop Work Authority and reporting where social distancing is not being practiced; inserted Interim Guidelines for Cardiopulmonary Resuscitation as Section 2.8 and moved “Other Considerations” to Section 2.9; added a bullet referencing Continuity Plan in Section 2.9
12	5/4/20	Revised Appendix C per jurisdictional updates.
13	6/16/20	Updated symptom list per CDC guidance; revised CDC close contact definition notes (Section 2.4); added plan for breaks bullets in Section 4.2; added Section 4.9 KN95; updated CDC’s face covering laundering recommendations in Appendix D.
14	8/14/20	Updated footnotes for “close contact” definition (Section 2.5); updated Sections 3.1 and 3.3 to reflect current travel recommendations; updated Section 4.8 and Appendix D to indicate exhalation valves or vents should NOT be worn; added links to the Face Covering Guide in Section 4.8.
15	10/23/20	Added Appendix E with additional signage that may be used; added reference to signage (Section 2.3.1); updated social distancing and close contact definitions (Section 2.5); added Yellow Guidance sub bullet (Section 2.7); updated order hyperlink (Section 3.1); added airline and other transportation (Section 3.2); added reporting requirement documentation (Section 4.3); updated Section 4.7.1 to clarify occupancy and documentation of visitors for contact tracing; added guidance to hold meetings outside (Section 4.7.2); minor edits to Section 4.8 and Appendix D.
16	11/13/20	Section 3.2 updated protocol to only one person in a vehicle; Section 3.3 updated protocol regarding room sharing and dining; Sections 4.2 through 4.7 added a face covering bullet; Section 4.8 and Appendix D added information from recent study that face coverings provide protection to the wearer.
17	12/4/20	Revised the reporting process in Section 2.7 to contact WorkCare instead of Brian Kundert. Added Section 2.7.1 describing WorkCare’s risk stratification and return to work process.
18	1/29/21	Updated all hyperlinks to new Intranet; added COVID-19 vaccine to Section 2.3; moved the Face Covering and KN95 section from 4.8 and 4.9, respectively, to Section 2.6; renumbered all sections; Section 2.9 clarified the continuity plan is required by the jurisdiction or client and is

Revision No.	Date Issued	Description
		recommended for all projects; revised poster in Appendix B; Appendix D updated with current CDC language and added CDC graphics.
19	2/25/21	Updated links in Section 2.1.2; updated Section 2.6 and Appendix D with revised face covering and KN95 guidance.
20	5/18/21	Added U.S. quarantine exemptions in Section 2.8; updated U.S. ridesharing requirements in Section 3.2; updated U.S. dining protocol in Section 3.3; updated face covering bullets in Section 4.0 work-specific situations; template update.
21	7/23/2021	Updated Section 2.1 and 2.8.1 to reflect the revised WorkCare Daily Screen and risk stratification process; removed outdated Section 2.6.1; updated U.S. vehicle sharing protocol in Section 3.2; Section 4.7 updated with guidance for vaccinated and unvaccinated employees.
22	8/13/21	Removed “Jurisdictional Social Distancing” template from Appendix C and renumber appendices; changed temperature at which individuals will not visit an office or project site to 100.0°F (37.8°C) in Section 2.1; updated face covering protocol for indoor spaces in Section 2.6 and Appendix C; updated U.S. vehicle sharing protocol in Section 3.2.
23	9/10/21	Added Section 2.3 Vaccine Policy and renumbered sections; Section 2.8 removed reference to retired “Yellow Caution Status” flowchart; Section 3.2 updated Canada ridesharing; Section 3.3 updated Canada and U.S. dining protocol; Section 4.7.1 removed reference to unvaccinated employees.
24	2/14/22	Updated vaccination terminology and definition in Section 2.9; revised U.S. ridesharing and lodging requirements for unvaccinated staff in Sections 3.2 and 3.3, respectively; added requirement that staff entering residential settings must be vaccinated in Section 4.5; updated Appendix C with latest CDC mask guidance; updated hyperlinks throughout the document.
25	2/16/22	Revised Section 4.5 recommending staff entering residential settings be vaccinated and added recommendation for an N95.

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Appendix B: Site Signage – Social Distancing

Appendix C: Guidance for the Use of Face Coverings

Appendix D: Additional Signage

Appendix E: Arcadis Contact Tracing Log

Acronyms and Abbreviations

AED	Automated external defibrillators
CDC	U.S. Centers for Disease Control and Prevention
CPR	Cardiopulmonary resuscitation
HC	Health Canada
PPE	Personal protective equipment
SDS	Safety Data Sheet

1 Introduction

Currently Arcadis is following CDC and Health Canada guidelines, as well as applicable government directives. The health and safety of our people is of utmost importance to us. Arcadians are empowered to use TRACK to evaluate individual situations and Stop Work Authority anytime safety is at risk. Employees will not come to work if exhibiting any respiratory illness symptoms, including but not limited to COVID-19.

It is recommended that all field and embedded staff review and have access to the current version of this document. The most current version can be viewed and downloaded from the ANA H&S COVID-19 Resources intranet page. COVID-19 symptoms may appear 2-14 days after exposure to the virus. People with these symptoms or combinations of symptoms may have COVID-19:

- Fever or chills
- Cough
- Shortness of breath or difficulty breathing
- Fatigue
- Muscle or body aches
- Headache
- New loss of taste or smell
- Sore throat
- Congestion or runny nose
- Nausea or vomiting
- Diarrhea

This list is not all inclusive. Please consult your medical professional for any other symptoms that are severe or concerning to you.

2 Guidance for Project Activities

Employees will complete the following for all project activities.

2.1 Arcadis COVID-19 Health Screening Self-Assessment Questionnaires

All employees going to an Arcadis office, a project site, or a client site will be required to complete a Daily Screening through WorkCare's WorkMatters app, regardless of vaccination status. Individuals should continuously monitor for signs and symptoms of COVID-19 and, if not feeling well, complete the WorkCare Daily Screen Process again.

When individuals take their own temperature to evaluate whether they have a fever, the temperature measurements will be completed without the use of fever-reducing medicines that contains ibuprofen or acetaminophen and not within 30 minutes of exercise. The CDC defines a fever as a temperature of 100.4°F (38°C) or greater. If the individual's temperature is between 99°F (37.2°C) and 99.9°F (37.7°C) it is recommended the individual pay close attention for signs and symptoms of COVID-19 and complete the WorkCare COVID-19 Daily Screen Process more frequently. Individuals with temperatures of 100.0°F (37.8°C) or greater should not

visit an office or project site. You may also contact WorkCare's COVID-19 services if you are experiencing symptoms consistent with COVID-19 and are concerned it may be COVID-19.

2.1.1 COVID-19 Daily Screen Process

All Arcadis staff will register in WorkCare's WorkMatters app. Arcadis staff can use the WorkCare WorkMatters app once a day (or multiple times a day, if appropriate) to complete their COVID-19 health screening self-assessment using the Daily Screen Survey.

Upon completion of the COVID-19 Daily Screen Process in the WorkMatters app, the user will receive a green or red completion message:

- Green – Proceed to the office or project site.
- Red – Do not proceed to the office or project site. Complete Survey 2 and follow end guidance. You and your supervisor will receive an email that you have not been cleared to work. You will need to conduct contact tracing with Corporate Health & Safety, if necessary. You must log into the URL or App to complete the Daily Symptom Tracker, each day you are Not Cleared To Return To Work.

Once you have been cleared to Return to Work by a WorkCare physician, you and your supervisor will receive an email that states you have been Cleared to Return to Work.

2.1.2 COVID-19 Health Screening Self-Assessment Questionnaire (Hardcopy)

The COVID-19 Health Screening Self-Assessment Questionnaire must be:

- Distributed to scheduled visitors, clients, and contractors before visiting Arcadis offices or sites.
- Post the self-assessment questionnaire and post Appendix A at entrances and/or field trailers.

Minimize visitors on site. All visitors (staff, subcontractors, clients, anticipated guests, unanticipated guests) to the site must be asked to review the applicable questionnaire from the following list.

Canada COVID-19 Health Screening Self-Assessment Questionnaire for Staff (English)

U.S. COVID-19 Health Screening Self-Assessment Questionnaire for Staff, Contractors and Visitors (English)

U.S. COVID-19 Health Screening Self-Assessment Questionnaire for Staff, Contractors and Visitors (Spanish)

If a client has a similar questionnaire that Arcadis staff are required to complete, the client questionnaire may be substituted for Arcadis questionnaire.

2.2 Client COVID-19 Health Screening Forms

Some clients are requiring our employees to complete their COVID-19 health screening forms.

- You are not required to share personal medical information with clients; therefore, Arcadis is not requiring you to complete any form requesting medical information. Your disclosure of personal medical information to clients is completely voluntary.
- Please understand, if you do not complete the form, you will not be allowed on the client's sites and facilities, per the client's directive.
- Also, if you complete the form, you have an ongoing duty to provide prompt notice of any changes to any of your responses. (Some clients may require periodically signing updated forms).
- If you are restricted from a client site as a result of your answers to the COVID-19 health screening form, or because you have chosen not to complete the form, Arcadis will attempt to find you alternative work that does not involve access to the client's site or facility; although, Arcadis cannot guarantee that other work will be available.

If your Project Manager is not already aware of the client COVID-19 health screening form, please alert them when you receive one from a client.

2.3 U.S. Vaccine Policy

Arcadis strongly encourages all employees to receive a COVID-19 vaccination. COVID-19 vaccines are effective at helping protect against severe disease and death from variants of the virus that causes COVID-19. In accordance with the Arcadis U.S. Vaccine Policy, all U.S. employees are encouraged to upload the vaccination details into WorkCare's WorkMatters portal.

Clients may require employees working at their sites be fully vaccinated or if unvaccinated, to complete surveillance testing. If the client requires Arcadis verification, Project Managers or Account Managers will reach out to HR Operations (HROperations.ANA@arcadis.com) with a list of names to be checked. If testing is required, contact Corporate Health & Safety.

2.4 Practice Good Hygiene

The best way to prevent illness is to avoid exposure to the virus. CDC and Health Canada recommend common flu and cold season preventative measures, including:

- Wash hands often with soap and water for at least 20 seconds. If soap and water are not readily available, use a hand sanitizer with at least 60% alcohol.
    - If hand sanitizer or soap & water are not available on site, bring your own source of water and hand soap to accommodate hand washing.
- Avoid touching your eyes, nose, and mouth.
- Cover your nose and mouth with a tissue when sneezing or coughing.
- Monitor your health daily by completing a self-assessment.
- Stay 6 feet (2 metres) away from others.
- Avoid crowds and poorly ventilated spaces.
- Do not share Personal Protective Equipment (PPE).
- Maintain and thoroughly clean PPE in accordance with manufacturer's instructions.
- Avoid sharing phones, offices, tools, and equipment. If sharing is necessary, clean and disinfect prior to use.
- Clean high touch surfaces daily.
- Get a vaccine (flu to reduce the risk of flu illness and COVID-19).

2.4.1 Hand Hygiene

Hand hygiene for infection prevention is an important part of the U.S. and Canada response to COVID-19. Washing hands with soap and water has been and will continue to be our primary method for good hand hygiene. Both CDC and HC recommend that you wash hands often with soap and water for at least 20 seconds especially after you have been in a public place, or after blowing your nose, coughing, or sneezing. Hand washing mechanically removes pathogens.

Alcohol based hand sanitizer is a flammable liquid and vapor. However, there is no evidence to suggest hand sanitizer poses a fire hazard when used according to package directions and warnings. To use hand sanitizer:

- Follow manufacturer instructions for use.
- Rub your hands together, covering all surfaces of both hands, including between your fingers and up around your fingertips and nails.
- Rub hands together for 30 seconds to allow your hands to completely absorb the product.
- Allow the hand sanitizer to completely dry.
- Do not touch food or anything until your hands are dry.
- Refer to the Safety Data Sheet (SDS) for hazards information.

If hand sanitizer is not available, Arcadis requires that project teams assess and address the need for hand washing (e.g., access to water and soap) while working on site. This can be achieved by having access to a functioning restroom, a portable hand washing station or as simple as having hand soap, bottled water and paper towels to clean hands as necessary. A handwashing sign that may be posted near handwashing stations is provided in Appendix D.

2.5 Clean Frequently Touched Surfaces

Arcadis recommends that project teams identify who is responsible for cleaning frequently touched surfaces in our workplaces (field trailers, client facilities, etc.). CDC and HC recommend that these surfaces are disinfected daily. This includes tables, doorknobs, light switches, countertops, handles, desks, phones, keyboards, toilets, faucets, and sinks. Before using a disinfectant product, understand the appropriate uses and limitations of the disinfectant, and refer to equipment/tool manufacturer care instructions to determine whether the disinfectant is compatible (e.g., using isopropyl alcohol to disinfect an iPhone).

> CDC cleaning and disinfecting facilities: https://www.cdc.gov/coronavirus/2019-ncov/community/disinfecting-building-facility.html
>
> Health Canada cleaning and disinfecting public spaces: https://www.canada.ca/en/public-health/services/publications/diseases-conditions/cleaning-disinfecting-public-spaces.html
>
> Health Canada hard surface disinfectants: https://www.canada.ca/en/health-canada/services/drugs-health-products/disinfectants/covid-19.html

If surfaces are dirty, clean them using detergent or soap and water prior to disinfection. To disinfect, most common EPA-registered or HC-approved household disinfectants will work. Use disinfectants appropriate for the surface.

If the sourcing of disinfectant products is limited, CDC and HC have outlined an option to use a diluted household bleach solution (at least 1,000 ppm sodium hypochlorite) as a disinfectant.

Standard household bleach is typically 5.25% sodium hypochlorite (52,500 ppm), whereas ultra-strength household bleach is typically 6% sodium hypochlorite (60,000 ppm). In accordance with Hazard Communication requirements, always refer to and have a copy of the Safety Data Sheet (SDS) available and on site with you. To **make a daily bleach solution** for use as a disinfectant:

- Mix 5 tablespoons (1/3rd cup) of standard bleach per gallon of water or for a smaller spray bottle size dilution, mix 4 teaspoons bleach per quart of water.
  OR
- 1 teaspoon (5 mL) per cup (250 mL) OR 4 teaspoons (20 mL) per litre (1000mL).
  Note: Solution must be mixed daily, because the solution will lose effectiveness as a disinfectant after 24-hours.

Follow manufacturer's instructions (e.g., Clorox) for application and proper ventilation, ensuring a contact time of at least 1 minute (for specific products and contact time information, refer to the CDC and HC links above). Check to ensure the product is not past its expiration date. Never mix household bleach with ammonia or any other cleanser. According to the HC, CDC and U.S. EPA, unexpired household bleach will be effective against coronaviruses when properly diluted.

A second alternative is to use an alcohol solution. The solution must have at least 70% isopropanol.

If supplies cannot be sourced locally, email PPErequests@arcadis.com.

2.6 Practice Social (Physical) Distancing

The CDC definition of **social distancing, also called "physical distancing,"** means keeping a safe space (approximately 6 feet, 2 metres or about two arm lengths) between yourself and other people who are not from your household in both indoor and outdoor spaces. Situations where social/physical distancing should be practiced include but are not limited to tailgate and safety briefing meetings, breaks in field trailers, entering stores and workstations. Plan work activities to maximize social (physical) distancing and minimize close contact with others. Social (physical) distancing is mandatory for unvaccinated individuals and highly recommended for vaccinated individuals. If there are instances where social distancing is not being practiced where it should, Stop Work and remove yourself from the situation. Contact the Project Manager or your Supervisor and document in the H&S App as an "Close Call" or "Unsafe Behavior."

Additional information when working in teams is required is discussed in the "work specific situations" section below.

> **Note:** The CDC defines **close contact** as: a person who was within 6 feet of an infected person for a cumulative total of 15 minutes or more over a 24-hour period starting from 2 days before illness onset (or, for asymptomatic patients, 2 days prior to test specimen collection) until the time the patient is isolated.[1]

[1] Individual exposures added together over a 24-hour period (e.g., three 5-minute exposures for a total of 15 minutes). Data are limited, making it difficult to precisely define "close contact;" however, 15 cumulative minutes of exposure at a distance of 6 feet or less can be used as an operational definition for contact investigation. Factors to consider when defining close contact include proximity (closer distance likely increases exposure risk), the duration of exposure (longer exposure time likely increases exposure risk), whether the infected individual has symptoms (the period around onset of symptoms is associated with the highest levels of viral shedding), if the infected person was likely to generate respiratory aerosols (e.g., was coughing, singing, shouting), and other environmental factors (crowding, adequacy of ventilation, whether exposure was indoors or outdoors). Because the general public has not received training on proper selection and use of respiratory PPE, such as an N95, the determination of close contact should generally be made irrespective of whether the contact was wearing respiratory PPE. At this time, differential determination of close contact for those using fabric face coverings is not recommended.

2.7 Face Coverings

Health Canada and CDC recommends wearing face coverings in public settings, like on public and mass transportation, at events and anywhere you will be around other people. In the U.S., face coverings are required on planes, buses, trains, and other forms of public transportation traveling into, within, or out of the United States and in U.S. transportation hubs such as airports and stations. When visiting Arcadis offices and project sites, face coverings will be worn when moving about the space, in common areas and during meetings. If social/physical distancing can be maintained, face coverings may be removed when sitting at individual workstations or actively eating in cafés. Some jurisdictions require face coverings to be worn at all times indoors regardless of vaccination status.

In Canada, non-surgical face coverings are mandatory when flying and travelling through airports. The wearing of face coverings is either required or recommended in all other public settings across Canada (indoors and outdoors).

Studies show that face coverings reduce the spray of droplets when worn over the nose and mouth. Studies also show face coverings can reduce wearers' exposure to infectious droplets through filtration. How well the face covering protects the wearer depends on the fabrics used and how it is made (e.g., the type of fabric, the number of layers of fabric, how well the mask fits). Health Canada and CDC still recommends that you stay at least 6 feet away from other people (social distancing), frequent hand cleaning, avoid contact with people who are sick and other everyday preventive actions. Face coverings are not a substitute for social/physical distancing. Face coverings with exhalation valves or vents should NOT be worn to help prevent the person wearing the mask from spreading COVID-19 to others. Face shields and goggles are not a substitute for face coverings.

Face coverings offering various features appropriate for different work environments, including moisture wicking and FR, are now in stock at Airgas (U.S.). The Face Covering Guide outlines several options to facilitate selection of the face covering that is appropriate for your work.

Some jurisdictional entities and clients require the use of face coverings based on Health Canada and CDC guidance. CDC guidance on selection of face coverings is included in Appendix C.

2.8 Personal Protective Equipment

Be prudent with PPE use (PPE with a purpose). Continue to work with our vendors on your PPE ordering needs and consider alternatives (e.g., N95 dust masks may not be available, but half face elastomeric respirators with P100 cartridges are available in limited supplies). If PPE and supplies cannot be sourced locally, email PPErequests@arcadis.com.

Select the appropriate glove for the task and include in the HASP, JSA and/or COVID-19 Preparedness, Response and Continuity Plan. Before using nitrile gloves as personal protective equipment (PPE), make sure to:

- Wash and dry your hands before and immediately after using gloves.
- Understand how to put nitrile gloves on and take them off (Ansell Donning & Doffing Technical Release).
- Nitrile gloves offer protection against common consumer cleaning supplies, chlorinated solvents, and offer good dexterity and sensitivity.
- Change gloves between tasks or wash gloved hands with soap and water between tasks.
- Do not touch your face.

- Inspect gloves frequently for rips, tears, etc. and replace as necessary.
- Understand limitations of nitrile gloves.

2.9 Reporting a COVID-19 Exposure

Contact WorkCare (888-449-7787, press 9) to initiate the COVID-19 Screening and Return to Work Process if you have tested positive for COVID-19, have been asked to be tested for COVID-19 by a medical professional or have received a red "Stop" screen during the COVID-19 self-assessment instructing you to call WorkCare.

If you learn you have been in **close contact** with a worker, client or member of the public who is COVID-19 positive:

- Stop work.
- Notify your Supervisor and Project Manager.
- Self-quarantine in accordance with country-specific requirements (Canada and U.S.) and contact your personal physician for additional direction.
    - If working in the U.S., the following people are exempt from self-quarantine due to close contact and are asymptomatic
        - Fully vaccinated and up-to-date on COVID-19 vaccines[2]
        - Had COVID-19 in the past 3 months

If you've been tested or asked to be tested for COVID-19 by a medical professional, please contact WorkCare (888-449-7787, press 9) to initiate the return to work process.

2.9.1 WorkCare COVID-19 Screening & Return to Work Process

Contact WorkCare (888-449-7787, press 9) for access to doctors and nurses who will discuss your symptoms, complete a risk stratification process, and advise on return-to-work process. If you complete the Daily Screen Process through the WorkMatters App and receive a red screen, you will be prompted to complete the risk stratification process electronically and depending on the outcome, you may receive a call from a WorkCare nurse or physician. If prompted to complete the risk stratification process, you can expect to:

- Be placed into a low, moderate or high-risk category
    - Low Risk – you may be cleared to return to work at an office or project site
    - Moderate and High Risk – you will not be cleared to return to work at an office or project site and instructed to remain at home
    - An email will be sent to you, Corporate H&S, HR, and your Supervisor indicating whether you can proceed to an office or project site (cleared) or whether you must work remotely (not cleared). If you are not cleared, this will initiate Arcadis' internal contact tracing process.
- Moderate and High-Risk individuals will be required to complete the "Daily Symptom Tracker" during their self-isolation period.
- At the end of your self-isolation period, you will complete a Return-to-Work Survey in the WorkMatters Portal. The survey and daily symptom tracker will be reviewed by a WorkCare physician.

[2] People are considered fully vaccinated and up-to-date when they have received all recommended COVID-19 vaccines, including any booster dose(s) when eligible. "Fully vaccinated" two weeks after second dose in a two-dose series, such as Pfizer/Moderna vaccines, or two weeks after a single-does vaccine, such as Johnson & Johnson's Janssen vaccine.

- You will receive a written notice from WorkCare indicating whether you are cleared or not cleared to return to work at an office or project site.

If you are not cleared, you will receive additional instruction, which may include continuing daily assessments and completing another return-to-work survey at a later date.

2.10 Interim Guidelines for Cardiopulmonary Resuscitation

The American Heart Association and Hearth & Stroke Foundation of Canada have issued interim Hands-only cardiopulmonary resuscitation (CPR) guidelines to reduce the risk when helping victims of cardiac arrest with suspected or confirmed COVID-19.

CPR and the use of automated external defibrillators (AED) significantly improve the chance of survival of patients experiencing cardiac arrest. During the COVID-19 pandemic, first aid trained folks and bystanders may feel uncomfortable performing lifesaving CPR and increasing their own risk of contracting the virus.

Hands-only CPR involves performing chest compressions only at a rate of 100 to 120 compressions per minute until an ambulance arrives.

When administering CPR, consider:

- Wearing a face covering
- Laying a cloth, towel, or clothing over the person's mouth and nose
- Perform hands-only CPR
- Use an AED, if available

2.11 Other Considerations

When planning field work, consider the following:

- Plan your journey to and from the site to manage social distancing and hand hygiene when you need to stop for gas or at a store for supplies
- Reevaluate the current field work situation as it relates to lone worker protocols
- A COVID-19 Preparation, Response and Continuity Plan template is required for all projects.

3 Travel Guidance

3.1 Traveling Between States, Provinces or Territories

Some states, provinces and territories have issued executive orders requiring self-quarantine, travel health screening questionnaires and/or COVID-19 testing for people traveling into or from certain locations. While some jurisdictions exempt essential workers, self-quarantine requirements may apply during off-work hours, confining the employee to their lodging location. Check local requirements before you travel to determine whether you can travel or if there is a need to self-quarantine at the destination. Prior to travel, it is important to have a destination plan in place and understand the steps you will take to remain safe and healthy throughout your trip. Whenever possible, use local project teams within a 4-hour drive radius.

3.2 Field Vehicles and Transportation

When using shared vehicles (fleet, rental, ride sharing services) follow the cleaning guidance above for frequently touched surfaces. Check with your rental agency before vehicle pick-up to understand their cleaning procedures, and supplement with your own cleaning, as necessary. Note: if using wipes, make sure the wipe is compatible with the surface being cleaned.

Canada: A limit of two vaccinated employees may share a vehicle. Unvaccinated individuals are not permitted to share vehicles.

U.S.: There is no limit to the number of vaccinated employees that may share a vehicle. Face coverings must be worn at all times when multiple people are in the vehicle. Unvaccinated employees are not allowed to share vehicles.

When traveling by air for business-critical travel, check with the airline to obtain their latest COVID-19 requirements. A summary of current airline COVID-19 policies can be found here.

3.3 Lodging Considerations

Most hotel chains have implemented additional cleaning, disinfection and face covering in common area procedures. Check with your hotel before check-in to understand their procedures. Consider bringing a surface cleaner or disinfecting wipes to clean frequently touched surfaces such as doorknobs, tv remote, etc.

In instances where AirBnB has been authorized and approved in writing by the Project Manager and Supervisor, consider the following:

- The entire team should not stay at the same residential facility.
- In the U.S., only vaccinated individuals may share lodging provided the configuration allows each individual to have their own dedicated living space (e.g., own bedroom). Face coverings are required in common spaces.
- Understand the AirBnB may need additional cleaning and disinfection of commonly touched surfaces upon arrival.

Lodging together is not permitted for unvaccinated employees.

Always maintain good personal hygiene and avoid crowded places such as restaurants or bars. Consider using take out or outdoor seating. If self-quarantine is required by the jurisdiction during off-work hours, plan ahead and evaluate local food and/or grocery delivery options.

Canada: Dining together outdoors and indoors without face coverings is permitted if everyone is fully vaccinated. Outdoor dining is preferable. Indoor dining should be limited, and groups kept small. Dining together is not permitted if anyone is not vaccinated.

U.S.: Dining together outdoors without face coverings is permitted if everyone is fully vaccinated. Indoor dining is permitted if everyone is fully vaccinated and face coverings are worn in public spaces. Dining together is not permitted if anyone is not vaccinated.

3.4 Rental Equipment and Sample Cooler Handling

Clean the exterior of rental equipment and sample coolers upon arrival at the job site using a cleaning product that will not impact data quality. Wear gloves and safety glasses when handling sample coolers to prevent contact with acid preservation of the bottles in coolers. Where possible, order separate sets of equipment and "assign" equipment to individuals for use through the duration of the event.

4 Work-Specific Situations

4.1 Working with Little or No Contact with Others

Follow procedures listed in Section 2.0 and Section 3.0.

4.2 Working in Project Teams

When working in project teams (paired Arcadians, embedded staff, contractors, clients, etc.):

- If feasible, prior to visiting the site, have a H&S check in to confirm all attendees are complying with CDC or Health Canada guidelines, including:
    - Confirm understanding that workers or clients should not go to the job site if they have personally tested positive for COVID-19, have been in close contact to anyone else who has tested positive for COVID-19 or are exhibiting symptoms. If a worker discloses close contact with someone COVID-19 positive and the worker is asymptomatic, instruct the employee to complete the WorkCare Daily Screen and follow the instructions provided following the survey.
- Out of respect for all, ask everyone to self-disclose if they are not feeling well (exhibiting flu-like symptoms), and request that they should go home.
- Observe person(s) for symptoms, and use Stop Work, as necessary, and contact Project Manager.
- Set visual or physical barriers to keep the public away (caution tape and cones).
- Consider if "split shifts" can be used to limit contact, or if work can be scheduled during hours of low to no facility operations.
- Arcadis staff plan work activities, continuously use TRACK and re-plan work activities to maximize social distancing and minimize "close contact"
    - Practice good hygiene and clean commonly touched surfaces
        - Clean clipboard and pen prior to use
        - Bring your own pen
        - Disinfect shared equipment (water level meters, pumps, etc.)
        - Coordinate with sanitation vendor for portable hand wash station (soap & water or hand sanitizer)
    - Use work practices and tools to minimize close contact when feasible, such as:
        - Single person operating a winch instead of a two-person manual lift
        - Tools to maximize distance
    - Use PPE in accordance with the Job Safety Analysis (face shield, safety glasses, gloves, etc.)
    - Plan for breaks to allow for hydration, nutrition and rest/prevention of heat related illness
        - Select locations where social distancing can be maintained
        - Allow time for safe doffing/donning of personal safety items
        - Communicate individual needs for breaks before beginning work.

- If social distancing or other controls are not feasible discuss this with your supervisor and PM, discuss “Is the work necessary?” or “Can the work be rescheduled for a later date?”
  - Refer to Section 2.6 for the definition of close contact. CDC has indicated short periods of time in close contact may not increase risk of exposure.
- Wear face coverings in accordance with Section 2.7 and jurisdictional requirements.
- Subcontractors need to develop and implement their own procedures to protect their workers.

4.3 Embedded Employee Working at a Client Facility

Embedded employee at a client facility should:

- Inquire whether working remotely is an option.
- If not, and Arcadis must work at the client facility:
  - Ask if arrangements can be made to practice social distancing (e.g., split shift, separate workstation, etc.)
  - Practice good hygiene, and if you do not feel the situation is safe, you can execute your stop work authority by having discussions with your Supervisor and Project Manager.
- Wear face coverings when social/physical distancing cannot be maintained or in accordance with client or jurisdictional requirements.
- If client facility cleanliness is a concern discuss concerns with Project Manager. The Project Manager will discuss with the client. If the client will not increase cleaning, Arcadis employees will be provided with the supplies to clean and disinfect frequently touched surfaces as well as supplies to clean hands.
- Discuss and document Arcadis, client and jurisdictional protocol for reporting a COVID-19 case using the template in the Arcadis COVID-19 Preparedness, Response and Continuity Plan or similar form.

4.4 Working in Contact with the Public

When working in contact with the public (mall areas, parks, outdoor residential settings):

- Set visual or physical barriers (caution tape and cones) to keep the public away and maintain social distancing.
- Wear face coverings when working indoors or in enclosed spaces. Refer to Appendix C for guidance on the appropriate face covering.
- Consider posting signs reminding the public of social distancing guidance (example in Appendix B).

4.5 Working at Indoor Residential Settings

When working at indoor residential settings, consider the following guidelines:

- It is recommended that employees entering residential settings are fully vaccinated.
- A N95 is recommended when entering residential settings.
- Call ahead to ask if the resident(s) is experiencing flu-like symptoms or if anyone in the house is in mandatory or precautionary self-quarantine. Reschedule the work if the resident is experiencing symptoms or under quarantine. Also share Arcadis work procedures and explain that Arcadis will be practicing social distancing during the work.
- Upon arrival, assess the residents for signs of flu-like symptoms. If observed, use Stop Work, exercise social distancing and contact the Project Manager.

- Where feasible, wear gloves, wipe down surfaces prior to touching them and thoroughly wash hands after completing the work (do not touch face).
- Ask if arrangements can be made to practice social distancing (meaning stay 6 feet [2 metres] away).
- Schedule your work when resident is not home, if your work area allows for access (e.g., a basement crawl space the doesn't require entry to the main living area of the home).

4.6 Projects Involving Drinking Water Systems, Recreational Water and/or Wastewater

According to the CDC, at this time, the risk of transmission of the virus that causes COVID-19 through sewerage systems is thought to be low. Although transmission of the virus that causes COVID-19 through sewage may be possible, there is no evidence to date that this has occurred.

Wastewater and sewage workers should use standard practices, practice basic hygiene precautions, and wear personal protective equipment (PPE) as prescribed for current work tasks.

When working on projects involving drinking water systems, recreational water and/or wastewater:

- The COVID-19 virus has not been detected in drinking water.
- Conventional water treatment methods that use filtration and disinfection, such as those in most municipal drinking water systems, should remove or inactivate the virus that causes COVID-19.
- Standard practices associated with wastewater treatment plant operations should be sufficient to protect wastewater workers from the virus that causes COVID-19.
- Review the project Health & Safety Plan and task-specific Job Safety Analysis for required personal protective equipment and other controls.
- Wear face coverings when working indoors. Refer to Appendix C for guidance on the appropriate face covering.

4.7 Construction Management/Construction

4.7.1 Field Trailers

Field trailers may present unique challenges for social distancing. Consider the following:

- Restrict access by posting site signage (Appendix D) requesting all visitors, including site workers. All who enter the field trailer should knock and don a face covering before entering.
    - The project team will determine the maximum occupancy based on the ability to maintain social distancing.
- Local jurisdictions may require face coverings in all indoor spaces regardless of vaccination status. In areas without jurisdictional mandates, all workers will wear face coverings in common spaces and when social/physical distancing cannot be maintained. Refer to Appendix C for guidance on the appropriate face covering.
- Maintain a log of visitors entering the trailer use the "Arcadis Contact Tracing Log" in Appendix E. Assign a person responsible for signing visitors in and out.
- Clean surfaces regularly. In the absence of professional cleaning services, occupants will develop a schedule for site personnel to complete cleaning of commonly touched surfaces.

    - When using common surfaces, each individual is responsible for wiping down the shared surface before and after use.
- Assess and address the need for the availability of hand washing (e.g., access to water and soap) while working on site. This can be achieved by:
    - Having access to a functioning restroom
    - Portable hand washing station
    - Hand soap and bottled water to clean hands as necessary.
- Plan seating arrangement so that personnel inside the trailer maintain social distancing, at least 6-feet (2 m) of separation.
- Meetings in the trailer will not exceed the maximum occupancy as determined based on the ability to maintain social distancing. Unvaccinated individuals must wear face coverings and maintain 6 feet (2 m) of physical distance.
- Consider the use of physical barriers to separate the field trailer from the public and/or site activities.

4.7.2 Other Construction Guidance

Additional guidance related to construction and construction management activities include:

- Consider use of technology (e.g., digital sign in using QR codes, virtual tailgate, or construction meetings, video camera systems to minimize the number of people on site).
- For tailgate or other meetings that are not virtual:
    - Unvaccinated individuals must wear face coverings at all times, when meeting indoors. Refer to Appendix C for guidance on the appropriate face covering.
    - Maintain 6 feet (2 m) of physical distance at all times between attendees (both seated and standing).
    - Have the person leading the meeting sign everyone in.
    - If signature is required, everyone should have their own pen.
    - Hold meetings in outdoor spaces whenever feasible.
- For work outdoors:
    - Masks are optional when working outside more than 6 feet (2 m) apart (socially distanced).
    - Determine comfort level and vaccination status of field team when deciding whether to wear face covering for work tasks that need to be completed within 6 feet (2 m) and physical distancing cannot be maintained. Unvaccinated staff must wear face coverings when physical distancing cannot be maintained.
    - Refer to Appendix C for guidance on the appropriate face covering.
- Simultaneous operations coordination to separate contractors:
    - Coordinate movements around the site
    - Set up work zones with visual barriers for specific activities with transition areas in common spaces
    - Post social distancing signage (refer to Section 4.4)
    - Maintain social distancing with at least 6-feet (2 m) of separation whenever feasible
    - Consider the following administrative controls:
        - Activity rotation - schedule work when the fewest number of people are present
        - “Split shifts” can be used to limit contact, or if work can be scheduled during hours of low to no facility operations.

- Work in teams/pairs:
    - Plan work activities, continuously use TRACK and re-plan work activities to maximize social distancing and minimize “close contact”
    - Use equipment or tools to increase distance between personnel to greater than 6-feet (2m) or eliminate the need for a second person.
- Coordinate with contractors to make sure they are following the same social distancing, hand hygiene and cleaning guidance to reduce the risk to other project personnel.

5 Post Shift Considerations

At the end of the work shift, clean the vehicle, if used throughout the day. Wash hands prior to leaving the site and after the commute.

Upon arriving home or at lodging, shower and launder clothing.

Appendix A

Site Signage – Self-Assessment Required

ARCADIS

Arcadis Employees

Have you done your “Daily Screen “ today?

Before each day, you must complete the online **“Daily Screen”.**

QR Code for daily self-assessment.

SAFE Return

Appendix B

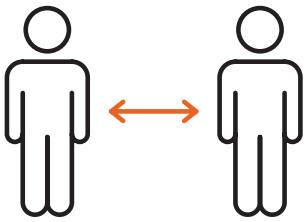
Site Signage – Social Distancing

ARCADIS

Project Sites

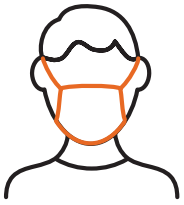
Keep Yourself and Others Working Safely

100% compliance is required by you and our subcontractors.



Maintain physical (social) distance of six feet, about two arms' length.

Need to talk? Shut equipment down if noise is interfering, use hand signals, radios, or move to another area of the site where distance can be maintained.



Face coverings must be worn when six feet of physical distance cannot be maintained.

***Stop Work** if procedures are not followed. It's mandatory!*

SAFE Return

Appendix C

Guidance for the Use of Face Coverings

COVID-19 Face Covering Recommendations

Scenario	Mask Type			Respirators	
	Cloth Masks	Procedure Masks	Masks that Meet a Standard	Respirators that Meet International Standards[3]	NIOSH-Approved Respirators[3]
Working Indoors					
Entering a resident, school, or hospital	Not Recommended	Recommended	Preferred	CDC Recommended	CDC Preferred
Working indoors with coworkers[1] and physically distanced	Not Recommended	Recommended	Preferred	--	--
Working indoors in close proximity to coworkers, no physical distancing	Not Recommended	Recommended	Preferred	CDC Recommended	CDC Preferred
Working indoors with the general public and physically distanced	Not Recommended	Recommended	Preferred	CDC Recommended	CDC Preferred
Working indoors in close proximity to the general public (no physical distancing)	Not Recommended	Not Recommended	Not Recommended	CDC Recommended	CDC Preferred
Working in an Arcadis Office[2]	Not Recommended	Recommended	Preferred	CDC Recommended	CDC Preferred
Working Outdoors					
Working outdoors with coworker and physically distanced	--	--	--	--	--
Working outdoors with a coworker and not physical distancing	Not Recommended	Recommended	Preferred	--	--
Working outdoors with the general public and physically distanced	Not Recommended	Recommended	Preferred	CDC Recommended	CDC Preferred
Working outdoors with the general public and not physical distancing	Not Recommended	Not Recommended	Not Recommended	CDC Recommended	CDC Preferred
Travel					
Travel on public transportation	Not Recommended	Recommended	Preferred	CDC Recommended	CDC Preferred
Ridesharing with coworker (Fully Vaccinated Only)	Not Recommended	Recommended	Preferred	CDC Recommended	CDC Preferred
Ridesharing	Not Recommended	Recommended	Preferred	CDC Recommended	CDC Preferred
Communal lodging	Not Recommended	Recommended	Preferred	CDC Recommended	CDC Preferred

Notes:

[1]Coworkers includes Arcadis employees, Arcadis or client subcontractors, and Arcadis clients

[2]Masks must be worn when entering an office or job trailer, moving about the space and in common areas. Masks may be removed when seated at a individual workstation and physically distanced from others or alone in a enclosed space with floor to ceiling walls and door closed. Additional jurisdiction requirements may apply.

[3]Required use of a respirator meeting an international standard or NIOSH-approved respirator will need to follow the Arcadis Respiratory Protection H&S Standard.

References:

CDC Types of Masks and Respirators

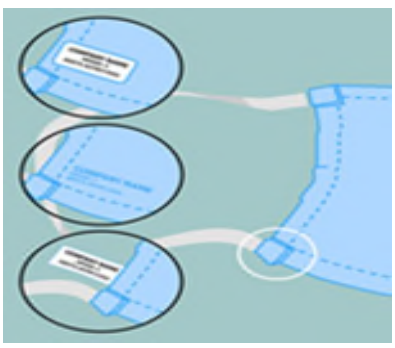
Types of Masks and Respirators

Cloth masks:

- Multiple layers of tightly woven, breathable fabric
- Nose wire
- Fabric that blocks light when held up to bright light source
- Do not wear mask with exhalation valve

Procedure masks:

- Multiple layers of non-woven material
- Nose wire
- Protects others from the wearer's respiratory emissions



Mask that meets a standard:

- Designed and tested to ensure they perform at a consistent level
- Must be labeled with the standard the mask meets
- Multiple layers of non-woven material

Respirators that meet international standards:

- Designed and tested to meet international standards
- Filters varying levels of particles in the air depending on the standard they are designed to meet
- Seals tightly to the face when fitted properly
- Medical surveillance and fit testing required if using when required under Arcadis' Respiratory H&S Standard

---

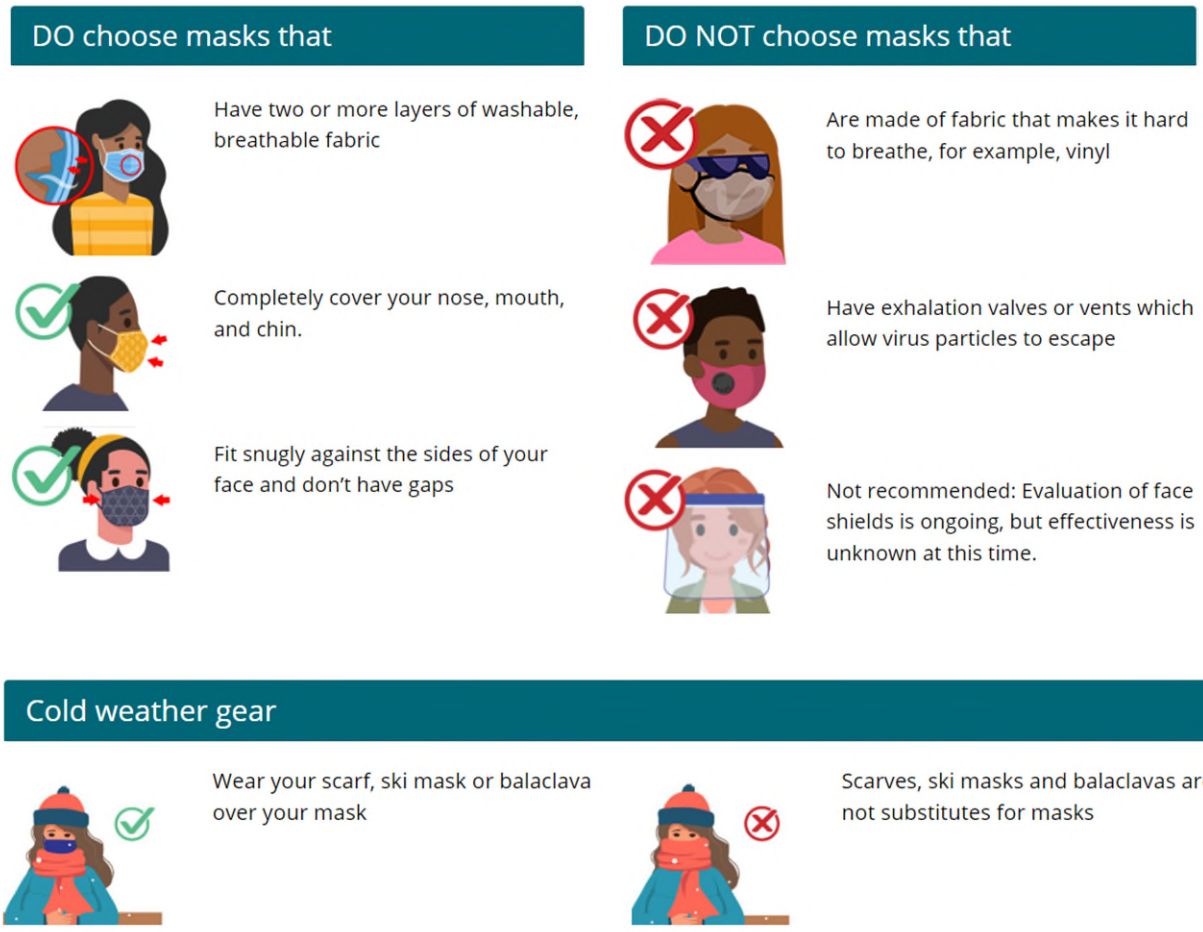
NIOSH-approved respirators:

- Respirators listed on the NIOSH-Approved Particulate Filtering Facepiece Respirators webpage
- Evaluated against a specific US standard that includes a quality requirement
- Filters at least 95% of particles in the air with proper fit
- Seals tightly on the face
- Medical surveillance and fit testing required if using when required under Arcadis' Respiratory H&S Standard

Resource: CDC Types of Mask and Respirators

Rev. 16 February 2022

The following graphics are from the U.S. CDC:



Note: Some jurisdictions may not consider gaiters or bandanas acceptable face coverings.

How to Wear a Mask

Wear a well-fitting mask **correctly** and **consistently** for the best protection.

- Be sure to wash your hands or use hand sanitizer before putting on a mask.
- Do **NOT** touch the mask when wearing it. If you have to touch/adjust your mask often, it doesn't fit you properly, and you may need to find a different mask or make adjustments.

Do wear a mask that

- Covers your nose and mouth and can be secured under your chin.
- Fits snugly against the sides of your face.

Two important ways to make sure your mask works the best it can

1. **Make sure your mask fits snugly against your face.** Gaps can let air with respiratory droplets leak in and out around the edges of the mask

2. **Pick a mask with layers to keep your respiratory droplets in and others' out.** A mask with layers will stop more respiratory droplets getting inside your mask or escaping from your mask if you are sick.

Do

Choose a mask with a nose wire

- A nose wire is a metal strip along the top of the mask
- Nose wires prevent air from leaking out of the top of the mask.
- Bend the nose wire over your nose to fit close to your face.

Use a mask fitter or brace

- Use a mask fitter or brace over a disposable mask or a cloth mask to prevent air from leaking around the edges of the mask.

Check that it fits snugly over your nose, mouth, and chin

- Check for gaps by cupping your hands around the outside edges of the mask.
- Make sure no air is flowing from the area near your eyes or from the sides of the mask.
- If the mask has a good fit, you will feel warm air come through the front of the mask and may be able to see the mask material move in and out with each breath.

Add layers of material

2 ways to layer

- Use a cloth mask that has multiple layers of fabric.
- Wear a disposable mask underneath a cloth mask.
  - The cloth mask should push the edges of the disposable mask against your face.

Make sure you can see and breathe easily

Knot and tuck ear loops of a 3-ply mask

- Knot the ear loops of a 3-ply face mask where they join the edge of the mask
- Fold and tuck the unneeded material under the edges
- For instructions, see the following https://youtu.be/GzTAZDsNBe0 .

Other things to consider

Certain types of facial hair, like beards, can make mask fitting difficult. People with beards can do one or more of the following:

- Shave their beards.
- Trim their beards close to the face.
- Use a mask fitter or brace.
- Wear one disposable mask underneath a cloth mask that has multiple layers of fabric. The second mask should push the edges of the inner mask snugly against the face and beard.

Masks designed for people with beards are being evaluated, and information will be provided when it becomes available.

Do NOT

Combine two disposable masks

- Disposable masks are not designed to fit tightly and wearing more than one will not improve fit.

Combine a N95 or KN95 mask with any other mask.

- Only use one N95 or KN95 mask at a time.

How NOT to Wear a Mask

How to take off a mask

1

Carefully, untie the strings behind your head or stretch the ear loops

2

Handle only by the ear loops or ties

3

Fold the outside corners together

4

Be careful not to touch your eyes, nose, and mouth when removing and wash hands immediately after removing

Appendix D

Additional Signage

ARCADIS

Best Practices

Wash your hands.

Wash in hot water for 40 seconds: 20 seconds with soap, 20 seconds to rinse.

Wipe surfaces with disinfectant wipes after you are finished.

Maintain proper social distancing.

Stand back 6 feet from others who may be washing their hands, or waiting in line to wash.

SAFE Return

ARCADIS

Best Practices

You touch it, you clean it.

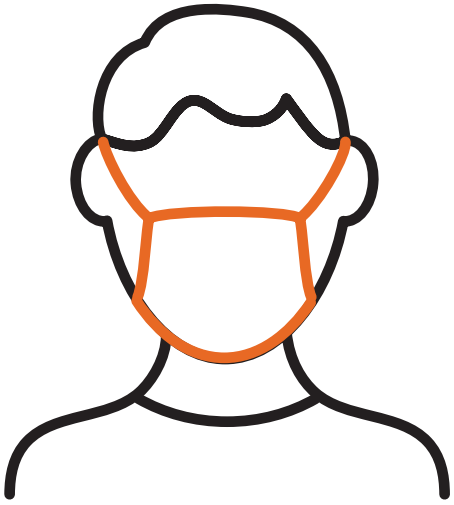
Remember to clean any surface you touch with the provided disinfectant spray.

SAFE Return

ARCADIS

Arcadis Staff, Visitors & Deliveries

Wear face cover.



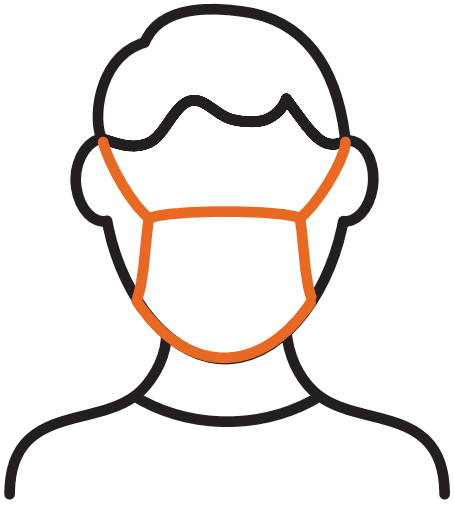
Face covering must be worn at
all times.

SAFE Return

ARCADIS

Arcadis Staff, Visitors & Deliveries

Wear face cover.



Please wear face covering when moving about the space. Face coverings can be removed while seated at workstation.

SAFE Return

ARCADIS

Visitors & Deliveries

All staff, visitors or deliveries must use the main entrance.

Located: Main lobby front door

Firstname Lastname: 123 555 1212
Firstname Lastname: 123 555 1212

SAFE Return

ARCADIS

Restricted

Authorized Staff Only

In order to maintain proper social distancing, this area is restricted to authorized staff.

Need something?

Contact: Firstname Lastname 123 555 1218

SAFE Return

ARCADIS

Restricted

Maximum Occupancy

2

In order to maintain proper social distancing, the number of people allowed in this area is limited.

SAFE Return

ARCADIS

Closure

Room Closed

In order to maintain proper social distancing guidelines, this room is temporarily closed.

SAFE Return

Off limits

CUT

Do not use

CUT

Restricted

Appendix E

Arcadis Contact Tracing Log

ARCADIS

Arcadis Contact Tracing Log

Printed Name	Company	Cell phone or email	Date/Time On Site	Date/Time Off Site

Attachment B
Forms

August 8, 2022

To whom it may concern:

Arcadis and its affiliates (“Arcadis”) is a firm with experienced professionals and staff who support projects, activities, infrastructure and businesses essential to maintaining the public's health, safety and welfare.

Arcadis has been authorized by Fischbach, LLC to complete the following activities:
Groundwater sampling and air monitoring

Arcadis	Fischbach, LLC
X	Branded hard hat and/or safety vest
	Branded vehicle
	Buisness card or ID badge
	Other: _____

If you have any questions related to the work being completed or Arcadis’ presence at this location, please contact the following:

Nicholas Beyrle	Arcadis Project Manager	at	585-662-4044
Laura Duhamel	Fischbach, LLC	at	859-734-7471

Task Improvement Process

General

Observed Company:

Observation Type:

TIP Form: H&S Field Multi-Task (General)

Task Observed:

Observee Name:

Observer Name:

Observation Date:

Project Number: 30135590

Project Name: Fischbach - Metro Park
235 Metro Park Brighton Site
Rochester, New York

Supervisor:

Equipment On Site:

Pertinent Information:

Observation

Task	Correct	Questionable	Comments
General			
PPE worn according to HASP/JLA specifications and inspected before use?			
STOP work authority used where appropriate?			
Body Use/Positioning			
Proper lifting/pushing/pulling techniques used (no awkward positions/posture; no twisting or excessive reaching; no straining; no excessive weight; load under control/stable; etc.)?			
Body parts away from pinch points (clear or protected from being caught between objects/equipment or from contacting sharp objects/edges, etc.)?			
Body parts not in the Line of Fire (protected from being struck by traffic, equipment, falling/flying objects, etc.)?			

Observation

Task	Correct	Questionable	Comments
Work Procedures/Environment			
Correct type and number of barricades/warning devices/cones?			
Communication with others when necessary (hand signals, flags, etc.)?			
Right tools and equipment selected for the job and inspected before use?			
Tools and equipment used properly?			
Housekeeping performed (work areas and pathways clear of hazards, uneven surfaces addressed, etc.)?			
Slip/trip/fall hazards addressed (path selected and cleared, eyes on path, speed footing, etc.)?			
Proper energy control (electrical systems grounded, lock out/tag out performed, isolated, cords/fixtures in good condition, GFCI inspected and utilized when appropriate and used properly, etc.)?			
Protected from overhead/underground utilities (proper clearance, properly marked, spotters as necessary, etc.)?			
Safe work on/near water (appropriate flotation device, appropriate boat for body of water and operation of boat, etc.)?			
Chemical/Radiation protection (decontamination zones set up properly, air monitoring, completed, and logged, etc.)?			
Fall from elevated height prevention (maintains 3-points of contact, appropriate ladder, mounting/dismounting vehicle/equipment, fall arrest system, etc.)?			
Any additional safety issues identified:			

Tip Summary Enter details of the TIP and follow up discussion provide details on how any questionable items were resolved.

Discussion following the TIP led by: _____

Date of follow-up discussion: _____

Positive Comments:

Discussion Summary Completed:

- ☐ Supervisor Led
- ☐ Peer to Peer
- ☐ Arcadis Employee to Subcontractor

Summary of Questionable Items

Action Items (Optional) Assign appropriate action items based on the observations made. You can add more than one action item if needed.

Item #	Action Item	Responsible Person	Due Date	Comp. Date
1				
2				
3				

Standard Review

Reviews to be performed after entry of this TIP into 4-Sight.

Quality Review

Quality Reviews to be performed after entry of this TIP into 4-Sight.

Field Validation and Verification

Use the 4-Sight generated copy of this TIP to perform field V&V activities.

Arcadis Visitor Acknowledgement and Acceptance of HASP Signature Form

By signing below, I waive, release, and discharge the owner of the site and Arcadis and their employees from any future claims for bodily and personal injuries which may result from my presence at, entering, or leaving the site and in any way arising from or related to any and all known and unknown conditions on the site.

Printed Name	Signature	Company	Date/Time On Site	Date/Time Off Site

Fischbach, LLC

Control Number: TSM- 30135590

TSM + project number plus date as follows: xxxxxxxx.xxxx.xxxxx - dd/mm/year

TAILGATE HEALTH & SAFETY MEETING FORM

Project Name:			**Project Location:**
Date:	**Time:**	**Conducted by:**	**Signature/Title:**

Issues or concerns from previous day's activities:

Task anticipated to be performed today:

☐ Additional permits/checklists attached

USE TRACK! Evaluate the hazards (h) for the tasks being performed today and rank as Low (L), Medium (M) or High (H). Use relevant JSAs, FHSHB, permit or other work standard to communicate controls (c) to be used to eliminate or mitigate identified hazards.

☐ Gravity (i.e., ladder, trips) (L M H) h: c:	☐ Motion (i.e., traffic, machinery) (L M H) h: c:	☐ Mechanical (i.e., augers, motors) (L M H) h: c:
☐ Electrical (i.e., utilities) (L M H) h: c:	☐ Pressure (i.e., gas cyl., wells) (L M H) h: c:	☐ Environment (i.e., heat, cold) (L M H) h: c:
☐ Chemical (i.e., fuel, acid, paint) (L M H) h: c:	☐ Biological (i.e., ticks, poison ivy) (L M H) h: c:	☐ Radiation (i.e., alpha, sun, laser) (L M H) h: c:
☐ Sound (i.e., machinery) (L M H) h: c:	☐ Personal (i.e. alone, night) (L M H) h: c:	☐ Driving (i.e. car, ATV, boat) (L M H) h: c:

☐ Refer to the attached Hazard Analysis Sheet(s) or JSA

Comments:

Signature and Certification: I have read and understand the project specific HASP for this project.

Non-Life Threatening Injury or Illness
Call WorkCare 1-888-449-7787

SSE Employee*	Printed Name/Signature/Company	Sign In Time	Sign Out Time

***Short Service Employee (SSE) working for Arcadis <1 year.**

I will STOP the job any time anyone is concerned or uncertain about health & safety or if anyone identifies a hazard or additional mitigation not recorded in the site, project, job or task hazard assessment.

I will be alert to any changes in personnel, conditions at the work site or hazards not covered by the original hazard assessments.

If it is necessary to **STOP THE JOB,** I will perform **TRACK**; and then amend the hazard assessments or the HASP as needed.

I will not assist a subcontractor or other party with their work unless it is absolutely necessary and then only after I have done TRACK and I have thoroughly controlled the hazard.

All site staff should arrive fit for work. If not, they should report to the supervisor any restrictions or concerns.

In the event of an injury, employees will call **WorkCare at 1.888.449-7787** and then notify the field supervisor.

Utility strike, motor vehicle accident or 3rd party property damage - field supervisor will immediately notify the Project or Task Manager

Attachment C
SDSs

Buffer Solution pH 4.00

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 07/19/2013 Revision date: 12/21/2016 Supersedes: 08/06/2014 Version: 1.3

SECTION 1: Identification

1.1. Identification

Product form : Mixture

Product name : Buffer Solution pH 4.00

Product code : LC12270

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : For laboratory and manufacturing use only.

Recommended use : Laboratory chemicals

Restrictions on use : Not for food, drug or household use

1.3. Details of the supplier of the safety data sheet

LabChem Inc
Jackson's Pointe Commerce Park Building 1000, 1010 Jackson's Pointe Court
Zelienople, PA 16063 - USA
T 412-826-5230 - F 724-473-0647
info@labchem.com - www.labchem.com

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300 or 011-703-527-3887

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS-US classification

Not classified

2.2. Label elements

Not classified as a hazardous chemical.

2.3. Other hazards

Other hazards not contributing to the classification : None.

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substance

Not applicable

3.2. Mixture

Name	Product identifier	%	GHS-US classification
Water	(CAS No) 7732-18-5	98.94	Not classified
Potassium Hydrogen Phthalate	(CAS No) 877-24-7	1.02	Eye Irrit. 2B, H320
Formaldehyde, 37% w/w	(CAS No) 50-00-0	0.04	Flam. Liq. 3, H226 Acute Tox. 4 (Oral), H302 Acute Tox. 4 (Dermal), H312 Acute Tox. 2 (Inhalation:vapour), H330 Skin Corr. 1C, H314 Eye Dam. 1, H318 Carc. 1A, H350 STOT SE 1, H370 Aquatic Acute 2, H401

Full text of hazard classes and H-statements : see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

First-aid measures after inhalation : Allow victim to breathe fresh air. Allow the victim to rest.

First-aid measures after skin contact : Remove affected clothing and wash all exposed skin area with mild soap and water, followed by warm water rinse.

First-aid measures after eye contact : Rinse immediately with plenty of water. Obtain medical attention if pain, blinking or redness persist.

First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. Obtain emergency medical attention.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries : Not expected to present a significant hazard under anticipated conditions of normal use.

4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Foam. Dry powder. Carbon dioxide. Water spray. Sand.

Unsuitable extinguishing media : Do not use a heavy water stream.

5.2. Special hazards arising from the substance or mixture

Reactivity : None.

5.3. Advice for firefighters

Firefighting instructions : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Protective equipment : Safety glasses.

Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Equip cleanup crew with proper protection.

Emergency procedures : Ventilate area.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Collect spillage. Store away from other materials.

6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor.

Hygiene measures : Do not eat, drink or smoke when using this product.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Keep container closed when not in use.

Incompatible products : Strong oxidizers.

Incompatible materials : None known.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Potassium Hydrogen Phthalate (877-24-7)
Not applicable

Formaldehyde, 37% w/w (50-00-0)		
ACGIH	ACGIH Ceiling (mg/m³)	0.37 mg/m³
OSHA	OSHA PEL (TWA) (ppm)	0.75 ppm
OSHA	OSHA PEL (STEL) (ppm)	2 ppm
IDLH	US IDLH (ppm)	20 ppm
NIOSH	NIOSH REL (TWA) (ppm)	0.016 ppm
NIOSH	NIOSH REL (ceiling) (ppm)	0.1 ppm 15 min.

Water (7732-18-5)
Not applicable

8.2. Exposure controls

Appropriate engineering controls : Emergency eye wash fountains should be available in the immediate vicinity of any potential exposure.

Personal protective equipment : Safety glasses. Gloves.

Hand protection : Wear protective gloves.

Eye protection : Chemical goggles or safety glasses.

Respiratory protection : Respiratory protection not required in normal conditions.

Other information : Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Liquid

Color : Colorless

Odor : Odorless

Odor threshold : No data available

pH : 4

Melting point : No data available

Freezing point : No data available

Boiling point : No data available

Flash point : No data available

Relative evaporation rate (butyl acetate=1) : No data available

Flammability (solid, gas) : Non flammable.

Vapor pressure : No data available

Relative vapor density at 20 °C : No data available

Relative density : No data available

Specific gravity / density : 1

Solubility : Soluble in water.

Log Pow : No data available

Auto-ignition temperature : No data available

Decomposition temperature : No data available

Viscosity, kinematic : No data available

Viscosity, dynamic : No data available

Explosion limits : No data available

Explosive properties : Not applicable.

Oxidizing properties : None.

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

None.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

None.

10.4. Conditions to avoid

Extremely high or low temperatures.

10.5. Incompatible materials

Strong oxidizers.

10.6. Hazardous decomposition products

Formaldehyde. Carbon monoxide. Carbon dioxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Likely routes of exposure : Skin and eye contact

Acute toxicity : Not classified

Potassium Hydrogen Phthalate (877-24-7)	
LD50 oral rat	≥ 3200 mg/kg
ATE US (oral)	3200.000 mg/kg body weight

Formaldehyde, 37% w/w (50-00-0)	
LD50 oral rat	500 mg/kg
ATE US (oral)	500.000 mg/kg body weight
ATE US (dermal)	2000.000 mg/kg body weight
ATE US (vapors)	0.578 mg/l/4h

Water (7732-18-5)	
LD50 oral rat	≥ 90000 mg/kg
ATE US (oral)	90000.000 mg/kg body weight

Skin corrosion/irritation : Not classified
pH: 4

Serious eye damage/irritation : Not classified
pH: 4

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Formaldehyde, 37% w/w (50-00-0)	
IARC group	1 - Carcinogenic to humans

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

Potential Adverse human health effects and symptoms : Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

12.1. Toxicity

Formaldehyde, 37% w/w (50-00-0)	
LC50 fish 1	41 mg/l (LC50; 96 h)
EC50 Daphnia 1	14.7 mg/l (EC50; 24 h)
EC50 Daphnia 2	2 mg/l
Threshold limit algae 1	2.5 mg/l (EC0; 192 h)

12.2. Persistence and degradability

Buffer Solution pH 4.00	
Persistence and degradability	Not established.

Potassium Hydrogen Phthalate (877-24-7)	
Persistence and degradability	Not established.

Formaldehyde, 37% w/w (50-00-0)	
Persistence and degradability	Readily biodegradable in water. Biodegradability in soil: no data available. No test data on mobility of the components available. Photodegradation in the air.
Biochemical oxygen demand (BOD)	0.64 g O_2/g substance
Chemical oxygen demand (COD)	1.06 g O_2/g substance
ThOD	1.068 g O_2/g substance
BOD (% of ThOD)	0.6 (5 days; Literature study)

Water (7732-18-5)	
Persistence and degradability	Not established.

12.3. Bioaccumulative potential

Buffer Solution pH 4.00	
Bioaccumulative potential	Not established.

Potassium Hydrogen Phthalate (877-24-7)	
Bioaccumulative potential	Not established.

Formaldehyde, 37% w/w (50-00-0)	
Log Pow	-0.78 - 0.0
Bioaccumulative potential	Bioaccumulation: not applicable.

Water (7732-18-5)	
Bioaccumulative potential	Not established.

12.4. Mobility in soil

Formaldehyde, 37% w/w (50-00-0)	
Ecology - soil	Toxic to flora.

12.5. Other adverse effects

Effect on the global warming : No known effects from this product.

GWPmix comment : No known effects from this product.

Other information : Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : Dispose in a safe manner in accordance with local/national regulations.

Ecology - waste materials : Avoid release to the environment.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Not regulated

SECTION 15: Regulatory information

15.1. US Federal regulations

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

This product or mixture does not contain a toxic chemical or chemicals in excess of the applicable de minimis concentration as specified in 40 CFR §372.38(a) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

Formaldehyde, 37% w/w (50-00-0)	
RQ (Reportable quantity, section 304 of EPA's List of Lists)	100 lb
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard Delayed (chronic) health hazard
SARA Section 313 - Emission Reporting	0.1 %

15.2. International regulations

CANADA

Buffer Solution pH 4.00	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria

Potassium Hydrogen Phthalate (877-24-7)	
WHMIS Classification	Class D Division 2 Subdivision B - Toxic material causing other toxic effects

Formaldehyde, 37% w/w (50-00-0)	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Class B Division 3 - Combustible Liquid Class D Division 1 Subdivision A - Very toxic material causing immediate and serious toxic effects Class D Division 2 Subdivision A - Very toxic material causing other toxic effects Class D Division 2 Subdivision B - Toxic material causing other toxic effects Class E - Corrosive Material

Water (7732-18-5)	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria

EU-Regulations

No additional information available

National regulations

Formaldehyde, 37% w/w (50-00-0)
Listed on the Canadian IDL (Ingredient Disclosure List)

15.3. US State regulations

California Proposition 65 - This product contains, or may contain, trace quantities of a substance(s) known to the state of California to cause cancer, developmental and/or reproductive harm

Formaldehyde, 37% w/w (50-00-0)				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	Non-significant risk level (NSRL)
Yes	Yes	No	No	40 µg/day

SECTION 16: Other information

Revision date : 12/21/2016

Other information : None.

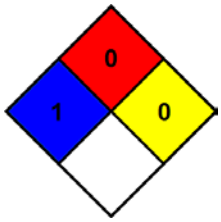
Full text of H-phrases: see section 16:

H226	Flammable liquid and vapor
H302	Harmful if swallowed
H312	Harmful in contact with skin
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H320	Causes eye irritation
H330	Fatal if inhaled
H350	May cause cancer
H370	Causes damage to organs
H401	Toxic to aquatic life

NFPA health hazard : 1 - Exposure could cause irritation but only minor residual injury even if no treatment is given.

NFPA fire hazard : 0 - Materials that will not burn.

NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating

Health : 1 Slight Hazard - Irritation or minor reversible injury possible

Flammability : 0 Minimal Hazard - Materials that will not burn

Physical : 0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NOT react with water, polymerize, decompose, condense, or self-react. Non-Explosives.

Personal protection : A

A - Safety glasses

SDS US LabChem

Information in this SDS is from available published sources and is believed to be accurate. No warranty, express or implied, is made and LabChem Inc assumes no liability resulting from the use of this SDS. The user must determine suitability of this information for his application.

Buffer Solution pH 7.00

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 07/22/2013 Revision date: 12/22/2016 Supersedes: 07/22/2013 Version: 1.1

SECTION 1: Identification

1.1. Identification

Product form : Mixture

Product name : Buffer Solution pH 7.00

Product code : LC12370

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : For laboratory and manufacturing use only.

Recommended use : Laboratory chemicals

Restrictions on use : Not for food, drug or household use

1.3. Details of the supplier of the safety data sheet

LabChem Inc
Jackson's Pointe Commerce Park Building 1000, 1010 Jackson's Pointe Court
Zelienople, PA 16063 - USA
T 412-826-5230 - F 724-473-0647
info@labchem.com - www.labchem.com

1.4. Emergency telephone number

Emergency number : CHEMTREC: 1-800-424-9300 or 011-703-527-3887

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS-US classification

Not classified

2.2. Label elements

Not classified as a hazardous chemical.

2.3. Other hazards

Other hazards not contributing to the classification : None.

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substance

Not applicable

3.2. Mixture

Name	Product identifier	%	GHS-US classification
Water	(CAS No) 7732-18-5	99.24	Not classified
Potassium Phosphate, Monobasic	(CAS No) 7778-77-0	0.68	Not classified
Sodium Hydroxide	(CAS No) 1310-73-2	0.08	Acute Tox. 4 (Dermal), H312 Skin Corr. 1A, H314 Eye Dam. 1, H318 Aquatic Acute 3, H402

Full text of hazard classes and H-statements : see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

First-aid measures after inhalation : Allow victim to breathe fresh air. Allow the victim to rest.

First-aid measures after skin contact : Remove affected clothing and wash all exposed skin area with mild soap and water, followed by warm water rinse.

First-aid measures after eye contact : Rinse immediately with plenty of water. Obtain medical attention if pain, blinking or redness persist.

First-aid measures after ingestion : Rinse mouth. Do NOT induce vomiting. Obtain emergency medical attention.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries : Not expected to present a significant hazard under anticipated conditions of normal use.

4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Foam. Dry powder. Carbon dioxide. Water spray. Sand.

Unsuitable extinguishing media : Do not use a heavy water stream.

5.2. Special hazards arising from the substance or mixture

No additional information available

5.3. Advice for firefighters

Firefighting instructions : Use water spray or fog for cooling exposed containers. Exercise caution when fighting any chemical fire. Prevent fire-fighting water from entering environment.

Protection during firefighting : Do not enter fire area without proper protective equipment, including respiratory protection.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

Protective equipment : Safety glasses.

Emergency procedures : Evacuate unnecessary personnel.

6.1.2. For emergency responders

Protective equipment : Equip cleanup crew with proper protection.

Emergency procedures : Ventilate area.

6.2. Environmental precautions

Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

Methods for cleaning up : Soak up spills with inert solids, such as clay or diatomaceous earth as soon as possible. Collect spillage. Store away from other materials.

6.4. Reference to other sections

See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Provide good ventilation in process area to prevent formation of vapor.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Keep container closed when not in use.

Incompatible products : Strong oxidizers.

Incompatible materials : None known.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Potassium Phosphate, Monobasic (7778-77-0)
Not applicable

Sodium Hydroxide (1310-73-2)		
ACGIH	ACGIH Ceiling (mg/m³)	2 mg/m³ (Sodium hydroxide; USA; Momentary value; TLV - Adopted Value)
OSHA	OSHA PEL (TWA) (mg/m³)	2 mg/m³
IDLH	US IDLH (mg/m³)	10 mg/m³
NIOSH	NIOSH REL (ceiling) (mg/m³)	2 mg/m³

Water (7732-18-5)
Not applicable

8.2. Exposure controls

Personal protective equipment : Safety glasses.

Eye protection : Chemical goggles or safety glasses.

Respiratory protection : Respiratory protection not required in normal conditions.

Other information : Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: Clear, colorless liquid.
Color	: Colorless
Odor	: None.
Odor threshold	: No data available
pH	: 7
Melting point	: No data available
Freezing point	: No data available
Boiling point	: No data available
Flash point	: No data available
Relative evaporation rate (butyl acetate=1)	: No data available
Flammability (solid, gas)	: Non flammable.
Vapor pressure	: No data available
Relative vapor density at 20 °C	: No data available
Relative density	: No data available
Solubility	: Soluble in water.
Log Pow	: No data available
Auto-ignition temperature	: No data available
Decomposition temperature	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosion limits	: No data available
Explosive properties	: No data available
Oxidizing properties	: No data available

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

No additional information available

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Not established.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

Strong oxidizers.

10.6. Hazardous decomposition products

Phosphorus oxides. Sodium oxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Likely routes of exposure : Skin and eye contact

Acute toxicity : Not classified

Potassium Phosphate, Monobasic (7778-77-0)	
LD50 dermal rabbit	4640 mg/kg
ATE US (dermal)	4640.000 mg/kg body weight

Sodium Hydroxide (1310-73-2)	
ATE US (dermal)	1350.000 mg/kg body weight

Water (7732-18-5)	
LD50 oral rat	≥ 90000 mg/kg
ATE US (oral)	90000.000 mg/kg body weight

Skin corrosion/irritation : Not classified
pH: 7

Serious eye damage/irritation : Not classified
pH: 7

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

Potential Adverse human health effects and symptoms : Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

12.1. Toxicity

Sodium Hydroxide (1310-73-2)	
LC50 fish 1	45.4 mg/l (LC50; Other; 96 h; Salmo gairdneri; Static system; Fresh water; Experimental value)

12.2. Persistence and degradability

Buffer Solution pH 7.00	
Persistence and degradability	Not established.

Potassium Phosphate, Monobasic (7778-77-0)	
Persistence and degradability	Not established.

Sodium Hydroxide (1310-73-2)	
Persistence and degradability	Biodegradability: not applicable. No test data on mobility of the substance available.
Biochemical oxygen demand (BOD)	Not applicable
Chemical oxygen demand (COD)	Not applicable
ThOD	Not applicable

Water (7732-18-5)	
Persistence and degradability	Not established.

12.3. Bioaccumulative potential

Buffer Solution pH 7.00	
Bioaccumulative potential	Not established.

Potassium Phosphate, Monobasic (7778-77-0)	
Bioaccumulative potential	Not established.

Sodium Hydroxide (1310-73-2)	
Bioaccumulative potential	No bioaccumulation data available.

Water (7732-18-5)	
Bioaccumulative potential	Not established.

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Effect on the global warming : No known effects from this product.

GWPmix comment : No known effects from this product.

Other information : Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : Dispose in a safe manner in accordance with local/national regulations.

Ecology - waste materials : Avoid release to the environment.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Not regulated

SECTION 15: Regulatory information

15.1. US Federal regulations

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

This product or mixture does not contain a toxic chemical or chemicals in excess of the applicable de minimis concentration as specified in 40 CFR §372.38(a) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

Sodium Hydroxide (1310-73-2)	
RQ (Reportable quantity, section 304 of EPA's List of Lists)	1000 lb
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard

15.2. International regulations

CANADA

Buffer Solution pH 7.00	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria

Potassium Phosphate, Monobasic (7778-77-0)	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria

Sodium Hydroxide (1310-73-2)	
Listed on the Canadian DSL (Domestic Substances List)	
WHMIS Classification	Class E - Corrosive Material

Water (7732-18-5)	
WHMIS Classification	Uncontrolled product according to WHMIS classification criteria

EU-Regulations
No additional information available

National regulations
No additional information available

15.3. US State regulations
California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

SECTION 16: Other information

Revision date : 12/22/2016

Other information : None.

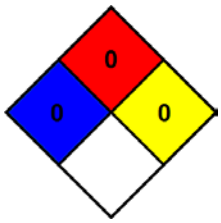
Full text of H-phrases: see section 16:

H312	Harmful in contact with skin
H314	Causes severe skin burns and eye damage
H318	Causes serious eye damage
H402	Harmful to aquatic life

NFPA health hazard : 0 - Exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials.

NFPA fire hazard : 0 - Materials that will not burn.

NFPA reactivity : 0 - Normally stable, even under fire exposure conditions, and are not reactive with water.



HMIS III Rating

Health : 0 Minimal Hazard - No significant risk to health

Flammability : 0 Minimal Hazard - Materials that will not burn

Physical : 0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NOT react with water, polymerize, decompose, condense, or self-react. Non-Explosives.

Personal protection : A

A - Safety glasses

SDS US LabChem

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SAFETY DATA SHEET

Creation Date 09-Dec-2009 **Revision Date** 19-Jan-2018 **Revision Number** 4

1. Identification

Product Name **Buffer solution pH 10, Carbonate buffer**

Cat No. : **AC258600000; AC258600010; AC258600025; AC258605000**

Synonyms None

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

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

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Label Elements
None required

Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS-No	Weight %

Water	7732-18-5	97.5
Ethylenediaminetetraacetic acid, disodium salt dihydrate	6381-92-6	1.0
Potassium carbonate	584-08-7	0.6
Potassium hydroxide	1310-58-3	0.5
Potassium Borate	12228-88-5	0.4

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if symptoms occur.

Inhalation Remove to fresh air. Get medical attention immediately if symptoms occur.

Ingestion Clean mouth with water and drink afterwards plenty of water. Get medical attention if symptoms occur.

Most important symptoms and effects None reasonably foreseeable.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available

Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
None known.

Hazardous Combustion Products
None known.

Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
1	0	0	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment as required. Ensure adequate ventilation.
Environmental Precautions Should not be released into the environment.

Methods for Containment and Clean Up Sweep up and shovel into suitable containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Avoid contact with skin, eyes or clothing. Avoid ingestion and inhalation. Ensure adequate ventilation.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Potassium hydroxide	Ceiling: 2 mg/m³	(Vacated) Ceiling: 2 mg/m³	Ceiling: 2 mg/m³	Ceiling: 2 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures None under normal use conditions.

Personal Protective Equipment

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

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

Respiratory Protection No protective equipment is needed under normal use conditions.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Odorless
Odor Threshold	No information available
pH	10
Melting Point/Range	No data available
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Specific Gravity	No information available
Solubility	Soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid None known.

Incompatible Materials None known

Hazardous Decomposition Products None known

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information No acute toxicity information is available for this product

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Water	-	-	-
Potassium carbonate	> 2000 mg/kg (Rat)	Not listed	Not listed
Potassium hydroxide	LD50 = 284 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

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

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Water	7732-18-5	Not listed	Not listed	Not listed	Not listed	Not listed
Ethylenediaminetetraacetic acid, disodium salt dihydrate	6381-92-6	Not listed	Not listed	Not listed	Not listed	Not listed
Potassium carbonate	584-08-7	Not listed	Not listed	Not listed	Not listed	Not listed
Potassium hydroxide	1310-58-3	Not listed	Not listed	Not listed	Not listed	Not listed
Potassium Borate	12228-88-5	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Potassium carbonate	Not listed	LC50 <510 mg/L/96h (Pimephales promelas)	Not listed	LC50: = 630 mg/L, 48h (Ceriodaphnia dubia)
Potassium hydroxide	Not listed	LC50: = 80 mg/L, 96h static (Gambusia affinis)	Not listed	Not listed

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

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

Component	log Pow
Potassium hydroxide	0.83

13. Disposal considerations

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

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Water	7732-18-5	X	ACTIVE	-
Ethylenediaminetetraacetic acid, disodium salt dihydrate	6381-92-6	-	-	-
Potassium carbonate	584-08-7	X	ACTIVE	-
Potassium hydroxide	1310-58-3	X	ACTIVE	-
Potassium Borate	12228-88-5	-	-	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Water	7732-18-5	X	-	231-791-2	X	X	X	X	KE-35400
Ethylenediaminetetraacetic acid, disodium salt dihydrate	6381-92-6	X	-	-	X	-	X	X	-

Potassium carbonate	584-08-7	X	-	209-529-3	X	X	X	X	KE-29083
Potassium hydroxide	1310-58-3	X	-	215-181-3	X	X	X	X	KE-29139
Potassium Borate	12228-88-5	-	-	-	-	-	-	-	-

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Potassium hydroxide	X	1000 lb	-	-

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Potassium hydroxide	1000 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Water	-	-	X	-	-
Potassium hydroxide	X	X	X	-	X

U.S. Department of Transportation

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

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

16. Other information

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

Creation Date 09-Dec-2009
Revision Date 19-Jan-2018
Print Date 19-Jan-2018
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

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

End of SDS

SAFETY DATA SHEET

Version 6.2
Revision Date 01/21/2020
Print Date 08/29/2020

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Conductivity Standard

Product Number : 06949
Brand : Sigma-Aldrich

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Carcinogenicity (Category 2), H351
Reproductive toxicity (Category 2), H361
Specific target organ toxicity - repeated exposure (Category 1), Liver, Kidney, H372

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H351 Suspected of causing cancer.
H361 Suspected of damaging fertility or the unborn child.
H372 Causes damage to organs (Liver, Kidney) through prolonged or

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

repeated exposure.

Precautionary statement(s)	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Component		Classification	Concentration
Chloroform			
CAS-No. EC-No. Index-No. Registration number	67-66-3 200-663-8 602-006-00-4 01-2119486657-20-XXXX	Acute Tox. 4; Acute Tox. 3; Skin Irrit. 2; Eye Irrit. 2A; Carc. 2; Repr. 2; STOT SE 3; STOT RE 1; Aquatic Acute 3; Aquatic Chronic 3; H302, H331, H315, H319, H351, H361, H336, H372, H402, H412 Concentration limits: 20 %: STOT SE 3, H336;	>= 1 - < 5 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Move out of dangerous area.Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas, Potassium oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): 12: Non Combustible Liquids

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operates as MilliporeSigma in the US and Canada

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Chloroform	67-66-3	TWA	10 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Liver damage Embryo/fetal damage Confirmed animal carcinogen with unknown relevance to humans		
		ST	2 ppm 9.78 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		
		C	50 ppm 240 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate. Ceiling limit is to be determined from breathing-zone air samples.		
		PEL	2 ppm 9.78 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

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Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: clear, liquid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	0.999 g/cm3
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

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SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas, Potassium oxides
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Chloroform)
NTP:	RAHC - Reasonably anticipated to be a human carcinogen (Chloroform)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

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Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

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IMDG
Not dangerous goods

IATA
Not dangerous goods

SECTION 15: Regulatory information

SARA 302 Components
The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
Chloroform	67-66-3	2008-11-03

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Chloroform	67-66-3	2008-11-03

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Reportable Quantity : D022 lbs

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Chloroform	67-66-3	2008-11-03

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Water	7732-18-5	
Chloroform	67-66-3	2008-11-03

New Jersey Right To Know Components

	CAS-No.	Revision Date
Water	7732-18-5	
Chloroform	67-66-3	2008-11-03
Potassium chloride	7447-40-7	

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer.Chloroform	67-66-3	2011-09-01

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WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.Chloroform	CAS-No. 67-66-3	Revision Date 2011-09-01

SECTION 16: Other information

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.2 Revision Date: 01/21/2020 Print Date: 08/29/2020

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SAFETY DATA SHEET

Version 5.10
Revision Date 11/24/2015
Print Date 12/12/2015

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Hydrochloric acid

Product Number : 258148
Brand : Sigma-Aldrich
Index-No. : 017-002-01-X

CAS-No. : 7647-01-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Corrosive to metals (Category 1), H290
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.
H335 May cause respiratory irritation.

Precautionary statement(s)
P234 Keep only in original container.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/ protective clothing/ eye protection/ face

	protection.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
P363	Wash contaminated clothing before reuse.
P390	Absorb spillage to prevent material damage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P406	Store in corrosive resistant stainless steel container with a resistant inner liner.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Formula : HCl
Molecular weight : 36.46 g/mol

Hazardous components

Component		Classification	Concentration
Hydrochloric acid			
CAS-No.	7647-01-0	Met. Corr. 1; Skin Corr. 1B; Eye Dam. 1; STOT SE 3; H290, H314, H335	>= 30 - < 50 %
EC-No.	231-595-7		
Index-No.	017-002-01-X		
Registration number	01-2119484862-27-XXXX		

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.Continue rinsing eyes during transport to hospital.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Metal containers must be lined. Corrodes metal.
Storage class (TRGS 510): Non-combustible, corrosive hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Hydrochloric acid	7647-01-0	C	2.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Upper Respiratory Tract irritation Not classifiable as a human carcinogen		
		C	5.000000 ppm 7.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Often used in an aqueous solution.		

		C	5.000000 ppm 7.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate. Ceiling limit is to be determined from breathing-zone air samples.		
		C	2 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Not classifiable as a human carcinogen		
		C	5 ppm 7 mg/m3	USA. NIOSH Recommended Exposure Limits
		Often used in an aqueous solution.		
		C	5 ppm 7 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate. Ceiling limit is to be determined from breathing-zone air samples.		
		C	5 ppm 7 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 480 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 69 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: light yellow
b)	Odour	pungent
c)	Odour Threshold	No data available
d)	pH	< 1
e)	Melting point/freezing point	Solidification / Setting point: -30 °C (-22 °F)
f)	Initial boiling point and boiling range	> 100 °C (> 212 °F) - lit.
g)	Flash point	Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	227 hPa (170 mmHg) at 21.1 °C (70.0 °F) 547 hPa (410 mmHg) at 37.7 °C (99.9 °F) 190 hPa (143 mmHg) at 20 °C (68 °F)
l)	Vapour density	No data available
m)	Relative density	1.2 g/cm3 at 25 °C (77 °F)
n)	Water solubility	completely miscible
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	Not explosive
t)	Oxidizing properties	The substance or mixture is not classified as oxidizing.

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
Corrosive in contact with metals

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Exothermic reaction with:, Amines, Aldehydes, permanganates, e.g. potassium permanganate, Risk of ignition or formation of inflammable gases or vapours with:, Aluminium, Carbides, Fluorine, Metals, Bases, Sulphides, Risk of explosion with:, Alkali metals, Sulphuric acid, Gives off hydrogen by reaction with metals.

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Metals

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available (Hydrochloric acid)

Inhalation: Inhalation may provoke the following symptoms: Respiratory irritation Cough Difficulty in breathing Pneumonia (Hydrochloric acid)

Dermal: No data available (Hydrochloric acid)

No data available (Hydrochloric acid)

Skin corrosion/irritation
Skin - Rabbit (Hydrochloric acid)
Result: Causes burns.

Serious eye damage/eye irritation
Eyes - Rabbit (Hydrochloric acid)
Result: Corrosive to eyes

Respiratory or skin sensitisation
Did not cause sensitisation on laboratory animals. (Hydrochloric acid)

Germ cell mutagenicity
No data available (Hydrochloric acid)

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification. (Hydrochloric acid)

(Hydrochloric acid)

(Hydrochloric acid)

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Hydrochloric acid)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available (Hydrochloric acid)

No data available (Hydrochloric acid)

Specific target organ toxicity - single exposure
The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation. (Hydrochloric acid)

Specific target organ toxicity - repeated exposure
The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard
No aspiration toxicity classification (Hydrochloric acid)

Additional Information
RTECS: MW4025000

Inhalation of vapors may cause:, burning sensation, Cough, wheezing, Shortness of breath, spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema (Hydrochloric acid)

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill) - 24.6 mg/l - 96 h (Hydrochloric acid)
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 4.91 mg/l - 48 h (Hydrochloric acid)

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available (Hydrochloric acid)

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

May be harmful to aquatic organisms due to the shift of the pH. Do not empty into drains.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1789 Class: 8 Packing group: II
Proper shipping name: Hydrochloric acid
Reportable Quantity (RQ):

Poison Inhalation Hazard: No

IMDG
UN number: 1789 Class: 8 Packing group: II EMS-No: F-A, S-B
Proper shipping name: HYDROCHLORIC ACID

IATA
UN number: 1789 Class: 8 Packing group: II
Proper shipping name: Hydrochloric acid

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Hydrochloric acid	7647-01-0	1993-04-24

SARA 311/312 Hazards

No SARA Hazards

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Hydrochloric acid	7647-01-0	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Water	7732-18-5	
Hydrochloric acid	7647-01-0	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Water	7732-18-5	
Hydrochloric acid	7647-01-0	1993-04-24

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Eye Dam.	Serious eye damage
H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H335	May cause respiratory irritation.
Met. Corr.	Corrosive to metals
Skin Corr.	Skin corrosion
STOT SE	Specific target organ toxicity - single exposure

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	3
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.10 Revision Date: 11/24/2015 Print Date: 12/12/2015

Isobutylene

Safety Data Sheet P-4614

This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Date of issue: 01/01/1979 Revision date: 10/17/2016 Supersedes: 02/27/2015

SECTION: 1. Product and company identification

1.1. Product identifier

Product form	:	Substance
Name	:	Isobutylene
CAS No	:	115-11-7
Formula	:	C4H8 / CH2=C(CH3)2
Other means of identification	:	Isobutene, 2-methylpropene

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture	:	Industrial use. Use as directed.

1.3. Details of the supplier of the safety data sheet

Praxair, Inc.
10 Riverview Drive
Danbury, CT 06810-6268 - USA
T 1-800-772-9247 (1-800-PRAXAIR) - F 1-716-879-2146
www.praxair.com

1.4. Emergency telephone number

Emergency number : Onsite Emergency: 1-800-645-4633

CHEMTREC, 24hr/day 7days/week
— Within USA: 1-800-424-9300, Outside USA: 001-703-527-3887
(collect calls accepted, Contract 17729)

SECTION 2: Hazard identification

2.1. Classification of the substance or mixture

GHS-US classification

Flam. Gas 1 H220
Liquefied gas H280

2.2. Label elements

GHS-US labeling

Hazard pictograms (GHS-US) :

GHS02 GHS04

Signal word (GHS-US) : DANGER

Hazard statements (GHS-US) :
H220 - **EXTREMELY FLAMMABLE GAS**
H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
OSHA-H01 - MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION
CGA-HG04 - MAY FORM EXPLOSIVE MIXTURES WITH AIR
CGA-HG01 - MAY CAUSE FROSTBITE

Precautionary statements (GHS-US) :
P202 - Do not handle until all safety precautions have been read and understood
P210 - Keep away from Heat, Open flames, Sparks, Hot surfaces. - No smoking
P271+P403 - Use and store only outdoors or in a well-ventilated place
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely
P381 - Eliminate all ignition sources if safe to do so
CGA-PG05 - Use a back flow preventive device in the piping
CGA-PG12 - Do not open valve until connected to equipment prepared for use
CGA-PG06 - Close valve after each use and when empty
CGA-PG11 - Never put cylinders into unventilated areas of passenger vehicles
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F)

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2.3. Other hazards

Other hazards not contributing to the classification : None.

2.4. Unknown acute toxicity (GHS US)

No data available

SECTION 3: Composition/Information on ingredients

3.1. Substance

Name	Product identifier	%
Isobutylene (Main constituent)	(CAS No) 115-11-7	100

3.2. Mixture

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove to fresh air and keep at rest in a position comfortable for breathing. If not breathing, give artificial respiration. If breathing is difficult, trained personnel should give oxygen. Call a physician.

First-aid measures after skin contact : The liquid may cause frostbite. For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). Water temperature should be tolerable to normal skin. Maintain skin warming for at least 15 minutes or until normal coloring and sensation have returned to the affected area. In case of massive exposure, remove clothing while showering with warm water. Seek medical evaluation and treatment as soon as possible.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

4.2. Most important symptoms and effects, both acute and delayed

No additional information available

4.3. Indication of any immediate medical attention and special treatment needed

None.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : Carbon dioxide, Dry chemical, Water spray or fog.

5.2. Special hazards arising from the substance or mixture

Fire hazard : **EXTREMELY FLAMMABLE GAS**. If venting or leaking gas catches fire, do not extinguish flames. Flammable vapors may spread from leak, creating an explosive reignition hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering an area, especially a confined area, check the atmosphere with an appropriate device.

Explosion hazard : **EXTREMELY FLAMMABLE GAS**. Forms explosive mixtures with air and oxidizing agents.

Reactivity : No reactivity hazard other than the effects described in sub-sections below.

5.3. Advice for firefighters

Firefighting instructions : **DANGER: FLAMMABLE LIQUID AND VAPOR.** Evacuate all personnel from danger area. Use self-contained breathing apparatus. Immediately cool surrounding containers with water spray from maximum distance, taking care not to extinguish flames. Avoid spreading burning liquid with water. Remove ignition sources if safe to do so. If flames are accidentally extinguished, explosive reignition may occur. Reduce vapors with water spray or fog. Stop flow of liquid if safe to do so, while continuing cooling water spray. Remove all containers from area of fire if safe to do so. Allow fire to burn out. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1919 Subpart L - Fire Protection.

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Special protective equipment for fire fighters	:	Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.
Other information	:	Containers are equipped with a pressure relief device. (Exceptions may exist where authorized by DOT.).

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : **DANGER: Flammable, liquefied gas.** FORMS EXPLOSIVE MIXTURES WITH AIR. Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Remove all sources of ignition if safe to do so. Reduce vapors with fog or fine water spray, taking care not to spread liquid with water. Shut off flow if safe to do so. Ventilate area or move container to a well-ventilated area. Flammable vapors may spread from leak and could explode if reignited by sparks or flames. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with an appropriate device.

6.1.1. For non-emergency personnel

No additional information available

6.1.2. For emergency responders

No additional information available

6.2. Environmental precautions

Try to stop release. Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

6.3. Methods and material for containment and cleaning up

No additional information available

6.4. Reference to other sections

See also sections 8 and 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only non-sparking tools. Use only explosion-proof equipment

Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g, wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

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7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store only where temperature will not exceed 125°F (52°C). Post “No Smoking/No Open Flames” signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage following appropriate codes and requirements (e.g, NFPA 30, NFPA 55, NFPA 70, and/or NFPA 221 in the U.S.) or according to requirements determined by the Authority Having Jurisdiction (AHJ). Always secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand when the container is not in use. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods. For other precautions in using this product, see section 16

OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE: When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Isobutylene (115-11-7)		
ACGIH	ACGIH TLV-TWA (ppm)	250 ppm

8.2. Exposure controls

Appropriate engineering controls : Use an explosion-proof local exhaust system. Local exhaust and general ventilation must be adequate to meet exposure standards. MECHANICAL (GENERAL): **Inadequate - Use only in a closed system.** Use explosion proof equipment and lighting.

Eye protection : Wear safety glasses when handling cylinders; vapor-proof goggles and a face shield during cylinder changeout or whenever contact with product is possible. Select eye protection in accordance with OSHA 29 CFR 1910.133.

Skin and body protection : Wear metatarsal shoes and work gloves for cylinder handling, and protective clothing where needed. Wear appropriate chemical gloves during cylinder changeout or wherever contact with product is possible. Select per OSHA 29 CFR 1910.132, 1910.136, and 1910.138.

Respiratory protection : When workplace conditions warrant respirator use, follow a respiratory protection program that meets OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable). Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA).

Thermal hazard protection : Wear cold insulating gloves when transfilling or breaking transfer connections.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state : Gas

Molecular mass : 56 g/mol

Color : Colorless.

Odor : Poor warning properties at low concentrations. Sweetish.

Odor threshold : Odor threshold is subjective and inadequate to warn for overexposure.

pH : Not applicable.

Relative evaporation rate (butyl acetate=1) : No data available

Relative evaporation rate (ether=1) : Not applicable.

Melting point : -140.3 °C

Freezing point : No data available

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Boiling point	:	-6.9 °C
Flash point	:	-80 °C (closed cup)
Critical temperature	:	144.7 °C
Auto-ignition temperature	:	465 °C
Decomposition temperature	:	No data available
Flammability (solid, gas)	:	1.8 - 8.8 vol %
Vapor pressure	:	260 kPa
Critical pressure	:	4000 kPa
Relative vapor density at 20 °C	:	No data available
Relative density	:	0.63
Density	:	0.599 g/cm³ (at 20 °C)
Relative gas density	:	2
Solubility	:	Water: 388 mg/l
Log Pow	:	2.35
Log Kow	:	Not applicable.
Viscosity, kinematic	:	Not applicable.
Viscosity, dynamic	:	Not applicable.
Explosive properties	:	Not applicable.
Oxidizing properties	:	None.
Explosion limits	:	No data available

9.2. Other information

Gas group	:	Liquefied gas
Additional information	:	Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level

SECTION 10: Stability and reactivity

10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

May occur.

10.4. Conditions to avoid

High temperature. Catalyst.

10.5. Incompatible materials

Halogens. Oxidizing agents. Acids.

10.6. Hazardous decomposition products

Thermal decomposition may produce : Carbon monoxide. Carbon dioxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

Isobutylene (\f)115-11-7	
LC50 inhalation rat (mg/l)	620 mg/l/4h
LC50 inhalation rat (ppm)	541657 ppm/1h
ATE US (gases)	270828.500 ppmV/4h
ATE US (vapors)	620.000 mg/l/4h
ATE US (dust, mist)	620.000 mg/l/4h

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Skin corrosion/irritation : Not classified

pH: Not applicable.

Serious eye damage/irritation : Not classified

pH: Not applicable.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Isobutylene (115-11-7)	
National Toxicology Program (NTP) Status	1 - Evidence of Carcinogenicity

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : Not classified

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : No known ecological damage caused by this product.

12.2. Persistence and degradability

Isobutylene (115-11-7)	
Persistence and degradability	The substance is biodegradable. Unlikely to persist.

12.3. Bioaccumulative potential

Isobutylene (115-11-7)	
Log Pow	2.35
Log Kow	Not applicable.
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.

12.4. Mobility in soil

Isobutylene (115-11-7)	
Mobility in soil	No data available.
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5. Other adverse effects

Effect on ozone layer : None

Effect on the global warming : No known effects from this product

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : Do not attempt to dispose of residual or unused quantities. Return container to supplier.

SECTION 14: Transport information

In accordance with DOT

Transport document description : UN1055 Isobutylene, 2.1

UN-No.(DOT) : UN1055

Proper Shipping Name (DOT) : Isobutylene

Class (DOT) : 2.1 - Class 2.1 - Flammable gas 49 CFR 173.115

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Hazard labels (DOT) : 2.1 - Flammable gas

DOT Special Provisions (49 CFR 172.102) : 19 - For domestic transportation only, the identification number UN1075 may be used in place of the identification number specified in column (4) of the 172.101 table. The identification number used must be consistent on package markings, shipping papers and emergency response information
T50 - When portable tank instruction T50 is referenced in Column (7) of the 172.101 Table, the applicable liquefied compressed gases are authorized to be transported in portable tanks in accordance with the requirements of 173.313 of this subchapter

Additional information

Emergency Response Guide (ERG) Number : 115 (UN1055)

Other information : No supplementary information available.

Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers: - Ensure there is adequate ventilation. - Ensure that containers are firmly secured. - Ensure cylinder valve is closed and not leaking. - Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted.

Transport by sea

UN-No. (IMDG) : 1055

Proper Shipping Name (IMDG) : ISOBUTYLENE

Class (IMDG) : 2 - Gases

MFAG-No : 115

Air transport

UN-No. (IATA) : 1055

Proper Shipping Name (IATA) : Isobutylene

Class (IATA) : 2

Civil Aeronautics Law : Gases under pressure/Gases flammable under pressure

SECTION 15: Regulatory information

15.1. US Federal regulations

Isobutylene (115-11-7)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard Delayed (chronic) health hazard Sudden release of pressure hazard Fire hazard

15.2. International regulations

CANADA

Isobutylene (115-11-7)
Listed on the Canadian DSL (Domestic Substances List)

EU-Regulations

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Isobutylene (115-11-7)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

15.2.2. National regulations

Isobutylene (115-11-7)
Listed on the AICS (Australian Inventory of Chemical Substances) Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China) Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory Listed on the Korean ECL (Existing Chemicals List) Listed on NZIoC (New Zealand Inventory of Chemicals) Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances) Listed on INSQ (Mexican National Inventory of Chemical Substances)

15.3. US State regulations

Isobutylene(115-11-7)	
U.S. - California - Proposition 65 - Carcinogens List	No
U.S. - California - Proposition 65 - Developmental Toxicity	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Female	No
U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No
State or local regulations	U.S. - Massachusetts - Right To Know List U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

Other information : When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product

Praxair asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Praxair, Inc, it is the user's obligation to determine the conditions of safe use of the product

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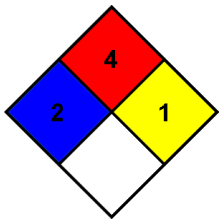
NFPA health hazard	: 2 - Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.
NFPA fire hazard	: 4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.
NFPA reactivity	: 1 - Normally stable, but can become unstable at elevated temperatures and pressures or may react with water with some release of energy, but not violently.



HMIS III Rating

Health	: 1 Slight Hazard - Irritation or minor reversible injury possible
Flammability	: 4 Severe Hazard
Physical	: 2 Moderate Hazard

SDS US (GHS HazCom 2012) - Praxair

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

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Isopropyl Alcohol (2-Propanol)

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of issue: 11/14/2013 Revision date: 01/23/2020 Supersedes: 01/26/2018 Version: 1.3

SECTION 1: Identification

1.1. Identification

Product form	:	Substance
Substance name	:	Isopropyl Alcohol (2-Propanol)
CAS-No.	:	67-63-0
Product code	:	LC15750
Formula	:	C3H8O
Synonyms	:	1-methylethanol / 1-methylethyl alcohol / 2-hydroxypropane / dimethyl carbinol / ethyl carbinol / hydroxypropane / IPA / i-propanol / isoethylcarbinol / propan-2-ol / sec-propanol

1.2. Recommended use and restrictions on use

Use of the substance/mixture	:	Disinfectant Solvent
Recommended use	:	Laboratory chemicals
Restrictions on use	:	Not for food, drug or household use

1.3. Supplier

LabChem, Inc.
Jackson's Pointe Commerce Park Building 1000, 1010 Jackson's Pointe Court
Zelienople, PA 16063 - USA
T 412-826-5230 - F 724-473-0647
info@labchem.com - www.labchem.com

1.4. Emergency telephone number

Emergency number	:	CHEMTREC: 1-800-424-9300 or +1-703-741-5970

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS US classification

Flammable liquids Category 2	H225 Highly flammable liquid and vapour
Serious eye damage/eye irritation Category 2A	H319 Causes serious eye irritation
Specific target organ toxicity (single exposure) Category 3	H335 May cause respiratory irritation

Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

GHS US labeling

Hazard pictograms (GHS US) :

Signal word (GHS US) : Danger

Hazard statements (GHS US) :
H225 - Highly flammable liquid and vapour
H319 - Causes serious eye irritation
H335 - May cause respiratory irritation

Precautionary statements (GHS US) :
P210 - Keep away from heat, hot surfaces, open flames, sparks. - No smoking.
P233 - Keep container tightly closed.
P240 - Ground/bond container and receiving equipment.
P241 - Use explosion-proof electrical, lighting, ventilating equipment.
P242 - Use only non-sparking tools.
P243 - Take precautionary measures against static discharge.
P261 - Avoid breathing mist, vapors, spray.
P264 - Wash exposed skin thoroughly after handling.
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear eye protection, face protection, protective clothing, protective gloves.
P303+P361+P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P312 - Call a POISON CENTER or doctor/physician if you feel unwell.
P337+P313 - If eye irritation persists: Get medical advice/attention.
P370+P378 - In case of fire: Use dry chemical powder, alcohol-resistant foam, carbon dioxide (CO2) to extinguish
P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
P403+P235 - Store in a well-ventilated place. Keep cool.
P405 - Store locked up.
P501 - Dispose of contents/container to comply with local, state and federal regulations.

2.3. Other hazards which do not result in classification

Other hazards not contributing to the classification : None.

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances

Substance type : Mono-constituent

Name	Product identifier	%	GHS US classification
Isopropyl Alcohol (2-Propanol) (Main constituent)	(CAS-No.) 67-63-0	100	Flam. Liq. 2, H225 Eye Irrit. 2A, H319 STOT SE 3, H335

Full text of hazard classes and H-statements : see section 16

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general : Check the vital functions. Unconscious: maintain adequate airway and respiration. Respiratory arrest: artificial respiration or oxygen. Cardiac arrest: perform resuscitation. Victim conscious with labored breathing: half-seated. Victim in shock: on his back with legs slightly raised. Vomiting: prevent asphyxia/aspiration pneumonia. Prevent cooling by covering the victim (no warming up). Keep watching the victim. Give psychological aid. Keep the victim calm, avoid physical strain. Depending on the victim's condition: doctor/hospital. Never give alcohol to drink.

First-aid measures after inhalation : Remove the victim into fresh air. Respiratory problems: consult a doctor/medical service.

First-aid measures after skin contact : Rinse with water. Do not apply (chemical) neutralizing agents without medical advice. Soap may be used. Take victim to a doctor if irritation persists.

First-aid measures after eye contact : Rinse immediately with plenty of water. Remove contact lenses, if present and easy to do. Continue rinsing. Do not apply (chemical) neutralizing agents without medical advice. Take victim to an ophthalmologist if irritation persists.

First-aid measures after ingestion : Rinse mouth with water. Do not apply (chemical) neutralizing agents without medical advice. Immediately after ingestion: give lots of water to drink. Do not induce vomiting. Call Poison Information Centre (www.big.be/antigif.htm). Consult a doctor/medical service if you feel unwell. Ingestion of large quantities: immediately to hospital. Take the container/vomit to the doctor/hospital.

4.2. Most important symptoms and effects (acute and delayed)

Potential Adverse human health effects and symptoms : Non-toxic if swallowed (LD50 oral, rat > 5000 mg/kg). Not irritant to skin. Non-toxic in contact with skin (LD50 skin> 5000 mg/kg). May cause drowsiness or dizziness. Causes serious eye irritation.

Symptoms/effects after inhalation : EXPOSURE TO HIGH CONCENTRATIONS: Coughing. Dry/sore throat. Central nervous system depression. Dizziness. Headache. Narcosis.

Symptoms/effects after skin contact : Dry skin.

Symptoms/effects after eye contact : Irritation of the eye tissue. Redness of the eye tissue.

Symptoms/effects after ingestion : AFTER ABSORPTION OF LARGE QUANTITIES: Central nervous system depression. Headache. Dilation of the blood vessels. Low arterial pressure. Nausea. Vomiting. Abdominal pain. Disturbed motor response. Disturbances of consciousness. FOLLOWING SYMPTOMS MAY APPEAR LATER: Body temperature fall. Slowing respiration.

Chronic symptoms : Red skin. Dry skin. Itching. Cracking of the skin. Skin rash/inflammation. Impaired memory.

4.3. Immediate medical attention and special treatment, if necessary

No additional information available

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

Suitable extinguishing media : Quick-acting ABC powder extinguisher. Quick-acting BC powder extinguisher. Quick-acting class B foam extinguisher. Quick-acting CO2 extinguisher. Class B foam (alcohol-resistant). Water spray if puddle cannot expand.

Unsuitable extinguishing media : Water (quick-acting extinguisher, reel); risk of puddle expansion. Water; risk of puddle expansion.

5.2. Specific hazards arising from the chemical

Fire hazard : DIRECT FIRE HAZARD. Highly flammable liquid and vapour. Gas/vapor flammable with air within explosion limits. INDIRECT FIRE HAZARD. May be ignited by sparks. Gas/vapor spreads at floor level: ignition hazard.

Explosion hazard : DIRECT EXPLOSION HAZARD. Gas/vapour explosive with air within explosion limits. INDIRECT EXPLOSION HAZARD. may be ignited by sparks. Reactions with explosion hazards: see "Reactivity Hazard".

5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions : Cool tanks/drums with water spray/remove them into safety. Do not move the load if exposed to heat.

Protection during firefighting : Heat/fire exposure: compressed air/oxygen apparatus.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Clean up any spills as soon as possible, using an absorbent material to collect it.

6.1.1. For non-emergency personnel

Protective equipment : Gloves. Protective goggles. Protective clothing. Large spills/in enclosed spaces: compressed air apparatus.

Emergency procedures : Keep upwind. Mark the danger area. Consider evacuation. Seal off low-lying areas. Close doors and windows of adjacent premises. Stop engines and no smoking. No naked flames or sparks. Spark- and explosion-proof appliances and lighting equipment. Keep containers closed. Wash contaminated clothes.

6.1.2. For emergency responders

Protective equipment : Equip cleanup crew with proper protection. Do not breathe gas, fumes, vapor or spray.

Emergency procedures : Stop leak if safe to do so. Ventilate area. If a major spill occurs, all personnel should be immediately evacuated and the area ventilated.

6.2. Environmental precautions

Prevent spreading in sewers.

6.3. Methods and material for containment and cleaning up

For containment : Contain released substance, pump into suitable containers. Plug the leak, cut off the supply. Dam up the liquid spill. Try to reduce evaporation. Measure the concentration of the explosive gas-air mixture. Dilute/disperse combustible gas/vapour with water curtain. Provide equipment/receptacles with earthing. Do not use compressed air for pumping over spills.

Methods for cleaning up : Take up liquid spill into absorbent material, e.g.: dry sand/earth/vermiculite or powdered limestone. Scoop absorbed substance into closing containers. Damaged/cooled tanks must be emptied. Do not use compressed air for pumping over spills. Carefully collect the spill/leftovers. Clean contaminated surfaces with an excess of water. Take collected spill to manufacturer/competent authority. Wash clothing and equipment after handling.

6.4. Reference to other sections

For further information refer to section 8: "Exposure controls/personal protection".

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed : May form explosive peroxides.

Precautions for safe handling : Use spark-/explosionproof appliances and lighting system. Take precautions against electrostatic charges. Keep away from naked flames/heat. Keep away from ignition sources/sparks. Measure the concentration in the air regularly. Work under local exhaust/ventilation. Comply with the legal requirements. Remove contaminated clothing immediately. Clean contaminated clothing. Handle uncleaned empty containers as full ones. Thoroughly clean/dry the installation before use. Do not discharge the waste into the drain. Do not use compressed air for pumping over. Keep container tightly closed.

Hygiene measures : Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Wash contaminated clothing before reuse.

7.2. Conditions for safe storage, including any incompatibilities

Incompatible products : Ammonia. Strong acids. Strong oxidizers.

Incompatible materials : Direct sunlight. Heat sources. Sources of ignition.

Heat-ignition : KEEP SUBSTANCE AWAY FROM: heat sources. ignition sources.

Prohibitions on mixed storage : KEEP SUBSTANCE AWAY FROM: oxidizing agents. strong acids. (strong) bases. amines. halogens.

Storage area : Store in a cool area. Store in a dry area. Ventilation at floor level. Fireproof storeroom. Provide for an automatic sprinkler system. Provide for a tub to collect spills. Provide the tank with earthing. May be stored under nitrogen. Meet the legal requirements.

Special rules on packaging : SPECIAL REQUIREMENTS: closing. with pressure relief valve. dry. clean. correctly labelled. meet the legal requirements. Secure fragile packagings in solid containers.

Packaging materials : SUITABLE MATERIAL: stainless steel. monel steel. carbon steel. copper. nickel. bronze. glass. Teflon. polyethylene. polypropylene. zinc. MATERIAL TO AVOID: steel with rubber inner lining. aluminium.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Isopropyl Alcohol (2-Propanol) (67-63-0)		
ACGIH	ACGIH TWA (ppm)	200 ppm
ACGIH	ACGIH STEL (ppm)	400 ppm
NIOSH	NIOSH REL (TWA) (mg/m³)	980 mg/m³
NIOSH	NIOSH REL (TWA) (ppm)	400 ppm
NIOSH	NIOSH REL (STEL) (mg/m³)	1225 mg/m³
NIOSH	NIOSH REL (STEL) (ppm)	500 ppm

8.2. Appropriate engineering controls

Appropriate engineering controls : Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Provide adequate general and local exhaust ventilation.

8.3. Individual protection measures/Personal protective equipment

Personal protective equipment:

Safety glasses. Gloves. Protective clothing. Face shield. High gas/vapor concentration: gas mask with filter type A.

Materials for protective clothing:

GIVE EXCELLENT RESISTANCE: butyl rubber. nitrile rubber. viton. polyethylene/ethylenevinylalcohol. GIVE GOOD RESISTANCE: neoprene. chloroprene rubber. GIVE LESS RESISTANCE: PVC. neoprene/natural rubber. GIVE POOR RESISTANCE: natural rubber. polyethylene. PVA

Hand protection:

Protective gloves against chemicals (EN 374)

Eye protection:

Safety glasses

Skin and body protection:

Protective clothing

Respiratory protection:

Full face mask with filter type A at conc. in air > exposure limit

Personal protective equipment symbol(s):

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Liquid
Appearance	:	Liquid.
Color	:	Colourless
Odor	:	Alcohol odour Stuffy odour Mild odour
Odor threshold	:	No data available
pH	:	Not applicable
Melting point	:	-89 °C
Freezing point	:	No data available
Boiling point	:	82 °C (1013 hPa)
Critical temperature	:	235 °C
Critical pressure	:	47600 hPa
Flash point	:	12 °C
Relative evaporation rate (butyl acetate=1)	:	2.3
Relative evaporation rate (ether=1)	:	21
Flammability (solid, gas)	:	No data available
Vapor pressure	:	44 hPa (20 °C)
Vapor pressure at 50 °C	:	229 hPa
Relative vapor density at 20 °C	:	2.1
Relative density	:	0.8 (20 °C)
Relative density of saturated gas/air mixture	:	1.05
Specific gravity / density	:	785 kg/m³
Molecular mass	:	60.1 g/mol
Solubility	:	Miscible with water. Soluble in ethanol. Soluble in ether. Soluble in acetone. Soluble in oils/fats. Soluble in chloroform. Water: miscible Ethanol: complete Ether: complete Acetone: soluble
Log Pow	:	0.05 (Weight of evidence approach, 25 °C)
Auto-ignition temperature	:	399 °C
Decomposition temperature	:	No data available
Viscosity, kinematic	:	2.532 mm²/s (25 °C)
Viscosity, dynamic	:	2.1 mPa·s (25 °C)
Explosion limits	:	2 – 13 vol % Lower explosive limit (LEL): 2 vol % Upper explosive limit (UEL): 13 vol %
Explosive properties	:	No data available
Oxidizing properties	:	No data available

9.2. Other information

Minimum ignition energy	:	0.65 mJ
Specific conductivity	:	350000000 pS/m (25 °C)
Saturation concentration	:	106 g/m³
VOC content	:	100 %
Other properties	:	Gas/vapour heavier than air at 20°C. Clear. Volatile.

SECTION 10: Stability and reactivity

10.1. Reactivity

Violent to explosive reaction with (strong) oxidizers. Prolonged storage/in large quantities: may form peroxides.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

May react violently with oxidants.

10.4. Conditions to avoid

Direct sunlight. High temperature. Incompatible materials. Open flame. Sparks.

10.5. Incompatible materials

Ammonia. Strong acids. Strong oxidizers.

10.6. Hazardous decomposition products

Carbon dioxide. Carbon monoxide.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral) : Not classified

Acute toxicity (dermal) : Not classified

Acute toxicity (inhalation) : Not classified

Isopropyl Alcohol (2-Propanol) (67-63-0)	
LD50 oral rat	5840 mg/kg body weight (Equivalent or similar to OECD 401, Rat, Experimental value, Oral, 14 day(s))
LD50 dermal rabbit	16400 mg/kg body weight (Equivalent or similar to OECD 402, 24 h, Rabbit, Experimental value, Dermal, 14 day(s))
LC50 inhalation rat (ppm)	> 10000 ppm (Equivalent or similar to OECD 403, 6 h, Rat, Male / female, Experimental value, Inhalation (vapours), 14 day(s))
ATE US (oral)	5840 mg/kg body weight
ATE US (dermal)	16400 mg/kg body weight

Skin corrosion/irritation : Not classified
pH: Not applicable

Serious eye damage/irritation : Causes serious eye irritation.
pH: Not applicable

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

STOT-single exposure : May cause respiratory irritation.

STOT-repeated exposure : Not classified

Aspiration hazard : Not classified

Viscosity, kinematic : 2.532 mm²/s (25 °C)

Likely routes of exposure : Inhalation. Skin and eye contact.

Potential Adverse human health effects and symptoms : Non-toxic if swallowed (LD50 oral, rat > 5000 mg/kg). Not irritant to skin. Non-toxic in contact with skin (LD50 skin> 5000 mg/kg). May cause drowsiness or dizziness. Causes serious eye irritation.

Symptoms/effects after inhalation : EXPOSURE TO HIGH CONCENTRATIONS: Coughing. Dry/sore throat. Central nervous system depression. Dizziness. Headache. Narcosis.

Symptoms/effects after skin contact : Dry skin.

Symptoms/effects after eye contact : Irritation of the eye tissue. Redness of the eye tissue.

Symptoms/effects after ingestion : AFTER ABSORPTION OF LARGE QUANTITIES: Central nervous system depression. Headache. Dilation of the blood vessels. Low arterial pressure. Nausea. Vomiting. Abdominal pain. Disturbed motor response. Disturbances of consciousness. FOLLOWING SYMPTOMS MAY APPEAR LATER: Body temperature fall. Slowing respiration.

Chronic symptoms : Red skin. Dry skin. Itching. Cracking of the skin. Skin rash/inflammation. Impaired memory.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Not classified as dangerous for the environment according to the criteria of Regulation (EC) No 1272/2008.

Ecology - air : Not included in the list of substances which may contribute to the greenhouse effect (IPCC). Not included in the list of fluorinated greenhouse gases (Regulation (EU) No 517/2014). Photooxidation in the air. Not classified as dangerous for the ozone layer (Regulation (EC) No 1005/2009).

Ecology - water : Not harmful to crustacea. Not harmful to fishes. Groundwater pollutant. Inhibition of activated sludge. Not harmful to algae. Not harmful to bacteria.

Isopropyl Alcohol (2-Propanol) (67-63-0)	
LC50 fish 1	9640 – 10000 mg/l (Equivalent or similar to OECD 203, 96 h, Pimephales promelas, Flow-through system, Fresh water, Experimental value, Lethal)

12.2. Persistence and degradability

Isopropyl Alcohol (2-Propanol) (67-63-0)	
Persistence and degradability	Biodegradable in the soil. Biodegradable in the soil under anaerobic conditions. Readily biodegradable in water.
Biochemical oxygen demand (BOD)	1.19 g O_2/g substance
Chemical oxygen demand (COD)	2.23 g O_2/g substance
ThOD	2.4 g O_2/g substance

12.3. Bioaccumulative potential

Isopropyl Alcohol (2-Propanol) (67-63-0)	
Log Pow	0.05 (Weight of evidence approach, 25 °C)
Bioaccumulative potential	Low potential for bioaccumulation (Log Kow < 4).

12.4. Mobility in soil

Isopropyl Alcohol (2-Propanol) (67-63-0)	
Surface tension	0.021 N/m (25 °C)
Log Koc	0.185 – 0.541 (log Koc, SRC PCKOCWIN v2.0, Calculated value)
Ecology - soil	Highly mobile in soil.

12.5. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste disposal recommendations : Do not discharge into drains or the environment. Remove waste in accordance with local and/or national regulations. Hazardous waste shall not be mixed together with other waste. Different types of hazardous waste shall not be mixed together if this may entail a risk of pollution or create problems for the further management of the waste. Hazardous waste shall be managed responsibly. All entities that store, transport or handle hazardous waste shall take the necessary measures to prevent risks of pollution or damage to people or animals. Recycle by distillation. Incinerate under surveillance with energy recovery. Obtain the consent of pollution control authorities before discharging to wastewater treatment plants.

Additional information : Hazardous waste according to Directive 2008/98/EC, as amended by Regulation (EU) No 1357/2014 and Regulation (EU) No 2017/997.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Transport document description : UN1219 Isopropyl alcohol, 3, II

UN-No.(DOT) : UN1219

Proper Shipping Name (DOT) : Isopropyl alcohol

Transport hazard class(es) (DOT) : 3 - Class 3 - Flammable and combustible liquid 49 CFR 173.120

Packing group (DOT) : II - Medium Danger

Hazard labels (DOT)	:	3 - Flammable liquid

DOT Packaging Non Bulk (49 CFR 173.xxx)	:	202
DOT Packaging Bulk (49 CFR 173.xxx)	:	242
DOT Special Provisions (49 CFR 172.102)	:	IB2 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 C (1.1 bar at 122 F), or 130 kPa at 55 C (1.3 bar at 131 F) are authorized. T4 - 2.65 178.274(d)(2) Normal..... 178.275(d)(3) TP1 - The maximum degree of filling must not exceed the degree of filling determined by the following: Degree of filling = 97 / 1 + a (tr - tf) Where: tr is the maximum mean bulk temperature during transport, and tf is the temperature in degrees celsius of the liquid during filling.
DOT Packaging Exceptions (49 CFR 173.xxx)	:	4b;150
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	:	5 L
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	:	60 L
DOT Vessel Stowage Location	:	B - (i) The material may be stowed ‘‘on deck’’ or ‘‘under deck’’ on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) ‘‘On deck only’’ on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded.
Other information	:	No supplementary information available.

Transportation of Dangerous Goods

Transport document description	:	UN1219 ISOPROPANOL, 3, II
UN-No. (TDG)	:	UN1219
Proper Shipping Name (Transportation of Dangerous Goods)	:	ISOPROPANOL
TDG Primary Hazard Classes	:	3 - Class 3 - Flammable Liquids
Packing group	:	II - Medium Danger
Explosive Limit and Limited Quantity Index	:	1 L
Passenger Carrying Road Vehicle or Passenger Carrying Railway Vehicle Index	:	5 L

Transport by sea

Transport document description (IMDG)	:	UN 1219 Isopropyl alcohol, 3, II
UN-No. (IMDG)	:	1219
Proper Shipping Name (IMDG)	:	Isopropyl alcohol
Class (IMDG)	:	3 - Flammable liquids
Packing group (IMDG)	:	II - substances presenting medium danger
EmS-No. (1)	:	F-E
EmS-No. (2)	:	S-D

Air transport

Transport document description (IATA)	:	UN 1219 Isopropyl alcohol, 3, II
UN-No. (IATA)	:	1219
Proper Shipping Name (IATA)	:	Isopropyl alcohol
Class (IATA)	:	3 - Flammable Liquids
Packing group (IATA)	:	II - Medium Danger

SECTION 15: Regulatory information

15.1. US Federal regulations

Isopropyl Alcohol (2-Propanol) (67-63-0)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Subject to reporting requirements of United States SARA Section 313	
SARA Section 311/312 Hazard Classes	Physical hazard - Flammable (gases, aerosols, liquids, or solids) Health hazard - Serious eye damage or eye irritation Health hazard - Specific target organ toxicity (single or repeated exposure)

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

Chemical(s) subject to the reporting requirements of Section 313 or Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986 and 40 CFR Part 372.

Isopropyl Alcohol (2-Propanol)	CAS-No. 67-63-0	100%

15.2. International regulations

CANADA
No additional information available

EU-Regulations
No additional information available

National regulations
No additional information available

15.3. US State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

SECTION 16: Other information

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision date : 01/23/2020

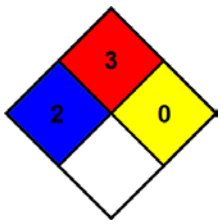
Full text of H-phrases: see section 16:

H225	Highly flammable liquid and vapour
H319	Causes serious eye irritation
H335	May cause respiratory irritation

NFPA health hazard : 2 - Materials that, under emergency conditions, can cause temporary incapacitation or residual injury.

NFPA fire hazard : 3 - Liquids and solids (including finely divided suspended solids) that can be ignited under almost all ambient temperature conditions.

NFPA reactivity : 0 - Material that in themselves are normally stable, even under fire conditions.



Hazard Rating		
Health	:	1 Slight Hazard - Irritation or minor reversible injury possible
Flammability	:	3 Serious Hazard - Materials capable of ignition under almost all normal temperature conditions. Includes flammable liquids with flash points below 73 F and boiling points above 100 F. as well as liquids with flash points between 73 F and 100 F. (Classes IB & IC)
Physical	:	0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NOT react with water, polymerize, decompose, condense, or self-react. Non-Explosives.
Personal protection	:	H H - Splash goggles, Gloves, Synthetic apron, Vapor respirator

SDS US LabChem

Information in this SDS is from available published sources and is believed to be accurate. No warranty, express or implied, is made and LabChem Inc assumes no liability resulting from the use of this SDS. The user must determine suitability of this information for his application.

SAFETY DATA SHEET

Version 5.1
Revision Date 07/18/2017
Print Date 07/28/2017

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Nitric acid

Product Number : 438073
Brand : Sigma-Aldrich
Index-No. : 007-004-00-1

CAS-No. : 7697-37-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Oxidizing liquids (Category 3), H272
Corrosive to metals (Category 1), H290
Skin corrosion (Category 1A), H314
Serious eye damage (Category 1), H318

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H272 May intensify fire; oxidizer.
H290 May be corrosive to metals.
H314 Causes severe skin burns and eye damage.

Precautionary statement(s)
P210 Keep away from heat.
P220 Keep/Store away from clothing/ combustible materials.
P221 Take any precaution to avoid mixing with combustibles.
P234 Keep only in original container.
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/ protective clothing/ eye protection/ face

	protection.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P363	Wash contaminated clothing before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P390	Absorb spillage to prevent material damage.
P405	Store locked up.
P406	Store in corrosive resistant container with a resistant inner liner.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Formula : HNO3

Hazardous components

Component		Classification	Concentration
Nitric acid			
CAS-No.	7697-37-2	Ox. Liq. 3; Met. Corr. 1; Skin Corr. 1A; Eye Dam. 1; H272, H290, H314	70 - 90 %
EC-No.	231-714-2		
Index-No.	007-004-00-1		
Registration number	01-2119487297-23-XXXX		

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.Continue rinsing eyes during transport to hospital.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Dry powder Dry sand

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Keep away from heat and sources of ignition.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Nitric acid	7697-37-2	TWA	2.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Upper Respiratory Tract irritation Eye irritation Dental erosion		
		STEL	4.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Eye irritation Dental erosion		

		ST	4.000000 ppm 10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	2.000000 ppm 5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	2.000000 ppm 5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		PEL	2 ppm 5 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		STEL	4 ppm 10 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available

j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
May discolor on exposure to air and light.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
Hazardous decomposition products formed under fire conditions. - Nitrogen oxides (NOx)
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: QU5775000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence
Liver - Irregularities - Based on Human Evidence (Nitric acid)

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2031 Class: 8 (5.1) Packing group: II
Proper shipping name: Nitric acid
Reportable Quantity (RQ): 1429 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 2031 Class: 8 (5.1) Packing group: II EMS-No: F-A, S-Q
Proper shipping name: NITRIC ACID

IATA
UN number: 2031 Class: 8 (5.1) Packing group: II
Proper shipping name: Nitric acid
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components
The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
Nitric acid	7697-37-2	2007-07-01

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Nitric acid	7697-37-2	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Nitric acid	7697-37-2	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Nitric acid	7697-37-2	2007-07-01
Water	7732-18-5	

	CAS-No.	Revision Date
Nitric acid	7697-37-2	2007-07-01
Water	7732-18-5	

New Jersey Right To Know Components

	CAS-No.	Revision Date
Nitric acid	7697-37-2	2007-07-01
Water	7732-18-5	

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Eye Dam.	Serious eye damage
H272	May intensify fire; oxidizer.
H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.

H318	Causes serious eye damage.
Met. Corr.	Corrosive to metals
Ox. Liq.	Oxidizing liquids
Skin Corr.	Skin corrosion

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	3

NFPA Rating

Health hazard:	3
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.1 Revision Date: 07/18/2017 Print Date: 07/28/2017

SAFETY DATA SHEET

PURELL® Advanced Hand Sanitizer Refreshing Gel

Version	Revision Date:	MSDS Number:	Date of last issue: 12/12/2014
1.1	02/10/2015	36779-00002	Date of first issue: 12/12/2014

SECTION 1. IDENTIFICATION

Product name : PURELL® Advanced Hand Sanitizer Refreshing Gel

Manufacturer or supplier's details

Company name of supplier : GOJO Industries, Inc.

Address : One GOJO Plaza, Suite 500
Akron OH 44311

Telephone : 1 (330) 255-6000

Emergency telephone : 1-800-424-9300 CHEMTREC

Recommended use of the chemical and restrictions on use

Recommended use : Hand Sanitizer

Restrictions on use : This is a personal care or cosmetic product that is safe for consumers and other users under normal and reasonably foreseeable use. Cosmetics and consumer products, specifically defined by regulations around the world, are exempt from the requirement of an SDS for the consumer. While this material is not considered hazardous, this SDS contains valuable information critical to the safe handling and proper use of the product for industrial workplace conditions as well as unusual and unintended exposures such as large spills. This SDS should be retained and available for employees and other users of this product. For specific intended-use guidance, please refer to the information provided on the package or instruction sheet.

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Flammable liquids : Category 3

Eye irritation : Category 2A

GHS Label element

Hazard pictograms :

Signal Word : Warning

Hazard Statements : H226 Flammable liquid and vapor.

H319 Causes serious eye irritation.

Precautionary Statements : **Prevention:**
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233 Keep container tightly closed.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/ eye protection/ face protection.
Response:
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
Storage:
P403 + P235 Store in a well-ventilated place. Keep cool.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

Vapors may form explosive mixture with air.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous ingredients

Chemical Name	CAS-No.	Concentration (%)
Ethanol	64-17-5	>= 50 - < 70
Propan-2-ol	67-63-0	>= 1 - < 5

SECTION 4. FIRST AID MEASURES

General advice : In the case of accident or if you feel unwell, seek medical advice immediately.
When symptoms persist or in all cases of doubt seek medical advice.

If inhaled : If inhaled, remove to fresh air.
Get medical attention if symptoms occur.

In case of skin contact : Wash with water and soap as a precaution.
Get medical attention if symptoms occur.

In case of eye contact	:	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lens, if worn. Get medical attention.
If swallowed	:	If swallowed, DO NOT induce vomiting. Get medical attention if symptoms occur. Rinse mouth thoroughly with water.
Most important symptoms and effects, both acute and delayed	:	Causes serious eye irritation.
Protection of first-aiders	:	First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.
Notes to physician	:	Treat symptomatically and supportively.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Water spray Alcohol-resistant foam Dry chemical Carbon dioxide (CO2)
Unsuitable extinguishing media	:	High volume water jet
Specific hazards during fire fighting	:	Do not use a solid water stream as it may scatter and spread fire. Flash back possible over considerable distance. Vapors may form explosive mixtures with air. Exposure to combustion products may be a hazard to health.
Hazardous combustion products	:	Carbon oxides
Specific extinguishing methods	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do so. Evacuate area.
Special protective equipment for fire-fighters	:	In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions,	:	Remove all sources of ignition.

protective equipment and emergency procedures		Use personal protective equipment. Follow safe handling advice and personal protective equipment recommendations.
Environmental precautions	:	Discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g. by containment or oil barriers). Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained.
Methods and materials for containment and cleaning up	:	Non-sparking tools should be used. Soak up with inert absorbent material. Suppress (knock down) gases/vapors/mists with a water spray jet. For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbent. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable. Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

SECTION 7. HANDLING AND STORAGE

Technical measures	:	See Engineering measures under EXPOSURE CONTROLS/PERSONAL PROTECTION section.
Local/Total ventilation	:	Use with local exhaust ventilation. Use only in an area equipped with explosion proof exhaust ventilation.
Advice on safe handling	:	Do not breathe vapors or spray mist. Do not swallow. Do not get in eyes. Avoid prolonged or repeated contact with skin. Handle in accordance with good industrial hygiene and safety practice. Non-sparking tools should be used. Keep container tightly closed. Keep away from heat and sources of ignition. Take precautionary measures against static discharges. Take care to prevent spills, waste and minimize release to the environment.
Conditions for safe storage	:	Keep in properly labeled containers. Keep tightly closed.

Keep in a cool, well-ventilated place.
Store in accordance with the particular national regulations.
Keep away from heat and sources of ignition.

Materials to avoid : Do not store with the following product types:
Strong oxidizing agents
Organic peroxides
Flammable solids
Pyrophoric liquids
Pyrophoric solids
Self-heating substances and mixtures
Substances and mixtures which in contact with water emit flammable gases
Explosives
Gases

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Ingredients	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Ethanol	64-17-5	TWA	1,000 ppm 1,900 mg/m3	NIOSH REL
		TWA	1,000 ppm 1,900 mg/m3	OSHA Z-1
		STEL	1,000 ppm	ACGIH
Propan-2-ol	67-63-0	TWA	200 ppm	ACGIH
		STEL	400 ppm	ACGIH
		TWA	400 ppm 980 mg/m3	NIOSH REL
		ST	500 ppm 1,225 mg/m3	NIOSH REL
		TWA	400 ppm 980 mg/m3	OSHA Z-1

Biological occupational exposure limits

Ingredients	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
Propan-2-ol	67-63-0	Acetone	Urine	End of shift at end of work-week	40 mg/l	ACGIH BEI

Engineering measures : Minimize workplace exposure concentrations.
Use only in an area equipped with explosion proof exhaust ventilation.
Use with local exhaust ventilation.

Personal protective equipment

Respiratory protection	:	General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.
Hand protection		
Material	:	Impervious gloves
Material	:	Flame retardant gloves
Remarks	:	Choose gloves to protect hands against chemicals depending on the concentration specific to place of work. Breakthrough time is not determined for the product. Change gloves often! For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday.
Eye protection	:	Wear the following personal protective equipment: Safety goggles
Skin and body protection	:	Select appropriate protective clothing based on chemical resistance data and an assessment of the local exposure potential. Wear the following personal protective equipment: Flame retardant antistatic protective clothing. Skin contact must be avoided by using impervious protective clothing (gloves, aprons, boots, etc).
Hygiene measures	:	Ensure that eye flushing systems and safety showers are located close to the working place. When using do not eat, drink or smoke. Wash contaminated clothing before re-use.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Color	:	clear, Colorless to pale yellow
Odor	:	citrus

Odor Threshold	:	No data available
pH	:	6.5 - 8.5
Melting point/freezing point	:	No data available
Initial boiling point and boiling range	:	70 °C
Flash point	:	25 °C
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable
Upper explosion limit	:	No data available
Lower explosion limit	:	No data available
Vapor pressure	:	No data available
Relative vapor density	:	No data available
Density	:	0.8750 g/cm3
Solubility(ies)		
Water solubility	:	soluble
Partition coefficient: n-octanol/water	:	Not applicable
Autoignition temperature	:	No data available
Decomposition temperature	:	The substance or mixture is not classified self-reactive.
Viscosity		
Viscosity, kinematic	:	3,500 - 23,000 mm2/s (20 °C)
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Not classified as a reactivity hazard.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Flammable liquid and vapor. Vapors may form explosive mixture with air. Can react with strong oxidizing agents.

Conditions to avoid	:	Heat, flames and sparks.
Incompatible materials	:	Oxidizing agents
Hazardous decomposition products	:	No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure
Inhalation
Skin contact
Ingestion
Eye contact

Acute toxicity

Not classified based on available information.

Product:

Acute oral toxicity	:	Acute toxicity estimate: > 5,000 mg/kg Method: Calculation method

Ingredients:

Ethanol:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg
Acute inhalation toxicity	:	LC50 (Rat): 124.7 mg/l Exposure time: 4 h Test atmosphere: vapor

Propan-2-ol:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg
Acute inhalation toxicity	:	LC50 (Rat): 72.6 mg/l Exposure time: 4 h Test atmosphere: vapor
Acute dermal toxicity	:	LD50 (Rat): > 5,000 mg/kg

Skin corrosion/irritation

Not classified based on available information.

Product:

Result: No skin irritation

Ingredients:

Ethanol:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Propan-2-ol:
Species: Rabbit
Result: No skin irritation

Serious eye damage/eye irritation

Causes serious eye irritation.

Ingredients:

Ethanol:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days
Method: OECD Test Guideline 405

Propan-2-ol:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days

Respiratory or skin sensitization

Skin sensitization: Not classified based on available information.
Respiratory sensitization: Not classified based on available information.

Product:

Assessment: Does not cause skin sensitization.

Ingredients:

Ethanol:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Result: negative

Propan-2-ol:
Test Type: Buehler Test
Routes of exposure: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: negative

Germ cell mutagenicity

Not classified based on available information.

Ingredients:

Ethanol:

Genotoxicity in vitro	:	Test Type: In vitro mammalian cell gene mutation test Result: negative
Genotoxicity in vivo	:	Test Type: Rodent dominant lethal test (germ cell) (in vivo) Species: Mouse Application Route: Ingestion Result: negative

Propan-2-ol:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Intraperitoneal injection
Result: negative

Carcinogenicity

Not classified based on available information.

Ingredients:

Propan-2-ol:
Species: Rat
Application Route: inhalation (vapor)
Exposure time: 104 weeks
Method: OECD Test Guideline 451
Result: negative

IARC No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

NTP No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity

Not classified based on available information.

Ingredients:

Ethanol:

Effects on fertility : Test Type: Two-generation reproduction toxicity study
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 416
Result: negative

Propan-2-ol:

Effects on fertility : Test Type: Two-generation reproduction toxicity study
Species: Rat
Application Route: Ingestion
Result: negative

Effects on fetal development : Test Type: Embryo-fetal development
Species: Rat
Application Route: Ingestion

Result: negative

STOT-single exposure

Not classified based on available information.

Ingredients:

Propan-2-ol:
Assessment: May cause drowsiness or dizziness.

STOT-repeated exposure

Not classified based on available information.

Repeated dose toxicity

Ingredients:

Ethanol:
Species: Rat
NOAEL: 2,400 mg/kg
Application Route: Ingestion
Exposure time: 2 y

Propan-2-ol:
Species: Rat
NOAEL: 5000 ppm
Application Route: inhalation (vapor)
Exposure time: 104 w
Method: OECD Test Guideline 413

Aspiration toxicity

Not classified based on available information.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Ingredients:

Ethanol:

Toxicity to fish	:	LC50 (Pimephales promelas (fathead minnow)): > 1,000 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 1,000 mg/l Exposure time: 48 h
Toxicity to algae	:	EC50 (Chlorella vulgaris (Fresh water algae)): 275 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 9.6 mg/l Exposure time: 9 d

Toxicity to bacteria : EC50 (Photobacterium phosphoreum): 32.1 mg/l
Exposure time: 0.25 h

Propan-2-ol:

Toxicity to fish : LC50 (Pimephales promelas (fathead minnow)): 10,000 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 10,000 mg/l
Exposure time: 24 h

Toxicity to algae : ErC50 (Scenedesmus quadricauda (Green algae)): > 1,800 mg/l
Exposure time: 8 d

Toxicity to bacteria : EC50 (Pseudomonas putida): > 1,050 mg/l
Exposure time: 16 h

Persistence and degradability

Ingredients:

Ethanol:

Biodegradability : Result: Readily biodegradable.
Biodegradation: 84 %
Exposure time: 20 d

Propan-2-ol:

Biodegradability : Result: rapidly degradable

Bioaccumulative potential

Ingredients:

Ethanol:

Partition coefficient: n-octanol/water : log Pow: -0.35

Propan-2-ol:

Partition coefficient: n-octanol/water : log Pow: 0.05

Mobility in soil

No data available

Other adverse effects

No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : Dispose of in accordance with local regulations.

Contaminated packaging : Dispose of as unused product.

Empty containers should be taken to an approved waste handling site for recycling or disposal.
Do not burn, or use a cutting torch on, the empty drum.

SECTION 14. TRANSPORT INFORMATION

International Regulation

UNRTDG

UN number	:	UN 1987
Proper shipping name	:	ALCOHOLS, N.O.S. (Ethanol, Propan-2-ol)
Class	:	3
Packing group	:	III
Labels	:	3

IATA-DGR

UN/ID No.	:	UN 1987
Proper shipping name	:	Alcohols, n.o.s. (Ethanol, Propan-2-ol)
Class	:	3
Packing group	:	III
Labels	:	Flammable Liquids
Packing instruction (cargo aircraft)	:	366
Packing instruction (passenger aircraft)	:	355

IMDG-Code

UN number	:	UN 1987
Proper shipping name	:	ALCOHOLS, N.O.S. (Ethanol, Propan-2-ol)
Class	:	3
Packing group	:	III
Labels	:	3
EmS Code	:	F-E, S-D
Marine pollutant	:	no

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable for product as supplied.

Domestic regulation

49 CFR

UN/ID/NA number	:	UN 1987
Proper shipping name	:	ALCOHOLS, N.O.S.
Class	:	3
Packing group	:	III
Labels	:	FLAMMABLE LIQUID
ERG Code	:	127

Marine pollutant : no

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 311/312 Hazards : Fire Hazard
Acute Health Hazard

SARA 302 : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

Propan-2-ol	67-63-0	3.4086 %

US State Regulations

Pennsylvania Right To Know

Ethanol	64-17-5	50 - 70 %
Water	7732-18-5	30 - 50 %
Propan-2-ol	67-63-0	1 - 5 %

New Jersey Right To Know

Ethanol	64-17-5	50 - 70 %
Water	7732-18-5	30 - 50 %
Propan-2-ol	67-63-0	1 - 5 %

California Prop 65 This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

The ingredients of this product are reported in the following inventories:

AICS : All ingredients listed or exempt.

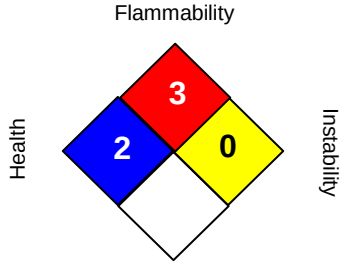
Inventories

AICS (Australia), DSL (Canada), IECSC (China), REACH (European Union), ENCS (Japan), ISHL (Japan), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), NECSI (Taiwan), TSCA (USA)

SECTION 16. OTHER INFORMATION

Further information

NFPA:



HMIS III:

HEALTH	2
FLAMMABILITY	3
PHYSICAL HAZARD	0

0 = not significant, 1 =Slight,
2 = Moderate, 3 = High
4 = Extreme, * = Chronic

Full text of other abbreviations

ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
ACGIH BEI	:	ACGIH - Biological Exposure Indices (BEI)
NIOSH REL	:	USA. NIOSH Recommended Exposure Limits
OSHA Z-1	:	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
ACGIH / TWA	:	8-hour, time-weighted average
ACGIH / STEL	:	Short-term exposure limit
NIOSH REL / TWA	:	Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek
NIOSH REL / ST	:	STEL - 15-minute TWA exposure that should not be exceeded at any time during a workday
OSHA Z-1 / TWA	:	8-hour time weighted average
Sources of key data used to compile the Material Safety Data Sheet	:	Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, http://echa.europa.eu/
Revision Date	:	02/10/2015

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.

US / Z8

Sodium Hydroxide, 0.5M

SECTION 1 : Identification of the substance/mixture and of the supplier

Product name : **Sodium Hydroxide, 0.5M**

Manufacturer/Supplier Trade name:

Manufacturer/Supplier Article number: **S25881**

Recommended uses of the product and uses restrictions on use:

Manufacturer Details:

AquaPhoenix Scientific
9 Barnhart Drive, Hanover, PA 17331

Supplier Details:

Fisher Science Education
15 Jet View Drive, Rochester, NY 14624

Emergency telephone number:

Fisher Science Education Emergency Telephone No.: 800-535-5053

SECTION 2 : Hazards identification

Classification of the substance or mixture:

Corrosive
Serious eye damage, category 1
Corrosive to metals, category 1
Skin corrosion, category 1B

Skin Corr. 1B
Eye corr. 1
Metal Corr. 1

Signal word :Danger

Hazard statements:
May be corrosive to metals
Causes severe skin burns and eye damage
Causes serious eye damage

Precautionary statements:
If medical advice is needed, have product container or label at hand
Keep out of reach of children
Read label before use
Keep only in original container
Do not breathe dust/fume/gas/mist/vapours/spray
Wash ... thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Absorb spillage to prevent material damage
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
Wash contaminated clothing before reuse
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing

Immediately call a POISON CENTER or doctor/physician
Store in a corrosive resistant/... container with a resistant inner liner
Store locked up
Dispose of contents/container to ...

Other Non-GHS Classification:

WHMIS

E

NFPA/HMIS

NFPA SCALE (0-4)

HMIS RATINGS (0-4)

SECTION 3 : Composition/information on ingredients

Ingredients:		
CAS 1310-73-2	Sodium Hydroxide	2 %
CAS 7732-18-5	Deionized Water	98 %
		Percentages are by weight

SECTION 4 : First aid measures

Description of first aid measures

After inhalation: Move exposed individual to fresh air. Loosen clothing as necessary and position individual in a comfortable position.Seek medical advice if discomfort or irritation persists.If breathing difficult, give oxygen.

After skin contact: Take off contaminated clothing and shoes immediately.Wash affected area with soap and water.Seek medical attention if irritation, discomfort persist.

After eye contact: Protect unexposed eye. Rinse/flush exposed eye(s) gently using water for 15-20 minutes. Remove contact lens(es) if able to do so during rinsing. Immediately get medical assistance.

After swallowing: Rinse mouth thoroughly. Do not induce vomiting. Have exposed individual drink sips of water. Seek medical attention if irritation, discomfort or vomiting persists.

Most important symptoms and effects, both acute and delayed:

Irritation, Nausea,Headache, Shortness of breath.;

Indication of any immediate medical attention and special treatment needed:

If seeking medical attention, provide SDS document to physician.

SECTION 5 : Firefighting measures

Extinguishing media

Suitable extinguishing agents: If in laboratory setting, follow laboratory fire suppression procedures. Use appropriate fire suppression agents for adjacent combustible materials or sources of ignition

For safety reasons unsuitable extinguishing agents:

Special hazards arising from the substance or mixture:

Combustion products may include carbon oxides or other toxic vapors.Thermal decomposition can lead to release of irritating gases and vapors.Sodium oxides.

Advice for firefighters:

Protective equipment: Use NIOSH-approved respiratory protection/breathing apparatus.

Additional information (precautions): Move product containers away from fire or keep cool with water spray as a protective measure, where feasible.

SECTION 6 : Accidental release measures

Personal precautions, protective equipment and emergency procedures:

Wear protective equipment. Transfer to a disposal or recovery container.Use respiratory protective device against the effects of fumes/dust/aerosol. Keep unprotected persons away. Ensure adequate ventilation.Keep away from ignition sources. Protect from heat.

Environmental precautions:

Prevent from reaching drains, sewer or waterway. Collect contaminated soil for characterization per Section 13

Methods and material for containment and cleaning up:

If in a laboratory setting, follow Chemical Hygiene Plan procedures.Place into properly labeled containers for recovery or disposal. If necessary, use trained response staff/contractor.Collect liquid and dilute with water. Neutralize with dilute acid solutions. Decant water to drain with excess water. Absorb with suitable material. Dispose of remaining solid as normal refuse. Always obey local regulations.

Reference to other sections:

SECTION 7 : Handling and storage

Precautions for safe handling:

Absorb spillage to prevent material damage due to corrosiveness to metal. Avoid contact with eyes, skin, and clothing. Wash hands after handling. Do not mix with acids.Follow good hygiene procedures when handling chemical materials. Use only in well ventilated areas.

Conditions for safe storage, including any incompatibilities:

Protect from freezing and physical damage.Provide ventilation for containers. Avoid storage near extreme heat, ignition sources or open flame. Store away from foodstuffs. Store away from oxidizing agents.Store in cool, dry conditions in well sealed containers. Store with Corrosives.

SECTION 8 : Exposure controls/personal protection

Control Parameters:	1310-73-2, Sodium Hydroxide, OSHA PEL TWA 2 mg/m3 1310-73-2, Sodium Hydroxide, ACGIH TLV TWA 2 mg/m3
Appropriate Engineering controls:	Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use/handling.Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapor or dusts (total/respirable) below the applicable workplace exposure limits (Occupational Exposure Limits-OELs) indicated above.
Respiratory protection:	Not required under normal conditions of use. Use suitable respiratory protective device when high concentrations are present. Use suitable respiratory protective device when aerosol or mist is formed. For spills, respiratory protection may be advisable.
Protection of skin:	The glove material has to be impermeable and resistant to the product/ the substance/ the preparation being used/handled.Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation.
Eye protection:	Safety glasses with side shields or goggles.
General hygienic measures:	The usual precautionary measures are to be adhered to when handling chemicals. Keep away from food, beverages and feed sources. Immediately remove all soiled and contaminated clothing. Wash hands before breaks and at the end of work. Do not inhale gases/fumes/dust/mist/vapor/aerosols. Avoid contact with the eyes and skin.

SECTION 9 : Physical and chemical properties

Appearance (physical state,color):	Clear, colorless liquid	**Explosion limit lower**: **Explosion limit upper**:	Non Explosive Non Explosive
Odor:	Odorless	**Vapor pressure**:	14mmHg @ 20C
Odor threshold:	Not Determined	**Vapor density**:	>1
pH-value:	Alkaline	**Relative density**:	Approx 1
Melting/Freezing point:	Approx 0°C	**Solubilities**:	Soluble in Water
Boiling point/Boiling range:	Approx 100°C	**Partition coefficient (n-octanol/water)**:	Not Determined
Flash point (closed cup):	Not Determined	**Auto/Self-ignition temperature**:	Not Determined
Evaporation rate:	Not Determined	**Decomposition temperature**:	Not Determined
Flammability (solid,gaseous):	Not Determined	**Viscosity**:	a. Kinematic:Not Determined b. Dynamic: Not Determined
Density: Not Determined			

SECTION 10 : Stability and reactivity

Reactivity:
Chemical stability: No decomposition if used and stored according to specifications.
Possible hazardous reactions:
Conditions to avoid: Incompatible materials, excess heat

Incompatible materials:acids, Organic materials, Chlorinated solvents, Aluminum, Phosphorus, Tin/tin oxides, Zinc
Hazardous decomposition products:sodium oxides, hydrogen. Carbon oxides (CO, CO2).

SECTION 11 : Toxicological information

Acute Toxicity: No additional information.	
Chronic Toxicity: No additional information.	
Corrosion Irritation: No additional information.	
Sensitization:	No additional information.
Single Target Organ (STOT):	No additional information.
Numerical Measures:	No additional information.
Carcinogenicity:	No additional information.
Mutagenicity:	No additional information.
Reproductive Toxicity:	No additional information.

SECTION 12 : Ecological information

Ecotoxicity Persistence and degradability: Readily degradable in the environment.
Bioaccumulative potential: Not Bioaccumulative.
Mobility in soil:
Other adverse effects:

SECTION 13 : Disposal considerations

Waste disposal recommendations:

Product/containers must not be disposed together with household garbage. Do not allow product to reach sewage system or open water.It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory entities (US 40CFR262.11). Consult federal state/ provincial and local regulations regarding the proper disposal of waste material that may incorporate some amount of this product.Neutralize with dilute acid solutions.

SECTION 14 : Transport information

UN-Number

1824

UN proper shipping name

Sodium hydroxide solution

Transport hazard class(es)

Class:
8 Corrosive substances

Packing group:II
Environmental hazard:
Transport in bulk:

Special precautions for user:

SECTION 15 : Regulatory information

United States (USA)

SARA Section 311/312 (Specific toxic chemical listings):

None of the ingredients is listed

SARA Section 313 (Specific toxic chemical listings):

None of the ingredients is listed

RCRA (hazardous waste code):

None of the ingredients is listed

TSCA (Toxic Substances Control Act):

All ingredients are listed.

CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act):

1310-73-2 Sodium Hydroxide 1000 lb

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

Canada

Canadian Domestic Substances List (DSL):

All ingredients are listed.

Canadian NPRI Ingredient Disclosure list (limit 0.1%):

None of the ingredients is listed

Canadian NPRI Ingredient Disclosure list (limit 1%):

1310-73-2 Sodium Hydroxide

SECTION 16 : Other information

This product has been classified in accordance with hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.Note:. The responsibility to provide a safe workplace remains with the user.The user should consider the health hazards and safety information contained herein as a guide and should take those precautions required in an individual operation to instruct employees and develop work practice procedures for a safe work environment.The information contained herein is, to the best of our knowledge and belief, accurate.However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by the use of this material.It is the responsibility of the user to comply with all applicable laws and regulations applicable to this material.

GHS Full Text Phrases:

Abbreviations and acronyms:
IMDG: International Maritime Code for Dangerous Goods
PNEC: Predicted No-Effect Concentration (REACH)
CFR: Code of Federal Regulations (USA)
SARA: Superfund Amendments and Reauthorization Act (USA)
RCRA: Resource Conservation and Recovery Act (USA)
TSCA: Toxic Substances Control Act (USA)
NPRI: National Pollutant Release Inventory (Canada)
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
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
DNEL: Derived No-Effect Level (REACH)

Effective date : 12.14.2014
Last updated : 03.25.2015

SAFETY DATA SHEET

Version 6.5
Revision Date 01/13/2020
Print Date 08/29/2020

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Sulfuric acid

Product Number : 258105
Brand : SIGALD
Index-No. : 016-020-00-8
CAS-No. : 7664-93-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Corrosive to metals (Category 1), H290
Skin corrosion (Category 1A), H314
Serious eye damage (Category 1), H318

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

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Hazard statement(s)

H290	May be corrosive to metals.
H314	Causes severe skin burns and eye damage.

Precautionary statement(s)

P234	Keep only in original container.
P264	Wash skin thoroughly after handling.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P363	Wash contaminated clothing before reuse.
P390	Absorb spillage to prevent material damage.
P405	Store locked up.
P406	Store in corrosive resistant container with a resistant inner liner.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	H_2O_4S
Molecular weight	:	98.08 g/mol
CAS-No.	:	7664-93-9
EC-No.	:	231-639-5
Index-No.	:	016-020-00-8

Component	Classification	Concentration
Sulfuric acid		
	Met. Corr. 1; Skin Corr. 1A; Eye Dam. 1; H290, H314, H318 Concentration limits: >= 1 %: Met. Corr. 1, H290;	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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SECTION 4: First aid measures

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.Continue rinsing eyes during transport to hospital.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Sulphur oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

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6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): 8B: Non-combustible, corrosive hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Sulfuric acid	7664-93-9	TWA	0.2 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		TWA	1 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	1 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants

Derived No Effect Level (DNEL)

Application Area	Exposure routes	Health effect	Value
Workers	Inhalation	Acute local effects	0.1 mg/m3
Workers	Inhalation	Long-term local effects	0.05 mg/m3

Predicted No Effect Concentration (PNEC)

Compartment	Value
Marine water	0.00025 mg/l
Fresh water	0.0025 mg/l
Marine sediment	0.002 mg/kg
Fresh water sediment	0.002 mg/kg
Onsite sewage treatment plant	8.8 mg/l

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8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.2 mm
Break through time: 30 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Do not let product enter drains.

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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: clear, liquid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	1.2 at 5 g/l
e)	Melting point/freezing point	3 °C (37 °F)
f)	Initial boiling point and boiling range	290 °C 554 °F - lit.
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	1.33 hPa at 145.8 °C (294.4 °F)
l)	Vapour density	3.39 - (Air = 1.0)
m)	Relative density	1.84 g/cm3 at 25 °C (77 °F)
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	55.1 mN/m at 20 °C (68 °F)
Relative vapour density	3.39 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

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10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Bases, Halides, Organic materials, Carbides, fulminates, Nitrates, picrates, Cyanides, Chlorates, alkali halides, Zinc salts, permanganates, for example potassium permanganate, Hydrogen peroxide, Azides, Perchlorates., Nitromethane, phosphorous, Reacts violently with:, cyclopentadiene, cyclopentanone oxime, nitroaryl amines, hexalithium disilicide, phosphorous(III) oxide, Powdered metalsStrong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Sulphur oxides
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - 2,140 mg/kg
Remarks: (ECHA)
LC50 Inhalation - Mouse - male and female - 4 h - 0.85 mg/l
(OECD Test Guideline 403)
Inhalation: Corrosive to respiratory system.
Dermal: No data available
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Extremely corrosive and destructive to tissue.
Remarks: (IUCLID)

Serious eye damage/eye irritation
Causes serious eye damage.

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Ames test
Salmonella typhimurium
Result: negative
(HSDB)

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

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Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: WS5600000

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Pulmonary edema. Effects may be delayed.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

After inhalation of aerosols: damage to the affected mucous membranes. After skin contact: severe burns with formation of scabs. After eye contact: burns, corneal lesions. After swallowing: severe pain (risk of perforation!), nausea, vomiting and diarrhoea. After a latency period of several weeks possibly pyloric stenosis.
Other dangerous properties can not be excluded.
Handle in accordance with good industrial hygiene and safety practice.

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Lepomis macrochirus (Bluegill sunfish) - > 16 - < 28 mg/l - 96 h Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - > 100 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	static test ErC50 - Desmodesmus subspicatus (green algae) - > 100 mg/l - 72 h (OECD Test Guideline 201)

12.2 Persistence and degradability
The methods for determining the biological degradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

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12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

Biological effects:
Harmful effect due to pH shift.
Caustic even in diluted form.
Does not cause biological oxygen deficit.
Endangers drinking-water supplies if allowed to enter soil and/or waters in large quantities.
Neutralisation possible in waste water treatment plants.
Discharge into the environment must be avoided.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

DOT (US)
UN number: 1830 Class: 8 Packing group: II
Proper shipping name: Sulfuric acid
Reportable Quantity (RQ): 1000 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 1830 Class: 8 Packing group: II EMS-No: F-A, S-B
Proper shipping name: SULPHURIC ACID

IATA
UN number: 1830 Class: 8 Packing group: II
Proper shipping name: Sulphuric acid

SECTION 15: Regulatory information

SARA 302 Components
The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
Sulfuric acid	7664-93-9	2007-07-01

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SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Sulfuric acid	7664-93-9	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Sulfuric acid	7664-93-9	2007-07-01

	CAS-No.	Revision Date
Sulfuric acid	7664-93-9	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Sulfuric acid	7664-93-9	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

SECTION 16: Other information

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.5 Revision Date: 01/13/2020 Print Date: 08/29/2020

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Safety Data Sheet

RUST-OLEUM CORPORATION
* Trusted Quality Since 1921 *
www.rustoleum.com

1. Identification

Product Name: PRO LSPR 6PK WB MARK WHITE

Revision Date: 5/18/2017

Product Identifier: 2592838

Supercedes Date: 4/28/2016

Product Use/Class: Marking Paint/Aerosols

Supplier:
Rust-Oleum Corporation
11 Hawthorn Parkway
Vernon Hills, IL 60061
USA

Manufacturer:
Rust-Oleum Corporation
11 Hawthorn Parkway
Vernon Hills, IL 60061
USA

Preparer: Regulatory Department

Emergency Telephone: 24 Hour Hotline: 847-367-7700

2. Hazard Identification

Classification

Symbol(s) of Product

Signal Word
Danger

Possible Hazards
27% of the mixture consists of ingredient(s) of unknown acute toxicity.

GHS HAZARD STATEMENTS

Flammable Liquid, category 1	H224	Extremely flammable liquid and vapour.
Carcinogenicity, category 2	H351	Suspected of causing cancer.
STOT, repeated exposure, category 2	H373	May cause damage to organs through prolonged or repeated exposure.

GHS LABEL PRECAUTIONARY STATEMENTS

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233	Keep container tightly closed.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P370+P378	In case of fire: Use alcohol film forming foam, carbon dioxide, dry chemical, dry sand to extinguish.
P403+P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/container in accordance with local, regional and national regulations.
P201	Obtain special instructions before use.
P308+P313	IF exposed or concerned: Get medical advice/attention.
P405	Store locked up.
P260	Do not breathe dust/fume/gas/mist/vapors/spray.
P314	Get medical advice/attention if you feel unwell.

GHS SDS PRECAUTIONARY STATEMENTS

P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ventilating/lighting/equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.

3. Composition/Information On Ingredients

HAZARDOUS SUBSTANCES

Chemical Name	CAS-No.	Wt.% Range	GHS Symbols	GHS Statements
Propane	74-98-6	10-25	GHS04	H280
Titanium Dioxide	13463-67-7	2.5-10	Not Available	Not Available
n-Butane	106-97-8	2.5-10	GHS04	H280
Naphtha, Petroleum, Hydrotreated Light	64742-49-0	2.5-10	GHS08	H304
Xylenes (o-, m-, p- isomers)	1330-20-7	2.5-10	GHS02-GHS07	H226-315-319-332
Talc (Hydrous Magnesium Silicate)	14807-96-6	1.0-2.5	Not Available	Not Available
n-Butyl Acetate	123-86-4	1.0-2.5	GHS02-GHS07	H226-336
Ethylbenzene	100-41-4	1.0-2.5	GHS02-GHS07-GHS08	H225-304-332-351-373

4. First-aid Measures

FIRST AID - EYE CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes holding eyelids open. Get medical attention. Do NOT allow rubbing of eyes or keeping eyes closed.

FIRST AID - SKIN CONTACT: Wash skin with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

FIRST AID - INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention. Do NOT use mouth-to-mouth resuscitation. If you experience difficulty in breathing, leave the area to obtain fresh air. If continued difficulty is experienced, get medical assistance immediately.

FIRST AID - INGESTION: Aspiration hazard: Do not induce vomiting or give anything by mouth because this material can enter the lungs and cause severe lung damage. Get immediate medical attention. If swallowed, get medical attention.

5. Fire-fighting Measures

EXTINGUISHING MEDIA: Alcohol Film Forming Foam, Carbon Dioxide, Dry Chemical, Dry Sand, Water Fog

UNUSUAL FIRE AND EXPLOSION HAZARDS: FLASH POINT IS LESS THAN 20°F. EXTREMELY FLAMMABLE LIQUID AND VAPOR!Water spray may be ineffective. Closed containers may explode when exposed to extreme heat due to buildup of steam. Closed containers may explode when exposed to extreme heat. Vapors may form explosive mixtures with air. Vapors can travel to a source of ignition and flash back. Isolate from heat, electrical equipment, sparks and open flame. Perforation of the pressurized container may cause bursting of the can. No unusual fire or explosion hazards noted. Keep containers tightly closed.

SPECIAL FIREFIGHTING PROCEDURES: Full protective equipment including self-contained breathing apparatus should be used. Evacuate area and fight fire from a safe distance. Water may be used to cool closed containers to prevent pressure buildup and possible autoignition or explosion. Use water spray to keep fire-exposed containers cool. Containers may explode when heated.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED: Contain spilled liquid with sand or earth. DO NOT use combustible materials such as sawdust. Isolate the hazard area and deny entry to unnecessary and unprotected personnel. Remove all sources of ignition, ventilate area and remove with inert absorbent and non-sparking tools. Dispose of according to local, state (provincial) and federal regulations. Do not incinerate closed containers. Ventilate area, isolate spilled material, and remove with inert absorbent. Dispose of contaminated absorbent, container, and unused contents in accordance with local, state, and federal regulations.

7. Handling and Storage

HANDLING: Wash thoroughly after handling. Wash hands before eating. Remove contaminated clothing and launder before reuse. Use only with adequate ventilation. Follow all MSDS/label precautions even after container is emptied because it may retain product residues. Avoid breathing fumes, vapors, or mist. Avoid contact with eyes, skin and clothing.

STORAGE: Keep containers tightly closed. Isolate from heat, electrical equipment, sparks and open flame. Contents under pressure. Do not store above 120 ° F. Store large quantities in buildings designed and protected for storage of flammable aerosols. Product should be stored in tightly sealed containers and protected from heat, moisture, and foreign materials. Store in a dry, well ventilated place. Keep container tightly closed when not in use. Keep away from heat, sparks, flame and sources of ignition. Avoid excess heat.

8. Exposure Controls/Personal Protection

Chemical Name	CAS-No.	Weight % Less Than	ACGIH TLV-TWA	ACGIH TLV-STEL	OSHA PEL-TWA	OSHA PEL-CEILING
Propane	74-98-6	20.0	N.E.	N.E.	1000 ppm	N.E.
Titanium Dioxide	13463-67-7	10.0	10 mg/m3	N.E.	15 mg/m3	N.E.
n-Butane	106-97-8	10.0	N.E.	1000 ppm	N.E.	N.E.
Naphtha, Petroleum, Hydrotreated Light	64742-49-0	10.0	N.E.	N.E.	N.E.	N.E.
Xylenes (o-, m-, p- isomers)	1330-20-7	10.0	100 ppm	150 ppm	100 ppm	N.E.
Talc (Hydrous Magnesium Silicate)	14807-96-6	5.0	2 mg/m3	N.E.	N.E.	N.E.
n-Butyl Acetate	123-86-4	5.0	50 ppm	150 ppm	150 ppm	N.E.
Ethylbenzene	100-41-4	5.0	20 ppm	N.E.	100 ppm	N.E.

PERSONAL PROTECTION

ENGINEERING CONTROLS: Use explosion-proof ventilation equipment. Provide general dilution of local exhaust ventilation in volume and pattern to keep TLV of hazardous ingredients below acceptable limits. Prevent build-up of vapors by opening all doors and windows to achieve cross-ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

RESPIRATORY PROTECTION: A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use. A NIOSH/MSHA approved air purifying respirator with organic vapor cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits.

SKIN PROTECTION: Use gloves to prevent prolonged skin contact. Nitrile or Neoprene gloves may afford adequate skin protection.

EYE PROTECTION: Use safety eyewear designed to protect against splash of liquids.

OTHER PROTECTIVE EQUIPMENT: Refer to safety supervisor or industrial hygienist for further guidance regarding types of personal protective equipment and their applications.

HYGIENIC PRACTICES: Wash thoroughly with soap and water before eating, drinking or smoking. Remove contaminated clothing immediately and launder before reuse.

9. Physical and Chemical Properties

Appearance:	Liquid	**Physical State:**	Liquid
Odor:	Solvent Like	**Odor Threshold:**	N.E.
Relative Density:	0.882	**pH:**	NE
Freeze Point, °C:	ND	**Viscosity:**	N.D.
Solubility in Water:	No Information	**Partition Coefficient, n-octanol/ water:**	N.D.
Decompostion Temp., °C:	N.D.		
Boiling Range, °C:	-37 - 537	**Explosive Limits, vol%:**	0.9 - 12.6
Flammability:	Supports Combustion	**Flash Point, °C:**	-96
Evaporation Rate:	Faster than Ether	**Auto-ignition Temp., °C:**	N.D.
Vapor Density:	No Information	**Vapor Pressure:**	N.D.

(See "Other information" Section for abbreviation legend)

10. Stability and Reactivity

CONDITIONS TO AVOID: Avoid temperatures above 120°F (49°C). Avoid all possible sources of ignition. Avoid contact with strong acid and strong bases.

INCOMPATIBILITY: Incompatible with strong oxidizing agents, strong acids and strong alkalies.

HAZARDOUS DECOMPOSITION: By open flame, carbon monoxide and carbon dioxide. When heated to decomposition, it emits acrid smoke and irritating fumes. Contains solvents which may form carbon monoxide, carbon dioxide, and formaldehyde.

HAZARDOUS POLYMERIZATION: Will not occur under normal conditions.

STABILITY: This product is stable under normal storage conditions.

11. Toxicological information

EFFECTS OF OVEREXPOSURE - EYE CONTACT: Causes Serious Eye Irritation

EFFECTS OF OVEREXPOSURE - SKIN CONTACT: May cause skin irritation. Allergic reactions are possible.

EFFECTS OF OVEREXPOSURE - INHALATION: High gas, vapor, mist or dust concentrations may be harmful if inhaled. High vapor concentrations are irritating to the eyes, nose, throat and lungs. Harmful if inhaled. Avoid breathing fumes, spray, vapors, or mist. Prolonged or excessive inhalation may cause respiratory tract irritation.

EFFECTS OF OVEREXPOSURE - INGESTION: Harmful if swallowed.

EFFECTS OF OVEREXPOSURE - CHRONIC HAZARDS: Overexposure to xylene in laboratory animals has been associated with liver abnormalities, kidney, lung, spleen, eye and blood damage as well as reproductive disorders. Effects in humans, due to chronic overexposure, have included liver, cardiac abnormalities and nervous system damage. IARC lists Ethylbenzene as a possible human carcinogen (group 2B). Contains Titanium Dioxide. Titanium Dioxide is listed as a Group 2B-"Possibly carcinogenic to humans" by IARC. No significant exposure to Titanium Dioxide is thought to occur during the use of products in which Titanium Dioxide is bound to other materials, such as in paints during brush application or drying. Risk of overexposure depends on duration and level of exposure to dust from repeated sanding of surfaces or spray mist and the actual concentration of Titanium Dioxide in the formula. (Ref: IARC Monograph, Vol. 93, 2010)May cause central nervous system disorder (e.g., narcosis involving a loss of coordination, weakness, fatigue, mental confusion, and blurred vision) and/or damage. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage. High concentrations may lead to central nervous system effects (drowsiness, dizziness, nausea, headaches, paralysis, and blurred vision) and/or damage.

PRIMARY ROUTE(S) OF ENTRY: Eye Contact, Ingestion, Inhalation, Skin Absorption, Skin Contact

ACUTE TOXICITY VALUES

The acute effects of this product have not been tested. Data on individual components are tabulated below:

CAS-No.	Chemical Name	Oral LD50	Dermal LD50	Vapor LC50
74-98-6	Propane	N.I.	N.I.	658 mg/L Rat
13463-67-7	Titanium Dioxide	>10000 mg/kg Rat	2500 mg/kg	N.I.
106-97-8	n-Butane	N.I.	N.I.	658 mg/L Rat
64742-49-0	Naphtha, Petroleum, Hydrotreated Light	>5000 mg/kg Rat	>3160 mg/kg Rabbit	>4951 mg/L Rat
1330-20-7	Xylenes (o-, m-, p- isomers)	3500 mg/kg Rat	>4350 mg/kg Rabbit	29.08 mg/L Rat
14807-96-6	Talc (Hydrous Magnesium Silicate)	6000	N.I.	30
123-86-4	n-Butyl Acetate	10768 mg/kg Rat	>17600 mg/kg Rabbit	> 21 mg/L Rat
100-41-4	Ethylbenzene	3500 mg/kg Rat	15400 mg/kg Rabbit	17.4 mg/L Rat

N.I. - No Information

12. Ecological Information

ECOLOGICAL INFORMATION: Product is a mixture of listed components.

13. Disposal Information

DISPOSAL INFORMATION: Dispose of material in accordance to local, state, and federal regulations and ordinances. Do not allow to enter waterways, wastewater, soil, storm drains or sewer systems.

14. Transport Information

	Domestic (USDOT)	International (IMDG)	Air (IATA)	TDG (Canada)
UN Number:	N.A.	1950	1950	N.A.
Proper Shipping Name:	Paint Products in Limited Quantities	Aerosols	Aerosols	Paint Products in Limited Quantities
Hazard Class:	N.A.	2.1	2.1	N.A.
Packing Group:	N.A.	N.A.	N.A.	N.A.
Limited Quantity:	Yes	Yes	Yes	Yes

15. Regulatory Information

U.S. Federal Regulations:

CERCLA - SARA Hazard Category

This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

Fire Hazard, Pressure Hazard, Acute Health Hazard, Chronic Health Hazard

Sara Section 313:

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendment and Reauthorization Act of 1986 and 40 CFR part 372:

Chemical Name	CAS-No.
Xylenes (o-, m-, p- isomers)	1330-20-7
Ethylbenzene	100-41-4

Toxic Substances Control Act:

This product contains the following chemical substances subject to the reporting requirements of TSCA 12(b) if exported from the United States:

Chemical Name	CAS-No.
Castor oil, sulfated, sodium salt	68187-76-8

16. Other Information

HMIS RATINGS

Health:	No Information	**Flammability:**	4	**Physical Hazard:**	No Information	**Personal Protection:**	No Information

NFPA RATINGS

Health:	N.E.	**Flammability:**	4	**Instability**	0

VOLATILE ORGANIC COMPOUNDS, g/L: 531

SDS REVISION DATE: 5/18/2017

REASON FOR REVISION:

Regulatory Formula Source Changed
Product Composition Changed
Substance and/or Product Properties Changed in Section(s):
02 - Hazard Identification
05 - Fire-fighting Measures
09 - Physical & Chemical Properties
16 - Other Information
Statement(s) Changed

Legend: N.A. - Not Applicable, N.E. - Not Established, N.D. - Not Determined

Rust-Oleum Corporation believes, to the best of its knowledge, information and belief, the information contained herein to be accurate and reliable as of the date of this safety data sheet. However, because the conditions of handling, use, and storage of these materials are beyond our control, we assume no responsibility or liability for personal injury or property damage incurred by the use of these materials. Rust-Oleum Corporation makes no warranty, expressed or implied, regarding the accuracy or reliability of the data or results obtained from their use. All materials may present unknown hazards and should be used with caution. The information and recommendations in this material safety data sheet are offered for the users' consideration and examination. It is the responsibility of the user to determine the final suitability of this information and to comply with all applicable international, federal, state, and local laws and regulations.

SAFETY DATA SHEET

Version 6.3
Revision Date 01/15/2020
Print Date 08/29/2020

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Zinc acetate

Product Number : 383317
Brand : Aldrich
CAS-No. : 557-34-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone number

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302
Serious eye damage (Category 1), H318
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

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Hazard statement(s)

H302	Harmful if swallowed.
H318	Causes serious eye damage.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P391	Collect spillage.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Zn(OAc)2
Formula	:	$C_4H_6O_4Zn$
Molecular weight	:	183.48 g/mol
CAS-No.	:	557-34-6
EC-No.	:	209-170-2

Component	Classification	Concentration
Zinc di(acetate)		
	Acute Tox. 4; Eye Dam. 1; Aquatic Acute 2; Aquatic Chronic 2; H302, H318, H401, H411 M-Factor - Aquatic Acute: 1	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice

Move out of dangerous area.Consult a physician. Show this safety data sheet to the doctor in attendance.

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If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Zinc/zinc oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

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SECTION 7: Handling and storage

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Handle and store under inert gas.
Storage class (TRGS 510): 11: Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374

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If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1.84 g/mL at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition	No data available

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temperature

q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Zinc/zinc oxides
Other decomposition products - No data available
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male - 663.8 mg/kg
(OECD Test Guideline 423)

Skin corrosion/irritation

Serious eye damage/eye irritation
Eyes - In vitro study
Result: Irreversible effects on the eye
(OECD Test Guideline 437)
Eyes - In vitro study
Result: Irreversible effects on the eye

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(OECD Test Guideline 438)

Respiratory or skin sensitisation

Germ cell mutagenicity
Result: Based on available data the classification criteria are not met.

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity

Specific target organ toxicity - single exposure

Specific target organ toxicity - repeated exposure

Aspiration hazard

Additional Information
RTECS: AK1500000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Pimephales promelas (fathead minnow) - 2.46 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	semi-static test - Daphnia magna (Water flea) - 3.72 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	static test EC50 - algae - 2.1 mg/l - 72 h (OECD Test Guideline 201)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 99 % - Readily biodegradable. (OECD Test Guideline 301A)

12.3 Bioaccumulative potential

12.4 Mobility in soil

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

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12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Zinc di(acetate))
Reportable Quantity (RQ): 1000 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc di(acetate))
Marine pollutant : yes

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Zinc di(acetate))
Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Zinc di(acetate)	557-34-6	1993-02-16

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SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Zinc di(acetate)	557-34-6	1993-02-16

SECTION 16: Other information

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.3 Revision Date: 01/15/2020 Print Date: 08/29/2020

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Material Safety Data Sheet

Section 1 – Chemical Product and Company Identification

Catalog Numbers: AC6004-A, AC6004-B, AC6004-C, AC6004-D, AC6004-P, AC6004-Q, AC6004-G, AC6004-T

Product Identity: AutoCal Solution

Chemical Family: Not Applicable
Synonyms: Not Applicable
Recommended Use: Laboratory chemicals

Manufacturer's Name: AquaPhoenix Scientific, Inc., 9 Barnhart Dr., Hanover, PA 17331, (866) 632-1291
Emergency Contact Number (24hr): Chemtel (800) 255-3924

Issue Date: 1/20/11
Revision Date: 02/19/12, 2/12/15

Section 2 – Hazard Identification

Emergency Overview: Non-flammable, non-corrosive, non-toxic. Does not present significant health hazards. Wash areas of contact with water.
Appearance: Clear liquid **Odor:** Odorless
Target Organs: Eyes, skin
Potential Health Effects/ Routes of Exposure:
Eyes: May cause slight irritation.
Skin: May cause slight irritation.
Ingestion: May cause diarrhea, nausea, vomiting, and cramps.
Inhalation: Not likely to be a hazard.
Chronic Effect / Carcinogenicity: None (IARC, NTP, OSHA)
Aggravated Medical Conditions No information available
These chemicals are not considered hazardous by OSHA.
See section 11 for toxicological information. See section 12 for potential environmental effects.

Section 3 – Composition, Information on Ingredients

Potassium Acid Phthalate, CAS# 877-24-7, <1% w/v
Water, purified, CAS# 7732-18-5, >98% w/v

Section 4 – First Aid

Eyes: Immediately flush eyes with water for at least 15 minutes. Immediately get medical assistance.
Skin: Flush with water for 15 minutes. Get medical assistance if irritation develops.
Ingestion: DO NOT induce vomiting. Dilute with water or milk. Get medical assistance.
Inhalation: Remove to fresh air. Give artificial respiration if necessary. If breathing is difficult, give oxygen.
Notes to Physician Treat symptomatically.

Section 5 – Fire Fighting Measures

Flash Point: Not Applicable **Autoignition Temperature** No information available.
Explosion Limits Upper No data available **Lower** No data available
Extinguishing Media: Use means suitable to extinguishing surrounding fire.
Unsuitable Extinguishing Media: No information available
Fire & Explosion Hazards: Not considered to be a fire or explosion hazard.

Fire Fighting Instructions / Equipment: Use normal procedures. Use protective clothing. Use NIOSH-approved breathing equipment.
Hazardous Combustion Products: No information Available
Sensitivity to mechanical impact No information available.
Sensitivity to static discharge No information available.
Specific Hazards Arising from the Chemical: No information available
NFPA Rating: (estimated) Health: 1; Flammable: 0; Reactivity: 0

Section 6 – Accidental Release Measures

Personal Precautions Use personal protective equipment. Ensure adequate ventilation. Avoid contact with skin, eyes and clothing.
Environmental Precautions No information available.
Methods for Containment and Clean Up Absorb with suitable material. Always obey local regulations.

Section 7 – Handling and Storage

Handling: Wash hands after handling. Avoid contact with skin and eyes.
Storage: Protect from freezing and physical damage.

Section 8 – Exposure Controls, Personal Protection

Potassium Acid Phthalate, CAS# 877-24-7, ACGIH TLV: NA, OSHA PEL: NA
Water, purified, CAS# 7732-18-5, ACGIH TLV: NA, OSHA PEL: NA

Engineering Measures/ General Hygiene: Normal ventilation is adequate. Ensure eyewash and safety showers are available.
Personal Protection Equipment: Skin Protection: Chemical resistant gloves.
Eye/Face Protection: Safety Glasses or goggles. **Respiratory Protection:** Normal ventilation is adequate

Section 9 – Physical and Chemical Properties

Appearance/Physical State: Clear liquid
Odor: Odorless
Boiling Point: Approx 100C
Melting Point: Approx 0 C
Vapor Density: No Information Available
Evaporation Rate: No Information Available
pH: 4.0
Flammability: No Information Available
Solubility: Infinite
available
Relative Density: No Information Available

% Volatility: No Information Available
Specific Gravity: Approx 1
Vapor Pressure: No Information Available
Flash Point: Not Applicable
Coefficient of water/oil distribution: Not Available
Odor Threshold: Not Available
Decomposition Temperature: No Information Available
Partition Coefficient n-octanol/water: No data

Molecular Weight: Not available

Section 10 – Stability and Reactivity

Chemical Stability: Stable under normal conditions of use and storage.
Incompatible Materials Nitric Acid.
Conditions to Avoid: No Information Available.
Hazardous Decomposition Products: Oxides of potassium and carbon.
Hazardous Polymerization: Does not occur
Hazardous Reactions: None under normal processing.

Section 11 – Toxicological Information

Routes of Exposure/Symptoms/Corrosiveness – See Section 2
LD50 orl-rat: 3200 mg/kg (Potassium Acid Phthalate) LC50 inhalation-rat: NA
Irritation: No Information Available
Toxicologically Synergistic: No Information Available

Chronic Exposure
Carcinogenicity No Information Available
Sensitization No information available.
Mutagenic Effects No information available.
Reproductive Effects No information available.
Developmental Effects (Immediate/Delayed) No information available.
Teratogenicity No information available.
Other Adverse Effects No Information Available.
Endocrine Disruptor Information No information available

Section 12 – Ecological Information

Ecotoxicity: Not Available.
Persistence and Degradability: No Information Available **Mobility:** No Information Available
Bioaccumulation/ Accumulation: No Information Available

Section 13 – Disposal Considerations

Waste Disposal/Waste Disposal of Packaging: Dilute with water.
All chemical waster generators must determine whether a discarded chemical is classified as hazardous waste. Comply with all local, state, and federal regulations.

Section 14 – Transport Information

DOT - Not Regulated

Section 15 – Regulatory Information (not meant to be all inclusive)

OSHA Status: These chemicals are not considered hazardous by OSHA.
Canada DSL: These chemicals are listed on Canada's DSL list.
TSCA: The components of this solution are listed on the TSCA Inventory
SARA Title III Section 313: Not Applicable
RCRA Status: Not Applicable
CERCLA Reportable Quantity: Not Applicable
WHMIS: Not Applicable.
This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

Section 16 – Additional Information

Disclaimer: The information on this MSDS applies to this specific material as supplied. It may not be valid for this material if it is used in combination with any other materials. It is the user's responsibility to determine the suitability and completeness of this information for his own particular use. No warranty is implied regarding the accuracy of the data or the results to be obtained form the products use.

HI 7021
ORP Solution for Platinum and Gold Electrodes

Safety Data Sheet

According to Regulation (EC) No. 1907/2006
OSHA Regulation 29 CFR 1910.1200
Canadian Regulation SOR/88-66

Revision Date: 2013-06-14
Reason for Revision: Regulation (EC) No. 1272/2008 Compliance

SECTION 1: IDENTIFICATION OF THE PRODUCT AND COMPANY

Product Name: HI 7021 ORP Solution

Application: ORP Solution for Platinum and Gold Electrodes.
240 mV @ 25°C/77°F

Additional Product Codes: HI 7021L
HI 7021M
HI 7021/G

Company Information (USA):
Hanna Instruments, Inc.
584 Park East Dr, Woonsocket, Rhode Island, USA 02895

Technical Service Contact Information:
1-800-426-6287 (8:30AM - 5:00PM ET)
+1-401-766-4260 (8:30AM - 5:00PM ET)

USA Emergency Contact Information: 1-800-424-9300 (Chemtrec 24Hr. Emergency)

International Emergency Contact Information: +1-703-527-3887 (Chemtrec 24Hr. Emergency)

E-mail Address: tech@hannainst.com

SECTION 2: HAZARD IDENTIFICATION

Non-hazardous product as specified in Directives 67/548/EEC and 1999/45/EC.
Non-hazardous product as specified in OSHA Regulation 29 CFR 1910.1200.
Non-hazardous product as specified in Canadian Regulation SOR/88-66.
Non-hazardous product as specified in Regulation (EC) 1272/2008.

SECTION 3: COMPOSITION AND COMPONENT INFORMATION

Aqueous Solution

SECTION 4: FIRST AID MEASURES

After Inhalation: Remove to fresh air.

After Skin Contact: Wash affected area with plenty of water.

After Eye Contact: Rinse out with water.

After Swallowing: Wash out mouth thoroughly with water and give plenty of water to drink. In severe cases obtain medical attention.

General Information: Remove contaminated, soaked clothing immediately and dispose of safely.

SECTION 5: FIRE-FIGHTING MEASURES

Suitable Extinguishing Media:
Water spray, Carbon Dioxide, Dry Chemical Powder, Appropriate Foam.

Special Risks:
Non-combustible.

Special Protective Equipment:
Do not stay in dangerous zone without suitable chemical protection clothing and self-contained breathing apparatus.

Additional Information:
NA

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal Precautions:

Avoid formation of dusts. Do not inhale dusts. Avoid substance contact.

Environmental Precautions:

Do not discharge into the drains/surface waters/groundwater.

Additional Notes:

Take up with liquid-absorbent material. Clean up affected area and dispose according to local regulation. Avoid generation of dusts.

SECTION 7: HANDLING AND STORAGE

Handling:

Cannot be stored indefinitely.

Storage:

Tightly closed. Store at room temperature (+15 to +25 °C recommended). Protect from light.

SECTION 8: EXPOSURE CONTROL/PERSONAL PROTECTION

Engineering:

Maintain general industrial hygiene practice.

Personal Protective Equipment:

Protective clothing should be selected specifically for the working place, depending on concentration and quantity of the hazardous substances handled.

Respiratory Protection:	***Protective Gloves:***	***Eye Protection:***
Required when vapors/aerosols are generated. Work under hood.	Rubber or plastic	Goggles or face mask

Industrial Hygiene:

Change contaminated clothing. Wash hands after working with substance.

SECTION 9: PHYSICAL/CHEMICAL PROPERTIES

Appearance:	Yellow liquid	***Odor:***	Odorless	***Density at 20°C:***	~ 1 g/cm³
Melting Point:	NA	***Boiling Point:***	ND	***Solubility:***	Soluble
pH at 20°C:	~ 7	***Explosion Limit:***	NA	***Flash Point:***	NA
Thermal Decomp.:	NA				

SECTION 10: STABILITY AND REACTIVITY

Conditions to be Avoided:

Strong Heating

Hazardous Decomposition Products:

None

Hazardous Polymerization:

Will not occur.

Substances to be Avoided:

The generally known reaction partners of water

Further Information:

Not available

SECTION 11: TOXICOLOGICAL INFORMATION

Product Toxicity

No toxic effects are to be expected when the product is handled appropriately.

Component Toxicity

Acute Toxicity:

Not Available

Chronic Toxicity:

Not Available

Additional Data:

Not Available

SECTION 12: ECOLOGICAL INFORMATION

No environmental hazard.

Further Data: Can be safely disposed off as ordinary refuse.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal:

SECTION 14: TRANSPORTATION INFORMATION

Land:	***Sea:***	***Air:***
Not subject to transport regulations	Not subject to transport regulations	Not subject to transport regulations

SECTION 15: REGULATORY INFORMATION

Complies with European Regulations (EC) No. 1907/2006 and No. 1272/2008.
Complies with European Council Directives 67/548/EEC and 1999/45/EC.
Complies with OSHA Regulation 29 CFR 1910.1200.
Complies with Canadian Regulation SOR/88-66

SECTION 16: OTHER INFORMATION

Text of phrases under Section 3

NA

Revision Information

Revision Date:	2013-06-14
Supersedes edition of:	2012-06-01
Reason for revision:	Regulation (EC) No. 1272/2008 Compliance
Legend	NA: Not Applicable ND: Not Determined

THE INFORMATION CONTAINED HEREIN IS BASED ON THE PRESENT STATE OF OUR KNOWLEDGE. IT CHARACTERIZES THE PRODUCT WITH REGARD TO THE APPROPRIATE SAFETY PRECAUTIONS. IT DOES NOT REPRESENT A GUARANTEE OF THE PROPERTIES OF THE PRODUCT.

Safety Data Sheet

1. IDENTIFICATION:

Product Name: ProCal Turbidity Calibration Standards
CAS Number: Mixture
Catalog Numbers: 39071 39820 39825 39828 39830 39845 39855 39887 39927 39928 39938 39939 39950 39953 39957 52070 52080 52090 52100 52110 52120 52180 52190 52200 52210 52220 52230 52240 52250 52300 52310 52320 52330 52340 52350 52360 52370 52380 52382 52384 52386 52430 52440 52450 52460 52470 52480 52530 52540 52550 52560 52570 52580 53000 53040 53050 53060 53070 53080 53090 53100 53110 53120 53130 53140 53160 53170 53180 53200 53210 53220 53230 53250 53260 53270 53280 53340 53350 53370 32483S 34381S 70853 30860 52000 52010 52090 52170 52290 52520 53380 52590
Product Use: Analytical \ Laboratory Reagent
Manufacturer: HF Scientific, Inc
Address: 3170 Metro Parkway Fort Myers, Fl 33916

General Information: 888-203-7248
Transportation Emergency Number: CHEMTREC® 24 hr US 800-424-9300
CHEMTREC® 24 hr International 703-527-3887

2. HAZARDS IDENTIFICATION

GHS Classification

Health	Environmental	Physical
Acute Toxicity: None Eye Corrosion: Category 2B Skin Corrosion: Category 3	Aquatic Toxicity: None	Flammable Liquid: No

GHS Label

Pictogram: None	Signal Word: WARNING
Hazard Statements Causes mild skin irritation Causes eye irritation	**Precautionary Statements** If skin irritation occurs, get medical advice/attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention. Wash hands after handling

3. COMPOSITION / INFORMATION ON INGREDIENTS

Component	Cas Number	Weight %
Deionized Water	7732-18-5	99.0
Styrene Divinylbenzene Co-Polymer Beads	9003-70-7	0.97
Antimicrobial	Mixture	0.02
Octylphenoxypolyethoxyethanol nonionic surfactant	Mixture	0.01

4. FIRST AID MEASURES

Eye Contact: Immediately Flush with Excess Water for 15 Minutes
Skin Contact: Immediately Flush with Excess Water for 15 Minutes. Remove Contaminated Clothing.
Inhalation: Remove to Fresh Air
Ingestion: Give Large Quantities of Water. Call Physician.

5. FIRE FIGHTING MEASURES

Suitable Extinguishing Media: Foam or Dry Chemical
Fire Fighting Procedures: Wear self contained breathing apparatus for fire fighting if necessary.
Unusual Fire and Exposure Hazards: None
Combustion Products: None
NFPA Classification HEALTH: 0 FLAMMABLE: 0 REACTIVITY:0

6. ACCIDENTAL RELEASE MEASURES

Wear Proper Personal Protective Equipment. See Section 8 for Additional Information. Remove Liquid with Absorbent Material and Seal in a Bag or Container for Disposal. Wash Spill Area Once Pickup is Complete.

7. HANDLING AND STORAGE

Handling: Wear Safety Glasses, Latex or Nitrile Gloves, and Lab Coat or Apron. Avoid Contact with Skin and Eyes. Do Not Ingest.
Storage: Store at Room Temperature. **Do not Freeze**.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Limits: N/A
Engineering Controls: N/A
Personal Protective Equipment:
Eyes: Safety Glasses
Skin: Latex or Nitrile Gloves and Lab Coat or Apron

9. PHYSICAL AND CHEMICAL PROPERTIES

Flashpoint: N/A
Autoignition Temperature: N/A
Boiliong Point: 100ºC, 212ºC
Melting Point: N/A
Vapor Pressure: 760 mm Hg

Vapor Density: N/A
% Solubility in Water: 100%

Pour Point: N/A
Molecular Formula: Mixture
Odor / Appearance: Odorless, clear to white liquid (depending on standard value)

Lower Flammability Limit: N/A
Upper Flammability Limit: N/A
Specific Gravity: 1.0
% Volatile: N/A
Evaporation Rate (Water=1): N/A
Viscosity: N/A
Octanol / Water Partition Coefficient: N/A
pH: Neutral (6.5-7.5)
Molecular Weight: Mixture

10. STABILITY AND REACTIVITY

Stability / Incompatibility: Product Stable Under General Use and Storage Conditions.
Hazardous Reactions / Decomposition Products: Hazardous polymerization will not occur

11. TOXICOLOGICAL INFORMATION

Symptoms of Overexposure: Irritation of the skin and eyes
Acute Effects: May cause skin, eye irritation
Eye Contact: May cause eye irritation
Skin Conatct: May cause skin irritation
Inhalation: N/A
Ingestion: N/A
Target Organs Effects: Skin and Eyes
Chronic Effects: N/A
Medical Conditions Aggravated by Exposure: Pre-existing skin and
Acute Toxicity Values: N/A

12. ECOLOGICAL INFORMATION

No Ecological Data Available

13. DISPOSAL CONSIDERATIONS

Dispose of in a manner consistent with Federal, State and Local Regulations.

14. TRANSPORT INFORMATION

US DOT (United States Department of Transportation): Not Regulated
IATA (International Air Transport Association): Not Regulated
IMO (International Maritime Organization): Not Regulated

15. REGULATORY INFORMATION

CERCLA: No
SARA/Title III: No
TSCA Inventory: Yes
Cal. Proposition 65: No
WHMIS: No
DSL: No
NDSL: No

16. OTHER INFORMATION

THE ABOVE INFORMATION IS BELIEVED TO BE ACCURATE AND REPRESENTS THE BEST INFORMATION CURRENTLY AVAILABLE TO US. ALL PRODUCTS ARE OFFERED IN ACCORDANCE WITH THE MANUFACTURER'S CURRENT PRODUCTION SPECIFICATIONS AND ARE INTENDED SOLELY FOR USE IN ANALYTICAL TESTING. THE MANUFACTURER SHALL IN NO EVENT BE LIABLE FOR ANY INJURY, LOSS OR DAMAGE RESULTING FROM THE HANDLING, USE OR MISUSE OF THESE PRODUCTS.

Attachment D
JSAs

Job Safety Analysis

General

JSA ID	HASP 1	**Status**	Complete
Job Name	General Industry-Driving - passenger vehicles	**Created Date**	7/14/2022
Task Description	Driving a car, van, or truck on public roadways.	**Completed Date**	07/14/2022

Client / Project

Client	Fischback, LLC
Project Number	30135590
Project Name	Metro Park
Project Manager	Ben Girard

User Roles

Role	Employee	Due Date	Completed Date
Developer	Kaitlyn Fleming	7/14/2022	7/14/2022
HASP Reviewer	Bean, Veronica	7/14/2022	7/14/2022
Quality Reviewer			

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Pre-Trip Inspection	1	Failing to perform pre-trip inspections may cause mechanical failure, accident or injury.	Perform walk around of vehicle with particular attention to tire inflation and condition. Check lights, wipers, seatbelts for proper operating condition. Properly adjust seat and mirrors prior to vehicle operation. Use or review vehicle inspection checklist as required under the MVSP.	ARC HSGE024 Motor Vehicle Safety Standard (MVSP)
		2	Scrapes, cuts, burns to hand if inspecting engine fluids and/or tires. Eye splash hazard if inspecting engine fluids. Pinch or crush hazards when opening or closing hood, trunk, or tailgate.	Wear protective gloves and safety glasses as described below when checking under hood or tires. Use TRACK and keep hands clear when opening/closing hood, trunk, or tailgate to avoid crush or pinch hazard.	
		3	Struck by other vehicles while walking around vehicle performing inspections.	Wear high visibility vest, shirt, or coat while performing inspections in parking lots or other areas with a traffic hazard. Remain vigilant of moving vehicles or equipment in area, face oncoming vehicles to extent practical.	
		4	Improperly secured cargo may dislodge creating injury, property damage, or road hazard.	Ensure all cargo is properly secured to prevent movement while the vehicle is in operation. This includes cargo in the cab of the vehicle.	
2	Driving a motor vehicle on public streets	1	Failing to observe traffic flow ahead increases risk of hard braking resulting in potential impact of vehicle ahead, being struck by another vehicle from behind, and decreases decision making time.	Use Smith System Key #1, "Aim High in Steering". **Look ahead (15 seconds if possible) to observe traffic flow and traffic signals.** Adjust speed accordingly to keep vehicle moving and avoid frequent braking. Select lane of least traffic and adjust speed based on observed signal timing when possible. Avoid following directly behind large vehicles that obscure view ahead.	Smith System "5-Keys" is a registered trademark of Smith System Driver Improvement Institute, Inc.

		2	Failing to observe vehicles, pedestrians, bicyclists, and other relevant objects in vicinity of your vehicle increases risk of side swipes, rear ending, and third party injury.	Use Smith System Key #2, "Get the Big Picture". **Maintain 360 degrees of awareness around vehicle.** Check a mirror every 6-8 seconds, maintain space around the vehicle, choose a lane that avoids being boxed in. Look for pedestrian activity ahead in crosswalks or sidewalks. Watch for construction zone approach signs and act early by executing lane changes and reducing speed.	
		3	Failing to keep your eyes moving increases risk of not seeing relevant vehicles, pedestrians, and objects in your vicinity that may impair your ability to make timely and appropriate driving decisions and also increases risk of accident.	Use Smith System Key #3, "Keep Your Eyes Moving". **Move your eyes every 2 seconds and avoid staring while evaluating relevant objects.** Scan major and minor intersections prior to entering them. Check mirrors.	
		4	Failing to maintain space around and in front of your vehicle increases risk of striking another vehicle or being struck by another vehicle. Insufficient space shortens time for effective driving decision making resulting in increased accident risk.	Use Smith System #4, "Leave Yourself an Out". **Use 4 second rule when following a vehicle.** Avoid driving in vehicle clusters by adjusting speed and using lanes that permit maximum space and visibility. When stopped, keep one car length space in front of vehicle ahead or white line.	
		5	Failing to communicate with other drivers and pedestrians increases risk of striking vehicles, pedestrians, or being struck by other vehicles, especially from the rear.	Use Smith System Key #5, "Make Sure They See You". **Brake early and gradually when stopping to reduce potential of being rear ended.** Keep foot on brake while stopped. Use turn signals and horn effectively. Establish eye contact with other drivers and pedestrians to extent practical. Use vehicle positioning that promotes being seen.	
		6	Distractions within the vehicle takes focus off driving, increases risk of accident decreases time for making effective driving decisions.	**Cell phone use (any type or configuration) is prohibited while the vehicle is in motion.** Familiarize yourself with vehicle layout and controls (radio, temperature controls, etc.) prior to operating unfamiliar vehicles. Set controls prior to operating vehicle. Use GPS in unfamiliar areas to avoid use of paper maps/directions while driving. Set GPS prior to vehicle operation. Pull over and stop to modify GPS functions. Avoid consuming food or drink while driving.	
3	Parking	1	Parking vehicle in areas of clustered parked vehicles or near facility entrance may impair visibility to oncoming traffic in lot and increase exposure to pedestrian traffic.	**Use pull through parking or back into parking space when permitted or practical.** When practical and safe to do so, park away from other vehicles and avoid parking near the facility entrance or loading docks. If available, use a spotter to aid in backing activity. Back no further than necessary and back slowly. Get out and look (GOAL) if uncertain of immediate surroundings. Tap horn prior to backing.	

PPE Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses	While checking engine or tires	Required
Hand Protection	work gloves (specify type)	Leather or equivalent checking engine or	Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
	other	Vehicle kit (applies to company trucks)	Required
Miscellaneous	fire extinguisher	Applies to company trucks	Required
	first aid kit	Applies to company trucks	Required

Job Safety Analysis

General

JSA ID	45	**Status**	(3) Completed
Job Name	Environmental-Groundwater Sampling and free product recovery	**Created Date**	2/4/2009
Task Description	Groundwater sampling	**Completed Date**	02/06/2009
Template	True	**Auto Closed**	False

Client / Project

Client	ARCADIS-AGMI
Project Number	000000100000
Project Name	GENERAL OVERHEAD
PIC	
Project Manager	NO PROJECT MANAGER

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Coppola, Mija	6/12/2012	2/4/2009	Mcburney, Lowell	☑
HASP Reviewer	Coppola, Mija	2/6/2009	2/6/2009	Mcburney, Lowell	☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Stage at pre-determined sampling location and set up work zone and sampling equipment	1	Personnel could be hit by vehicular traffic	Set up cones and establish work area. Position vehicle so that field crew is protected from site traffic. Unload as close to work area as safely possible.	ARC Field H&S Handbook Sec III-G
		2	Sampling equipment, tools and monitoring well covers can cause tripping hazard	Keep equipment picked up and use TRACK to assess changes.	
2	Open wells to equilibrate and gauge wells	1	When squatting, personnel can be difficult to see by vehicular traffic.	Wear class II traffic vest if wells are located proximal to vehicular traffic. Use tall cones and the buddy system if practicable.	
		2	Pinchpoints on well vault can pinch or lacerate fingers	Use correct tools to open well vault/cap. Wear leather gloves when removing well vault lids, and chemical protective gloves while gauging. Wear proper PPE including safety boots, knee pads and safety glasses.	
		3	Lifting sampling equipment can cause muscle strain	Unload as close to work area as safely possible; use proper lifting and reaching techniques and body positioning; don't carry more than you can handle, and get help moving heavy or awkward objects.	
		4	Pressure can build up inside well causing cap to release under pressure	Keep head away from well cap when removing. If pressure relief valves are on well use prior to opening well	
3	Begin Purging Well and Collecting Parameter Measurements	1	Electrical shock can occur when connecting/disconnecting pump from the battery.	Make sure equipment is turned off when connecting/disconnecting. Wear leather gloves. Use GFCIs when using powered tools and pumps. Do not use in the rain or run electrical cords through wet areas.	ARC Field H&S Handbook Sec III-AA
		2	Purge water can spill or leak from equipment	Stop purging activities immediately, stop leakage and block any drainage grate with absorbent pads. Call PM to notify them of any reportable spill.	
		3	Water spilling on the ground can cause muddy/slippery conditions	Be careful walking in work area when using plastic around well to protect from spillage	
		4	Lacerations can occur when cutting materials such as plastic tubing	When cutting tubing, use tubing cutter. No open fixed blades should ever be used. When possible wear work gloves, leather type.	

		5	Purge water can splash into eyes	Pour water slowly into buckets/drums to minimize splashing. Wear safety glasses.	
4	Collect GW or Free Product Sample	1	Working with bailer rope can cause rope burns on hands.	Slowly raise and lower the rope or string for the bailer. Wear appropriate gloves for the task.	
		2	Sample containers could break or leak preservative	Discard any broken sampleware or glass properly. Do not overtighten sample containers. Wear chemical protective gloves.	
5	Recovery of Free Product from well	1	Exposure to free product	Additional chemical protection may be necessary based on the type of product. Additionally, safety goggles, a faceshield, or respiratory protection may be required. Verify in the HASP.	
6	Staging of Well Purge water and/or Free Product	1	Muscle strains can occur when moving purge water or drums	If using buckets, do not fill buckets up to the top. Always keep lid on buckets when traveling or moving them to another location. Only half fill buckets so when dumping the buckets weigh less. See drum handling JSA for movement of drums.	ARC Field H&S Handbook Sec III-II

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Dermal Protection	long sleeve shirt/pants		Recommended
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	Nitrile	Required
	work gloves (specify type)	leather	Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs		Recommended
Miscellaneous PPE	other	Knee pads	Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Decontamination	Decon supplies (specify type)	alconox, DI water, spray bottle	Required
Miscellaneous	fire extinguisher		Required
	first aid kit		Required
	flashlight		Required
Personal	eye wash (specify type)	bottle	Required
	insect repellant		Recommended
	sunscreen		Recommended
Traffic Control	barricades		Recommended
	traffic cones		Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Coppola, Mija HASP Reviewer Approve 2/6/2009	

Job Safety Analysis

General

JSA ID	166	**Status**	(3) Completed
Job Name	Environmental-Sample cooler handling	**Created Date**	5/1/2009
Task Description	Sample cooler handling	**Completed Date**	05/13/2009
Template	True	**Auto Closed**	False

Client / Project

Client	ARCADIS-AGMI
Project Number	000000100000
Project Name	GENERAL OVERHEAD
PIC	
Project Manager	NO PROJECT MANAGER

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Coppola, Mija	12/19/2011	5/11/2009	Mcburney, Lowell	☑
HASP Reviewer	Moyers, Sam	5/25/2009	5/13/2009	Kundert, Brian	☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	Transfer field samples to sample packing area	1	Lifting heavy coolers may result in muscle strain especially to lower back.	Use proper lifting techniques and keep back straight. Use buddy system for large coolers, Use mechanical aids like hand trucks if readily available to move coolers. Do not over fill coolers with full sample containers for temporary movement to the sample prep area. Ensure an adequate supply of sample coolers are in field.	
		2	Hazards to hands from broken glass caused by over tightening lids or improper placement in cooler	Inspect all bottles and bottle caps for cracks/leaks before and after filling container. Do not over tighten sample lids. Clean up any broken bottles immediately, avoid contact with sample preservatives. Wear leather gloves when handling broken glass.	
		3	Exposure to chemicals (acid preservatives or site contaminants) on the exterior of sample bottles after filling.	Wear protective gloves for acid preservatives and safety glasses with side shields during all sample container handling activities (before and after filling), Once filled follow project specific HASP PPE requirements for skin and eye protection.	
		4	Samples containing hazardous materials may violate DOT/IATA HazMat shipping regulations	All persons filling a sample bottle or preparing a cooler for shipment must have complete ARCADIS DOT HazMat shipping training. Compare the samples collected to the materials described in the Shipping Determination for the Project and ensure consistent. Re-perform all Shipping determinations if free product is collected and not anticipated during planning.	
2	Sample cooler selection	1	Sample coolers with defective handles, lid hinges, lid hasps cracked or otherwise damaged may result in injury (cuts to hands, crushing of feet if handle breaks etc)	Only use coolers that are new or in like new condition, No rope handled coolers unless part of the manufacturer's handle design.	ARCADIS Shipping Guide US-001
		2	Selection of excessively large coolers introduces lifting hazards once the cooler is filled.	Select coolers and instruct lab to only provide coolers of a size appropriate for the material being shipped. For ordinary sample shipping sample coolers should be 48 quart capacity or smaller to reduce lifting hazards.	
3	Pack Samples	1	Pinch points and abrasions	Beware that lid could slam shut; block/brace	

			to hands from cooler lid closing unexpectedly	if needed; be wary of packing in strong winds. New coolers may be more prone to self closing, tilt cooler back slightly to facilitate keeping lid open.	
		2	Awkward body positions and contact stress to legs and knees when preparing coolers on irregular or hard ground surfaces.	Plan cooler prep activities. Situate cooler where neutral body positions can be maintained if practical, like truck tailgate. Avoid cooler prep on rough gravel surfaces unless knees and legs protected during kneeling.	
		3	Frostbite or potential for oxygen deficiency when packing with dry ice. Contact cold stress to fingers handling blue ice or wet ice	Dry ice temperature is -109.30F. Wear thermal protective gloves. DO NOT TOUCH with bare skin! Dry ice sublimates at room temp and could create oxygen deficiency in closed environment. Maintain adequate ventilation! Do not keep dry ice in cab of truck. Wear gloves when handling blue ice or gaging wet ice. Dry Ice is DOT regulated for air shipping, follow procedures in Shipping Determination.	
4	Sealing, labeling and Marking Cooler	1	Cuts to hands and forearms from strapping tape placement or removing old tape and labels	Do not use a fixed, open-blade knife to remove old tags/labels, USE SCISSORS or other safety style cutting device. Only use devices designed for cutting. Do not hurry through task.	
		2	Lifting and awkward body position hazards from taping heavy coolers, dropping coolers on feet during taping.	Do not hurry through the taping tasks, ensure samples in cooler are evenly distributed in cooler to reduce potential for overhanging cooler falling off edge of tailgate/table when taping.	
		3	Improper labeling and marking may result in violation of DOT/IATA HazMat shipping regulations delaying shipment or resulting in regulatory penalty	Do not deviate from ARCADIS Shipping Guide or Shipping Determination marking or labeling requirements.	
5	Offering sample cooler to a carrier or lab courier for shipment.	1	Lifting heavy coolers may result in muscle strain especially to lower back.	See lifting hazard controls above.	
		2	Carrier refusal to accept cooler may cause shipping delay and/or result in violation of DOT HazMat shipping regulations.	Promptly report all rejected and refused shipments to the ARCADIS DOT Program Manager. Do Not re-offer shipment if carrier requires additional labels markings or paperwork inconsistent with your training or Shipping Determination without contacting the ARCADIS DOT Compliance Manager.	

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Hand Protection	chemical resistant gloves (specify type)	nitrile	Required
	work gloves (specify type)	leather	Required

Supplies

Type	Supply	Description	Required
Miscellaneous	Other	Scissors	Required

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Moyers, Sam HASP Reviewer Revise 5/11/2009	Kevlar is required? Leather work gloves are listed. i suggest just leather gloves.

Employee:	Moyers, Sam	
Role	HASP Reviewer	
Review Type	Approve	
Completed Date	5/13/2009	

Job Safety Analysis

General

JSA ID	7272	**Status**	(3) Completed
Job Name	General Industry-Site inspection/walkover - commercial/manufacturin	**Created Date**	4/9/2012
Task Description	Walkover-building	**Completed Date**	04/18/2012
Template	True	**Auto Closed**	False

Client / Project

Client	ARCADIS-AGMI
Project Number	000000100000
Project Name	GENERAL OVERHEAD
PIC	
Project Manager	NO PROJECT MANAGER

User Roles

Role	Employee	Due Date	Completed Date	Supervisor	Active
Developer	Byers, Susan	4/30/2012	4/9/2012	Edwards, Lauren	☐
HASP Reviewer	Edwards, Lauren	4/23/2012	4/18/2012	Balcer, Denis	☑

Job Steps

Job Step No.	Job Step Description		Potential Hazard	Critical Action	H&S Reference
1	PPE verification	1	Lack of adequate PPE at the facility could lead to injury	Prior to traveling to the site, ask the facility representative/escort for information on the types of PPE required. Verify that all necessary PPE is being worn and that PPE is in good working condition.	ARC HSGE015, ARC Field H&S Handbook Sec III-R.
2	Site safety orientation	1	Inability to quickly and safely exit an unfamiliar facility during an emergency	At the start of the site walk, ask the facility representative/escort for information regarding alarms, evacuation routes, and assembly areas.	
		2	Inability to recognize hazards prior to handling chemicals	At the start of the site walk, ask the facility representative/escort for the location of Material Safety Data Sheets.	
3	Building inspection and site walk	1	Slips, trips and falls	Use caution when walking on uneven or wet surfaces. Use proper footwear with good traction. Pay attention to where you are walking-including foot placement. Walk in designated areas and pathways. Maintain a safe distance from open holes and unprotected edges. Use handrails on stairways.	ARC HSIH008, ARC HSGE007, ARC HSFS021, ARC HSFS003, ARC HSIH013, Elevated Heights JSA, FHSB
		2	Acute exposure to hazardous chemicals	Wear appropriate gloves and eye protection when examining containers holding chemicals, wastes, and other potentially hazardous materials. Note the location of nearby eyewash stations and safety showers. Do not handle containers that are unlabeled or that are leaking. Do not open any chemical containers.	
		3	Falling from ladders	Climb ladders slowly, one person at a time. Maintain three points of contact. Do not climb fixed ladders that require fall protection (above 24 feet). Do not use portable ladders	
		4	Falling from elevated heights	Do not walk on elevated areas (greater than 4 feet above lower level) unless protected with a guardrail. Do not walk on scaffolding.	
		5	Falling from roofs	Do not walk on building roofs unless edges are protected with guardrails and skylights are guarded with railing or screens.	
		6	Hearing damage	Wear hearing protection when noise exceeds 85 dBA and in any areas labeled as requiring	ARC Field H&S Handbook Sec III-L

			hearing protection.	
		7	Hazardous atmosphere or entrapment in a confined space	Do not enter confined spaces, crawl spaces, tanks, utility vaults, or trenches.	ARC Field H&S Handbook Sec III-Y
		8	Vehicle / pedestrian accidents	Use caution when walking in areas with vehicle or forklift traffic. Establish eye contact with equipment operators. Maintain a safe distance from moving vehicles and equipment.	
		9	Heat illness	If the site walk involves the inspection of outdoor areas in weather conditions that pose a risk for heat illness (based on temperature, humidity, and sunshine), apply sunscreen and bring drinking water to the site walk.	ARC Field H&S Handbook Sec III-M
		10	Entrapment and pinch points in automatic gates	Do not walk through or underneath automatic gates designed for vehicles or forklifts.	

PPE — Personal Protective Equipment

Type	Personal Protective Equipment	Description	Required
Eye Protection	safety glasses		Required
Foot Protection	steel-toe boots		Required
Hand Protection	chemical resistant gloves (specify type)	as appropriate for chemical hazards	Required
Head Protection	hard hat		Required
Hearing Protection	ear plugs	In excessive noise areas	Required
Miscellaneous PPE	traffic vest--Class II or III		Required

Supplies

Type	Supply	Description	Required
Communication Devices	mobile phone		Required
Miscellaneous	flashlight		Recommended

Review Comments

Reviewer		Comments
Employee: **Role** **Review Type** **Completed Date**	Edwards, Lauren HASP Reviewer Approve 4/18/2012	

Attachment E
HS Standards

EXECUTIVE SUMMARY

Through the use of personal protective equipment (PPE), ARCADIS employees are protected from occupational hazards in the event that engineering and administrative controls are not sufficient or practical. PPE will be provided to ARCADIS full time and permanent part time employees who regularly conduct field work or visit project sites outside of office environments at no cost following training on the proper use and maintenance of PPE.

Project managers are responsible for assessing potential hazards on a worksite and determining the applicable PPE.

Project personnel are responsible for understanding and utilizing "Stop Work Authority" should a hazard present itself that was not previously identified or has been identified in concentrations that are higher than anticipated.

This minimum level of PPE (hard hat; safety glasses; class II high-visibility vest, shirt or coat; and protective footwear with safety toe cap) is expected to be worn on all project sites unless in a field trailer or vehicle, unless a specific exemption has been established within an approved HASP or modification to a task specific JSA or Permit to Work upon completion/review of the hazard analysis.

PPE selection will be based on an evaluation of the performance characteristics of the PPE relative to the following:

- The requirements and limitations of the tasks or work environment
- The task-specific conditions and duration of the work
- The hazards and potential hazards identified at the site

PPE may be categorized into levels A, B, C or D.

- Level A offers the highest skin and respiratory protection
- Level B offers a high degree of respiratory protection with lesser levels of skin protection
- Level C is used when the concentration and type of airborne substance is known, and the criteria for using an air purifying respirator are met
- Level D offers the least skin and respiratory protection

PPE training will include, at minimum:

- When and what PPE is necessary
- How to put on, adjust, wear and take off the PPE
- Limitations of the PPE
- Proper care, maintenance, useful life, and proper disposal of PPE

1. POLICY

It is the policy of ARCADIS to assess the workplace to identify and assess hazards in order to appropriately implement controls for those hazards. In addition, it is ARCADIS policy to supply personal protective equipment (PPE) for employees in a working environment where engineering and administrative controls are not feasible or effective in the control of hazards. ARCADIS will train and supply this PPE at no cost to the employee.

2. PURPOSE AND SCOPE

2.1 Purpose

The purpose of PPE is to shield or isolate individuals from the chemical, physical and biologic hazards that may be encountered in their work environment. A hazard analysis or assessment will be performed before a job task is begun to evaluate if PPE is necessary to protect an employee from identified hazards and determine the type of PPE required. This analysis will include the identification of hazards/suspected hazards and their routes of exposure.

Combinations of protection may be needed to provide the appropriate level of protection for any given work environment. The level of PPE may change during a job, so periodic task evaluation will be conducted to ensure that the most appropriate PPE is being used. Over-protection, as well as under-protection, can create additional hazards and should be avoided where possible.

Subcontractors and other non-ARCADIS employees must supply their own PPE. ARCADIS will not supply PPE to any non-ARCADIS employees unless specific arrangements and agreements are made with the other party.

This Health and Safety Standard (HSS) provides guidance on the proper selection, use, care and maintenance of PPE.

2.2 Scope

Whenever possible, engineering, substitution and administrative controls will be used to reduce or eliminate hazards. When such controls are not feasible, practical or adequate, PPE will be used to protect employees from exposure to hazards during ARCADIS-related work tasks.

3. DEFINITIONS

Definitions related to personal protective equipment can be found in Exhibit 1.

4. RESPONSIBILITIES

4.1 ARCADIS Management

ARCADIS Management is responsible for providing resources for the acquisition of PPE and for the conduct of hazard assessments.

4.2 Project Managers

Project Managers are responsible, as part of the project hazard assessment, for determining PPE necessary to complete the project. In addition, the Project Manager is responsible for determining client requirements with respect to PPE. Project Managers notify health and safety staff of biological, chemical and physical hazards present or potentially present on the site, as well as verifying that any specific state and/or local requirements for PPE have been identified. Project Managers are also responsible for ensuring that project staff has the appropriate and applicable training for PPE use prior to those staff beginning work.

4.3 Corporate Health and Safety

Corporate Health and Safety is responsible for keeping this standard up-to-date with current regulatory requirements and best practices and for assisting in determining the appropriate PPE for a particular task and work environment and for assisting in the identification of appropriate vendors of such PPE.

4.4 Health and Safety Staff

Project Health and Safety Staff including designated Writers and Reviewers of Project Health and Safety Plans (HASPs) are responsible for developing control processes and techniques on specific projects based on the physical, chemical and biological hazards expected to be encountered on project facilities.

It is the responsibility of the Site Safety Officer (SSO) to verify that any employee-owned PPE brought to the job site is adequate for the task, properly fitted to the employee, and has been properly maintained and is cleaned in accordance with this standard.

4.5 ARCADIS Staff

ARCADIS staff is responsible for completing PPE training as required by this policy and standard, and for following all hazard control processes designated by the Project Manager, Project Health and Safety Staff and the project HASP. Employees must choose appropriate, properly fitted PPE where required, and are responsible for inspecting their PPE for wear, damage and effectiveness. Employees that bring their own PPE to the job site must ensure that the equipment is adequate for the task (e.g., meets minimum ANSI requirements, AUS requirements and client requirements), and has been properly maintained in a sanitary and reliable condition in accordance with this standard.

If project personnel believe that a hazard is present that was not previously identified or is at levels that are higher than expected, they should stop work and notify project health and safety staff or the project manager immediately and not proceed until authorized.

Staff are expected to comply with minimum PPE requirements as established by ARCADIS policy and HASP requirements and/or task specific PPE requirements detailed in the task specific Job Safety Analysis (JSA) or Permit to Work.

5. PROCEDURE

5.1 Minimum PPE Requirements

All full time and permanent part time employees that regularly conduct field work or visit project sites outside of office environments will be issued a field bag that contains, at a minimum, the following PPE:

- An ARCADIS branded hardhat
- Two pair of safety glasses, one clear pair and one tinted pair, or one pair of prescription safety glasses with transitional lenses
- Hearing protection
- A minimum, Type 2 reflective vest in either orange, lime green or yellow

Office locations will stock extra bags with the equipment listed above for use by other staff that do not regularly go to field locations. Additional PPE and H&S equipment will be issued to staff based on the hazards they face on specific projects (i.e. respirators, goggles, chaps, etc.).

ARCADIS has established the following minimum PPE requirement for field activities that must be worn unless excepted by the HASP, JSA or Permit to Work:

- Type I Hardhat (Class G rating if there is potential danger of contact exposure to low voltage conductors)
- Safety Glasses (Z87.1)
- Class 2 reflective traffic vest, coat or shirt in either orange, lime green or yellow
- Protective Footwear, e.g. steel toe safety shoes (minimum I/50 Impact resistance for the toe area which is an impact resistance rating of at least 50-foot pounds; C/50 Compression resistance for the toe area which correlates to 1750 pounds of compression resistance).

This minimum level of PPE is expected to be worn on all project sites unless in a field trailer or vehicle, unless a specific exemption has been established within an approved HASP or modification to a task specific JSA or Permit to Work upon completion/review of the hazard analysis.

The goal in this section is to specify PPE for work that is not governed by a JSA or Permit to Work to avoid conflicts in PPE requirements. The PPE specified in a JSA/Permit to Work is automatically the PPE requirement for all work governed by the JSA/Permit to Work. As a result, it is critical to take the time during JSA/Permit development to consider and identify the proper PPE required for the activity. Please note that the template JSA

PPE information may not be the appropriate PPE for your project and should be adjusted accordingly.

Note: Project Teams must check and comply with state, local and/or client requirements for specific minimum PPE requirements and adjust the HASP, JSA or Permit to Work process accordingly.

Temporary full time/part time employees (temp staff) will be provided all of the above PPE; however, standard steel toed safety boots will only be provided to temp staff employees with the approval of the administrative supervisor and Project Manager. If the administrative supervisor or Project Manager elects to not provide protective footwear or other non-specialty required footwear to temp staff, the employee will be informed of the requirement to provide their own footwear meeting project health and safety requirements prior to hire.

No ARCADIS staff should arrive at a field or project site without this minimum PPE.

5.2 The PPE Program

The basic objectives of a PPE program are to protect the wearer from safety and health hazards; and to prevent injury to the wearer from incorrect use and/or malfunction of the PPE. This document serves as the overall ARCADIS PPE program and is used as guidance for the development of a project-specific PPE program which becomes part of a project-specific health and safety plan. A project-specific PPE program in combination with this HSS will address the following:

- PPE selection based upon site hazards (Hazard Identification/Assessment).
  - Identify the hazards/suspected hazards and their potential routes of exposure (e.g., skin, inhalation, ingestion or eye contact).
- The use and limitations of the equipment including limitations during temperature extremes and under certain medical conditions;
- The work mission duration;
- Maintenance, storage, decontamination and disposal of PPE;
- Training including proper fit and how to properly put on and take off PPE;
- PPE inspection procedures prior to, during, and after use; and
- Periodic evaluation of the effectiveness of the PPE program.

5.3 PPE Selection

The use of PPE can itself create significant worker hazards, such as heat stress, physical and psychological stress and impaired vision, mobility and communication. Over-protection, as well as under-protection and poor fit, can be hazardous and should be avoided where possible. Site or project-specific health and safety plans take into

consideration engineering, substitution, and administrative controls first as a means to eliminate/reduce the need for PPE. When it is not feasible or practical to eliminate the use of PPE, PPE must be properly fitted to each affected employee, and PPE selection will be based on an evaluation of the performance characteristics of the PPE relative to the following:

- The requirements and limitations of the tasks or work environment;
- The task-specific conditions and duration; and
- The hazards and potential hazards identified at the site.

The level of protection will be increased whenever it is shown that increased protection is necessary to reduce employee exposures to the hazards. It may be decreased when it is shown that this will not result in hazardous exposure to employees.

5.4 Levels of PPE Protection

For work on hazardous sites, a combination of PPE may be categorized into levels A, B, C, or D with level A offering the highest level of protection and D the lowest. Monitoring the effectiveness of PPE will be done throughout a project to ensure that the appropriate level of protection is being worn. These levels of protection are described below.

5.4.1 Level A Protection

Level A PPE offers the highest level of respiratory and skin protection and should be worn when:

- The hazardous substance has been identified and requires the highest level of protection of the skin, eyes, and respiratory system based on either:
  - The measured (or potential) high concentrations of atmospheric gases, vapors, or particulates; or
  - If site operations and work functions involve a high potential for splash, immersion, or exposure to unexpected vapors, gases, or particulates which are harmful to skin eyes, or the respiratory system.
- There is a known or suspected high degree of hazard to the skin and skin contact is possible.
- Conducting work in a confined, poorly ventilated area and the other criteria requiring Level A PPE have not been determined.

Level A equipment includes:

- NIOSH approved positive pressure, full-face piece self contained breathing apparatus (SCBA), or positive pressure supplied airline respirator with escape SCBA;
- Totally encapsulating chemical-protective suit (material based on the hazard);

- Chemical resistant outer **and** inner gloves (type and material based on the hazard);
- Chemical resistant boots with steel toe and shank;
- Disposable protective suit, gloves and boots (depending on suit construction, may be worn over the totally encapsulating suit);
- Coveralls (optional, as applicable);
- Long underwear (optional, as applicable); and
- Hard-hat - under suit (optional, as applicable).

5.4.2 Level B Protection

Level B PPE offers a high degree of respiratory protection with lesser levels of skin protection. Level B PPE should be worn when:

- The type and atmospheric concentration of substances have been identified and require a high level of respiratory protection but less skin protection;
- The atmosphere contains less than 19.5 percent oxygen; or
- The presence of incompletely identified vapors or gases is indicated by direct reading organic vapor detection instruments, but the vapors and gases are not suspected of containing high levels of chemical harmful to the skin or capable of being absorbed through the skin. Level B is the minimum level of protection that should be worn when there is insufficient information to determine the hazards or potential hazards of the substance.

Level B PPE equipment includes:

- NIOSH approved positive pressure, full face piece self contained breathing apparatus 1(SCBA), or positive pressure supplied air respirator with escape SCBA;
- Hooded chemical resistant clothing (overalls and long sleeve jacket; coveralls; one or two piece chemical splash suit; disposable chemical resistant overalls) (materials based on the hazards);
- Chemical resistant outer **and** inner gloves (material based on the hazards);
- Chemical resistant boots with steel toe and shank;
- Coveralls (optional, as applicable);
- Outer chemical resistant boot covers (optional, as applicable);
- Hard hat (optional, as applicable); and

- Face shield (optional as applicable).

5.4.3 Level C Protection

Level C PPE is used when the concentration and type of airborne substance is known, and the criteria for using an air purifying respirator are met. It should be worn when:

- Atmospheric contaminants, liquid splashes, or other direct contact will not adversely affect or be absorbed through any exposed skin;
- The types of air contaminants have been identified, concentrations measured, and an air purifying respirator is available that can remove the contaminants; and
- All criteria for the use of an air purifying respirator are met.

Level C PPE equipment includes:

- NIOSH approved full face or half mask air purifying respirator (with appropriate cartridges based on the hazards);
- Hooded chemical resistant clothing (overalls and long sleeve jacket; coveralls; one or two piece chemical splash suit; disposable chemical resistant overalls) (materials based on the hazards);
- Chemical resistant outer **and** inner gloves (select appropriate materials based on the hazards);
- Chemical resistant boots with steel toe and shank;
- Coveralls (optional, as applicable);
- Outer chemical resistant boot covers (optional, as applicable);
- Hard hat (optional, as applicable);
- Escape mask (optional, as applicable); and
- Face shield (optional, as applicable).

5.4.4 Level D Protection

Level D PPE offers the least skin and respiratory protection and should be worn when the atmosphere contains no known hazards, and work functions preclude splashes, immersions or the potential for unexpected inhalation of or contact with hazardous levels of any chemicals.

Level D PPE equipment may include any or all of the following depending on the hazards of the site:

- Chemical resistant boots with steel toe and shank (optional, as applicable);
- Coveralls (optional, as applicable);
- Gloves (optional, as applicable);
- Outer chemical resistant boots (disposable) (optional, as applicable);
- Safety glasses or chemical splash goggles (optional, as applicable);
- Hard hat (optional, as applicable);
- Escape mask (optional as applicable); and
- Face shield (optional as applicable).

5.5 Combinations of Protection

Combinations of protection are acceptable if the task hazard analysis and the site conditions warrant modification of PPE levels.

5.6 Equipment List

5.6.1 Eye/Face Protection

All employees engaged in or working in or adjacent to areas with eye-hazardous activities or operations, such as but not limited to flying objects and hazardous chemicals shall wear appropriate eye protection.

It is strongly encouraged that eye protection be worn when present on any project site, including construction sites

- Safety glasses with side shields are required for impact protection and shall meet ANSI Standard Z87.1 requirements.
- Chemical goggles (for protection against chemical splash).
- Face shields (for face protection from chemical splash and are not a substitute for primary eye protection).
- Full-face respirators can provide eye and face protection in lieu of safety glasses, goggles or face shields.
- Shaded eye protection meeting the minimum shade requirements established in 29 CFR 1910.133 (for employees exposed to sources of injurious light radiation [e.g., welding, cutting, lasers]).
- For prescription eye protection contact your supervisor to fill out an AOSafety order form available on the ARCADIS Health and Safety website (The Source). For temporary staff, standard prescription safety glasses will be provided with the

approval of the administrative supervisor and Project Manager. If the administrative supervisor or Project Manager elects to not provide standard prescription safety glasses to temp staff, the employee will be informed of the requirement to provide their own prescription safety meeting project health and safety requirements prior to hire.

5.6.2 Respiratory Protection

Respirators will be provided and used in accordance with the ARCADIS Respiratory Protection Policy/Standard ARC HSGE017 and 29 CFR 1910.134.

5.6.3 Hearing Protection

Hearing protection will be provided and used in accordance with the ARCADIS Hearing Conservation Policy/Standard ARC HSIH008 and 29CFR 1910.95.

5.6.4 Foot Protection

Basic foot protection is required for all ARCADIS job sites and industrial locations. Specialized footwear will be provided as required by the nature of the work. Special foot protection may include, but is not limited to, chemically resistant, thermally shielded, metatarsal guards, etc.

One pair of leather safety boots will be provided as necessary by ARCADIS. The employee purchasing the footwear is required to ensure that it meets any of the consensus standards as specified by OSHA 29 CFR 1910.136 which include:

- ASTM F2413-11 Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear

  Note: ASTM F2413-11 Standard Specification for Performance Requirements for Protective (Safety) Toe Cap Footwear contains performance requirements for footwear to protect workers' feet from the following hazards by providing:

  1. Impact resistance (I) for the toe area of footwear (75 foot-pounds);
  2. Compression resistance (C) for the toe area of the footwear (75/ 2,500 pounds);
  3. Metatarsal impact protection (Mt) that reduces the chance of injury to the metatarsal bones at the top of the foot (75 foot-pounds);
  4. Conductive properties (Cd) which reduce hazards that may result from static electricity buildup; and reduce the possibility of ignition of explosives and volatile chemicals (electrical resistance zero â€“ 500,000 ohms);
  5. Electric hazard protection (EH) to protect the wearer when accidental contact is made by stepping on live electrical wire (capable of withstanding the application of 18,000 volts at 60 hertz for one minute

with no current flow or leakage current in excess of one milliampere, under dry conditions);

6. Static dissipative properties (SD) to reduce hazards due to excessively low footwear electrical resistance that may exist where SD footwear is required (must have a lower limit of electrical resistance of 106 ohms and an upper limit of 108 ohms when tested at 50-volts); and
7. Puncture resistance (PR) (when viewed at a 90° angle, the test pin tip must not visually penetrate beyond the face of the material nearest the foot after an applied force of 270 pounds, no signs of de-lamination or cracking after 1.5 million flexes and no sign of corrosion, de-lamination or deterioration after being exposed to a five percent salt solution for 24-hours.)

- ASTM F-2412-2005, "Standard Test Methods for Foot Protection," and ASTM F-2413-2005, "Standard Specification for Performance Requirements for Protective Footwear"

- ANSI Z41-1999, "American National Standard for Personal Protection -- Protective Footwear"

Safety shoes worn by ARCADIS staff during field work must be equipped with protective (safety) toe cap that has a minimum I/50 Impact resistance rating for the toe area which is an impact resistance rating of at least 50-foot pounds and a C/50 Compression resistance rating for the toe area which correlates to 1750 pounds of compression resistance.

Puncture resistant soles or in-soles equipped in the safety boots are project driven based on the Hazard Assessment. Some clients may require puncture resistant soles or in-soles.

The maximum expenditure or reimbursement for approved safety shoe purchases will be $150. Reimbursement requests must be approved by the employee's supervisor.

It should be noted that some clients may prohibit the use of athletic-style safety shoes ("safety sneakers") due to the difficulties created by these styles in supervising proper use of protective footwear.

5.6.5 Head Protection

Hard hats meeting ANSI Z89.1 will be provided to protect employees from impact, penetration, falling objects and/or limited electrical shock and burn, as appropriate for work site hazards. A hard hat must be replaced when it becomes damaged, contaminated (and contamination cannot be removed) or it has been struck by an object of sufficient size to potentially compromise its integrity.

Hardhats must resist penetration by objects, be water resistant and slow burning, and have a chin strap if it is worn while working at elevation. It must be worn square on the head and not be pushed back, to the side or forward.

Baseball-style caps will interfere with the ability of a suspension to work properly during an impact; they should not be worn under protective headgear.

There are two types and three classes of head protection described in ANSI standard.

Other hazard situations to consider are:

- In areas of heavy vegetation or in any area where hunters may be present, it is recommended that some type of brightly colored head protection be worn. For example, a bright orange or yellow baseball cap or stocking cap.
- If cold exposure is an issue, hardhat liners are available (made specifically for the particular hardhat) or if a hardhat is not required, some type of insulated head protection such as a stocking cap should be worn.
- Because it can degrade headwear material and reduce the level of protection, insect repellent should not be applied to or inserted into headwear. The headwear manufacturer should be consulted for instructions on the use of insect repellents and other chemicals on its' products.

5.6.6 Hand Protection

Appropriate hand protection will be provided if employee's hands are exposed to hazards while on the job.

Such as:

- pinch points
- sharp/pointed tools or objects
- incorrect or inadequate tool use
- improper use
- rotating/energized/automated parts
- abrasive materials
- inadequate job planning
- lack of/inadequate protection
- changing weather conditions and extreme temperatures
- hazardous material
- Jewelry and loose clothing.

Once these hazards are identified, the appropriate glove or hand protection must be selected. When choosing gloves, keep in mind:

- Hazardous Chemicals/Substances to be Contacted
- Nature of Contact (total immersion, splash, etc.)
- Duration of Contact
- Area of Protection (hand only, forearm, arm)
- Equipment (rotating, sharp edges, etc.)
- Grip (dry, wet, oily)
- Thermal Protection
- Abrasion/Cut/Puncture Resistance
- Tear/Tensile Strength
- Ergonomics (size, heat stress, dexterity)
- Decontamination/Disposal

In selecting chemically protective gloves, the toxic properties of the chemical(s) will be determined. Information provided on the manufacturer's label or by chemical compatibility charts regarding breakthrough time, permeation rate and degradation should be considered during selection.

5.6.7 Body Protection

Protective clothing, gloves, boots, and other protective equipment will be provided as appropriate for the hazards associated with the tasks being performed.

Long pants are required for all field work unless approval is granted by corporate H&S. Additional protection such as cooling vests may be required. In environments with potential biological hazards such as ticks, plants or snakes, gloves and long sleeves should be worn along with head protection of some kind to protect the scalp. In areas of roadway work or other vehicle traffic high visibility Class II safety vests will be worn.

Chemically Protective Clothing (CPC) will be selected by evaluating the performance characteristics of the CPC against the requirements and limitations of the site and task-specific conditions. This selection should be performed by an employee with training and experience taking into consideration:

- Permeation, degradation, penetration of the CPC by the chemical and;
- Durability, flexibility, fit, temperature effects, ease of decontamination, compatibility with other necessary equipment (e.g., hardhats, SCBA, etc.); and duration of use that could affect the employees ability perform the task.

Where required, appropriate Fire Resistant (FR) protective clothing must be used where there is a potential for electrical arc flash hazards (refer to the ARCADIS Electrical Safety

Standard HSFS006 for additional information). Jobs that expose workers to fire dangers require the use of FR protective clothing.

5.6.8 Specialized Equipment

All other specialized safety equipment required for an assignment (e.g., work gloves, specialized protective clothing, hip boots, field rain gear, personal floatation devices) will be provided by ARCADIS as specified in the HASP.

5.6.9 Extreme Cold Environments

Supervisors are responsible for ensuring that staff is properly equipped to protect themselves while working in extreme cold environments. The following is suggested as appropriate PPE for cold conditions:

- Hats/hat liners and gloves
- Thermal clothing
- Hi-Visibility clothing
- Winter footwear

Use of specialized equipment will be charged to projects in accordance with established policy and rental rates.

5.7 Maintenance/Storage/Disposal

5.7.1 PPE Maintenance and Disposal

PPE must be inspected by the user before and after each use for defects, rips, tears and/or damaged parts. Damaged or compromised PPE will not be used and must be repaired before re-use or disposed. PPE must be disposed of according to the HASP and other project plans for the site. If non-disposable, PPE must be decontaminated and sanitized before being reused according to the HASP. Contaminated PPE which cannot be properly decontaminated by normal procedures must be disposed of accordingly.

Employees are responsible for using and maintaining PPE in a sanitary and reliable condition.

5.7.2 PPE Storage

All PPE must be stored to protect against dust, sunlight, extreme heat and cold, excessive moisture and damaging chemicals. Storage must be in accordance with the manufacturer's specifications and OSHA requirements.

5.7.3 Contaminated Boots

Single-use boots or boot covers which become contaminated on the job will be waste profiled, as necessary, and properly disposed. Work boots will be properly decontaminated upon exiting contaminated work zones (exclusion zones). Work boots that are damaged on the job must be replaced.

6. TRAINING

Training in the proper use of PPE will generally be provided in conjunction with HAZWOPER training or via coursework selected and approved by Corporate H&S. Training will be completed prior to the employee's use of PPE, when changes in the work place alter the use or type of PPE, and when inadequacies in the employee's knowledge or use of PPE are noted.

The training will include at a minimum:

- When and what PPE is necessary;
- How to put on, adjust, wear and take off the PPE;
- Limitations of the PPE; and
- Proper care, maintenance, useful life, and proper disposal of PPE.

Retraining will be conducted when the workplace changes making the earlier training obsolete, the type of PPE changes or when the employee demonstrates lack of use, improper use, or insufficient skill or understanding.

7. REFERENCES (regulation citation, technical links, publications, etc.)

29 CFR 1910.120 "Hazardous Waste Operations and Emergency Response"

29 CFR 1910 Subpart I "Personal Protective Equipment"

29 CFR 1910.136 Foot Protection

29 CFR 1910.6 Incorporation by reference

8. RECORDS - DATA RECORDING AND MANAGEMENT

Records of the PPE training are retained by the employee and in the ARCADIS training database. Medical clearance for respirator use is maintained by the employee and ARCADIS' medical vendor.

9. APPROVALS AND HISTORY OF CHANGE

Approved by: Tony Tremblay, CSP – Corporate H&S, Director of Technical Programs

History of Change

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
20 February 2009	01	Miriam Koesterich/Mike Thomas	Original document
19 August 2011	02	Sue Byers/Mija Coppola	Updated footwear protection consensus standards, clarified contaminated work boot section and updated document format
2 February 2012	03	Tony Tremblay	Clarified temp staff PPE issues in sections 5.1 and 5.6.1
16 January 2013	04	Pat Vollertsen/Tony Tremblay	Added hand protection to section 5.1, added to employee responsibility in section 4.5, and added information on when eye protection should be worn in section 5.6
12 February 2013	05	Amanda Tine/Tony Tremblay	Added that PPE must be properly fitted. Added requirements for employees that bring their own PPE; Added Retraining information into Section 6
23 June 2014	06	Tony Tremblay	Identified minimum PPE requirements for ARCADIS field work in section 5.1 of HSS; Updated footwear protection consensus standard information in Section 5.6.4; and updated foot protection definition

Exhibit 1 – Definitions

Eye/Face Protection - Equipment designed to provide eye or face protection when exposed to hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.

Foot Protection - Footwear designed to provide foot and toe protection when working in areas where there is a danger of foot injuries due to falling or rolling objects, or objects piercing the sole, and/or where an employee's feet are exposed to electrical hazards. These include such measures as safety toe cap and puncture resistant soles.

Hand and Body Protection - Equipment designed to provide protection to the hands and body during exposures to potential hazards such as potential for skin absorption of harmful substances, sharp objects, abrasive surfaces, punctures, temperature extremes and chemical contact.

Hazard Assessment - The process utilized to identify hazards in the workplace and to select the appropriate PPE to guard people against potential hazards.

Head Protection - Equipment designed to provide protection to the head during exposure to potential hazards such as falling objects, striking against objects or electrical hazards.

Hearing Protection - Equipment designed to provide protection to an individual's hearing during exposure to excessive noise levels and any 8hr work day with noise levels consistently 85dB or above.

Personal Protective Equipment (PPE) - Equipment designed to provide protection to the wearer from potential hazards to the eyes, face, hands, head, feet, ears, extremities and respiratory system.

Respiratory Protection - Equipment designed to provide protection to the wearer from potential inhalation hazards such as vapors, mists, particulates and gases.

Implementation Date 15 February 2010	Arcadis HS Standard Name Stop Work Authority	ARCADIS Design & Consultancy for natural and built assets
Revision Date 22 October 2015	Arcadis HS Standard No. ARC HSGE009	Revision Number 04

EXECUTIVE SUMMARY

This Health and Safety Standard (HSS) describes the authority, obligation and responsibility to stop potentially unsafe work at the earliest stage possible. Every Arcadis and subcontractor employee is responsible for prevention of unsafe acts, behaviors or conditions, consequently preventing harm to people, the environment or property.

Every Arcadis and subcontractor employee has the authority and obligation to stop work that he or she considers to be unsafe. The Arcadis leadership team is committed to support anyone who exercises his or her 'Stop Work' authority. There will be no negative consequences as a result of 'Stop Work' actions.

This standard applies to all activities performed by Arcadis or on behalf of Arcadis. A stop work process will include the participation of all Arcadis, Arcadis subcontractors and other involved personnel as appropriate.

Senior Leaders shall establish the clear expectation for Arcadis employees and subcontractors to exercise 'Stop Work Authority'.

Project managers and field supervisors are responsible for confirming that 'Stop Work' requirements and obligations are understood thoroughly by Arcadis and subcontractor employees.

'Stop Work' involves:

- Initiating a 'Stop Work.'
- Notifying affected employees, other personnel (including client staff) and supervision.
- Assessing hazards and associated risks.
- Identifying and implementing controls.
- Resuming work once a hazard assessment and controls implementation (if applicable) are approved by a competent person and are satisfactory to all parties involved.

The "Stop Work" process will be included in employee induction, and in ongoing company communications and during Tailgate meetings

Records will be maintained to include Tailgate Meeting forms and Incident Investigation reports

1. POLICY

It is Arcadis policy that during the conduct of their work, Arcadis and subcontractor employees have the authority and responsibility to Stop Work immediately in any situation when the Health, Safety, Security and Environment hazards and associated risks associated with work being performed is not clearly understood, established or controlled. This standard presents the requirements to be observed if and when this situation occurs.

2. PURPOSE AND SCOPE

2.1 Purpose

This standard describes the authority, obligation and responsibility to stop potentially unsafe work at the earliest stage possible. Every Arcadis and subcontractor employee is responsible for prevention of unsafe acts, behaviors or conditions, consequently preventing harm to people, the environment or property.

Every Arcadis and subcontractor employee has the authority and obligation to stop work that he or she considers to be unsafe. The Arcadis leadership team is committed to support anyone who exercises his or her 'Stop Work' authority. There will be no negative consequences as a result of 'Stop Work' actions.

2.2 Scope

This standard applies to all activities performed by Arcadis or on behalf of Arcadis. A stop work process will include the participation of all Arcadis, Arcadis subcontractors and other involved personnel as appropriate.

3. DEFINITIONS

Definitions relating to this HSS can be found in Exhibit 1.

4. RESPONSIBILITIES

4.1 Senior Leaders (including Account Managers and company leadership)

In the scope of this HSS, senior leaders shall establish the clear expectation for Arcadis employees and subcontractors to exercise 'Stop Work Authority', create a culture where 'Stop Work' is exercised freely, resolve 'Stop Work' conflicts when they arise, and hold those accountable who do not to comply with established 'Stop Work' policies.

4.2 Project Managers and Field Supervisors

In the scope of this standard, project managers and field supervisors are responsible for confirming that 'Stop Work' requirements and obligations are understood thoroughly by Arcadis and subcontractor employees, creating a culture where 'Stop Work' is exercised freely, honoring and responding promptly to requests to stop work, working to resolve issues to the satisfaction of all involved parties before operations resume, recognizing proactive participation and verifying that all 'Stop Work' actions are properly reported with required follow-up, as necessary.

4.3 Arcadis and Subcontractor Employees

In the scope of this standard, Arcadis and subcontractor employees are responsible for understanding their authority and obligations under 'Stop Work,' initiating a 'Stop Work' intervention when warranted, supporting the intervention of others and properly reporting all 'Stop Work' actions as described in this standard. Arcadis and subcontractor employees are responsible for understanding the hazards of their activities, implementing the controls for the hazards and using 'Stop Work' authority if they don't understand the hazards, their job tasks, or if they do not feel safe for any reason. In addition, employees will participate in determining and implementing the solutions for mitigating the unsafe issue.

5. PROCEDURE

5.1 General Requirements

Arcadis and subcontractor employees shall be made aware of their obligation to 'Stop Work' for issues that they consider to be unsafe.

Employees have the authority, obligation and responsibility to stop any task or operation where there are concerns or questions regarding the control of the hazards or risks associated with a task or operation that is being performed.

No work will resume until all 'Stop Work' concerns or questions have been adequately addressed and associated risks have been eliminated or mitigated to acceptable levels to the satisfaction of all parties involved.

All employees are made aware of the actions they shall take, including reporting, when stopping unsafe work.

All indications from personnel that the work is unsafe must be properly investigated as deemed appropriate for the situation. All instances of work being stopped for reasons of health and safety shall be recorded and appropriately investigated. This documentation may be completed using the Tailgate Meeting form or using the Arcadis Incident Investigation process.

Any form of retaliation or intimidation directed at any individual or company for exercising their authority as outlined in this standard will not be tolerated. Disregard for the requirements in this standard shall be addressed with disciplinary actions in accordance with Arcadis policy.

Before work begins, a responsible person shall be defined by the Project Manager for coordination of any 'Stop Work' activities, including hazard and risk assessment and mitigation actions following a 'Stop Work' intervention (refer to the Tailgate Meetings standard – ARC HSGE001).

5.2 Stop Work Process

In general terms, 'Stop Work' involves:

- Initiating a 'Stop Work.'

- Notifying affected employees, other personnel (including client staff) and supervision.
- Assessing hazards and associated risks.
- Identifying and implementing controls.
- Resuming work once a hazard assessment and controls implementation (if applicable) are approved by a competent person and are satisfactory to all parties involved.

5.2.1 Initiate a 'Stop Work'

When a person identifies a perceived or actual unsafe condition, act, error, omission, confusion or lack of understanding that could result in harm to persons, the environment or property, he or she shall immediately initiate a 'Stop Work' intervention.

This intervention shall:

- Be initiated in a positive manner.
- Result in a stop of associated work activities, if there is an immediate risk of injury or accident; removal of all person(s) (also persons not directly related to the Arcadis Work Team) from the area; as appropriate to the issue; stabilization of the situation and making the area as safe as possible, until more permanent solutions can be developed and implemented as appropriate to the situation.
- If there is no immediate risk, address the potentially unsafe issue with the person(s) potentially at risk and/or the person(s) causing the risk. This includes all affected employees of Arcadis, subcontractor, client and other parties.

5.2.2 Notifying the Affected Parties

All personnel affected by the 'Stop Work' situation shall be notified as soon as possible.

5.2.3 Assessing Hazards and Associated Risks

A competent person (e.g. task manager, field supervisor, task or job expert, H&S resource) shall guide the assessment for potential hazards and risks by involving the affected parties to determine the hazards and assess the associated risks, so that appropriate controls can be identified. This information will be documented on the Tailgate Meeting form or an incident investigation form in 4Sight.

5.2.4 Identifying Controls

To identify controls that eliminate risk or mitigate it to an acceptable level and to decide on an appropriate course of action, the following questions and others shall be considered:

- How can the risk be controlled or otherwise mitigated to an acceptable level and to the reasonable satisfaction of the parties involved?

- Is a competent person approving the hazard and risk assessment and the identified controls in order to prepare to re- start work?

All affected parties should be in agreement with the hazard and risk assessment and controls identification.

The results of the hazard and risk assessment and controls identification resulting from the 'Stop Work' shall be reported, documented and maintained on either Tailgate Meeting form or the incident investigation form as appropriate for the issue.

5.2.5 Qualifiers for Stopping/Resuming Work

The following should be considered when stopping or resuming work as the result of a 'Stop Work' intervention:

- If the 'Stop Work' intervention is based on a perceived (but not an actual) risk as determined from the hazard and risk assessment, the affected person(s), as appropriate, should:
    - Show appreciation to the initiator for his or her awareness and concern.
    - Proceed with work.
    - Share the learnings with the initiator and involved parties.
- If the 'Stop Work' intervention is based on an actual risk that cannot be immediately assessed and/or controlled on site by the present employees and available resources, work shall be suspended. If the identified controls that mitigate the risk in the 'Stop Work' situation are not within the original scope of work, the change will be managed appropriately, and the JSA and HASP should be reviewed to include a hazard and risk assessment and identify subsequent controls.
- If the work is in the scope of a permit, the permit issuer shall review/reissue the permit with the necessary changes or modifications.

Work can be resumed only once a competent person with the appropriate level of authority approves the hazard and risk assessment and the implemented controls and all parties are satisfied with the controls.

5.3 Stop Work ("If Not Me, Then Who?") Involving Parties Outside of Arcadis Control

The Arcadis H&S Vision and Policy and our culture of TRACK to 0 puts H&S first in all things. Yet, stopping work or intervening under the Arcadis "If Not Me, Then Who?" concepts when it involves parties outside of Arcadis control must be implemented in such a way to protect the health and safety of our staff members, but also to protect the company from any undue risk and liability. Consequently, a separate guidance document has been developed and included as Exhibit 2.

5.4 Reporting

All planned and unplanned 'Stop Work' interventions shall be documented on the Tailgate Meeting form, and/or in 4-Sight as a near miss report or incident investigation report, as appropriate to the issue.

Adequate descriptions shall be given of the act, behavior or condition that caused the 'Stop Work' intervention, its hazard and risk assessment and implemented risk mitigations.

Near miss and incident reports shall be reviewed by H&S personnel and reported to senior leaders to:

- Measure participation.
- Determine the quality of interventions and follow-up.
- Track common issues and identify trends and opportunities for improvement.
- Facilitate the sharing of learnings.
- Provide feedback from recognition programs.

The H&S team shall regularly communicate incident details reported by Business Line as well as details regarding common trends and learnings.

6. TRAINING

The "Stop Work" process will be included in H&S Orientation training, in ongoing company communications and reinforced during Tailgate meetings.

7. REFERENCES (regulation citation, technical links, publications, etc.)

Arcadis Health and Safety Plan standard – ARC HSFS010

Arcadis Incident Investigation Standard – ARC HSMS010

8. RECORDS - DATA RECORDING AND MANAGEMENT

Stop Work actions shall be documented in:

- Tailgate Meeting forms; and/or
- Incident Investigation reports

9. APPROVALS AND HISTORY OF CHANGE

Approved By:

Tony Tremblay, CSP – Corporate H&S, Director of Technical Programs

History of Change

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
15 February 2010	01	Mike Thomas	Original document
17 April 2012	02	Camille Carollo/Tony Tremblay	Executive Summary added
16 January 2013	03	Pat Vollertsen/Tony Tremblay	Revised section 6.0 and Executive summary in regard to training
22 October 2015	04	Tony Tremblay/Julie Santaniello	Section 3 Definitions moved to Exhibit 1; Section 5.3 Stop Work ("If Not Me, Then Who?") Involving Parties Outside of Arcadis Control added and existing section 5.3 renumbered to Section 5.4; text updated in Section 5.4; Document template updated; Exhibit 2 If Not Me, Then Who guidance document added

Exhibit 1

Planned 'Stop Work' is a 'Stop Work' situation previously identified in a Job Loss Analysis, HASP or other standard (e.g., 'Stop Work' trigger)

'Stop Work' is the stopping of all activities associated with a task, condition, situation, action or activity (issue) that anyone views as potentially unsafe. 'Stop Work' can be applied to the single issue, a group of issues, or an entire job project or site as applicable.

Exhibit 2 – If Not Me, Then Who? Guidance Document

ARCADIS Design & Consultancy for natural and built assets

IF NOT ME, THEN WHO?

- H&S SITUATIONS WHERE NO ARCADIS EMPLOYEES ARE INVOLVED OR WHEN ARCADIS DOES NOT HAVE HEALTH & SAFETY RESPONSIBILITY-

Effective: 1 March 2013

This document addresses the "If Not Me, Then Who?" concept in perceived or actual H&S situations (unsafe acts or behaviors, unsafe conditions, etc.) which do not involve our employees or partners and where we are not contractually or statutorily responsible for H&S[1].

For example, what does an Arcadis employee do, when Arcadis has no construction site responsibility but they see that a fence that was erected by a general contractor and is supposed to be protecting this site, has a gap that may allow an unauthorized person to enter the site where they could be injured?

The Arcadis H&S Vision and Policy, and our culture using TRACK to 0 concept put H&S first in all things. Yet we also have the need to protect ourselves from injury and the company from undue risk and liability:

1. Take a minute to think through the situation, related risks, and risks that would result from corrective action (TRACK).
2. Act immediately to safe lives if in your best judgment delay would cost lives or severe injuries (imminent danger).
3. If we see unsafe acts/behavior or conditions that are not imminent dangers: speak up and promptly notify the appropriate party. In a project: liaise with project manager about best person to address (consider H&S responsible person - contractor and client). In other situations, attempt to identify the person with H&S or overall responsibility for the activities.
4. Re-confirm the formal H&S responsibilities (law & contract) with H&S and legal department before doing anything else, or, if action could not be postponed for risk of losing lives/severe injuries, immediately after the action.
5. When having pointed out, or about to point out, areas of concern outside of our scope of responsibilities, accompany with a specific disclaimer[2].
6. Refrain from taking H&S responsibility through further action (actual corrections, audits, reviews or other)[3].

It is noted that the above example actually occurred involving an Arcadis employee. Instead of notifying the appropriate parties of the situation, our employee attempted to fix the contractor fence and got seriously injured in doing so. This resulted in lost time to our employee and a recordable injury against the company.

EXECUTIVE SUMMARY

The purpose of the Arcadis Hearing Conservation Health and Safety Standard (HSS) is to provide a standard policy on the health and safety requirements and processes for all employees with potential exposure to excessive noise (levels in excess of 80 decibels in the A scale (dBA)) and to comply with occupational exposure limits established by the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), detailed in Exhibit 2 and the Occupational Safety and Health Administration (OSHA) Occupational Noise Exposure Standard (29 CFR 1910.95).

This HSS and associated procedures apply to every project and all operations conducted by Arcadis. Hearing Protection Devices (HPDs) are supplied and/or approved by Arcadis for use by employees in carrying out their assignments. All employees conducting work where the potential for noise exposure exceeds 85 dBA as an 8-hour time-weighted average (TWA) are required to use their assigned HPDs as required by the project Health and Safety Plan (HASP), Job Safety Analysis (JSA), and/or client requirements.

When information indicates that an employee's exposure may equal or exceed an 8-hour TWA of 80 dBA, Arcadis shall conduct a noise exposure evaluation (e.g., review of historical exposure monitoring data, published sound levels for anticipated activities) and, as warranted, develop and implement a monitoring program. This evaluation and/or assessment where excessive noise may be present is conducted in order to evaluate potential engineering/administrative controls and to assist in identifying the necessity for HPDs.

Arcadis will make hearing protection devices available to staff to wear when exposed to noise that exceeds an 8-hour TWA of 80 dBA or a peak sound pressure level of 130 dB C-weighted (dBC) for any amount of time.

Where noise exposure cannot be eliminated or minimized by engineering and administrative controls and an Arcadis employee will be exposed to noise at or over an 8-hour TWA of 85 dBA, employees will be required to wear appropriate hearing protection. When in doubt, Arcadis will provide hearing protection.

If an employee is exposed to noise at 85 dBA or higher for an 8-hr TWA, then they are required to have audiometric testing included as part of their workplace medical surveillance. Audiometric tests will be scheduled in conjunction with pre-placement, periodic, and termination medical examinations as required by the Medical Surveillance Program.

Where work area noise levels exceed 85 dBA and it is feasible to do so, Arcadis shall require that noise hazard signs be posted.

Managers have the responsibility to steward the Health & Safety (H&S) program to ensure that staff in their practice are appropriately equipped with the necessary HPDs and have been provided the appropriate training.

Employees required to wear HPDs will receive training in the use and care of all hearing protectors provided to them. The training program shall be repeated annually for each employee included in the hearing conservation program.

All records regarding noise exposure measurements will be maintained by the offices for two years. All audiometric test records will be maintained the third party administrator (TPA) for the Arcadis medical surveillance program (currently WorkCare) for the duration of the affected employee’s employment.

1. POLICY

It is the policy of Arcadis to assess noise hazards resulting from or encountered by our staff during job activities and to control such noise hazards to minimize and eliminate hearing loss among our staff, subcontractors, clients, and the public. Arcadis will make hearing protection devices available to staff to wear when exposed to noise that exceeds an 8-hour time-weighted average (TWA) of 80 decibels in the A scale (dBA) or a peak sound pressure level of 130 dB C-weighted (dBC) for any amount of time. Where noise exposure cannot be eliminated or minimized by engineering and administrative controls and an Arcadis employee will be exposed to noise at or over an 8-hour TWA of 85 dBA, employees will be required to wear appropriate hearing protection. When in doubt, Arcadis will provide hearing protection.

2. PURPOSE AND SCOPE

2.1 Purpose

Arcadis is committed to providing a healthy and safe work environment for our employees, subcontractors, clients and visitors. The purpose of the Arcadis Hearing Conservation Health and Safety Standard (HSS) is to provide a standard policy on the health and safety requirements and processes for employees with potential exposure to excessive noise (levels in excess of 80 dBA) and to comply with occupational exposure limits established by the American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), detailed in Exhibit 2 and the Occupational Safety and Health Administration (OSHA) Occupational Noise Exposure Standard (29 CFR 1910.95)..

2.2 Scope

This HSS applies to every project and all operations conducted by Arcadis. Hearing Protection Devices (HPDs) will be supplied and/or approved by Arcadis for use by employees in carrying out their assignments. All employees conducting work where the potential for noise exposure exceeds 85 dBA as an 8-hour TWA are required to have their assigned HPDs available and used as required by the project Health & Safety Plan (HASP), Job Safety Analysis (JSA) and/or client requirements.

3. DEFINITIONS

There are a number of definitions associated with this standard. These definitions are presented in Exhibit 1 of this document.

4. RESPONSIBILITIES

4.1 Employees

Employees are required to wear prescribed HPDs during activities where noise levels will exceed 85 dBA as an 8-hour TWA. The requirements for availability, selection and use of HPDs shall be defined by project HASPs, JSAs and/or client requirements.

In addition, employees have the responsibilities to adhere to this HSS and to communicate H&S concerns, issues and questions to their supervisor or their respective H&S resource. In addition, all employees have the responsibility to:

- Maintain hearing protectors in sanitary condition and proper working order;
- Use the **TRACK** process prior to any activity;
- Follow all Arcadis and client requirements;
- Participate in the medical surveillance program, including annual audiogram and hearing conservation training, as applicable based on their job duties;
- Notify both their Supervisor and Corporate Health and Safety if they were exposed to high noise levels and required to wear hearing protection during the previous year and are not already in the medical surveillance program; and
- Understand and appropriately use the “Stop Work Authority” concept.

4.2 Supervisors and Operations Managers

Supervisors and Operations Managers have the responsibility to steward the H&S program to ensure that staff in their practice are appropriately equipped with the necessary hearing protection and have been provided the appropriate training. To accomplish this, Supervisors have the responsibility to know and understand our H&S program, policy, vision, and this HSS in detail enough so as to be prepared to explain it to a client when required. In addition, Supervisors have the responsibility to provide oversight management for the H&S of employees in their respective operations. Each will assure that appropriate time and resources are provided to facilitate the implementation of this HSS. In addition, the Supervisors will involve themselves in any “Stop Work” issued by an employee, as requested by an Arcadis employee, project manager, or Operations Managers. Supervisors will assist in resolving the issue associated with the “Stop Work Authority” issued by an employee.

4.3 Project Managers and Task Managers

Project Managers (PMs) and Task Managers (TMs) have the responsibility to know and follow applicable Arcadis and client H&S requirements for ensuring work is conducted in accordance with this HSS, and for implementing the requirements in this HSS on any project and/or office that pose hazards to Arcadis employees or employees of its subcontractors, clients, and other organizations present in the vicinity of work controlled by Arcadis.

For project related work, PMs and TMs responsibilities also include determining and communicating any specific client requirements that are applicable, including:

- Taking appropriate steps to minimize the risk of noise-induced hearing loss that may include implementing noise control measures, as well as the provision of hearing protection devices to employees, as required;
- Communicating with and appropriately managing subcontractors, ensuring that employees have appropriate training and qualifications, and for ensuring all client HS requirements are met;

- Involving the appropriate Arcadis H&S staff and project client staff, as necessary;
- Ensuring that all subcontractors have been communicated with concerning the minimum H&S requirements for the project;
- Providing adequate resources and budget for personal protective equipment (PPE), including HPDs, at no cost to the employee; and
- Ensure that Arcadis employees working on their projects are properly using and caring for their HPDs.

In addition, as project and client agents and on behalf of Arcadis, the Project Managers and Task Managers for client-related work shall be responsible for:

- Stewarding H&S and setting expectations that all Arcadis employees working on their projects must comply with H&S rules and requirements;
- Guaranteeing each employee the absolute right to exercise “Stop Work Authority” in good faith without fear of retribution or disciplinary action; and
- Using the Arcadis Incident Investigation process for formally resolving a “Stop Work” condition.

Using this “Stop Work Authority” process, the Project and/or Task Manager and the employee will:

- Discuss and document the condition;
- Identify and document the root cause for the condition;
- Determine and document the solutions;
- Implement the solutions; and
- Sign and acknowledge the solutions are in place to the satisfaction of the employee.

4.4 Corporate H&S Staff

Corporate H&S Staff have the responsibility for:

- Communicating the policy and standard requirements in this HSS with Arcadis staff;
- Ensuring that Operations Management, Supervisors, Project/Task Managers, and staff affected by excessive noise are aware of this HSS;
- Ensuring this HSS is being implemented effectively;
- Provide technical services and advice regarding control measures, assist employees in the selection of appropriate hearing protective devices and provide instruction on their use, maintenance and care, as requested;
- Provide required training or guidance on approved training options; and

- Review, evaluate and maintain this HSS on a routine basis.

4.5 Health & Safety Managers, Specialists and Site Safety Officers

Health and Safety Managers and Specialists and Site Safety Officers are responsible for facilitating the policy and standard requirements in this HSS in their area of responsibility and for providing “hands-on” assistance to Arcadis staff to ensure this standard is appropriately implemented.

5. PROCEDURES

5.1 Noise Monitoring and Exposure Assessments

When information indicates that an employee's exposure may equal or exceed an 8-hour TWA of 80 dBA, Arcadis shall conduct a noise exposure evaluation (e.g., review of historical exposure monitoring data, published sound levels for anticipated activities) and, as warranted, develop and implement a monitoring program. This evaluation and/or assessment where excessive noise may be present is conducted in order to evaluate potential engineering/administrative controls and to assist in identifying the necessity for HPDs.

Noise monitoring will be prescribed by H&S professionals during the development of HASP and/or JSA. Noise monitoring may also be conducted at the discretion of the Site Safety Officer (SSO) or any staff members that have questions or concerns about potential noise exposure that could result in employee exposure above 85 dBA as an 8-hour TWA. If noise monitoring is not feasible, Arcadis staff will assume that exposures that require elevated speech are above 85 dbA and will use appropriate hearing protection. Noise monitoring results will be collected in accordance with the OSHA *Occupational Noise Exposure Standard* (29 CFR 1910.95). Monitoring results will be communicated to staff and used to determine adequate types and effectiveness of hearing protection device.

The measurement of the A-weighted sound pressure level in a work place shall be performed instantaneously, during normal working conditions, using the slow response setting of a sound level meter. Noise exposure level is determined through the integration of all continuous, intermittent and impulsive sounds between 80 dB and 130 dB.

During this noise hazard investigation, the following matters shall be considered:

- the sources of sound in the work place;
- the A-weighted sound pressure levels to which the employee is likely to be exposed and the duration of such exposure;
- the methods being used to reduce this exposure;
- whether the exposure of the employee is likely to exceed the 85 dBA as an 8-hour TWA or other limits defined in the Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices; and
- whether the employee is likely to be exposed to a noise exposure level equal to or greater than 85 dBA as an 8-hour TLV-TWA.

On completion of the noise hazard assessment or monitoring, the person appointed to carry out the assessment or monitoring shall document:

- observations with regards to potential noise exposure;
- recommendations respecting the measures that should be taken to limit employee exposure to noise;
- requirements that HPDs will be made available to staff to wear when exposed to noise that exceeds an 8-hour TWA of 80 dBA or a peak sound pressure level of 130 dBC for any amount of time; and
- requirements for use of hearing protection by employees who are exposed to a noise exposure level equal to or greater than 85 dBA as an 8-hour TWA.

5.2 Reduction / Control of Noise Exposure

Insofar as is reasonably practicable, Arcadis shall, by engineering controls or physical means other than hearing protectors, reduce the exposure to sound of employees to a level that does not exceed an 8-hour TWA noise exposure level of 85 dBA or other limits defined in the ACGIH TLV – refer to Exhibit 2.

The hierarchy of control that must be followed:

1. *Eliminating the Noise Source* - The elimination of a source of noise is the most effective way to prevent risks to employees, and should always be considered when new work equipment or workplaces are planned.

2. *Engineering Controls* – The next best method of dealing with noise in the workplace is to reduce the noise at the source through the use of engineering controls. Engineering controls can eliminate the need for hearing protection; audiometric testing, and other elements of a hearing conservation program. Even if noise cannot be reduced to safe levels at the source, reducing noise increases the likelihood that hearing protection will be even more effective in reducing noise exposures below the 85 dBA exposure limit. Some possible options include reduction of noise at source, enclosure of noise source, enclosure of employees, acoustical treatment of room, separating workers from the noise source and a combination of these controls. In addition, substitution controls may be employed, as part of the engineering control measures.

3. *Administrative Controls* - Education and training are the primary administrative controls for hearing protection. Administrative controls also include measures such as work-rest cycles and infrequent work tasks. These controls are aimed at reducing the time a worker is potentially exposed to noise.

4. *Use of Personal Protective Equipment (PPE)* - When engineering controls cannot eliminate the noise hazard, HPDs will be used to lower noise exposures to acceptable levels. Hearing protection in the form of ear plugs and/or ear muffs are examples of hearing protection devices that can help serve to minimize noise exposures.

5.3 Warning Signs

Workplaces in which the noise level exceeds 85 dBA TWA, and where it is feasible to do so, will have signs posted. Signs shall read “Caution - Hearing Protection Required." In extreme noise areas with measured noise levels greater than 105 dBA, signs shall read “Danger – Hearing Protection Required.” In some cases, the responsibility will fall upon the client and/or contractor to post these warning signs. For temporary work locations, Arcadis will coordinate/discuss required warning sign requirements with the controlling contractor.

5.4 Audiometric Testing

Arcadis has established and maintains an audiometric testing program by making audiometric testing available to all employees whose exposures equal or exceed an 8-hour TWA of 85 decibels.

Within 6 months of an employee's first exposure at or above the action level, Arcadis shall establish a valid baseline audiogram against which subsequent audiograms can be compared.

At least annually after obtaining the baseline audiogram, Arcadis shall obtain a new audiogram for each employee exposed at or above an 8-hour TWA of 85 decibels.

Audiometric tests will be scheduled in conjunction with pre-placement, periodic, and termination medical examinations as required by the Medical Surveillance Program (ARC HSGE010). All employees that are not already part of the medical surveillance program must inform their supervisor and Corporate Health and Safety if they were exposed to high noise levels as part of their job duties. Employees that were exposed to high noise levels must receive an audiogram as specified by the Medical Surveillance Program. Employees will be informed of the requirement that they avoid both non-occupational and occupational noise exposure for 14 hours prior to audiometric testing.

Audiograms will be compared to baseline and prior tests to determine if a standard threshold shift has occurred. The TPA for the Arcadis Medical Surveillance Program (currently WorkCare) will directly notify an employee and the Arcadis Corporate Health and Safety Medical Surveillance Program Administrator in writing of a standard threshold shift within 21 days of determination. If a shift is detected, retesting may be done within 30 days. If a shift is confirmed, the employee will be informed in writing and may need to be refitted and retrained in hearing protection use. If subsequent testing shows that a standard threshold shift is not present, the employee will be informed. Additional audiometric testing may be conducted at the discretion of Health and Safety.

The TPA physician or audiologist will determine if further evaluation is needed and, if so, will provide to the specialist all the information that is required. If the physician determines that the medical pathology is unrelated to work exposure or wearing hearing protectors, the employee will be informed by the physician.

The Audiometric Testing program will be managed by Arcadis’ TPA for the medical surveillance program.

5.5 Hearing Protection Devices

HPDs will be available to all workers exposed to noise levels that exceed 80 dBA as an 8-hour TWA and will be required when workers are exposed to noise levels that exceed

85 dBA as an 8-hour TWA. HPDs will be provided at no cost to the employee. Some types of hearing protection include:

- Ear Muffs – fit over the whole ear and seal the ear from noise. The efficiency of the muff type may decrease if the muff is not fitted properly or if glasses are worn with them.
- Ear Plugs – which are worn in the internal part of the ear and they are made of a variety of materials (rubber, plastic, or other material) that will fit tightly in the ear.

Arcadis shall supply a hearing protector that:

- Has appropriate Environmental Protection Agency (EPA) labeling for hearing protectors (40 CFR 211), which requires manufacturers to identify the noise reduction capability of all hearing protectors on the hearing protector package. This measure is referred to as the noise reduction rating (NRR); and
- Prevents the employee using the hearing protector from being exposed to a level of sound that exceeds the limits detailed in Exhibit 2.

Note: The actual effectiveness of any individual hearing protector cannot be determined under workplace conditions. However, OSHA's noise standards (29 CFR 1910.95(j)(2) and 29 CFR 1926.52(b)) require that personal hearing protection be worn to attenuate the occupational noise exposure of employees. Arcadis chooses to implement the ACGIH-TLV for noise exposure. OSHA Occupational Noise Exposure Standard, Appendix B: Methods For Estimating the Adequacy of Hearing Protector Attenuation provides information on how to determine the adequacy of hearing protector attenuation using the NRR of a given hearing protector.

As a Best Management Practice, Arcadis employees working in **extreme** noise areas are directed to wear “dual” hearing protection, consisting of earplugs along with earmuffs. Additional engineering and/or administrative controls limiting the exposure time to keep the sound from reaching the worker’s ear drum below 85 dBA TWA must also be initiated. *Extreme noise areas are defined as areas with measured noise levels greater than 105 dBA for any amount of time*. Based on current OSHA policy, the wearing of ear muffs over ear plugs will boost the overall attenuation of the earplugs by 5 dB.

Employees will be given the opportunity to select their HPDs from a suitable variety.

Arcadis shall provide training in the use and care of all HPDs provided to employees.

6. TRAINING

Employees who have noise exposure exceeds 80 dBA as an 8-hour TWA value, will be required to receive training on noise hazards, the selection, use and care of HPDs.

Employees required to wear hearing protection will receive training as provided by Corporate H&S. The training will be provided at least annually with refresher training as necessary and will include:

- information regarding: effects of noise on hearing;
- purpose of hearing protectors;

- advantages, disadvantages, and attenuation of various types of hearing protectors;
- selection, fitting, use, and care of hearing protectors; and
- purpose of audiometric testing and an explanation of the test procedures.

7. REFERENCES (regulation citation, technical links, publications, etc.)

- OSHA Standard 29 CFR 1910.95

- ACGIH Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices

- Noise Navigator™ Sound Level Database with over 1700 Sound Level Measurement Values; E-A-R 88-34/HP; 3M Occupational Health & Environmental Safety Division; July 6, 2010; Version 1.5 (Refer to Noise Hazard question #2 link to excel file)

8. RECORDS

Record Maintenance – All records regarding noise exposure measurements will be maintained by the offices for two years. All audiometric test records will be maintained by the TPA for the Arcadis Medical Surveillance Program for the duration of the affected employee's employment.

9. APPROVALS AND HISTORY OF CHANGE

Approved By: Julie Santaniello, CSP – Corporate H&S, Manager of Technical Programs

History of Change

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
1 December 2007	01	Mike Thomas/Tony Tremblay	Original document
30 January 2008	02		Change to new template
5 October 2010	03		Change name from Procedure to Standard; revision of section 5.3

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
12 December 2012	04		Executive Summary Added; HSP changed to HSS; Definitions relocated to Exhibit 1 and added Representative Exposure definition; Added BMP regarding use of both ear plugs and ear muffs when noise level exceeds 105 dBA; Requirement for use of HPD aligned with ACGIH Noise TLV; Training Section updated; References hyperlinked; Section 7 Hyperlinks added, including link to Common Noise Level Reference table; NRR to assess hearing protector adequacy calculation added to Exhibit 1 NRR definition
10 June 2013	05	Tony Tremblay	Noise Exposure values clarified in Executive Summary; Section 5 reformatted to include noise monitoring exposure and assessment, reduction/control of noise exposure, warning signs, audiometric testing and HPDs; Section 6 determining when noise exposure Training clarified
01 October 2013	06	Lauren Edwards	Changed the requirement for an audiometric exam within in 6 months if an employee is exposed to noise at 85 dBA or higher for an 8-hr TWA. Section 5.4
6 October 2014	07	Amanda Tine/Tony Tremblay	Clarified employee audiometric testing requirements in Section 5.4 based on OSHA 29 CFR 1910.95

Revision Date	Revision Number	Standard Developed/Reviewed By or Revised By	Reason for change
20 April 2017	08	Sharon Lingle, Tony Tremblay/Julie Santaniello	New format. Added TPA will notify the Arcadis employee within 21 days of a threshold shift. Updated requirements include making hearing protection devices available to staff to wear when exposed to noise that exceeds an 8-hour TWA of 80 dBA or a peak sound pressure level of 130 dBC for any amount of time; and staff are required to wear prescribed HPDs during activities where noise levels will exceed 85 dBA as an 8-hr TWA. Excessive noise definition modified.

Exhibit 1 – Definitions

Decibels – A Weighted – the unit of measure to be used when measuring noise levels on Arcadis work sites and when comparing to occupational exposure standards and limits.

Excessive Noise – noise levels in excess of 80 dBA for any amount of time (noise environment that requires speech levels above those used for normal conversation).

Extreme Noise Areas are defined as areas with measured noise levels greater than 105 dBA for any amount of time.

HSS – Health and Safety Standard

NRR – Noise Reduction Rating is the measure, in decibels, of how well a hearing protector reduces noise, as specified by the Environmental Protection Agency. The higher the number, the greater the noise reduction. When dual protectors are used, the combined NRR provides approximately 5 decibels more than the higher rated of the two products. For example, using ear plugs (NRR of 29 decibels) with ear muffs (NRR 27) would provide a Noise Reduction Rating of 34 decibels. For practical purposes, users should assume they will actually receive protection that is 5 decibels less than the published value.

When using the NRR to assess hearing protector adequacy and the sound level measurement reported is in the "A" scale, the following method is used to evaluate the adequacy of the hearing protector attenuation:

Step 1: Convert the A-weighted dose to TWA (dBA)

Step 2: Subtract 7 dB from the NRR

Step 3: Subtract the remainder of Step 2 from the A-weighted TWA (Step 1 value) to obtain the estimated A-weighted TWA under the ear protector.

Representative Exposure - Measurements of an employee's noise dose or 8-hour time-weighted average sound level that the employers deem to be representative of the exposures of other employees in the workplace.

Sound Level Meter means a device for measuring sound pressure level that meets the performance requirements for a Type 2 instrument as specified in the International Electrotechnical Commission Standard 651 (1979).

Sound Pressure Level means 20 times the logarithm to the base 10 of the ratio of the root mean square pressure of a sound to the reference sound pressure of 20 µPa, expressed in decibels.

Summary of Noise Trigger Levels:

- 80 dBA – Noise exposure assessment will be conducted if worker is or is likely to be exposed to noise at a workplace in excess of 80 dBA.
- 80 dBA – HPDs will be made available to staff to wear when exposed to noise that exceeds an 8-hour TWA of 80 dBA or a peak sound pressure level of 130 dBC for any amount of time. This will also trigger training on the selection, use and care of HPDs.
- 85 dBA – AUS staff will be **required** to use HPDs for noise levels at or exceeding 85 dBA as an 8-hour TWA.

- 85 dBA as 8-hour TWA – If employee exposed at 85 dBA or higher for an 8-hr TWA, then they are required to have audiometric testing included as part of their workplace medical surveillance.
- 85 dBA or higher – noise hazard signs posted.
- 105 dBA or higher – Employee must use both ear plugs and ear muffs together for exposure to noise for any amount of time that exceeds 105 dBA.

TWA – Time Weighted Average; The average exposure to a contaminant or condition (such as noise) to which workers may be exposed without adverse effect over a period of 8 hours a day or a 40 hour work week.

Exhibit 2 – ACGIH TLV FOR NOISE

	Duration per Day	Sound Level dBA (slow response)
Hours	24	80
	16	82
	8	85
	4	88
	2	91
	1	94
Minutes	30	97
	15	100
	7.5	103
	3.75	106
	1.88	109
	0.94	112
Seconds	28.12	115
	14.06	118
	7.03	121
	3.52	124
	1.76	127
	0.88	130
	0.44	133
	0.22	136
	0.11	139

Note: No exposure to continuous, intermittent, or impact noise in excess of a peak C-weighted level of 140 dB.

1. POLICY

Arcadis implements defensive driving programs and techniques, along with effective administrative management and controls, to assist Arcadis employees in the safe operation of motor vehicles when conducting company business.

Arcadis prohibits the use of hand-held and hands-free mobile electronic devices when driving while conducting Arcadis-related activities, whether the vehicle is in motion or stopped in traffic. This includes initiating or receiving a phone call, talking on a phone call, and texting in hand-held or hands-free mode.

2. PURPOSE AND SCOPE

2.1 Purpose

This standard provides best practices and requirements related to motor vehicle operation whilst conducting any business on behalf of Arcadis.

2.2 Scope

Business Driving – This standard applies to driving any motor vehicle during whilst conducting Arcadis business. Arcadis strongly encourages employees to follow this standard for their own personal driving.

Exceptions – Additional requirements may apply to driving certain types of motor vehicles based on specific country law/regulation and/or client expectation.

3. STANDARD REQUIREMENTS

All Arcadis drivers should determine if an alternative, safer method of transportation than driving is available, or use electronic methods such as conference calls to minimize driving. If driving is deemed the most practical mode of transportation, this section applies.

3.1 General Standards and Requirements

Only Arcadis drivers are permitted to operate Arcadis leased/owned vehicles or Arcadis rented vehicles. Exceptions to this requirement are permitted only with approval of appropriate Line Managers of the Region.

Arcadis drivers will maintain a valid driver's license, appropriate for the vehicle they are operating, that is free from any driving restrictions or suspension. An Arcadis driver who is asked to drive for business purposes in any type of vehicle, when possible, shall notify their Line Manager or Arcadis contact by the next business day if they receive a traffic violation/citation while undertaking company business or receive a moving violation during non-business-related driving in any type of motor vehicle that might affect their driving status with Arcadis. The Region will determine if the employee is permitted to drive on Arcadis business.

An Arcadis driver who is asked to drive for business purposes in any type of vehicle shall notify their Line Manager immediately if their license is suspended, revoked, or restricted.

At all times, the Arcadis driver will:

- Operate and license the vehicle in accordance with applicable laws/regulations.
- Wear seatbelts in any vehicle with seatbelts. In addition, it is recommended and considered best practice that Arcadis drivers with passengers not move the vehicle without ensuring all occupants are wearing their individual seatbelts.
- Drive defensively as instructed through training, education, and/or experience.
- Use their Stop Work Authority if they feel they are not appropriately rested and alert, and will take appropriate breaks during their journey. In regions or countries where specific rest periods are determined, Arcadis drivers will conform to the rest period requirements.
- Exercise caution when taking any prescription or over-the-counter medication that may cause drowsiness or affect driving ability. Advise your Line Managers of any medications that you may be taking.
- Not use radar/laser-type detectors.
- Not pick up hitchhikers.

On project sites, Arcadis drivers will operate the vehicle consistent with client driving rules, speed limits, and site requirements.

The driver and each passenger must ride in a seat deigned by the manufacturer for use as a seat in the vehicle used.

Arcadis owned/leased vehicles will:

- Maintain safety equipment required by local law/regulation, client requirement, or Arcadis project-specific requirement. This equipment typically inlcudes:
    - A high-visibility traffic vest that has a miminmum of 775 inches/1970 cms of bright orange or yellow background material and 201 square inches/1296 square cms of reflective material;
    - Traffic warning triangle, road flares, and/or other appropriate demarcation as required by local law/regulation or client requirement;
    - Appropriate first-aid kit;
    - Fire extinguisher (as mandated for certain vehicles per local laws/regulations or client requirement); and/or
    - Other equipment and supplies based on the use and project and as determined by risk assessment. For example, when traveling to remote locations, emergency roadside assist arrangements/contacts and emergency equipment such as a fully charged mobile or sataellite phone, water, blankets, etc., should be available in case of a breakdown
- Be fit for the purpose of its intended use, inspected, and maintained as per manufacturer recommendations, local law/regulation and client, and local Arcadis requirements.
-

- Be operated only with secure loads that are properly placed in the vehicle and do not exceed the manufacturer's specifications and gross weight limits for the vehicle as specified on the vehicles specification label.

Drivers of the following vehicles must conduct a hazard assessment and implement appropriate hazard controls for the environment where they will be operated when used in an off-road situation or when used on a public road [when permitted by local law/regulation],. and receive approval from line manager and Regional H&S Advisor: ~~or~~

- Motorcycles;
- Snowmobiles;
- All terrain vehicles (typically a 4-wheeled off-road vehicle where the driver and passenger are required to straddle the seat);
- Utility vehicles (typically a 4 or 6 wheeled vehicle designed for off road use where the driver and passenger sit side by side in a bucket or bench style seat);
- Golf carts or similar carts; and
- Farm or construction equipment.

All passengers riding on a vehicle listed above must ride in a seat designed by the manufacturer for use as a seat in the vehicle.

3.2 Defensive Driving Competency for Employees

Regions should assess the Arcadis driver's competency based on the drivers' risk considering type of vehicle, distances driven, driver experience, and driving environment along with law/regulatory or client requirements.

At a minimum, Arcadis drivers will be provided defensive driving training in accordance with local law/regulation and client and local Arcadis requirements.

3.3 Mobile Device Use and Other Distractions While Operating a Motor Vehicle

Arcadis prohibits the use of hand-held and hands-free mobile electronic devices when driving during the conduct of Arcadis-related activities, whether the vehicle is in motion or stopped in traffic. This includes initiating or receiving a phone call, talking on a phone call, and texting in hand-held or hands-free mode. Programming global positioning system (GPS) navigation devices must be done while the vehicle is parked.

3.4 Vehicle Inspections and Maintenance

All company owned or leased vehicles should be maintained in accordance with the manufacturer's guidelines and recommended service schedule. An example weekly inspection form can be found in Appendix 1. Any deficiencies identified during inspections shall be reported to Line Managers and any recommended remedial actions taken. Driver inspections should include, but are not limited to:

- Engine oil level;
- Windshield washer fluid levels and function, and condition and function of wiper blades;
- Tire pressure and wear;

- Headlight, brake light and turn signal function;
- Horn function;
- Interior lights and gauges;
- Rearview and side view mirrors;
- Heater, defroster and air conditioning;
- Presence of license plate; and
- Any required safety equipment.

Any items found to be unsatisfactory will be rectified prior to any use of the vehicle.

3.5 Fatigue Management

Employees driving vehicles on behalf of Arcadis must be rested and mentally alert. Regions should adopt their own fatigue management criteria based on country law/regulation, client requirement (for specific projects), and/or other considerations. The following table provides suggested criteria to reduce the hazards of fatigue:

Fatigue Management Suggested Criteria

Maximum Time Driving before taking a break and break duration	Maximum Hours of Driving in a 24 hour period	Maximum Time on Duty in a 24 hour period	Maximum Hours of Driving Per Week
Required: 3 hours, followed by a 15-minute break Recommend: 2 hours, followed by a 10-minute break	10	16	40 over 4 consecutive days, followed by a break of 24 hours

3.6 Insurance

Arcadis has vehicle insurance coverage for Arcadis Vehicles. This is the responsibility of the Region per country law/regulations.

Employees who drive their own vehicle for company business, as a condition for performance of his or her duties, shall comply with all minimum requirements for vehicle insurance as required by their local laws/regulations.

3.7 Driver's License Verification

Arcadis reserves the right to review and verify the validity of any employee's or temporary agency employee's driver's license per country law/regulatory requirements.

3.8 Accident Investigation

A motor vehicle accident is considered an incident that requires reporting and investigation. Regions will use the Arcadis Incident Reporting and Investigation process as soon as possible considering local laws/regulations and practices in their country. Police and insurance reports will be utilized in these investigations as available and as appropriate. Arcadis will attempt to determine the root cause of any accident based on the investigation and available information.

4. DEFINITIONS

Arcadis Vehicle: Any vehicle owned, rented, or leased by Arcadis

Arcadis Driver: Any Arcadis employee or temporary agency employee who drives an Arcadis vehicle, rental vehicle, or personal vehicle for Arcadis business reasons

Rental Vehicle: Any motor vehicle rented from an established rental car company

5. RESPONSIBILITIES

Employee Line Managers – Confirms that their employees (including temporary agency employees) who are Arcadis drivers are competent to drive while conducting company business

6. TRAINING

Arcadis drivers participating in defensive driving training programs shall maintain documentation of the training completion in accordance with local Arcadis requriement.

7. REFERENCES

Mobile Device Use and Other Distraction When Driving Policy – via Arcadis Intranet.

Vehicle Inspection Form (see Appendix 1)

8. RECORDS

Defensive driving training records

Competency Assessment records

Vehicle inspection records

Incident investigation records

9. APPROVALS AND HISTORY OF CHANGE

Revision Date	Revision Number	Reason for Change	Approved By
1 March 2010	01	Original Document	Mike Thomas
15 April 2011	02	Updates and clarification; change to mobile device usage policy	Mike Thomas
26 July 2011	03	Added TRACK in the footer of document	Mike Thomas
1 February 2012	04	Reformatted to new format for Arcadis H&S Standards	Mike Thomas
1 February 2013	05	Clarify notification of violations requirements and grammatical changes as part of the annual review	Pat Vollertsen
20 May 2016	06	Required 3-year review	Geoff Germann
30 July 2019 (ANA and AME)	07	Updated electronic device policy based on 2019 update to electronic device policy; clarified when moving violations must be reported to Arcadis; replaced “The Source” with Arcadis Intranet revised need for planning for various types of vehicles in section 3.1. section 3.5 revised. Training section revised. Added the inspection form as Appendix 1	Geoff Germann

APPENDIX 1 – VEHICLE WEEKLY “WALK-AROUND”

ARCADIS Design & Consultancy for natural and built assets

VEHICLE WEEKLY "WALK-AROUND"

Keep this form with the vehicle until completed and then route to vehicle manager. Report any deficiencies immediately for correction. (Deficiencies related to the safe operation of the vehicle must be corrected before the vehicle is used.)

Office/Project Location: Vehicle/Plate Number:

1. Check under the hood 2. Examine exterior 3. Check for leaks under hood and exterior
4. Test brakes, steering, transmission 5. Examine interior

"S" = satisfactory or "NS"= not satisfactory

If "NS" is noted, please explain below and include what corrective action was taken and the date it was taken.

	Date/Initials	S or NS	Date/Initial	S NSor	Date/Initial	S NSor	Date/Initial	S or NS
Odometer Reading:								
Inside:								
3-point Seatbelts								
Side & Rear View Mirrors								
Horn and Door Locks								
Windshield Wipers								
Heater, Defroster, AC								
Interior Lights & Panel/Gages								
Flashers & Turn Signals								
Parking & Emergency Brake								
Steering Wheel (excessive play?)								
Clutch (if applicable)								
Cleanliness								
Fire Extinguisher is present and inspected within last month								
First Aid Kit is present with no expired items								
Emergency kit is present and complete								
Engine:								
Engine (start without problem?)								
Fluid Levels & Belts (oil, brake, transmission, window washer, coolant)								
Noticeable Leaks								
Exterior:								
Back-up Alarm, if applicable, is functional								
Lights, Flashers, Signals, Reflectors								
Tires (condition, inflation, tread within legal limits)								
Spare Tire present and inflated								
Car Jack and Brace present								
Cargo Area/Tie-Downs secure								
License Tags – check tatus (date)								
Damage to Exterior – note on diagram								
General								
Next car service due date or km's driven								
Safety Triangle, road flares and/or other appropriate demarcation present, as required by local law/regulation or client requirement								
Hi-Visibility Vest in car								

Exterior Interior

Mark with an X any dents/scratches

General Rules

Stay within speed limits!

Do not drive tired!

Keep a safe distance between you and the car in front of you!

All passengers and driver to use seatbelts!

Mobile phones will not be used whilst driving!

Take regular breaks!

Checked by – Name and initials

1.	**3.**	**5.**	**7.**
2.	**4.**	**6.**	**8.**

Explanation:

Implementation Date	ARCADIS HS Standard Name	ARCADIS Design & Consultancy for natural and built assets
13 December 2006	Utility Location and Clearance	
Revision Date	ARCADIS HS Standard No.	Revision Number
13 May 2020	ARC HSFS019	17

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QUICK SHEET

Applicability

This HSS assigns responsibilities and expectations for proper utility location and clearance by both Arcadis employees and Arcadis subcontractors at project sites

Need to Know

PMs are responsible for ensuring the requirements of this HSS are followed. Project personnel are responsible for understanding the HSS and Supplemental document, having the minimum 1 year of required training in order to clear sites, understand and apply the requirement for a minimum three reliable lines of evidence for each point of work, know and understand the Arcadis 30-in tolerance Zone requirements.

If and when any line of evidence reveals planned subsurface work will occur within the Arcadis 30-inch Tolerance Zone of known/marked/located/observed utilities or structures, the project team must Stop Work and contact Corporate H&S for a review of steps the team has taken to prevent injury or incident involving the conflict.

Additional details addressing hazards, risk factors, and safe work practices are discussed in the HSS Supplemental document Sections:

1. Best Practices for Project Managers (or Their Delegates) Concerning Utility Clearance.
2. Best Practices for Field Personnel Concerning Utility Clearance.
3. Use and Limitations of Common Underground Locating Technologies and Clearance Methods.
4. Best Practices for State One Call Notification Process and Mark Outs.
5. Emergency Action Plan Guidelines for Utility Strikes.
6. Utility Location Procedures for Aquatic Work Activities.

Arcadis field personnel involved with any strike incidents including contact with a structural feature, subsurface, submerged, and/or aboveground utilities must immediately STOP WORK and contact the Project Manager to discuss the incident. If there are life threatening injuries, or the incident presents a risk to public safety (e.g. natural gas leak, downed live electrical line, flooding, or an unstable building) first call 911 or the available emergency services number for the client site or area and then call the Project Manager. The incident must be reported to Corporate Health and Safety immediately and no later than 24 hours after gaining knowledge of the incident. Compliant notification within 24 hrs. requires an acknowledgement of the notification by Corporate H&S.

The Arcadis standard client and subcontractor contracts contain required terms and conditions defining responsibility for utility clearance and the allocation of risk associated with an impacted utility.

Training

Field staff must complete a minimum of one year of utility clearance-related experience before accepting responsibility for any utility clearance tasks. This experience requires mentorship by a currently trained and experienced Arcadis employee for the processes of; completing DigSafe 811 notifications, developing a working understanding of the types of utilities present at project sites, developing a working understanding of the various reliable lines of evidence, and

participating in on-site training led by another Arcadis employee with detailed knowledge and experience in identifying utilities and structures.

Permits or Forms Required

The Utility Location HSS and associated supplements will be reviewed, and the Utility and Structures Checklist will be prepared during project planning to document and record the location and clearance process for the Site.

1. POLICY

It is the practice of Arcadis and its affiliated companies to implement appropriate, reasonable, and practical standards within acceptable and customary industry practices to promote the health and safety of its employees and avoid and mitigate exposure of risk in the performance of their work. In furtherance of this policy, Arcadis promotes and encourages compliance by all employees with this policy and standards relating to work in the vicinity of subsurface, submerged, or aboveground utilities.

2. PURPOSE AND SCOPE

2.1 Purpose

Arcadis is committed to providing a healthy and safe work environment for our employees, subcontractors, clients, and visitors. To this end, this health and safety standard (HSS) establishes general safety standards and best practices associated with the identification, management and avoidance of subsurface, submerged, and aboveground structures and utilities on project sites.

2.2 Scope

This HSS assigns responsibilities and expectations for proper utility location and clearance by both Arcadis employees and Arcadis subcontractors at project sites.

3. DEFINITIONS

Definitions related to Utility Location and Clearance can be found in Exhibit 1. Acronyms and Abbreviations are found in Exhibit 2.

4. RESPONSIBILITIES

Project staff involved in subsurface and aboveground work activities are expected to read, understanding and comply with this HSS and the ARC HSFS-019 Supplements, specifically ARC HSFS-019 Supplement Sections 2 and 3, make the required DigSafe notification(s), and complete the appropriate checklists during the on-site utility and structures locate and clearance process.

4.1 Project Managers

For every project site having the potential to come into contact with utilities, Project Managers (PMs) are responsible for the requirements of this HSS in that:

- The requirements of this HSS are followed.
- Local regulations governing utility clearance are followed. This includes ensuring local and/or state laws defining activities or depth of intrusive work/excavation requiring utility clearance are reviewed as they vary by location. For further information, refer to the

Common Ground Alliance One Call State Law Directory (https://commongroundalliance.com/map).

- Efforts are made to work with the client, project site representatives, public utility companies, and subcontractors to identify the nature of any utilities and to determine control processes that need to be implemented by Arcadis and the subcontractors to prevent damage to these utilities and to properly manage the effects in the event there is utility damage.

- In jurisdictions where the actual contractor performing the subsurface intrusive work is required to perform utility clearance notifications (811, State One Call, etc.) ***and*** Arcadis is also self-performing the work, Arcadis will complete the clearance notifications and include the ticket number on the Utility Clearance Checklist. Refer to ARC HSFS-019 Supplement Section 4 for Best Practices for State One Call procedures.

- Utility clearance activities are only delegated to a Task Manager or other individual meeting the requirements of Section 4.2 below, as appropriate. However, even if the Project Manager delegates certain responsibilities, the Project Manager maintains primary responsibility for the completion of utility clearance. For additional information on Project Manager responsibilities and best practices, refer to ARC HSFS-019 Supplement 1.

- Prior to beginning subsurface work, Project Managers or designee must review the Utility and Structures Checklist with staff and Arcadis subcontractors (including subs of subs). The Project Manager or designee review must be documented on the Utility and Structures Checklist prior to starting subsurface intrusive work

4.2 Field Personnel Responsibilities

Arcadis field personnel conducting work on a project site having the potential to come into contact with utilities have the responsibility to:

- Read, understand, and follow this HSS and ARC HSFS-019 Supplement document.

- Complete a minimum of one year of utility clearance-related experience before accepting responsibility for any utility clearance tasks. This experience requires mentorship for notifying DigSafe 811, developing a working understanding of the types of utilities present at project sites, developing a working understanding of the various reliable lines of evidence, and participating in on-site training led by another Arcadis employee with detailed knowledge and experience in identifying utilities and structures.

- Request and review the 811 DigSafe notification(s) in place for the appropriate work area(s).

- Prior to beginning any subsurface intrusive work (i.e., any work or activity that breaks the plane of the ground surface), excavation work involving heavy and mechanized equipment, or operating high clearance equipment at the Site, the Utility and Structures Checklist must be completed and signed by the staff member completing or overseeing the clearance. Confirm that the Utility and Structures Checklist was reviewed by the Project Manager or designee as discussed in Section 4.1 above. Review the Utility and Structures Checklist daily prior to starting subsurface intrusive activities to ensure all

utilities are identified and markings are present. A copy of the completed Utility and Structures Checklist will remain on-site during all subsurface intrusive work.

- Use their STOP WORK Authority to eliminate any reasonable concern if utilities cannot be reasonably located and contact the Project Manager to review the STOP WORK situation and confirm the direction of action before proceeding with the work.
- Check that Arcadis subcontractors conduct their own reasonable independent utility clearance efforts as required by state and local laws and the Arcadis subcontractor agreement.
- Be on-site and provide oversight during utility location and clearance activities and any active subsurface intrusive work or activities involving subcontractor under contract to Arcadis.
- If a utility is damaged and repaired during the course of the field event, Arcadis field staff must provide oversight and document that the repair was tested to ensure the repaired utility is competent and complete to prevent further damage to the site when the damaged utility is re-activated.

4.3 Corporate Health & Safety

Corporate H&S is responsible for keeping this HSS up to date with regulatory requirements and best work practices.

Corporate H&S will, as requested, provide guidance to employees and their supervisors engaged in work involving utility location and clearance on the risks and measures prevention utility strikes, including how to recognize the presence of utilities whether overhead, underground, or submerged and how to mark and protect them from damage.

4.4 Arcadis Subcontractor Responsibilities

According to the Arcadis standard subcontract terms and conditions, subcontractors agree to take responsibility for any damages resulting from a utility impact caused by their work. Therefore, Arcadis subcontractors are expected to take reasonable time and diligence to conduct their own independent utility clearance using reasonable standards and processes. Subcontractors have the responsibility to stop their work if utility concerns are identified and will report those concerns to the Arcadis employee overseeing their work activities. Arcadis staff should reinforce these responsibilities with subcontractors during job safety briefings.

In jurisdictions where the actual contractor performing the subsurface intrusive work is required to perform utility clearance notifications (811, State One Call, etc.), the contractor will perform the clearance notification and will provide evidence of the notification to Arcadis (ticket or ticket number, etc.). Refer to ARC HSFS-019 Supplement Section 4 for Best Practices for State One Call procedures.

- If overhead utilities are present in areas where heavy equipment will be operated, ensure adequate clearance is provided. For heavy equipment with extendable or telescoping (e.g., excavators, dump trucks, extendable lift trucks) equipment, evaluate whether the use of a spotter is necessary prior to operating heavy equipment when in proximity to the overhead utility.

- Consider signage and/or other forms of identification to ensure aboveground and overhead utilities that need to be protected during Arcadis work are effectively addressed.

- If a utility is struck and requires repair, the repair must be tested prior to restoring the utility to full service.

5. PROCEDURE

5.1 General Safe Work Practices

Arcadis staff will follow these general safe work practices when working around utilities. Procedures to be followed during utility and structures location and clearance activities are outlined in the following sections of the Utility Location and Clearance Supplemental document:

7. Best Practices for Project Managers (or Their Delegates) Concerning Utility Clearance.
8. Best Practices for Field Personnel Concerning Utility Clearance.
9. Use and Limitations of Common Underground Locating Technologies and Clearance Methods.
10. Best Practices for State One Call Notification Process and Mark Outs.
11. Emergency Action Plan Guidelines for Utility Strikes.
12. Utility Location Procedures for Aquatic Work Activities.

5.2 Lines of Evidence

When locating utilities and structures three (3) reliable “lines of evidence” must be established to help determine where a subsurface utility may be located. A line of evidence may be a scaled site drawing showing where a utility is located, it could be information obtained verbally from owners or employees who meet the definition of a “knowledgeable person” regarding utility and structural features, it could be established using any number of non-intrusive geophysical methods including but not limited to; ground penetrating radar (GPR), electromagnetic survey (EM), radio-frequency methods (RF), or it could involve probing for or exposing the utility by soft dig technologies (AKA “daylighting” or “potholing”) using air knife, Hydroknife and/or soil vacuum. Some lines of evidence will identify utility locations with a high degree of certainty (e.g., direct connect radio-frequency technique, daylighting, or potholing, sonde tracing, etc.). Other lines of evidence will identify utilities will less certainty (e.g., GPR, historical reports, old design drawings, etc.).

Effective utility locate practices must use multiple lines of evidence until there is a high degree of certainty that the various underground utility services have been adequately located. A minimum of three (3) reliable lines of evidence are required for an appropriate utility clearance as defined in this HSS. All reliable lines of evidence used during the utility clearance procedure will be recorded on the Utility and Structures Checklist or equivalent client-provided checklist or ground disturbance permit. If three (3) reliable lines of evidence have not established certainty regarding the location of a utility, STOP WORK and do not proceed until the certainty has improved, the work has been modified to resolve the lack of certainty. Additional reliable lines of evidence must be utilized until the presence or absence of the underground utility can be established. During work activities, if a line of evidence is lost or not apparent (e.g., paint markings have faded), STOP WORK, and re-establish the line of evidence prior to resuming subsurface intrusive work.

Generally, the following example reliable lines of evidence may be used to meet the minimum three lines utility clearance requirement:

1. Contacting the State One Call or equivalent service (Nationwide "811") in advance of intrusive work is **REQUIRED BY LAW**.. Contacting the State One Call or equivalent service (Nationwide "811") is an acceptable reliable line of evidence when working within or adjacent to the public right of way or easement. Note that the State One Call can provide valuable information regarding locations and types of utilities entering a privately owned property.

   Note: When conducting work on private property or in areas not served by State One Call or equivalent service, teams are to evaluate using a reputable private utility locating company to locate and mark the utilities. **Use of a reputable private utility locator is encouraged for all projects with subsurface or submerged utilities.** When working with a private utility location subcontractor, it is best practice to pre-plan clearance areas, review the necessary clearance equipment needed based on the types of utilities anticipated to be present, and the re-clearing/confirmation of any public utility location markings (State One Call or equivalent service Nationwide "811").

2. Use detailed, scaled site utility plans, preferably in the form of an "as-built" or "record" drawing, to identify and/or confirm utility locations. Document request and/or receipt of utility drawings from the property owner/client on the Utilities and Structures Checklist.

3. Interview(s) with knowledgeable site or client personnel. The following questions should be asked during the interview and answers documented on the Utility and Structures Checklist:

   - Employees(s) Name and Affiliation(s) with the site.
   - Types of utilities, including utility composition and location of utilities on-site.
   - Depths of known utilities; and
   - Any other pertinent information regarding utilities on the site.

4. Conduct a detailed visual site inspection of areas around all planned subsurface intrusive work points or areas to identify and/or confirm utility locations. The area needed to conduct a thorough site inspection can vary significantly depending on the number and type of utilities present, notably gravity-fed utilities such as sewers. Sewer network manhole spacing can often include 100-foot distances or greater between manholes. For underground utilities, conduct an inspection for structures that tend to indicate the presence and general location of such utilities, including, but not limited to manholes, vaults, valve covers, valve markers, telephone pedestals, transformer housings, fire hydrants, fire suppression post indicator valves (PIVs), spigots, sprinkler heads, air relief valves, backflow preventers, meters, vent lines, downspouts going into the subsurface, power poles with wiring going into the subsurface and line markers, stakes, and monuments. Saw cut lines and concrete/asphalt repairs often yield valuable information regarding utility locations.

Always discuss the presence of utilities with the site owner, operator, facility representative and/or occupant to identify any potential utilities that might not be readily identified by non-intrusive geophysical clearing methods. Situations where non-intrusive clearance methods may not be effective include:

- Depths > 5 ft. below ground surface (BGS).
- Small diameter or certain utility construction materials (e.g. plastics).
- Multiple layers of surface cover e.g. reinforced concrete, multiple layers of historical roadbed.
- Soil conditions such as dense soils or shallow groundwater table.

A discussion of use and limitations associated with common utility location and clearance geophysical methods is provided in ARC HSFS-019 Supplement Section 3.

Standard operating procedures for utility location in submerged settings are presented in ARC HSFS-019 Supplement Section 6.

The lines of evidence will be recorded on the Utility and Structures Checklist or equivalent client-provided checklist or permit.

Note: If a line of evidence is lost, not apparent, no longer applicable or utility location markings are removed/worn/unclear, or area of previous clearance is not confirmed, STOP WORK and re-establish the line(s) of evidence prior to resuming subsurface intrusive work. **Each location of subsurface intrusive work must have a minimum of 3 reliable lines of evidence.** All lines of evidence used during the utility clearance procedure will be recorded on the Utility and Structures Checklist or equivalent client-provided checklist or permit. The Utility Structures and Checklist is valid for 15 business days from the date of completion. Prior to the end of the 15 day period the checklist detailing the utilities which have been located and marked must be reviewed to verify no new utilities have been identified but are unmarked and, utilities which have been located and marked continue to be clearly marked. Update the checklist with the date of the review and reviewer name to "re-set" the 15-day period. A copy of the completed Utility and Structures Checklist will remain onsite while work involving or in the vicinity of utilities is conducted.

Caution: If and when any line of evidence reveals planned subsurface work will occur within the Arcadis 30-inch Tolerance Zone of known/marked/located/observed utilities, the project team must Stop Work and contact Corporate H&S for a review of the steps the team has taken to prevent injury or incident involving the utility conflict.

5.3 Color Codes Used for Utility Markings

The following colors are used for marking utilities. Some government agencies or large industrial facilities may use additional colors not provided below. Arcadis policy is to assume any paint marking or pin flag color not provided below is a subsurface utility marking until proven otherwise.

If utilities or subsurface anomalies are identified but the utility type or anomalies are not classified, it is recommended the color pink (Temporary Survey Marking) be used to mark the location pending confirmation. Once the type of utility is established, the pink marks will be repainted/remarked to represent the correct type of utility.

COLOR	Utility Line
WHITE	Proposed Excavation
PINK	Temporary Survey Markings
RED	Electrical Power Lines, Cables, Conduit and Lighting Cables
YELLOW	Gas, Oil, Steam, Petroleum or Gaseous Materials
ORANGE	Communication, Alarm or Signal Lines, Cables or Conduit
BLUE	Potable Water
PURPLE	Reclaimed Water, Irrigation and Slurry Lines
GREEN	Sewer and Drain Lines

APWA and ANSI standard Z-53.1

5.4 Locating Technologies

There are several types of locating technologies that can be used to identify and locate utilities in the subsurface. Project teams need to work closely with private utility locators (PUL) in order to best match locating technology with site conditions. To provide the best results, all possible locating technologies should be available for use and implementation at the project location. Any potential interferences should also be discussed up front and then at the project site during utility location activities. Potential interferences could be soil moisture, soil type, standing water on concrete/asphalt, rebar, fencing, and metal structures that are in the subsurface. Employees overseeing locating technology activities should have an understanding of device operation and limitations. For further information, refer to ARC HSFS-019 Supplement Section 3, Use and Limitations of Common Utility Location Technologies and Clearance Methods.

5.5 Clearance Methods

In some cases, proposed subsurface intrusive locations may be pre-cleared using other intrusive methods. Determine the clearance or soft dig method based on-site conditions and utilize the least invasive method possible. The number of subsurface intrusive locations and soil type should be taken into consideration. The following clearance methods are listed from least invasive to most invasive:

1. Vacuum Extraction/Potholing (air or water-based)
2. Air knifing
3. Hydro knifing
4. Probing
5. Hand augering
6. Hand digging
7. Posthole digging

"Single-Point" clearance involves clearing the intrusive location to 110% of the proposed subsurface intrusive area or the diameter plus 2 inches of the largest piece of tooling used in the subsurface (e.g. clear the borehole to 10-in. when setting wells using 8-in. hollow stem auger tooling), or whichever is greater.

"Three-Point" clearance involves clearing the utility using a triangular pattern placed around the proposed borehole location and in a configuration such as to not allow utilities to pass undetected between the clearance boreholes. In some cases, it is more practical to advance three individual slot trenches which connect at each end making a "clearance triangle" instead of advancing multiple boreholes side-by-side. Using the Three-Point clearance triangle trenching method allows for teams to inspect larger areas for potential utilities. The teams can advance trenches along each side of the proposed work area extending down to a target depth based on suspected depth of utilities at the Site. Each method of clearance will be documented on the Utility and Structures Checklist.

Manual clearing methods, such as shoveling, using pickaxes, digging bars (AKA "Spud bars" and other hand tools, should be avoided completely or only used when absolutely necessary and used with caution. Excessive downward force, prying or use in poor/obstructed visibility conditions is prohibited as these tools are known to be capable of damaging utilities.

Surface cover (e.g., asphalt) removal methods that pose excessive downward force, such as jackhammering, must be used with extreme caution. Methods that only cut the surface cover (coring or saw cutting) present less risk due to the absence of the blunt downward force, which could cause collateral damage to shallow subsurface utilities by unintentionally pushing buried debris into the utility. Note that certain utilities are often present at the concrete or pavement/soil interface or encased within the concrete or pavement and are easily damaged during concrete coring or pavement removal. Always work slowly, methodically, and frequently STOP WORK to evaluate conditions during these work activities.

For borings and excavations, if the utility is known to be at depths where hand clearing is not feasible or creates additional safety concerns, no work will be performed within the Arcadis 30-inch Tolerance Zone vertically or horizontally of the utility unless manual clearing of the utility is performed under the oversight of an Excavation Competent Person as defined in ARC HSCS005 HSS Arcadis Excavation and Trenching.

5.5.1 Temporary Backfilling of Pre-Cleared Boreholes

In some cases, it may be necessary to temporarily backfill a pre-cleared / daylighted location until the remaining subsurface activities are performed. At these locations where subsurface intrusive work does not immediately follow pre-clearance, it is important to properly backfill and mark the pre-cleared location in order to protect the utility integrity and maintain the location. In general, wooden stakes, survey flags, whisker markers, paint marking, or other surface markings alone are inadequate because these markings can be easily removed, damaged, or otherwise lost creating uncertainty for the pre-cleared location. Although the specific steps for backfilling a pre-cleared location will depend on site-specific conditions, use the following steps to prevent loss of the pre-cleared location:

- Backfill a pre-cleared location with clean sand or other granular material that is recognizably different from the surrounding subsurface native material. Native soil should not be used to backfill a pre-cleared location that may require further subsurface work.

- Backfill the top 2 feet of a pre-cleared location with dyed sand or gravel to facilitate re-location.
- Place wooden stakes or delineators to mark locations as an additional measure, if practical.
- In the event that the pre-cleared borehole is located on asphalt or concrete and an asphalt cold patch is required, use white paint to mark the intrusive location over the asphalt cold patch.
- In some instances, such as projects potentially affected by unexploded ordinance (UXO), the pre-cleared borehole may require that a PVC pipe of matching diameter be inserted into the pre-cleared borehole, filled with clean sand and affixed with a matching cap. Project teams are to discuss client specific utility location and marking requirements with the project manager prior to conducting work.
- Always use a physical subsurface marker such as described above to identify the pre-cleared borehole location. Don't rely solely on field measurements or GPS coordinates as the only means for locating pre-cleared locations.
- If a utility or anomaly/obstruction is encountered during the pre-clearing process, backfill the hole with the native soil and mark the location with a pink-painted X and/or NO.

In the event that a previously pre-cleared location cannot be located, the location must be re-cleared prior to performing subsurface intrusive work

5.6 Clearance for Working in Vicinity of Subsurface Utilities – The Arcadis Utility Tolerance Zone

Prior to the start of subsurface intrusive activities (i.e., excavating / test pitting, drilling, installing grounding rods, manual soil sampling etc.), all utilities must be located, and steps taken to avoid unintentionally contacting or damaging subsurface utilities. See exemptions for subsurface intrusive work in Exhibit 1 (Definitions). Field Teams are not to procced with subsurface work involving utilities located within 30 inches of a line marking as measured radially (e.g. 360 degrees) from the outermost point of the marked utility. If only the centerline of the utility or utility bank is marked, but the utility width or diameter is known or suspected, the diameter of the utility or utility bank (Exhibit 1) must be incorporated into the Arcadis 30-inch Tolerance Zone, see Figure 1 located in Exhibit 2 for further instructions and an illustration of the Arcadis 30-in. Tolerance Zone.

If and when any line of evidence reveals planned subsurface work will occur within the Arcadis 30-inch Tolerance Zone of known/marked/located/observed utilities or structures, the project team must Stop Work and contact Corporate H&S for a review of steps the team has taken to prevent injury or incident involving the conflict.

If subsurface work using heavy or mechanized equipment must take place within the Arcadis 30-inch Tolerance Zone of the marked utility, the utility must be exposed (daylighted) using soft dig clearance methods prior to starting subsurface intrusive activities as described in Section 5.5 of this HSS.

Note: No heavy or mechanized equipment is permitted to be used within the Arcadis 30-inch Tolerance Zone for the purpose of daylighting the utility.

Once the utility in conflict has been daylighted, and heavy or mechanized equipment use is planned within the Arcadis 30-inch Tolerance Zone of the utility, such work must receive pre-approval by Corporate H&S to review steps the team has taken to assess and mitigate the risk associated with the planned work. Additional excavation safety procedures may have to be developed as part of the Corporate H&S approval to proceed. It should be noted that any disturbance within 30 inches of the marked utility, or disruption of the surrounding bedding materials could affect the integrity of the utility.

For horizontal borings, to avoid striking a utility, damage from vibration, damage by pressure of the advancing boring, do not drill within 30 inches in all directions (3-Dimensional cylinder) of a line marking. Make sure to factor the diameter of the line or utility bank when calculating the extent of the 30-inch Tolerance Zone. When crossing a utility during horizontal drilling, it is recommended that the utility be exposed 30 inches in a 360°-direction. When exposing utilities for horizontal borings, the utility must be exposed (potholed) by soft dig/clearance methods. This recommendation applies even if the operating contractor has technology that places the location to within a few inches. Make sure to factor the diameter of the utility when determining the 30-inch Tolerance Zone. If subsurface work must take place within the 30-inch Tolerance Zone of the line marking, the utility must be exposed (potholed) by soft dig/clearance methods prior to starting subsurface intrusive work (see Section 5.5 for options); no mechanized equipment is permitted for the exposing of the utility. Once the utility has been exposed, if mechanized equipment is planned for use within the 30-inch Tolerance Zone of the utility, such activity must receive pre-approval by Corporate H&S, as necessary, to mitigate or accept the risk associated with the planned work. Additional excavation safety procedures may have to be developed as part of the approval to proceed. It should be noted that any disturbance within the 30 inches or disruption of the bedding materials could affect the integrity of the utility.

Additional cautions for horizontal borings include gravity-fed utilities, such as sewers and storm drains. The depth of these utilities will change (sometimes significantly) as they run across the project site. Project teams need to obtain sewer utility depths in the work area(s) and determine the depth of the sewer at the location where the boring will actually intersect with the sewer line by collecting sewer pipe invert elevations from identified manholes and interpolating those depths to the area of the subsurface intrusive work.

During well installations and well abandonment via mechanical equipment, the Arcadis 30-inch Tolerance Zone rule applies in an outward direction extending from the outermost edge of the largest diameter auger or greatest width tool used for installation and abandonment (e.g. “over drilling”). In cases where wells have been previously installed and the 30-inch rule has not been followed, work proposed using heavy or mechanized equipment falling within the Arcadis 30-inch Tolerance Zone requires approval from Corporate H&S. For more information, see Figure 1 in Exhibit 2 for further instructions.

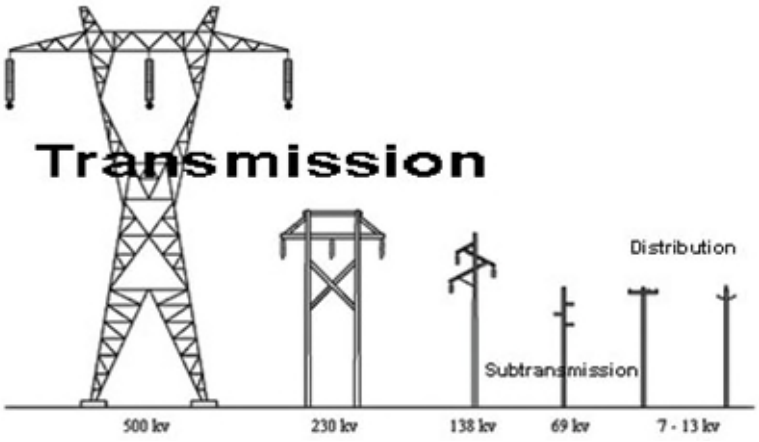
5.6.1 Aboveground Activities causing Subsurface Disturbance in the Vicinity of Underground Utilities

Aboveground work-related activities can cause damage to shallow underground utilities or structures. Asses the intended travel paths, mobilization, staging, and operation of heavy equipment and take steps to ensure shallow utilities are not damaged. If heavy equipment must cross over shallow utilities, the team is responsible for confirming the utilities will be protected.

Other subsurface disturbances may lead to damage such as removing trees/tree stumps, shrubs, or dense vegetation as roots may be entangled with underground piping or structures. For more information, see ARC HSFS-019 Supplement Section 2 Best Practices for Field Personnel Concerning Utility Clearance.

5.7 Acceptable Clearance for Working in Vicinity of Overhead Power Lines and Other Overhead Lines and Structures

No work will be performed by Arcadis or our subcontractor near overhead power lines where any Unqualified Person or equipment is within the limits specified below, unless the power line has been properly covered or de-energized by the owner or operator of the power line, or a qualified electrical subcontractor. Qualified Person approach distances are defined in Exhibit 5A and 5B of **ARC HSFS0006 Electrical Safety Standard**. Illustrations of general types of overhead utility conveyances are provided in **Exhibit 3** - Overhead Power Utility Illustrations



OSHA Electric Power etool illustration

Power Line Voltage Phase to phase (kV)	Minimum Safe Clearance (feet)
50 or below	10
Above 50 to 200	15
Above 200 to 350	20
Above 350 to 500	25
Above 500 to 750	35
Above 750 to 1,000	45

ANSI standard B30.5-1994, 5-3.4.5

5.7.1 Reducing Vehicle and Mechanical Equipment Clearance Requirements

Any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines shall be operated so that a minimum clearance of 10 feet (305 centimeters [cm]) is maintained. If the voltage is greater than 50 kilovolts (kV), the clearance shall be increased 4 inches (10 cm) for every 10 kV over that voltage. However, under any of the following conditions, the clearance may be reduced:

- If the vehicle is in transit with its structure lowered, the clearance may be reduced to 4 feet (122 cm).
- If insulating barriers or “power line shields” rated for the voltage of the line being guarded are installed to prevent contact with the lines, and the barriers are not a part of, or an attachment to, the vehicle or its raised structure, the clearance may be reduced to a distance within the designed working dimensions of the insulating barrier.
- If the equipment is an aerial lift that is insulated for the voltage involved and if the work is performed by a qualified person, the clearance (between the uninsulated portion of the aerial lift and the power line) may be reduced to the distance given in OSHA 1910.333(c)(3)(ii)(C) Table S-5. Reference information from OSHA 1910.333 Table S-5 and NFPA 70E Table 130.4(C)(a) for alternating-current systems and 130.4(C)(b) for the distances associated with direct-current voltage systems is included as Exhibit 5 of ARC HSFS0006 Electrical Safety Standard.

Employees standing on the ground may not contact the vehicle or mechanical equipment or any of its attachments unless:

- The employee is using protective equipment rated for the voltage; or
- The equipment is located so that no uninsulated part of its structure (that portion of the structure that provides a conductive path to employees on the ground) can come closer to the line than permitted in this section of this HSS.

If any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines is intentionally grounded, employees working on the ground near the point of grounding may not stand at the grounding location whenever there is a possibility of overhead line contact. Additional precautions, such as the use of barricades or insulation, shall be taken to protect employees from hazardous ground potentials, depending on earth resistivity and fault currents, which can develop within the first few feet or more outward from the grounding point.

When a machine is in contact with an overhead power line, do not allow anyone to come near or touch the machine. Stay away from the machine and summon outside assistance.

5.7.2 Acceptable Clearance for Working in Vicinity of Non-Electrical Overhead Utilities and Structures

Arcadis field personnel will identify non-electrical overhead utilities and structures and where possible, work is not be conducted within the 30-inch Tolerance Zone of these overhead utilities

and structures. It is recommended that if work will be completed in the vicinity of non-electric overhead utilities, the overhead utilities should be labeled with warning signs, protective barricades, and/or flags. Non-electrical overhead utilities and structures may include, but is not limited to, pipe chases, water lines, ceilings in buildings, etc. Arcadis field personnel will notify its site workers (employees, subcontractors, vendors, etc.) of known overhead utilities and structures during the tailgate safety meeting. See Exhibit 2 for additional details.

5.8 Reporting Utility Incidents

Arcadis field personnel involved with any strike incidents including contact with a structural feature, subsurface, submerged, and/or aboveground utilities must immediately STOP WORK and contact the Project Manager to discuss the incident. If there are life threatening injuries, or the incident presents a risk to public safety (e.g. natural gas leak, downed live electrical line, flooding, or an unstable building) first call 911 or the available emergency services number for the client site or area and then call the Project Manager. The incident must be reported to Corporate Health and Safety immediately and no later than 24 hours after gaining knowledge of the incident. Compliant notification within 24 hrs. requires an acknowledgement of the notification by Corporate H&S. Team must provide critical details of the incident when notifying Corporate H&S such as; 3rd party involvement, any injuries, known extent of damage and estimate of potential repair cost, service interruption, and client reporting requirements. The project team and field staff will use the Arcadis Utility Line Strike Investigation Form to record initial details of the incident as part of the notification process.

Selected utility strike incidents may also utilize a conference call with operations management to review findings and lessons learned. The Business Line H&S Director will make the determination concerning the need to have the incident investigation review call and will arrange the call, if deemed necessary.

5.9 Relationship of this HSS to the Project Specific HASP

With the exception of the Utility and Structures Checklist, this HSS and the supplement documents, are not required to be printed and attached to project HASPs. Project teams have discretion to include such supplements as a BMP or reference guide when developing a project HASP. During project health and safety planning, this HSS will be reviewed and applicable clearance technologies and methods will be documented on the Utility and Structures Checklist.

Additionally, emergency response procedures specific to utility strikes should be addressed. See ARC HSFS-019 Supplement Section 5 which provides general guidelines for emergency response to utility strikes. Applicable information may be attached to the HASP or the Utility and Structures Checklist to facilitate communication of response expectations.

5.10 Required Contract Terms and Conditions

The Arcadis standard client and subcontractor contracts contain required terms and conditions defining responsibility for utility clearance and the allocation of risk associated with an impacted utility. These terms and conditions have prescribed language concerning subsurface work that is presented in Arcadis client contracts and the Arcadis subcontractor contracts, which can be found on the ANA Intranet Legal webpage. If such provisions cannot be agreed upon, the reasons are documented and other risk-management actions should be identified, such as limits of liability, add additional physical investigations, additional lines of evidence or utility location, assignment

of risk to subcontractors, etc. In addition, any changes to these terms and conditions require approval by Legal Services.

6. TRAINING

Employees responsible for coordinating or conducting utility clearance activities will be familiar with the requirements of this HSS and the supplemental documents. Arcadis in-house 8-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) refresher may provide awareness-level training regarding this utility location and clearance HSS.

Field staff must complete a minimum of one year of utility clearance-related experience before accepting responsibility for any utility clearance tasks. This experience requires mentorship by a currently trained and experienced Arcadis employee for the processes of; completing DigSafe 811 notifications, developing a working understanding of the types of utilities present at project sites, developing a working understanding of the various reliable lines of evidence, and participating in on-site training led by another Arcadis employee with detailed knowledge and experience in identifying utilities and structures.

7. REFERENCES

- Occupational Safety and Health Administration (OSHA) 29 CFR Subpart P, Excavations, 1926.651, Specific Excavation Requirements.
    - Common Ground Alliance State Law Directory - https://commongroundalliance.com/map
    - Arcadis Utilities and Structures Checklist:
        - Excel Version - Utility and Structures Checklist
        - PDF Version - Utility and Structures Checklist
    - Arcadis Utility Line Strike Investigation Form
    - The Arcadis ARC HSFS-019 Supplement Documents include the following Sections:
        - Section 1 - Best Practices for Project Managers (or Their Delegates) Concerning Utility Clearance
        - Section 2 - Best Practices for Field Personnel Concerning Utility Clearance
        - Section 3 - Use and Limitations Associated with Location Technologies and Common Utility Clearance Methods
        - Section 4 - Best Practices for State One Call Procedures and Notifications
        - Section 5 - Emergency Action Plan guidelines for Utility Strikes
        - Section 6 - Utility Location SOP for Aquatic Work Activities
    - Figure 1 – 30-Inch Tolerance Zone
    - Arcadis H&S Standard ARC HSCS005 Excavation and Trenching

- Arcadis H&S Standard ARC HSFS0006 Electrical Safety Standard

8. RECORDS

8.1 Utility Clearance Records

All records (maps, checklists, and documentation of communications) used to determine the location of utilities should be retained and kept in the project file.

9. APPROVALS AND HISTORY OF CHANGE

Approved by Julie Santaniello, CSP – Corporate H&S Manager of Technical Programs

History of Change

Revision Date	Revision Number	Standard Developed/Reviewed by or Revised By	Reason for change
13 December 2006	01	Mike Thomas/Pat Vollertsen	Original document
26 March 2007	02	Mike Thomas/Pat Vollertsen	Put in new company format
15 May 2007	03	Mike Thomas/Pat Vollertsen	Added nation-wide 811 number
6 September 2007	04	Mike Thomas/Pat Vollertsen	Changing over to new template format
22 February 2008	05	Mija Coppola	Changing over to new template format
13 January 2009	06	Mija Coppola	Define lines of evidence
4 October 2010	07	Sam Moyers/Mija Coppola	Reformatting and addition of utility clearance information
13 February 2012	08	Sam Moyers/Mija Coppola	Modified link information for utility strike reporting, clarified local/state requirements in section 4.1 and 4.3

Revision Date	Revision Number	Standard Developed/Reviewed by or Revised By	Reason for change
28 January 2013	09	Tony Tremblay	Utility and Structures Checklist revised; hyperlink updated
12 February 2013	10	Amanda Tine/Tony Tremblay	Clarified clearance boundaries for Unqualified staff in Section 5.7 and added information about vehicles and equipment being used near power lines in Section 5.7.1
15 March 2013	11	Kurt Merkle, Rebecca Lindeman / Tony Tremblay	Added additional text to HSS for recent lessons learned, added section 5.4 (Locating Technologies) and 5.5 (Clearance Methodologies), added additional details to section 5.6 when working in close proximity to subsurface utilities, and added Supplement 6 - Utility Location SOP for Aquatic Work Activities.
07 July 2013	12	Andrew McDonald/ Tony Tremblay	Removed HSFS-019 Supplement 1, Utility Definitions. Added hyperlink for One Call and State Law Directory. Segregated evidence of sewer or storm drains in USC list. Removed Sam Moyers and added Andrew McDonald as author.
26 September 2014	13	Andrew McDonald/Tony Tremblay	Added Exhibit 1. Definitions and 30-inch tolerance zone. Clarified use of 811 or state one call as a reliable line of evidence. Added best practice to cover backfilling of pre-cleared boreholes. Updated USC list to cover soft dig termination depths and PM review.
23 February 2015	14	Tony Tremblay	Page number correction

Revision Date	Revision Number	Standard Developed/Reviewed by or Revised By	Reason for change
10 May 2016	15	Denis Balcer/Sharon Lingle/Alec MacAdam/Andrew McDonald/Tony Tremblay/Julie Santaniello	ES and Section 4.2 - define subsurface intrusive work; clarify employees providing oversight of utility contractors, Arcadis requirements of operating and interpreting results of utility clearance equipment, and utility clearance before all subsurface intrusive work. Sections 1 and 5.8- changed submarine to submerged. Section 4.1 – added contacting public utility companies to help clear utilities. Section 4.2 – Clarified requirement to complete one year of utility clearance-related experience. Section 4.2 and 4.3 - Added discussion on aboveground activities causing subsurface disturbances. Added responsibility to clear overhead utilities when heavy equipment will be used and to evaluate use of a spotter. Added that repairs to damaged utilities need to be verified as competent and complete. Section 5.2 – Clarified reliable lines of evidence for each subsurface intrusive work point and degrees of certainty. Added all work within 30-inch Tolerance Zone needs Corp H&S preapproval. Section 5.6 and Exhibit 1- Clarify subsurface intrusive work and activity and exemptions for subsurface intrusive work. Section 5.6.1 – Add requirement to evaluate aboveground activities that may lead to subsurface disturbances that may cause damage to shallow underground utilities or structures.

Revision Date	Revision Number	Standard Developed/Reviewed by or Revised By	Reason for change
10 May 2016	15	Denis Balcer/Sharon Lingle/Alec MacAdam/Andrew McDonald/Tony Tremblay/Julie Santaniello	Section 5.7.2 – added non-electric overhead utilities and structures other than power lines need to be identified and marked if working in that area. Section 9 – Changed reviewer from Tony Tremblay to Julie Santaniello. Exhibit 1 – added definitions of Utility Strike, Daylighting, Potholing, Subsurface Intrusive Work, Subsurface Intrusive Activities, and Utility Bank. HSS and Supplements placed on new Arcadis headers. Updated Supplement revision numbers to be consistent with HSS. Supplement 2 revised. Utility Clearance and Structures Checklist and Utility Strike Investigation Form revised.
17 March 2017	16	Alec MacAdam/Julie Santaniello	Hyperlink updates; minor formatting; Utility Clearance and Structures Checklist revised.
13 May 2020	17	Alec MacAdam/Denis Balcer/Greg Mason/Julie Santaniello	Updated HSS format. Combined HSS Supplements, revised HSS sections, revised the Utility & Structures Checklist, added Exhibit 2 - Acronyms and Abbreviations.

EXHIBIT 1 - DEFINITIONS

Aboveground Utilities - For the purpose of this procedure, aboveground utilities include, but are not limited to: any aboveground line, pipe, conduit, system, or facility used for producing, storing, conveying, transmitting or distributing communication or telecommunications signals, electricity, gas, liquid, petroleum and petroleum products, coal slurry, hazardous liquids or gases, water under pressure, steam, sanitary sewage, storm water, or other materials, liquids, or gases.

Daylighting – exposing underground utilities or structures through soft dig technology/clearance prior to completing subsurface intrusive activities.

e.g. - Exempli gratia. Latin for “for the sake of example.” Use it to introduce one or more examples.

Excavation - Any man-made cut, cavity, trench, or depression, in an earth surface formed by earth removal into which a person can bodily enter.

I.e. - I.e. is the abbreviation for “id est” and means “in other words” or “in essence”.

Kilovolt (kV) - One kilovolt is equal to 1,000 volts (v), which are the potential difference that would move one ampere of current against one ohm of resistance. The kilovolt is a multiple of the volt, which is the SI derived unit for voltage.

Overhead Utilities and Structures – Overhead water lines, overhead pipe chases, ceilings in buildings.

Potholing – exposing underground utilities or structures through soft dig technology/clearance prior to completing subsurface intrusive activities.

Subsurface Intrusive Activities – For the purposes of this procedure, subsurface intrusive activities include, but are not limited to excavations, vertical drilling, installing grounding rod, soil sampling, etc.,

Subsurface Intrusive Work – Is any work or activity that breaks the plane of the ground surface. Exemptions include soil sampling using a non-conductive sampling tool to a depth of 6 inches below ground surface (bgs), placement of survey flagging to a depth of 6 inches bgs, and placement of non-conductive survey stake(s) to a depth of 6 inches bgs).

Subsurface Utilities - For the purposes of this procedure, subsurface utilities include, but are not limited to: any underground line, pipe, conduit, system, or facility used for producing, storing, conveying, transmitting or distributing communication or telecommunications signals, electricity, gas, liquid, petroleum and petroleum products, coal slurry, hazardous liquids or gases, water under pressure, steam, storm water, or sanitary sewage; underground storage tanks; tunnels and cisterns; and septic tanks and lines.

Utility Bank – a structure containing two or more conduits. A conduit is a single enclosure containing one or more facilities.

Utility Strike – An unplanned contact of a utility (i.e., overhead utilities, buildings, structures, aboveground utilities, underground utilities. or submerged utilities) during the course of work that results in; damage requiring repairs, making a report to the utility owner, or requiring further assessment to evaluate the potential for damage.

Utility Tolerance Zone – The area within 30 inches measured radially (e.g. extending in all directions) from the outside diameter of a located/marked utility in which special care is to be taken. If the centerline of the utility is marked, the diameter of the utility or utility bank/trench must be incorporated into the 30 inches. This area must be hand cleared with non-mechanized equipment. Once the utility has been exposed, if mechanized equipment is planned for use within the Arcadis 30-inch Tolerance Zone of the utility, such activity must receive pre-approval by Corporate H&S, to mitigate or accept the risk associated with the planned work. See Figure 1 – 30-inch Tolerance Zone.

Exhibit 2 – Acronyms and Abbreviations

ANA	Arcadis North America
Arcadis	Arcadis U.S. Inc.
ARC	Arcadis
APM	Associate Project Manager
APL	Acoustic Pipe Location
AKA	Also Known As
BGS	Below Ground Surface
cm	Centimeter
EM	Electromagnetic
ft.	Feet
GPR	Ground Penetrating Radar
HS	Health and Safety
H&S	Health and Safety
HSS	Health and Safety Standard
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSFS	Health and Safety Field Safety
HSCS	Health and Safety Construction Safety
https	Hypertext transfer protocol secure
in.	Inch
kV	Kilovolt
m	Meter
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
PIV	Post Indicator Valve
PUL	Private Utility Locator
PM	Project Manager
RF	Radio Frequency

RFD	Radio Frequency Detection
SOP	Standard Operating Procedure
TM	Task Manager
TZ	Tolerance Zone
UXO	Unexploded Ordinance

Exhibit 2 Figure 1 – Arcadis Tolerance Zone Illustration

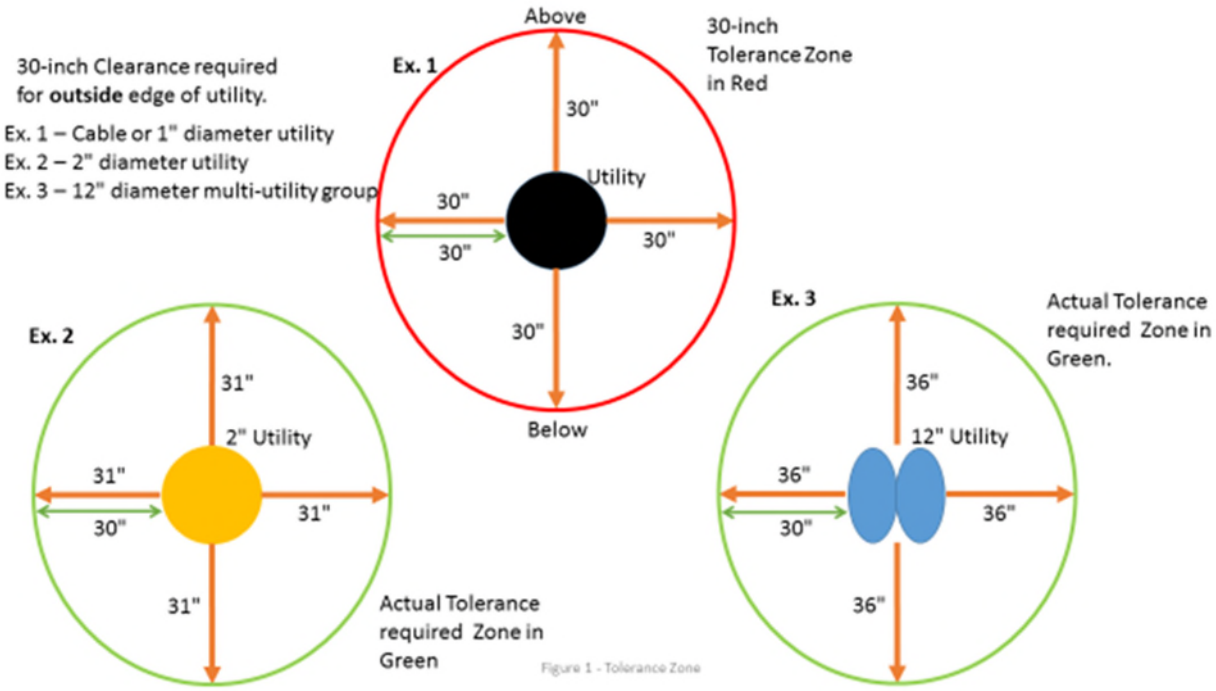
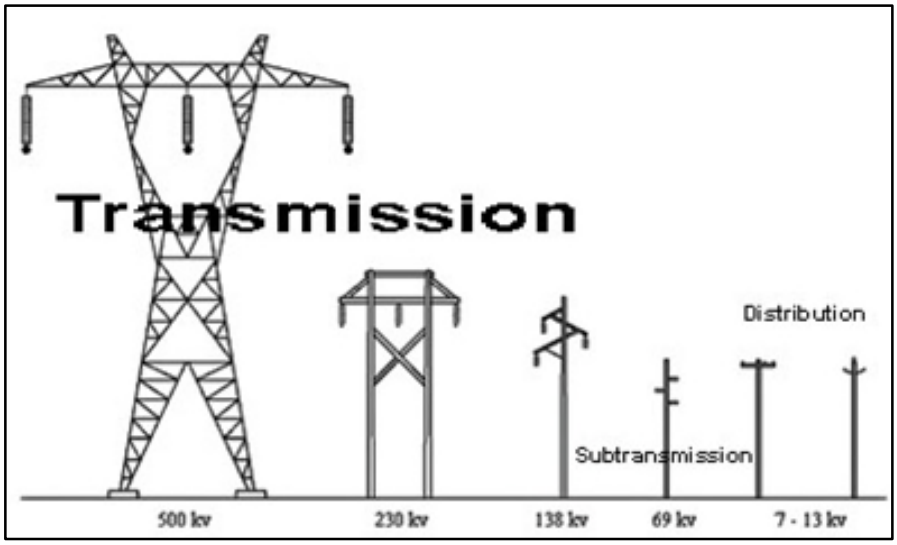
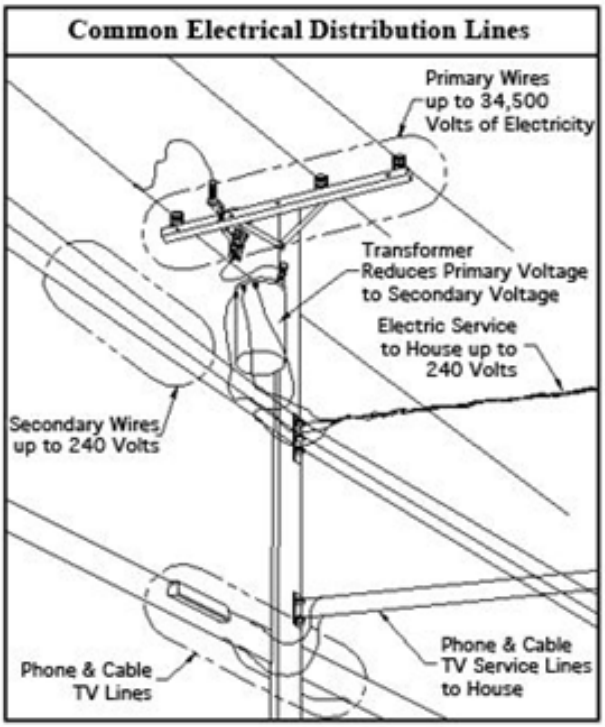


Exhibit 3 – Overhead Power Utility Illustrations





Attachment F
Shipping Determination

SHIPPING/TRANSPORTATION DETERMINATION FORM Revision 14

Regulated Material Shipping Determination for Non-Bulk and Bulk Consignments

Date:	6/23/2022
Project Name:	Metro Park
Project Number:	30135590
Supplemental Information:	None

1) Description of the Material to be Transported or Shipped

1a	Select a description category ===>	Select
1b	*Select from this menu a description most accurately representing the material to be shipped/transported*	
1c		

☐ This material is mixed with water, soil or other inert material

☐ This material will be shipped on wet or blue ice

☐ Consignment contains dry ice

☐ Consignment contains containers with acid/base preservatives prepared by an analytical laboratory.

☐ Leave this box unchecked

☐ AIR shipping is required

2) Classification and Identification

2a This material is: None

Complete for Hazardous Materials ONLY:

2b UN/NA/ID# : NA 2c PG: NA Primary Hazard Class: NA

Subsidiary Hazard Class: NA NA

PSN: NA

☐ See Section 7a

2d This material is a: No additional criteria applies to this material

3) Packaging, Exceptions and Shipping Information

3a Packaging Type: None

3b Inner Container Category: None

3c Number and Quantity:

	Number	Container type		Net Qty. Each Container		
Largest Container Type =>	0	None	None		None	<= Select units here
Container type #2	0	None	None		None	TIP: Do not place units in the white column. Place the largest container in bottle set in row #1.
Container type #3	0	None	None		None	
Container type #4	0	None	None		None	
Container type #5	0	None	None		None	
Container type #6	0	None	None		None	

3d Intermediate Packaging: None

3e Outer Packaging: None

3f Other: None Type: None

☐ AIR shipping is required

Your suggested shipping configuration (**excluding MOT**): None

This material will be shipped (mode of transport and type of shipment):

3g None

If using an exception/exemption, list the exception/exemption below

3h None

Carrier/Transporter information:

3i None

3j Auth. Air Limits for EQ, LQ and Fully Reg. Shipments and Selected Ground LQ and SQE:

Inner Container Limit (NA- Not Applicable; F- Forbidden; mg, g, or kg for solids; ml or L for liquids):

Attachment G
Traffic Plan

Traffic Safety Plan (TSP)

1.0 General

Plan type	Non-Right of Way (Non-ROW)
Project Name:	Metro Park
Project Number:	30135590
Developer Name:	Kaitlyn Fleming
Duration of Project (in hours or days):	8 hrs/day
Time Restrictions (Y/N, if Y describe below):	N
Not Applicable	
Not Applicable	
Not Applicable	NA
Not Applicable	
Not Applicable	NA

☐ Working on multiple roads?

Comments: Work in active parking lot for 1-8 hours.

2.0 Work Description

Provide a brief description of scope of work:
Groundwater sampling and well O&M to be performed at monitoring wells in an active parking lot.

3.0 Type and Duration

Work locations on this project will be: Intermediate work (1-8 hours per location)

Non-ROW work will be performed in: Active parking lot

Special traffic conditions may include (select most prevalent): Not applicable

4.0 Traffic Control Layout, Number of Devices Required, and Phasing

The following Non-ROW requirements in the Traffic Safety Handbook applies:

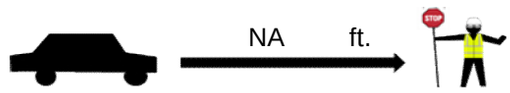
Section 7.3 Intermediate Duration Work in Parking Areas (1 to 8 Hours) (DOT Facts-302b)

The menu below will be blank and is not applicable.

The menu below will be blank and is not applicable.

Non-ROW configuration:
An example non-ROW traffic control configuration for this project is illustrated below. The actual type and number of devices required are specified below. Don't leave vehicle doors open. Don't establish controls within 25 ft of the front or rear of parked large vehicles/rolling equipment without coordinating with the vehicle/equipment operator.

Intermediate Term (1-8 Hours)
Channelizing Cones with Caution Tape

ROW minimum sign spacing distances for "A", "B" and "C" (as applicable) in referenced DOT Facts.	ROW oncoming traffic minimum site distance required to see Flagger and properly decelerate and stop.
A NA ft. B NA ft. C NA ft.	 NA ft.

ROW Cone Calculation (Values are default. Light grey fields may be modified based on actual road conditions)

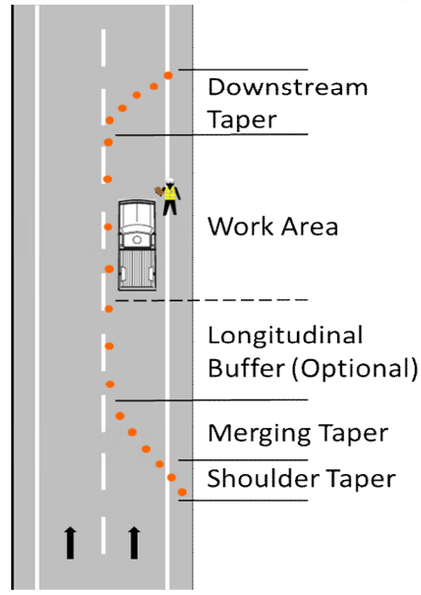
Active work area length (feet)	200
☐ Apply Optional Longitudinal Buffer (ft)?	0
Lane width of offset (feet)	12
Shoulder width of offset (feet)	8
Posted speed limit	NA

☐ **Shoulder Taper**

Taper Length (feet)	NA
Cones Required	NA
Cones Spacing (max., ft)	NA

☐ **Merging Taper**

Taper Length (feet)	NA
Cones Required	NA
Cones Spacing (max., ft)	NA



☐ **Work Area**

Cone Spacing (max., ft)	NA
Cones Required	NA

☐ **Downstream Taper**

Taper Length (feet)	NA
Cones Required	NA
Cone Spacing (max., ft)	NA

Cones Required (minimum) NA

Note: Review taper configuration and cone spacing after ROW implementation to ensure traffic is moving efficiently without motorist confusion in the RWZ.

Select the traffic control devices to be used and enter number each required:

Check all that apply:	*Wording or Pictogram*	*Number:*
☐ Warning signs		
☐ Warning signs		
☐ Warning signs		
☐ Stop/Slow paddle		
☐ Red flag		
☐ Drums		
☐ Channelizer cone (42 inch height, 10 lb base)		
☐ Channelizer cone (42 inch height, 30 lb base)		
X Traffic cones (≥ 18 inches tall)		6
☐ Barricade:		
☐ Flags for cones		
☐ Lights (for night work)		
☐ Plastic fencing (rolls)		
X Caution tape (rolls)		1
☐ Other (specify):		

Non-ROW Phasing:

1) Position truck as shield, if practical

2) Deploy traffic control devices

3) Affix flags, caution tape or fencing

4) Unload project equipment

5) Commence work

6) SSO to maintain controls

7) Remove controls in reverse order

Electronic Device Use Safety

Electronic devices (tablets, laptops and cell phones) used to collect data or document activities in active parking lots must be used in a manner that does not interfere with the user's ability to see and react to vehicle movements in the work area. If this requirement cannot maintained, a spotter must be used. When possible position vehicle to act as a shield. Short-term traffic control scenarios provided by this TSP are not authorized if a spotter is not used.

Reviewed By:

HASP Reviewer: Veronica Bean

Appendix G

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.

VOC Monitoring, Response Levels, and Actions

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

1. If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

2. If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

3. If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

4. All 15-minute readings must be recorded and be available for State (DEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

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

1. If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 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

Appendix 1B
Fugitive Dust and Particulate Monitoring

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

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Remedial activities may also include the excavation, grading, or placement of clean fill. These control measures should not be considered necessary for these activities.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM10) with the following minimum performance standards:

(a) Objects to be measured: Dust, mists or aerosols;
(b) Measurement Ranges: 0.001 to 400 mg/m3 (1 to 400,000 :ug/m3);
(c) Precision (2-sigma) at constant temperature: +/- 10 :g/m3 for one second averaging; and +/- 1.5 g/m3 for sixty second averaging;
(d) Accuracy: +/- 5% of reading +/- precision (Referred to gravimetric calibration with SAE fine test dust (mmd= 2 to 3 :m, g= 2.5, as aerosolized);
(e) Resolution: 0.1% of reading or 1g/m3, whichever is larger;
(f) Particle Size Range of Maximum Response: 0.1-10;
(g) Total Number of Data Points in Memory: 10,000;
(h) Logged Data: Each data point with average concentration, time/date and data point number
(i) Run Summary: overall average, maximum concentrations, time/date of maximum, total number of logged points, start time/date, total elapsed time (run duration), STEL concentration and time/date occurrence, averaging (logging) period, calibration factor, and tag number;
(j) Alarm Averaging Time (user selectable): real-time (1-60 seconds) or STEL (15 minutes), alarms required;
(k) Operating Time: 48 hours (fully charged NiCd battery); continuously with charger;
(l) Operating Temperature: -10 to 50^{o} C (14 to 122^{o} F);
(m) Particulate levels will be monitored upwind and immediately downwind at the working site and integrated over a period not to exceed 15 minutes.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the remedial party to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m3 (15 minutes average). While conservative,

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

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

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

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

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

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

Appendix H

Field Sampling Plan

Fischbach, LLC

Field Sampling Plan

235 Metro Park Brighton Site
Rochester, New York
Site No. 828150

December 2025

Field Sampling Plan

235 Metro Park Brighton Site
Rochester, New York
Site No. 828150

December 2025

Prepared By:
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Prepared For:
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Our Ref:
30135590

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Attachments

Attachment 1 Technical Guidance Instructions

- Sub-Slab Soil Gas Sampling Point Installation Using Vapor Pin Approach
- Indoor or Ambient Air Sampling and Analysis Via USEPA Method TO-15
- Groundwater and Soil Sampling Equipment Decontamination
- Installation of Permanent Soil Vapor Probes
- Investigation-Derived Waste Handling and Storage
- Per- and Polyfluoroalkyl Substances (PFAS) Field Sampling Guide
- Low-Flow Groundwater Purging and Sampling Procedures for Monitoring Wells
- NYSDEC PFAS Guidance April 2023

Attachment 2 Air Sampling Log and Product Inventory Form

Attachment 3 Low-Flow Groundwater Sampling Form

Attachment 4 Chain-of-Custody Form

Attachment 5 PID Calibration Log

Acronyms and Abbreviations

%	percent
Arcadis	Arcadis of New York, Inc.
CFR	Code of Federal Regulations
COC	chain-of-custody
DO	dissolved oxygen
FSP	Field Sampling Plan
HASP	Health and Safety Plan
HazMat	Hazardous Materials
IDW	investigation-derived waste
in. Hg	inches of mercury
NAPL	non-aqueous phase liquid
NYSDEC	New York State Department of Environmental Conservation
ORP	oxidation reduction
PFAS	per- and polyfluoroalkyl substances
PID	photoionization detector
PPE	personal protective equipment
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
SMP	Site Management Plan
CAMP	Community Air Monitoring Plan
TGI	Technical Guidance Instruction
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency

1 Introduction

1.1 General

This Field Sampling Plan (FSP) supports the December 2025 Site Management Plan (SMP) for the 235 Metro Park Site located in the Town of Brighton, Rochester, New York (the Site).

This FSP provides field procedures and sample collection methods to be used to characterize environmental media, as needed, for future site maintenance. This FSP should be used in conjunction with the SMP, the Excavation Work Plan, the Quality Assurance Project Plan (QAPP), an approved Health and Safety Plan (HASP), and the Community Air Monitoring Plan. The QAPP (included as Appendix G of the SMP) presents quality assurance (QA)/quality control (QC) procedures to be used during field activities described in the SMP, as well as a description of the general field and laboratory procedures.

1.2 Overview of Investigation Field Activities

The following activities may be conducted at the Site:

- Sampling ambient air;
- Collecting indoor air samples;
- Collecting sub-slab vapor samples;
- Measuring water table elevations; and
- Collecting groundwater samples.

Sampling locations and the rationale for each field sampling activity are described in the SMP.

2 Field Activities

This section describes field procedures and methods potentially used for site investigation work.

2.1 General Field Guidelines

The general field guidelines below will be modified to account for special requirements necessary to appropriately sample 1,4-dioxane and polyfluoroalkyl substances (PFAS). The latest edition of the NYSDEC's *Guidelines for Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS),* under the NYSDEC's Part 375 Remedial Program (Attachment 1) will be consulted along with Arcadis of New York, Inc's (Arcadis') January 26, 2022 Technical Guidance Instruction (TGI) – *Per- and Polyfluoroalkyl Substances (PFAS) Field Sampling Guide* (Attachment 1).

2.1.1 Groundwater Sampling Equipment

The following is a general list of equipment necessary for sample collection:

- Appropriate sample containers provided by the laboratory (kept closed and in laboratory-supplied coolers until the samples are collected);
- Pre-preserved sample containers (as required) for aqueous samples;
- Chain-of-custody (COC) record forms;
- Logbooks, field sampling records, and indelible ink pens and markers;
- Laboratory-grade soap (such as Alconox®), reagent-grade solvents, and distilled water to be used for decontaminating equipment between sampling stations;
- Buckets, plastic wash bins, and scrub brushes for decontaminating equipment;
- A digital camera and extra batteries;
- Shipping labels and forms;
- A safety auto-retract knife;
- Packing/shipping material for sample bottles;
- Strapping tape;
- Clear plastic tape;
- Duct tape;
- Aluminum foil; and
- Portable field instruments, including a photoionization detector (PID) and a water-level indicator.

2.1.2 Air Sampling Equipment

Air and effluent soil vapor samples will be collected using a Summa canister sampling train. The typical Summa canister sampling train consists of:

- Summa canister;
- Flow controller;

- Particulate filter;
- Pressure gauge; and
- Fittings and a sampling line.

The laboratory will evacuate the canister to a minimum vacuum of negative 28 inches (± 2 inches) of mercury (in. Hg) prior to sampling. After sampling, the final vacuum will be recorded on a COC form to confirm sample integrity. A pressure gauge will be used to measure the vacuum before, during, and after sampling. A seven-micron particulate filter will be used upstream of the flow controller to prevent blockage of the flow controller. The sampling line will consist of new, unused, ¼-inch diameter flexible Teflon® or stainless-steel tubing. All parts of the sampling train coming into direct contact with the sample will be made of stainless steel or Teflon®. The following general set-up procedure will be followed for each sampling location:

1. Place the Summa canister at the sampling location.
2. Note the environmental conditions in the sample area on the air sampling log (Attachment 2).
3. Assemble the Summa canister sampling train. Follow the laboratory instructions for pressure measurement, particulate filter placement, and flow controller attachment.
4. Sample following the procedures described below.

2.1.3 Field Logbooks

Field logbooks will be maintained by the field team leader and other team members to provide a daily record of significant events, observations, and measurements during the field investigation.

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

- Author's name, date of entry, and physical/environmental conditions during field activity;
- Purpose of sampling activity;
- Location of sampling activity;
- Field crew members' names;
- Site visitors' names;
- Sample media (e.g., soil, groundwater);
- Sample collection method;
- Number and volume of sample(s) taken;
- Description of sampling point(s);
- Volume of groundwater removed before sampling (where appropriate);
- Preservatives used;
- Date and time of collection;
- Sample identification number(s);
- Field observations; and
- Any field measurements made, such as, but not limited to, pH, temperature, conductivity, and water level.

All original data recorded in field logbooks and COC records will be written with indelible ink. If an error is made on an original document assigned to one individual, that individual will make all corrections by simply crossing a single line through the error and entering the correct information. The erroneous information will not be erased. Any subsequent error discovered on an original document will be corrected by the person who made the entry. All subsequent corrections will be initialed and dated.

2.2 Measurement of Fluid levels

The following procedure will be used to measure fluid-level depths at monitoring wells if present onsite:

- Decontaminate the water-level probe or oil/water interface probe (for wells expected to contain non-aqueous phase liquid [NAPL]).
- Measure the static fluid level, fluid interfaces (i.e., NAPL/water interface), and the bottom of the well (if applicable) with reference to the surveyed elevation mark on the top of the well casing or surface-water gauge. Record all measurements, to the nearest hundredth of a foot, in the field logbook.

Measurements will be made in as short a timeframe as practical to minimize temporal fluctuations in hydraulic conditions.

Fluid levels will be measured using an electronic fluid-level indicator (sounder), steel tape, pressure transducer, or stream gauge at established reference points (e.g., top of casing, stream gauge).

The following materials will be available, as required:

- Appropriate health and safety equipment, as specified in the HASP;
- Laboratory-type soap (Alconox® or equivalent);
- Electronic water-level indicator (sounder) or pressure transducer;
- PID;
- Analyte-free water;
- Indelible ink pen; and
- Six-foot engineer's rule.

The following procedures will be used to obtain fluid levels.

1. Measure the lengths between markers on the cable with a 6-foot engineer's rule or a fiberglass engineer's tape. The tape or cable associated with the electronic water-level probe should be checked for the length corresponding to the deepest total well depth to be monitored during the data collection event.

   Note: If the length designations on the tape or cable associated with the electronic water-level probe are found to be incorrect, the probe will not be used until it is repaired by the manufacturer.
2. Record the verification of this calibration process in the field logbook.
3. Obtain fluid level depth measurements.

   Note: Field notes on logs will be treated as secured documentation, and indelible ink will be used. As a general rule, the order of measuring should proceed from the least to most contaminated monitoring wells, based on available data.
4. Identify the Site and well number in the field logbook using indelible ink, along with the date, time, personnel names, and weather conditions.

5. Avoid activities that may introduce contamination into monitoring wells. Activities such as dispensing gasoline into vehicles or generators should be accomplished well in advance of obtaining field measurements.
6. Use personal protective equipment (PPE), as required by the HASP.
7. Clean the water-level probe and cable in accordance with appropriate cleaning procedures. Down-hole instrumentation should be cleaned prior to obtaining readings at the first monitoring well and upon completion of readings at each well.
8. Clean the water-level probe and cable with a soapy (Alconox®) water rinse, followed by a solvent rinse (if appropriate, based on site-specific constituents of concern) and an analyte-free water rinse. Contain the rinse water in a portable container that will be transferred to an onsite container.
9. Put clean plastic sheeting on the ground next to the well.
10. Unlock and open the well cover while standing upwind from the well. Place the well cap on the plastic sheeting.
11. Locate a measuring reference point on the well casing. If one is not found, initiate a reference point at the highest discernable point on the inner casing (or outer casing if an inner casing is not present) by notching with a hacksaw or using an indelible marker. All down-hole measurements will be taken from the reference point established at each well on the inner casing (or on the outer casing, only if an inner casing is not present).
12. Measure to the nearest hundredth of a foot and record the height of the inner and outer casings (from the reference point, as appropriate) to ground level.
13. Record the inside diameter of the well casing in the field logbook.
14. Lower the probe until it emits a signal (tone and/or light) indicating the top of the water surface. Gently raise and lower the instrument through this interface to confirm its depth. Measure and record the depth of the water surface and the total well depth, to the nearest hundredth of a foot, from the reference point at the top of the well. Lower the probe to the bottom of the well to obtain a total depth measurement.
15. Clean the water-level probe and cable in accordance with appropriate cleaning procedures.
16. Compare the depth of the well to previous records and note if there is a discrepancy.
17. Lock the well when all activities are completed.

Fluid level measurement data will be recorded legibly in the field logbook in indelible pen. Field situations, such as apparent well damage or suspected tampering, or other observations of conditions that may result in compromised data collection, will be photographically documented where practicable.

2.3 Groundwater Sampling Procedures

The following procedures will be used to collect groundwater samples from monitoring wells.

2.3.1 Low-Flow Groundwater Purging and Sampling

Groundwater samples are not anticipated to be collected at the Site. However, if groundwater samples were to be collected, this protocol describes procedures that would be used to collect the samples. This protocol has been developed in accordance with the United States Environmental Protection Agency (USEPA) Region I *Low Stress (Low Flow) Purging and Sampling Procedures for the Collection of Groundwater Samples from Monitoring Wells* (USEPA Standard Operating Procedure No. GW0001; July 30, 1996). No wells will be sampled until well

development has been performed. During heavy precipitation events, groundwater sampling will be discontinued until the precipitation ceases. Groundwater samples will not be collected within 2 weeks following well development. When one round of water levels is taken to generate water-elevation data, the water levels will be taken consecutively, at one time, prior to sampling or other activities.

The following equipment and materials will be available, as required, during groundwater sampling:

- Appropriate PPE, as required in the site HASP;
- Site map, well construction records, and prior groundwater sampling records (if available);
- Sample pump, which may consist of one or more of the following:
  - Submersible pump (e.g., Grundfos Redi-Flo 2),
  - Peristaltic pump (e.g., ISCO Model 150), and
  - Bladder pump (e.g., Marschalk System 1, QED Well Wizard, Geotech, etc.);
- Low-density polyethylene tubing of an appropriate size for the pump being used (high-density polyethylene tubing if sampling for 1,4-dioxane or PFAS);
- Power source (i.e., generator, battery);
- PID;
- Water-level probe (PFAS-sampling-compliant if sampling for PFAS);
- Water-quality (temperature/pH/specific conductivity/oxidation-reduction potential [ORP]/turbidity/dissolved oxygen [DO]) meter and flow-through measurement cell; several brands may be used, including:
  - YSI 6-series multi-parameter instrument,
  - Hydrolab Series 3 or Series 4a multiprobe and display, and
  - Horiba U-10 or U-22 water quality monitoring system;
- Supplemental turbidity meter (e.g., Horiba U-10, Hach 2100P, LaMotte 2020);
- Appropriate water sample containers;
- Appropriate blanks (trip blank supplied by the laboratory);
- Appropriate transport containers (coolers) with ice and appropriate labeling, packing, and shipping materials;
- Groundwater sampling logs;
- COC forms;
- Indelible ink pens;
- Decontamination equipment;
- Plastic sheeting (for each sampling location);
- Dedicated or disposable bailers;
- New disposable polypropylene rope;
- Buckets to measure purge water; and
- Keys to wells.

To mitigate potential cross-contamination, groundwater samples will be collected in a pre-determined order, from least impacted to most impacted, based on previous analytical data. If no analytical data are available, samples will be collected in order from the furthest upgradient to the furthest downgradient to the source area locations.

The following steps detail monitoring well sampling procedures:

1. Review the materials checklist to ensure that the appropriate equipment has been acquired.
2. Identify the Site and the well to be sampled on the sampling log sheets, along with the date, arrival time, and weather conditions. Also identify the personnel, the equipment used, and other pertinent data requested on the Low-Flow Groundwater Sampling Form (Attachment 3).
3. Label all sample containers using an appropriate label.
4. Use safety equipment, as required in the HASP.
5. Calibrate the field instruments according to the manufacturer's procedures for calibration.
6. Place plastic sheeting adjacent to the well to use as a clean work area.
7. Establish the background reading with the PID and record the reading on the field log.
8. Remove the lock from the well. If the lock is rusted or broken, replace it with a new brass keyed-alike lock.
9. Unlock and open the well cover while standing upwind of the well. Remove the well cap and place it on the plastic sheeting. Insert the PID probe into the breathing zone above the well casing following instructions in the HASP.
10. Set out dedicated or disposable sampling devices and meters on plastic sheeting.
11. Prior to sampling, measure groundwater elevations at each monitoring well. Determine whether light NAPL or dense NAPL is present. Note the presence of either of these NAPLs on the sampling form. Obtain a water-level depth and bottom of well depth using an electric well probe and record the depths on the sampling log sheet. Clean the well probe after each use with a soapy (Alconox®) water wash and a tap water rinse. (Note: Water levels will be measured at all wells prior to initiating a sampling event.)
12. After the groundwater elevations are measured and NAPLs are determined to be not present, groundwater will be purged from the wells. If NAPLs are determined to be present, a groundwater sample will not be collected; rather, a representative NAPL sample may be collected (if required) using a peristaltic pump or other method determined by the Field Manager/Site Supervisor.
13. Prepare and install a pump in the well:
    a. For submersible and non-dedicated bladder pumps, decontaminate the pump according to site decontamination procedures. Attach the air line tubing to the air port on the top of the bladder pump. Attach the sample discharge tubing to the water port on the top of the bladder pump. Care should be taken not to reverse the air and discharge tubing lines during bladder pump set-up as this could result in bladder failure or rupture. Attach and secure a safety cable to the eyebolt on the top of bladder pump (if present, depending on the pump model used). Slowly lower the pump, safety cable, tubing, and electrical lines into the well to a depth corresponding to the approximate center of the saturated screen section of the well. Take care to avoid twisting and tangling of the safety cable, tubing, and electrical lines while lowering the pump into the well; twisted and tangled lines could result in the pump becoming stuck in the well casing. Also, make sure to keep the tubing and lines from touching the ground or other surfaces while introducing them into the well as this could lead to well contamination.
    b. If using a bladder pump, connect the air line to the pump controller output port. The pump controller should then be connected to a supply line from an air compressor or compressed gas cylinder using an appropriate regulator and air hose. Take care to tighten the regulator connector onto the gas cylinder (if used) to prevent leaks. Once the air compressor or gas cylinder is connected to the pump controller, turn on the compressor or open the valve on the cylinder to begin the gas flow. Turn on the pump controller if

an on/off switch is present and verify that all batteries are charged and fully operating before beginning to pump.

c. If using a peristaltic pump, slowly lower the sampling tubing into the well to a depth corresponding to the approximate center of the saturated screen section of the well. The pump intake or sampling tube must be kept at least 2 feet above the bottom of the well to prevent mobilization of any sediment present in the bottom of the well.

14. Connect the pump discharge water line to the bottom inlet port on the flowthrough cell connected to the water quality meter.
15. If the well diameter is 2 inches in diameter or larger, measure the water level again, with the pump in the well, before starting the pump. Start pumping the well at 200 to 500 milliliters per minute. Ideally, the pump rate should cause little water-level drawdown in the well (less than 0.3 feet), and the water level should be stabilized. The water level should be monitored every 3 to 5 minutes (or as appropriate) during pumping. Care should be taken to avoid breaking the pump suction or entrainment of air in the sample. Record any pumping rate adjustments and the depths to water. Pumping rates should, if needed, be reduced to the minimum capabilities of the pump to avoid pumping the well dry and/or to ensure stabilization of the indicator parameters. If the recharge rate of the well is very low, purging should be interrupted to prevent drawdown within the well advancing below the pump. However, a steady flow rate should be maintained to the extent practicable. Sampling should commence as soon as the volume in the well has recovered sufficiently to permit sample collection.
16. Containerize all purge and decontamination liquids per Section 2.3.2 below.
17. During well purging, monitor the field indicator parameters (turbidity, temperature, specific conductance, pH, DO, and ORP) every 3 to 5 minutes (or as appropriate). The well is considered stabilized and ready for sample collection when the indicator parameters have stabilized for three consecutive readings as follows:
    - ±0.1 for pH;
    - ±3 percent (%) for specific conductance (conductivity);
    - ±10 millivolts for ORP; and
    - ±10% for turbidity and DO.

    Note: Turbidity and DO usually require the longest time to achieve stabilization. If the field indicator parameters do not stabilize within 1 hour of the start of purging, but the groundwater turbidity is below the goal of 50 nephelometric turbidity units and the values for all other parameters are within 10%, the well can be sampled. If the parameters have stabilized but the turbidity is not in the 50 nephelometric turbidity unit range, the pump flow rate should be decreased to a minimum rate of 100 milliliters per minute to reduce turbidity levels as much as possible.
18. Fill in the sample label and cover the label with clear packing tape to secure it to the container.
19. After the indicator parameters have stabilized, collect groundwater samples by diverting flow out of the unfiltered discharge tubing into the appropriately labeled sample container. If a flow-through cell is being used to measure field parameters, the flow-through cell should be disconnected after stabilization of the field indicator parameters and prior to groundwater sample collection. Under no circumstances should analytical samples be collected from the discharge of the flow-through cell. When the container is full, tightly screw on the cap.
20. Secure the sample containers with packing material and store at 4 degrees Celsius on wet ice in an insulated transport container provided by the laboratory.

21. Record the time the sampling procedures were completed on the field logs.
22. Place all disposable sampling materials (plastic sheeting, disposable bailers, and health and safety equipment) in appropriately labeled containers. Go to the next well and repeat Step 1 through Step 21 until all wells are sampled.
23. Complete the procedures for packaging, shipping, and handling samples with associated COC forms.

2.3.2 Waste Management

Materials generated during groundwater sampling activities, including disposable equipment, purge water, and decontamination liquids, will be stored on site in appropriately labeled containers and disposed of properly. Waste will be managed in accordance with the TGI – *Investigation-Derived Waste Handling and Storage* (Attachment 1); the procedures identified in the SMP or QAPP; and all state-, federal-, or client-specific requirements. Waste containers will be properly labeled and documented in the field logbook.

2.3.3 Data Recording and Management

The original documents from the field will be managed in accordance with the site-specific QAPP. In general, forms (e.g., Low-Flow Sampling Field Forms), logs/notes (including daily field and calibration logs), digital records, and COC records will be maintained by the field team lead.

Field logs and COC records will be transmitted to the Arcadis Project Manager and/or Task Manager, as appropriate, at the end of each day unless otherwise directed. Electronic data files will be sent to the project team and uploaded to the electronic project folder daily.

Records generated as a result of this FSP will be controlled and maintained in the project record files in accordance with project requirements.

2.3.4 Quality Assurance

QA procedures will be conducted in accordance with the Arcadis Quality Management System or the site-specific QAPP.

Unless described otherwise in the project-specific work plan or QAPP, QA/QC samples will be collected as follows:

- One duplicate for every 20 samples; and
- One laboratory matrix/matrix spike sample for every 20 samples.

In addition to the QC samples to be collected in accordance with this FSP, the following QC procedures will be observed in the field:

- Collect samples from the monitoring wells, in order of increasing concentration, to the extent known based on review of historical site information, if available.
- Collect equipment blanks after wells with higher concentrations (if known) have been sampled. Equipment blanks will include the pump and tubing (if using disposable tubing) or the pump only (if using tubing dedicated to each well).
- Operate all monitoring instrumentation in accordance with manufacturers' instructions and calibration procedures—calibrate the instruments at the beginning of each day, verify the calibration at the end of each day, and record all calibration activities in the field logbook.

- Following the procedures for equipment decontamination, clean all groundwater sampling equipment prior to use in the first well and after each subsequent well.

2.4 Indoor and Ambient Air Sampling Procedures

Indoor and ambient air samples will be collected in accordance with the New York State Department of Health Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (2006) and associated soil vapor intrusion updates. The procedures implemented for the collection of indoor and ambient air samples are summarized as follows:

1. Complete a product inventory form (Attachment 2).
2. Remove the brass plug fitting covering the 6-liter stainless steel Summa canister sampling port using a wrench.
3. Connect the pressure gauge or flow controller with integral pressure gauge to the Summa canister sampling port. Open the valve on the canister and quickly measure the vacuum within the canister. If the vacuum is greater than negative 25 inches of mercury (in. Hg), then the canister is acceptable for sampling. Any canisters with a vacuum less than negative 25 in. Hg should not be used for sampling. Close the valve and record the measurement on the sampling sheet.
4. Assemble the sampling train. Each fitting should be hand tightened and then tightened with a wrench approximately ¼ turn.
5. Confirm that the sampling train is air tight by conducting a vacuum test. Place the brass cap at the end of the sampling train (particulate filter), quickly open and close the sampling valve and monitor the vacuum on the pressure gauge. If the vacuum decreases, there is a leak in the system. The fittings should be rechecked and the vacuum test redone.
6. Initiate sampling by opening the Summa canister valve. Record starting time on the sampling sheet.
7. During sampling, the pressure will be monitored periodically to ensure that the flow controller is operating properly.
8. When the time corresponding to the calibrated flow controller (for indoor air – 24 hours) has elapsed, close the canister valve. Disassemble the sampling train. Check the vacuum within the canister using the pressure gauge and record the measurement on the sampling sheet.
9. Since the flow rate into the canister can fluctuate because of variations in atmospheric conditions, the measured final vacuum may range from 4 to 12 in. Hg. If the measured vacuum is greater than 12 in. Hg or less than 3 in. Hg, the sample may be flagged and re-sampling may be needed.
10. Place the brass cap on the sampling port of the canister and tighten it. The air sampling is complete.
11. Place the air sample in the travel box and complete the COC forms and identification tag on the canister.
12. Send the canister to the laboratory via next day airmail service for analysis of volatile organic compounds by USEPA Method TO-15.

2.5 Effluent Vapor Sampling Procedures

Effluent vapor sampling points will be orifice connections on treatment effluent lines.

To obtain representative samples that meet the data quality objectives, effluent vapor samples will be collected as follows:

- To ensure samples collected are representative, one to three volumes (i.e., the volume of the tube) will be purged using disposable syringes prior to collecting the samples.

- Samples will be collected, using conventional sampling methods, in a laboratory-certified Summa canister consistent with the sampling and analytical methods.
- Summa canisters will be batch or individually certified as analyte free by the laboratory.

2.6 Sample Labeling, Packing, and Shipping

The analytical laboratory will provide the sample containers for all soil, groundwater, air, and soil vapor samples. Container closures for all samples, except air and soil vapor, will be screw-on type and made of inert materials. Sample containers are cleaned and prepared by the laboratory prior to being sent to the Site. Trip blanks will be used to check for false positives from laboratory cleaning procedures or cross contamination during sample shipment.

Each sample will be given a unique identification. With this type of identification, no two samples will have the same label.

Upon collection, samples will be promptly labeled with the following information:

- Project number and site location;
- Unique sample identification;
- Analysis required;
- Date and time sampled;
- Sample type (composite or grab); and
- Preservative, if applicable.

Clear tape will be secured over the sample label and the COC will be initiated. A sample COC form is included as Attachment 4.

Appropriate sample containers, preservation methods, and laboratory holding times for each sample type will be applied as identified in the QAPP.

If samples are to be shipped by a commercial carrier (e.g., Federal Express), the sample bottles/jars will be packed in coolers containing the following:

- A drain plug (if present) that has been sealed with duct tape;
- Bubble wrap on the bottom of the cooler (1 to 2 inches);
- Water ice packaged in re-sealable plastic bags;
- Sufficient bubble wrap to fill in the remaining area; and
- The completed COC form in a re-sealable plastic bag, taped in place on the inside cover of the cooler.

The cooler will then be sealed with tape. Appropriate shipping labels, such as "this-end-up" and "fragile" stickers, will be affixed to the cooler. Samples will be hand delivered or delivered by an express carrier within 48 hours of sample collection. The express carrier will not be required to sign the COC form; however, the shipping receipt should be retained by the sampler and forwarded to the project files.

All samples, whether solids, liquids, or gases, being shipped by air or ground transport will be evaluated using a shipping determination process to determine if the material or equipment being shipped is hazardous for transport. All materials identified as Hazardous Materials (HazMat) will be shipped according to applicable United States Department of Transportation (USDOT) and International Air Transport Association regulations and

requirements. All employees collecting samples, preparing HazMat packages, or offering HazMat to a third-party carrier, such as Federal Express, will have current HazMat training.

2.7 Equipment Decontamination

The general equipment decontamination procedures below will be modified to account for special requirements necessary to appropriately decontaminate equipment for 1,4-dioxane and PFAS. The latest edition of the NYSDEC's *Guidelines for Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS)*, under the NYSDEC's Part 375 Remedial Program (Attachment 1) will be consulted along with Arcadis' January 26, 2022 TGI – *Per- and Polyfluoroalkyl Substances (PFAS) Field Sampling Guide* (Attachment 1).

2.7.1 Sampling Equipment Decontamination

The following equipment will be required for use during sampling equipment cleaning procedures:

- Appropriate PPE, as required in the site HASP;
- Distilled water;
- PFAS-free water (if sampling for PFAS);
- Non-phosphate detergent, such as Alconox® (or equivalent);
- Tap water;
- Rinsate collection plastic containers;
- USDOT-approved waste shipping container(s);
- Brushes;
- Large, heavy-duty, garbage bags;
- Spray bottles;
- "Pesticide grade" methanol (optional);
- "Ultra-pure grade" nitric acid (optional);
- Hexane (optional);
- Re-sealable plastic bags; and
- Plastic sheeting.

Prior to collecting samples to be submitted for chemical analysis, if any, all non-dedicated bowls, spoons, hand augers, bailers, and filtering equipment will be washed with potable water and a detergent (such as Alconox®). Decontamination may take place at the sampling location, as long as all liquids are contained in pails and buckets. Sampling equipment will then be rinsed with potable water, followed by a 10% "pesticide-grade" methanol rinse and then a distilled water rinse. When sampling for inorganic constituents in an aqueous phase, an additional rinse step will be added prior to the rinse with methanol. The rinse step will entail a rinse with a 10% "ultra-pure-grade" nitric acid followed by a distilled water rinse. If sampling for PFAS, all distilled water rinses will be replaced with PFAS-free water rinses. Between rinses, equipment will be placed on polyethylene sheets or aluminum foil, if necessary. At no time will washed equipment be placed directly on the ground. Equipment will either be used immediately or wrapped in plastic or aluminum foil for storage or transportation from the designated decontamination area to the sampling location. If sampling for PFAS, decontaminated equipment will

not come into contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (Teflon ®) materials.

2.8 Investigation-Derived Waste and Storage

Investigation-derived waste (IDW) will be generated during Site activities, which include, but are not limited to, groundwater sampling and equipment decontamination. IDW may include decontamination liquids, PPE, sorbent materials, purge water, and disposable sampling materials that may have come in contact with potentially impacted materials. IDW will be collected and staged at the point of generation. Waste materials will be analyzed for constituents of concern to evaluate proper disposal methods. Anticipated IDW will be labeled and stored in 55-gallon drums with bolt-sealed lids. Disposable equipment (PPE and disposable sampling equipment) typically does not require laboratory analysis. All IDW will be disposed of offsite at a permitted facility in accordance with all applicable local, State, and Federal regulations.

Minimization of IDW will be considered and may include techniques such as replacing solvent-based cleaners with aqueous-based cleaners for decontamination of equipment, reuse of equipment (where it can be decontaminated), and sampling techniques that generate little waste.

The procedures for handling IDW are based on the USEPA's 1992 *Guide to Management of Investigation Derived Wastes*. IDW is assumed to be contaminated with site residuals until analytical evidence indicates otherwise. IDW will be managed to ensure the protection of human health and the environment and will comply with all applicable or relevant and appropriate requirements, including, but not limited to, the following laws and regulations for hazardous waste management.

- 6 New York Codes, Rules, and Regulations Part 364 *Waste Transporter Permits*, Part 371 *Identification and Listing of Hazardous Wastes*, and Part 372 *Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities*;
- Resource Conservation and Recovery Act (RCRA) 42 United States Code Part 6901-6987;
- Comprehensive Environmental Response, Compensation, and Liability Act 42 United States Code Part 9601-9675;
- Superfund Amendments and Reauthorization Act; and
- USDOT HazMat transportation regulations.

Waste characterization will be conducted in accordance with waste hauler, waste handling facility, and state/federal requirements and following the laboratory requirements and methodologies outlined in the QAPP. IDW will be analyzed by methods appropriate for the known constituents that have been historically detected in the monitoring wells.

In the unexpected event that IDW is characterized as a hazardous waste (as defined in 6 New York Codes, Rules, and Regulations Part 371), RCRA and USDOT requirements must be followed for packaging, labeling, transporting, storing, and recordkeeping, as described in Title 40 of the Code of Federal Regulations (CFR) (40 CFR) Part 262 and Title 49 of the CFR Part 171-178. Waste material classified as RCRA non-hazardous may be handled and disposed of as an industrial waste.

These procedures may be varied or changed as required, dependent upon site conditions, equipment limitations, or limitations imposed by the procedure. The ultimate procedure employed will be documented in the project work plans or reports.

The following materials, as required, shall be available for IDW handling and storage:

- Appropriate PPE, as specified by the HASP;
- USDOT 1A2 or equivalent 55-gallon steel drums;
- Socket wrench (15/16-inch);
- Hammer;
- Leather gloves;
- Drum dolly;
- Appropriate drum labels (outdoor waterproof self-adhesive);
- Polyethylene storage tank;
- Appropriate labeling, packing, COC forms, and shipping materials;
- Indelible ink and/or permanent marking pens;
- Plastic sheeting;
- Digital camera; and
- Field logbook.

2.8.1 Drum Storage

All 55-gallon drums will be stored at a secure, centralized, onsite location that is readily accessible for vehicular pick-up in accordance with local, State and Federal rules and regulations. Drums confirmed as containing, or believed to contain, hazardous waste will be stored over an impervious surface provided with secondary containment. For drums containing liquid, the storage location will have a containment system that can contain at least the larger of 10% of the aggregate volume of staged materials or 100% of the volume of the largest container. Drums will be closed during storage and in good condition in accordance with the USEPA's 1992 *Guide to Management of Investigation-Derived Wastes*.

2.8.2 Drum Container Labelling

Drums will be labeled on both the side and lid of the drum using a permanent marking pen. Old drum labels must be removed to the extent possible, descriptions crossed out should any information remain, and new labels affixed on top of the old labels. Other containers used to store various types of waste (polyethylene tanks, roll-off boxes, end-dump trailers, etc.) will be labeled with an appropriate "Waste Container" or "Testing in Progress" label pending characterization. Drums and containers will be labeled as follows:

- Appropriate waste characterization label ("Testing in Progress", "Hazardous", or "Non-Hazardous");
- Waste generator's name (e.g., client name);
- Project name;
- Name and telephone number of Arcadis Project Manager;
- Composition of contents (e.g., used oil, acetone 40%, toluene 60%);
- Media (e.g., solid, liquid);
- Accumulation date (i.e., date the waste is first placed in the container); and
- Drum number of total drums as reconciled with the drum inventory maintained in the field logbook.

Immediately upon placing waste into the drum/container, an appropriate waste label will be filled out to include the information specified above and affixed to the container. Containers with waste determined to be non-hazardous will be labeled with a green and white "Non-Hazardous Waste" label over the "Waste Container" label. Containers with waste determined to be hazardous will be stored in an onsite storage area and will be labeled with the "Hazardous Waste" label and affixed over the "Waste Container" label. USDOT hazardous class labels must be applied to all hazardous waste containers for shipment offsite to an approved disposal or recycling facility. In addition, a proper USDOT shipping name shall be included on the hazardous waste label. The transporter should be equipped with the appropriate USDOT placards. However, placarding or offering placards to the initial transporter is the responsibility of the generator per 40 CFR Part 262.33.

2.8.3 Inspection and Documentation

All IDW will be documented as generated on a Drum Inventory Log maintained in the field logbook. The Drum Inventory Log will record the generation date, type, quantity, matrix, and origin (e.g., MW-1 through MW-20) of materials in every drum, as well as a unique identification number for each drum. The drum inventory will be used during drum pickup to assist with the labeling of drums. Digital photographs will be taken upon the initial generation and drumming/staging of waste and upon final labeling after characterization to document compliance with labeling and storage protocols and the condition of the containers. Two photographs of each drum, including one of the entire drum and a close-up photograph of the label, will be provided as part of the drum inventory log. An additional photograph of the drum storage location (including all drums) will also be included. Evidence of damage, tampering, or other discrepancies should be documented photographically.

2.8.4 Preparing Waste Shipment Documentation (Hazardous and Non-Hazardous)

Waste profiles will be prepared by Arcadis and forwarded, along with laboratory analytical data, to Fischbach, LLC for approval/signature. Fischbach, LLC will then return the profiles to Arcadis, who will then forward them to the waste removal contractor for preparation of a manifest. The manifest will be reviewed by Arcadis prior to forwarding to Fischbach, LLC for approval. Upon approval of the manifest, Fischbach, LLC will return the original signed manifest directly to the waste contractor.

Different profile numbers will be generated for different matrices or materials in the drums. For example, the profile number for disposable equipment will be different than the profile number for soil cuttings. When there are multiple profiles, it is critical that the proper label, with the profile number appropriate to a specific material, be affixed to the proper drums. A copy of the Arcadis drum inventory will be provided to the waste transporter during drum pickup and to the facility receiving the waste.

2.9 Emergency Response and Notifications

Specific procedures for responding to site emergencies will be detailed in the HASP. In the event of a fire, explosion, or other release that could threaten human health outside of the Site, or when Fischbach, LLC or Arcadis has knowledge of a spill that has reached surface water, Fischbach, LLC or Arcadis must immediately notify the National Response Center (800-424-8802) in accordance with 40 CFR Part 262.34. Other notifications to state agencies may also be necessary.

3 Field Instruments

All field-screening equipment will be calibrated immediately prior to each day's use or more frequently, if required. Additional calibration may be required if measurements appear erroneous. Calibration procedures will conform to the manufacturer's standard instructions. Records of all instrument calibration will be maintained by the field personnel.

3.1 Portable Photoionization Analyzer

If required, the PID will be a MiniRAE 3000 (or equivalent), equipped with a 10.6 electron volt lamp. The MiniRAE is capable of ionizing and detecting compounds with an ionization potential of less than 10.6 electron volts. This accounts for up to 73% of the volatile organic compounds on the Target Compound List. Calibration will be performed according to the following procedures:

1. Turn on the MiniRAE 3000 and monitor the ambient air. If there is any doubt of the air quality, then zero grade gas will be obtained.
2. Connect the regulator to the span gas cylinder. Hand-tighten the fittings.
3. Open the valve on the gas bag by turning the valve stem fully counterclockwise.
4. Attach the gas bag to the regulator. Hand-tighten the fittings.
5. Turn the regulator knob counterclockwise half a turn to start the gas flow.
6. Fill the gas bag half full and then close the regulator fully clockwise to turn off the flow of gas.
7. Fill the gas bag and then turn the valve clockwise.
8. Press “MODE” and “N” at the same time to enter the set-up screens. Press “MODE” to cycle through the screens. Press “Y” for span calibration and “Y” again for zero point. Press “Y” to set the zero point.
9. When the screen displays “CAL GAS,” press “Y” and calibrate the unit with isobutylene calibration gas.
10. Press and hold “MODE” for a few seconds, and the display will return to normal screening mode.
11. After 7 hours of use, recharge the battery pack. Record the time the battery pack was charged.

The date, time, user’s initials, calibration gas, and concentration will be recorded on the PID Calibration Log (Attachment 5).

3.2 Water-Level Meter

The water-level cable will be checked once to a standard to assess if the meter has been correctly calibrated by the manufacturer or vendor. If the markers are incorrect, the meter will be sent back to the manufacturer or vendor.

Attachment 1

Technical Guidance Instructions

- Sub-Slab Soil Gas Sampling Point Installation Using Vapor Pin Approach
- Indoor or Ambient Air Sampling and Analysis Via USEPA Method TO-15
- Groundwater and Soil Sampling Equipment Decontamination
- Installation of Permanent Soil Vapor Probes
- Investigation-Derived Waste Handling and Storage
- PFAS Field Sampling Guide
- Low-Flow Groundwater Purging and Sampling Procedures for Monitoring Wells
- NYSDEC PFAS Guidance April 2023

TGI - Sub-Slab Soil Gas Sampling Point Installation Using Vapor PIN™ Approach

Rev: 2

Rev Date: December 30, 2021

Version Control

Issue	Revision No.	Date Issued	Page No.	Description	Reviewed By
	1	July 20, 2017	All	Original/Rev 1	Dawn Cacia Mitch Wacksman
	2	December 30, 2021	All	Rev 2 for QMS Library / Updates	Robert Uppencamp

Approval Signatures

Prepared by: 7/20/2017

Dawn Cacia (Preparer) Date

Reviewed by: 12/30/2021

Robert Uppencamp (Subject Matter Expert) Date

1 Introduction

This Technical Guidance Instruction (TGI) provides the methods and procedures for installing sub-slab vapor ports using the Vapor Pin™ approach.

2 Intended Use and Responsibilities

This document describes general and/or specific procedures, methods, actions, steps, and considerations to be used and observed by Arcadis staff when performing work, tasks, or actions under the scope and relevancy of this document. This document may describe expectations, requirements, guidance, recommendations, and/or instructions pertinent to the service, work task, or activity it covers.

It is the responsibility of the Arcadis Certified Project Manager (CPM) to provide this document to the persons conducting services that fall under the scope and purpose of this procedure, instruction, and/or guidance. The Arcadis CPM will also ensure that the persons conducting the work falling under this document are appropriately trained and familiar with its content. The persons conducting the work under this document are required to meet the minimum competency requirements outlined herein, and inquire to the CPM regarding any questions, misunderstanding, or discrepancy related to the work under this document.

This document is not considered to be all inclusive nor does it apply to all projects. It is the CPM's responsibility to determine the proper scope and personnel required for each project. There may be project- and/or client- and/or state-specific requirements that may be more or less stringent than what is described herein. The CPM is responsible for informing Arcadis and/or Subcontractor personnel of omissions and/or deviations from this document that may be required for the project. In turn, project staff are required to inform the CPM if or when there is a deviation or omission from work performed as compared to what is described herein.

In following this document to execute the scope of work for a project, it may be necessary for staff to make professional judgment decisions to meet the project's scope of work based upon site conditions, staffing expertise, regulation-specific requirements, health and safety concerns, etc. Staff are required to consult with the CPM when or if a deviation or omission from this document is required that has not already been previously approved by the CPM. Upon approval by the CPM, the staff can perform the deviation or omission as confirmed by the CPM.

3 Scope and Application

This document describes the procedures for installing permanent sub-slab sampling probes using the Vapor Pin™ approach. These sample probes can then be used for the collection of sub-slab soil gas samples, for vacuum readings, or other uses. When not in use, the probes can be sealed in place without having to abandon the point.

The following sections list the necessary materials, equipment, and detailed instructions for installing sub-slab sampling points using the Vapor Pin™ approach.

4 Personnel Qualifications

Arcadis field sampling personnel will have current health and safety training, including 40-hour HAZWOPER training, site supervisor training, site-specific training, first-aid, and cardiopulmonary resuscitation (CPR), as

needed. Arcadis field sampling personnel will be well versed in the relevant standard operating procedures (SOPs), technical guidance instructions (TGIs) and possess the required skills and experience necessary to successfully complete the desired field work. Arcadis personnel responsible for leading sub-slab soil gas sampling point installation activities must have previous sub-slab soil gas sampling point installation experience.

5 Equipment List

- Appropriate personal protective equipment (PPE), as required by the site-specific Health and Safety Plan (HASP) and the job safety analysis (JSA)
- Electric hammer drill (big – e.g., Bosch, Hilti, etc.)
- 5/8-inch and 1 ½-inch concrete drill bits for impact drill (drill bit length contingent on slab thickness)
- 2-inch concrete coring drill bit (for stainless steel flush mount cover installation)
- Contractor Cox Colvin Vapor Pin™ Kit that includes:
  - Decontaminated Stainless Steel Vapor Pin™ with barbed fitting (0.5-inch outside diameter at end, 0.8125-inch diameter at middle, 3.5-inch in length)
  - Vapor Pin™ sleeves
  - Vapor Pin™ rubber protective caps
  - Secure, steel flush mount covers or plastic flush mount cover
  - Spanner screwdriver
  - Stainless steel drilling guide
  - Installation/Extraction tool
  - Bottle brush
  - Vapor Pin™ SOP
- Photoionization detector (PID) with appropriate eV lamp for site related contaminants of concern (COCs)
- Dead blow hammer
- Pliers
- Whisk broom and dustpan or shop vacuum with clean fine-particle filter
- Spray bottle with distilled water
- Paper towels
- Nitrile gloves
- Work gloves
- Knee pads
- Ground fault circuit interrupter (GFCI)
- Extension cords capable of amperage required for hammer drill
- Plastic sheeting
- Field notebook and/or FieldNow® application

6 Cautions

The following cautions and field tips should be reviewed and considered prior to installing or collecting a sub-slab soil gas sample.

- When drilling sample collection holes, be mindful of utilities that may be in the area. Always complete utility location, identification and marking before installing sub-slab ports as required by the Arcadis Utility Location Policy and Procedure. Be aware that public utility locator organizations frequently do not provide location information within buildings so alternative lines of evidence must be used. If the driller is concerned about a particular location, consult the project manager about moving it to another location. Do not hesitate to use Stop Work Authority; if something doesn't seem right stop and remedy the situation.
- Use of Vapor Pins™ and drill bit length will be based on the thickness of the slab encountered. Every effort will be made to establish the thickness of the slab during the preliminary investigation activities, such as interviews with site personnel, review of construction drawings, building walk through and utility clearance process. If slab is determined to be too thin for Vapor Pins™ – install a standard port using the permanent probe approach consistent with the corresponding TGI.
- Sampling personnel should not handle hazardous substances (such as gasoline), permanent marking pens (sharpies), use hand sanitizer, wear/apply fragrances, or smoke cigarettes/cigars before and/or during the installation event.
- Only a clean decontaminated hammer drill and drill bits should be used for installation. A hammer drill dedicated to VI work is preferred. Be extra cautious if using rental equipment.
- Field personnel will properly seal the sub-slab soil gas sampling point at the slab surface to prevent leaks of atmosphere into the sub-slab soil gas sampling point during purging and sampling. Permanent ports will be fit snug into the predrilled hole by ensuring that the silicone sleeve is fitted properly around the Vapor Pin™ before installation and expands sufficiently inside the hole during installation. A protective cap will be installed on the end of the barb fitting. If this is not done properly, the integrity of the sample port may be compromised.
- If possible, have equipment shipped two to three days before the scheduled start of the installation event so that all materials can be checked. Order replacements if needed.

7 Health and Safety Considerations

All sampling personnel should review the appropriate HASP and JSA prior to beginning work to be aware of all potential hazards associated with the job site and the specific task. Field sampling must be carefully performed to minimize the potential for injury and the spread of hazardous substances. For sub-slab soil gas sampling point installation, drilling with an electric concrete impact drill should be done only by personnel with prior experience using such a piece of equipment or directly supervised by an experienced person and with the appropriate health and safety measures in place as presented in the JSA. It is possible to encounter high concentrations of VOCs in sub-slab soil gas, so the amount of time the borehole remains open should be minimized. For the same reason, when installing sub-slab soil gas sampling points in spaces with minimal dilution potential, such as closets, it is advisable to provide local ventilation. Finally, sub-slab soil gas sampling point installation should be completed at least 24 hours in advance or after any indoor air sampling to avoid cross contamination of the indoor air samples.

Proper procedures should be used to eliminate exposure to silca dust when drilling through concrete and asbestos containing materials such as floor tile, etc.

8 Procedure

Permanent sub-slab soil gas sampling points are installed using a hammer drill and manual placement of the Vapor Pin™ probe. After a dry fit, the vapor probe is inserted into the hole and installed using a dead blow hammer to tap the installation/extraction tool over the Vapor Pin™ to protect the barb fitting. The vapor probe is equipped with a rubber protective cap that is used to close the sampling port when not in use. A figure presenting a properly installed Vapor Pin™ is below:

Figure 1 - Cross-section of properly installed Vapor Pin™(Cox-Colvin Vapor Pin™ Installation SOP [2016])

The Vapor Pin™ and tubing will be purged prior to collecting the soil gas sample. Detailed installation methods are as follows:

1. Complete the procedure in the Arcadis Utility Location and Clearance Standard prior to drilling activities.
2. Remove, only to the extent necessary, any covering on top of the slab (e.g., carpet) if present.
3. Lay down plastic sheeting to keep the work area clean. Check to make sure shop vacuum is working properly and fine concrete particles will not pass through filter.
4. Advance the 1½-inch drill bit approximately 1.75 inches into the slab (Please note that if the stainless-steel flush mount is being used, advance the 2-inch drill bit approximately 1/8 inch into the slab first before using the 1½-inch drill bit). This hole is drilled deep enough to permit the top of the Vapor Pin™ to be set flush with the slab when the Vapor Pin™ is inserted into the 5/8-inch hole drilled under Step 7, below. Careful not to advance too far into the slab. This will cause the threaded portion of the Vapor Pin™ to be set too deeply to engage with stainless-steel cover. Clean up cuttings with shop vacuum, bottle brush, and dust pan.
5. Drill a 5/8-inch-diameter hole into the concrete slab using the hammer drill. Do not fully penetrate the slab at this time. Stop drilling approximately 1-inch short of penetrating the slab.
6. Use the shop vacuum, bottle brush and dust broom to clean up the work area and material that may have fallen into and around the drill hole.

7. Advance the 5/8-inch drill bit the remaining thickness of the slab and approximately 3 inches into the sub-slab material to create an open cavity. Record any observations from the drill cuttings, if possible, regarding approximate soil type(s), presence of soil moisture/water, and presence or absence of a plastic sub-slab sheet. Record PID readings.
8. Use the bottle brush, dust broom and dust pan to clean material around and within the hole. Do not use the shop vacuum to clean up the drill hole after the full thickness of the slab has been penetrated.
9. Using a Vapor Pin™ without the silicone sleeve fitted, test fit the components so that the proper depth of the 1½-inch hole provides enough space for the Vapor Pin™. Adjust so that the Vapor Pin™ will lie flush with the slab surface and does not create a tripping hazard.
10. Re-drill the 5/8-inch hole to ensure it remains clear. This can also be accomplished using a piece of steel rod, sample tubing or a piece of heavy wire (e.g., coat hanger).
11. Assemble the Vapor Pin™ for installation by fitting the silicone sleeve over the lower end of the pin.
12. Place the lower end of Vapor Pin™ assembly into the drilled hole. Place the small hole located in the handle of the installation/extraction tool over the Vapor Pin™ to protect the barb fitting, and tap the Vapor Pin™ into place using a dead blow hammer. Make sure the installation/extraction tool is aligned with the Vapor Pin™ to avoid damaging the barb fitting. Place the rubber protective cap over the Vapor Pin™ barb so that it covers the first barb. Do not push the cap down so that it is flush as this will make it very difficult to remove when preparing to sample.
13. For flush mount installations, cover the Vapor Pin™ with a flush mount cover, using either the plastic cover or by threading the stainless-steel secure cover onto the Vapor Pin™. Replace the surface covering (e.g., carpet) if warranted. Sample collection location should be returned to pre-sampling conditions to the extent feasible given the presence of a permanent probe.
14. All permanent sub-slab soil gas sampling points should be allowed to equilibrate for a minimum of 24 hours before proceeding to sample collection.

9 Waste Management

Silica dust generated from drilling through concrete must be captured and disposed of properly. If drilling through known or potential asbestos containing materials (e.g., floor tile, linoleum, etc.), discuss with the project manager and VI lead for proper management and disposal of dust and cuttings.

10 Data Recording and Management

Digital data collection is the Arcadis standard using available FieldNow® applications that enable real-time, paperless data collection, entry, and automated reporting. Paper forms should only be used as backup to FieldNow® digital data collection and/or as necessary to collect data not captured by available FieldNow® applications. The Field Now® digital form applications follow a standardized approach, correlate to most TGIs and are available to all projects accessible with a PC or capable mobile device. Once the digital forms are saved within FieldNow®, the data is instantly available for review on a web interface. This facilitates review by project management team members and SMEs enabling error or anomalous data detection for correction while the staff are still in the field. Continual improvements of FieldNow® applications are ongoing, and revisions are made as necessary in response to feedback from users and subject matter experts.

11 Quality Assurance

Conduct quality assurance as required by the project-specific work plan and/or Quality Assurance Project Plan (QAPP).

12 References

Cox-Colvin & Associates, Inc. 2016. Standard Operating Procedure Installation and Extraction of the Vapor Pin™. http://vaporpin.coxcolvin.com/wp-content/uploads/2016/09/Vapor-Pin-SOP-09-2016-Web.pdf

TGI - Indoor or Ambient Air Sampling and Analysis Via USEPA Method TO-15

Rev: 2

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Version Control

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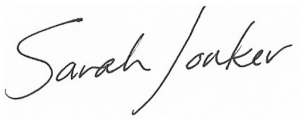
	1	August 19, 2016	All	Update Rev 0	Margaret Bartee Mitch Wacksman
	2	December 30, 2021	All	Updated Rev 1 and for QMS Relaunch	Sarah Jonker Robert Uppencamp

Approval Signatures

Prepared by:  12/30/2021

Sarah Jonker (Subject Matter Expert) Date

Reviewed by: 12/30/2021

Robert Uppencamp (Subject Matter Expert) Date

1 Introduction

This document describes specific procedures and considerations to be used by Arcadis staff to collect indoor air or ambient air samples in passivated stainless-steel canisters (e.g., SUMMA®) for the analysis of volatile organic compounds (VOCs) using United States Environmental Protection Agency (USEPA) Compendium Method TO-15 (TO-15).

2 Intended Use and Responsibilities

This document describes general and/or specific procedures, methods, actions, steps, and considerations to be used and observed by Arcadis staff when performing work, tasks, or actions under the scope and relevancy of this document. This document may describe expectations, requirements, guidance, recommendations, and/or instructions pertinent to the service, work task, or activity it covers.

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3 Scope and Application

This Technical Guidance Instruction (TGI) document describes the methods and procedures for collecting indoor air or ambient air samples with passivated stainless-steel canisters (e.g., SUMMA®) and the subsequent analysis of volatile organic compounds (VOCs) using USEPA TO-15.

4 Personnel Qualifications

Arcadis field sampling personnel will have current health and safety training, including 40-hour HAZWOPER training, site supervisor training, site-specific training, first aid, and cardiopulmonary resuscitation (CPR), as

needed. Arcadis field sampling personnel will be competent in the relevant procedures and possess the required skills and experience necessary to successfully collect indoor air and ambient air samples and the desired field work. Arcadis personnel responsible for directing indoor air and/or ambient air sample collection activities must have previous indoor air sampling experience and be able to complete the field work without direct supervision.

5 Equipment List

The equipment required for indoor air and ambient air collection is presented below:

- 6-liter, stainless steel passivated canisters (e.g., SUMMA®). Request one canister for each sampling location, plus duplicate canisters per project-specific requirements. If feasible, order extra canisters at a rate of 10 to 20% of the total number of sampling canisters (including duplicates).
- Flow controllers with in-line particulate filters and vacuum gauges. Flow controllers are pre-calibrated by the laboratory to the sampling duration [typically 8-hours in commercial/industrial settings and 24-hours in residential settings] specified by the project team). Vacuum gauges are also generally supplied by the laboratory. Flow controllers can be connected to the canister via 9/16-inch compression fittings or quick-connect fittings.
- Open-end wrench. Typical canister caps require 9/16-inch wrenches.
- Chain-of-custody (COC) form.
- Sample collection log (attached) or the Fulcrum Application: FieldNow® – TO-15 Indoor/Outdoor Air Collection Log Version 2.0 (Tier 1).
- Box, chair, tripod, or similar to hold canister above the ground surface at approximate breathing height (3-5 feet).
- Hand-held weather meter (optional).
- Nitrile gloves
- Camera (if photography is permitted at sampling locations).
- Chain and padlock or bike lock (for securing ambient air canisters).
- Zip ties
- Independent digital gauge (optional).
- Outdoor Air Sampling Tag noting: “Environmental Testing – Do Not Disturb”

For abnormal situations (i.e., sumps, crawlspaces with no access, where canisters must be hidden, etc.), Teflon tubing may be used to collect an air sample. In these situations, ¼-inch Swagelok fittings (including nut, front sleeve, and back sleeve) or other methods may be appropriate to affix tubing to canister. Teflon tubing may be connected to various lengths of electrical fish rods with zip ties (do not use tape) to direct the end of the tubing into a crawlspace or other area.

6 Cautions

Care must be taken to minimize the potential for introducing interferences during the sampling event. As such, keep canisters away from heavy pedestrian traffic areas (e.g., main entranceways, walkways), if possible. Sampling personnel should not handle hazardous substances (such as gasoline), permanent marking pens (sharpies), wear/apply fragrances, use hand sanitizer, or smoke cigarettes before and/or during the sampling event.

Specify sample collection duration with the laboratory when ordering equipment and confirm with the laboratory upon equipment receipt. Sample integrity can be compromised if sample collection is extended to the point that the canister reaches atmospheric pressure. Sample integrity is maintained if sample collection is terminated prior to the target sample duration and a measurable vacuum (e.g., 5 inches Hg) remains in the canister when sample collection is terminated. In extreme cold temperature, it is suggested the final measurable vacuum remains higher (e.g., 10 inches of Hg) to account for pressure loss. Digital gauges are recommended.

7 Health and Safety Considerations

All sampling personnel should review the appropriate health and safety plan (HASP) and job safety analysis (JSA) prior to beginning work to be aware of all potential hazards associated with the job site and the specific task.

8 Procedure

Preparation of Passivated Canister and Collection of Sample

1. Record the following information on the sampling form (use a hand-held weather meter, contact the local airport or other suitable information source [e.g., weatherunderground.com] to obtain the following information):
   - Ambient temperature
   - Barometric pressure
   - Wind speed
   - Relative humidity
   - Significant recent precipitation
   - Snow/ice cover
1. For indoor air sampling, note whether the heating, ventilation, and air conditioning (HVAC) system is operational and record settings.
2. For outdoor air sampling, canisters should be initiated at least 30 minutes prior to initiating the first indoor air sample and should be placed upwind of the structure(s) being sampled.
2. Attach an outdoor air tag to each outdoor air canister using a zip tie as applicable. Outdoor air tags are usually only required for off-site locations where disturbance of the canister may occur. The outdoor air tag should include the words, “Environmental Testing – Do Not Disturb”. If possible, place the outdoor air canister(s) in areas with less foot traffic.
3. Choose the sampling location in accordance with the project sampling plan. If a breathing zone sample is required, place the canister on a box, chair, tripod, or other similar stand to locate the canister orifice 3 to 5 feet above the ground or floor surface. The canister may be affixed to wall/ceiling support with nylon rope or placed on a stable surface. In general, areas near windows, doors, air supply vents, and/or other potential sources of “drafts” shall be avoided.
4. Record canister serial number and flow controller number on the sampling log or FieldNow® application and COC form. Assign sample identification (ID) and record on canister ID tag on the sample collection log or FieldNow® application and COC form.
5. Remove the brass dust cap from the canister with the wrench. Attach the independent gauge provided by the laboratory or a digital gauge to the canister. For compression fittings tighten with fingers first, then gently with

the wrench (roughly a quarter turn). Use caution not to over tighten fittings. For quick-connect fittings simply attach the gauge to the canister. Open the canister and record the initial vacuum on the sampling log or FieldNow® application and COC form. Close the canister and remove the gauge. The initial pressure reading should be evaluated with respect to project-specific and regulatory jurisdictional requirements. If the initial pressure registers less than -25 inches of Hg, then the canister is not appropriate for use, and another canister should be used. Note: confirm specific project jurisdiction regulatory requirements for initial pressure.

6. Attach the flow controller and integrated vacuum gauge to the canister with the wrench. Tighten with fingers first, then gently with the wrench (roughly a quarter turn). Use caution not to over tighten fittings. Some laboratories ship the canister and flow controller pre-assembled. Confirm that connections are appropriately tight. For quick-connect fittings simply attach to the canister. Caution – some quick-connect canisters do not have valves and begin sampling as soon as the flow controller is attached.
7. Open the canister valve to initiate sample collection. Record the date and local time (24-hour basis) of valve opening on the sample collection log and COC form. Collection of duplicate samples will include collecting two samples side by side at the same time or by using a duplicate tee. Duplicate tees can be requested from the laboratory and made from Teflon tubing and Swagelok fittings.
8. Check the initial canister pressure using the vacuum gauge. Ensure the initial pressure on the flow controller vacuum gauge matches the pressure from the independent gauge, note difference in the canister on the sample log.
9. Photograph the canister and surrounding area within the FieldNow® application; if photography is permitted at sampling locations. Also photograph the sample tag.
3. If feasible, check the canister approximately half-way through the sample duration and note progress on sample logs.

Termination of Sample Collection

1. Arrive at the sampling location at least 1 to 2 hours prior to the end of the sampling interval (e.g., 6 hours following sample initiation for an 8-hour sampling duration).
2. The appropriate canister pressure for termination of sampling is between -2 and -10 inches of Hg with the optimal ending pressure of -5 inches of Hg. Leaving some vacuum in the canister provides a way to ensure that the sample was collected over the appropriate duration and to evaluate whether the canister leaks before it reaches the laboratory. Stop collecting the sample by turning the valve on the canister when the canister pressure reaches approximately -5 inches of Hg and when the desired sample time has elapsed. If the canister pressure is outside of the appropriate range at the end of the sampling duration, consult with the project manager before ending the sample.
3. Record the final canister pressure. Record the date and local time (24-hour basis) of valve closing on the sample collection log or FieldNow® application and COC form.
4. Remove the flow controller from the canister. Connect the independent gauge to confirm the final canister pressure using the procedure as described above. Re-install brass cap on canister fitting and tighten with the wrench.
5. Package the canister and flow controller in accordance with Department of Transportation regulations available on the Transportation Health and Safety's Team Site on the Source for return shipment to the laboratory. The canister does not require preservation with ice or refrigeration during shipment.
6. Complete the forms and sample labels provided by the laboratory as directed (e.g., affix card with string).

7. Complete the COC form; copy, photograph, or scan a version for the project file (if possible); and place the form in the shipping container. Close the shipping container and affix the custody seal to the container closure. Transmit canisters via courier delivery service (e.g., Federal Express or UPS) to laboratory for analysis.

9 Waste Management

No specific waste management procedures are required.

10 Data Recording and Management

Digital data collection is the Arcadis standard using available FieldNow® applications that enable real-time, paperless data collection, entry, and automated reporting. Paper forms should only be used as backup to FieldNow® digital data collection and/or as necessary to collect data not captured by available FieldNow® applications. The Field Now® digital form applications follow a standardized approach, correlate to most TGIs and are available to all projects accessible with a PC or capable mobile device. Once the digital forms are saved within FieldNow®, the data is instantly available for review on a web interface. This facilitates review by project management team members and SMEs enabling error or anomalous data detection for correction while the staff are still in the field. Continual improvements of FieldNow® applications are ongoing, and revisions are made as necessary in response to feedback from users and subject matter experts.

Notes and pictures taken during the sampling process that cannot be collected using the FieldNow® application will be compiled and uploaded to the project specific folder on SharePoint and/or Collaboration Hub.

11 Quality Assurance

Conduct quality assurance as required by the project-specific work plan and/or Quality Assurance Project Plan (QAPP). Additionally:

4. Canisters should be pre-cleaned by an accredited laboratory and individually certified clean.
5. Communicate with laboratory to insure that project-specific reporting limits and deliverables are met.
6. If tubing is used during sampling activities, the tubing should be Teflon or Teflon-lined tubing.
7. All fittings should be stainless-steel.
8. Ambient (outdoor) air sample(s) should be collected each day of the indoor air sampling event to evaluate background VOC concentrations.

12 References

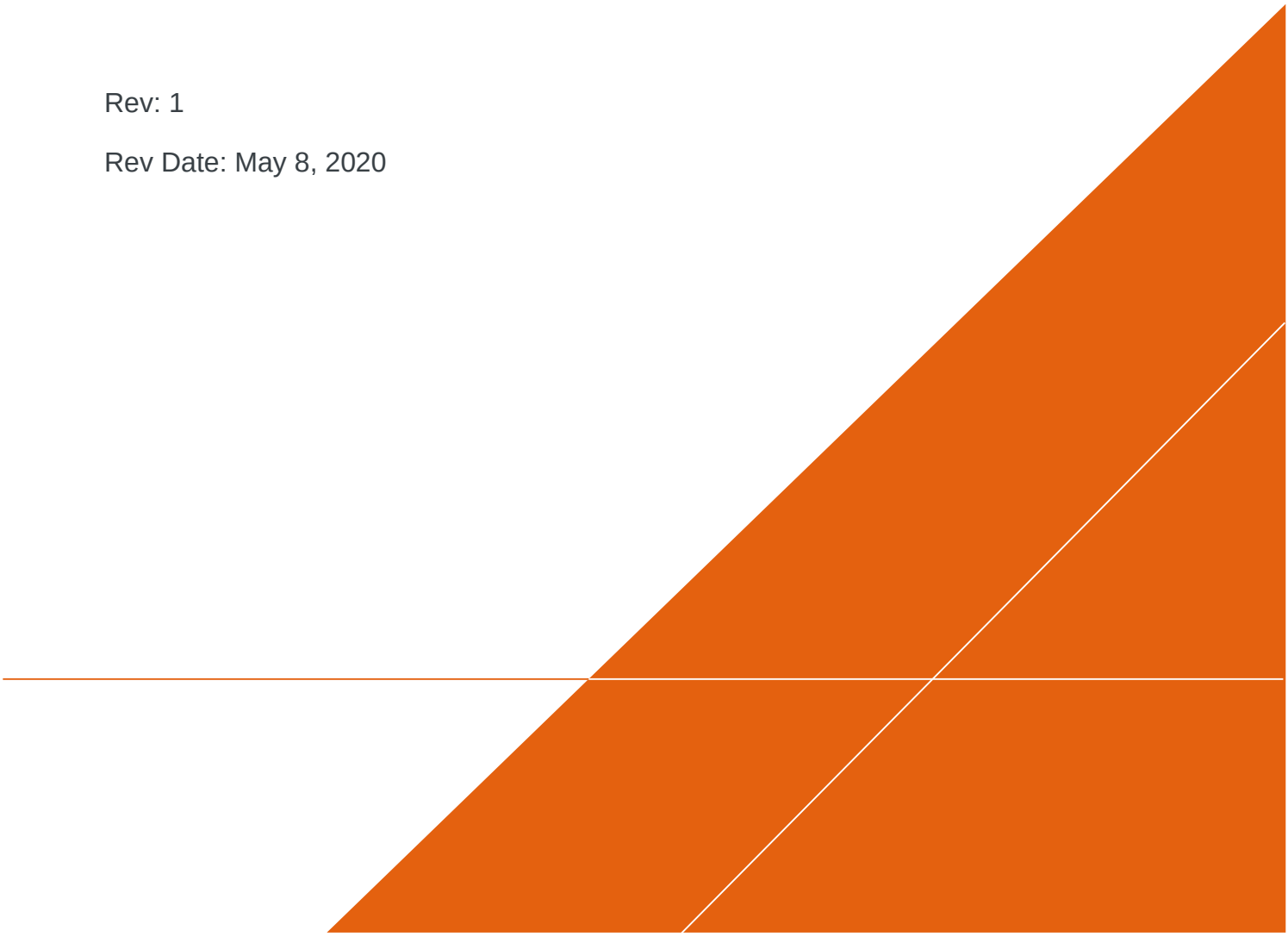
Not Applicable

ARCADIS Design & Consultancy for natural and built assets

TGI – GROUNDWATER AND SOIL SAMPLING EQUIPMENT DECONTAMINATION

Rev: 1

Rev Date: May 8, 2020



VERSION CONTROL

Revision No	Revision Date	Page No(s)	Description	Reviewed by
0	February 23, 2017	ALL	Conversion from SOP to TGI	Cassandra McCloud / Pete Frederick
1	May 8, 2020	4-5	Added note regarding use of Liquinox and 1,4-Dioxane	Marc Killingstad

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APPROVAL SIGNATURES

Prepared by: Date: 02/23/2017

Derrick Maurer

Technical Expert Reviewed by: Date: May 8, 2020

Marc Killingstad (Technical Expert)

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1 INTRODUCTION

This document describes general and/or specific procedures, methods, actions, steps, and considerations to be used and observed by Arcadis staff when performing work, tasks, or actions under the scope and relevancy of this document. This document may describe expectations, requirements, guidance, recommendations, and/or instructions pertinent to the service, work task, or activity it covers.

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2 SCOPE AND APPLICATION

Decontamination is performed on sampling equipment prior to sample collection to ensure that the sampling equipment that contacts a sample, or monitoring equipment that is brought into contact with environmental media to be sampled, is free from analytes of interest and/or constituents that could interfere with laboratory analysis for analytes of interest. Sampling equipment must be appropriately cleaned prior to use for sampling or coming into contact with environmental media to be sampled, and following completion of the sampling event prior to shipment or storage. The effectiveness of the decontamination procedure should be verified by collecting and analyzing equipment blank samples.

The sampling equipment cleaning procedures described herein includes pre-field, in the field, and post-field cleaning of sampling equipment which may be conducted at an established equipment decontamination area (EDA) on site, as appropriate and necessary. Sampling equipment that may require decontamination at a given site includes: soil sampling tools; groundwater, sediment, and surface-water sampling devices; water testing instruments; down-hole instruments; and other activity-specific sampling equipment. Non-disposable equipment will be cleaned before collecting each sample, between each

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sample collected, and prior to placing sampling equipment in protective cases, or containers for transport. Cleaning procedures for sampling equipment should be monitored by collecting equipment blank samples as required in project work plans, field sampling plans, quality assurance project plans (QAPP), or other pertinent project documents. Dedicated and/or single-use (i.e., not to be re-used) sampling equipment will not require decontamination.

3 PERSONNEL QUALIFICATIONS

Arcadis field sampling personnel will have completed or are in the process of completing site-specific training as well as having current health and safety training as required by Arcadis, client, or regulations, such as 40-hour HAZWOPER training and/or OSHA HAZWOPER site supervisor training. Arcadis personnel will also have current training as specified in the Health and Safety Plan (HASP) which may include first aid, cardiopulmonary resuscitation (CPR), Blood Borne Pathogens (BBP) as needed. In addition, Arcadis field sampling personnel will be knowledgeable in the relevant processes, procedures, and Technical Guidance Instructions (TGIs) and possess the demonstrated required skills and experience necessary to successfully complete the desired field work. The project health and safety plan (HASP) and other documents will identify other training requirements or access control requirements.

4 EQUIPMENT LIST

The equipment required for equipment decontamination is presented below:

- Health and safety equipment, including appropriate PPE, as required in the site Health and Safety Plan (HASP)
- Deionized water that meets that analytical criteria for deionized water with no detectable constituents above the reporting limits for the methods to be used and analytes being analyzed for. Deionized water is used for inorganics, and organic-free water for VOCs, SVOCs, pesticides, etc.
- Non-phosphate detergent such as Alconox or, if sampling for phosphorus or phosphorus-containing compounds, Liquinox (or equivalent). NOTE: *Liquinox has shown to provide false positives for 1,4-Dioxane and should not be used at sites where that may be a constituent of concern (COC).*
- Tap water
- Rinsate collection plastic containers
- DOT-approved waste shipping container(s), as specified in the work plan, field sampling plan, or regulatory requirements if decontamination waste is to be shipped for disposal
- Brushes
- Large heavy-duty garbage bags
- Spray bottles

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- (Optional) – Isopropyl alcohol (free of ketones) or methanol. These can be wipes or diluted with water (usually 1part isopropyl/methanol to 10 parts water) if a spray is needed.
- Airtight, sealable plastic baggies, such as Ziploc-type
- Plastic sheeting

5 CAUTIONS

Rinse equipment thoroughly and allow the equipment to dry before re-use or storage to prevent introducing solvent into sample medium. If manual drying of equipment is required, use clean lint-free material to wipe the equipment dry. Ensure all rinsate materials do not adversely affect sample collection efficiency or analytical results.

Store decontaminated equipment in a clean, dry environment. Do not store near combustion engine exhausts. Properly containerize equipment to ensure cross-contamination doesn't happen from other uncontaminated surfaces or equipment.

If equipment is damaged to the extent that decontamination is uncertain due to cracks, gouges, crevices, or dents, the equipment should not be used and should be discarded or submitted for repair prior to use for sample collection.

A proper shipping determination regarding hazardous materials will be performed by a DOT-trained individual for cleaning materials shipped by Arcadis.

Caution should be exercised to avoid contact with the pump casing and water in the container while the pump is running (do not use metal drums or garbage cans) to avoid electric shock.

6 HEALTH AND SAFETY CONSIDERATIONS

Review the safety data sheets (SDS) for the cleaning agents and materials used in decontamination. If solvent is used during decontamination, use appropriate PPE and work in a well-ventilated area and stand upwind while applying solvent to equipment. Apply solvent in a manner that minimizes potential for exposure to workers and bystanders. Follow health and safety procedures outlined in the HASP.

7 PROCEDURE

A designated area will be established to clean sampling equipment in the field prior to and following sample collection. Equipment cleaning areas will be set up within or adjacent to the specific work area, but not at a location that expose equipment to contamination (i.e. exposed to combustion engine exhaust). Detergent solutions will be prepared in clean containers for use in equipment decontamination. Decontaminated equipment should be handled by workers wearing clean gloves, properly changed to prevent cross-contamination.

Cleaning Sampling Equipment

1. Wash the equipment/pump with potable water.

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2. Wash with detergent solution (Alconox, Liquinox or equivalent) to remove all visible particulate matter and any residual oils or grease. NOTE: *Liquinox has shown to provide false positives for 1,4-Dioxane and should not be used at sites where that may be a constituent of concern (COC).*
3. If equipment is very dirty, precleaning gross debris with a brush and tap water may be necessary.
4. If non-aqueous phase liquids are present, the use of isopropyl alcohol (free of ketones) or methanol is recommended. Cloth wipes or diluted solution can be used to remove the non-aqueous phase liquids that are hard to remove with detergent solution in step 2. Consult with project manager if non-aqueous phase liquids are present onsite and design an appropriate decontamination procedure that includes step 4.
5. Rinse with deionized water.

Decontaminating Submersible Pumps

Submersible pumps may be used during well development, groundwater sampling, or other investigative activities. The pumps must be cleaned and flushed before and between uses. This cleaning process will consist of an external detergent solution wash and tap water rinse, a flush of detergent solution through the pump, followed by a flush of potable water through the pump. Flushing will be accomplished by using an appropriate container filled with detergent solution and another container filled with potable water. The pump should be flushed with deionized water as the last step prior to use. The pump will run long enough to effectively flush the pump housing and hose (unless new, disposable hose is used). Disconnect the pump from the power source before handling. The pump and hose should be placed on or in clean polyethylene sheeting to avoid contact with the ground surface.

8 WASTE MANAGEMENT

Equipment decontamination rinsate will be managed in conjunction with all other waste produced during the field sampling effort. Waste management procedures are outlined in the work plan or Waste Management Plan (WMP).

9 DATA RECORDING AND MANAGEMENT

Equipment cleaning and decontamination will be noted in the field notebook for project documentation. Information will include the type of equipment cleaned, the decontamination location, specific procedures utilized, solvents and/or cleaning agents used, source of water, and deviations or omissions from this TGI.

Unusual field conditions should be noted if there is potential to impact the efficacy of the decontamination or subsequent sample collection.

An inventory of the solvents brought on site and used and removed from the site will be maintained in the project documentation. Records will be maintained for solvents used in decontamination, including lot number and expiration date.

Containers with decontamination fluids will be labeled.

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10 QUALITY ASSURANCE

Equipment blanks should be collected to verify that the decontamination procedures are effective in minimizing potential for cross contamination. The equipment blank is prepared by pouring deionized water (or organic-free water, for organic analyses) over the clean and dry tools and collecting the water into appropriate sample containers. Equipment blanks should be analyzed for the same set of parameters that are performed on the field samples collected with the equipment that was cleaned as specified in the sampling and analysis plan. Equipment blanks are collected per equipment set, which represents all of the tools needed to collect a specific sample.

11 REFERENCES

USEPA Region 9 - Field Sampling Guidance #1230, Sampling Equipment Decontamination.

USEPA Region 1 - Low Stress (low flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells.

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TGI: Installation of Permanent Soil Vapor Probes

Rev: 1

Rev Date: January 3, 2022

Version Control

Issue	Revision No.	Date Issued	Page No.	Description	Reviewed By
1	0	12/12/2017	All	Initial TGI Development	Eric Epple Daniel Zuck Mitch Wacksman
2	1	1/5/2021	All	Revisions, Update to new format for QMS	Lindsey Deschenes Robert Uppencamp

Approval Signatures

Prepared by:		12/12/2017
	Name (Preparer)	Date
Reviewed by:		1/5/2021
	Name (Subject Matter Expert)	Date

1 Introduction

This Technical Guidance Instruction (TGI) provides the methods and procedures for installing permanent soil vapor probes in subsurface geology. Additional TGIs should be reviewed for soil vapor probe sampling.

2 Intended Use and Responsibilities

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3 Scope and Application

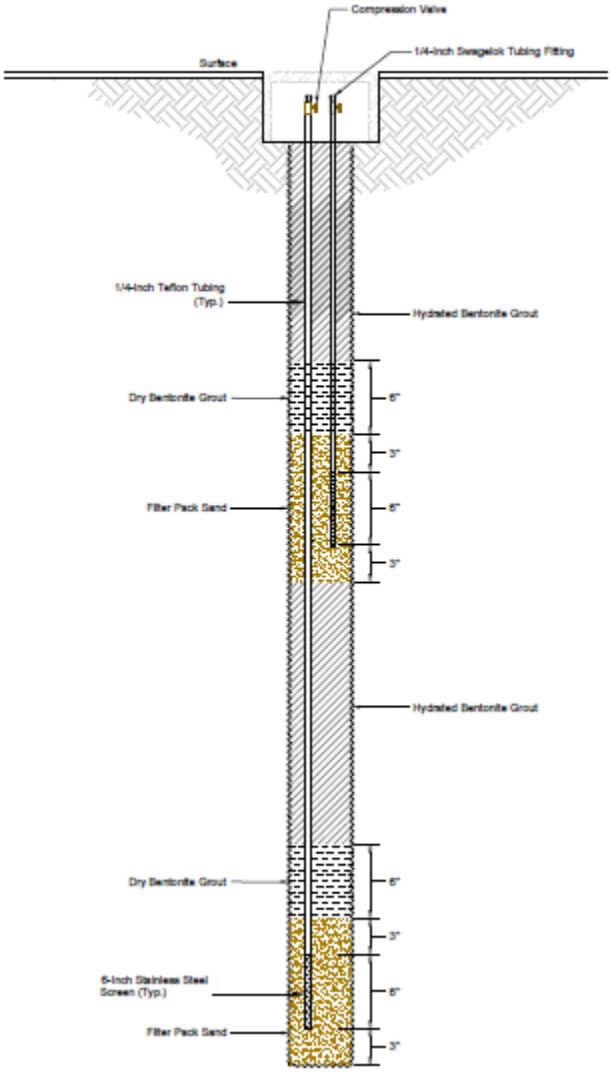
This TGI is recommended as a practical approach for the installation of permanent soil vapor sampling probes where the intent is to collect soil vapor samples over one or more sampling events. Nested sample soil vapor probes (i.e., multiple sample depths inside a single boring) can also be installed using these methods. Methods that can be used to advance the soil vapor probes installation include: hand auger, direct push, and hollow stem auger. Rotary sonic drilling is discouraged but may be necessary in certain circumstances. If rotary sonic drilling is necessary, discuss thoroughly with the project team. Soil vapor samples are often used during vapor intrusion investigations associated with subsurface impacts. Methods for soil vapor sample collection are described in Arcadis documents *TGI: Sub-Slab Soil Vapor or Soil Vapor Sampling Using Whole Air Canisters Analyzed Via USEPA Method TO-15* and *SOP: Soil-Gas Sampling and Analysis Using Sorbent Tubes*. The project team is responsible for ensuring this procedure meets all applicable guidance or regulations in the jurisdiction where work

is performed. Receiving approval/concurrence from the leading regulatory agency for the project is suggested prior to implementation.

Water level gauging, geotechnical sampling, soil sampling, and soil logging are often executed during soil vapor sampling or as part of a vapor intrusion investigation. These activities are outside the scope of this TGI.

The depth of each soil vapor probe should be discussed and determined by the project team prior to beginning installation procedures. Under normal circumstances soil vapor probe should not be shallower than 5’ below ground surface. Soil vapor probe placement is project specific and based on site objectives, however as a general consideration soil vapor probe are often placed approximately 2.5’ above the highest known groundwater elevation.

An example of a finished soil vapor probe is presented in the schematic below.



4 Personnel Qualifications

Soil vapor probe installation activities will be performed by persons who have been trained on proper installation procedures. If geotechnical sampling, soil sampling, or soil logging are required as part of the scope of work it is critical that field personnel are appropriately trained for these additional tasks as described in the appropriate Standard Operating Procedures (SOPs) and/or Technical Guidance Instructions (TGI)s for those activities.

5 Equipment List

The following materials will be available during soil vapor probe installation and soil logging activities, as required:

- Site Plan figure presenting proposed soil boring/well locations
- Work Plan (or equivalent)
- Site-specific Health and Safety Plan (HASP) with task specific Job Safety Analysis (JSAs)
- Personal protective equipment (PPE), as required by the HASP and JSA
- Traffic cones, delineators, caution tape, and/or fencing, as appropriate
- Probe tubing – new 1/4-inch or 3/8-inch outer diameter (OD) Teflon, Teflon-lined, or Nylon tubing. Be aware that some jurisdictions have requirements on the type of tubing to be used.
- Probe cap (to seal the tubing during equilibration) – Swagelok® part number SS-400.
- Probe screen and anchor point – ½-inch OD stainless steel screen, such as the Geoprobe Systems® implant, or similar. Several screen lengths are available (1-inch, 6-inch, 14-inch, 21-inch), for discrete intervals required in Vapor Intrusion investigations, a 6-inch screen is typically recommended. Make sure the diameter of the tubing connection (i.e., barbed, Swagelok®) on the top side of the screen matches the diameter of the sample tubing used for the installation.
- Hand tools including appropriate-sized open-end wrenches (typically 9/16-inch, 1/2-inch, and 3/4-inch), tubing cutters, etc.
- Drum labels as required for investigation derived waste (IDW) handling
- Labels for sample soil vapor probe tubing. Stamped metal tags affixed with zip ties are recommended. Do not use tape.
- MultiRae® four or five-gas meter (or equivalent) for health and safety monitoring during drilling. A photoionization detector (PID) capable of parts per billion (ppb) readings (e.g., ppbRAE); and/or Landtec® GEM 2000 landfill gas meter (or equivalent) may be used instead of the five-gas meter when only VOC hazards exist
- Particulate Dust Meter (PDR-1000) as required by HASP
- Decontamination equipment (bucket, distilled or deionized water, cleansers (Alconox®, TSP, or similar) appropriate for removing expected chemicals of concern, paper towels)
- Engineer's tape/measuring wheel
- Weighted tape
- Digital camera or phone with camera (confirm client approval)
- Field notebook and/or FieldNow® digital app (preferred)

- Appropriate field forms

If soil sampling or soil logging is required by the project additional materials may be required per the appropriate TGIs for these tasks.
Prior to mobilizing to the site, Arcadis personnel will contact the drilling subcontractor to confirm that appropriate equipment will be provided. Specifications of the installation equipment are expected to vary by project, and so communication with the driller is necessary to ensure that the materials provided will meet the project objectives. It is strongly recommended that Arcadis personnel provide sample tubing and fittings and not the drillers.

Equipment/materials typically provided by the driller could include:

- Disposable plastic liners (when drilling with direct-push equipment);
- Drums for investigation derived waste;
- Drilling decontamination materials;
- Decontamination pad materials, if required;
- Boring equipment: hand auger, air knife with vac-truck, and/or drill rig equipped with direct push or rotary auger capability;
- Clean filter silica sand (#2 or larger);
- Granular bentonite and bentonite powder;
- Hydraulic or non-shrink cement grout;
- Tremie pipe with funnel or manual grout pump (1-inch OD PVC Pipe);
- Applicable materials to install watertight protective casing (flush or stand-pipe) to be discussed with drilling contractor prior to mobilization.

6 Cautions

Pre-installation considerations:

- Underground utilities in the vicinity of the drilling areas must be delineated by the drilling contractor or an independent underground utility locator service prior to soil vapor probe installation. See AUS Utility Clearance HS Standard and HASP for detail. An AUS Utility Clearance Checklist must be completed and discussed with the project manager and team. There should be a clear understanding of subsurface conditions at the site, with a minimum of 3 good lines of evidence used.
- A field mobilization memo, work plan or scope of work should be reviewed and discussed with team members (office, field, and subcontractors) prior to implementation to ensure that all field logistics (e.g., access issues, health and safety issues, communication network, schedules, etc.) and task objectives are clearly understood by all.
- Soil vapor probe installation should not be performed within 48 hours after a significant rain event (defined as >1 inch of rainfall), as saturated soils could present a false saturated soil interval which could lead to inaccurate screen settings.
- Field personnel should not handle substances that could contain VOCs and lead to cross-contamination. These include marking paint, hand sanitizers, fuels and solvents or oils prior to handling soil vapor

construction materials. Clean nitrile gloves should be used when handling any probe components (this include the drilling contractor). Field personnel should not use sharpie markers during installation or note taking.

- Gravel or dense clay may make direct push installation impracticable. Site geology should be discussed with the project technical lead and drilling contractor prior to field work.
- Ensure all soil vapor sampling probes are decontaminated and compatible with sample tubing prior to field mobilization. A two-stage decontamination process is preferred consisting of a soap wash that consists of distilled water detergent (Alconox®, TSP, or similar), then a final rinse with distilled water. The equipment should be allowed to air dry before use. When 1,4 dioxane is a site-specific constituent of concern, TSP (trisodium phosphate) should be used.
-
- **Installation Considerations:**
- Depth to Groundwater – soil vapor samples must be collected in the vadose zone (and above the capillary fringe). The bottom of the soil vapor probe must be above the capillary fringe. Depths of perched water zones should also be considered. Review historical groundwater data for seasonal high groundwater depths.
- If using an air knife for utility clearing, soils should be removed via hand auger or direct push beginning a minimum of 1 foot above the top of the sampling interval. An air knife is discouraged for utility clearance as it can rearrange the subsurface soil vapor profile. Some jurisdictions explicitly prohibit the use of an air knife for soil vapor probe installation.
- Vapor probes can be finished at the ground surface with a flush mount road box (preferred) or with a stand pipe protective casing, similar to groundwater monitoring wells.
- Soil permeability - It may not be feasible to collect soil vapor from finer-grained or tight soils with little pore volume, such as clays or dense dry silts; if there are known clay layers present in the subsurface, these intervals should be avoided when setting vapor probes. During the installation process, it is advisable to collect a soil core from the proposed sampling interval prior to installing the soil vapor probe to identify the exact depth of the capillary fringe and/or determine where the most permeable soil layers are located. For sampling in tighter soils, it is recommended that permanent soil vapor implants be installed with a wider borehole diameter.

7 Health and Safety Considerations

Field activities associated with soil vapor probe installation will be performed in accordance with a site-specific HASP and applicable JSA, a copy of which will be present on site during such activities.

8 Procedure

All drilling equipment must be decontaminated prior to use. Handle and store decontaminated soil vapor probes in a manner that prevents contamination, such as in a Ziploc® bag prior to use.

Inspect vapor probe parts and drilling equipment for wear and faulty parts. Have the driller replace probe tips, o-rings, adapters, and probe rods as appropriate.

The procedures below allow the installation of a soil vapor probe similar to that presented in the figure below. If multiple depths are to be installed, steps 3-6 are repeated, starting with the deepest sample interval.

1. Hand clear boring location as specified in HASP. If an air knife is used, discontinue use 1-foot above the top of the sample interval and finish boring using a hand auger or drill rig.
2. Record in the field log the soil type and any PID readings that were collected from soil cuttings removed during installation. If saturated soils are encountered, plug the interval(s) with granulated bentonite up through the last dry interval.
3. After reaching the desired depth, install sample screen and tubing. Place the screen and tubing into the open borehole or have the driller place inside the direct push drill pipe along with the push tip.
4. Once in place, install the required amount of clean silica sand (as specified in Step 3 based on soil type). Add clean silica sand to create an appropriate sand pack. Typically, there are 3 inches of clean silica sand both above and below a 6-inch sample screen, along with the clean silica sand surrounding the screen, creating a 12 inches total sampling interval.
5. Withdraw the drill pipe 6-inches and place 6 inches of dry granulated bentonite on top of the clean sand layer.
6. Add hydrated granular bentonite or bentonite slurry to 12-inches below the ground surface, or bottom of next sample interval (for nested installations). Install appropriate surface finish (i.e., bolting watertight road box, stick-up). If nested ports are not installed and the depth is greater than 10-feet below grade, a bentonite slurry grout may be placed above the granulated bentonite to 1-foot below grade.
    a. For permanent probe installation at California sites, add 6-inches of hydrated granular bentonite and let it set for a minimum of 30 minutes. After the bentonite is set, pour Portland Neat Cement Type I/II up to 12-inches below ground surface. For temporary probes, to be destroyed shortly after sampling, only use hydrated bentonite up to 12-inches below ground surface.
7. Fill the remaining annulus within the road box with non-shrink grout cement to approximately 0.5-foot below ground surface, or enough to seal the tubing to the protective casing. A small amount of sand may need to be placed on top of the cement to ensure that the tubing does not make contact with the cement during curing.
8. Cut sample tubing long enough to allow enough length to reach a sample container or sorbent tube in the future. For flush mounted casings, 2-3 feet of tubing is recommended. For stand-pipe casing, make sure there is at least 6-7-feet of tubing extending above grade. Terminate sample tubing using an airtight plug or valve. Swagelok® or similar stainless-steel fittings are recommended.
9. Clearly label sample probe and protective casing with ID and depth. Stamped metal tags affixed with stainless zip ties are recommended.
10. Allow at least 24-hours for soil vapor probe equilibration and cement curing prior to leak testing and sampling. See applicable TGIs for these procedures.

9 Waste Management

Investigation-derived wastes (IDW), including soil cuttings, decontamination liquids, and disposable materials (material packages, PPE, etc.), will be placed in clearly labeled, appropriate containers, or managed as otherwise specified in the Work Plan (or equivalent), field sampling plan (FSP), and/or IDW management guidance document.

10 Data Recording and Management

Digital data collection is the Arcadis standard using available FieldNow® applications that enable real-time, paperless data collection, entry, and automated reporting. Paper forms should only be used as backup to FieldNow® digital data collection and/or as necessary to collect data not captured by available FieldNow® applications. The Field Now® digital form applications follow a standardized approach, correlate to most TGIs and are available to all projects accessible with a PC or capable mobile device. Once the digital forms are saved within FieldNow®, the data is instantly available for review on a web interface. This facilitates review by project management team members and SMEs enabling error or anomalous data detection for correction while the staff are still in the field. Continual improvements of FieldNow® applications are ongoing, and revisions are made as necessary in response to feedback from users and subject matter experts.

Drilling activities should be documented on appropriate field/log forms (see Attachment A) as well as in a proper field notebook and/or PDA. Additionally, all documents (and photographs) should be scanned and electronically filed in the appropriate project directory for easy access. Pertinent information will include personnel present on site, times of arrival and departure, significant weather conditions, timing of installation activities, soil descriptions, construction specifications (backfill material and borehole diameter, tubing length, screen details, seal type), and quantities of materials used. In addition, the locations of newly-installed soil vapor probes will be documented photographically or in a site sketch. If appropriate, a measuring wheel or engineer's tape will be used to determine approximate distances between important site features. The well location will be surveyed using the method specified in the site Work Plan (or equivalent).

11 Quality Assurance

All drilling equipment and associated tools (including augers, drill rods, sampling equipment, wrenches, and any other equipment or tools) that may have come in contact with soil will be cleaned in accordance with the procedures outlined in the appropriate SOP. Soil vapor probe materials will also be cleaned prior to well installation.

12 References

California Environmental Protection Agency (CalEPA) – Department of Toxic Substances Control (DTSC). 2012. Advisory – Active Soil Gas Investigations (https://www.dtsc.ca.gov/SiteCleanup/upload/VI_ActiveSoilGasAdvisory_FINAL_043012.pdf). April.

Interstate Technology Regulatory Council (ITRC). 2007. Technical and Regulatory Guidance. Vapor Intrusion Pathway: A Practical Guideline (http://www.itrcweb.org/documents/VI-1.pdf). January.

New Jersey Department of Environmental Protection (NJDEP) – Site Remediation and Waste Management Program. 2016. Vapor Intrusion Technical Guidance (http://www.nj.gov/dep/srp/guidance/vaporintrusion/vig_main.pdf?version_4). August.

United States Environmental Protection Agency (USEPA) – Office of Solid Waste and Emergency Response (OSWER). 2015. Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air (https://www.epa.gov/sites/production/files/2015-09/documents/oswer-vapor-intrusion-technical-guide-final.pdf). June.

ARCADIS Design & Consultancy for natural and built assets

TGI - INVESTIGATION-DERIVED WASTE HANDLING AND STORAGE

Rev #: 1

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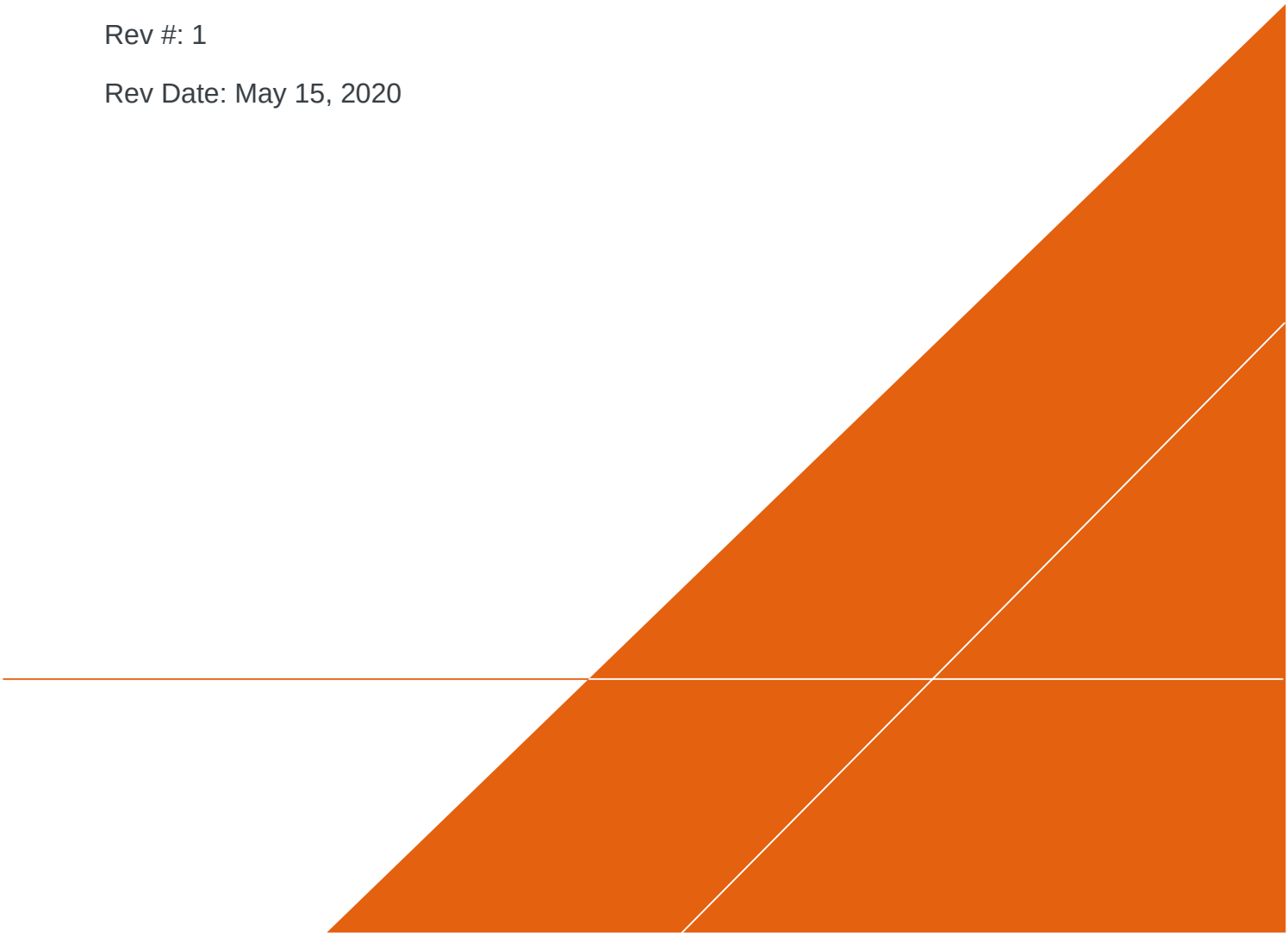

VERSION CONTROL

Revision No	Revision Date	Page No(s)	Description	Reviewed by
0	February 23, 2017	ALL	Conversion from SOP to TGI	Ryan Mattson / Peter Frederick
1	May 15, 2020	ALL	Updated to reflect regulatory changes	

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APPROVAL SIGNATURES

Prepared by:		02/23/2017
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Technical Expert Reviewed by:		05/15/2020
	Ryan Mattson (Technical Expert)	Date:

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1 INTRODUCTION

This document describes general and/or specific procedures, methods, actions, steps, and considerations to be used and observed by Arcadis staff when performing work, tasks, or actions under the scope and relevancy of this document. This document may describe expectations, requirements, guidance, recommendations, and/or instructions pertinent to the service, work task, or activity it covers.

It is the responsibility of the Arcadis Certified Project Manager (CPM) to provide this document to the persons conducting services that fall under the scope and purpose of this procedure, instruction, and/or guidance. The Arcadis CPM will also ensure that the persons conducting the work falling under this document are appropriately trained and familiar with its content. The persons conducting the work under this document are required to meet the minimum competency requirements outlined herein, and inquire to the CPM regarding any questions, misunderstanding, or discrepancy related to the work under this document.

This document is not considered to be all inclusive nor does it apply to any and all projects. It is the CPM's responsibility to determine the proper scope and personnel required for each project. There may be project- and/or client- and/or state-specific requirements that may be more or less stringent than what is described herein. The CPM is responsible for informing Arcadis and/or Subcontractor personnel of omissions and/or deviations from this document that may be required for the project. In turn, project staff are required to inform the CPM if or when there is a deviation or omission from work performed as compared to what is described herein.

In following this document to execute the scope of work for a project, it may be necessary for staff to make professional judgment decisions to meet the project's scope of work based upon site conditions, staffing expertise, state-specific requirements, health and safety concerns, etc. Staff are required to consult with the CPM when or if a deviation or omission from this document is required that has not already been previously approved by the CPM. Upon approval by the CPM, the staff can perform the deviation or omission as confirmed by the CPM.

2 SCOPE AND APPLICATION

The objective of this Technical Guidance Instruction (TGI) is to describe the procedures to manage investigation-derived wastes (IDW), both hazardous and nonhazardous, generated during site activities, which may include, but are not limited to: drilling, trenching/excavation, construction, demolition, monitoring well sampling, soil sampling, decontamination and remediation. For the purposes of this TGI, IDW is considered to be discarded materials which are defined as solid waste by United States Environmental Protection Agency (EPA) standard 40 CFR § 261.2 (which may include liquids, solids, or sludges). IDW may include soil, groundwater, drilling fluids, decontamination liquids, as well as contaminated personal protective equipment (PPE), sorbent materials, construction and demolition debris, and disposable sampling materials. Hazardous or uncharacterized IDW will be collected and staged at the point of generation. Quantities small enough to be containerized in 55-gallon drums will be taken to a designated temporary onsite storage area (discussed in further detail under Drum Storage) pending characterization and disposal. IDW materials will be characterized using process knowledge and appropriate laboratory analyses to determine the waste classification and evaluate proper safe handling and disposal methods.

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This TGI describes the necessary equipment, field procedures, materials, regulatory references, and documentation procedures necessary for proper handling and storage of IDW up to the time it is properly transported from the project site and disposed. The procedures included in this TGI for handling and temporary storage of IDW are based on the EPA's guidance document *Guide to Management of Investigation Derived Wastes* (USEPA, 1992). IDW is assumed to be contaminated with the site constituents of concern (COCs) until analytical evidence indicates otherwise. IDW will be managed to ensure the protection of human health and the environment and will comply with all applicable or relevant and appropriate requirements (ARAR). Although not comprehensive, the following laws and regulations on Hazardous Waste Management should be considered as potential ARAR. It is the Arcadis Certified Project Manager (CPM) and/or designated Technical Expert to determine which laws and regulations, at all levels of government, are applicable to each project site and activity falling under this TGI.

Federal Laws and Regulations

- Resource Conservation and Recovery Act (RCRA) 42 USC § 6901-6987.
- Federal Hazardous Waste Regulations 40 CFR § 260-265

Department of Transportation (DOT) Hazardous Materials Transportation 49 CFR

Occupational Safety and Health Administration (OSHA) Regulations 29 CFR

State Laws and Regulations

- To be determined based on location of site and location of treatment, storage, and/or disposal facility (TSDF) to be utilized.

Regional, County, Municipal, and Local Regulations

- To be determined based on location of site and location of treatment, storage, and/or disposal facility (TSDF) to be utilized.

Initial Storage

Pending characterization, IDW will be temporarily stored appropriately within each area of contamination (AOC). Under RCRA, "storage" is defined as the "holding of hazardous waste for a temporary period, at the end of which the hazardous waste is treated, disposed of, or stored elsewhere" (40 CFR § 260.10). The onsite waste staging area will be in a secure and controlled area. Uncharacterized wastes are considered potentially hazardous wastes and must be stored in DOT approved packaging. Liquid wastes must be stored in DOT approved closed head drums or other approved containers (e.g., portable tank containers) that are compatible with the type of material stored therein. Solid materials must be stored in DOT approved open head drums where practicable. Larger quantities of solid IDW can be containerized in bulk containers (such as in a roll-off box). Soil from large excavation projects may be managed in stockpiles with within the AOC and does not need to be containerized until exiting the AOC.

Characterization

Waste characterization can either be based on generator knowledge, such as using historical process knowledge and safety data sheets (SDS), or can be based upon characterization sampling analytical results. IDW typically is not characterized using SDS as it is a mixture of aged chemicals and environmental media. Historical process knowledge should be used to determine if the IDW is a listed hazardous waste (40 CFR § 261.31-33). If the IDW is not a listed hazardous waste, waste

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characterization can be completed by laboratory analysis of representative samples of the IDW. The laboratory used for waste characterization analysis must have the appropriate state and federal accreditations and may be required to be pre-approved by the Client. IDW will be classified as RCRA hazardous or non-regulated under RCRA based on the waste characterization determination.

If IDW is characterized as RCRA hazardous waste, RCRA and DOT requirements must be followed for packaging, labeling, transporting, storing, and record keeping as described in 40 CFR § 262 and 49 CFR § 171-178. Waste material classified as RCRA nonhazardous may be handled and disposed of as nonhazardous waste in accordance with applicable federal, state, and local regulations.

Storage Time Limitations

Containerized hazardous wastes can be temporarily stored for a maximum of 90 calendar days from the accumulation start date for a large quantity generator or a maximum of 180 calendar days from the accumulation start date for a small quantity generator. Wastes classified as nonhazardous may be handled and disposed of as nonhazardous waste and are not subject to storage time limitations.

This is TGI may be modified by the CPM and/or Technical Expert for a specific project or client program, as required, dependent upon client requirements, site conditions, equipment limitations, or limitations imposed by the procedure. The resulting procedure employed to execute the work will be documented in the project work plans or reports. If changes to the sampling procedures are required due to unanticipated field conditions, the changes will be discussed with the CPM and/or Technical Expert as soon as practicable, and if approved to be performed, be documented.

3 PERSONNEL QUALIFICATIONS

Arcadis field sampling personnel will have current regulatory- and Arcadis-required health and safety training including 40-hour HAZWOPER training, site supervisor training, site-specific training, first aid, and cardiopulmonary resuscitation (CPR), as needed. Personnel handling and packaging hazardous waste and performing hazardous waste characterizations must have RCRA hazardous waste management training per 40 CFR § 264.16. Additional state-specific hazardous waste management training is required in certain states (i.e., California).

Although not common practice, in certain situations Arcadis personnel may sign waste profiles and/or waste manifests on a case by case basis for clients, provided the appropriate agreement is in place between Arcadis and the client documenting that Arcadis is not the generator, but is acting as an authorized representative of the generator. Arcadis personnel who sign waste profiles and/or waste manifests will have both current RCRA hazardous waste management training per 40 CFR § 264.16 and current DOT hazardous materials transportation training per 49 CFR § 172.704. Arcadis field personnel will also comply with client-specific training. In addition, Arcadis field sampling personnel will be knowledgeable in the relevant processes, procedures, and Technical Guidance Instructions (TGIs) and possess the demonstrated required skills and experience necessary to successfully complete the desired field work. The project health and safety plan (HASP) and other documents will identify other training requirements or access control requirements.

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4 EQUIPMENT LIST

The Following Materials, as required, will be available for IDW handling and Storage:

- Appropriate personal protective equipment as specified in the Site Health and Safety Plan (HASP)
- DOT approved containers
- Hammer
- Leather gloves
- Drum dolly
- Appropriate drum labels (outdoor waterproof self-adhesive)
- Portable tank container
- Appropriate labeling, packing, chain-of-custody forms, and shipping materials as determined by the CPM and/or Technical Expert.
- Indelible ink and/or permanent marking pens
- Plastic sheeting
- Appropriate sample containers, labels, and forms
- Stainless-steel bucket auger
- Stainless steel spatula or knife
- Stainless steel hand spade
- Stainless steel scoop
- Digital camera
- Field logbook

5 CAUTIONS

Filled drums can be very heavy, become unbalanced, or spill its contents. Therefore, use appropriate moving techniques and equipment for safe handling. Similar media (e.g. soils with other soils; or liquids with other liquids) will be stored in the same drums to aid in sample analysis and disposal. Drum lids must be secured to prevent rainwater from entering the drums and leakage during movement. Drums containing solid material may not contain any free liquids. Waste containers stored for extended periods of time may be subject to deterioration. Drum Over Packs may be used as secondary containment. All drums must be visually inspected for condition to ensure that they are in good condition without visible evidence of rusting, holes, breakage, etc., to prevent potential leakage and facilitate subsequent disposal. All drum lids must be verified as having a properly functioning secured lid prior to use.

6 HEALTH AND SAFETY CONSIDERATIONS

As determined by the site's known and suspected hazards, appropriate PPE must be worn by all field personnel within the designated work area. Exposure air monitoring may be required during certain field activities as required in the Site Health and Safety Plan. If soil excavation in areas with potentially hazardous contaminants is possible, contingency plans will be developed to address the potential for encountering gross contamination or non-aqueous phase liquids. All excavation activities shall be in compliance with OSHA standard 29 CFR 1926.651 Excavations, and any other applicable regulations.

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Arcadis field personnel and subcontractors will be trained in and perform their work in compliance with all applicable federal, state, and local health and safety regulations as well as Arcadis' HASP and applicable Client health and safety requirements.

7 PROCEDURE

Specific waste temporary storage and handling procedures to be used are dependent upon the type of generated waste, including type of media (e.g. soils or free liquids) and constituents of concern. For this reason, IDW can be stored in a secure location onsite in separate 55-gallon storage drums, where solids can be stockpiled onsite (if nonhazardous) and purge water may be stored in portable tank containers. Waste materials such as broken sample bottles or equipment containers and wrappings will be stored in 55-gallon drums unless they were not in contact with sample media.

Management of IDW

Minimization of IDW should be considered by the project team during all phases of the project. Site managers may want to consider techniques such as replacing solvent based cleaners with aqueous-based cleaners for decontamination of equipment, reuse of equipment (where it can be properly decontaminated), limitation of traffic between exclusion and support zones, and drilling methods and sampling techniques that minimize the generation of waste. Alternative drilling and subsurface sampling methods may include the use of small diameter boreholes, as well as borehole testing methods such as a core penetrometer or direct push technique instead of coring.

Drum Storage

Drums containing hazardous waste will be stored in accordance with the requirements of 40 CFR 265 Subpart I (for containers) and 265 Subpart DD (for containment buildings). All 55-gallon drums will be stored at a secure, centralized onsite location that is readily accessible for vehicular pick-up. Drums confirmed as, or assumed to contain hazardous waste will be stored over an impervious surface provided with secondary spill containment. The storage location will, for drums containing liquid, have a containment system that can contain at least the larger of 10% of the aggregate volume of staged materials or 100% of the volume of the largest container. Drums will be closed during storage and be in good condition in accordance with the Guide to Management of Investigation-Derived Wastes (USEPA, 1992).

Hazardous Waste Determination

Waste material must be characterized to determine if it meets any of the federal definitions of hazardous waste as required by 40 CFR § 262.11. If the waste does not meet any of the federal definitions, it must then be established if any state-specific or local-specific hazardous waste criteria exist/apply.

Generator Status

Once hazardous waste determination has been made, the generator status will be determined. Large quantity generators (LQG) are generators who generate more than 1,000 kilograms of hazardous waste in a calendar month. Small quantity generators (SQG) of hazardous waste are generators who generate greater than 100 kilograms but less than 1,000 kilograms of hazardous waste in a calendar month. Very small quantity generators (VSQG) are generators who generate less than 100 kilograms of hazardous

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waste per month. Please note that a generator status may change from month to month and that a notice of this change is usually required by the generator's state agency.

Accumulation Time for Hazardous Waste

A LQG may accumulate hazardous waste on site for 90 calendar days or less without a permit and without having interim status, provided that such accumulation is in compliance with requirements in 40 CFR § 262.17. A SQG may accumulate hazardous waste on site for 180 calendar days or less without a permit or without having interim status, subject to the requirements of 40 CFR § 262.16. VSQG requirements are found in 40 CFR § 262.14. NOTE: The federal VSQG and SQG provisions may not be recognized by some states (e.g., California and Rhode Island). State-specific and local-specific regulations must be reviewed and understood prior to the generation of hazardous waste.

Satellite Accumulation of Hazardous Waste Satellite accumulation (SAA) will mean the accumulation of as much as fifty-five (55) gallons of hazardous waste, or the accumulation of as much as one quart of acutely hazardous waste, in containers at or near any point of generation where the waste initially accumulates, which is under the control of the operator of the process generating the waste, without a permit or interim status and without complying with the requirements of 40 CFR § 262.15 and without any storage time limit, provided that the generator complies with 40 CFR § 262.15.

Once more than 55 gallons of hazardous waste accumulates in SAA, the generator has three days to move this waste into storage.

Storage recommendations for hazardous waste include:

- Ignitable or reactive hazardous wastes must be >50 feet from the property line per 40 CFR § 265.176 (LQG generators only).
- Hazardous waste should be stored on a concrete slab (asphalt is acceptable if there are no free liquids in the waste).
- Drainage must be directed away from the accumulation area.
- Area must be properly vented.
- Area must be secure.

Drum/Container Labeling

Drums will be labeled on both the side and lid of the drum using a permanent marking pen. Old drum labels must be removed to the extent possible, descriptions crossed out should any information remain, and new labels affixed on top of the old labels. Other containers used to store various types of waste (e.g., polyethylene tanks, roll-off boxes, end-dump trailers, etc.) will be labeled with an appropriate "Waste Container" or "Testing in Progress" label pending characterization. Drums and containers will be labeled as follows:

- Appropriate waste characterization label (Pending Analysis, Hazardous, or Nonhazardous)
- Waste generator's name (e.g., client name)
- Project Name
- Name and telephone number of Arcadis project manager
- Composition of contents (e.g., used oil, acetone 40%, toluene 60%)
- Media (e.g., solid, liquid)
- Accumulation start date

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- Drum number of total drums as reconciled with the Drum Inventory maintained in the field log book.

IDW containers will remain closed except when adding or removing waste. Immediately upon beginning to place waste into the drum/container, a “Waste Container” or “Pending Analysis” label will be filled out to include the information specified above, and affixed to the container. Once the contents of the container are identified as either non-hazardous or hazardous, the following additional labels will be applied.

- Containers with waste determined to be non-hazardous will be labeled with a green and white "Nonhazardous Waste" label over the "Waste Container" label.
- Containers with waste determined to be hazardous will be stored in an onsite storage area and will be labeled with the "Hazardous Waste" label and affixed over the "Waste Container" label.

The ACCUMULATION DATE for the hazardous waste is the date the waste is first placed in the container and is the same date as the date on the "Waste Container" label. DOT hazardous class labels must be applied to all hazardous waste containers for shipment offsite to an approved disposal or recycling facility. In addition, a DOT proper shipping name will be included on the hazardous waste label. The transporter should be equipped with the appropriate DOT placards. However, placarding or offering placards to the initial transporter is the responsibility of the generator per 40 CFR § 262.33.

Inspections and Documentation

All IDW will be documented as generated on a Drum Inventory Log maintained in the field log book. The Drum Inventory will record the generation date, type, quantity, matrix and origin (e.g., Boring-1, Test Pit 3, etc.) of materials in every drum, as well as a unique identification number for each drum. The drum inventory will be used during drum pickup to assist with labeling of drums. The drum storage area and any other areas of temporarily staged waste, such as soil/debris piles, will be inspected weekly. The weekly inspections will be recorded in the field notebook or on a Weekly Inspection Log. Digital photographs will be taken upon the initial generation and drumming/staging of waste, and final labeling after characterization to document compliance with labeling and storage protocols, and condition of the container. Evidence of damage, tampering or other discrepancy should be documented photographically.

Emergency Response and Notifications

Specific procedures for responding to site emergencies will be detailed in the HASP. If the generator is designated as a LQG, a Contingency Plan will need to be prepared to include emergency response and notification procedures per 40 CFR § 265 Subpart D. In the event of a fire, explosion, or other release which could threaten human health outside of the site or when Client or Arcadis has knowledge of a spill that has reached surface water, Client or Arcadis must immediately notify the National Response Center (800-424-8802) in accordance with 40 CFR § 262.265. Other notifications to state and/or other local regulatory agencies may also be necessary.

Drilling Soil Cuttings and Muds

Soil cuttings are solid to semi-solid soils generated during trenching activities, subsurface soil sampling, or installation of monitoring wells. Depending on the drilling method, drilling fluids known as "muds" may be used to remove soil cuttings. Drilling fluids flushed from the borehole must be directed into a settling section of a mud pit. This allows reuse of the decanted fluids after removal of the settled sediments. Soil cuttings will be labeled and stored in 55-gallon drums with bolt-sealed lids.

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Excavated Solids

Excavated solids may include, but are not limited to: soil, fill, and construction and demolition debris. Prior to permitted treatment or offsite disposal, potentially hazardous excavated solids may be temporarily stockpiled onsite as long as the stockpile remains in the same AOC from where it was excavated. Potentially hazardous excavated solids removed from the AOC must be immediately containerized in labeled drums or closable top roll-offs lined with 9-mil polyvinyl chloride (PVC) sheeting and are subject to LQG storage time limits. Nonhazardous excavated solids can be stockpiled either inside or outside of the AOC, do not have to be containerized and are not subject to hazardous waste regulations. Potentially hazardous excavated solids must not be mixed with nonhazardous excavated solids. All classes of excavated solid stockpiles should be maintained in a secure area onsite. At a minimum, the floor of the stockpile area will be covered with a 20-mil high density polyethylene liner that is supported by a foundation or at least a 60-mil high density polyethylene liner that is not supported by a foundation. The excavated material will not contain free liquids. The owner/operator will provide controls for windblown dispersion, run-on control, and precipitation runoff. The run-on control system will prevent flow onto the active portion of the pile during peak discharge from at least a 25-year storm and the run-off management system will collect and control at least the water volume resulting from a 24-hour, 25-year storm (USEPA, 1992). Additionally, the stockpile area will be inspected on a weekly basis and after storm events. Individual states may require that the stockpile be inspected/certified by a licensed professional engineer. Stockpiled material will be covered with a 6-mil polyvinyl chloride (PVC) liner or sprayed dust control product. The stockpile cover will be secured in place with appropriate material (concrete blocks, weights, etc.) to prevent the movement of the cover.

Decontamination Solutions

Decontamination solutions are generated during the decontamination of personal protective equipment and sampling equipment. Decontamination solutions may range from detergents, organic solvents and acids used to decontaminate small field sampling equipment to steam cleaning rinsate used to wash heavy field equipment. These solutions are to be labeled and stored in closed head drums compatible with the decontamination solution. Decontamination procedures, including personnel and field sampling equipment, must comply with applicable Arcadis procedural documents.

Disposable Equipment

Disposable equipment includes personal protective equipment (e.g., tyvek coveralls, gloves, booties and APR cartridges) and disposable sampling equipment such as trowels or disposable bailers. If the media sampled exhibits hazardous characteristics per results of waste characterization sampling, contaminated disposable equipment will also be disposed of as a hazardous waste. If compatible with the original IDW waste stream (i.e., the IDW is a solid and the disposal equipment is a solid), the disposable equipment can be combined with the IDW. If these materials are not compatible (i.e., the IDW is a liquid and the disposal equipment is a solid), the disposable equipment will be stored onsite in separate labeled 55-gallon drums. Uncontaminated or decontaminated disposable equipment can be considered nonhazardous waste.

Purge Water

Purge water includes groundwater generated during well development, groundwater sampling, or aquifer testing. The volume of groundwater generated will dictate the appropriate storage procedure. Monitoring

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well development and groundwater sampling may generate three well volumes of groundwater or more. This volume will be stored in labeled 55-gallon drums. Aquifer tests may generate significantly greater volumes of groundwater depending on the well yield and the duration of the test. Therefore, large-volume portable polyethylene tanks will be considered for temporary storage pending groundwater-waste characterization.

Purged Water Storage Tank Decontamination and Removal

The following procedures will be used for inspection, cleaning, and offsite removal of storage tanks used for temporary storage of purge water. These procedures are intended to be used for rented portable tanks such as Baker Tanks or Rain for Rent containers. Storage tanks will be made of inert plastic materials. The major steps for preparing a rented tank for return to a vendor include characterizing the purge water, disposing of the purge water, decontaminating the tank, final tank inspection, and mobilization. Decontamination and inspection procedures are described in further detail below.

- Tank Cleaning: Most vendors require that tanks be free of any visible sediment and water before returning, a professional cleaning service may be required. Each specific vendor should be consulted concerning specific requirements for returning tanks.
- Tank Inspection: After emptying the tank, purged water storage tanks should be inspected for debris, chemical staining, and physical damage. The vendors require that tanks be returned in the original condition (i.e., free of sediment, staining and no physical damage).

8 WASTE MANAGEMENT

Soil/Solids Characterization

Waste characterization will be conducted in accordance with waste hauler, waste handling facility, and local/state/federal requirements. In general, RCRA hazardous wastes are those solid wastes determined by a Toxicity Characteristic Leaching Procedure (TCLP) test or to contain levels of certain toxic metals, pesticides, or other organic chemicals above specific applicable regulatory agency thresholds. If the one or more of 40 toxic compounds listed in Table I of 40 CFR § 261.24 are detected in the sample at levels above the maximum unregulated concentrations, the waste must be characterized as a toxic hazardous waste. Wastes can also be considered “listed” hazardous waste depending on site-specific processes.

Composite soil samples will be collected at a frequency of one sample per 250 cubic yard basis for stockpiled soil or one per 55-gallon drum per different waste stream for containerized. A four-point composite sample will be collected per 250 cubic yards of stockpiled material and for each drum waste stream. Sample and composite frequencies may be adjusted in accordance with the waste handling facility’s requirements and may be reduced for large volumes of waste with consistent properties. Waste characterization samples will be considered valid for consistent waste streams for a period of 1 year. Waste characterization samples may be analyzed for the TCLP volatile organic compounds (VOCs), TCLP semi-volatile organic compounds (SVOCs), TCLP RCRA metals, and polychlorinated biphenyls (PCBs), as well as reactivity and flammability (flashpoint). Additional samples may be collected and analyzed by the laboratory on a contingency basis. Site-specific constituents of concern including pesticides may require additional sampling. Please note that state- or local-specific regulations may require a different or additional sampling approaches.

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Wastewater Characterization

Waste characterization will be conducted in accordance with the requirements of the waste hauler, waste handling facility, and local/state/federal governments. In general, purge water should be analyzed by methods appropriate for the known contaminants, if any, that have been historically detected in the monitoring wells. Samples will be collected and analyzed in accordance with the requirements of the waste disposal facility. Wastewater characterization samples may be analyzed for TCLP volatile organic compounds (VOCs), TCLP semi-volatile organic compounds (SVOCs), TCLP RCRA metals, and polychlorinated biphenyls, as well as corrosivity (pH), reactivity and flammability (flashpoint). Additional samples may be collected and analyzed by the laboratory on a contingency basis. Site-specific constituents of concern including pesticides may require additional sampling. Please note that state- and/or local-specific regulations may require different or additional sampling approaches.

Sample Handling and Shipping

All samples will be appropriately labeled, packed, and shipped, and the chain-of-custody will be filled out in accordance with current Arcadis sample chain of custody, handling, packing, and shipping procedures and guidance instructions.

It should be noted that additional training is required for packaging and shipping of hazardous and/or dangerous materials. Please refer to the current Arcadis training requirements related to handling and shipping of samples, shipping determinations, and hazardous materials.

Preparing Waste Shipment Documentation (Hazardous and Nonhazardous)

Waste profiles will be prepared by the Arcadis CPM and forwarded, along with laboratory analytical data to the Client for approval/signature. The Client will then return the profile to Arcadis who will then forward to the waste removal contractor for preparation of a manifest. The manifest will be reviewed by Arcadis prior to forwarding to the Client for approval. Upon approval of the manifest, the Client will return the original signed manifest directly to the waste contractor or to the Arcadis CPM for forwarding to the waste contractor. Arcadis personnel may sign waste profiles and/or waste manifests on a case by case basis for clients, provided the appropriate agreement is in place between Arcadis and the client documenting that Arcadis is not the generator, but is acting as an authorized representative of the generator.

Final drum labeling and pickup will be supervised by an Arcadis representative who is trained and experienced with applicable waste labeling procedures. The Arcadis representative will have a copy of the drum inventory maintained in the field book and will reconcile the drum inventory with the profile numbers on the labels and on the manifest. Different profile numbers will be generated for different matrices or materials in the drums. For example, the profile number for drill cuttings will be different than the profile number for purge water. When there are multiple profiles it is critical that the proper label, with the profile number appropriate to a specific material be affixed to the proper drums. A copy of the Arcadis drum inventory will be provided to the waste transporter during drum pickup and to the facility receiving the waste.

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9 DATA RECORDING AND MANAGEMENT

Waste characterization sample handling, packing, and shipping procedures will be documented in accordance with relevant Arcadis procedures and guidance instructions as well as applicable client and/or project requirements, such as a Quality Assurance Project Plan or Sampling and Analysis Plan. Copies of the chain-of-custody forms will be maintained in the project file. Arcadis should photograph or maintain a copy of any hazardous waste manifest signed on behalf of Client in the corresponding office DOT record file.

10 QUALITY ASSURANCE

The CPM or APM will review all field documentation once per week for errors or omissions as compared to applicable project requirements including but not limited to: the proposal/scope of work, QAPP, SAP, HASP, etc. Deficiencies will be noted, tracked, and resolved. Upon correction, they will be noted for project documentation.

11 REFERENCES

United States Environmental Protection Agency (USEPA). 1992. Guide to Management of Investigation-Derived Wastes. Office of Remedial and Emergency Response. Hazardous Site Control Division. January 1992.

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TGI – Per- and Polyfluoroalkyl Substances (PFAS) Field Sampling Guide

Rev: 10

Rev Date: January 26, 2022

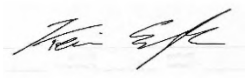
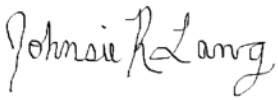
Version Control

Issue	Revision No.	Date Issued	Page No.	Description	Reviewed By
	0	April 27, 2017	All	Initial Release	Erica Kalve Erika Houtz Sue Tauro
	1	June 19, 2018	1 through 4 and 17	Updated Information on Sampling Materials	Erica Kalve Erika Houtz
	2	October 15, 2018	6 to 16	Minor updates on laboratory elements, updates to decontamination procedures, and clarification on equipment and reagent blank collection	Erika Houtz Erica Kalve
	3	December 17, 2018	4, 6, 17	Removed Sharpies from acceptable field writing implements; Changed language in Section 3.2 and Section 10.5 to provide stricter guidance for DoD projects.	Erika Houtz, Erica Kalve
	4	March 26, 2019	4,5	Removed Citranox from acceptable Decon solutions in Table 1a, added all fluoropolymer containing materials to prohibited items in Table 1b. Made a correction that Liquinox contains trace levels of 1,4 Dioxane, not Alconox.	Erika Houtz
	5	October 16, 2020	14	Added Air Force preference to sample surface water at surface for Air Force investigations.	Erika Houtz

	6	March 23, 2021	4, 5, 7, 12, 13, 14, 15, 16, 17	Made clarifications that fine/ultra-fine point Sharpies are allowed. Referenced 2018 MDEQ sampling guidance. Made updates to 'After Sample Collection' in Section 7.	Kevin Engle
	7	April 18, 2021	All	Changed title from Poly- and Perfluoroalkyl Substances to **"Per- and Polyfluoroalkyl Substances"** and changed PFASs to PFAS.	Rosario Varrella, Erika Houtz
	8	May 4, 2021	12, 13, 15, 16	Clarified that sample containers should have an HDPE lined screw cap and that LDPE plastic sheeting should be used.	Kevin Engle, Erika Houtz
	9	October 20, 2021	Note that numbers have shifted one page forward relative to prior versions. 5, 7, 9-12, 15, 16, 18-25.	Specific acceptable sunscreen and insect repellent brands were added to Table 1. Clarified language regarding footwear and H&S trainings. Laboratories section and Section 10.5 was updated to reflect new laboratory names and an updated version of the QSM. Sections 5 and 6 were updated to provide clearer language on health and safety protocols for sunscreen, insect repellent, and rain events. Added language to specify decontamination of reusable equipment prior to initial use in Section 7.1. Section 8 on Waste Management was updated to state that	Kevin Engle, Erika Houtz

				waste storage and disposal should be determined in the site specific workplan. Section 9 was updated to include Rite in the Rain® notebooks as approved for PFAS sampling. Changed the term "sample port" to "sample location" when describing where to place plastic sheeting. Section 10.1 was updated to indicate an equipment blank can be collected for unvetted hazard controls that contact a sample. References were updated to include the newer version of the DoD QSM, MDEQ Sampling Guidance, and California State Water Board PFAS Sampling Guidance.
	10	January 26, 2022	Various, Section 7	TGI formatted to comply with new QMS TGI template and Arcadis brand compliance. Indicated to avoid use of anti-fog spray on safety glasses due to possible presence of PFAS.

Approval Signatures

Prepared by:		1/26/2022
	Kevin Engle, PG Geologist (Preparer)	Date
Reviewed by:		1/26/2022
	Johnsie Lang, PhD (Subject Matter Expert)	Date

1 Introduction

This document is intended to provide guidance to field staff sampling for Per- and Polyfluoroalkyl Substances (PFAS). The content in this document describes the intended use, scope and application, personnel qualifications, equipment, cautions, health and safety considerations, procedures, waste management, data recording and management, and quality assurance of PFAS sampling.

2 Intended Use and Responsibilities

This document describes general and/or specific procedures, methods, actions, steps, and considerations to be used and observed by Arcadis staff when performing work, tasks, or actions under the scope and relevancy of this document. This document may describe expectations, requirements, guidance, recommendations, and/or instructions pertinent to the service, work task, or activity it covers.

It is the responsibility of the Arcadis Certified Project Manager (CPM) to provide this document to the persons conducting services that fall under the scope and purpose of this procedure, instruction, and/or guidance. The Arcadis CPM will also ensure that the persons conducting the work falling under this document are appropriately trained and familiar with its content. The persons conducting the work under this document are required to meet the minimum competency requirements outlined herein, and inquire to the CPM regarding any questions, misunderstanding, or discrepancy related to the work under this document.

This document is not considered to be all inclusive nor does it apply to all projects. It is the CPM's responsibility to determine the proper scope and personnel required for each project. There may be project- and/or client- and/or state-specific requirements that may be more or less stringent than what is described herein. The CPM is responsible for informing Arcadis and/or Subcontractor personnel of omissions and/or deviations from this document that may be required for the project. In turn, project staff are required to inform the CPM if or when there is a deviation or omission from work performed as compared to what is described herein.

In following this document to execute the scope of work for a project, it may be necessary for staff to make professional judgment decisions to meet the project's scope of work based upon site conditions, staffing expertise, regulation-specific requirements, health and safety concerns, etc. Staff are required to consult with the CPM when or if a deviation or omission from this document is required that has not already been previously approved by the CPM. Upon approval by the CPM, the staff can perform the deviation or omission as confirmed by the CPM.

3 Scope and Application

The purpose of this Technical Guidance Instructions (TGI) is to provide guidance on field sampling to be used for **Per- and Polyfluoroalkyl Substances** (PFAS). This protocol was adapted from various sources including Arcadis Australia, Transport Canada, and the U.S Army Corp of Engineers (USACE) Omaha. In general, sampling techniques used for PFAS site characterization are consistent with conventional sampling techniques used in the environmental industry, but special consideration is made regarding PFAS-containing materials and cross-contamination potential. **Table 1a** provides a summary of materials that have been approved for site investigation; this list is expected to grow longer as industry experience increases. **Table 1b** provides a summary of field equipment and materials that have available testing information and/or industry knowledge regarding

PFAS cross-contamination potential, and it is recommended that these materials be prohibited for sample collection; for materials that are suspected of containing PFAS and/or to retain PFAS, these recommendations are considered preliminary and subject to change. Further discussion of approved and prohibited materials is found throughout this document.

Table 1a: Summary of Acceptable Sampling Equipment and Materials for PFAS Site Investigations

Sampling Materials	Additional Considerations	References
Water Sampling Materials		
High density polyethylene (HDPE) or silicone tubing materials	--	DER 2016; USACE 2016; NHDES 2016; MassDEP 2017
HDPE HydraSleeves™	Low density polyethylene (LDPE) HydraSleeves™ are not recommended	USACE 2016; MassDEP 2017
Drilling and Soil Sampling Materials		
PFAS-free drilling fluids	--	DER 2016
PFAS-free makeup water	Confirm PFAS-free water source via laboratory analysis prior to investigation	--
Acetate liners	For use in soil sampling	USACE 2016
Sample Containers and Storage		
HDPE sample containers with HDPE lined lids for soil and water samples	Laboratory should provide; whole bottle analysis of aqueous samples combined with a solvent rinse of bottle is recommended	DER 2016, MassDEP 2017
Ice contained in plastic (polyethylene) bags (double bagged)	--	DER 2016; USACE 2016; NHDES 2016; MassDEP 2017
Field Documentation		
Ball point pens	--	MassDEP 2017
Standard paper and paper labels	--	DER 2016; USACE 2016; NHDES 2016; MassDEP 2017
Fine/Ultra-Fine point Sharpies®	Larger point Sharpies® should be avoided.	MDEQ 2018
Decontamination		
Water-only decontamination	Confirm PFAS-free water source via laboratory analysis prior to investigation	DER 2016

Sampling Materials	Additional Considerations	References
Alconox® or Liquinox® followed by deionized water or PFAS-free water rinse	Liquinox® known to contain trace levels of 1,4-dioxane	NHDES 2016; USACE 2016; MassDEP 2017
Methanol, isopropanol, or acetone	Special health and safety precautions are necessary	UNEP 2015; USACE 2016
Sun and Biological Protection		
OFF Deep Woods, Sawyer Permethrin	Apply >10 m away from sampling area	MDEQ 2018
Banana Boat, Coppertone, Neutrogena, Meijer, and L'Oreal Sunscreens	Apply >10 m away from sampling area	MDEQ 2018

Note: This list is considered preliminary and additional materials may be added as additional information becomes available. Project teams are expected to follow a methodical evaluation process of materials to be used and confirm acceptance prior to implementation of field activities.

Table 1b: Summary of Sampling Equipment and Materials Not Recommended for PFAS Site Investigations.

Sampling Materials	Known PFAS-Containing Materials	Suspected PFAS-Containing Materials	Materials with Potential to Retain PFAS	References
Water Sampling Materials				
Teflon®, PTFE-containing or other fluoropolymer coated or containing field equipment (e.g., tubing, bailers, liners, tape, plumbing paste, pump parts)	x			DER 2016; USACE 2016; NHDES 2016; MassDEP 2017
Passive diffusion bags			x	MassDEP 2017
LDPE HydraSleeves ™			x	USACE 2016; MassDEP 2017
Water particle filters			x	MassDEP 2017
Drilling and Soil Sampling Materials				
Aluminum foil			x	DER 2016; USACE 2016; NHDES 2016; MassDEP 2017
Drilling fluid containing PFAS	x	x		DER 2016
Sample Containers and Storage				
Glass sample containers with lined lids			x	DER 2016; USACE 2016; NHDES 2016; MassDEP 2017

Sampling Materials	Known PFAS-Containing Materials	Suspected PFAS-Containing Materials	Materials with Potential to Retain PFAS	References
LDPE containers and lined lids			x	USACE 2016
Teflon® or PTFE- lined lids on containers (e.g., sample containers, rinsate water storage containers)	x			DER 2016; USACE 2016; NHDES 2016; MassDEP 2017
Reusable chemical or gel ice packs (e.g., BlueIce®)		x		DER 2016; USACE 2016; NHDES 2016; MassDEP 2017
Field Documentation				
Self-sticking notes and similar office products (e.g., 3M Post-it-notes)		x		DER 2016; USACE 2016; NHDES 2016; MassDEP 2017
Waterproof paper, notebooks, and labels	x			DER 2016, MassDEP 2017
Markers		x		NHDES 2016
Decontamination				
[Some] detergents and decontamination solutions (e.g., Decon 90® Decontamination Solution)	x	x		DER 2016; NHDES 2016; MassDEP 2017

Note: For materials that are suspected of containing PFAS, or have the potential to retain PFAS, project specific considerations may provide adequate justification for use during the field event. For example, further evaluation may be conducted in the form of pre-field equipment blank sample analysis.

Given the extremely low detection limits associated with PFAS analysis and the many potential sources of trace levels of PFAS, field personnel are advised to err on the side of caution by strictly following these protocols, frequently replacing nitrile gloves, and rinsing field equipment to help mitigate the potential for false detections of PFAS. A summary of other specific items related to field sampling for PFAS are discussed in the sections below.

This TGI applies to all Arcadis and subcontractor personnel involved in field sampling for PFAS.

4 Personnel Qualifications

4.1 Sampling Personnel

Field personnel must have current health and safety training, including 40-hour HAZWOPER training, up to date 8-hour refresher, site supervisor training, and site-specific training, as needed. In addition, field personnel will be versed in the other relevant SOPs (e.g., low flow sampling) and will possess the skills and experience necessary

to successfully complete the desired field work. The site Health and Safety Plan (HASP) and other documents will identify any other training requirements such as site-specific safety training or access control requirements.

4.2 Laboratories

These laboratories are example laboratories that could be used to analyze environmental media for PFAS, pending project approval:

- United States: Pace, SGS, Vista, ALS, and Eurofins
- Canada: AXYS-SGS and Bureau Veritas

Other laboratories may be used if they are appropriately accredited for PFAS analysis according to any project requirements. It is recommended that a laboratory is Environmental Laboratory Accreditation Program (ELAP)-accredited for PFAS analysis in accordance with the Department of Defense (DoD) Quality Systems Manual (QSM) 5.3 Table B-15 or any subsequent updates. **For all data collection efforts at DoD sites, PFAS data must be obtained using a method that is DoD ELAP-accredited under QSM 5.3 or later.**

5 Equipment List

The following equipment and materials must be available for sampling:

- Site plan of sampling locations, relevant work plan (or equivalent), and this TGI;
- Appropriate health and safety equipment, as specified in the site HASP;
- Dedicated plastic sheeting (preferably high-density polyethylene [HDPE]) or other clean surface to prevent sample contact with the ground;
- Conductivity/temperature/pH meter;
- Dissolved oxygen meter, oxidation reduction potential meter, and turbidity meter;
- Depth to water meter;
- If using low-flow groundwater sampling techniques, peristaltic pump (groundwater sampling)/bladder pump (with PFAS free bladder/ HDPE bladder), flow through cell, and accompanying HDPE and silicone tubing;
- Hydrasleeves™, if using Hydrasleeves™ for groundwater sampling;
- Metal trowel for soil samples; specialized soil/sediment sampling equipment as required;
- Brushes for scrubbing sampling equipment;
- Pens, pencils, and/or fine/ultra-fine point Sharpies® for writing;
- Clipboards, field binders, and field note pages that are not waterproof;
- Labeled sample bottles:
    - Water: HDPE bottles fitted with polypropylene screw cap only; some types of PFAS samples (primarily drinking water) may require preservative, which will be indicated by the laboratory conducting the analysis. The laboratory will specify the sample bottle volume.

  - Soil and sediment: HDPE bottles fitted with polypropylene screw cap only; no preservatives. The laboratory will specify the sample bottle volume.
- If high concentrations of PFAS related to class B firefighting foams are expected, bring additional small vials to conduct field-based shaker tests for foaming;
- Ziploc® bags to hold ice and samples;
- Bottles containing “PFAS-free” water used for reagent blanks;
- Labeled, thoroughly decontaminated coolers for samples with ice; Blue ice is not permitted;
- Deionized or distilled water for initial decontamination rinsing;
- “PFAS-free” water provided by the laboratory for final decontamination rinsing;
- Methanol, isopropanol, or acetone if able to be brought safely to field site; especially important for decontamination during soil sampling;
- Alconox or Liquinox®;
- Packing and shipping materials;
- Groundwater and/or Sampling Log; and
- Chain-of-Custody (COC) Forms.

6 Cautions

6.1 Food Packaging

Some food packaging may be treated with PFAS-containing chemicals to prevent permeation of oil and water in the food outside of the packaging. To avoid potential food packaging-related PFAS contact:

- Do not bring any food outside of the field vehicles onsite and eat snacks and meals offsite.
- Wash hands after eating.
- Remove any field garments or outer layers prior to eating. Do not put them back on until done eating and hands are washed.

6.2 Field Gear

6.2.1 Clothing

Many types of clothing are treated with PFAS for stain and water resistance, in particular outdoor performance wear under brand names such as Gore-Tex®. To avoid potential clothing-related PFAS contact:

- Do not wear any outdoor performance wear that is water or stain resistant, or appears to be. Err on the side of caution.

- Wear pre-laundered (multiple washings, i.e., 6+) clothing that is not stain resistant or waterproof (unless made from the materials listed in Section 5.3.1).
- Natural fabrics such as cotton are preferred. Synthetic fabrics may also be acceptable if there is no indication on the label that the fabric is water and stain resistant.
- Most importantly, avoid contacting your clothing with sampling equipment, bottles, and samples.

6.2.2 Personal Protective Equipment

Safety Footwear

Some safety footwear has been treated to provide a degree of waterproofing and increased durability and may represent a source of trace PFAS. If at all possible, Gore-Tex footwear should not be worn and safety footwear without waterproofing should be worn; footwear that provides adequate safety from physical hazards is required and takes precedence over potential PFAS concerns. To avoid any PFAS cross contamination to samples from footwear:

- Do not contact your footwear with equipment, bottles, or samples in any way.
- Do not allow gloves used for sampling to come in contact with safety footwear.

Nitrile Gloves

Wear disposable nitrile gloves at all times. Don a new pair of nitrile gloves **before** the following activities at each sample location:

- Decontamination of re-usable sampling equipment;
- Contact with sample bottles or “PFAS-free” water bottles;
- Insertion of anything into the sample ports (e.g., HDPE tubing); and
- Handling of any quality assurance/quality control (QA/QC) samples including field blanks and equipment blanks.

Don a new pair of nitrile gloves **after** the following activities:

- Handling of any non-dedicated sampling equipment;
- Contact with contaminated surfaces; or
- When judged necessary by field personnel.

6.3 Personal Hygiene

- Shower at night.
- Do not use personal care products after showering such as lotions, makeup, and perfumes, UNLESS medically necessary.
- Use sunscreen and insect repellent as necessary for health and safety, i.e., if sampling is to occur outdoors in direct sunlight and/or if insect hazards may be present. Specific products that are acceptable for PFAS

sampling are listed in Table 1 and in Section 6.1. Apply sunscreen and insect repellant prior to initiating field sampling. If sunscreen and/or repellant need to be reapplied, ensure a safe distance away from the sampling locations and equipment (i.e., more than 10 meters (m) away). Wash hands after application and don new gloves following hand washing.

6.4 Visitors

Visitors to the site are asked to remain at least 10 m from sampling areas.

7 Health and Safety Considerations

7.1 Biological and Environmental Hazard Controls

7.1.1 Sunscreens and Insect Repellents

When site conditions warrant, insect repellent and sunscreen should be applied. Some insect repellents and sunscreen have been approved for PFAS sampling by individual states. According to Michigan Department of Environmental Quality (MDEQ; now known as Michigan Department of Environment, Great Lakes, and Energy [EGLE]), the products below are allowable (MDEQ 2018). Note that California State Water Quality Control Board's PFAS sampling guidance refers to MDEQ/EGLE's allowable list of sunscreens and insect repellents (California State Water Quality Control Board 2020).

Insect Repellents

- OFF Deep Woods
- Sawyer Permethrin

Sunscreen

- Banana Boat Sport Performance Sunscreen Lotion Broad Spectrum SPF 30
- Meijer Sunscreen Lotion Broad Spectrum SPF 30
- Neutrogena Ultra-Sheer Dry-Touch Sunscreen Broad Spectrum SPF 30
- Banana Boat for Men Triple Defense Continuous Spray Sunscreen SPF 30
- Banana Boat Sport Performance Coolzone Broad Spectrum SPF 30
- Banana Boat Sport Performance Sunscreen Lotion Broad Spectrum SPF 30
- Banana Boat Sport Performance Sunscreen Stick SPF 50
- Coppertone Sunscreen Lotion Ultra Guard Broad Spectrum SPF 50
- Coppertone Sport High-Performance AccuSpray Sunscreen SPF 30
- Coppertone Sunscreen Stick Kids SPF 55
- L'Oréal Silky Sheer Face Lotion 50+
- Meijer Clear Zinc Sunscreen Lotion Broad Spectrum SPF 15, 30 and 50
- Meijer Wet Skin Kids Sunscreen Continuous Spray Broad Spectrum SPF 70
- Neutrogena Beach Defense Water + Sun Barrier Lotion SPF 70
- Neutrogena Beach Defense Water + Sun Barrier Spray Broad Spectrum SPF 30
- Neutrogena Pure & Free Baby Sunscreen Broad Spectrum SPF 60+

Please plan for sampling events and purchase these products ahead of time. For any sunscreens and bug sprays, including those listed above, always follow these instructions for application:

- Insect repellents and sunscreen should be applied away from the work area prior to initiating sampling.
- When re-applying, stay at least 10 m away from the sampling locations and equipment.
- Wash hands after application and don new nitrile gloves.

7.1.2 Rain Event

Special care should be taken when rain is falling at the project site:

- Field sampling during extreme rainfall should be avoided if possible. If sampling needs to take place during a rain event (or other extreme weather condition), ensure the rain gear or other safety clothing is appropriate. For example, rain gear made from the following materials is allowable: polyurethane, PVC, wax coated fabrics, rubber/neoprene, uncoated Tyvek® (MDEQ 2018).
- If project timelines are tight, consider the use of a gazebo tent that can be erected over the top of the monitoring well to provide shelter from the rain. The canopy material is possibly a PFAS-treated surface and should be managed as such; therefore, wear gloves when moving the tent, change them immediately after moving the tent, and avoid further contact with the tent until all sampling activities have been finished and the team is ready to move on to the next site.

7.1.3 Other H&S Considerations

- ***If an unapproved or potentially suspect hazard control is needed for health and safety, apply or keep that control away from the samples, document its use in field notes, and, if it does contact a sample, take an equipment blank with that material.***
- The ability to safely access the surface water sampling locations must be verified before sampling.
- Field activities must be performed in accordance with the site HASP, a copy of which will be present onsite during such activities.
- Safety hazards associated with sampling surface water include fast-moving water, deep water, and steep slopes close to sampling sites. Use extreme caution when approaching sampling sites.
- If thunder or lighting is present, discontinue sampling and take cover until 30 minutes have passed after the last occurrence of thunder or lighting.
- Use caution when removing well caps as well may be under pressure, cap can dislodge forcefully and cause injury.
- Avoid the use of anti-fog sprays on glasses, which may contain PFAS. It's recommended to instead purchase pre-treated anti-fog safety glasses.

8 Procedure

8.1 Field Equipment Cleaning

Reusable field sampling equipment will require cleaning before initial use and between uses. For groundwater sampling, between uses, decontaminate the flow-through cell and any non-dedicated equipment (i.e., interface probe of depth to water meter) that comes into contact with well water. Trowels and other materials used to sample soil samples will also require decontamination, although dedicated, single use equipment such as liners should be used where possible.

After donning a new pair of nitrile gloves:

- Rinse sampling equipment with Alconox or Liquinox® cleaning solution; Scrub equipment with a plastic brush if needed;
- Rinse two times with distilled water or deionized water;
- Rinse one time with “PFAS-free” water or once with methanol/isopropanol/acetone, if it is available, and once with “PFAS-free” water; organic solvents are especially useful for decontaminating soil sampling equipment. If organic cleaning solvents cannot be brought to site, scrub equipment a second time after a single distilled or deionized water rinse, then rinse two times with distilled or deionized water and once with “PFAS-free” water (i.e., two scrubbings and four water rinsings total).
- Collect all rinsate in a sealed pail for disposal. Do not reuse decontamination solutions between sampling locations.

8.2 Borehole/Monitoring Well Development

If a drill rig is being used to drill for soil cores or to install monitoring wells, wear clean nitrile gloves before collecting each continuous soil sample. Additional requirements include the following:

- Verify in writing with the manufacturer that single-use liners used to collect each sample are made of a material that does not contain PFAS;
- Collect soil samples in laboratory-supplied HDPE bottles.
- Store the sample bottles in coolers and keep at a temperature of 0 to 6ºC until transported to the laboratory.

8.2.1 Well Condition Survey/ Water Level Monitoring

Using equipment that has been thoroughly decontaminated according to the procedures in Section 7.1, conduct the well condition surveys and water level monitoring:

- Conduct monitoring well inspections and record water levels.
- Use an interface probe to evaluate presence/absence of non-aqueous phase liquid (NAPL).
- Measure the depth to water from the top of the polyvinyl chloride (PVC) riser and the total depth of the well.
- Record information in the field notes.

8.2.2 Monitoring Well Development and Purging

Follow these requirements for monitoring well development and purging:

- Do not use Teflon™ tubing for purging or sample collection. HDPE tubing is acceptable.
- Do not re-use materials between wells. Upon completion of use, remove all disposable materials (such as HDPE and/or silicone tubing) and place in heavy duty garbage bags for disposal.
- During development of the well, create sufficient energy to agitate the water column and create flow reversals in the well screen, filter pack and formation to loosen fine-grained materials and draw them into the well. The pumping or bailing action should then draw all drilling fluids and fine-grained material out of the borehole and adjacent formation and then out of the well. Review the Arcadis Monitoring Well Development guidance (Arcadis 2010) for more detailed information.
- Follow the low-flow purge and sampling techniques per the U.S. Protection Agency's (EPA's) guidance document titled *Low Stress (Low Flow) purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells* (2010) and ASTM's standard titled *Standard Practice for Low-Flow Purging and Sampling for Wells and Devices Used for Ground-Water Quality Investigations* (2002). Also available for review is the Arcadis Low-Flow Groundwater Purging and Sampling Procedures for Monitoring Wells (Arcadis 2011).
- To purge the well, if using HDPE tubing and a peristaltic pump, insert the end of the tubing to the approximate depth of the midpoint of the screened section of the monitoring wells. Measure the length of HDPE tubing to be inserted into each monitoring well and pre-cut it to approximate lengths (such as the previously measured arm span of a field technician) to avoid contact with any materials other than the monitoring well and peristaltic pump. Flow rates should be as low as can be reasonably achieved. Collect and appropriately dispose of purge water.
- Silicone tubing should direct the purge water through a flow-through cell for field parameter measurements of pH, conductivity, temperature, dissolved oxygen, and turbidity. Calibrate the instrument in the field prior to use. Decontaminate the instrument and flow-through cell at each monitoring well location before purging.
- Record field parameters in intervals (generally of 3-minute duration) to ensure purge water has cycled through the flow-through cell. Sample the wells after field parameter measurements indicate stabilization, which allows collection of representative formation water (generally acceptable standards are three consecutive pH readings to within ±0.1 units, and three consecutive conductivity, temperature and dissolved oxygen measurements to within 3%). Turbidity must be monitored, but does not need to be used as a stabilization indicator of purge completion. Record field parameter measurements at each well. Drawdown should be monitored throughout the purge.
- If wells are suspected to be dewatering throughout the purge (i.e., reduced flow rate/difficulty pumping water or bubbles begin to come through the flow through cell), turn off the pump and allow the water level to recover for ½ hour, followed by sample collection. Document these activities in the field notes.

8.3 Sample Collection

Different laboratories may supply sample collection bottles of varying sizes depending on the type of media to be sampled.

8.3.1 Sample Containers

- Collect samples in HDPE bottles fitted with a HDPE lined (no Teflon™) screw cap.
- Complete bottle labels after the caps have been placed back on each bottle.
- Do not use glass bottles due to potential loss of analyte through adsorption. This is particularly important for aqueous samples.
- Review with analytical lab the sample size, sample container, etc. depending upon the type of PFAS analysis that is being requested.

8.3.2 Soil Sampling

Before Sample Collection

- Place LDPE plastic sheeting adjacent to the sample location for use as a clean work area, if conditions allow. Otherwise, prevent sampling equipment from contacting the ground or other surface that could compromise sample integrity.
- Trowels or drilling equipment that will come into contact with a sample should be decontaminated prior to sample collection, preferably with methanol/isopropanol/acetone;
- Don a new set of nitrile gloves. Do not use gloved hands to subsequently handle papers, pens, clothes, etc., before collecting samples.
- Use the HDPE bottles that are supplied by the laboratory. Make sure that the caps remain on the bottle until immediately prior to sample collection.

During Sample Collection

- Collect soil samples using a clean stainless-steel trowel or with single-use PFAS-free liners;
- Place soil samples in labeled HDPE bottles supplied by the laboratory.
- Note the time on the sample label.
- Collect any necessary duplicates/co-located samples and matrix spikes – verify with laboratory whether they need to be collected in separate sample bottles.
- Collect any necessary equipment blanks. The best timing to collect equipment blanks is immediately after the collection of a sample likely to contain high concentrations of PFAS, after the sampling equipment has been appropriately decontaminated.
- Collect any necessary field reagent blanks. This sample should be collected after field staff return from an offsite break (e.g., lunch) to capture any potential cross-contamination from field personnel.

After Sample Collection

- Place each sample bottle in two sealed Ziploc® bags. Another brand of LDPE bag is acceptable.
- Record the label information and time of sampling in the field notes.
- Place soil sample bottles in coolers that are durable in transportation and keep the temperature between 0 and 6ºC until transported to the laboratory. Do not use blue ice.

8.3.3 Groundwater Sampling

Before Sample Collection

- Place LDPE plastic sheeting adjacent to the sample location for use as a clean work area, if conditions allow. Otherwise, prevent sampling equipment from contacting the ground or other surface that could compromise sample integrity.
- Don a new set of nitrile gloves. Do not use gloved hands to subsequently handle papers, pens, clothes, etc., before collecting samples.
- Use the labeled HDPE bottles that are supplied by the laboratory. Make sure that the caps remain on the bottle until immediately prior to sample collection.
- Measure depth to water and field parameters. Turbidity and the physical appearance of the purged water should be noted on the Groundwater Sampling Log.

During Sample Collection

- Start groundwater sample collection upon stabilization of field parameters.
- If low-flow groundwater sampling techniques are being used, disconnect the silicone tubing from the flow-through cell, enabling collection of groundwater samples without passing through the cell.
- Hydrasleeves are also considered acceptable for sampling of PFAS in groundwater – consult the project manager to determine which technique should be used. In general, low flow sampling is preferable.
- Collect groundwater samples (to the neck of the bottle, some headspace is acceptable) from the dedicated sampling ports at the center of the well screen. While collecting the sample, make sure the bottle cap remains in the other hand of the sampler, until replaced on the bottle.
- To mitigate cross contamination, collect groundwater samples in a pre-determined order from least impacted to greater impacted based on previous analytical data or knowledge about past activities at the site. If no analytical data are available, samples are to be collected in the following order:
    1. First sample the upgradient well(s).
    2. Next, sample the well located furthest downgradient of the interpreted or known source.
    3. The remaining wells should be progressively sampled in order from downgradient to upgradient, such that the wells closest to the interpreted or known source are sampled last.
- NOTE: If high concentrations of PFAS related to class B firefighting foams are expected in a groundwater sample, conduct a Shaker test by collecting and shaking a small portion of the sample (~10 to 25 mL) on site in a small disposable vial. If foaming is noted within the sample, document the foaming when samples are

submitted for analysis; the 'shaker test' vial can then be disposed. This shaker test provides information about how each of the samples should be handled analytically.

- After collecting the sample, tightly screw on the polypropylene cap (snug, but not too tight). This will minimize leaking or cross contamination of the sample. Most PFAS, including all analytes measured by USEPA Method 537, are not volatile at environmental pH.
- Note the time on the sample label.
- Collect any necessary duplicates and matrix spikes. As the laboratory should be analyzing the entire aqueous sample rather than sub-sampling, separate bottles will be required for these samples.
- Collect any necessary equipment blanks. The best timing to collect equipment blanks is immediately after the collection of a sample likely to contain high concentrations of PFAS, after the sampling equipment has been appropriately decontaminated.
- Collect any necessary field reagent blanks. This sample should be collected after field staff return from an offsite break (e.g., lunch) to capture any potential cross-contamination from field personnel.
- Do not rinse PFAS sample bottles during sampling. Do not filter samples.

After Sample Collection

- Place each sample bottle in two sealed Ziploc® bags. Another brand of LDPE bag is acceptable.
- Record the label information and time of sampling in the field notes and COC. Note ‘shake test’ results if appropriate.
- Place groundwater samples in coolers that are durable in transportation and keep the temperature between 0 and 6ºC until transported to the laboratory. **Do not use blue ice. Store PFAS samples in a separate cooler from other types of samples.**

  Treat all disposable sampling materials as single use and dispose of them appropriately after sampling at each monitoring well.

8.3.4 Sediment Sampling

Before Sample Collection

- Place LDPE plastic sheeting adjacent to the sample location for use as a clean work area, if conditions allow. Otherwise, prevent sampling equipment from contacting the ground or other surface that could compromise sample integrity.
- Don a new set of nitrile gloves. Do not use gloved hands to subsequently handle papers, pens, clothes, etc., before collecting samples.
- Use the HDPE bottles that are supplied by the laboratory. Make sure that the caps remain on the bottle until immediately prior to sample collection.

During Sample Collection

- Where surface water samples and sediment samples are collected at the same location, collect surface water samples first to minimize siltation.

- Collect sediment samples either manually using a stainless-steel trowel or using a petite ponar grab sampler, depending on field conditions at each sampling location during sampling program.
- Collect sediment samples from the upper 10 cm of sediment.
- For a sample to be acceptable overlying, low turbidity water must be present.
- Decant the overlying water and use a stainless-steel trowel to collect only the upper 5 centimeters (cm) of sediment.
- Collect sediment samples directly into laboratory-supplied bottles that are suitable in both material and size.
- Do not overfill the sample bottle.
- Make sure that the sample does not contain vegetation, that the sediment is undisturbed, and that the sampler shows no signs of winnowing or leaking.
- Make sure bottle caps remain in the gloved hand of the sampler until sampling is complete and caps are replaced on the bottle.
- Note the time on the sample label.
- Collect any necessary duplicates and matrix spikes.
- Collect any necessary equipment blanks. The best timing to collect equipment blanks is immediately after the collection of a sample likely to contain high concentrations of PFAS, after the sampling equipment has been appropriately decontaminated.
- Collect any necessary field reagent blanks. This sample should be collected after field staff return from an offsite break (e.g., lunch) to capture any potential cross-contamination from field personnel.

After Sample Collection

- Place each sample bottle in two sealed Ziploc® bags. Another brand of LDPE bag is acceptable.
- Record the label information and time of sampling in the field notes.
- Place samples in coolers that are durable in transportation and keep the temperature between 0 and 6ºC until transported to the laboratory. **Do not use blue ice. Store PFAS samples in a separate cooler from other types of samples.**
- Measure surface water pH, conductivity, temperature, and total dissolved solids (TDS) at each location **after** both surface water and sediment sampling is completed.

8.3.5 Surface Water Sampling

Before Sample Collection

- Place LDPE plastic sheeting adjacent to the sample location for use as a clean work area, if conditions allow. Otherwise, prevent sampling equipment from contacting the ground or other surface that could compromise sample integrity.
- Don a new set of nitrile gloves. Do not use gloved hands to subsequently handle papers, pens, clothes, etc., before collecting samples.

- Use the HDPE bottles that are supplied by the laboratory. Make sure that the caps remain on the bottle until immediately prior to sample collection.

During Sample Collection

- Avoid sampling the surface, in general.
- However, for Air Force investigations, collect samples from the water surface.
- Where surface water samples and sediment samples are collected at the same location, collect surface water samples first to minimize siltation.
- Collect surface water samples directly into laboratory-supplied bottles; wide-mouth bottles may be preferable to narrow mouth bottles for ease of surface water collection.
- Make sure bottle caps remain in the gloved hand of the sampler until sampling is complete and caps are replaced on the bottle.
- Note the time on the sample bottle.
- Collect any necessary duplicates and matrix spikes. As the laboratory should be analyzing the entire aqueous sample rather than sub-sampling, separate bottles will be required for these samples.
- Collect any necessary equipment blanks. The best timing to collect equipment blanks is immediately after the collection of a sample likely to contain high concentrations of PFAS, after the sampling equipment has been appropriately decontaminated.
- Collect any necessary field reagent blanks. This sample should be collected after field staff return from an offsite break (e.g., lunch) to capture any potential cross-contamination from field personnel.

After Sample Collection

- Place each sample bottle in two sealed Ziploc® bags. Another brand of LDPE bag is acceptable.
- Record the label information and time of sampling in the field notes.
- Place samples in coolers that are durable in transportation and keep the temperature between 0 and 6ºC until transported to the laboratory. **Do not use blue ice. Store PFAS samples in a separate cooler from other types of samples.**
- Measure surface water pH, conductivity, temperature, and TDS at each location **after** both surface water and sediment sampling.

8.4 Shipping

- If samples cannot be shipped the same day as collected, arrange an appropriate means of keeping the samples cool overnight and maintain the temperature between 0 and 10°C for the first 48 hours after collection, and then between 0 and 6°C thereafter.
- Store samples in appropriate transport bottles (coolers) with ice (Ziploc© bags for use as ice containers) with appropriate labeling. **Do not use blue ice. Store PFAS samples in a separate cooler from other types of samples.**

- Complete the appropriate procedures for COC, handling, packing, and shipping.
- Fill out and check COC Forms against the labels on the sample bottles progressively after each sample is collected.
- Place all disposable sampling materials (such as plastic sheeting, and health and safety equipment) in appropriate containers.
- Ship samples via courier service with priority overnight delivery. Tracking numbers for all shipments should be provided and recorded after they have been sent out to ensure their timely delivery.
- Do not ship samples via Fed Ex for Saturday delivery.

9 Waste Management

All rinsate should be collected in a sealed pail for disposal. Drill cuttings and purge water will be managed as specified in the Field Sampling Plan (FSP) or Work Plan, and according to state and/or federal requirements. PPE and decontaminated fluids will be contained separately and staged at the sampling location. Containers must be labeled at the time of collection. Labels will include date, location(s), site name, city, state, and description of matrix contained (e.g., soil, groundwater, PPE). General guidelines for investigation derived waste (IDW) handling and storage are set forth in a separate IDW guidance document (Arcadis 2009).

Typical waste characterization procedures include collection of a composite sample of the drill cutting material and a composite sample of the purge water for laboratory analysis. Samples are typically analyzed for disposal toxicity characteristic leaching procedure (TCLP) analysis for metals and VOCs. For PFAS, a simple leach test with neutral pH water may be more indicative of actual risk. Additionally, generators of waste are required to include analysis of other constituents that are reasonably believed to be present including (in this case) PFAS.

Waste storage and final waste disposition should be determined in the site specific workplan.

10 Data Recording and Management

Digital data collection is the Arcadis standard using available FieldNow® applications that enable real-time, paperless data collection, entry, and automated reporting. Paper forms should only be used as backup to FieldNow® digital data collection and/or as necessary to collect data not captured by available FieldNow® applications. The Field Now® digital form applications follow a standardized approach, correlate to most TGIs and are available to all projects accessible with a PC or capable mobile device. Once the digital forms are saved within FieldNow®, the data is instantly available for review on a web interface. This facilitates review by project management team members and SMEs enabling error or anomalous data detection for correction while the staff are still in the field. Continual improvements of FieldNow® applications are ongoing, and revisions are made as necessary in response to feedback from users and subject matter experts.

If digital data collection isn't possible, waterproof field books should be avoided for field notes. Instead, field notes on loose paper on Masonite, plastic, or aluminum clip boards is preferred. Please note that newer Rite in the Rain® notebooks are approved for PFAS sampling. Other requirements for field notes include:

- Pens, pencils, and fine/ultra-fine point Sharpies® may be used.
- Keep field notes and writing implements away from samples and sampling materials.
- One person should conduct sampling while another records field notes.

- Do not write on sampling bottles unless they are closed.

10.1 Other Project Documentation

- Complete groundwater and/or soil sampling logs.
- Make sure COC Forms are properly completed. Verify which PFAS analytes (e.g., just PFOS and PFOA, some or all of the 537 list, etc.) are required for analysis and note on the COC.

11 Quality Assurance

Refer to quality control requirements for the project to ensure that appropriate quality assurance and quality control (QA/QC) samples are collected. When collecting QA/QC samples, the same guidelines apply as when collecting regular samples – specifically that:

- Samples should be collected in laboratory-supplied HDPE bottles;
- Bottle caps must remain in the hand of the sampler until replaced on the bottle;
- Labels must be completed after the caps have been placed back on each bottle; and
- Samples must be stored in appropriate transport bottles (coolers) with ice (Ziploc© bags for use as ice containers) with appropriate labeling. **Do not use blue ice. Store PFAS samples in a separate cooler from other types of samples.**

11.1 Equipment Blanks (if relevant)

QA/QC sampling typically includes daily collection of equipment blanks using the laboratory-supplied “PFAS-free” water. For peristaltic pump tubing, laboratory supplied “PFAS-free” water should be poured into a clean HDPE sample bottle and then pumped through new HDPE tubing using the peristaltic pump (with new silicone tubing). The best timing to collect equipment blanks is immediately after the collection of a sample likely to contain high concentrations of PFAS, after the sampling equipment has been appropriately decontaminated. Note that an equipment blank can also be collected if an unapproved or potentially suspect hazard control is needed for health and safety and it contacts a sample, i.e., that material would be exposed to PFAS free water then the water would be collected in a separate sample container.

11.2 Field Duplicates

QA/QC sampling typically includes the collection of one field duplicate for every 10 or 20 samples collected. Each duplicate sample will be collected immediately after the initial sample of which it is a duplicate into a separate laboratory-provided sample bottle. Do not indicate to the laboratory which sample the duplicate replicates, i.e., it should be given a blind reference on the COC and sample name such as “duplicate”.

11.3 Field Reagent Blanks

QA/QC sampling for PFAS typically includes the submission of one laboratory supplied field reagent blank per day. The field reagent blank sample is brought to the site in a laboratory-supplied sample bottle. Field staff

transfer the laboratory-supplied reagent blank to an empty sample bottle. This sample should be collected after field staff return from an offsite break (e.g., lunch) to capture any potential cross-contamination from field personnel and should be placed in the same cooler as the other PFAS samples.

11.4 Matrix Spikes (optional in some cases)

QA/QC sampling includes submitting a sample to be used as a matrix spike if the project requires it. If a separate sample bottle is required, an additional sample will be collected immediately after the initial sample of which it is a duplicate into a separate laboratory-supplied sample bottle.

11.5 Laboratory Analytical QA/QC

- Arcadis recommends that any request for PFAS analysis in groundwater or soil should be conducted by an ELAP-accredited method compliant with QSM 5.3 Table B-15. Requirements laid out in Table B-15 strictly govern acceptable laboratory data quality for PFAS analysis in environmental samples. **For all data collection efforts at DoD sites, PFAS data must be obtained using a method that is DoD ELAP-accredited under QSM 5.3 or later.**
- Laboratory QA/QC should consist of one laboratory blank and one laboratory control sample (or blank spike) per batch of samples, and additional QA/QCs as indicated by the laboratory QA/QC procedures.
- Isotope dilution should be used for quantification with isotope-labeled surrogate standards, as available, according to the guidelines of QSM 5.3 Table B-15. The USEPA has two drinking water methods (USEPA Method 537.1 and USEPA Method 533). Method 537.1 does not allow for isotope dilution but USEPA Method 533 requires isotope dilution.
- For drinking water, groundwater, and surface water samples, laboratories must extract the entire sample and include a solvent rinse of the bottle for analysis. Aqueous samples should generally not be sub-sampled prior to analysis, unless they are high concentration and require serial dilution (US DoD 2017).
- Soil samples should be analyzed in their entirety or thoroughly homogenized before extraction and analysis.
- As part of the internal QA/QC of laboratory results, relative percent difference (RPD) should be calculated between samples and corresponding field or laboratory duplicates. The laboratory quality assurance portion of the laboratory certificates should be reviewed to verify that all calculations/recoveries were within acceptable limits as established by the laboratory method and guidelines in Table B-15 of QSM 5.3 or later (USDoD 2019).

12 References

Arcadis Australia. 2017. Soil and Concrete Sampling for PFAS. April.

Arcadis. 2010. Monitoring Well Development, Rev. #2.2. March 22.

Arcadis. 2009. Investigation-Derived Waste Handling and Storage, Rev. #2. March 6.

Arcadis. 2011. Low-Flow Groundwater Purging and Sampling Procedures for Monitoring Wells, Rev. #4. February 2.

ASTM. 2002. ASTM D6771-02 - Standard Practice for Low-Flow Purging and Sampling for Wells and Devices Used for Ground-Water Quality Investigations (Withdrawn 2011). Available at: https://www.astm.org/Standards/D6771.htm.

California State Water Quality Control Board. 2020. Per- and Polyfluoroalkyl Substances (PFAS) Sampling Guidelines for Non-Drinking Water. September. https://www.waterboards.ca.gov/pfas/docs/sept_2020_pfas_sampling_guidelines.pdf

Department of Environment Regulation (DER). Government of Western Australia. 2016. Interim Guideline on the Assessment and Management of Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS). Contaminated Sites Guidelines. February.

Michigan Department of Environmental Quality (MDEQ). 2018. General PFAS Sampling Guidance. October. https://www.michigan.gov/documents/pfasresponse/General_PFAS_Sampling_Guidance_634597_7.pdf

Massachusetts Department of Environmental Protection (MassDEP). 2017. DRAFT Fact Sheet, Guidance on Sampling and Analysis for PFAS at Disposal Sites Regulated under the Massachusetts Contingency Plan. January.

New Hampshire Department of Environmental Services (NHDES). 2016. Perfluorinated Compound (PFC) Sample Collection Guidance. November.

United Nations Environment Programme (UNEP). 2015. PFAS analysis in water for the Global Monitoring Plan of the Stockholm Convention, Set-up and guidelines for monitoring. Jana Weiss, Jacob de Boer, Urs Berger, Derek Muir, Ting Ruan, Alejandra Torre, Foppe Smedes, Branislav Vrana, Fabrice Clavient, and Heidelore Fiedler. Division of Technology, Industry and Economics. Geneva. April.

United States Army Corps of Engineers (USACE). 2016. DRAFT – Standard Operating Procedure 047: Per/Poly Fluorinated Alkyl Substances (PFAS) Field Sampling. Revision: 1. March.

U.S. Army Corps of Engineers – Omaha District. 2016. Chemistry Requirements – PFAS.

U.S. Department of Defense (DoD). 2019. Consolidated Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.3. In conjunction with the U.S. Department of Energy. May.

U.S. Environmental Protection Agency. 2009. USEPA Method 537: Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS), version 1.1, September. National Exposure Research Laboratory, Office of Research and Development.

U.S. Environmental Protection Agency. 2010. Low Stress (Low Flow) purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells. Available at: https://www.epa.gov/quality/low-stress-low-flow-purging-and-sampling-procedure-collection-groundwater-samples-monitoring.

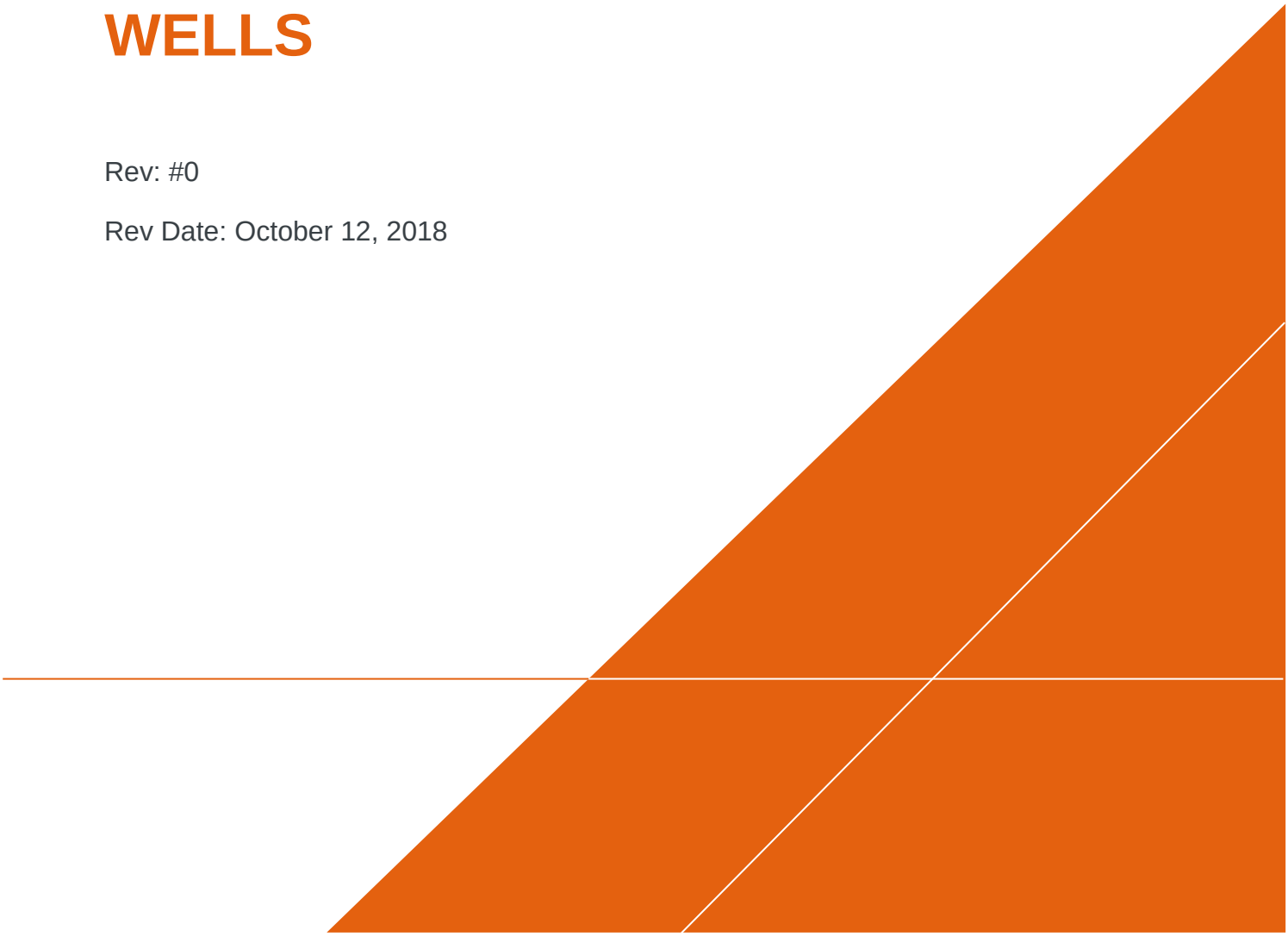
Transport Canada. February 2016, Per-and Polyfluorinated Alkyl Substances (PFAS) Field Sampling Guidance.

ARCADIS Design & Consultancy for natural and built assets

TGI - LOW-FLOW GROUNDWATER PURGING AND SAMPLING PROCEDURES FOR MONITORING WELLS

Rev: #0

Rev Date: October 12, 2018



VERSION CONTROL

Revision No	Revision Date	Page No(s)	Description	Reviewed by
0	October 12, 2018	All	Updated and re-written as TGI with new branding and content	Marc Killingstad

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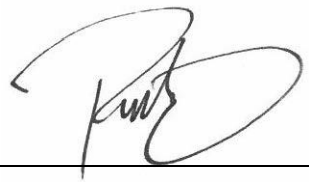
APPROVAL SIGNATURES

Prepared by:		10/12/2018
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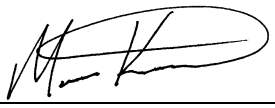
Technical Expert Reviewed by:		10/12/2018
	Marc Killingstad (Technical Expert)	Date:

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1 INTRODUCTION

This document describes general and/or specific procedures, methods, actions, steps, and considerations to be used and observed by Arcadis staff when performing work, tasks, or actions under the scope and relevancy of this document. This document may describe expectations, requirements, guidance, recommendations, and/or instructions pertinent to the service, work task, or activity it covers.

It is the responsibility of the Arcadis Certified Project Manager (CPM) to provide this document to the persons conducting services that fall under the scope and purpose of this procedure, instruction, and/or guidance. The Arcadis CPM will also ensure that the persons conducting the work falling under this document are appropriately trained and familiar with its content. The persons conducting the work under this document are required to meet the minimum competency requirements outlined herein, and inquire to the CPM regarding any questions, misunderstanding, or discrepancy related to the work under this document.

This document is not considered to be all inclusive nor does it apply to all projects. It is the CPM's responsibility to determine the proper scope and personnel required for each project. There may be project- and/or client- and/or state-specific requirements that may be more or less stringent than what is described herein. The CPM is responsible for informing Arcadis and/or Subcontractor personnel of omissions and/or deviations from this document that may be required for the project. In turn, project staff are required to inform the CPM if or when there is a deviation or omission from work performed as compared to what is described herein.

In following this document to execute the scope of work for a project, it may be necessary for staff to make professional judgment decisions to meet the project's scope of work based upon site conditions, staffing expertise, regulation-specific requirements, health and safety concerns, etc. Staff are required to consult with the CPM when or if a deviation or omission from this document is required that has not already been previously approved by the CPM. Upon approval by the CPM, the staff can perform the deviation or omission as confirmed by the CPM.

2 SCOPE AND APPLICATION

Groundwater samples are collected from monitoring wells to evaluate groundwater quality. The protocol presented in this Technical Guidance Instruction (TGI) describes the procedures to purge monitoring wells and collect groundwater samples using the low flow purging/sampling methodology. This protocol has been developed in accordance with the United States Environmental Protection Agency (USEPA) Region I *Low Stress (Low Flow) Purging and Sampling Procedures for the Collection of Groundwater Samples from Monitoring Wells* (EQASOP-GW4; September 19, 2017).

Both filtered and unfiltered groundwater samples may be collected using this low-flow sampling method. Filtered samples will be obtained using a 0.45-micron disposable filter. Project teams will evaluate the last time the monitoring wells were developed and determine if additional development might be necessary. Water samples will not be taken immediately following well development. Sufficient time will be allowed for the groundwater flow regime in the vicinity of the monitoring well to stabilize and to approach chemical equilibrium with the well construction materials. This lag time will depend on site conditions and methods of installation but often exceeds one week.

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3 PERSONNEL QUALIFICATIONS

Arcadis field sampling personnel will have completed or are in the process of completing site-specific training as well as having current health and safety training as required by Arcadis, client, or regulations, such as 40-hour HAZWOPER training and/or OSHA HAZWOPER site supervisor training. Arcadis personnel will also have current training as identified in the site-specific Health and Safety Plan (HASP) which may include first aid, cardiopulmonary resuscitation (CPR), Blood Borne Pathogens (BBP) as needed. The HASP will also identify any access control requirements.

Prior to mobilizing to the field, the groundwater sampling team will review and be thoroughly familiar with relevant site-specific documents including but not limited to the task-specific work plan or field implementation plan (FIP)/field sampling plan, Quality Assurance Project Plan (QAPP), HASP, historical information, and other relevant site documents.

Arcadis field sampling personnel will be knowledgeable in the relevant processes, procedures, and TGIs and possess the demonstrated required skills and experience necessary to successfully complete the desired field work. Additionally, the groundwater sampling team will review and be thoroughly familiar with documentation provided by equipment manufacturers and become familiar with the operation of (i.e., hands-on experience) all equipment that will be used in the field prior to mobilization.

4 EQUIPMENT LIST

Specific to this activity, the following materials (or equivalent) will be used:

- Site-specific HASP and health and safety documents identified in the HASP
- Field Implementation Plan (FIP) that includes site map, well construction records, sampling plan (sample analyses, sample volume required, and sample holding time), and prior groundwater sampling records (if available)
- Field notebook and/or smart device (phone or tablet)
- Low-flow sampling field forms (**Attachment A**)
- Appropriate personal protective equipment (PPE) (e.g., latex or nitrile gloves, safety glasses, etc.) as specified in the HASP
- Well keys and other tools to remove manhole covers (manual torque wrench with 9/16” socket and flat head screwdriver typical)
- Photoionization detector (PID) or Flame ionization detector (FID) (as appropriate, depending on site-specific constituents of concern)
- Electronic water-level indicator (e.g., Solinist Model 101) or oil/water interface probe with 0.01-foot accuracy (oil/water as appropriate, note that sampling will not be performed when sheen or light non-aqueous phase liquid [LNAPL] is present)
- Down-hole multiparameter water-quality sonde (temperature/pH/specific conductivity/oxidation reduction [ORP]/turbidity/dissolved oxygen) meter and flow-through measurement cell; for example:

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  - YSI 6-Series Multi-Parameter Instrument
  - Horiba U-22 Multi-Parameter Instrument.
  - Hydrolab Series 3 or Series 4a Multiprobe and Display.
- Plastic sheeting (e.g., Weatherall Visqueen) to protect all down-hole sampling equipment from contact with potential sources of contamination.
- Decontamination equipment
  - Non-phosphate laboratory soap (Alconox or equivalent), brushes, clean buckets or clean wash tubs—new buckets or tubs will be purchased if it cannot be determined if the present items are clean
  - Distilled or de-ionized water for equipment decontamination
- Indelible ink pen
- 150-foot measuring tape (or sufficient length for the maximum site depth requirement)
- Sampling pump, which may consist of one or more of the following:
  - Submersible pump (e.g., Grundfos Redi-Flo 2)
  - Peristaltic pump (e.g., ISCO Model 150)
  - Bladder pump (e.g., Marschalk System 1, QED Micropurge, Geotech)
- Appropriate controller and power source for pump:
  - Submersible and peristaltic pumps require electric power from either a generator or a deep cell battery
  - Submersible pumps such as Grundfos require a pump controller to run the pump
  - Bladder pumps require a pump controller and a gas source (e.g., air compressor or compressed N2 or CO2 gas cylinders)
- Teflon® tubing or Teflon®-lined polyethylene tubing of an appropriate size for the pump being used
  - For peristaltic pumps, dedicated Tygon® tubing (or other type as specified by the manufacturer) will be used through the pump apparatus
  - Teflon® will not be used when sampling for per- and polyfluoroalkyl substances (PFAS)
- Graduated cylinder and stop watch or other device to measure time to determine pumping rate
- Appropriate water sample containers (supplied by the laboratory)
- Appropriate blanks (trip blank supplied by the laboratory)
- Sample labels and Chain-of-Custody forms (COC)
- 0.45-micron disposable filters (if field filtering is required)

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- A supplemental turbidity meter (e.g., Horiba U-10, Hach 2100P, LaMotte 2020) may be required for specific projects and will be specified in the project FIP/ work plan and the kick-off notes.
    - If used, in-line 'T' and valve allows for collection of water for turbidity measurements before the pump discharge enters the flow-through cell

NOTE: *The maintenance requirements for the above equipment generally involve decontamination or periodic cleaning, battery charging, and proper storage, as specified by the manufacturer. For operational difficulties, the equipment will be serviced by a qualified technician.*

5 CAUTIONS

Different USEPA regions and/or state regulatory agencies may stipulate deviations from this document. It is the responsibility of the Project Team (Project Manager and Technical Lead) to be fully aware of the requirements from the applicable regulatory framework.

Weather

- If heavy precipitation occurs, and no cover over the sampling area and monitoring well can be erected, sampling may be discontinued until adequate cover is provided. Rain water could compromise groundwater samples.
- Avoid extreme weather situations. Be aware that thermal currents and vertical mixing of cold and warm water inside the well casing could create a convection cell within the well and compromise data collection (e.g., biological mechanisms).
    - Direct sunlight and hot ambient temperatures may cause the groundwater in the tubing or flow-through-cell to heat up and de-gas. This may result in the loss of volatile organic compounds (VOCs) and dissolved gases. Shade the equipment from direct sunlight, keep the tubing as short as possible, and avoid the hottest times of the day.
    - Sampling during freezing conditions may adversely impact the data quality objectives. USEPA recommends low-flow sampling be conducted at air temperatures above 32°F (0°C) or taking special precautions to prevent groundwater from freezing in the equipment.

Cross-Contamination

- To mitigate potential cross-contamination, groundwater samples are to be collected in a pre-determined order from least impacted to impacted based on previous analytical data. If no analytical data are available, collect samples in order of up-gradient, then furthest down-gradient to source area locations.
- Note that permanent markers could introduce volatile constituents into the samples; *therefore, indelible ink is recommended* to be used for labels on sample containers or sample coolers.
- When using a gasoline generator, this power source will be set-up at least 30 feet downwind from the well to avoid exhaust fumes to contaminate samples.

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Pumps

- Preferred methods of extracting groundwater are adjustable rate, submersible pumps - such as centrifugal pumps or bladder pumps – constructed of stainless steel or polytetrafluoroethylene (PTFE, i.e. Teflon®). However, *PTFE will not be used when sampling for per- and polyfluoroalkyl substances (PFAS). PTFE could contain PFAS.*
- When using a bladder pump for collecting VOCs and dissolved gases, “best practice” is to set-up the pump to deliver sufficient water to fill a 40 mL VOC vial.
- The use of peristaltic pumps will be based on the type of data to be collected. *Because the use a peristaltic pump can result in de-gassing of VOC and / or dissolved gases from groundwater, a different type of pump will be considered if these compounds are of concern.*
- *Manual or motor driven inertial pumping devices are not recommended because they cause greater disturbance during purging and pumping than regular pumps and are less easily controlled. This could cause a higher degree of data variability.*

Tubing

- When sampling for VOCs, SVOCs, pesticides, PCBs and inorganics, use of PTFE (Teflon®) or PTFE-lined tubing is preferred. However, PTFE tubing will not be used when sampling for PFAS.
- PVC, polypropylene or polyethelene tubing may be used when sampling for metals or other inorganics.
- Tubing with inside diameters of 1/4 or 3/8 inch is recommended because this will help ensure tubing remains water filled when operating at very low pumping rates.

General Precautions

- Store and/or stage empty and full sample containers and coolers out of direct sunlight.
- It may be necessary to field filter the groundwater for some parameters (e.g., metals) during collection, depending on preservation, analytical method, and project quality objectives. The task-kick-off notes and the FIP/work plan will list the samples that require field filtering.
- Be careful not to overtighten lids with Teflon® liners or septa (e.g., 40 mL vials). Over-tightening can cause the glass to shatter or impair the integrity of the Teflon® seal.

6 HEALTH AND SAFETY CONSIDERATIONS

The HASP will be followed, as appropriate, to ensure the safety of field personnel.

Appropriate personal protective equipment (PPE) will be worn at all times in line with the task and the site-specific HASP.

Review all site-specific and procedural hazards as they are provided in the HASP, and review Job Safety Analysis (JSA) documents in the field each day prior to beginning work.

Access to wells may expose field personnel to hazardous materials such as contaminated groundwater or non-aqueous phase liquid (NAPL) (e.g., oil). Other potential hazards include pressurized wells, stinging

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insects that may inhabit well heads, other biologic hazards (e.g. ticks in long grass/weeds around well head), and potentially the use of sharp cutting tools (scissors, knife)—open well caps slowly and keep face and body away to allow to vent any built-up pressure; only use non-toxic peppermint oil spray for stinging insect nests; review client-specific health and safety requirements, which may preclude the use of fixed/folding-blade knives, and use appropriate hand protection.

Generators and cord and plug equipment will employ an overcurrent protection device such as an integrated ground fault circuit interrupter (GFCI) cord. Grundfos pump controllers will not run properly with a GFCI, so the power source will be equipped with other overcurrent protection means.

Overtightening of lids with Teflon® liners can cause the glass to shatter and create a risk for hand injuries.

7 PROCEDURE

Field personnel will set up and perform low-flow sampling in accordance with the following procedures.

1. Review FIP and groundwater sampling records from previous sampling events (if available) prior to mobilization to estimate the optimum pumping rate and anticipated drawdown for each well to perform sampling as efficiently as possible (i.e., reach a stabilized pumping condition)
2. Calibrate field instruments according to manufacturer procedures for calibration and record calibration procedure and results in field log
3. All equipment will either be new or decontaminated in accordance with appropriate guidance document (*TGI – Groundwater and Soil Sampling Equipment Decontamination)* prior to use
4. Visually inspect the well to ensure that it is undamaged, properly labeled and secured
    a) Damage or other conditions that may affect the integrity of the well will be recorded in the Field Activity Daily Log and brought to the attention of the designated Field Manager and/or Project Manager
    b) Record well construction and conditions on the Low-Flow Sampling Field Form (**Attachment A**)
5. Place clean plastic sheeting on the ground near the well to keep monitoring and sampling equipment off the surface unless the equipment is elevated above the ground (e.g. on a table).
6. Open the well cover while standing upwind of the well. Remove the well cap and place it on the plastic sheeting. If appropriate or required for site-specific conditions, insert the photoionization detector (PID) probe approximately 4 to 6 inches into the casing or the well headspace and cover it with a gloved hand. Record the PID reading in the field log. Perform air monitoring in the breathing zone according to the HASP and/or JSA.
7. Measure and record the initial depth to groundwater prior to placing the pumps
8. Prepare and install the pump in the well

NOTE: *Groundwater will be purged from the wells using an appropriate pump. If the depth to water is below the sampling range of a peristaltic pump (approximately 25 feet below ground surface), a*

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submersible or bladder pump will be used, provided that the well is constructed with a casing diameter of at least two (2) inches (the minimum well diameter capable of accommodating such pumps). For smaller diameter wells, where the depth to water is below the sampling range of a peristaltic pump, alternative sampling methods (i.e., bailing or small diameter bladder pumps) will be used to purge and sample the groundwater. Bladder pumps are preferred over peristaltic and submersible pumps to prevent volatilization if sampling of VOCs and/or dissolved gasses is required. Purge water will be collected and containerized according to the direction of the project team.

a) For submersible and non-dedicated bladder pumps, decontaminate the pump according to site decontamination procedures. Non-dedicated bladder pumps will require a new bladder and attachment of an air-line, sample discharge line, and safety cable prior to placement in the well. Attach the air-line tubing to the air-port on the top of the bladder pump. Attach the sample discharge tubing to the water port on the top of the bladder pump. Take care not to reverse the air and discharge tubing lines during bladder pump setup, as this could result in bladder failure or rupture. Attach and secure a safety cable to the eyebolt on the top of pump (if present, depending on pump model used). Slowly lower the pump, safety cable, tubing, and electrical lines into the well to a depth corresponding to the approximate center of the saturated screen section of the well. Avoid twisting and tangling of safety cable, tubing, and electrical lines while lowering the pump into the well; twisted and tangled lines could result in the pump becoming stuck in the well casing. Also, make sure to keep tubing and lines from touching the ground or other surfaces while introducing them into the well, as this could lead to unintended contamination.

b) If using a bladder pump, connect the air-line to the pump controller output port. The pump controller will be connected to a supply line from an air compressor or compressed gas cylinder using an appropriate regulator and air hose. Tighten the regulator connector onto the gas cylinder (if used) to prevent leaks. Teflon® tape may be used on the threads of the cylinder to provide a tighter seal. Once the air compressor or gas cylinder is connected to the pump controller, turn on the compressor or open the valve on the cylinder to begin the gas flow. Turn on the pump controller power (if an on/off switch is present) and verify that all batteries are charged and fully functioning before starting the pump.

c) If a peristaltic pump is being used, slowly lower the sampling tubing into the well to a depth corresponding to the approximate center of the saturated screen section of the well. The pump intake or sampling tube must be kept at least two (2) feet above the bottom of the well to prevent mobilization of any sediment present in the bottom of the well.

d) If using an in-line ‘T’ and valve, install between pump discharge water line and the bottom inlet port of the flow-through cell. Attach a short piece of tubing to the outlet. This set-up will be used to collect samples for turbidity readings.

9. Connect the pump discharge water line to the bottom inlet port on the flow-through cell connected to the water quality meter.

10. Before starting the pump, ensure that the water level inside the well has stabilized (i.e., measure the water level multiple times after deploying the pump in the well)

11. Start pumping the well at 200 to 500 milliliters (mL) per minute (or at lower site-specific rate if specified) and adjust the pumping rate to cause little or no water level drawdown in the well (less

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than 0.3 feet below the initial static depth to water measurement): the water level should stabilize, however, this is not always possible.

12. If the well diameter is of sufficient size, measure the water level every 3 to 5 minutes (or as appropriate, lower flow rates may require longer time between readings) during pumping

13. Maintain a steady flow rate to the extent practicable and do not break pump suction or cause entrainment of air in the sample

14. Record pumping rate adjustments and depths to water

    If necessary, reduce pumping rates to the minimum capabilities of the pump to avoid pumping the well dry and/or to stabilize indicator parameters; if the recharge rate of the well is very low, use alternative purging techniques, which will vary based on the well construction and screen position:

    For wells screened across the water table, the well may be pumped dry and sampling can commence as soon as the volume in the well has recovered sufficiently to permit collection of samples

    For wells screened entirely below the water table, the well can be pumped until a stabilized level (which may be greater than the maximum displacement goal of 0.3 feet) is maintained and monitoring for stabilization of field indicator parameters can commence; if a lower stabilization level cannot be maintained, the well may be pumped until the drawdown is at a level slightly higher than top of the well screen

15. The sampling process may commence after one well volume has been removed and the well has recovered sufficiently to permit collection of samples

16. After water levels have stabilized and a sufficient volume has been purged, continue pumping and begin monitoring field indicator parameters (e.g., turbidity, temperature, specific conductance, pH, ORP, and dissolved oxygen [DO]) every 3 to 5 minutes (or after each volume of the flow-through cell has been purged or other appropriate interval) using a flow-through analytical cell or a clean container such as a glass beaker and collect samples for turbidity readings using the T-valve

17. Record field indicator parameters on the groundwater sampling log

18. The well is considered stabilized and ready for sample collection when three consecutive readings are within the following limits:

    - **Turbidity** within ± 10% for values greater than 5 nephelometric turbidity unit [NTU] or if three turbidity values are less than 5 NTU, consider the values as stabilized;
    - **Dissolved Oxygen (DO)** within ± 10% for values greater than 0.5 mg/L or if three DO values are less than 0.5 mg/L, consider the values as stabilized;
    - **Specific Conductance** within ± 3%;
    - **Temperature** within ± 3%;
    - **pH** within ± 0.1 unit;
    - **Oxidation/Reduction Potential (ORP)** within ±10 millivolts (mV);

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NOTE: *Alternate stabilization goals may exist in different geographic regions, consult the site-specific FIP/work plan for stabilization criteria).*

NOTE: *If the parameters have stabilized but turbidity remains relatively high (e.g., greater than 50 NTU), the pump flow rate may be decreased to a minimum rate of 100 mL/min to reduce turbidity levels as low as possible.*

NOTE: *If field indicator parameters do not stabilize within one (1) hour of the start of purging, but the groundwater turbidity has been minimized (i.e., within ± 10%) and the values for all other parameters are within ± 10%, the well may be sampled; however, consult specifications in the FIP/work plan and/or the project technical lead.*

NOTE: *DO is extremely susceptible to various external influences (including temperature or the presence of bubbles on the DO meter); therefore, great care will be taken to minimize the agitation or other disturbance of water within the flow-through cell while collecting these measurements. If air bubbles are present on the DO probe or in the discharge tubing, remove them before taking a measurement. If DO values are not within acceptable range for the temperature of groundwater, again check for and remove air bubbles on the probe before re-measuring. The table below may be used as a general guide for DO values under various temperatures; however, understand that groundwater contaminants may affect oxygen solubility. If DO value is 0.00 or less, then the meter will be serviced and re-calibrated. If DO values are above possible results, then the meter will be serviced and re-calibrated.*

NOTE: *During extreme weather conditions, stabilization of field indicator parameters may be difficult to attain. Modifications to the sampling procedures to alleviate these conditions (e.g., measuring the water temperature in the well adjacent to the pump intake) will be documented in the field logbook/on the sampling form.*

NOTE: *If other field conditions are suspected of preventing stabilization of certain parameters, observations will be documented in the field logbook/on the sampling form.*

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Oxygen Solubility in Fresh Water

Temperature (degrees C)	Dissolved Oxygen (mg/L)
0	14.6
1	14.19
2	13.81
3	13.44
4	13.09
5	12.75
6	12.43
7	12.12
8	11.83
9	11.55
10	11.27
11	11.01
12	10.76
13	10.52
14	10.29
15	10.07
16	9.85
17	9.65
18	9.45
19	9.26
20	9.07
21	8.9
22	8.72
23	8.56
24	8.4
25	8.24
26	8.09
27	7.95
28	7.81
29	7.67
30	7.54
31	7.41
32	7.28
33	7.16
34	7.05
35	6.93

Reference: Vesilind, P.A., *Introduction to Environmental Engineering*, PWS Publishing Company, Boston, 468 pages (1996).

19. Complete the sample label(s) and cover the label(s) with clear packing tape to secure the label onto the container

20. After the indicator parameters have stabilized, collect groundwater samples by diverting flow out of the unfiltered discharge tubing into the appropriate labeled sample container

    a) If a flow-through analytical cell is being used to measure field parameters, the flow-through cell will be disconnected after stabilization of the field indicator parameters and prior to groundwater sample collection

    b) Under no circumstances will analytical samples be collected from the discharge of the flow-through cell

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c) If an in-line 'T' and valve are used, the valve needs to be removed as well

d) Samples will be collected in the following order: VOCs, total organic carbon (TOC), semi-volatile organic compounds (SVOCs), metals and cyanide, and others (or other order as defined in the site-specific FIP/work plan)

e) When the container is full, tightly screw on the cap

21. If sampling for total and filtered metals and/or polychlorinated biphenyls (PCBs), a filtered and unfiltered sample will be collected

    a) Install an in-line, disposable 0.45-micron particle filter on the discharge tubing after the appropriate unfiltered groundwater sample has been collected

    b) Continue to run the pump until an initial volume of "flush" water has been run through the filter in accordance with the manufacturer's directions (generally 100 to 300 mL)

    c) Collect the filtered groundwater sample by diverting flow out of the filter into the appropriately labeled sample container

    d) When the container is full, tightly screw on the cap

22. Secure with packing material and store the samples on ice (targeting 4° Celsius) in an insulated transport container provided by the laboratory and include a temperature blank in each container to be shipped

23. Record on the Low-Flow Sampling Field Form (and bound field logbook) the time at which sampling procedures were completed, any pertinent observations of the sample (e.g., physical appearance and the presence or lack of odors or sheens), and the values of the stabilized field indicator parameters as measured during the final reading during purging (see **Attachment A**)

24. Turn off the pump and air compressor or close the gas cylinder valve if using a bladder pump setup

25. Slowly remove the pump, tubing, lines, and safety cable from the well

    a) If using dedicated tubing, do not allow the tubing or lines to touch the ground or any other surfaces which could contaminate them

    b) If using dedicated tubing, it will be folded - without pinching it - to a length that will allow the well to be capped and also facilitate retrieval of the tubing during later sampling events.

    c) Use a length of rope or string to tie the tubing to the well cap

    d) Alternatively, if tubing and safety line are to be saved and reused for sampling the well at a later date, coil the tubing neatly and placed in a clean plastic bag that is clearly labeled with the well ID ensuring the bag is tightly sealed before placing it in storage

26. Secure the well and properly dispose of personal protective equipment (PPE) and disposable equipment

27. Complete the procedures for packaging, shipping, and handling with the associated Chain-of-Custody

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28. Complete decontamination for flow-through analytical cell and submersible or bladder pump, as appropriate (*TGI – Groundwater and Soil Sampling Equipment Decontamination*)
29. At the end of each day of the sampling event, perform calibration check of field instruments and record procedure and results in field log

8 WASTE MANAGEMENT

Materials generated during groundwater sampling activities, including disposable equipment and excess purge water, will be stored on site in appropriately labeled containers and disposed of properly. Waste will be managed in accordance with the *TGI – Investigation-Derived Waste Handling and Storage,* the procedures identified in the FIP or QAPP as well as state-, federal- or client-specific requirements. Be certain that waste containers are properly labeled and documented in the field log book.

9 DATA RECORDING AND MANAGEMENT

Management of the original documents from the field will be completed in accordance with the site-specific QAPP.

In general, forms (e.g., Low-Flow Sampling Field Forms), logs/notes (including daily field and calibration logs), digital records, and Chain-of-Custody records will be maintained by the field team lead.

Field logs and Chain-of-Custody records will be transmitted to the Arcadis Project Manager and/or Task Manager, as appropriate, at the end of each day unless otherwise directed. Electronic data files will be sent to the project team and uploaded to the electronic project folder daily.

Records generated as a result of this TGI will be controlled and maintained in the project record files in accordance with project requirements.

10 QUALITY ASSURANCE

Quality assurance procedures will be conducted in accordance with the Arcadis Quality Management System or the site-specific QAPP.

Unless described otherwise in the project-specific FIP/work plan, QAPP, or Sampling and Analysis Plan, quality assurance/quality control samples will be collected as follows:

- One duplicate for every 10 samples
- One laboratory matrix/matrix spike sample for every 20 samples

In addition to the quality control samples to be collected in accordance with this TGI, the following quality control procedures will be observed in the field:

- Collect samples from monitoring wells, in order of increasing concentration, to the extent known based on review of historical site information if available
- Equipment blanks will include the pump and tubing (if using disposable tubing) or the pump only (if using tubing dedicated to each well)

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- Collect equipment blanks after wells with higher concentrations (if known) have been sampled
- Operate all monitoring instrumentation in accordance with manufacturer's instructions and calibration procedures—calibrate instruments at the beginning of each day, verify the calibration at the end of each day, and record all calibration activities in the field notebook
- Clean all groundwater sampling equipment prior to use in the first well and after each subsequent well following the procedure for equipment decontamination

11 REFERENCES

USEPA. 1986. *RCRA Groundwater Monitoring Technical Enforcement Guidance Document* (September 1986).

USEPA. 1991. *Handbook Groundwater, Volume II Methodology*, Office of Research and Development, Washington, DC. USEPN62S, /6-90/016b (July 1991).

USEPA Region I. 2017. *Low Stress (Low Flow) Purging and Sampling Procedures for the Collection of Groundwater Samples from Monitoring Wells* (EQASOP-GW4; September 19, 2017).

U.S. Geological Survey (USGS). 1977. *National Handbook of Recommended Methods for Water-Data Acquisition: USGS Office of Water Data Coordination*. Reston, Virginia.

12 ATTACHMENTS

Attachment A - Low-Flow Sampling Field Form

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ATTACHMENT

Attachment A - Low-Flow Sampling Field Form

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LOW-FLOW GROUNDWATER SAMPLING FORM

ARCADIS

Project No. _____ Well ID _____ Date _____

Project Name/Location _____ Weather _____

Measuring Pt. Description _____ Screen Setting (ft-bmp) _____ Casing Diameter (in.) _____ Well Material ____ PVC ____ SS

Static Water Level (ft-bmp) _____ Total Depth (ft-bmp) _____ Water Column (ft) _____ Gallons in Well _____

MP Elevation _____ Pump Intake (ft-bmp) _____ Purge Method: _____ Sample Method _____

Pump On/Off _____ Volumes Purged _____ Centrifugal _____ Submersible _____ Other _____

Sample Time: Label _____ Gallons Purged _____

Purge Start _____ Replicate/

Purge End _____ Code No. _____ Sampled by _____

Time	Minutes Elapsed	Rate (gpm)/(mL/min) 200mL/min +	Depth to Water (ft) -0.3	Gallons Purged	pH ± 0.1	Cond. (µMhos)/(mS/cm) ± 3%	Turbidity (NTU) ± 10%	DO (mg/L) ± 10%	Temp. (°C)/(°F) ± 3%	Redox (mV) ± 10mV	Appearance	
											Color	Odor
Stabilization Calculations (±)												
Stabilization Criteria					**± 0.1 s.u.**	**±3%**	**± 10% or within 1 NTU (1)**	**± 10%**	**±3%**	**±10 mV**		

(1) **Turbidity** < 50 NTU and ±10% or within 1 NTU of a previous reading when <10 NTU

Constituents Sampled	Container	Number	Preservative

Comments _____

Well Casing Volumes

Gallons/Foot	*1" = 0.04*	*1.5" = 0.09*	*2.5" = 0.26*	*3.5" = 0.50*	*6" = 1.47*
	1.25" = 0.06	*2" = 0.16*	*3" = 0.37*	*4" = 0.65*	

Well Information

Well Location: _____ Well Locked at Arrival: Yes / No

Condition of Well: _____ Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: _____

NEW YORK STATE OF OPPORTUNITY.

Department of Environmental Conservation

SAMPLING, ANALYSIS, AND ASSESSMENT OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

Under NYSDEC's Part 375 Remedial Programs

April 2023

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ERRATA SHEET for

SAMPLING, ANALYSIS, AND ASSESSMENT OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) Under NYSDEC's Part 375 Remedial Programs Issued January 17, 2020

Citation and Page Number	Current Text	Corrected Text	Date
Title of Appendix I, page 32	Appendix H	Appendix I	2/25/2020
Document Cover, page 1	Guidelines for Sampling and Analysis of PFAS	Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs	9/15/2020
Data Assessment and Application to Site Cleanup Page 3	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published	Until such time as Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published	3/28/2023
Water Sample Results Page 3	PFOA and PFOS should be further assessed and considered as potential contaminants of concern in groundwater or surface water if PFOA or PFOS is detected in any water sample at or above 10 ng/L (ppt) and is determined to be attributable to the site, either by a comparison of upgradient and downgradient levels, or the presence of soil source areas, as defined below.	NYSDEC has adopted ambient water quality guidance values for PFOA and PFOS. Groundwater samples should be compared to the human health criteria of 6.7 ng/l (ppt) for PFOA and 2.7 ng/l (ppt) for PFOS. These guidance values also include criteria for surface water for PFOS applicable for aquatic life, which may be applicable at some sites. Drinking water sample results should be compared to the NYS maximum contaminant level (MCL) of 10 ng/l (ppt).Analysis to determine if PFOA and PFOS concentrations are attributable to the site should include a comparison between upgradient and downgradient levels, and the presence of soil source areas, as defined below.	3/28/2023
Soil Sample Results Page 3	Soil cleanup objectives for PFOA and PFOS have been proposed in an upcoming revision to 6 NYCRR Part 375-6. Until SCOs are in effect, the following are to be used as guidance values:	NYSDEC will delay adding soil cleanup objectives for PFOA and PFOS to 6 NYCRR Part 375-6 until the PFAS rural soil background study has been completed. Until SCOs are in effect, the following are to be used as guidance values:	3/28/2023
Protection of Groundwater Page 3	PFOA (ppb) 1.1 PFOS (ppb) 3.7	PFOA (ppb) 0.8 PFOS (ppb) 1.0	3/28/2023

Citation and Page Number	Current Text	Corrected Text	Date
Footnote 2 Page 3	The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the guidance value for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).	The Protection of Groundwater values are based on the above referenced ambient groundwater guidance values. Details on that calculation are available in the following document, prepared for the February 2022 proposed changes to Part 375 (https://www.dec.ny.gov/docs/remediation_hudson_pdf/part375techsupport.pdf). The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the guidance value for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).	3/28/2023
Testing for Imported Soil Page 4	If the concentrations of PFOA and PFOS in leachate are at or above 10 ppt (the Maximum Contaminant Levels established for drinking water by the New York State Department of Health), then the soil is not acceptable.	If the concentrations of PFOA and PFOS in leachate are at or above the ambient water quality guidance values for groundwater, then the soil is not acceptable.	3/28/2023
Routine Analysis, page 9	"However, laboratories analyzing environmental samples…PFOA and PFOS in drinking water by EPA Method 537, 537.1 or ISO 25101."	"However, laboratories analyzing environmental samples…PFOA and PFOS in drinking water by EPA Method 537, 537.1, ISO 25101, or Method 533."	9/15/2020
Additional Analysis, page 9, new paragraph regarding soil parameters	None	"In cases where site-specific cleanup objectives for PFOA and PFOS are to be assessed, soil parameters, such as Total Organic Carbon (EPA Method 9060), soil pH (EPA Method 9045), clay content (percent), and cation exchange capacity (EPA Method 9081), should be included in the analysis to help evaluate factors affecting the leachability of PFAS in site soils."	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Data Assessment and Application to Site Cleanup Page 10	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFAS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Target levels for cleanup of PFAS in other media, including biota and sediment, have not yet been established by the DEC.	Until such time as Ambient Water Quality Standards (AWQS) and Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Preliminary target levels for cleanup of PFOA and PFOS in other media, including biota and sediment, have not yet been established by the DEC.	9/15/2020
Water Sample Results Page 10	PFAS should be further assessed and considered as a potential contaminant of concern in groundwater or surface water (…) If PFAS are identified as a contaminant of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.	PFOA and PFOS should be further assessed and considered as potential contaminants of concern in groundwater or surface water (…) If PFOA and/or PFOS are identified as contaminants of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Soil Sample Results, page 10	"The extent of soil contamination for purposes of delineation and remedy selection should be determined by having certain soil samples tested by Synthetic Precipitation Leaching Procedure (SPLP) and the leachate analyzed for PFAS. Soil exhibiting SPLP results above 70 ppt for either PFOA or PFOS (individually or combined) are to be evaluated during the cleanup phase."	"Soil cleanup objectives for PFOA and PFOS will be proposed in an upcoming revision to 6 NYCRR Part 375-6. Until SCOs are in effect, the following are to be used as guidance values. " [Interim SCO Table] "PFOA and PFOS results for soil are to be compared against the guidance values listed above. These guidance values are to be used in determining whether PFOA and PFOS are contaminants of concern for the site and for determining remedial action objectives and cleanup requirements. Site-specific remedial objectives for protection of groundwater can also be presented for evaluation by DEC. Development of site-specific remedial objectives for protection of groundwater will require analysis of additional soil parameters relating to leachability. These additional analyses can include any or all the parameters listed above (soil pH, cation exchange capacity, etc.) and/or use of SPLP. As the understanding of PFAS transport improves, DEC welcomes proposals for site-specific remedial objectives for protection of groundwater. DEC will expect that those may be dependent on additional factors including soil pH, aqueous pH, % organic carbon, % Sand/Silt/Clay, soil cations: K, Ca, Mg, Na, Fe, Al, cation exchange capacity, and anion exchange capacity. Site-specific remedial objectives should also consider the dilution attenuation factor (DAF). The NJDEP publication on DAF can be used as a reference: https://www.nj.gov/dep/srp/guidance/rs/daf.pdf. "	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Testing for Imported Soil Page 11	Soil imported to a site for use in a soil cap, soil cover, or as backfill is to be tested for PFAS in general conformance with DER-10, Section 5.4(e) for the PFAS Analyte List (Appendix F) using the analytical procedures discussed below and the criteria in DER-10 associated with SVOCs. If PFOA or PFOS is detected in any sample at or above 1 µg/kg, then soil should be tested by SPLP and the leachate analyzed for PFAS. If the SPLP results exceed 10 ppt for either PFOA or PFOS (individually) then the source of backfill should be rejected, unless a site-specific exemption is provided by DER. SPLP leachate criteria is based on the Maximum Contaminant Levels proposed for drinking water by New York State's Department of Health, this value may be updated based on future Federal or State promulgated regulatory standards. Remedial parties have the option of analyzing samples concurrently for both PFAS in soil and in the SPLP leachate to minimize project delays. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.	Testing for PFAS should be included any time a full TAL/TCL analyte list is required. Results for PFOA and PFOS should be compared to the applicable guidance values. If PFOA or PFOS is detected in any sample at or above the guidance values then the source of backfill should be rejected, unless a site-specific exemption is provided by DER based on SPLP testing, for example. If the concentrations of PFOA and PFOS in leachate are at or above 10 ppt (the Maximum Contaminant Levels established for drinking water by the New York State Department of Health), then the soil is not acceptable. PFOA, PFOS and 1,4-dioxane are all considered semi-volatile compounds, so composite samples are appropriate for these compounds when sampling in accordance with DER-10, Table 5.4(e)10. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.	9/15/2020

Citation and Page Number	Current Text	Corrected Text	Date
Footnotes	None	[1] TOP Assay analysis of highly contaminated samples, such as those from an AFFF (aqueous film-forming foam) site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances. [2] The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the soil cleanup objective for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).	9/15/2020
Additional Analysis, page 9	In cases… soil parameters, such as Total Organic Carbon (EPA Method 9060), soil…	In cases… soil parameters, such as Total Organic Carbon (Lloyd Kahn), soil…	1/8/2021
Appendix A, General Guidelines, fourth bullet	List the ELAP-approved lab(s) to be used for analysis of samples	List the ELAP- certified lab(s) to be used for analysis of samples	1/8/2021
Appendix E, Laboratory Analysis and Containers	Drinking water samples collected using this protocol are intended to be analyzed for PFAS by ISO Method 25101.	Drinking water samples collected using this protocol are intended to be analyzed for PFAS by EPA Method 537, 537.1, 533, or ISO Method 25101	1/8/2021
Water Sample Results Page 9	"In addition, further assessment of water may be warranted if either of the following screening levels are met: a. any other individual PFAS (not PFOA or PFOS) is detected in water at or above 100 ng/L; or b. total concentration of PFAS (including PFOA and PFOS) is detected in water at or above 500 ng/L"	Deleted	6/15/2021

Citation and Page Number	Current Text	Corrected Text	Date
Routine Analysis, Page XX	Currently, New York State Department of Health's Environmental Laboratory Approval Program (ELAP)… criteria set forth in the DER's laboratory guidelines for PFAS in non-potable water and solids (Appendix H - Laboratory Guidelines for Analysis of PFAS in Non-Potable Water and Solids).	Deleted	5/31/2022
Analysis and Reporting, Page XX	As of October 2020, the United States Environmental Protection Agency (EPA) does not have a validated method for analysis of PFAS for media commonly analyzed under DER remedial programs (non-potable waters, solids). DER has developed the following guidelines to ensure consistency in analysis and reporting of PFAS.	Deleted	5/31/2022
Routine Analysis, Page XX	LC-MS/MS analysis for PFAS using methodologies based on EPA Method 537.1 is the procedure to use for environmental samples. Isotope dilution techniques should be utilized for the analysis of PFAS in all media.	EPA Method 1633 is the procedure to use for environmental samples.	
Soil Sample Results, Page XX	Soil cleanup objectives for PFOA and PFOS will be proposed in an upcoming revision to 6 NYCRR Part 375-6	Soil cleanup objectives for PFOA and PFOS have been proposed in an upcoming revision to 6 NYCRR Part 375-6	
Appendix A	"Include in the text… LC-MS/MS for PFAS using methodologies based on EPA Method 537.1"	"Include in the text ….EPA Method 1633"	
Appendix A	"Laboratory should have ELAP certification for PFOA and PFOS in drinking water by EPA Method 537, 537.1, EPA Method 533, or ISO 25101"	Deleted	
Appendix B	"Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1"	"Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633"	

Citation and Page Number	Current Text	Corrected Text	Date
Appendix C	"Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1"	"Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633"	
Appendix D	"Samples collected using this protocol are intended to be analyzed for PFAS using methodologies based on EPA Method 537.1"	"Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633"	
Appendix G		Updated to include all forty PFAS analytes in EPA Method 533	
Appendix H		Deleted	
Appendix I	Appendix I	Appendix H	
Appendix H	"These guidelines are intended to be used for the validation of PFAS analytical results for projects within the Division of Environmental Remediation (DER) as well as aid in the preparation of a data usability summary report."	"These guidelines are intended to be used for the validation of PFAS using EPA Method 1633 for projects within the Division of Environmental Remediation (DER)."	
Appendix H	"The holding time is 14 days…"	"The holding time is 28 days…"	
Appendix H, Initial Calibration	"The initial calibration should contain a minimum of five standards for linear fit…"	"The initial calibration should contain a minimum of six standards for linear fit…"	
Appendix H, Initial Calibration	Linear fit calibration curves should have an R^2 value greater than 0.990.	Deleted	
Appendix H, Initial Calibration Verification	Initial Calibration Verification Section	Deleted	
Appendix H	secondary Ion Monitoring Section	Deleted	
Appendix H	Branched and Linear Isomers Section	Deleted	

Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs

Objective

New York State Department of Environmental Conservation's Division of Environmental Remediation (DER) performs or oversees sampling of environmental media and subsequent analysis of PFAS as part of remedial programs implemented under 6 NYCRR Part 375. To ensure consistency in sampling, analysis, reporting, and assessment of PFAS, DER has developed this document which summarizes currently accepted procedures and updates previous DER technical guidance pertaining to PFAS.

Applicability

All work plans submitted to DEC pursuant to one of the remedial programs under Part 375 shall include PFAS sampling and analysis procedures that conform to the guidelines provided herein.

As part of a site investigation or remedial action compliance program, whenever samples of potentially affected media are collected and analyzed for the standard Target Analyte List/Target Compound List (TAL/TCL), PFAS analysis should also be performed. Potentially affected media can include soil, groundwater, surface water, and sediment. Based upon the potential for biota to be affected, biota sampling and analysis for PFAS may also be warranted as determined pursuant to a Fish and Wildlife Impact Analysis. Soil vapor sampling for PFAS is not required.

Field Sampling Procedures

DER-10 specifies technical guidance applicable to DER's remedial programs. Given the prevalence and use of PFAS, DER has developed "best management practices" specific to sampling for PFAS. As specified in DER-10 Chapter 2, quality assurance procedures are to be submitted with investigation work plans. Typically, these procedures are incorporated into a work plan, or submitted as a stand-alone document (e.g., a Quality Assurance Project Plan). Quality assurance guidelines for PFAS are listed in Appendix A - Quality Assurance Project Plan (QAPP) Guidelines for PFAS.

Field sampling for PFAS performed under DER remedial programs should follow the appropriate procedures outlined for soils, sediments, or other solids (Appendix B), non-potable groundwater (Appendix C), surface water (Appendix D), public or private water supply wells (Appendix E), and fish tissue (Appendix F).

QA/QC samples (e.g. duplicates, MS/MSD) should be collected as specified in DER-10, Section 2.3(c). For sampling equipment coming in contact with aqueous samples only, rinsate or equipment blanks should be collected. Equipment blanks should be collected at a minimum frequency of one per day per site or one per twenty samples, whichever is more frequent.

Analysis and Reporting

The investigation work plan should describe analysis and reporting procedures, including laboratory analytical procedures for the methods discussed below. As specified in DER-10 Section 2.2, laboratories should provide a full Category B deliverable. In addition, a Data Usability Summary Report (DUSR) should be prepared by an independent, third-party data validator. Electronic data submissions should meet the requirements provided at: https://www.dec.ny.gov/chemical/62440.html.

DER has developed a *PFAS Analyte List* (Appendix G) for remedial programs to understand the nature of contamination at sites. It is expected that reported results for PFAS will include, at a minimum, all the compounds listed. If lab and/or matrix specific issues are encountered for any analytes, the DER project manager, in consultation with the DER chemist, will make case-by-case decisions as to whether certain analytes may be temporarily or permanently discontinued from analysis at each site. As with other contaminants that are analyzed for at a site, the *PFAS Analyte List* may be refined for future sampling events based on investigative findings.

Routine Analysis

EPA Method 1633 is the procedure to use for environmental samples. Reporting limits for PFOA and PFOS in aqueous samples should not exceed 2 ng/L. Reporting limits for PFOA and PFOS in solid samples should not exceed 0.5 µg/kg. Reporting limits for all other PFAS in aqueous and solid media should be as close to these limits as possible. If laboratories indicate that they are not able to achieve these reporting limits for the entire *PFAS Analyte List*, site-specific decisions regarding acceptance of elevated reporting limits for specific PFAS can be made by the DER project manager in consultation with the DER chemist. Data review guidelines were developed by DER to ensure data comparability and usability (Appendix H - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids).

Additional Analysis

Additional laboratory methods for analysis of PFAS may be warranted at a site, such as the Synthetic Precipitation Leaching Procedure (SPLP) and Total Oxidizable Precursor Assay (TOP Assay).

In cases where site-specific cleanup objectives for PFOA and PFOS are to be assessed, soil parameters, such as Total Organic Carbon (Lloyd Kahn), soil pH (EPA Method 9045), clay content (percent), and cation exchange capacity (EPA Method 9081), should be included in the analysis to help evaluate factors affecting the leachability of PFAS in site soils.

SPLP is a technique used to determine the mobility of chemicals in liquids, soils and wastes, and may be useful in determining the need for addressing PFAS-containing material as part of the remedy. SPLP by EPA Method 1312 should be used unless otherwise specified by the DER project manager in consultation with the DER chemist.

Impacted materials can be made up of PFAS that are not analyzable by routine analytical methodology. A TOP Assay can be utilized to conceptualize the amount and type of oxidizable PFAS which could be liberated in the environment, which approximates the maximum concentration of perfluoroalkyl substances that could be generated if all polyfluoroalkyl substances were oxidized. For example, some polyfluoroalkyl substances may degrade or transform to form perfluoroalkyl substances (such as PFOA or PFOS), resulting in an increase in perfluoroalkyl substance concentrations as contaminated groundwater moves away from a source. The TOP Assay converts, through oxidation, polyfluoroalkyl substances (precursors) into perfluoroalkyl substances that can be detected by routine analytical methodology.[1]

[1] TOP Assay analysis of highly contaminated samples, such as those from an AFFF (aqueous film-forming foam) site, can result in incomplete oxidation of the samples and an underestimation of the total perfluoroalkyl substances.

Commercial laboratories have adopted methods which allow for the quantification of targeted PFAS in air and biota. The EPA's Office of Research and Development (ORD) is currently developing methods which allow for air emissions characterization of PFAS, including both targeted and non-targeted analysis of PFAS. Consult with the DER project manager and the DER chemist for assistance on analyzing biota/tissue and air samples.

Data Assessment and Application to Site Cleanup

Until such time as Soil Cleanup Objectives (SCOs) for PFOA and PFOS are published, the extent of contaminated media potentially subject to remediation should be determined on a case-by-case basis using the procedures discussed below and the criteria in DER-10. Preliminary target levels for cleanup of PFOA and PFOS in other media, including biota and sediment, have not yet been established by the DEC.

Water Sample Results

NYSDEC has adopted ambient water quality guidance values for PFOA and PFOS. Groundwater samples should be compared to the human health criteria of 6.7 ng/l (ppt) for PFOA and 2.7 ng/l (ppt) for PFOS. These human health criteria should also be applied to surface water that is used as a water supply. This guidance also includes criteria for surface water for PFOS applicable for aquatic life, which may be applicable at some sites. Drinking water sample results should be compared to the NYS maximum contaminant level (MCL) of 10 ng/l (ppt). Analysis to determine if PFOA and PFOS concentrations are attributable to the site should include a comparison between upgradient and downgradient levels, and the presence of soil source areas, as defined below.

If PFOA and/or PFOS are identified as contaminants of concern for a site, they should be assessed as part of the remedy selection process in accordance with Part 375 and DER-10.

Soil Sample Results

NYSDEC will delay adding soil cleanup objectives for PFOA and PFOS to 6 NYCRR Part 375-6 until the PFAS rural soil background study has been completed. Until SCOs are in effect, the following are to be used as guidance values:

Guidance Values for Anticipated Site Use	PFOA (ppb)	PFOS (ppb)
Unrestricted	0.66	0.88
Residential	6.6	8.8
Restricted Residential	33	44
Commercial	500	440
Industrial	600	440
Protection of Groundwater[2]	0.8	1.0

PFOA and PFOS results for soil are to be compared against the guidance values listed above. These guidance values are to be used in determining whether PFOA and PFOS are contaminants of concern for the site and for determining remedial action objectives and cleanup requirements. Site-specific remedial objectives for protection of groundwater can also be presented for evaluation by DEC. Development of site-specific remedial objectives for protection of groundwater will require analysis of additional soil parameters relating to leachability. These

[2] The Protection of Groundwater values are based on the above referenced ambient groundwater guidance values. Details on that calculation are available in the following document, prepared for the February 2022 proposed changes to Part 375 (https://www.dec.ny.gov/docs/remediation_hudson_pdf/part375techsupport.pdf). The movement of PFAS in the environment is being aggressively researched at this time; that research will eventually result in more accurate models for the behaviors of these chemicals. In the meantime, DEC has calculated the guidance value for the protection of groundwater using the same procedure used for all other chemicals, as described in Section 7.7 of the Technical Support Document (http://www.dec.ny.gov/docs/remediation_hudson_pdf/techsuppdoc.pdf).

additional analyses can include any or all the parameters listed above (soil pH, cation exchange capacity, etc.) and/or use of SPLP.

As the understanding of PFAS transport improves, DEC welcomes proposals for site-specific remedial objectives for protection of groundwater. DEC will expect that those may be dependent on additional factors including soil pH, aqueous pH, % organic carbon, % Sand/Silt/Clay, soil cations: K, Ca, Mg, Na, Fe, Al, cation exchange capacity, and anion exchange capacity. Site-specific remedial objectives should also consider the dilution attenuation factor (DAF). The NJDEP publication on DAF can be used as a reference: https://www.nj.gov/dep/srp/guidance/rs/daf.pdf.

Testing for Imported Soil

Testing for PFAS should be included any time a full TAL/TCL analyte list is required. Results for PFOA and PFOS should be compared to the applicable guidance values. If PFOA or PFOS is detected in any sample at or above the guidance values then the source of backfill should be rejected, unless a site-specific exemption is provided by DER based on SPLP testing, for example. If the concentrations of PFOA and PFOS in leachate are at or above the ambient water quality guidance values for groundwater, then the soil is not acceptable.

PFOA, PFOS and 1,4-dioxane are all considered semi-volatile compounds, so composite samples are appropriate for these compounds when sampling in accordance with DER-10, Table 5.4(e)10. Category B deliverables should be submitted for backfill samples, though a DUSR is not required.

Appendix A - Quality Assurance Project Plan (QAPP) Guidelines for PFAS

The following guidelines (general and PFAS-specific) can be used to assist with the development of a QAPP for projects within DER involving sampling and analysis of PFAS.

General Guidelines in Accordance with DER-10

- Document/work plan section title – Quality Assurance Project Plan
- Summarize project scope, goals, and objectives
- Provide project organization including names and resumes of the project manager, Quality Assurance Officer (QAO), field staff, and Data Validator
    - The QAO should not have another position on the project, such as project or task manager, that involves project productivity or profitability as a job performance criterion
- List the ELAP certified lab(s) to be used for analysis of samples
- Include a site map showing sample locations
- Provide detailed sampling procedures for each matrix
- Include Data Quality Usability Objectives
- List equipment decontamination procedures
- Include an "Analytical Methods/Quality Assurance Summary Table" specifying:
    - Matrix type
    - Number or frequency of samples to be collected per matrix
    - Number of field and trip blanks per matrix
    - Analytical parameters to be measured per matrix
    - Analytical methods to be used per matrix with minimum reporting limits
    - Number and type of matrix spike and matrix spike duplicate samples to be collected
    - Number and type of duplicate samples to be collected
    - Sample preservation to be used per analytical method and sample matrix
    - Sample container volume and type to be used per analytical method and sample matrix
    - Sample holding time to be used per analytical method and sample matrix
- Specify Category B laboratory data deliverables and preparation of a DUSR

Specific Guidelines for PFAS

- Include in the text that sampling for PFAS will take place
- Include in the text that PFAS will be analyzed by EPA Method 1633
- Include the list of PFAS compounds to be analyzed (*PFAS Analyte List*)
- Include the laboratory SOP for PFAS analysis
- List the minimum method-achievable Reporting Limits for PFAS
    - Reporting Limits should be less than or equal to:
        - Aqueous – 2 ng/L (ppt)
        - Solids – 0.5 µg/kg (ppb)
- Include the laboratory Method Detection Limits for the PFAS compounds to be analyzed
-
- Include detailed sampling procedures
    - Precautions to be taken
    - Pump and equipment types
    - Decontamination procedures
    - Approved materials only to be used
- Specify that regular ice only will be used for sample shipment
- Specify that equipment blanks should be collected at a minimum frequency of 1 per day per site for each matrix

Appendix B - Sampling Protocols for PFAS in Soils, Sediments and Solids

General

The objective of this protocol is to give general guidelines for the collection of soil, sediment and other solid samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Containers

Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in to contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel spoon
- stainless steel bowl
- steel hand auger or shovel without any coatings

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Sampling is often conducted in areas where a vegetative turf has been established. In these cases, a pre-cleaned trowel or shovel should be used to carefully remove the turf so that it may be replaced at the conclusion of sampling. Surface soil samples (e.g. 0 to 6 inches below surface) should then be collected using a pre-cleaned, stainless steel spoon. Shallow subsurface soil samples (e.g. 6 to ~36 inches below surface) may be collected by digging a hole using a pre-cleaned hand auger or shovel. When the desired subsurface depth is reached, a pre-cleaned hand auger or spoon shall be used to obtain the sample.

When the sample is obtained, it should be deposited into a stainless steel bowl for mixing prior to filling the sample containers. The soil should be placed directly into the bowl and mixed thoroughly by rolling the material into the middle until the material is homogenized. At this point the material within the bowl can be placed into the laboratory provided container.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A soil log or sample log shall document the location of the sample/borehole, depth of the sample, sampling equipment, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix C - Sampling Protocols for PFAS in Monitoring Wells

General

The objective of this protocol is to give general guidelines for the collection of groundwater samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including plumbers tape and sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel inertia pump with HDPE tubing
- peristaltic pump equipped with HDPE tubing and silicone tubing
- stainless steel bailer with stainless steel ball
- bladder pump (identified as PFAS-free) with HDPE tubing

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Monitoring wells should be purged in accordance with the sampling procedure (standard/volume purge or low flow purge) identified in the site work plan, which will determine the appropriate time to collect the sample. If sampling using standard purge techniques, additional purging may be needed to reduce turbidity levels, so samples contain a limited amount of sediment within the sample containers. Sample containers that contain sediment may cause issues at the laboratory, which may result in elevated reporting limits and other issues during the sample preparation that can compromise data usability. Sampling personnel should don new nitrile gloves prior to sample collection due to the potential to contact PFAS containing items (not related to the sampling equipment) during the purging activities.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank per day per site and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Additional equipment blank samples may be collected to assess other equipment that is utilized at the monitoring well
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A purge log shall document the location of the sample, sampling equipment, groundwater parameters, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix D - Sampling Protocols for PFAS in Surface Water

General

The objective of this protocol is to give general guidelines for the collection of surface water samples for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Samples collected using this protocol are intended to be analyzed for PFAS using EPA Method 1633.

The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include: stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

A list of acceptable equipment is provided below, but other equipment may be considered appropriate based on sampling conditions.

- stainless steel cup

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Where conditions permit, (e.g. creek or pond) sampling devices (e.g. stainless steel cup) should be rinsed with site medium to be sampled prior to collection of the sample. At this point the sample can be collected and poured into the sample container.

If site conditions permit, samples can be collected directly into the laboratory container.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- Collect one equipment blank per day per site and minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers
- Request appropriate data deliverable (Category B) and an electronic data deliverable

Documentation

A sample log shall document the location of the sample, sampling equipment, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate. Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appropriate rain gear (PVC, polyurethane, or rubber rain gear are acceptable), bug spray, and sunscreen should be used that does not contain PFAS. Well washed cotton coveralls may be used as an alternative to bug spray and/or sunscreen.

PPE that contains PFAS is acceptable when site conditions warrant additional protection for the samplers and no other materials can be used to be protective. Documentation of such use should be provided in the field notes.

Appendix E - Sampling Protocols for PFAS in Private Water Supply Wells

General

The objective of this protocol is to give general guidelines for the collection of water samples from private water supply wells (with a functioning pump) for PFAS analysis. The sampling procedure used should be consistent with Sampling Guidelines and Protocols – Technological Background and Quality Control/Quality Assurance for NYS DEC Spill Response Program – March 1991 (http://www.dec.ny.gov/docs/remediation_hudson_pdf/sgpsect5.pdf), with the following limitations.

Laboratory Analysis and Container

Drinking water samples collected using this protocol are intended to be analyzed for PFAS by EPA Method 537, 537.1, 533, or ISO Method 25101. The preferred material for containers is high density polyethylene (HDPE). Pre-cleaned sample containers, coolers, sample labels, and a chain of custody form will be provided by the laboratory.

Equipment

Acceptable materials for sampling include stainless steel, HDPE, PVC, silicone, acetate, and polypropylene. Additional materials may be acceptable if pre-approved by New York State Department of Environmental Conservation's Division of Environmental Remediation.

No sampling equipment components or sample containers should come in contact with aluminum foil, low density polyethylene, glass, or polytetrafluoroethylene (PTFE, Teflon™) materials (e.g. plumbers tape), including sample bottle cap liners with a PTFE layer.

Equipment Decontamination

Standard two step decontamination using detergent (Alconox is acceptable) and clean, PFAS-free water will be performed for sampling equipment. All sources of water used for equipment decontamination should be verified in advance to be PFAS-free through laboratory analysis or certification.

Sampling Techniques

Locate and assess the pressure tank and determine if any filter units are present within the building. Establish the sample location as close to the well pump as possible, which is typically the spigot at the pressure tank. Ensure sampling equipment is kept clean during sampling as access to the pressure tank spigot, which is likely located close to the ground, may be obstructed and may hinder sample collection.

Prior to sampling, a faucet downstream of the pressure tank (e.g., washroom sink) should be run until the well pump comes on and a decrease in water temperature is noted which indicates that the water is coming from the well. If the homeowner is amenable, staff should run the water longer to purge the well (15+ minutes) to provide a sample representative of the water in the formation rather than standing water in the well and piping system including the pressure tank. At this point a new pair of nitrile gloves should be donned and the sample can be collected from the sample point at the pressure tank.

Sample Identification and Logging

A label shall be attached to each sample container with a unique identification. Each sample shall be included on the chain of custody (COC).

Quality Assurance/Quality Control

- Immediately place samples in a cooler maintained at 4 ± 2º Celsius using ice
- Collect one field duplicate for every sample batch, minimum 1 duplicate per 20 samples. The duplicate shall consist of an additional sample at a given location
- Collect one matrix spike / matrix spike duplicate (MS/MSD) for every sample batch, minimum 1 MS/MSD per 20 samples. The MS/MSD shall consist of an additional two samples at a given location and identified on the COC
- If equipment was used, collect one equipment blank per day per site and a minimum 1 equipment blank per 20 samples. The equipment blank shall test the new and decontaminated sampling equipment utilized to obtain a sample for residual PFAS contamination. This sample is obtained by using laboratory provided PFAS-free water and passing the water over or through the sampling device and into laboratory provided sample containers.
- A field reagent blank (FRB) should be collected at a rate of one per 20 samples. The lab will provide a FRB bottle containing PFAS free water and one empty FRB bottle. In the field, pour the water from the one bottle into the empty FRB bottle and label appropriately.
- Request appropriate data deliverable (Category B) and an electronic data deliverable
- For sampling events where multiple private wells (homes or sites) are to be sampled per day, it is acceptable to collect QC samples at a rate of one per 20 across multiple sites or days.

Documentation

A sample log shall document the location of the private well, sample point location, owner contact information, sampling equipment, purge duration, duplicate sample, visual description of the material, and any other observations or notes determined to be appropriate and available (e.g. well construction, pump type and location, yield, installation date). Additionally, care should be performed to limit contact with PFAS containing materials (e.g. waterproof field books, food packaging) during the sampling process.

Personal Protection Equipment (PPE)

For most sampling Level D PPE is anticipated to be appropriate. The sampler should wear nitrile gloves while conducting field work and handling sample containers.

Field staff shall consider the clothing to be worn during sampling activities. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFAS materials should be avoided. All clothing worn by sampling personnel should have been laundered multiple times.

Appendix F - Sampling Protocols for PFAS in Fish

This appendix contains a copy of the current SOP developed by the Division of Fish and Wildlife (DFW) entitled "General Fish Handling Procedures for Contaminant Analysis" (Ver. 8). This SOP should be followed when collecting fish for contaminant analysis. Note, however, that the Bureau of Ecosystem Health will not be supplying bags or tags. All supplies are the responsibility of the collector

Procedure Name: General Fish Handling Procedures for Contaminant Analysis

Number: FW-005

Purpose: This procedure describes data collection, fish processing and delivery of fish collected for contaminant monitoring. It contains the chain of custody and collection record forms that should be used for the collections.

Organization: Environmental Monitoring Section
Bureau of Ecosystem Health
Division of Fish and Wildlife (DFW)
New York State Department of Environmental Conservation (NYSDEC)
625 Broadway
Albany, New York 12233-4756

Version: 8

Previous Version Date: 21 March 2018

Summary of Changes to this Version: Updated bureau name to Bureau of Ecosystem Health. Added direction to list the names of all field crew on the collection record. Minor formatting changes on chain of custody and collection records.

Originator or Revised by: Wayne Richter, Jesse Becker

Date: 26 April 2019

Quality Assurance Officer and Approval Date: Jesse Becker, 26 April 2019

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

GENERAL FISH HANDLING PROCEDURES FOR CONTAMINANT ANALYSES

A. Original copies of all continuity of evidence (i.e., Chain of Custody) and collection record forms must accompany delivery of fish to the lab. A copy shall be directed to the Project Leader or as appropriate, Wayne Richter. All necessary forms will be supplied by the Bureau of Ecosystem Health. Because some samples may be used in legal cases, it is critical that each section is filled out completely. Each Chain of Custody form has three main sections:

   1. The top box is to be filled out **and signed** by the person responsible for the fish collection (e.g., crew leader, field biologist, researcher). This person is responsible for delivery of the samples to DEC facilities or personnel (e.g., regional office or biologist).

   2. The second section is to be filled out **and signed** by the person responsible for the collections while being stored at DEC, before delivery to the analytical lab. This may be the same person as in (1), but it is still required that they complete the section. Also important is the **range of identification numbers** (i.e., tag numbers) included in the sample batch.

   3. Finally, the bottom box is to record any transfers between DEC personnel and facilities. Each subsequent transfer should be **identified, signed, and dated**, until laboratory personnel take possession of the fish.

B. The following data are required on each **Fish Collection Record** form:

   1. Project and Site Name.

   2. DEC Region.

   3. All personnel (and affiliation) involved in the collection.

   4. Method of collection (gill net, hook and line, etc.)

   5. Preservation Method.

C. The following data are to be taken on each fish collected and recorded on the **Fish Collection Record** form:

   1. Tag number - Each specimen is to be individually jaw tagged at time of collection with a unique number. Make sure the tag is turned out so that the number can be read without opening the bag. Use tags in sequential order. For small fish or composite samples place the tag inside the bag with the samples. The Bureau of Ecosystem Health can supply the tags.

   2. Species identification (please be explicit enough to enable assigning genus and species). Group fish by species when processing.

   3. Date collected.

   4. Sample location (waterway and nearest prominent identifiable landmark).

   5. Total length (nearest mm or smallest sub-unit on measuring instrument) and weight (nearest g or

smallest sub-unit of weight on weighing instrument). Take all measures as soon as possible with calibrated, protected instruments (e.g. from wind and upsets) and prior to freezing.

6. Sex - fish may be cut enough to allow sexing or other internal investigation, but do not eviscerate. Make any incision on the right side of the belly flap or exactly down the midline so that a left-side fillet can be removed.

D. General data collection recommendations:

1. It is helpful to use an ID or tag number that will be unique. It is best to use metal striped bass or other uniquely numbered metal tags. If uniquely numbered tags are unavailable, values based on the region, water body and year are likely to be unique: for example, R7CAY11001 for Region 7, Cayuga Lake, 2011, fish 1. If the fish are just numbered 1 through 20, we have to give them new numbers for our database, making it more difficult to trace your fish to their analytical results and creating an additional possibility for errors.

2. Process and record fish of the same species sequentially. Recording mistakes are less likely when all fish from a species are processed together. Starting with the bigger fish species helps avoid missing an individual.

3. If using Bureau of Ecosystem Health supplied tags or other numbered tags, use tags in sequence so that fish are recorded with sequential Tag Numbers. This makes data entry and login at the lab and use of the data in the future easier and reduces keypunch errors.

4. Record length and weight as soon as possible after collection and before freezing. Other data are recorded in the field upon collection. An age determination of each fish is optional, but if done, it is recorded in the appropriate “Age” column.

5. For composite samples of small fish, record the number of fish in the composite in the Remarks column. Record the length and weight of each individual in a composite. All fish in a composite sample should be of the same species and members of a composite should be visually matched for size.

6. Please submit photocopies of topographic maps or good quality navigation charts indicating sampling locations. GPS coordinates can be entered in the Location column of the collection record form in addition to or instead for providing a map. These records are of immense help to us (and hopefully you) in providing documented location records which are not dependent on memory and/or the same collection crew. In addition, they may be helpful for contaminant source trackdown and remediation/control efforts of the Department.

7. When recording data on fish measurements, it will help to ensure correct data recording for the data recorder to call back the numbers to the person making the measurements.

E. Each fish is to be placed in its own individual plastic bag. For small fish to be analyzed as a composite, put all of the fish for one composite in the same bag but use a separate bag for each composite. It is important to individually bag the fish to avoid difficulties or cross contamination when processing the fish for chemical analysis. Be sure to include the fish’s tag number inside the bag, preferably attached to the fish with the tag number turned out so it can be read. Tie or otherwise secure the bag closed. **The Bureau of Ecosystem Health will supply the bags.** If necessary, food grade bags may be procured from a suitable vendor (e.g., grocery store). It is preferable to redundantly label each bag with a manila tag tied between the knot and the body of the bag. This tag should be labeled with the project name, collection location, tag number, collection date, and fish species. If scales are collected, the scale envelope should be labeled with

the same information.

F. Groups of fish, by species, are to be placed in one large plastic bag per sampling location. **The Bureau of Ecosystem Health will supply the larger bags.** Tie or otherwise secure the bag closed. Label the site bag with a manila tag tied between the knot and the body of the bag. The tag should contain: project, collection location, collection date, species and **tag number ranges**. Having this information on the manila tag enables lab staff to know what is in the bag without opening it.

G. Do not eviscerate, fillet or otherwise dissect the fish unless specifically asked to. If evisceration or dissection is specified, the fish must be cut along the exact midline or on the right side so that the left side fillet can be removed intact at the laboratory. If filleting is specified, the procedure for taking a standard fillet (SOP PREPLAB 4) must be followed, including removing scales.

H. Special procedures for PFAS: Unlike legacy contaminants such as PCBs, which are rarely found in day to day life, PFAS are widely used and frequently encountered. Practices that avoid sample contamination are therefore necessary. While no standard practices have been established for fish, procedures for water quality sampling can provide guidance. The following practices should be used for collections when fish are to be analyzed for PFAS:

No materials containing Teflon.
No Post-it notes.
No ice packs; only water ice or dry ice.
Any gloves worn must be powder free nitrile.
No Gore-Tex or similar materials (Gore-Tex is a PFC with PFOA used in its manufacture).
No stain repellent or waterproof treated clothing; these are likely to contain PFCs.
Avoid plastic materials, other than HDPE, including clipboards and waterproof notebooks.
Wash hands after handling any food containers or packages as these may contain PFCs.
Keep pre-wrapped food containers and wrappers isolated from fish handling.
Wear clothing washed at least six times since purchase.
Wear clothing washed without fabric softener.
Staff should avoid cosmetics, moisturizers, hand creams and similar products on the day of sampling as many of these products contain PFCs (Fujii et al. 2013). Sunscreen or insect repellent should not contain ingredients with “fluor” in their name. Apply any sunscreen or insect repellent well downwind from all materials. Hands must be washed after touching any of these products.

I. All fish must be kept at a temperature <45° F (<8° C) immediately following data processing. As soon as possible, freeze at -20° C ± 5° C. Due to occasional freezer failures, daily freezer temperature logs are required. The freezer should be locked or otherwise secured to maintain chain of custody.

J. In most cases, samples should be delivered to the Analytical Services Unit at the Hale Creek field station. Coordinate delivery with field station staff and send copies of the collection records, continuity of evidence forms and freezer temperature logs to the field station. For samples to be analyzed elsewhere, non-routine collections or other questions, contact Wayne Richter, Bureau of Ecosystem Health, NYSDEC, 625 Broadway, Albany, New York 12233-4756, 518-402-8974, or the project leader about sample transfer. Samples will then be directed to the analytical facility and personnel noted on specific project descriptions.

K. A recommended equipment list is at the end of this document.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF FISH AND WILDLIFE
FISH COLLECTION RECORD

Project and Site Name _____ DEC Region _____

Collections made by (include all crew) _____

Sampling Method: □Electrofishing □Gill netting □Trap netting □Trawling □Seining □Angling □Other _____

Preservation Method: □Freezing □Other _____ Notes (SWFDB survey number): _____

FOR LAB USE ONLY- LAB ENTRY NO.	COLLECTION OR TAG NO.	SPECIES	DATE TAKEN	LOCATION	AGE	SEX &/OR REPROD. CONDIT	LENGTH ( )	WEIGHT ( )	REMARKS

richter: revised 2011, 5/7/15, 10/4/16, 3/20/17; becker: 3/23/17, 4/26/19

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
CHAIN OF CUSTODY

I, _____, of _____ collected the
(Print Name) (Print Business Address)

following on _____, 20____ from _____
(Date) (Water Body)

in the vicinity of _____
(Landmark, Village, Road, etc.)

Town of _____, in _____ County.

Item(s) _____

_____

Said sample(s) were in my possession and handled according to standard procedures provided to me prior to collection. The sample(s) were placed in the custody of a representative of the New York State Department of Environmental Conservation on _____, 20_____.

_____ _____
Signature Date

I, _____, received the above mentioned sample(s) on the date specified and assigned identification number(s) _____ to the sample(s). I have recorded pertinent data for the sample(s) on the attached collection records. The sample(s) remained in my custody until subsequently transferred, prepared or shipped at times and on dates as attested to below.

_____ _____
Signature Date

SECOND RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
THIRD RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
FOURTH RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
RECEIVED IN LABORATORY BY (Print Name)	TIME & DATE	REMARKS
SIGNATURE	UNIT	
LOGGED IN BY (Print Name)	TIME & DATE	ACCESSION NUMBERS
SIGNATURE	UNIT	

richter: revised 21 April 2014; becker: 23 March 2017, 26 April, 2019

NOTICE OF WARRANTY

By signature to the chain of custody (reverse), the signatory warrants that the information provided is truthful and accurate to the best of his/her ability. The signatory affirms that he/she is willing to testify to those facts provided and the circumstances surrounding the same. Nothing in this warranty or chain of custody negates responsibility nor liability of the signatories for the truthfulness and accuracy of the statements provided.

HANDLING INSTRUCTIONS

On day of collection, collector(s) name(s), address(es), date, geographic location of capture (attach a copy of topographic map or navigation chart), species, number kept of each species, and description of capture vicinity (proper noun, if possible) along with name of Town and County must be indicated on reverse.

Retain organisms in manila tagged plastic bags to avoid mixing capture locations. Note appropriate information on each bag tag.

Keep samples as cool as possible. Put on ice if fish cannot be frozen within 12 hours. If fish are held more than 24 hours without freezing, they will not be retained or analyzed.

Initial recipient (either DEC or designated agent) of samples from collector(s) is responsible for obtaining and recording information on the collection record forms which will accompany the chain of custody. This person will seal the container using packing tape and writing his signature, the time and the date across the tape onto the container with indelible marker. Any time a seal is broken, for whatever purpose, the incident must be recorded on the Chain of Custody (reason, time, and date) in the purpose of transfer block. Container then is resealed using new tape and rewriting signature, with time and date.

EQUIPMENT LIST

Scale or balance of appropriate capacity for the fish to be collected.

Fish measuring board.

Plastic bags of an appropriate size for the fish to be collected and for site bags.

Individually numbered metal tags for fish.

Manila tags to label bags.

Small envelops, approximately 2” x 3.5”, if fish scales are to be collected.

Knife for removing scales.

Chain of custody and fish collection forms.

Clipboard.

Pens or markers.

Paper towels.

Dish soap and brush.

Bucket.

Cooler.

Ice.

Duct tape.

Appendix G – PFAS Analyte List

Group	Chemical Name	Abbreviation	CAS Number
Perfluoroalkyl sulfonic acids	Perfluorobutanesulfonic acid	PFBS	375-73-5
	Perfluoropentanesulfonic acid	PFPeS	2706-91-4
	Perfluorohexanesulfonic acid	PFHxS	355-46-4
	Perfluoroheptanesulfonic acid	PFHpS	375-92-8
	Perfluorooctanesulfonic acid	PFOS	1763-23-1
	Perfluorononanesulfonic acid	PFNS	68259-12-1
	Perfluorodecanesulfonic acid	PFDS	335-77-3
	Perfluorododecanesulfonic acid	PFDoS	79780-39-5
Perfluoroalkyl carboxylic acids	Perfluorobutanoic acid	PFBA	375-22-4
	Perfluoropentanoic acid	PFPeA	2706-90-3
	Perfluorohexanoic acid	PFHxA	307-24-4
	Perfluoroheptanoic acid	PFHpA	375-85-9
	Perfluorooctanoic acid	PFOA	335-67-1
	Perfluorononanoic acid	PFNA	375-95-1
	Perfluorodecanoic acid	PFDA	335-76-2
	Perfluoroundecanoic acid	PFUnA	2058-94-8
	Perfluorododecanoic acid	PFDoA	307-55-1
	Perfluorotridecanoic acid	PFTrDA	72629-94-8
	Perfluorotetradecanoic acid	PFTeDA	376-06-7
Per- and Polyfluoroether carboxylic acids	Hexafluoropropylene oxide dimer acid	HFPO-DA	13252-13-6
	4,8-Dioxa-3H-perfluorononanoic acid	ADONA	919005-14-4
	Perfluoro-3-methoxypropanoic acid	PFMPA	377-73-1
	Perfluoro-4-methoxybutanoic acid	PFMBA	863090-89-5
	Nonafluoro-3,6-dioxaheptanoic acid	NFDHA	151772-58-6
Fluorotelomer sulfonic acids	4:2 Fluorotelomer sulfonic acid	4:2-FTS	757124-72-4
	6:2 Fluorotelomer sulfonic acid	6:2-FTS	27619-97-2
	8:2 Fluorotelomer sulfonic acid	8:2-FTS	39108-34-4
Fluorotelomer carboxylic acids	3:3 Fluorotelomer carboxylic acid	3:3 FTCA	356-02-5
	5:3 Fluorotelomer carboxylic acid	5:3 FTCA	914637-49-3
	7:3 Fluorotelomer carboxylic acid	7:3 FTCA	812-70-4
Perfluorooctane sulfonamides	Perfluorooctane sulfonamide	PFOSA	754-91-6
	N-methylperfluorooctane sulfonamide	NMeFOSA	31506-32-8
	N-ethylperfluorooctane sulfonamide	NEtFOSA	4151-50-2
Perfluorooctane sulfonamidoacetic acids	N-methylperfluorooctane sulfonamidoacetic acid	N-MeFOSAA	2355-31-9
	N-ethylperfluorooctane sulfonamidoacetic acid	N-EtFOSAA	2991-50-6
Perfluorooctane sulfonamide ethanols	N-methylperfluorooctane sulfonamidoethanol	MeFOSE	24448-09-7
	N-ethylperfluorooctane sulfonamidoethanol	EtFOSE	1691-99-2

Group	Chemical Name	Abbreviation	CAS Number
Ether sulfonic acids	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (F-53B Major)	9Cl-PF3ONS	756426-58-1
	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (F-53B Minor)	11Cl-PF3OUdS	763051-92-9
	Perfluoro(2-ethoxyethane) sulfonic acid	PFEESA	113507-82-7

Appendix H - Data Review Guidelines for Analysis of PFAS in Non-Potable Water and Solids

General

These guidelines are intended to be used for the validation of PFAS using EPA Method 1633 for projects within the Division of Environmental Remediation (DER). Data reviewers should understand the methodology and techniques utilized in the analysis. Consultation with the end user of the data may be necessary to assist in determining data usability based on the data quality objectives in the Quality Assurance Project Plan. A familiarity with the laboratory's Standard Operating Procedure may also be needed to fully evaluate the data. If you have any questions, please contact DER's Quality Assurance Officer, Dana Barbarossa, at dana.barbarossa@dec.ny.gov.

Preservation and Holding Time

Samples should be preserved with ice to a temperature of less than 6°C upon arrival at the lab. The holding time is 28 days to extraction for aqueous and solid samples. The time from extraction to analysis for aqueous samples is 28 days and 40 days for solids.

Temperature greatly exceeds 6ºC upon arrival at the lab*	Use professional judgement to qualify detects and non-detects as estimated or rejected
Holding time exceeding 28 days to extraction	Use professional judgement to qualify detects and non-detects as estimated or rejected if holding time is grossly exceeded

*Samples that are delivered to the lab immediately after sampling may not meet the thermal preservation guidelines. Samples are considered acceptable if they arrive on ice or an attempt to chill the samples is observed.

Initial Calibration

The initial calibration should contain a minimum of six standards for linear fit and six standards for a quadratic fit. The relative standard deviation (RSD) for a quadratic fit calibration should be less than 20%.

The low-level calibration standard should be within 50% - 150% of the true value, and the mid-level calibration standard within 70% - 130% of the true value.

%RSD >20%	J flag detects and UJ non detects

Continuing Calibration Verification

Continuing calibration verification (CCV) checks should be analyzed at a frequency of one per ten field samples. If CCV recovery is very low, where detection of the analyte could be in question, ensure a low level CCV was analyzed and use to determine data quality.

CCV recovery <70 or >130%	J flag results

Blanks

There should be no detections in the method blanks above the reporting limits. Equipment blanks, field blanks, rinse blanks etc. should be evaluated in the same manner as method blanks. Use the most contaminated blank to evaluate the sample results.

Blank Result	Sample Result	Qualification
Any detection	<Reporting limit	Qualify as ND at reporting limit
Any detection	>Reporting Limit and >10x the blank result	No qualification
>Reporting limit	>Reporting limit and <10x blank result	J+ biased high

Field Duplicates

A blind field duplicate should be collected at rate of one per twenty samples. The relative percent difference (RPD) should be less than 30% for analyte concentrations greater than two times the reporting limit. Use the higher result for final reporting.

RPD >30%	Apply J qualifier to parent sample

Lab Control Spike

Lab control spikes should be analyzed with each extraction batch or one for every twenty samples. In the absence of lab derived criteria, use 70% - 130% recovery criteria to evaluate the data.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects

Matrix Spike/Matrix Spike Duplicate

One matrix spike and matrix spike duplicate should be collected at a rate of one per twenty samples. Use professional judgement to reject results based on out of control MS/MSD recoveries.

Recovery <70% or >130% (lab derived criteria can also be used)	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only
RPD >30%	Apply J qualifier to detects and UJ qualifier to non detects of parent sample only

Extracted Internal Standards (Isotope Dilution Analytes)

Problematic analytes (e.g. PFBA, PFPeA, fluorotelomer sulfonates) can have wider recoveries without qualification. Qualify corresponding native compounds with a J flag if outside of the range.

Recovery <50% or >150%	Apply J qualifier
Recovery <25% or >150% for poor responding analytes	Apply J qualifier
Isotope Dilution Analyte (IDA) Recovery <10%	Reject results

Signal to Noise Ratio

The signal to noise ratio for the quantifier ion should be at least 3:1. If the ratio is less than 3:1, the peak is discernable from the baseline noise and symmetrical, the result can be reported. If the peak appears to be baseline noise and/or the shape is irregular, qualify the result as tentatively identified.

Reporting Limits

If project-specific reporting limits were not met, please indicate that in the report along with the reason (e.g. over dilution, dilution for non-target analytes, high sediment in aqueous samples).

Peak Integrations

Target analyte peaks should be integrated properly and consistently when compared to standards. Ensure branched isomer peaks are included for PFAS where standards are available. Inconsistencies should be brought to the attention of the laboratory or identified in the data review summary report.

Attachment 2

Air Sampling Log and Product Inventory Form

ARCADIS

Indoor Air Sample Log

Sample ID _____ Project/No. _____

Date _____ Sampling Personnel _____

Weather _____ _____

Precipitation w/in preceding 12 hours? Y / N Amount:_____in _____

Current Building Type: Residential Commercial Industrial

Building Construction Characteristics (e.g., rancher, apartment): _____

General Description of Building Materials (e.g., concrete, cinder block): _____

Characteristics of basement:

	Floor:	**Foundation Walls:**	**Moisture:**
Finished			
Unfinished	Concrete	Concrete	Wet
	Dirt	Block	Damp
	Other _____	Layed up stone	Dry

DESCRIPTION OF SAMPLE LOCATION:

Location _____

Floor Level: Basement / 1st Floor

Room size ft x ft: _____

Location Sketch:

SAMPLE COLLECTION:

Sample Time: _____

Sample Rate: _____

Sample Volume: _____

CONTAINER DESCRIPTION:

_____ L Summa Canister

ANALYTICAL METHOD:

_____

13. PRODUCT INVENTORY FORM

Make & Model of field instrument used: _____

List specific products found in the residence that have the potential to affect indoor air quality.

Location	Product Description	Size (units)	Condition*	Chemical Ingredients	Field Instrument Reading (units)	Photo**

* Describe the condition of the product containers as **Unopened (UO), Used (U),** or **Deteriorated (D)**
** Photographs of the **front and back** of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

Attachment 3

Low-Flow Groundwater Sampling Form

LOW-FLOW GROUNDWATER SAMPLING FORM

ARCADIS

Project No. _____ Well ID _____ Date _____

Project Name/Location _____ Weather _____

Measuring Pt. Description _____ Screen Setting (ft-bmp) _____ Casing Diameter (in.) _____ Well Material ____ PVC ____ SS

Static Water Level (ft-bmp) _____ Total Depth (ft-bmp) _____ Water Column (ft) _____ Gallons in Well _____

MP Elevation _____ Pump Intake (ft-bmp) _____ Purge Method: _____ Sample Method _____

Pump On/Off _____ Volumes Purged _____ Centrifugal _____ Submersible _____ Other _____

Sample Time: Label _____ Gallons Purged _____

Purge Start _____ Replicate/

Purge End _____ Code No. _____ Sampled by _____

Time	Minutes Elapsed	Rate (gpm)/(mL/min) 200mL/min +	Depth to Water (ft) -0.3	Gallons Purged	pH ± 0.1	Cond. (µMhos)/(mS/cm) ± 3%	Turbidity (NTU) ± 10%	DO (mg/L) ± 10%	Temp. (°C)/(°F) ± 3%	Redox (mV) ± 10mV	Appearance	
											Color	Odor
Stabilization Calculations (±)												
Stabilization Criteria					**± 0.1 s.u.**	**±3%**	**± 10% or within 1 NTU (1)**	**± 10%**	**±3%**	**±10 mV**		

(1) **Turbidity** < 50 NTU and ±10% or within 1 NTU of a previous reading when <10 NTU

Constituents Sampled	**Container**	**Number**	**Preservative**

Comments (L/D)NAPL observations: _____

Well Casing Volumes

Gallons/Foot	*1" = 0.04*	*1.5" = 0.09*	*2.5" = 0.26*	*3.5" = 0.50*	*6" = 1.47*
	1.25" = 0.06	*2" = 0.16*	*3" = 0.37*	*4" = 0.65*	

Well Information

Well Location: _____ Well Locked at Arrival: Yes / No

Condition of Well: _____ Well Locked at Departure: Yes / No

Well Completion: Flush Mount / Stick Up Key Number To Well: _____

Attachment 4

Chain-of-Custody Form

ARCADIS

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page ___ of ___

Lab Work Order #

Send Results to:

Contact & Company Name: | Telephone:

Address: | Fax:

City | State | Zip | E-mail Address:

Project Name/Location (City, State): | Project #:

Sampler's Printed Name: | Sampler's Signature:

Preservative							
Filtered (✓)							
# of Containers							
Container Information							

PARAMETER ANALYSIS & METHOD

Keys

Preservation Key:
A. H_2SO_4
B. HCL
C. HNO_3
D. NaOH
E. None
F. Other: _____
G. Other: _____
H. Other: _____

Container Information Key:
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: _____
10. Other: _____

Matrix Key:
SO - Soil | SE - Sediment | NL - NAPL/Oil
W - Water | SL - Sludge | SW - Sample Wipe
T - Tissue | A - Air | Other: _____

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	REMARKS

Special Instructions/Comments:

☐ **Special QA/QC Instructions(✓):**

Laboratory Information and Receipt		Relinquished By	Received By	Relinquished By	Laboratory Received By
Lab Name:	Cooler Custody Seal (✓)	Printed Name:	Printed Name:	Printed Name:	Printed Name:
☐ Cooler packed with ice (✓)	☐ Intact ☐ Not Intact	Signature:	Signature:	Signature:	Signature:
Specify Turnaround Requirements:	Sample Receipt:	Firm:	Firm/Courier:	Firm/Courier:	Firm:
Shipping Tracking #:	Condition/Cooler Temp: _____	Date/Time:	Date/Time:	Date/Time:	Date/Time:

Distribution: **WHITE – Laboratory returns with results** **YELLOW – Lab copy** **PINK – Retained by Arcadis**

Attachment 5

PID Calibration Log

PID Calibration Log

ARCADIS Design & Consultancy for natural and built assets

Zero Gas Source: _____ Instrument Type: _____ PAGE ____ of ____

Lot Number/Expiration Date: _____ Serial Number: _____

Calibration Gas Source: _____ Instrument Type: _____

Lot Number/Expiration Date: _____ Serial Number: _____

Concentration: _____ _____

Instrument Number	Date	Time	Zero Cal. OK (Y/N)	Calibration Gas Reading	Comments	Calibration w/in 2% (Y/N)?	Alarms Set (Yes/No)?	User Initials

Arcadis of New York, Inc.
One HSBC Plaza, 100 West Chestnut Street, Suite 1020
Rochester
New York 14604
Phone: 585 385 0090
Fax: 585 546 1973
www.arcadis.com

Appendix I

Quality Assurance Project Plan

Fischbach, LLC

Quality Assurance Project Plan

235 Metro Park Brighton Site
Rochester, New York
Site No. 828150

December 2025

Quality Assurance Project Plan

235 Metro Park Brighton Site
Rochester, New York
Site No. 828150

December 2025

Prepared By:
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Prepared For:
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Our Ref:
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Attachment 1 EQuIS™ Laboratory Standard Operating Procedure

Acronyms and Abbreviations

%	percent
ASP	Analytical Services Protocol
Arcadis	Arcadis of New York, Inc.
COC	chain-of-custody
DQO	data quality objective
EDD	electronic data deliverable
FSP	Field Sampling Plan
GC/MS	gas chromatography/mass spectrometry
IDW	investigation-derived waste
LCS	laboratory control sample
MB	method blank
MDL	method detection limit
MS	matrix spike
MSD	matrix spike duplicate
NYSDEC	New York State Department of Environmental Conservation
OSHA	Occupational Safety and Health Administration
OSWER	Office of Solid Waste and Emergency Response
PDF	portable document format
PPE	personal protective equipment
QA	quality assurance
QAC	Quality Assurance Coordinator
QAM	Quality Assurance Manager
QAPP	Quality Assurance Project Plan
QC	quality control
RL	reporting limit
RPD	relative percent difference
SDG	sample delivery group
SMP	Site Management Plan
SOP	standard operating procedure
USEPA	United States Environmental Protection Agency

VOC	volatile organic compound

1 Introduction

This Quality Assurance Project Plan (QAPP) supports the December 2025 Site Management Plant (SMP) and provides guidance for data collection associated with the Fischbach, LLC 235 Metro Park Brighton Site ("the Site") located in the Town of Brighton, Rochester, New York. Site background information is included in the SMP.

1.1 Purpose

This QAPP and the Field Sampling Plan (FSP) (SMP Appendix H) are intended to guide all sampling, measurement, and other field and laboratory activities conducted as part of the SMP. This QAPP contains laboratory analysis procedures and quality control (QC) methods to be used to characterize environmental media, as needed, for future site monitoring. Laboratory analysis includes volatile organic compounds (VOCs) and biogeochemical parameters.

This QAPP is applicable to the SMP. To the extent that other work plans are written and approved relevant to this QAPP, those activities will be incorporated by reference to the scope of the QAPP herein.

This QAPP was prepared in a manner consistent with the following documents, where applicable:

- United States Environmental Protection Agency (USEPA) guidance document entitled *EPA Requirements for Quality Assurance Project Plans*, EPA-QA/R-5 (USEPA 2001) (https://www.epa.gov/quality/agency-wide-quality-system-documents);
- USEPA *Guidance for Quality Assurance Project Plans,* EPA-QA/G-5 (USEPA 2002b) (https://www.epa.gov/quality/agency-wide-quality-system-documents); and
- The *National Enforcement Investigations Center Policies and Procedures Manual* (USEPA 1991) (https://www.epa.gov/quality/agency-wide-quality-system-documents).

1.2 Report Organization

The information contained in this QAPP has been organized as presented in the following table.

Section	Content
Project Management	
1	Introduction
2	Project Organization
3	Quality Objectives and Criteria for Measurement Data
4	Special Training Requirements/Certification
5	Documentation and Records
Measurement/Data Acquisition	
6	Sampling Process Design
7	Sampling Method Requirements
8	Sample Handling and Custody Requirements
9	Analytical Method Requirements
10	Quality Control Requirements

Section	Content
11	Instrument/Equipment Testing, Inspection, and Maintenance Requirements
12	Instrument Calibration and Frequency
13	Inspection/Acceptance Requirements for Supplies and Consumables
14	Data Management
Assessment/Oversight	
15	Assessment and Response Actions
16	Reports to Management
Data Validation and Usability	
17	Data Reduction and Review
18	Data Verification and Validation
19	Reconciliation with User Requirements
20	References

Details on each of the subjects listed above are provided in the subsequent sections.

2 Project Organization

The activities to be completed under this QAPP may require integration of personnel from the organizations identified below, collectively referred to as the "project team." A description of the responsibilities of each member of the project team is presented below.

2.1 Overall Project Management

The QAPP will be executed by a project team assigned per the specific work plan. The project team will perform sampling activities and will evaluate data and prepare the deliverables as specified in the SMP. Project direction will be provided with lead regulatory oversight by the New York State Department of Environmental Conservation (NYSDEC).

2.2 Team Member Responsibilities

The responsibilities and duties of the various team members are summarized below by organization.

2.2.1 Fischbach, LLC

Project Manager

The Fischbach, LLC Project Manager responsibilities and duties include:

- Provide overall direction of site actions.
- Direct consultant(s) and contractors/subcontractors.
- Review work products, including data, memoranda, letters, reports, and all other documents transmitted to the NYSDEC.

2.2.2 Arcadis of New York, Inc.

Project Manager/Assistant Project Manager

The Arcadis of New York, Inc. (Arcadis) Project Manager/Assistant Project Manager responsibilities and duties include:

- Manage and coordinate the project as defined in the SMP, and any other related work plans, with an emphasis on adhering to the objectives of the site activities.
- Review documents prepared by subcontractors.
- Verify that corrective actions are taken for deficiencies cited during any audits of site activities.

Task Managers

The sampling components will be managed by various Arcadis Task Managers. The duties of each Task Manager include, as appropriate:

- Manage relevant day-to-day activities.
- Develop, establish, and maintain files on relevant site activities.

- Review data reductions from the relevant site activities.
- Perform a final data review of field data reductions and reports on relevant site activities.
- Verify that corrective actions are taken for deficiencies cited during audits of relevant site activities.
- Perform overall quality assurance (QA)/QC of the relevant portions of the site activities.
- Review relevant field records and logs.
- Instruct personnel working on relevant site activities.
- Coordinate field and laboratory schedules pertaining to relevant site activities.
- Request sample bottles from the laboratory.
- Review field instrument maintenance and calibration to meet quality objectives.
- Prepare reports pertaining to relevant site activities.
- Maintain field and laboratory files of notebooks/logs, data reductions, and calculations. Transmit the original files to the Project Manager.

Field Personnel

The Arcadis field personnel responsibilities and duties include:

- Perform field procedures associated with the investigations as set forth in the specific work plan.
- Perform field analyses and collect QA samples.
- Calibrate, operate, and maintain field equipment.
- Reduce field data.
- Maintain sample custody.
- Prepare field records and logs.

Quality Assurance Coordinator

The Quality Assurance Coordinator (QAC) responsibilities and duties include:

- Review laboratory data packages.
- Oversee and interface with the analytical laboratory.
- Coordinate field QA/QC procedures with the Task Managers, concentrating on field analytical measurements and practices to meet the data quality objectives (DQOs).
- Perform and review audit reports.
- Prepare interim QA/QC compliance reports.
- Prepare a QA/QC report in accordance with USEPA guidelines, including an evaluation of laboratory data and data usability reports.

2.2.3 Analytical Laboratories

The general responsibilities and duties of the analytical laboratories include:

- Perform sample analyses and associated laboratory QA/QC procedures.
- Supply sample bottles and coolers.

- Maintain laboratory custody of sample.
- Strictly adhere to all protocols in the QAPP.

Laboratory Project Manager

The laboratory Project Manager responsibilities and duties include:

- Serve as the primary communication link between the environmental consultant and the laboratory technical staff.
- Monitor the workload and maintain an availability of resources.
- Oversee the preparation of analytical reports.
- Supervise the in-house chain-of-custody (COC).

Quality Assurance Manager

The laboratory Quality Assurance Manager (QAM) responsibilities and duties include:

- Supervise the personnel who are reviewing and inspecting all project-related laboratory activities.
- Conduct audits of all laboratory activities.

2.2.4 Regulatory Agencies

Project Manager

The regulatory agency Project Manager responsibilities and duties include:

- Provide review and approval of the QAPP, work plans, supporting documents, and future deliverables.
- Monitor the progress of site activities.

3 Quality Objectives and Criteria for Measurement Data

The DQO process, as described in *Guidance for Quality Assurance Project Plans* (USEPA 2002b), is intended to provide a "logical framework" for planning field investigations. This section addresses, in turn, each of the seven sequential steps in the USEPA's QAPP DQO process, listed below.

Step 1: Problem Statement

The Site is impacted by residuals related to historical operations conducted at the property. The site-specific constituent list will be evaluated during the time of sampling. Existing sampling data from past investigations will be incorporated and utilized to determine the site-specific constituent list. Past investigations are summarized in the SMP.

Step 2: Goal Identification

The goal of the sampling program will depend on the specific sampling needs for the Site. In general, the goal will be to protect human health and the environment and manage the remaining site impacts in accordance with applicable rules and regulations. Analytical results of constituents will be compared to applicable NYSDEC standards/guidance values and any other applicable regulations. The analyzed environmental media will then be managed and handled accordingly. Based on analytical results, additional characterization or remedial measures may be required.

Step 3: Identifying Decision Inputs

Decision inputs incorporate both the concentration and distribution of constituents in site media. A fundamental basis for decision making is that a sufficient number of data points of acceptable quality must be available to support decisions. Thus, the necessary inputs for the decision are: 1) the proportion of non-rejected (usable) data points; and 2) the quantity of data needed to evaluate whether there is unacceptable risk to human health and the environment at and surrounding the Site.

The data will be evaluated for completeness, general conformance with the requirements of this QAPP, and consistency among data sets and with historical data, as appropriate.

Step 4: Defining the Study Boundaries

The Site is in a commercial and light industrial park located in the Town of Brighton, Rochester, Monroe County, New York (SMP Figures 1 and 2). The Site is a 3.107-acre area and is bounded by Metro Park Street and commercial properties to the north; several businesses followed by Brighton Henrietta Town Line Road to the south; a home health care business, nursing home, and East Henrietta Road to the east; and commercial and industrial properties to the west. The property is situated approximately 4 miles south of downtown Rochester and a half mile west of Monroe Community College. Features of the Site include a building, parking lot, vacant grass areas, and landscaped lawn. A map showing the site location and boundaries is included as Figure 2 in the SMP.

Step 5: Developing a Decision Rule

The decision on whether data can be used will be based on the validation results. Following validation, the data will be flagged, as appropriate, and any use restrictions will be noted. Media-specific sampling plans have been devised so that the loss of any single data point will not hinder the description of the distribution of constituents or

the development of a remediation plan. Given this, a reasonable decision rule would be that 90 percent (%) of the data points are not rejected or deemed unusable.

The usable data will be evaluated versus the applicable NYSDEC standards and guidance values. The required reporting limits (RLs) are documented in Tables 1a through 1c. The lowest achievable reporting and method detection limits (MDLs) will be reported by the laboratory and, where possible, at or below the screening criteria. Applicable actions would be evaluated, if needed, based on the results of the exposure evaluation.

Step 6: Limits on Decision Errors

Specifications for this step call for: 1) giving forethought to corrective actions to improve data usability; and 2) understanding the representative nature of the sampling design. This QAPP has been designed to meet both specifications for this step. The sampling and analysis programs have been developed based on a review of previous site data and knowledge of present site conditions. The representative nature of the sampling design has been facilitated by discussions among professionals familiar with the Site and the appropriate government agencies.

Step 7: Design Optimization

The overall QA objective is to develop and implement procedures for field sampling and develop COC, laboratory analysis, and reporting that will provide results to support the evaluation of the site data consistent with the Remedial Design Work Plan requirements. Specific procedures for sampling, COC, laboratory instrument calibration, laboratory analysis, data reporting, internal QC, audits, preventive maintenance of field equipment, and corrective action are described in other sections of this QAPP.

A DQO summary for the anticipated sampling efforts is presented in the following subsections. The summary consists of stated DQOs relative to data uses, data types, data quantity, sampling and analytical methods, and data measurement performance criteria. Field sampling procedures are detailed in the FSP, which is included as Appendix H to the SMP.

3.1 Data Categories

Three data categories have been defined to address various analytical data uses and the associated QA/QC effort and methods required to achieve the desired levels of quality. These categories are:

Screening Data

Screening data affords a rapid preliminary assessment of site characteristics or conditions. The collection activities for screening data involve rapid, non-rigorous methods of analysis and QA. Screening DQOs are generally applied to the physical and/or chemical properties of samples, preliminary ecological and/or human health and safety indicators, and visual or other qualitative observations used to make rapid assessment decisions for deployment or additional assessment.

Screening Data with Definitive Confirmation

Screening data provide rapid identification and quantitation; however, because screening generally involves the use of less precise methods of analysis with less rigorous sample preparation, the quantitation may be relatively imprecise. Generally, at least 10% of the data are confirmed using analytical methods and QA/QC procedures and criteria associated with definitive data. Screening data with definitive confirmation can also be used to verify

less rigorous laboratory-based methods and is available for data collection activities that require qualitative and/or quantitative verification of a select portion of sample findings.

Definitive Data

Definitive data are generated using rigorous analytical methods, such as approved USEPA reference methods. Data are analyte-specific, with confirmation of analyte identity and concentration. These methods produce tangible raw data (e.g., chromatograms, spectra, digital values). Definitive data may be generated at the Site or at an offsite location, as long as the QA/QC requirements are satisfied. For data to be definitive, either the analytical or total measurement error must be determined. Definitive data are used for formal site characterization, environmental monitoring, the confirmation of field data, decision-making, and risk assessments.

It is anticipated that definitive data will be collected during this investigation. All soil and water samples will be analyzed at an off site laboratory using definitive techniques.

For the purposes of this investigation, two levels of data reporting have been defined in accordance with the NYSDEC Analytical Services Protocol (ASP) (NYSDEC 2005). They are as follows:

Category A

Category A reporting is used for analyses that do not generate or require extensive supporting documentation. For this investigation, Category A reporting will be required for liquid and solid waste characterization samples.

Category A laboratory data reports include the following items:

- A sample delivery group (SDG) narrative;
- Sample information sheets;
- NYSDEC data package summary forms;
- COC forms; and
- Test analysis results.

Category B

Category B reporting is used for analyses that are performed following standard USEPA-approved methods and QA/QC protocols. For this investigation, Category B reporting is anticipated to be used for final “documentation” sampling events. Based on the intended data use, full documentation is required.

Category B laboratory data reports include the following items:

- An SDG narrative;
- Sample information sheets;
- NYSDEC data package summary forms;
- COC forms;
- Test analysis results;
- Calibration standards;
- Surrogate recoveries;
- Blank results (method blank [MB], instrument blanks);
- Spike recoveries (matrix spike [MS]/matrix spike duplicate [MSD], laboratory control sample [LCS]);

- Laboratory duplicate results;
- Confirmation samples;
- An internal standard area and retention time summary;
- Chromatograms;
- Raw data files; and
- Other method-specific information.

Analytical results will be reported by the laboratory in the electronic data deliverable (EDD) format, which will be in either an ASCII comma-separated value format or a format outlined in the EQuIS™ Laboratory Standard Operating Procedure (SOP) (Attachment 1). The Form Is (results sheets) will be in either a portable document format (PDF) or an electronic spreadsheet format. The analytical results will be provided within 15 working days from the date of sample receipt.

3.2 Field Investigations

To obtain the information necessary to meet the objectives stated above, additional field sampling will be conducted to support the DQOs. Further details of anticipated field sampling will be presented in future sampling plans. For the purposes of the SMP, anticipated sampling details are provided in the Excavation Work Plan, FSP, and this appendix.

Monitoring well samples will be analyzed for the following:

- VOCs using USEPA SW-846 Method 8260;
- Semi-volatile organic compounds using USEPA SW-846 Method 8270;
- Polychlorinated biphenyls using USEPA SW-846 Method 8082;
- Metals using USEPA SW-846 Methods 6010 and 7470;
- Cyanide using USEPA SW-846 Method 9012;
- Per- and polyfluoroalkyl substances using USEPA Modified Method 537;
- 1,4-Dioxane using USEPA Method 8270 SIM;
- VOCs in ambient air using USEPA TO15;
- Total Organic Carbon using USEPA Method 9060A;
- Alkalinity using USEPA Method 2320B; and
- Nitrate and Nitrite as Nitrogen using USEPA Method 353.2.

Indoor air and sub-slab vapor samples will be analyzed for the following:

- VOCs using USEPA Method TO-15.

Data Uses

Data generated as part of the field sampling will be used in any future work plan. The Excavation Work Plan provides guidance for anticipated data usages for the future of the Site.

Data Quantity

Field activities will involve collecting environmental samples and associated QC samples. The anticipated number of samples to be collected, the number of QC samples, and the constituents to be analyzed are presented in Table 2 of this QAPP.

Sampling and Analytical Methods

Sampling procedures are provided in the FSP (SMP Appendix H). The laboratory analytical methods for the chemical constituents are listed above. Category B will be used for data reporting (as defined previously).

Measurement Performance Criteria

Table 3 presents precision and accuracy QC limits for chemical constituents used during data review to assess analytical performance. Data representativeness is addressed by the sample quantities and locations identified in the sampling plans. Data comparability will be achieved by using standard USEPA-approved methods. Data completeness will be assessed at the conclusion of the analytical activities.

4 Special Training Requirements/Certification

In compliance with the Occupational Safety and Health Administration's (OSHA's) final rule, "Hazardous Waste: Operations and Emergency Response," 29 Code of Federal Regulations 1910.120(e)", all personnel performing sampling activities at the Site, except as noted below, will have completed the requirements for OSHA 40-Hour Hazardous Waste Operations and Emergency Response initial training and have current 8-hour Refresher Training. Persons in field supervisory positions will have also completed the additional OSHA 8-Hour Supervisory Training.

Field personnel involved with the shipping of samples to the subcontracted laboratory will have completed United States Department of Transportation Hazardous Materials #1 – United States Department of Transportation/International Air Transportation Association Hazardous Materials Shipping and Transportation training.

5 Documentation and Records

Samples will be collected as described in the FSP (SMP Appendix H). Detailed descriptions of the documentation and reporting requirements are presented below.

5.1 Sample Designation System

Samples will be identified with a unique designation system that will facilitate sample tracking. The sample designation system to be employed during the sampling activities will be consistent, yet flexible enough to accommodate unforeseen sampling events and conditions. An alpha-numeric system is considered appropriate and will be used by field personnel to assign each sample with a unique sample identification number.

The sample identification number will begin with a two- or three-letter prefix indicating the sample type and two digits indicating the sequential sample number collected from the location.

The sample types (if applicable) will be designated using the following codes:

- Surface Soil Sample – “SS;”
- Subsurface Soil Sample – “SB;”
- Groundwater Sample – “GW” or “MW;”
- Indoor Ambient Air – “IA;”
- Sub-Slab Soil Vapor -- “SV;”
- Trip Blank Sample – “TB;”
- Field Duplicate Sample – “DUP;”
- Equipment Blank Sample – “EB;”
- Matrix Spike and Matrix Spike Duplicate – “MS” and MSD;” and
- Waste Characterization – “WC.”

The location code will follow the sample type code. The sample code will also be a six-digit number indicating the month, day, and year the sample was obtained. For example, a groundwater sample collected from MW-10 on March 11, 2022, will be designated MW-10(220311).

QA/QC samples will be designated using the sample type code followed by the six-digit sample collection date. For example, a field blank collected on March 11, 2022, during groundwater samples collection would be designated GW-FB1-220311. The locations of field duplicates must be recorded in the field logbook.

5.2 Field Documentation

Field personnel will provide comprehensive documentation covering various aspects of field sampling, field analysis, and sample COC. This documentation consists of a record that allows reconstruction of field events to aid in the data review and interpretation process. Documents, records, and information relating to the performance of the field work will be retained in the project file.

The various forms of documentation to be maintained throughout the investigation include:

- Sampling Information – Detailed notes will be made as to the exact sampling location, physical observations, and weather conditions (as appropriate).
- Field Logbooks/Forms – All pertinent information regarding the Site and sampling procedures will be documented. A field notebook consists of a waterproof, bound notebook that will contain a record of all activities performed at the Site. Detailed notes will be made as to the exact sampling location, physical observations, and weather conditions (as appropriate). To ensure that data collected in the field is consistent, accurate, and complete, forms may be used during repetitive data collection (e.g., depth to groundwater in monitoring wells during groundwater sampling).
- Sample Labels – Sample labels reduce the possibility of confusing sample containers and provide information necessary to complete COC forms. To the extent practical, sample containers will be pre-labeled before sample collection (with all the required information, except the date and time of the sample collection). The labels will be protected with a clear tape covering.
- Sample COC – COC forms will provide the record of responsibility for sample collection, transport, and submittal to the laboratory. COC forms will be filled out at each sampling site, at a group of sampling sites, or at the end of each day of sampling by field personnel responsible for sample custody. In the event that samples are relinquished by the designated sampling person to other sampling or field personnel, the COC form will be signed and dated by the appropriate personnel to document the sample transfer. The original COC form will accompany the samples to the laboratory, and copies will be forwarded to the project files.

  Persons will have custody of samples when the samples are in their physical possession, in their view after being in their possession, or in their physical possession and secured so they cannot be tampered with. In addition, when samples are secured in a restricted area accessible only to authorized personnel, they will be deemed to be in the custody of such authorized personnel.
- Field Equipment, Calibration, and Maintenance Logs – To document the calibration and maintenance of field instrumentation, calibration and maintenance logs will be maintained for each piece of field equipment that is not factory calibrated.

5.3 Laboratory Documentation Files

Analytical laboratory documentation requirements are presented in the following subsections.

5.3.1 Laboratory Project Files

The laboratory will establish a file for pertinent data. The file will include correspondence, faxed information, telephone logs, and COC forms. The laboratory will retain project files and data packages for a period not less than 5 years.

5.3.2 Laboratory Logbooks

Workbooks, bench sheets, instrument logbooks, and instrument printouts will be used to trace the history of samples through the analytical process and to document important aspects of the work, including the associated QC checks. As such, logbooks, bench sheets, instrument logs, and instrument printouts will be part of the permanent record of the laboratory.

Each page or entry will be dated and initialed by the analyst at the time of entry. Errors in entry will be crossed out in indelible ink with a single stroke, corrected without the use of white-out or by obliterating or writing directly over the erroneous entry, and initialed and dated by the individual making the correction. Pages of logbooks that are not used will be completed by lining out unused portions.

Information regarding the sample, analytical procedures performed, and the results of the testing will be recorded on laboratory forms or personal notebook pages by the analyst. These notes will be dated and will also identify the analyst, the instrument used, and the instrument conditions.

Laboratory notebooks will be periodically reviewed by the laboratory group leaders for accuracy, completeness, and compliance with this QAPP. All entries and calculations will be verified by the laboratory group leader. If all entries on the pages are correct, the laboratory group leader will initial and date the pages. Corrective action will be taken for incorrect entries before the laboratory group leader signs.

5.3.3 Computer and Hard Copy Storage

All electronic files and deliverables will be retained by the laboratory for not less than 5 years. Hard copy data packages (or electronic copies) will also be retained for not less than 5 years.

5.4 Data Reporting Requirements

Data will be reported both in the field and by the analytical laboratory, as described below.

5.4.1 Field Data Reporting

Information collected in the field through visual observation, manual measurement, and/or field instrumentation will be recorded in field logbooks or data sheets and/or on forms. Such data will be reviewed by the appropriate Task Manager for adherence to the work plans and for consistency. Concerns identified as a result of this review will be discussed with the field personnel, corrected if possible, and (as necessary) incorporated into the data evaluation process.

If applicable, field data forms and calculations will be processed and included as appendices to the appropriate reports (when generated). The original field logs, documents, and data reductions will be kept in the project file.

5.4.2 Laboratory Data Reporting

Analytical results will be provided by the laboratory in a digital format. The data packages will be examined to ensure that the correct analyses were performed for each sample submitted and that all of the analyses requested on the COC form were performed. If discrepancies are noted, the QAC will be notified and will promptly follow up with the laboratory to resolve any issues.

If validation is required, each data package will be validated in accordance with the procedures presented in this QAPP. Data that do not meet the specified standards will be flagged pending resolution of the issue. The flag will not be removed from the data until the issue associated with the sample results is resolved. Although flags may remain for certain data, the use of that data may not necessarily be restricted.

Following completion of the data validation, the data review will be used to populate the appropriate database tables. This format specifies one data record for each constituent and each sample analyzed. Specific fields include:

- Sample identification number;
- Date sampled;
- Date analyzed;
- Parameter name;
- Analytical result;
- Units;
- Detection limit; and
- Qualifier(s).

The individual EDDs supplied by the laboratory, which will be in either an ASCII comma-separated value format or a format outlined in the EQuIS™ Laboratory SOP (Attachment 1), will be loaded into the appropriate database table. Analytical data that cannot be provided by the laboratory in electronic format will be entered manually. Hand-keyed data will be reviewed for accuracy. After entry into the database, the EDD data will be compared to the field information previously entered into the database to confirm that all requested analytical data were received.

The analytical laboratory is responsible for preparing Category B data packages for all samples, except solid and liquid waste characterization samples. Data reports for all parameters will include, at a minimum, the following items:

Narrative

The narrative will contain a summary of activities that took place during the course of sample analysis, including the following information:

- Laboratory name and address;
- Date of sample receipt;
- Cross-reference of the laboratory identification number to the sample identification;
- Analytical methods used;
- Deviations from specified protocol; and
- Corrective actions taken.

Included with the narrative will be any sample handling documents, including field and internal COC forms, air bills, and shipping tags.

Analytical Results

Analytical results will be reported according to the analysis type and will include the following information, as applicable:

- Sample identification;
- Laboratory identification;
- Date of collection;

- Date of receipt;
- Date of extraction;
- Date of analysis;
- Dilution factor; and
- Detection limits.

Sample results on the report forms will be corrected for dilutions. Unless otherwise specified, all results will be reported uncorrected for blank contamination.

5.5 Project File

Project documentation will be placed in project files according to Arcadis' protocol for document management. Project files typically consist of the following components:

1. Agreements/Proposals (filed chronologically).
2. Change Orders/Purchase Orders (filed chronologically).
3. Invoices (filed chronologically).
4. Project Management (filed by topic).
5. Correspondence (filed chronologically).
6. Notes and Data (filed by topic).
7. Public Relations Information (filed by topic).
8. Regulatory Documents (filed chronologically).
9. Marketing Documents (filed chronologically).
10. Final Reports/Presentations (filed chronologically).
11. Draft Reports/Presentations (filed chronologically).
12. Documents Prepared by Others (filed chronologically).

Final reports (including QA reports) are filed in a designated folder within the project file. Analytical laboratory documentation (when received) and field data will also be filed in a designated folder within the project file. Filed materials may be removed and signed out by authorized personnel on a temporary basis only.

6 Sampling Process Design

Information regarding the sampling design and rationale and associated sampling locations are presented in the SMP. Field investigation activities will be conducted according to the appropriate FSP (SMP Appendix H) procedures and applicable NYSDEC regulations.

7 Sampling Method Requirements

Sampling of site media will be collected as described in the FSP (SMP Appendix H). The approximate sample quantities and field QC samples are shown in Table 2. The FSP also contains the procedures that will be followed to perform field measurements; handle investigation-derived waste (IDW); and handle, package, and ship collected samples.

8 Sample Handling and Custody Requirements

Sampling handling requirements for various project personnel are presented in the following subsections.

8.1 Sample Containers and Preservation

Appropriate sample containers, preservation methods, and laboratory holding times for the samples are shown in Table 4.

The analytical laboratory will supply appropriate sample containers and preservatives, as necessary. The bottles will be purchased pre-cleaned to USEPA Office of Solid Waste and Emergency Response (OSWER) Directive 9240.05A requirements. The field personnel will be responsible for properly labeling containers and appropriately preserving samples. Sample labeling procedures are discussed in Section 8.2.2.

8.2 Field Custody Procedures

The objective of field sample custody is to ensure that samples are not tampered with or modified from the time of collection through transport and transfer to the analytical laboratory. Persons will have “custody of samples” when the samples are in their physical possession, in their view after being in their possession, or in their physical possession and secured so they cannot be tampered with. In addition, when samples are secured in a restricted area accessible only to authorized personnel, they will be deemed to be in the custody of such authorized personnel.

Field custody documentation consists of both field logbooks and field COC forms.

8.2.1 Field Logbooks

Field logbooks will provide the means of recording the data collecting activities that are performed. As such, entries will be described in as much detail as possible so that persons going to the Site could reconstruct a particular situation without reliance on memory.

Field logbooks will be bound field survey books or notebooks. Logbooks will be assigned to field personnel but will be stored in a secure location when not in use. Each logbook will be identified by the project-specific document number. The title page of each logbook will contain the following:

- Person to whom the logbook is assigned;
- Logbook number;
- Project name;
- Project start date; and
- End date.

Entries will be made in indelible ink with no erasures. If an incorrect entry is made, the information will be crossed out with a single strike mark and initialed by the person making the correction.

Recorded information in field logbooks typically includes, but may not be limited to, the following:

- Name and location of the Site;
- Date and time of arrival and departure;
- Name and signature of person keeping the logbook;
- Names of all persons on site;
- Purpose of the site visit;
- Level of personal protective equipment (PPE) used;
- Field instrument identification and calibration information;
- Location of sampling points;
- Results of field measurements made;
- Number and volume of samples taken;
- Preservation;
- Method of sample collection and any factors that may affect its quality;
- Name of sample collector;
- All sample identification numbers (assigned prior to sample collection);
- Description of samples, including, as applicable, the depth at which the sample was collected;
- Weather conditions on the day of sampling and any field observations; and
- Number and description of photographs taken, if any.

8.2.2 Sample Labeling

The following information is required on each sample label:

- Project name;
- Date collected;
- Time collected;
- Location;
- Sampler;
- Analysis to be performed;
- Preservative; and
- Sample identification number.

8.2.3 Field Chain-of-Custody Forms

Completed COC forms will be required for all samples to be analyzed. COC forms will be initiated by the sampling crew in the field. The COC forms will contain the unique sample identification number, sample date and time, sample description, sample type, preservation (if any), and analyses required. The original COC form will accompany the samples to the laboratory. Copies of the COC form will be made prior to shipment (or multiple-copy forms will be used) for field documentation. The COC forms will remain with the samples at all times. The samples and signed COC forms will remain in the possession of the sampling crew until the samples are

delivered to the express carrier (e.g., Federal Express), hand delivered to a mobile or permanent laboratory, or placed in secure storage.

Sample labels will be completed for each sample using waterproof ink. The labels will include the information listed in Section 8.2.2. The completed sample labels will be affixed to each sample bottle and covered with clear tape.

Whenever samples are split with a government agency or other party, a separate COC form will be prepared for those samples and marked to identify the party with whom the samples are being split. The person relinquishing the samples to the facility or agency should request the representative's signature acknowledging sample receipt. If the representative is unavailable or refuses, this is noted in the "Received By" space.

8.2.4 Sample Custody Seals

Custody seals are narrow strips of adhesive paper or glass fiber used to demonstrate that no tampering of the shipping container has occurred. The custody seals will be signed and dated by the sampling crew and placed across the opening of the lid and body of the shipping containers and at least on one side and the front of the container. The custody seals will be covered with clear, wide tape. These custody seals shall be plainly visible.

8.3 Management of Investigation-Derived Materials and Wastes

IDW will be generated during site activities and may include decontamination liquids, PPE, sorbent materials, purge water, and disposable sampling materials that may have come into contact with potentially impacted materials. The intent of managing IDW is to insure that impacted materials and media are not allowed to contaminate non-impacted materials and media. An example of an impacting event would be the purging of impacted groundwater and discharging that water onto non-impacted soil and shallow groundwater. Those kinds of activities will not be allowed.

Where necessary to promote the safe, efficient, and environmentally protective performance of work, management of investigation-derived materials and wastes will be performed consistent with the USEPA guidance, *Guide to Management of Investigation-Derived Wastes*, 9345.3-03FS (USEPA 1992). Disposable equipment (including PPE) will be containerized, appropriately labeled during the sampling events, and disposed of appropriately. All purged groundwater and water generated during equipment decontamination will be containerized, temporarily staged on site in 55-gallon drums or portable tanks and disposed of appropriately based on analytical results. Equipment will be decontaminated, as appropriate.

8.4 Packing, Handling, and Shipping Requirements

Sample packaging and shipment procedures are designed so that the samples will arrive at the laboratory, with the COC, intact.

Samples will be packaged for shipment as outlined below:

- Securely affix the sample label to the container with clear packing tape.
- Check the cap on the sample container to confirm that it is properly sealed.
- Wrap the sample container cap with clear packing tape to prevent the cap from becoming loose.

- Complete the COC form with the required sampling information and confirm that the recorded information matches the sample labels.

  NOTE: If the designated sampler relinquishes the samples to other sampling or field personnel for packing or other purposes, the sampler will complete the COC form prior to this transfer. The appropriate personnel will sign and date the COC form to document the sample custody transfer.
- Wrap the glass sample containers in bubble wrap or other cushioning material.
- Place 1 to 2 inches of cushioning material at the bottom of the cooler.
- Place the sealed sample containers into the cooler.
- Place ice in plastic bags, seal the bags, and place the bags loosely in the cooler.
- Fill the remaining space in the cooler with cushioning material.
- Place the COC forms in a plastic bag and seal the bag. Tape the COC forms to the inside of the cooler lid.
- Close the lid of the cooler and secure the lid with duct tape.
- Wrap strapping tape (or equivalent) around both ends of the cooler at least twice.
- Mark the cooler on the outside with the shipping address and the return address, affix “Fragile” labels to the cooler, and draw (or affix) arrows indicating “this side up” on the cooler. Cover the shipping labels with clear plastic tape. If the samples are being delivered directly to the laboratory or will be picked up by the laboratory’s courier service, this step is eliminated.
- Place a signed custody seal over the sample cooler lid.

Samples will be packaged by the field personnel and transported as low-concentration environmental samples. The samples will be hand-delivered or delivered by an express carrier within 48 hours of the time of collection. In some cases, the analytical method may require analysis within a shorter holding time, and arrangements will need to be made to accommodate the laboratory requirements. Shipments will be accompanied by the COC form identifying the contents. The original COC form will accompany the shipment; copies will be retained by the sampler for the sampling office records. If the samples are sent by common carrier, a bill of lading will be used. Receipts or bills of lading will be retained as part of the permanent project documentation. Commercial carriers are not required to sign off on the COC form, as long as the forms are sealed inside the sample cooler and the custody seals remain intact.

Sample custody seals and packing materials for filled sample containers will be provided by the analytical laboratory. As described above, the filled, labeled, and sealed containers will be placed in a cooler on ice and carefully packed to eliminate the possibility of container breakage.

8.5 Laboratory Custody Procedures

Upon sample receipt, laboratory personnel will be responsible for sample custody. The original field COC form will accompany all samples requiring laboratory analysis. The laboratory will use COC guidelines described in the USEPA guidance documents. Samples will be kept secured in the laboratory until all stages of analysis are complete. All laboratory personnel having samples in their custody will be responsible for documenting and maintaining sample integrity.

8.5.1 Sample Receipt and Storage

Immediately upon sample receipt, the laboratory sample custodian will verify the integrity of the cooler seal, open the cooler, and compare the contents against the field COC form. If a sample container is missing, a sample container is received broken, the sample is in an inappropriate container, or the sample has not been preserved by appropriate means, the Arcadis Project Manager and/or QAC will be notified. The laboratory sample custodian will be responsible for logging the samples in, assigning a unique laboratory identification number to each sample, labeling the sample bottle with the laboratory identification number, and moving the sample to an appropriate storage location to await analysis. The project name, field sample code, date sampled, date received, analysis required, storage location and date, and action for final disposition will be recorded in the laboratory tracking system. Relevant custody documentation will be placed in the project file.

8.5.2 Sample Analysis

Analysis of an acceptable sample will be initiated by a work sheet that will contain pertinent information for analysis. The routing sheet will be forwarded to the analyst, and the sample will be moved into an appropriate storage location to await analysis. The document control officer will file the COC forms in the project file.

Samples will be organized into SDGs by the laboratory. An SDG may contain up to 20 field samples (field duplicates and trip blanks are considered field samples for the purposes of SDG assignment). All field samples assigned to a single SDG will be received by the laboratory over a maximum of 7 calendar days and must be processed through the laboratory (preparation, analysis, and reporting) as a group. If reanalysis of a sample is required, it may be re-run separately from the original SDG; however, the resulting data will be reported with the original SDG.

Every SDG must include a minimum of one MB and one MS/MSD pair; each SDG will, therefore, be self-contained for all of the required QC samples. Project samples to be used for MS/MSDs will be noted on the COC form.

Information regarding the sample, analytical procedures performed, and the results of the testing will be recorded in a laboratory notebook by the analyst. These notes will be dated and identify the analyst, the instrument used, and the instrument conditions.

8.5.3 Sample Storage Following Analysis

Samples will be maintained by the laboratory for at least 1 month after the final report is delivered. The laboratory will be responsible for the eventual and appropriate disposal of the samples. The analytical laboratory will inform the environmental consultant before any samples are disposed. Unused portions of the samples, sample extracts, and associated wastes will be disposed of by the laboratory in accordance with applicable rules and regulations.

9 Analytical Method Requirements

Analytical method requirements are presented in the following subsections.

9.1 Field Analytical Procedures

Specific field measurement protocols are provided in the FSP (SMP Appendix H).

9.2 Laboratory Parameters and Methods

The laboratory analytical requirements presented in the subsections below include a general summary of the requirements, the specifics related to each sample medium to be analyzed, and details of the methods to be used for this project. Current USEPA-approved methods will be used for all applicable parameters and sample media.

9.2.1 General

The following tables (attached at the end of this QAPP) summarize the general analytical requirements:

- Table 1a: Parameters, Methods, and Target Quantitation Limits (Groundwater);
- Table 1b: Parameters, Methods, and Target Quantitation Limits (Air);
- Table 1c: Parameters, Methods, and Target Quantitation Limits (Liquid Waste Characterization);
- Table 2: Sample Quantities and Quality Control Frequencies;
- Table 3: Laboratory Quality Control Limits; and
- Table 4: Sample Containers, Preservation, and Holding Times.

9.2.2 Groundwater

The primary sources of the analytical methods to be used during the investigation are provided in USEPA Method SW-846. Quantitation limits for the analyses are shown in Table 1a. The laboratory will make every effort to achieve quantitation limits as low as practicable, unless dilution or interference effects make it necessary to report at higher levels. Results quantitated below the RLs will be reported as estimated concentrations and flagged with a "J".

9.2.3 Air

The primary sources of the analytical methods to be used during the investigation are provided in USEPA Method TO-15. Quantitation limits for the analyses are shown in Table 1b. The laboratory will make every effort to achieve quantitation limits as low as practicable, unless dilution or interference effects make it necessary to report at higher levels. Results quantitated below the RLs will be reported as estimated concentrations and flagged with a "J".

10 Quality Control Requirements

The following subsections present a summary of the project QC requirements.

10.1 Data Quality Indicators

The overall DQO for this assessment is to develop and implement procedures for sampling, COC, laboratory analysis, instrument calibration, data reduction and reporting, internal QC, audits, preventive maintenance, and corrective action, such that valid data will be generated for site assessment purposes. These DQO procedures are presented or referenced in subsequent sections of the QAPP.

DQOs are generally defined in terms of the following parameters:

- Representativeness;
- Comparability;
- Completeness;
- Precision;
- Accuracy; and
- Sensitivity.

Each parameter is defined below. Specific objectives for this assessment are set forth in other sections of this QAPP as referenced below.

10.1.1 Representativeness

Representativeness is the extent to which measurements represent the site conditions. It is dependent on sampling and analytical variability and the variability (or homogeneity) of the site itself. The sampling activities have been designed to assess the presence of the constituents at the time of sampling. This QAPP presents field sampling methodologies and laboratory analytical methodologies. The use of the prescribed field and laboratory analytical methods, with associated holding times and preservation requirements, are intended to provide representative data.

10.1.2 Comparability

Comparability is defined as the extent to which data from one data set can be compared directly to similar or related data sets and/or decision-making standards. Comparability between this investigation and, to the extent possible, with existing data will be maintained through consistent use of the sampling and analytical methodologies set forth in this QAPP, applicable analytical methods, stringent application of established QA/QC procedures, and utilization of appropriately trained personnel.

10.1.3 Completeness

Completeness is defined as a measure of the amount of usable data collected compared to the total amount of data that was expected to be obtained. This will be determined upon final assessment of the analytical results.

10.1.4 Precision

Precision is a measure of the reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the objectives of the site assessment. To maximize precision, sampling and analytical procedures will be strictly followed and work will adhere to established protocols presented in the QAPP and sampling plans. Checks for analytical precision will include the analysis of MS/MSD pairs, laboratory duplicates, and field duplicates. Field measurement precision will be monitored by obtaining duplicate field measurements.

10.1.5 Accuracy

Accuracy is a measure of how close a measured result is to the true value. Recovery of reference standards, MSs, laboratory control standards, and surrogate standards will be used to assess the accuracy of the analytical data.

10.1.6 Sensitivity

Sensitivity is defined as the ability of the method or instrument to detect the contaminant of concern and other target compounds at the level of interest. The MDL is defined as the minimum concentration of a substance that can be identified, measured, and reported with 99% confidence that the analyte concentration is greater than zero and is determined from repeated analysis of a sample in a given matrix containing the analyte. MDLs have been determined as required in Title 40 Code of Federal Regulations Part 136B. The RL is greater than or equal to the lowest standard used to establish the calibration curve. The RLs for this investigation are generally at least 3 times greater than the MDL. Results greater than the MDL and less than the RL will be qualified estimated (“J”) by the laboratory. Non-detected results will be reported at the RL.

10.2 Field Quality Control Checks

Field QC requirements are presented in the following subsections.

10.2.1 Field Measurements

To verify the quality of data using field instrumentation, duplicate measurements will be obtained and reported for all field measurements. A duplicate measurement will involve obtaining measurements a second time at the same sampling location.

10.2.2 Sample Containers

Certified, clean, sample containers (Eagle Picher pre-cleaned containers or equivalent), in accordance with Exhibit I of the NYSDEC ASP (NYSDEC 2005), will be supplied by the laboratory.

10.2.3 Field Duplicates

Field duplicates will be collected to verify the reproducibility of the sampling methods. In general, field duplicates will be analyzed at a 5% frequency (every 20 samples) for the chemical constituents.

10.3 Analytical Laboratory Quality Control Checks

Internal laboratory QC checks will be used to monitor data integrity. These checks will include MBs, LCSs, MS/MSDs, laboratory duplicates, internal standards, surrogate samples, and calibration standards. Project QC limits are identified in Table 3. Laboratory control charts will be used to determine long-term instrument trends.

10.3.1 Method Blanks

Sources of contamination in the analytical process, whether from specific analyses or interferences, must be identified, isolated, and corrected. The MB is useful in identifying possible sources of contamination within the analytical process. For this reason, it is necessary that the MB be initiated at the beginning of the analytical process and encompass all aspects of the analytical work. As such, the MB would assist in accounting for any potential contamination attributable to glassware, reagents, instrumentation, or other sources that could affect sample analysis. One MB will be analyzed with each analytical series associated with no more than 20 samples.

10.3.2 Matrix Spike/Matrix Spike Duplicates

MS/MSDs will be used to measure the accuracy of analyte recovery from the sample matrices and will be site-specific. MS/MSD pairs will be analyzed at a 5% frequency (every 20 samples).

When MS recoveries are outside QC limits, associated control sample and surrogate spike recoveries will be evaluated, as applicable, to attempt to verify the reason for the deviation and determine the effect on the reported sample results. Table 2 presents an estimated number of MS and MSD analyses for each applicable parameter.

10.3.3 Laboratory Control Samples

LCSs are standards of known concentrations and are independent in origin from the calibration standards. The intent of LCS analysis is to provide insight into the analytical proficiency within an analytical series. This includes preparation of calibration standards, validity of calibration, sample preparation, instrument setup, and the premises inherent in quantitation. Reference standards will be analyzed at the frequencies specified within the analytical methods.

10.3.4 Surrogate Spikes

Surrogates are compounds that are unlikely to occur under natural conditions but have properties similar to the analytes of interest. This type of control is primarily used for organic samples analyzed by gas chromatography/mass spectrometry (GC/MS) and is added to the samples prior to purging or extraction. The surrogate spike is utilized to provide broader insight into the proficiency and efficiency of an analytical method on a sample-specific basis. This control reflects analytical conditions that may not be attributable to the sample matrix.

If surrogate spike recoveries exceed specified QC limits, the analytical results must be evaluated thoroughly in conjunction with other control measures. In the absence of other control measures, the integrity of the data may not be verifiable, and reanalysis of the samples with additional control may be necessary.

Surrogate spike compounds will be selected utilizing the guidance provided in the analytical methods.

10.3.5 Calibration Standards

The initial calibration of instruments will be performed as required in the analytical methods and when any ongoing calibration does not meet control criteria. The number of points used in the initial calibration is defined in each analytical method.

Calibration check standards analyzed within a particular analytical series provide insight regarding instrument stability. Ongoing calibration verification will be performed as specified in the analytical methods to monitor instrument performance. In general, the calibration check standard will be analyzed at the beginning and end of an analytical series, or periodically throughout a series containing a large number of samples.

In the event that an ongoing calibration does not meet control limits, the analysis of samples will be suspended until the source of the control failure is either eliminated or reduced to within control specifications. Any samples analyzed while the instrument was out of control specifications will be reanalyzed.

10.3.6 Internal Standards

Internal standard areas and retention times will be monitored for organic analyses performed by GC/MS methods. Method-specified internal standard compounds will be spiked into all field samples, calibration standards, and QC samples after preparation and prior to analysis. If internal standard areas in one or more samples exceed the specified tolerances, the cause will be investigated, the instrument will be recalibrated if necessary, and all affected samples may be re-analyzed.

The acceptability of internal standard performance will be determined using the guidance provided within the analytical methods.

10.4 Data Precision Assessment Procedures

Field precision is difficult to measure because of temporal variations in field parameters. However, precision will be controlled through the use of experienced field personnel, properly calibrated meters, and duplicate field measurements. Field duplicates will be used to assess precision for the entire measurement system, including sampling, handling, shipping, storage, preparation, and analysis.

Laboratory data precision for analyses will be monitored through the use of MSDs, laboratory duplicates, and field duplicates, as identified in Table 3.

The precision of data will be measured by calculation of the relative percent difference (RPD) by the following equation:

$$RPD = \frac{abs(D1 - D2)}{\frac{(D1 + D2)}{2}} \times 100$$

Where:

abs = absolute value
D1 = sample value
D2 = duplicate sample value

The precision objectives for MSDs and laboratory duplicate analyses are identified in Table 3.

10.5 Data Accuracy Assessment Procedures

The accuracy of field measurements will be controlled by experienced field personnel, properly calibrated field meters and adherence to established protocols. The accuracy of field meters will be assessed by review of calibration and maintenance logs.

Laboratory accuracy will be assessed by using MSs, surrogate spikes, internal standards and reference standards. Where available and appropriate, QA performance standards will be analyzed periodically to assess laboratory accuracy. Accuracy will be calculated in terms of % recovery as follows:

$$\%\ \text{Recovery} = \frac{A - X}{B} \times 100$$

Where:

A = value measured in spiked sample or standard
X = value measured in original sample
B = amount added to sample or true value of the standard

This formula is derived under the assumption of constant accuracy between the original and spiked measurements. If any accuracy calculated by this formula is outside of the acceptable levels, data will be evaluated to determine whether the deviation represents unacceptable accuracy, or variable, but acceptable accuracy. Accuracy objectives for MS recoveries and surrogate recovery objectives are identified in Table 3.

10.6 Data Representative Assessment Procedures

Representativeness will be assessed by examining sample preservation, results of the precision and accuracy evaluation, and adherence to method holding times. Failure of the field or laboratory personnel to properly handle samples may result in qualification of the data as estimated or unusable. The use of laboratory data from a sample with a failed holding time could render the data unusable. In particular, for VOC analysis, there is a potential for the loss of compounds, and the concentration may be biased low. The representativeness review will qualitatively consider whether precision and/or accuracy are sufficient to characterize the representativeness of the samples.

10.7 Blank Sample Assessment Procedures

Blank samples will be used to determine the existence and magnitude of contamination resulting from laboratory or field activities. The MB is used as a check on laboratory procedures, as well as possible contamination from laboratory equipment (i.e., reagents, glassware, etc.). Trip blanks determine the integrity of the sample container for loss or addition of analytes due to handling and transport. Detections in any blank samples will be used to qualify similar detections in associated field samples.

10.8 Data Completeness Assessment Procedures

Completeness of a field or laboratory data set will be calculated by comparing the number of valid sample results generated to the total number of results generated.

$$Completeness = \frac{usable\ data\ points\ obtained}{total\ data\ points\ planned} \times 100$$

As a general guideline, overall project completeness is expected to be at least 90%. The assessment of completeness will require professional judgment to determine data usability for the intended purposes.

11 Instrument/Equipment Testing, Inspection, and Maintenance Requirements

Testing and maintenance schedules have been developed for both field and laboratory instruments. This section summarizes the testing and maintenance activities to be performed.

11.1 Field Instruments and Equipment

Prior to field sampling, each piece of field equipment will be calibrated (if necessary) and inspected to confirm that it is operational. If the equipment is not operational, it will be serviced prior to use. All meters that require charging or batteries will be fully charged or have fresh batteries. If instrument servicing is required, the appropriate field activities Task Manager or field personnel will be responsible for following the maintenance schedule and arranging for timely service. Field instruments will be maintained according to the manufacturers' instructions.

Field instrumentation to be used in this study includes meters to measure pH, oxidation-reduction potential, turbidity, temperature, conductivity, dissolved oxygen, and groundwater levels. Field equipment also includes sampling devices for groundwater. A logbook will be kept for each field instrument. Each logbook contains records of operation, maintenance, calibration, and any problems and repairs. The Task Manager will review the calibration and maintenance logs.

All measuring and test equipment to be used in support of the field sampling activities that directly affect the quality of the analytical data will be subject to preventive maintenance measures that minimize equipment downtime. Equipment will be examined to certify that it is in operating condition. This includes checking the manufacturer's operating manual to confirm that all maintenance requirements are being observed. Field notes from previous sampling events will be reviewed to verify that any prior equipment problems are not overlooked and that any necessary repairs to the equipment have been carried out. However, in most cases, the environmental consultant will use field meters maintained and calibrated by national, reputable environmental rental equipment companies; calibration and maintenance records are provided with these pieces of rental equipment and will be maintained as part of the project file.

Field equipment returned from the Site will be inspected to confirm that it is in working order. The inspection will be recorded in the logbook or field notebooks, as appropriate. It will also be the obligation of the last user to record any equipment problems in the logbook. Non-operational field equipment will either be repaired or replaced. Appropriate spare parts for field equipment/meters will be available from the rental companies or manufacturers. Consultant-/subcontractor-owned or leased equipment will be maintained in accordance with the manufacturers' instructions.

11.2 Laboratory Instruments and Equipment

Laboratory instrument and equipment documentation procedures include the details of any observed problems, corrective measure(s), routine maintenance, and instrument repair (including information regarding the repair and the individual who performed the repair).

Preventive maintenance of laboratory equipment generally will follow the guidelines recommended by the manufacturer. A malfunctioning instrument will be repaired immediately by in-house staff or through a service call to the manufacturer.

Maintenance schedules for laboratory equipment adhere to each manufacturer's recommendations. Equipment service records will reflect the complete history of each instrument and specify the timeframe for future maintenance. Major repairs or maintenance procedures are performed through service contracts with the manufacturer or qualified contractors. Paperwork associated with service calls and preventive maintenance calls will be kept on file by the laboratory.

Laboratory Systems Managers are responsible for the routine maintenance of instruments used in the laboratory. Any routine preventive maintenance carried out is logged into the appropriate logbooks. The frequency of routine maintenance is dictated by the nature of samples being analyzed, the requirements of the analytical method used, and/or the judgment of the Laboratory Systems Manager.

All major instruments are backed up by comparable (if not equivalent) instrument systems for use in the event of unscheduled downtime. An inventory of spare parts is also available to minimize equipment/instrument downtime.

The operation of balances, incubators, ovens, refrigerators, and water purification systems will be checked and documented on a daily basis. Any discrepancies will be immediately reported to the appropriate laboratory personnel for resolution.

12 Instrument Calibration Frequency

Instrument calibration requirements are presented in the following subsections.

12.1 Field Equipment Calibration Procedures and Frequency

Calibration checks will be performed daily, or as often as required, to ensure the accuracy of field equipment. Field calibration solutions, standards, and gases will be used within specified expiration dates and will be obtained from manufacturers or authorized suppliers. Calibration solutions, standards, and gases will be discarded or returned to the supplier if expiration dates have been exceeded.

Field personnel are responsible for confirming that a master calibration/maintenance log is maintained following the procedures specified for each measuring device. A calibration log for each specific field instrument (as identified by serial/instrument number) will be used to link daily calibrations to that specific field instrument. Where applicable, each log will include, at a minimum, the following information in order to link daily calibrations to specific field instruments:

- Name of the device and/or instrument calibrated;
- Device/instrument serial/identification numbers;
- Calibration method;
- Tolerance;
- Calibration standard used;
- Frequency of calibration;
- Date(s) of calibration(s); and
- Name of the person(s) performing the calibration(s).

The instruments and equipment used to gather, generate, or measure environmental data will be calibrated at the intervals specified by the manufacturer, or more frequently, and in such a manner that accuracy and reproducibility of results are consistent with the manufacturer's specifications. If an internally calibrated field instrument fails to meet calibration/checkout procedures, it will be returned to the manufacturer for service. Equipment found to be out of tolerance during the period of use will be removed from the field, and measuring and testing activities performed using the equipment will be addressed via the corrective action system described in Section 15.3 of this QAPP.

12.2 Laboratory Equipment Calibration Procedures and Frequency

Instrument calibration will follow the specifications provided by the instrument manufacturer or specific analytical method used. The analytical methods for chemical constituents are identified in Tables 1a though 1e.

When analyses are conducted according to USEPA methods, the calibration procedures and frequencies specified in the applicable method will be followed. Records of calibrations will be filed and maintained by the laboratory. These records will be subject to a QA audit. For all instruments, the laboratory will maintain trained repair staff with in-house spare parts or will maintain service contracts with vendors.

All standards used to calibrate equipment are traceable, directly or indirectly, to the National Institute of Standards and Technology. All standards received will be logged into standard receipt logs maintained by the individual analytical groups. Each group will maintain a standards log that tracks the preparation of standards used for calibration and QC purposes.

13 Inspection/Acceptance Requirements for Supplies and Consumables

All supplies to be used in the field and laboratory will be available when needed. They will be free of target chemicals and interferences.

All laboratory reagents will be tested for acceptability prior to use in the analyses of site samples. All standards will be verified against a second source standard. The laboratory will follow a “first in/first out” procedure for the storage and use of all consumables to minimize the risk of contamination and degradation.

14 Data Management

The purpose of data management is to provide for the accuracy and ready accessibility of all of the necessary data to meet the analytical and reporting objectives of the project.

The data management program established for the project includes field documentation and sample QA/QC procedures, methods for tracking and managing the data, and a system for filing all site-related information. More specifically, data management procedures will be employed to efficiently process the information collected such that the data are readily accessible and accurate. These procedures are described in detail in the following section.

The data management plan has five elements:

1. Sample designation system.
2. Field activities.
3. Sample tracking and management.
4. Data management system.
5. Document control and inventory.

Each of these elements is discussed in the following subsections.

14.1 Sample Designation System

A concise and easily understandable sample designation system is an important part of the project sampling activities. It provides a unique sample number that will facilitate both sample tracking and easy re-sampling of select locations to evaluate data gaps, if necessary. The sample designation system to be employed during the sampling activities will be consistent, yet flexible enough to accommodate unforeseen sampling events or conditions. A combination of letters and numbers will be used to yield a unique sample number for each field sampled collected, as outlined in Section 5.1.

14.2 Field Activities

Field activities designed to gather the information necessary to make decisions require consistent documentation and accurate record keeping. During site activities, standardized procedures will be used for documenting field activities, data security, and QA. These procedures are described in further detail in the following subsections.

14.2.1 Field Documentation

Complete and accurate record keeping is a critical component of the field activities. When interpreting analytical results and identifying data trends, field notes are an important part of the review and validation process. To confirm that all aspects of the field investigation are thoroughly documented, several different information records, each with its own specific reporting requirements, will be maintained, including field logs, instrument calibration records, and COC forms. A description of each of these types of field documentation is provided in previous sections of this QAPP.

14.2.2 Data Security

Measures will be taken during the field investigation to prevent samples and records from being lost, damaged, or altered. When not in use, all field notebooks and logbooks will be stored at the field office or locked in the field vehicle. An electronic copy (e.g., scan to PDF) of all field data and laboratory data are available to all project team members.

14.3 Sample Tracking and Management

A record of all field documentation will be maintained to provide verification of the validity of data used in the site analysis. To effectively execute such documentation, specific sample tracking and data management procedures will be used throughout the sampling program.

Sample tracking will begin with the completion of COC forms, as summarized in Section 8.2.3. The completed COC forms associated with samples collected will be faxed and/or scanned and emailed to the Task Manager. Copies of all completed COC forms will be maintained in the field office. The laboratory will verify receipt of the samples electronically (via email) on the following day.

When analytical data are received from the laboratory, the QAC or designee will review the incoming analytical data packages against the information on the COC forms to confirm that the correct analyses were performed for each sample and that results for all samples submitted for analysis were received. Any discrepancies noted will be promptly followed up by the QAC.

14.4 Data Management System

In addition to the sample tracking system, a data management system will be implemented. The central focus of the data management system will be the development of a computer-based project database. Additionally, the data management system will allow submission of data to the NYSDEC's EQuIS™ database. The project database, to be maintained by the database administrator, will combine pertinent geographical, field, and analytical data. Information that will be used to populate the database will be derived from three primary sources: surveying of sampling locations, field observations, and analytical results. Each of these sources is discussed in the following sections.

14.4.1 Computer Hardware

The database will be constructed on personal computer workstations connected through a network server. The network will provide access to various hardware peripherals, such as laser printers, backup storage devices, image scanners, and modems. Computer hardware will be upgraded to industrial and corporate standards, as necessary, in the future.

14.4.2 Computer Software

The data will be warehoused in a database using CORE or EQuIS™ software. Geographic information system applications will be developed using ESRI ArcGIS software, with additional customization performed with Visual Basic. Tables and other database reports will be generated through Microsoft® Access in conjunction with Microsoft® Excel and/or Microsoft® Word. These software products will be upgraded to current industrial standards, as necessary.

14.4.3 Survey Information

In general, each location sampled will be surveyed or located using a global positioning system, with sub-meter accuracy, to confirm the accurate documentation of sample locations for mapping and geographic information system purposes (if appropriate) and to facilitate the re-sampling of select sample locations during future monitoring programs, if needed, and for any potential remediation activities. The surveying activities that will occur in the field will consist of the collection of information that will be used to compute a northing and easting in state plane coordinates for each sample location and the collection of information to compute elevations relative to the North American Vertical Datum of 1988 for select sample locations, as appropriate. All field logbooks associated with surveying activities will be stored as a record of the project activities.

14.4.4 Field Observations

An important part of the information that will ultimately reside in the data management system for use during the project will originate in the observations that are recorded in the field.

During each sampling event, appropriate field documentation will be prepared by the field personnel who performed the sampling activities. The purpose of the documentation is to create a summary and a record of the sampling event. Items included may be the locations sampled, the sampling methodologies used, blind duplicate and sample identification numbers, equipment decontamination procedures, personnel involved in the activity, and any noteworthy events that occurred.

14.4.5 Analytical Results

Analytical results will be provided by the laboratory in digital format. The data packages will be examined to confirm that the correct analyses were performed for each sample submitted and that all of the analyses requested on the COC form were performed. If discrepancies are noted, the QAC will be notified and will promptly follow up with the laboratory to resolve any issues.

Each data package will be validated in accordance with the procedures presented in Section 18. Any data that do not meet the specified standards will be flagged pending resolution of the issue. The flag will not be removed from the data until the issue associated with the sample results is resolved. Although flags may remain for certain data, the use of those data may not necessarily be restricted.

Following completion of the data validation, the digital files will be used to populate the appropriate database tables. An example of the EDD format is included in the EQuIS™ Laboratory SOP in Attachment 1. This format specifies one data record for each constituent for each sample analyzed. Specific fields include:

- Sample identification number;
- Date sampled;
- Date analyzed;
- Parameter name;
- Analytical result;
- Units;
- Detection limit; and
- Qualifier(s).

The individual EDDs, supplied by the laboratory in EQuIS™ file format, will be loaded into the appropriate database. Any analytical data that cannot be provided by the laboratory in electronic format will be entered manually. After entry into the database, the EDD data will be compared to the field information previously entered into the database to confirm that all requested analytical data have been received.

14.4.6 Data Analysis and Reporting

The database management system will have several functions to facilitate the review and analysis of the data. Data entry screens will be developed to assist in the keypunching of field observations. Routines have been developed to permit the user to scan analytical data from a given site for a given media. Several output functions are also available that can be modified, as necessary, for use in the data management system.

A valuable function of the data management system will be the generation of tables of analytical results from the project databases. The capability of the data management system to directly produce tables reduces the redundant manual entry of analytical results during report preparation and precludes transcription errors that may occur otherwise. This data management system function creates a digital file of analytical results and qualifiers for a given media. The file can then be processed into a table of rows and columns that can be transferred to word processing software (e.g., Microsoft® Excel) for final formatting and addition of titles and notes. Tables of analytical data will be produced as part of data interpretation tasks and the reporting of data to the USEPA.

The data management system also has the capability of producing a digital file of select parameters that exist in one or more of the databases. This type of custom function is accomplished on an interactive basis and is best used for transferring select information into a number of analysis tools, such as statistical or graphing programs.

14.5 Document Control and Inventory

Arcadis will maintain project files as discussed in Section 5.5.

15 Assessment and Response Actions

Performance and systems audits will be completed in the field and in the laboratory during sampling, as described below.

15.1 Field Audits

Field performance audit summaries will contain an evaluation of field activities to verify that the activities are performed according to established protocols. Field performance audits may be performed by the NYSDEC and the Arcadis Project Manager (or designee). The auditor(s) will review field reports and communicate concerns to the Arcadis Project Manager and/or Task Managers, and/or NYSDEC Project Manager, as appropriate. The observations made during field performance audits and any recommended changes/deviations to the field procedures will be recorded and documented.

In addition, systems audits comparing scheduled QA/QC activities from this QAPP with actual QA/QC activities completed will be performed. The appropriate Task Manager and QAC will periodically confirm that work is being performed consistent with this QAPP.

15.2 Laboratory Audits

Internal laboratory audits are conducted by the Laboratory QAM. As part of the audit, the overall performance of the laboratory staff is evaluated and compared to the performance criteria outlined in the laboratory QA manual and SOPs. The results of the audits are summarized and issued to each department supervisor, the Laboratory Manager, and the Laboratory Director. A systems audit of each laboratory may be performed by the QAM to determine whether the procedures implemented by each laboratory are in compliance with the QA manual and SOPs.

As a participant in state and federal certification programs, the laboratory is audited by representatives of the regulatory agency issuing certification in addition to the laboratory's internal audits. Audits are usually conducted on an annual basis and focus on laboratory conformance to the specific program protocols for which the laboratory is seeking certification. The auditor reviews sample handling and tracking documentation, analytical methodologies, analytical supportive documentation, and final reports. The audit findings are formally documented and submitted to the laboratory for corrective action, if necessary.

15.3 Corrective Action

Corrective actions are required when field or analytical data are not within the objectives specified in this QAPP or the FSP (SMP Appendix H). Corrective actions include procedures to promptly investigate, document, evaluate, and correct data collection and/or analytical procedures. Field and laboratory corrective action procedures for the assessment are described below.

15.3.1 Field Procedures

When conducting field work, if a condition is noted by the field crew that would have an adverse effect on data quality, corrective action will be taken so as not to repeat this condition. Any condition identification, cause, and corrective action implemented by the Field Manager or designee will be documented on a Corrective Action Form

and reported to the appropriate Task Manager, QAC, and Project Manager. The QAC or designee will be responsible for follow-up and acceptance of corrective actions.

Examples of situations that would require corrective actions are provided below:

- Protocols, as defined by the QAPP, SOPs, and/or work plans, have not been followed.
- The equipment is not in proper working order or properly calibrated.
- QC requirements have not been met.
- There are issues resulting from performance or systems audits.

Project personnel will continuously monitor ongoing work performance in the normal course of daily responsibilities.

15.3.2 Laboratory Procedures

In the laboratory, when a condition is noted to have an adverse effect on data quality, corrective action will be taken so as not to repeat this condition. Any condition identification, cause, and corrective action to be taken will be documented and reported to the appropriate Project Manager and QAC.

Corrective action may be initiated, at a minimum, under the following conditions:

- Protocols, as defined by this QAPP, have not been followed.
- Predetermined data acceptance standards are not obtained.
- The equipment is not in proper working order or calibrated.
- The sample and test results are not completely traceable.
- QC requirements have not been met.
- There are issues resulting from performance or systems audits.

Laboratory personnel will continuously monitor ongoing work performance in the normal course of daily responsibilities. Corrective action will be initiated upon identification of a problem. At whatever level this occurs (analyst, supervisor, data review or QC), it will be brought to the attention of the Laboratory QAM and, ultimately, the Laboratory Director. Final approval of any action deemed necessary is subject to the approval of the Laboratory Director. If previously reported data are affected by a situation requiring correction or if the corrective action impacts a project budget or schedule, the action will directly involve the Arcadis Project Manager and QAC.

A corrective action deemed necessary based on system or performance audits, the analytical results of split samples, or the results of data review will be implemented. The corrective action may include sample re-extraction, sample re-preparation, sample re-analysis, cleanup, dilution, matrix modification, or other activities deemed necessary to assure usable analytical data.

16 Reports to Management

The QAC will audit the implementation of the QAPP. Each project component will result in some type of QA report or, by its absence, will indicate that no significant QA or QC deviations occurred. Items that may result in a QA report include:

- Changes or updates to the QAPP;
- Deviations from the QAPP or work plan specifications;
- Results of system and performance audits;
- Significant QA/QC problems, recommended solutions, and results of corrective actions; and
- Limitations on the use of measurement data.

16.1 Field Reports

Reporting of the quality of field sample collection and field measurements will be the responsibility of the Field Supervisor or designee. Information from the field logbooks will be compiled, and a summary report on field activity QA will be prepared for the project file.

16.2 Laboratory Reports

The laboratory will maintain QA records related to analyses, QC, and corrective action. This information will be made available to the Project Manager upon request. Routine reporting will include documenting all internal QC checks performed for this project.

17 Data Reduction and Review

After field and laboratory data are obtained, the data will be subject to the following:

- Data reduction or manipulation, mathematically or otherwise, into meaningful and useful forms;
- Data validation;
- Review; and
- Organization, interpretation, and reporting.

17.1 Field Data Reduction and Review

Requirements for field data reduction and review are presented in the following subsections.

17.1.1 Field Data Reduction

Information collected in the field through visual observation, manual measurement, and/or field instrumentation will be recorded in field notebooks, data sheets, and/or on forms. Such data will be reviewed by the appropriate Task Manager for adherence to the SMP and this QAPP and for consistency. Concerns identified as a result of this review will be discussed with the field personnel, corrected if possible, and (as necessary) incorporated into the data evaluation process.

17.1.2 Field Data Review

Field data calculations, transfers, and interpretations will be conducted by the field personnel and reviewed for accuracy by the appropriate Task Manager and QAC. Field documentation and data reduction prepared by field personnel will be reviewed by the appropriate Task Manager and the QAC. Logs and documents will be checked for:

- General completeness;
- Readability;
- Usage of appropriate procedures;
- Appropriate instrument calibration and maintenance;
- Reasonableness in comparison to present and past data collected;
- Correct sample locations; and
- Correct calculations and interpretations.

17.2 Laboratory Data Reduction and Review

Requirements for laboratory data reduction and review are presented in the following subsections.

17.2.1 Laboratory Data Reduction

The calculations used for data reduction will be in accordance with the analytical methods. Whenever possible, analytical data will be transferred directly from the instrument to a computerized data system. Raw data will be

entered into permanently bound laboratory notebooks. The data entered must be sufficient to document all factors used to arrive at the reported value.

Concentration calculations for chromatographic analyses will be based on response factors. Quantitation will be performed using internal standards for GC/MS methodology.

Unless otherwise specified, all values will be reported as uncorrected for blank contamination.

17.2.2 Laboratory Data Review

Data will be subject to multi-level review by the laboratory. The group leader will review all data reports prior to release for final data report generation. The QAM will review the final data reports, and the Laboratory Director will review a cross-section of the final data reports prior to release.

If discrepancies or deficiencies are present in the analytical results, corrective action will be taken, as discussed in Section 15. Deficiencies discovered as a result of internal data review, as well as the corrective actions to be used to rectify the situation, will be documented on a Corrective Action Form. This form will be submitted to the Project Manager and QAC.

18 Data Verification and Validation

For samples where Category B report is requested, data validation will be conducted as outlined in the USEPA's *Guidance on Environmental Data Verification and Data Validation*, EPA QA/G-8 (USEPA 2002a).

Data validation is a standardized review process for judging the analytical quality and usefulness of a discrete set of chemical data and is necessary to ensure that data of known and documented quality are used in making environmental decisions that meet the DQOs of the Site. Data validation is a systematic process that compares a body of data to the requirements in a set of documented acceptance criteria to ascertain its completeness, correctness, and consistency. The data validation personnel will work independently from all other project teams. Data validators will not be involved in sampling or data analysis/reporting for the end user.

18.1 Data Validation Process

All data generated will be validated using the most recent versions of:

- The *National Functional Guidelines for Organic Superfund Methods Data Review*, EPA 540-R-2017-002 (USEPA 2017a) (with reference to the historical *Contract Laboratory Program National Functional Guidelines for Organic Data Review*, OSWER 9240.1-05A-P [USEPA 1999], as appropriate);
- The *National Functional Guidelines for Inorganic Superfund Methods Data Review*, EPA 540-R-2017-001 (USEPA 2017b) (with reference to the historical *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, OSWER 9240.1-45 [USEPA 2004], as appropriate);
- USEPA SW-846 methodology;
- NYSDEC ASP (NYSDEC 2005); and
- QA/QC and reporting deliverables requirements for data validation available at the time of project initiation, where appropriate.

These procedures and criteria may be modified, as necessary, to address project-specific and method-specific criteria, control limits, and procedures. Data validation will consist of data screening, checking, reviewing, and editing to document analytical data quality and to determine whether the quality is sufficient to meet the DQOs.

The data validator will verify that reduction of laboratory measurements and laboratory reporting of analytical parameters is in accordance with the procedures specified for each analytical method and/or as specified in this QAPP. Any deviations from the analytical method or any special reporting requirements, apart from those specified in this QAPP, will be detailed on the COC forms.

Upon receipt of laboratory data, the following procedures will be executed by the data validator:

- Evaluate the completeness of the data package.
- Verify that the field COC forms were completed and that samples were handled properly.
- Verify that holding times were met for each parameter. Document holding time exceedances, if any occur. Flag data for all samples exceeding holding time requirements as either estimated or rejected. The decision as to which qualifier is more appropriate will be made on a case-by-case basis.
- Verify that parameters were analyzed according to the analytical methods specified.
- Review QA/QC data (i.e., confirm that duplicates, blanks, and LCSs were analyzed for the required number of samples, as specified in the analytical method, and verify that duplicate RPDs are acceptable).

- Investigate any anomalies identified during review. When anomalies are identified, they will be discussed with the Project Manager and/or Laboratory Manager, as appropriate.

Deficiencies discovered as a result of the data review, as well as the corrective actions implemented in response to the deficiencies, will be documented and submitted in the form of a written report addressing the following topics, as applicable to each analytical method:

- Assessment of the data package;
- Description of any protocol deviations;
- Failures to reconcile reported and/or raw data;
- Assessment of any compromised data;
- Laboratory case narrative;
- Overall appraisal of the analytical data; and
- Table of site name, sample quantities, data submitted to the laboratory, year of protocol used, matrix, and fractions analyzed.

18.2 Data Verification

It should be noted that qualified results do not necessarily invalidate data. The goal to produce the best possible data does not necessarily mean that data must be produced without QC qualifiers. Qualified data can provide useful information.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results will be qualified with the following codes in accordance with the National Functional Guidelines.

Qualifier	Definition
Concentration Qualifiers (Laboratory Assigned)	
U	The analyte/compound was analyzed for but not detected. The associated value is the compound RL.
B	The analyte/compound has been found in the sample as well as its associated blank; its presence in the sample may be suspect. (Note: Laboratory assigned B qualifiers will be removed during data validation in the event that the concentration detected in the sample is greater than 5 times the concentration detected in the associated blank.)
J	The analyte/compound was positively identified; however, the associated numerical value is an estimated concentration only.
Quantitation Qualifiers (Laboratory Assigned)	
E	The compound was quantitated above the calibration range.
D	The concentration is based on a diluted sample analysis.
P	The lower of the two values is reported when the percent difference between the results of two GC columns is greater than 40%.
Validation Qualifiers	
UJ	The analyte/compound was not detected above the reported sample quantitation limit; however, the reported limit is approximate and may or may not represent the actual RL.

Qualifier	Definition
UB	The analyte/compound is considered non-detect at the listed value due to associated blank contamination (i.e., concentration in the sample is less than 5 times the concentration detected in the associated blank).
J	The analyte/compound was positively identified; however, the associated numerical value is an estimated concentration.
R	The sample results are rejected.

Two notes to all data users:

- The “R” qualifier means that the associated value is unusable. In other words, due to significant QC problems, the analysis is invalid and provides no information as to whether the compound is present or not. “R” values should not appear on data tables because they cannot be relied upon, even as a last resort.
- No compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in the data, but any value potentially contains an error.

Resolution of any issues regarding laboratory performance or deliverables will be handled between the laboratory and the data validator. Suggestions for reanalysis may be made by the QAC at this point.

Data validation reports will be kept in electronic format (e.g., PDF) at the environmental consultant’s office.

19 Reconciliation with User Requirements

The data results will be examined to determine the performance that was achieved for each data usability criterion. The performance will then be compared with the project objectives and DQOs. Deviations from the objectives will be noted. Additional action may be warranted when the performance does not meet the performance objectives for critical data. Options for corrective action relating to incomplete information, questionable results, or inconsistent data may include any or all of the following:

- Retrieval of missing information;
- Request for additional explanation or clarification;
- Reanalysis of a sample from extract (when appropriate); and
- Recalculation or reinterpretation of the results by the laboratory.

These actions may improve the data quality, reduce uncertainty, and eliminate the need to qualify or reject data.

If these actions do not improve the data quality to an acceptable level, the following additional actions may be taken:

- Extrapolation of missing data from existing data points;
- Use of historical data; and
- Evaluation of the critical/non-critical nature of the sample.

If the data gap cannot be resolved by these actions, an evaluation of the data bias and potential for false negatives and positives can be performed. If the resultant uncertainty level is unacceptable, additional sample collection and analysis may be required.

20 References

NYSDEC. 2005 Analytical Services Protocol. July 2005.

USEPA. 1991. National Enforcement Investigations Center Policies and Procedures Manual. August 1991.

USEPA. 1992. Guide to Management of Investigation-Derived Wastes. 9345.3-03FS. Office of Solid Waste and Emergency Response. April 1992.

USEPA. 1999. Contract Laboratory Program National Functional Guidelines for Organic Data Review. EPA-540/R-99-008. October 1999.

USEPA. 2001. EPA Requirements for QA Project Plans for Environmental Operations. EPA-QA/R-5. Office of Environmental Information. March 2001.

USEPA. 2002a. Guidance on Environmental Data Verification and Data Validation. EPA QA/G-8. Office of Environmental Information. November 2002.

USEPA. 2002b. Guidance for Quality Assurance Project Plans. EPA-QA/G-5. Office of Environmental Information. December 2002.

USEPA. 2004. Contract Laboratory Program National Functional Guidelines for Inorganic Data Review. OSWER 9240.1-45. October 2004.

USEPA. 2017a. National Functional Guidelines for Organic Superfund Methods Data Review, EPA 540-R-2017-002. January 2017.

USEPA. 2017b. National Functional Guidelines for Inorganic Superfund Methods Data Review, EPA-540-R-2017-001. January 2017.

Tables

Table 1a
Parameters, Methods, and Target Quantitation Limits (Groundwater)
Quality Assurance Project Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Analyte	CAS Number	Action Limit (ug/L)[1,2]	Laboratory MDL (ug/L)[3,4]	Laboratory RL (ug/L)[3,4]
VOCs (SW-846 8260C)				
1,1,1-Trichloroethane	71-55-6	5	0.82	1.0
1,1,2,2-Tetrachloroethane	79-34-5	5	0.21	1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	5	0.31	1.0
1,1,2-Trichloroethane	79-00-5	1	0.23	1.0
1,1-Dichloroethane	75-34-3	5	0.38	1.0
1,1-Dichloroethene	75-35-4	5	0.29	1.0
1,2,4-Trichlorobenzene	120-82-1	5	0.41	1.0
1,2-Dibromo-3-chloropropane	96-12-8	0.04	0.39	1.0
1,2-Dibromoethane	106-93-4	0.0006	0.73	1.0
1,2-Dichlorobenzene	95-50-1	3	0.79	1.0
1,2-Dichloroethane	107-06-2	0.6	0.21	1.0
1,2-Dichloropropane	78-87-5	1	0.72	1.0
1,3-Dichlorobenzene	541-73-1	3	0.78	1.0
1,4-Dichlorobenzene	106-46-7	3	0.84	1.0
2-Butanone	78-93-3	50	1.3	10
2-Hexanone	591-78-6	50	1.2	5.0
4-Methyl-2-pentanone	108-10-1	--	2.1	5.0
Acetone	67-64-1	50	3.0	10
Benzene	71-43-2	1	0.41	1.0
Bromodichloromethane	75-27-4	50	0.39	1.0
Bromoform	75-25-2	50	0.26	1.0
Bromomethane	74-83-9	5	0.69	1.0
Carbon disulfide	75-15-0	60	0.19	1.0
Carbon tetrachloride	56-23-5	5	0.27	1.0
Chlorobenzene	108-90-7	5	0.75	1.0
Chloroethane	75-00-3	5	0.32	1.0
Chloroform	67-66-3	7	0.34	1.0
Chloromethane	74-87-3	5	0.35	1.0
cis-1,2-Dichloroethene	156-59-2	5	0.81	1.0
cis-1,3-Dichloropropene	10061-01-5	0.4	0.36	1.0
Cyclohexane	110-82-7	--	0.18	1.0
Dibromochloromethane	124-48-1	50	0.32	1.0
Dichlorodifluoromethane	75-71-8	5	0.68	1.0
Ethylbenzene	100-41-4	5	0.74	1.0
Isopropylbenzene	98-82-8	5	0.79	1.0
m,p-Xylene	179601-23-1	5	0.66	2.0
Methyl acetate	79-20-9	--	1.3	2.5
Methyl tert-butyl ether	1634-04-4	10	0.16	1.0
Methylcyclohexane	108-87-2	--	0.16	1.0
Methylene chloride	75-09-2	5	0.44	1.0
o-Xylene	95-47-6	5	0.76	1.0
Styrene	100-42-5	930	0.73	1.0
Tetrachloroethene	127-18-4	5	0.36	1.0
Toluene	108-88-3	5	0.51	1.0
trans-1,2-Dichloroethene	156-60-5	5	0.90	1.0
trans-1,3-Dichloropropene	10061-02-6	0.4	0.37	1.0
Trichloroethene	79-01-6	5	0.46	1.0
Trichlorofluoromethane	75-69-4	5	0.88	1.0
Vinyl chloride	75-01-4	2	0.90	1.0
Xylenes, Total	1330-20-7	5	0.66	2.0

See Notes on Page 2.

Table 1a
Parameters, Methods, and Target Quantitation Limits (Groundwater)
Quality Assurance Project Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Analyte	CAS Number	Action Limit (ug/L)[1,2]	Laboratory MDL (ug/L)[3,4]	Laboratory RL (ug/L)[3,4]
Biogeochemical Parameters (methods listed below)				
Total Organic Carbon (TOC) (SW-846 9060A)	7440-44-0	--	434	1000
Alkalinity as CaCO3 (total) (SM2320B)	--	--	790	5000
Chloride (SW-846 9056A)	16887-00-6	500,000	282	500
Nitrate as Nitrogen (USEPA 353.2)	14797-55-8	20,000	20	50
Nitrite as Nitrogen (USEPA 353.2)	14797-65-0	2,000	20	50
Iron (total) (SW-846 6010C)	7439-89-6	600	19	50
Iron (dissolved) (SW-846 6010C)	7439-89-6	600	19	50
Sulfate (SW-846 9056A)	14808-79-8	500,000	349	2000
Methane (RSK-175)	74-82-8	--	0.17	1.0
Ethene (RSK-175)	74-85-1	--	0.27	1.0
Ethane (RSK-175)	74-84-0	--	0.29	1.0
Acetylene (RSK-175)	74-86-2	--	0.15	5.0
1,4-Dioxane (SW-846 8270D-SIM)				
1,4-Dioxane	123-91-1	0.35	0.10	0.20
PFAS (UAEPA 537 Modified)				
Perfluorobutanoic acid (PFBA)	375-22-4	--	0.0012	0.005
Perfluoropentanoic acid (PFPeA)	2706-90-3	--	0.00049	0.002
Perfluorohexanoic acid (PFHxA)	307-24-4	--	0.00073	0.002
Perfluoroheptanoic acid (PFHpA)	375-85-9	--	0.00037	0.002
Perfluorooctanoic acid (PFOA)	335-67-1	0.0067	0.00041	0.002
Perfluorononanoic acid (PFNA)	375-95-1	--	0.00022	0.002
Perfluorodecanoic acid (PFDA)	335-76-2	--	0.00037	0.002
Perfluoroundecanoic acid (PFUnA)	2058-94-8	--	0.00027	0.002
Perfluorododecanoic acid (PFDoA)	307-55-1	--	0.00043	0.002
Perfluorotridecanoic acid (PFTriA)	72629-94-8	--	0.00033	0.002
Perfluorotetradecanoic acid (PFTeA)	376-06-7	--	0.00030	0.002
Perfluorobutanesulfonic acid (PFBS)	375-73-5	--	0.00051	0.002
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	--	0.00039	0.002
Perfluoroheptanesulfonic acid (PFHpS)	375-92-8	--	0.00018	0.002
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	0.0027	0.00050	0.002
Perfluorodecanesulfonic acid (PFDS)	335-77-3	--	0.00034	0.002
Perfluorooctanesulfonamide (PFOSA)	754-91-6	--	0.00041	0.002
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2355-31-9	--	0.0017	0.005
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	2991-50-6	--	0.0016	0.005
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	--	0.0018	0.005
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	--	0.0013	0.002

Notes:

1 Groundwater screening criteria for VOCs and biogeochemical parameters reflect New York State Division of Water Technical and Operational Guidance Series (1.1.1), Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, June 1998 and April 2000 Addendum. Shaded cells indicate that the screening criteria is greater than the laboratory RL and/or MDL.

2 Groundwater screening criteria for 1,4-dioxane and PFAS reflect NYSDEC Final Ambient Water Quality Guidance Values for PFOA, PFOS, and 1,4-Dioxane published March 15, 2023.

3 Concentrations detected less than the reporting limit but greater than the method detection limit must be reported with the appropriate qualifier (J). Non-detected results will be reported at the RL.

4 The laboratory limits were provided by Eurofins Environmental Testing Northeast are current as of the writing of the QAPP. Samples will be reported using the current limits at the time of the analysis.

Abbreviations and Acronyms:

-- = not applicable
ug/L = micrograms per liter
CAS = chemical abstract service
MDL = method detection limit
PFAS = per- and polyfluoroalkyl substances
RL = reporting limit
VOCs = volatile organic compounds

Table 1b
Parameters, Methods, and Target Quantitation Limits
(Indoor Ambient Air/Sub-Slab Vapor)
Quality Assurance Project Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Analyte	CAS Number	Action Limit (ug/m^3)[1]		Laboratory MDL (ug/m^3)[2,3]	Laboratory RL (ug/m^3)[2,3]
		Sub-Slab Vapor	Indoor Air		
VOCs (EPA TO-15)					
1,1,1-Trichloroethane	71-55-6	Per NYSDOH matrix evaluation		0.066	0.54
1,1,2,2-Tetrachloroethane	79-34-5	--		0.074	0.53
1,1,2-trichloro-1,2,2-trifluoroethane	76-13-1	--		0.076	0.53
1,1,2-Trichloroethane	79-00-5	--		0.054	0.53
1,1-Dichloroethane	75-34-3	--		0.078	0.51
1,1-Dichloroethene	75-35-4	Per NYSDOH matrix evaluation		0.074	0.53
1,2,4-Trichlorobenzene	120-82-1	--		0.13	0.55
1,2,4-Trimethylbenzene	95-63-6	Per NYSDOH matrix evaluation		0.074	0.53
1,2-Dibromo-3-chloropropane	96-12-8	--		NA	NA
1,2-Dibromoethane	106-93-4	--		0.062	0.53
1,2-Dichloro-1,1,2,2-tetrafluoroethane	76-14-2	--		0.084	0.51
1,2-Dichlorobenzene	95-50-1	--		0.079	0.54
1,2-Dichloroethane	107-06-2	--		0.059	0.53
1,2-Dichloropropane	78-87-5	--		0.066	0.53
1,3,5-Trimethylbenzene	108-67-8	Per NYSDOH matrix evaluation		0.077	0.52
1,3-Butadiene	106-99-0	--		0.088	0.53
1,3-Dichlorobenzene	541-73-1	--		0.08	0.54
1,4-Dichlorobenzene	106-46-7	--		0.082	0.53
1,4-Dioxane	123-91-1	--		0.063	0.53
Acetone	67-64-1	--		1.2	5.3
Acrolein	107-02-8	--		NA	NA
Benzene	71-43-2	Per NYSDOH matrix evaluation		0.077	0.53
Bromodichloromethane	75-27-4	--		0.077	0.53
Bromomethane	74-83-9	--		0.074	0.5
Carbon Tetrachloride	56-23-5	Per NYSDOH matrix evaluation		0.074	0.53
Chlorobenzene	108-90-7	--		0.071	0.53
Chloroethane	75-00-3	--		0.066	0.51
Chloroform	67-66-3	--		0.071	0.53
Chloromethane	74-87-3	--		0.086	0.5
cis-1,2-Dichloroethene	156-59-2	Per NYSDOH matrix evaluation		0.075	0.53
cis-1,3-Dichloropropene	10061-01-5	--		0.083	0.56
Cyclohexane	110-82-7	Per NYSDOH matrix evaluation		0.15	1.1
Dibromochloromethane	124-48-1	--		0.07	0.53
Dichlorodifluoromethane	75-71-8	--		0.087	0.52
Ethylbenzene	100-41-4	Per NYSDOH matrix evaluation		0.075	0.53
Heptane	142-82-5	Per NYSDOH matrix evaluation		0.085	0.53
Hexane	110-54-3	Per NYSDOH matrix evaluation		0.11	0.53
Hexachlorobutadiene	87-68-3	--		0.11	0.53
Isooctane (2,2,4-trimethylpentane)	540-84-1	Per NYSDOH matrix evaluation		NA	NA
m,p-Xylene	179601-23-1	Per NYSDOH matrix evaluation		0.14	1.1
Methyl tert-butyl ether	1634-04-4	--		0.063	0.54
Methylene Chloride	75-09-2	Per NYSDOH matrix evaluation		0.15	0.53
Naphthalene	91-20-3	Per NYSDOH matrix evaluation		0.13	0.53
o-Xylene	95-47-6	Per NYSDOH matrix evaluation		0.077	0.53
Styrene	100-42-5	--		0.086	0.53
Tetrachloroethene	127-18-4	Per NYSDOH matrix evaluation		0.069	0.53
Toluene	108-88-3	Per NYSDOH matrix evaluation		0.065	0.53
trans-1,2-Dichloroethene	156-60-5	--		0.074	0.54
trans-1,3-Dichloropropene	10061-02-6	--		0.11	0.53
Trichloroethene	79-01-6	Per NYSDOH matrix evaluation		0.072	0.53
Trichlorofluoromethane	75-69-4	--		0.081	0.53
Vinyl Chloride	75-01-4	Per NYSDOH matrix evaluation		0.057	0.52

Notes:

1 Sub-slab soil vapor and indoor air screening criteria reflect New York State Department of Health (NYSDOH) FINAL Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006 (updated through 2024).

2 Concentrations detected less than the reporting limit but greater than the method detection limit must be reported with the appropriate qualifier (J). Non-detected results will be reported at the RL.

3 The laboratory limits and TO-15 analyte list were provided by ALS Environmental and are current as of the writing of the QAPP. Samples will be reported using the current limits at the time of the analysis.

Abbreviations and Acronyms:

-- = not applicable
ug/m^3 = micrograms per cubic meter
CAS = chemical abstract service
MDL = method detection limit
NA = Constituent not reported in Lab's TO-15 Method
RL = reporting limit
VOCs = volatile organic compounds

Table 1c
Parameters, Methods, and Target Quantitation Limits
(Liquid Waste Characterization)
Quality Assurance Project Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Analyte	CAS Number	Action Limit (ug/L)[1]	Laboratory MDL (ug/L)[2,3]	Laboratory RL (ug/L)[2,3]
VOCs (SW-846 8260C)				
1,1,1-Trichloroethane	71-55-6	--	0.82	1.0
1,1,2,2-Tetrachloroethane	79-34-5	--	0.21	1.0
1,1,2-Trichloro-1,2,2-trifluoroethane	76-13-1	--	0.31	1.0
1,1,2-Trichloroethane	79-00-5	--	0.23	1.0
1,1-Dichloroethane	75-34-3	--	0.38	1.0
1,1-Dichloroethene	75-35-4	700	0.29	1.0
1,2,4-Trichlorobenzene	120-82-1	--	0.41	1.0
1,2-Dibromo-3-chloropropane	96-12-8	--	0.39	1.0
1,2-Dibromoethane	106-93-4	--	0.73	1.0
1,2-Dichlorobenzene	95-50-1	--	0.79	1.0
1,2-Dichloroethane	107-06-2	500	0.21	1.0
1,2-Dichloropropane	78-87-5	--	0.72	1.0
1,3-Dichlorobenzene	541-73-1	--	0.78	1.0
1,4-Dichlorobenzene	106-46-7	7,500	0.84	1.0
2-Butanone	78-93-3	200,000	1.3	10
2-Hexanone	591-78-6	--	1.2	5.0
4-Methyl-2-pentanone	108-10-1	--	2.1	5.0
Acetone	67-64-1	--	3.0	10
Benzene	71-43-2	500	0.41	1.0
Bromodichloromethane	75-27-4	--	0.39	1.0
Bromoform	75-25-2	--	0.26	1.0
Bromomethane	74-83-9	--	0.69	1.0
Carbon disulfide	75-15-0	--	0.19	1.0
Carbon tetrachloride	56-23-5	500	0.27	1.0
Chlorobenzene	108-90-7	100,000	0.75	1.0
Chloroethane	75-00-3	--	0.32	1.0
Chloroform	67-66-3	6,000	0.34	1.0
Chloromethane	74-87-3	--	0.35	1.0
cis-1,2-Dichloroethene	156-59-2	--	0.81	1.0
cis-1,3-Dichloropropene	10061-01-5	--	0.36	1.0
Cyclohexane	110-82-7	--	0.18	1.0
Dibromochloromethane	124-48-1	--	0.32	1.0
Dichlorodifluoromethane	75-71-8	--	0.68	1.0
Ethylbenzene	100-41-4	--	0.74	1.0
Isopropylbenzene	98-82-8	--	0.79	1.0
m,p-Xylene	179601-23-1	--	0.66	2.0
Methyl acetate	79-20-9	--	1.3	2.5
Methyl tert-butyl ether	1634-04-4	--	0.16	1.0
Methylcyclohexane	108-87-2	--	0.16	1.0
Methylene chloride	75-09-2	--	0.44	1.0
o-Xylene	95-47-6	--	0.76	1.0
Styrene	100-42-5	--	0.73	1.0
Tetrachloroethene	127-18-4	700	0.36	1.0
Toluene	108-88-3	--	0.51	1.0
trans-1,2-Dichloroethene	156-60-5	--	0.90	1.0
trans-1,3-Dichloropropene	10061-02-6	--	0.37	1.0
Trichloroethene	79-01-6	500	0.46	1.0
Trichlorofluoromethane	75-69-4	--	0.88	1.0
Vinyl chloride	75-01-4	200	0.90	1.0
SVOCs (SW-846 8270D)				
1,1'-Biphenyl	92-52-4	--	0.653	5.0
2,2-Oxybis(1-chloropropane)	108-60-1	--	0.520	5.0
2,4,5-Trichlorophenol	95-95-4	400,000	0.480	5.0
2,4,6-Trichlorophenol	88-06-2	2,000	0.610	5.0
2,4-Dichlorophenol	120-83-2	--	0.510	5.0

See Notes on Page 3.

Table 1c
Parameters, Methods, and Target Quantitation Limits
(Liquid Waste Characterization)
Quality Assurance Project Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Analyte	CAS Number	Action Limit (ug/L)[1]	Laboratory MDL (ug/L)[2,3]	Laboratory RL (ug/L)[2,3]
SVOCs (SW-846 8270D) (cont.)				
2,4-Dimethylphenol	105-67-9	--	0.500	5.0
2,4-Dinitrophenol	51-28-5	--	2.22	10
2,4-Dinitrotoluene	121-14-2	130	0.447	5.0
2,6-Dinitrotoluene	606-20-2	--	0.400	5.0
2-Chloronaphthalene	91-58-7	--	0.460	5.0
2-Chlorophenol	95-57-8	--	0.530	5.0
2-Methylnaphthalene	91-57-6	--	0.600	5.0
2-Methylphenol	95-48-7	200,000	0.400	5.0
2-Nitroaniline	88-74-4	--	0.420	10
2-Nitrophenol	88-75-5	--	0.480	5.0
3,3'-Dichlorobenzidine	91-94-1	--	0.400	5.0
3-Nitroaniline	99-09-2	--	0.480	10
4,6-Dinitro-2-methylphenol	534-52-1	--	2.20	10
4-Bromophenyl-phenylether	101-55-3	--	0.450	5.0
4-Chloro-3-methylphenol	59-50-7	--	0.450	5.0
4-Chloroaniline	106-47-8	--	0.590	5.0
4-Chlorophenyl-phenylether	7005-72-3	--	0.350	5.0
4-Methylphenol	106-44-5	200,000	0.360	10
4-Nitroaniline	100-01-6	--	0.250	10
4-Nitrophenol	100-02-7	--	1.52	10
Acenaphthene	83-32-9	--	0.410	5.0
Acenaphthylene	208-96-8	--	0.380	5.0
Acetophenone	98-86-2	--	0.540	5.0
Anthracene	120-12-7	--	0.280	5.0
Atrazine	1912-24-9	--	0.460	5.0
Benzaldehyde	100-52-7	--	0.267	5.0
Benzo(a)anthracene	56-55-3	--	0.360	5.0
Benzo(a)pyrene	50-32-8	--	0.470	5.0
Benzo(b)fluoranthene	205-99-2	--	0.340	5.0
Benzo(g,h,i)perylene	191-24-2	--	0.350	5.0
Benzo(k)fluoranthene	207-08-9	--	0.730	5.0
bis(2-Chloroethoxy)methane	111-91-1	--	0.350	5.0
bis(2-Chloroethyl)ether	111-44-4	--	0.400	5.0
bis(2-Ethylhexyl)phthalate	117-81-7	--	2.20	5.0
Butylbenzylphthalate	85-68-7	--	1.00	5.0
Caprolactam	105-60-2	--	2.20	5.0
Carbazole	86-74-8	--	0.300	5.0
Chrysene	218-01-9	--	0.330	5.0
Dibenzo(a,h)anthracene	53-70-3	--	0.420	5.0
Dibenzofuran	132-64-9	--	0.510	10
Diethylphthalate	84-66-2	--	0.220	5.0
Dimethylphthalate	131-11-3	--	0.360	5.0
Di-n-butylphthalate	84-74-2	--	0.310	5.0
Di-n-octylphthalate	117-84-0	--	0.470	5.0
Fluoranthene	206-44-0	--	0.400	5.0
Fluorene	86-73-7	--	0.360	5.0
Hexachlorobenzene	118-74-1	130	0.510	5.0
Hexachlorobutadiene	87-68-3	500	0.680	5.0
Hexachlorocyclopentadiene	77-47-4	--	0.590	5.0
Hexachloroethane	67-72-1	3,000	0.590	5.0
Indeno(1,2,3-cd)pyrene	193-39-5	--	0.470	5.0
Isophorone	78-59-1	--	0.430	5.0
Naphthalene	91-20-3	--	0.760	5.0
Nitrobenzene	98-95-3	2,000	0.290	5.0
N-Nitrosodiphenylamine	86-30-6	--	0.510	5.0

See Notes on Page 3.

Table 1c
Parameters, Methods, and Target Quantitation Limits
(Liquid Waste Characterization)
Quality Assurance Project Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Analyte	CAS Number	Action Limit (ug/L)[1]	Laboratory MDL (ug/L)[2,3]	Laboratory RL (ug/L)[2,3]
SVOCs (SW-846 8270D) (cont.)				
N-Nitroso-di-n-propylamine	621-64-7	--	0.540	5.0
Pentachlorophenol	87-86-5	100,000	2.20	10
Phenanthrene	85-01-8	--	0.440	5.0
Phenol	108-95-2	--	0.390	5.0
Pyrene	129-00-0	--	0.340	5.0
PCBs (SW-846 8082A)				
Aroclor-1016	12674-11-2	--	0.176	0.500
Aroclor-1221	11104-28-2	--	0.176	0.500
Aroclor-1232	11141-16-5	--	0.176	0.500
Aroclor-1242	53469-21-9	--	0.176	0.500
Aroclor-1248	12672-29-6	--	0.176	0.500
Aroclor-1254	11097-69-1	--	0.250	0.500
Aroclor-1260	11096-82-5	--	0.250	0.500
Total PCBs	1336-36-3	50	0.250	0.500
Metals (SW-846 6010C/7470A)				
Arsenic	7440-38-2	5,000	5.6	15
Barium	7440-39-3	100,000	0.70	2
Cadmium	7440-43-9	1,000	0.50	2
Chromium	7440-47-3	5,000	1.0	4
Lead	7439-92-1	5,000	3.0	10
Mercury	7439-97-6	200	0.043	0.20
Selenium	7782-49-2	1,000	8.7	25
Silver	7440-22-4	5,000	1.7	6
General Chemistry				
Total Cyanide (SW-846 9012B)	57-12-5	--	5	10
Oil and Grease (SW-846 1664A)	NA	--	1400	5000
pH (SW-846 9040C)	NA	< 2 or > 12.5	0.1	0.1

Notes:

1 Waste characterization screening criteria reflect 40 CFR 261, Appendix II, 1993 ed., as amended by 58 FR 46040, August 31, 1993.

2 Concentrations detected less than the reporting limit but greater than the method detection limit must be reported with the appropriate qualifier (J). Non-detected results will be reported at the RL.

3 The laboratory limits were provided by Eurofins Environmental Testing Northeast are current as of the writing of the QAPP. Samples will be reported using the current limits at the time of the analysis.

Abbreviations and Acronyms:

-- = not applicable
ug/L = micrograms per Liter
CAS = chemical abstract service
MDL = method detection limit
PCBs = polychlorinated biphenyls
RL = reporting limit
SVOCs = semivolatile organic compounds
VOCs = volatile organic compounds

Table 2
Sample Quantities and Quality Control Frequencies
Quality Assurance Project Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Parameter	Field QC Analyses						Laboratory QC Sample					
	Trip Blank		Rinse Blank		Field Duplicate		MS		MSD		Laboratory Duplicate	
	Freq.	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.	No.	Freq.	No.
Groundwater												
VOCs (SW-846 8260C)	1/cooler	TBD	1/20	TBD	1/20	TBD	1/20	TBD	1/20	TBD	1/20	TBD
Total Organic Carbon (TOC) (SW-846 9060A)	--	--	--	--	--	--	--	--	--	--	--	--
Alkalinity as CaCO3 (total) (SM2320B)	--	--	--	--	--	--	--	--	--	--	--	--
Chloride and Sulfate (SW-846 9056A)	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate as Nitrogen and Nitrite as Nitrogen (USEPA 353.2)	--	--	--	--	--	--	--	--	--	--	--	--
Iron (total) (SW-846 6010C)	--	--	--	--	--	--	--	--	--	--	--	--
Iron (dissolved) (SW-846 6010C)	--	--	--	--	--	--	--	--	--	--	--	--
Dissolved Gases (RSK-175)	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dioxane (SW-846 8270D-SIM)	--	--	1/20	TBD	1/20	TBD	1/20	TBD	1/20	TBD	1/20	TBD
PFAS (USEPA 537 Modified)	--	--	1/20	TBD	1/20	TBD	1/20	TBD	1/20	TBD	1/20	TBD
Air												
VOCs (USEPA TO-15)	--	--	--	--	1/20	TBD	--	--	--	--	--	--
Liquid Waste Characterization												
VOCs (SW-846 8260C)	--	--	--	--	--	--	--	--	--	--	--	--
SVOCs (SW-846 8270D)	--	--	--	--	--	--	--	--	--	--	--	--
PCBs (SW-846 8082A)	--	--	--	--	--	--	--	--	--	--	--	--
Metals (SW-846 6010C)	--	--	--	--	--	--	--	--	--	--	--	--
Mercury (SW-846 7470A)	--	--	--	--	--	--	--	--	--	--	--	--
Cyanide (SW-846 9012B)	--	--	--	--	--	--	--	--	--	--	--	--
Oil and Grease (SW-846 1664A)	--	--	--	--	--	--	--	--	--	--	--	--
pH (SW-846 9040C)	--	--	--	--	--	--	--	--	--	--	--	--

Abbreviations and Acronyms:
-- = not applicable
Freq. = frequency
MS = matrix spike
MSD = matrix spike duplicate
No. = number
PCBs = polychlorinated biphenyls
PFAS = per- and polyfluoroalkyl substances
QC = quality control
SVOCs = semivolatile organic compounds
TBD = to be determined
VOCs = volatile organic compounds

Table 3
Laboratory Quality Control Limits
Quality Assurance Project Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Parameter	Accuracy - Percent Recovery[1]			Precision - Relative Percent Difference		
	Surrogate	MS/MSD	LCS	MS/MSD	Laboratory Duplicate	Field Duplicate
Groundwater						
VOCs (SW-846 8260C)	73-120	55-150	55-150	35	--	30
Total Organic Carbon (TOC) (SW-846 9060A)	--	54-131	90-110	20	--	--
Alkalinity as CaCO3 (total) (SM2320B)	--	60-140	90-110	20	--	--
Chloride and Sulfate (SW-846 9056A)	--	80-120	90-110	15	--	--
Nitrate as Nitrogen and Nitrite as Nitrogen (USEPA 353.2)	--	90-110	90-110	20	--	--
Iron (total) (SW-846 6010C)	--	75-125	80-120	20	--	--
Iron (dissolved) (SW-846 6010C)	--	75-125	80-120	20	--	--
Dissolved Gases (RSK-175)	60-140	50-150	60-140	30	--	--
1,4-Dioxane (SW-846 8270D-SIM)	40-140	40-140	40-140	20	--	30
PFAS (USEPA 537 Modified)	40-140	60-140	70-130	30	--	30
Air						
VOCs (USEPA TO-15)	--	--	70-130	--	--	50

Note:
1. The listed QC limits are based on the laboratory-provided limits at the time of this document. The limits are updated periodically by the laboratory, and the current limits at the time of analysis will be reported. For VOCs and dissolved gases, the upper and lower range of values are provided and differ for each compound.

Abbreviations and Acronyms:
-- = not applicable
LCS = laboratory control sample
MS = matrix spike
MSD = matrix spike duplicate
PFAS = per- and polyfluoroalkyl substances
VOCs = volatile organic compounds

Table 4
Sample Containers, Preservation, and Holding Times
Quality Assurance Project Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

Parameter	Method	Bottle Type[1]	Preservation	Holding Time[2]
Groundwater				
VOCs	SW-846 8260C	2-40ml glass vials with Teflon®-lined lid	HCl to pH<2 Cool to <6°C	14 days to analysis
Total Organic Carbon (TOC)	SW-846 9060A	2-40ml glass vials with Teflon®-lined lid	H_2SO_4 to pH<2 Cool to <6°C	28 days to analysis
Alkalinity as CaCO3 (total)	SM2320B	250mL plastic or glass	Cool to <6°C	14 days to analysis
Chloride and Sulfate	SW-846 9056A	125mL plastic	Cool to <6°C	28 days to analysis
Nitrate as Nitrogen and Nitrite as Nitrogen	USEPA 353.2	125mL plastic or glass	H_2SO_4 to pH<2 Cool to <6°C	28 days to analysis
Iron (total)	SW-846 6010C	250mL plastic	HNO_3 to pH<2 Cool to <6°C	180 days to analysis
Iron (dissolved)	SW-846 6010C	250mL plastic	Field filtered: HNO_3 to pH<2 Lab filtered: None Cool to <6°C	180 days to analysis
Dissolved Gases	RSK-175	2-40ml glass vials with Teflon®-lined lid	HCl to pH<2 Cool to <6°C	14 days to analysis
1,4-Dioxane	SW-846 8270D-SIM	2-1 L amber glass bottle with Teflon®-lined lid	Cool to <6°C	7 days to extraction 40 days to analysis
PFAS	USEPA 537 Modified	250mL polyethylene bottle *Note: caps must not have Teflon liners*	Cool to <6°C	14 days to extraction 28 days to analysis
Air				
VOCs	USEPA TO-15	SUMMA Canister	None	30 days to analysis
Liquid Waste Characterization				
VOCs	SW-846 8260C	2-40ml glass vials with Teflon®-lined lid	HCl to pH<2 Cool to <6°C	14 days to analysis
SVOCs	SW-846 8270D	2-1 L amber glass bottle with Teflon®-lined lid	Cool to <6°C	7 days to extraction 40 days to analysis
PCBs	SW-846 8082A	2-1 L amber glass bottle with Teflon®-lined lid	Cool to <6°C	7 days to extraction 40 days to analysis
Metals	SW-846 6010C	1 L plastic bottle	HNO_3 to pH<2	180 days to analysis
Mercury	SW-846 7470A		Cool to <6°C	28 days to analysis
Cyanide	SW-846 9012B	500 ml plastic bottle	Cool to <6°C Zinc acetate; NaOH pH >12	14 days to analysis
pH	SW-846 9040C	250 ml plastic bottle	Cool to <6°C	24 hours to analysis
Oil and Grease	USEPA 1664A	2-1 L amber glass bottle with Teflon®-lined lid	HCl to pH<2 Cool to <6°C	28 days to analysis

Notes:

[1] The laboratory should be consulted prior to sample collection, as it may be possible to combine sample volume for multiple analyses in one sample container.

[2] All holding times are measured from date of collection. It is imperative that all samples are submitted to the laboratory with ample time for the analysis to be completed within the holding time. Missing a holding time is unacceptable and may result in unusable data if the holding time is missed.

Abbreviations and Acronyms:

< = less than
°C = degrees Celsius
H_2SO_4 = sulfuric acid
HCl = hydrochloric acid
HNO_3 = nitric acid
L = liter
ml = milliliter
NaOH = sodium hydroxide
PCBs = polychlorinated biphenyls
PFAS = per- and polyfluoroalkyl substances
SVOCs = semivolatile organic compounds
VOCs = volatile organic compounds

Attachment 1

EQuIS™ Laboratory Standard Operating Procedure

INTRODUCTION

ARCADIS manages and verifies/validates analytical data generated by commercial analytical laboratories in the EQuIS database (product of Earthsoft, Inc.). All laboratories contracted by ARCADIS or their clients, on a site-by-site basis, may be required to submit electronic data deliverables (EDDs) in addition to the hard copy report. This Standard Operating Procedure (SOP) describes the structure, format, and submission requirements for electronic data deliverables (EDDs) in the EQuIS EFWEDD (Sample, Test, Result, Batch) format.

This document is a general guidance for preparation of the required electronic data and associated quality control information. The structure of the EDD as defined in this document will remain constant unless Earthsoft modifies the database structure. Reference values and requirements for population of additional fields with specific information will not change from project to project.

Modification to reference value lists may NOT be made by the laboratory without authorization from ARCADIS.

Section I provides ARCADIS contact information and the procedure to submit electronic deliverables directly via e-mail. However, all EDDs will be required to be submitted in a final CD compilation for each specific sampling event or as directed by the ARCADIS Project Manager (PM).

Section II outlines the table structures and general requirements of the EDDs. The EDD structure is based on EarthSoft's EFWEDD EDD format. EarthSoft's EDD format has not been changed; however, some 'optional' fields identified in the EarthSoft EDD have been modified to be 'required' in this EDD format. Additional information regarding the EarthSoft products can be found at http://www.earthsoft.com/.

Section III presents some additional explanation and requirements for populating the table structure and population set forth in Section II.

Section IV summarizes the use of the EDP. Each laboratory **MUST** use EDP to check each EDD file set prior to submission to ARCADIS. The EDP Error Report must be submitted with the EDD. ***All errors identified by the EDP routine must be corrected prior to forwarding the files for entry into the EQuIS database. Or approval for submittal with errors must be authorized by ARCADIS.***

I. CONTACT INFORMATION

Laboratories should contact the ARCADIS National Program Lab Managers with questions regarding this document. The contact info is as follows:

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ELECTRONIC LABORATORY DATA CHECKER EDP

Prior to submitting an EDD to ARCADIS, the EarthSoft EDP must be run to check and verify the EDD structure, format and reference value compliance. The EDP report must be submitted for each file with each EDD set. The Data Checker error report, which demonstrates that the EDD files were successfully checked, must be electronically submitted with the four EDD files to ARCADIS.

REFERENCE VALUES

A specific set of values is required to be utilized in populating certain key fields of the EDD. The Reference Value Lists for the EDP will be provided for each ARCADIS subcontracted laboratory. The Reference Value Lists must be utilized as provided. Alterations or additions to the Reference Values are **NOT** allowed **without prior** written authorization by the ARCADIS Data Manager. Electronic mail may be considered written authorization.

ELECTRONIC DATA DELIVERABLE (EDD) SUBMISSION

Prior to submission to ARCADIS, each data file must also be reviewed by the laboratory to ensure that the sample IDs, dates, times and other inter-related information is consistent between all four (4) files and the EDD is complete. All parameters that are subcontracted to other laboratories must be included in the EDD for a specific SDG or Laboratory Project Number. It is not acceptable to submit separate EDDs for subcontract parameters. Manual review of the files may be necessary to complete this review.

It is **IMPERATIVE** that the EDD results match the hard copy results. If the results do not match the lab will correct the error ASAP at no additional charge. This includes issues involving various rounding routines for different electronic data management programs within the laboratory (i.e. LIMS vs. EPA CLP). Significant figures must also match hard copy and be consistent from one sampling event to the next. Reporting limits must be consistent between events as well and must be in compliance with the Laboratory Task Order or Project Statement of Work. There may be instances where diluted surrogates and unrecovered spike compounds will require population of the EDD with numeric values in lieu of data flags in the hard copy report. The ARCADIS Data Manager will provide project specific guidance for these conditions. Adherence to the SOP requirements for population of spike/surrogate recovery and RPD fields is required to allow electronic validation of the data.

The EDP Reports for each file must be submitted with the 4 files of the actual EDD.

Laboratories must submit EDDs via e-mail for verification of compatibility and completeness to the assigned ARCADIS Data Manager for the project.

The subject line of this e-mail must include the following text:

[Facility-Code] [Laboratory Project/Log/SDG Number] - EDD Submission

The e-mail should also include the laboratory contact name and phone number.

EDDs must be submitted via e-mail prior to or at the same time the final hard copy document is delivered. ARCADIS may review the EDDs prior to requesting final submittal on CD. EDDs will be returned to the laboratory for modifications until the files can be successfully imported into the EQuIS Project Database and Electronic Data Validation can be performed without field population errors. Any revisions to the EDD will be required within 24 hours of notification to the laboratory regarding observed problems with the EDD. When the EDD is acceptable to the ARCADIS Data Manager and Project Manager, a CD containing all final versions of the EDD should be submitted to ARCADIS for archiving.

Invoices for analytical work will not be approved for payment until the final EDD revisions are acceptable.

II. ELECTRONIC DELIVERABLE DATA FORMAT

This section identifies the structure and format requirements for EQuIS EFWEDD EDDs submitted by all laboratories to ARCADIS. Specific field definitions are presented for each of the four files. Laboratories should review the unique requirements for these fields. The format population and adherence to the criteria are mandatory. Data are electronically validated and errors are quickly identifiable if the EDD is incorrect.

GENERAL FORMAT REQUIREMENTS

All laboratory data must be saved as an ASCII file format using the following standard format. Each subcontracting laboratory's data must be incorporated into the primary laboratory's EDD.

Each data field must be either separated by tabs or enclosed in double quotes (") and separated by commas. Data fields that do not contain information may be represented by two commas. Maximum length of text fields is indicated in the parentheses. If the input information is less than the maximum field length, **DO NOT ADD** spaces to account for the difference.

Each record must be terminated with a carriage return/line feed (i.e., standard DOS text file). The file can be produced using any software with the capability to create ASCII files.

THE LABORATORY SHALL LEAVE THE HEADERS IN EACH ASCII FILE TO ASSIST IN REVIEW AND RESOLUTION OF ERRORS.

Four files are required for each SDG or Laboratory Project Number: one each for samples, tests, results, and batches. Each file must be saved as a Tab Delimited or Comma Separated file.

Enterprise EDD File Naming Conventions
EDD packages must be named using a specific naming convention. An EDD Package consists of a .zip file containing the text (.txt) EDDs and a User Certificate. The zip file and text file names must contain the specific elements listed below under file naming conventions, separated by a period. A User Certificate file will be supplied to the lab by Arcadis for inclusion in the zip file. Please include in the subject line of emailed EDD submissions the facility code and Sample Delivery Group (SDG) number.

File Naming Conventions:
ZIP File Name = Unique ID.Facility Code.Format Name.zip
Text File EDDs Name = Unique ID.EDD Section Name.txt

Unique ID = SDG number.
Facility Code = The facility code (i.e., Site Name from ENFOS)
Format Name = The EQuIS EDD format name (e.g., ESBasic, EFWEDD, etc.).
EDD Section Name = The name of the section within the EDD (e.g. EFW2FSample, EFW2LabTST, etc.).

For example, ZIP File Name = "2009001.BP-99999.EFWEDD.zip" will contain the following files: "2009001.EFW2FSample.txt", "2009001.EFW2LabTST.txt", “2009001.EFW2LabRES.txt", '2009001.EFW2LabBCH.txt' and "pfoos.usr".

Package re-submittal
In order to re-submit corrected EDDs, the .zip file and text (.txt) EDDs must each be renamed. If the example EDD package above were to be re-submitted it would have ZIP File Name = "2009001B.BP-99999.EFWEDD.zip" containing "2009001B.EFW2FSample.txt", "2009001B.EFW2LabTST.txt", “2009001B.EFW2LabRES.txt", '2009001B.EFW2LabBCH.txt' and "pfoos.usr". Note that a “B” has been appended to the SDG name in both the zip file name and each of the text file names. A subsequent re-submittal of the same SDG would require that a C be appended and so on.

Referential integrity is enforced between tables (e.g. sys_sample_code present in the result, batch, and test tables must also be present in the sample table). For example, a data record with a specific sys_sample_code found in the result table, but not in the sample table, will cause and error in the Data Import Module and the file will not be allowed to be entered into the database. Dates and times associated with each test must match in the “Test” and “Result” files or the database will not allow entry of the entire file.

Reference values must be adhered to for a variety of fields as identified in the Reference Value list and described in the following table format requirements.

FORMAT DETAILS

The following four sections provide a detailed summary and the specific layout for each field required in each of the four (4) tables of the EDD. The ARCADIS EDD has been derived from the EarthSoft EFWEDD EDD.

Date is reported as MM/DD/YY (month/day/year) and time as HH:MM (hour:minute). Time must be reported in 24-hour (military) format (3:30 p.m. = 15:30 and 8:30 AM = 08:30 not 8:30). **NOTE:** Make certain that the LIMS systems format the date and time the same way for all files.

The columns in the following 4 tables relate to:

“Number” Column in Tables = Column of EDD table

“Attribute Name” = Column Name
PK after attribute indicates this is a primary key within Access for the table.

"Column Data" Type = Text or Numeric values required. Parenthetical number indicates total allowable number of characters in the field.

"Required" Column:

The column titled 'Required' will contain the text 'Yes' if the field is required to be populated by the laboratory. In addition, a "condition" is added to indicate additional information applying to population of the associated field. The first number of the condition relates to the table in which the condition applies, i.e. 1 is the Sample File, 2 is the Test File, 3 is the Result File, and 4 is the Batch File. Conditions apply as follows:

Condition	Table	Description
0	ALL	Field always required
1-1	SAMPLE	Field required for field samples only not required for laboratory samples
1-2	SAMPLE	Field required (parent_sample_code) for **laboratory** QC samples that have 'parents'
1-3	SAMPLE	Field not required for field samples
2-1	TEST	Field required if applicable for specific test
3-1	RESULT	Field required (result_value) for detected analytes only (TRG or TICs). Must be NULL if non-detect or surrogates, internal standards or spiked compounds
3-2	RESULT	Field required if available or appropriate for result
3-3	RESULT	Field required for matrix spikes or matrix spike duplicates (NOT required for surrogate compounds or LCS samples where the original concentration is assumed to be zero).
3-4	RESULT	Field required for surrogate compounds, LCS, Blank Spikes, Matrix Spikes, and Internal Standards.
3-5	RESULT	Field required for LCS duplicates, Blank Spike Duplicates, Matrix Spike Duplicates, Lab Replicates
3-6	RESULT	Field required for LCSD, BSD, MSD, and Lab duplicate samples
3-7	RESULT	Field required for surrogates and spike compounds
4-1	BATCH	Field required if available or appropriate for result

"REQUIRED":

"YES" = Required data if applicable

"NO" = Optional information unless otherwise directed by ARCADIS Data Manager or preferred for insertion by lab except where lab is specifically directed to leave the field Null.

Parent Sample Definition

Parent Samples are base samples for duplicates or spikes. i.e. original field samples used for matrix spikes or field sample used for Lab Duplicate/Replicate. A Matrix Spike is not the Parent Sample of the Matrix Spike Duplicate.

POPULATING SPIKE FIELDS

SURROGATES: surrogate recoveries are to be populated in qc_spike_added, qc_spike_measure, and qc_spike_recovery fields. Surrogates are analyte type = SUR. Control limits for surrogate recoveries must also be populated.

INTERNAL STANDARDS: internal standard values are to be populated in qc_spike_added, qc_spike_measure, and qc_spike_recovery fields. Internal Standards are analyte type = IS.

LCS, BS, and MS COMPOUNDS: recoveries are to be populated in qc_spike_added, qc_spike_measured, and qc_spike_recovery fields. Compounds spiked to evaluate method accuracy are analyte type = SC. Control limits for spike recoveries must also be populated.

LCSD, BD, AND MSD COMPOUNDS: recoveries are to be populated in qc_dup_spike_added, qc_dup_spike_measured, and qc_dup_spike_recovery fields. The Compounds spiked to evaluate method accuracy are analyte type = SC. Control limits for spike recoveries must also be populated. Additionally, the qc_rpd and qc_rpd_cl fields must be populated for these samples.

LAB REPLICATE SAMPLE DATA: values for lab duplicates/replicates are to be populated in qc_dup_spike_measured field. The qc_rpd and qc_rpd_cl fields must be populated for these samples.

III. ADDITIONAL REQUIREMENTS

SAMPLE TABLE				
Num	**Attribute Name**	**Column Data Type**	**Required**	**Attribute Definition**
1	sys_sample_code	Text(40)	Yes (0)	Unique sample identifier (COC Sample ID). Each sample must have a unique value, including spikes and duplicates. Unique sample identifiers **throughout** the database are an **ABSOLUTE** restriction enforced by EQuIS Chemistry. This unique identifier also carries through to each subsequent sampling event where the samples IDs must be unique for EVERY event of the project (continuing years). Laboratory QC samples must also have unique identifiers between sampling event and from 1 year to the next and between laboratories in the event subcontractors are used. For Matrix Spike, Matrix Spike Duplicate, and Laboratory Duplicates of Field Samples, add the suffix **MS, MSD, and LR**, respectively to create unique identifiers for these types of Lab QC samples.
2	sample_name	Text(30)	No	Additional sample identification information as necessary. Is not required to be unique (i.e., duplicates are OK).

SAMPLE TABLE				
Num	**Attribute Name**	**Column Data Type**	**Required**	**Attribute Definition**
3	sample_matrix_code	Text(10)	Yes (0)	Code, which distinguishes between different types of sample matrix. **Examples**: Soil samples =“SO” , groundwater samples = “WG”. Field Blanks, Trip Blanks, and Rinsate Blanks = “WQ”. Water Method Blanks and liquid matrix spikes = “WQ” Soil Method Blanks and soil/sludge/sediment matrix spikes = “SQ’ This field refers to the sample matrix not the matrix after preparation or extraction. See rt_matrix for the list of valid values.
4	sample_type_code	Text(10)	Yes (0)	Code that distinguishes between different types of samples. **For example**, normal field samples = “N” and laboratory method blank =“LB”. Field QC sample types are Field Duplicates = “FD”, Field Blanks = “FB”, Trip Blanks = “TB”. Lab QC sample types are LCS or Blank Spikes = “BS”, LCSD or BS Duplicates = “BD” and Matrix Spikes = “MS” and Matrix Spike Duplicates = “SD”. See rt_sample_type in Reference Values list of valid values.
5	sample_source	Text(10)	Yes (0)	Must be either "Field" for field samples **or** "Lab" for laboratory QC samples. No other values are allowed. Matrix spikes and lab duplicate/replicate are "Lab" samples, even though the parent is a "Field" and the base sample came from the field. The spiking or splitting for duplication is done in the lab. Field duplicates as submitted to the lab by field sampling teams are “Field”
6	parent_sample_code	Text(40)	Yes (1-2)	The value in the "sys_sample_code" that identifies the sample that was the source of this sample. *For example*, the Matrix Spike and the Matrix Spike Duplicate or Lab Replicates parent_sample_code is the sys_sample_code for the originating field sample that is spiked to generate the MS/MSD or split by the lab for use as the laboratory duplicate. This field is only required in the EDD for laboratory "clone" samples (e.g., matrix spikes and duplicates). Field duplicates are submitted blind to the laboratory, so this field cannot be completed by the laboratory. This field must be blank for samples that have no parent (e.g., normal field samples, method blanks, etc.).
7	sample_delivery_group	Text(10)	Yes (0)	Sample delivery group or laboratory Project/Log Number. All deliverables must reference the SDG or Lab Log-in Number. **This field MUST BE POPULATED**
8	sample_date	Date	Yes (1-1)	Date of sample collection in **MM/DD/YY** format including trip blanks. Must be blank for laboratory samples.
9	sample_time	Time	Yes (1-1)	Time of sample collection in 24-hour (military) **HH:MM** format. 8:45 AM = 08:45 and 3:30 PM = 15:30. Must be blank for laboratory samples.

SAMPLE TABLE				
Num	**Attribute Name**	**Column Data Type**	**Required**	**Attribute Definition**
10	sys_loc_code	Text(20)	No	Sample collection location. To be populated by ARCADIS unless otherwise directed at project initiation.
11	start_depth	Double	No	Beginning depth (top) of soil sample. To be populated by ARCADIS unless otherwise directed at project initiation.
12	end_depth	Double	No	Ending depth (bottom) of soil sample. To be populated by ARCADIS unless otherwise directed at project initiation.
13	depth_unit	Text(15)	No	Unit of measurement for the sample begin and end depths. IRPIMS-style unit of measurement codes (see table X03) are recognized by Chem; other codes may be allowed by the Chem project manager. To be populated by ARCADIS unless otherwise directed at project initiation.
14	chain_of_custody	Text(15)	Yes (1-1)	Chain of custody identifier or number. A single sample may be assigned to only one chain of custody. The COC identifier will be provided by the field sampling team based on conventions established for a specific project.
15	sent_to_lab_date	Date	No	Date sample was sent to lab (in MM/DD/YY format for EDD).
16	sample_receipt_date	Date	Yes (1-1)	Date that sample was received at laboratory in **MM/DD/YY** format. Must be blank for laboratory samples.
17	sampler	Text(30)	No	Name or initials of sampler.
18	sampling_company_ code	Text(10)	Yes (1-1)	Name or initials of sampling company (no controlled vocabulary). "ARCADIS" should be entered into this field unless otherwise directed at project initiation.
19	sampling_reason	Text(30)	No	Optional reason for sampling. No controlled vocabulary is enforced.
20	sampling_technique	Text(40)	No (1-1)	To be populated by ARCADIS unless otherwise directed at project initiation. Sampling technique. **For example**, low flow, bailing, MIP, etc… Must be blank for laboratory samples.
21	task_code	Text(10)	No	Code used to identify the task under which the field sample was retrieved.
22	collection_quarter	Text(5)	No	Quarter of the year sample was collected (e.g., "1Q96")
23	composite_yn	Text(1)	No	Boolean field used to indicate whether a sample is a composite sample.
24	composite_desc	Text(255)	No	Description of composite sample (if composite_yn is YES).

SAMPLE TABLE				
Num	**Attribute Name**	**Column Data Type**	**Required**	**Attribute Definition**
25	sample_class	Text(10)	No	Navy sample class code.
26	custom_field_1	Text(255)	No	Custom sample field
27	custom_field_2	Text(255)	No	Custom sample field
28	custom_field_3	Text(255)	No	Custom sample field
29	comment	Text(255)	Yes (0)	Field required to contain the full sample ID code.
30	sample_receipt_time	Text(5)	Yes (1-1)	Time of sample receipt by laboratory in 24-hour (military) **HH:MM** format. 8:45 AM = 08:45 and 3:30 PM = 15:30

TEST TABLE				
Num	**Attribute Name**	**Column Data Type**	**Required**	**Attribute Definition**
1	sys_sample_code (PK)	Text (40)	Yes (0)	SAME AS #1 IN SAMPLE TABLE. This value is used in enforcing referential integrity between tables. Must match sys_sample_code in Sample Table.
2	lab_anl_method_name (PK)	Text (35)	Yes (0)	Laboratory analytic method name or description. See rt_analytic_method in reference value tables for list of valid values.
3	analysis_date (PK)	Date/ Time	Yes (0)	Date of sample analysis in MM/DD/YY format. Refers to initiation of the analysis not prep method date.
4	analysis_time (PK)	Text (5)	Yes (0)	Time of sample analysis in 24-hour (military) HH:MM format. Note that this field, combined with the "analysis_date" field is used to distinguish between reextractions, reanalyses, and dilutions. Please ensure that retests have "analysis_date" and/or analysis_time" different from the original test event (and complete test_type field as appropriate).
5	total_or_dissolved (PK)	Text (1)	Yes (0)	"T" for total metal organic carbon concentration, "D" for dissolved or filtered metal or organic carbon concentration ONLY. USE "N" for organic (or other) constituents for which neither "total" nor "dissolved" is applicable including TDS.
6	column_number (PK)	Text (2)	Yes (2-1)	Applicable for GC or HPLC methods. "1C" for first column analyses, "2C" for second column analyses, or "NA" for analyses where not applicable. If any "2C" tests are listed, then there must be corresponding "1C" tests present also. Laboratories must indicate which of the two columns is to be considered "primary" by entering “Y” in the "reportable_result" field of the result table for the result presented in hard copy reports. It is NOT acceptable to identify both “1C” and “2C” reportable_result as “Y:; one must be “N” if” “1C” and “2C” are provided in the EDD.

TEST TABLE				
Num	**Attribute Name**	**Column Data Type**	**Required**	**Attribute Definition**
7	test_type (PK)	Text (10)	Yes (0)	Type of test. Valid values include "initial", "reextract", and "reanalysis", "dilution" are acceptable. See rt_test_type for al valid values.
8	lab_matrix_code	Text (10)	Yes (0)	Code that distinguishes between different types of matrix analyzed. Soil = "SO"; groundwater = "GW" and TCLP = TCLP as a lab matrix. See rt_matrix for valid values
9	analysis_location	Text (2)	Yes (0)	"LB" for fixed-based laboratory analysis, "FI" for field instrument, "FL" for mobile field laboratory analysis, or.
10	basis	Text (10)	Yes (0)	"Wet" for wet-weight basis; or "Dry" for dry-weight basis. For tests for which this distinction is not applicable use Wet
11	container_id	Text (30)	No	Sample container identifier.
12	dilution_factor	Single	Yes (0)	Test or analytical run dilution factor. **Must** be "1'" if no dilution.
13	Prep_method	Text (35)	Yes (2-1)	Laboratory sample preparation method name. See rt_std_prep_method for valid values.
14	prep_date	Date/ Time	Yes (2-1)	Date of sample preparation in MM/DD/YY format.
15	prep_time	Text (5)	Yes (2-1)	Time of sample preparation in 24-hour (military) HH:MM format
16	leachate_method	Text (15)	Yes (2-1)	Method name, e.g., SW1311 or SW1312. See rt_analytic_method for valid values.
17	leachate_date	Date/ Time	Yes (2-1)	Date of leachate preparation in MM/DD/YY format.
18	leachate_time	Text (5)	Yes (2-1)	Time of leachate preparation in 24-hour (military) HH:MM format.
19	lab_name_code	Text (10)	Yes (0)	Unique identifier of the laboratory reporting results. See rt_subcontractor for valid values.
20	qc_level	Text (10)	NO	Not populated by Lab.
21	lab_sample_ id	Text (20)	Yes (0)	Laboratory sample identifier. A field sample may have more than one laboratory lab_sample_id; however it is limited to only ONE lab_sample_id per method).
22	percent_moisture	Text (5)	Yes (2-1)	Percent moisture of the sample portion used in the specific lab_anl_methd_name test; this value may vary from test to test for any sample. The value must be NUMERIC as "NN.MM", e.g., 70.1% could be reported as "70.1" but not as 70.1%". The database assumes that the number is a "%" and units of measure are not necessary. **NOTE: This field MUST be populated for all soil, sludge, and sediment samples whether or not the value is reported in the hard copy. Use "0" for lab soil QC samples.**
23	subsample_amount	Text (14)	Yes 0)	Amount of sample used for the test. THIS FIELD MUST BE POPULATED
24	subsample_amount_unit	Text (15)	Yes (0)	Unit of measurement for subsample amount. See rt_unit for valid values.

TEST TABLE				
Num	**Attribute Name**	**Column Data Type**	**Required**	**Attribute Definition**
25	analyst_name	Text (30)	Yes (0)	Name or initials of laboratory analyst.
26	instrument_lab	Text (50)	Yes (0)	Instrument identifier.
27	comment	Text (255)	NO	Comments about the test as necessary (Optional).
28	preservative	Text (50)	Yes (2-1)	Indicate preservative or leave blank, if none. **THIS FIELD MUST BE POPULATED IF A PRESERVATIVE WAS IN THE SAMPLE AS RECEIVED FROM THE FIELD OR IF THE SAMPLE WAS PRESERVED BY THE LABORATORY BEFORE PREPARATION AND ANALYSIS.**
29	final_volume	Text (15)	Yes (2-1)	Final amount of extract or digestate.
30	final_volume_unit	Text (15)	Yes (2-1)	Unit of measure for final_volume. See rt_unit for valid values.

RESULT TABLE				
Num	**Attribute Name**	**Column Data Type**	**Required**	**Attribute Definition**
1	sys_sample_code (PK)	Text (40)	Yes (0)	SAME AS #1 IN SAMPLE & TEST TABLES. This value is used in enforcing referential integrity between tables.
2	lab_anl_method_name (PK)	Text (35)	Yes (0)	Laboratory analytic method name. Must be same as lab_anl_method_name in Test File. See rt _analytic_method for valid values.
3	analysis_date (PK)	Date/Time	Yes (0)	Must be the SAME AS #3 IN THE TEST TABLE. This value is used in enforcing referential integrity between tables. Date of sample analysis in MM/DD/YY format.
4	analysis_time (PK)	Text (5)	Yes (0)	Must be the SAME AS #4 IN THE TEST TABLE. This value is used in enforcing referential integrity between tables.
5	total_or_dissolved_ (PK)	Text (1)	Yes (0)	Must be the SAME AS #5 IN THE TEST FILE.
6	column_number (PK)	Text (2)	Yes (3-2)	Must be the SAME AS #6 IN THE TEST FILE
7	test_type (PK)	Text (10)	Yes (0)	Must be the SAME AS #7 IN THE TEST FILE
8	cas_rn (PK)	Text (15)	Yes (0)	Chemical Abstracts Number for the parameter if available. This must be the true CAS # and "not made up". Where CAS #s are not available, i.e. wet chem. Parameters, identifiers will be provided by ARCADIS project requirements. See notes at end of section for TIC management. See rt_analyte for valid values. The lab is not authorized to add internally developed "CAS #s" for general chemistry parameters, surrogates, internal standards, TICs. CAS#s used for TICs must be available through an outside source such as "Chemfinder".
9	chemical_name	Text (60)	Yes (0)	Chemical name associated with CAS # in #8. The cas_rn field is the only chemical identifier information actually imported in EQuIS Chemistry.

RESULT TABLE				
Num	**Attribute Name**	**Column Data Type**	**Required**	**Attribute Definition**
10	result_value	Text (20)	Yes (3-1)	Analytical result reported for **"TRG" or "TIC"** result_type **ONLY**. Appropriate and consistent number of significant digits must be entered. **MUST BE BLANK FOR NON-DETECTS.** "SUR", "IS", and "SC" results do **NOT** populate this field (populate the QC fields).
11	result_error_delta	Text (20)	Yes (3-2) [Radiochem)	Error range applicable to the result value for radiochemistry results.
12	result_type_code	Text (10)	Yes (0)	Must be either "TRG" for a target or regular results, "TIC" for tentatively identified compounds, "SUR" for surrogates, "IS" for internal standards, or "SC" for spiked compounds.[**LCS, LCSD, MS, MSD, BS, BSD]**
13	reportable_result	Text (10)	Yes (0)	Must be either "**Yes**" for results, which are considered to be reportable, **or** "**No**" for other results. Used to distinguish between multiple results where a sample is retested after dilution or to indicate which of the first or second column result should be considered primary. For re-analyses and dilutions all results must be entered into the database if hard copy data is provided **BUT ONLY ONE RESULT FOR EACH COMPOUND/ANALYTE MAY BE FLAGGED AS REPORTABLE**.
14	detect_flag	Text (2)	Yes (0)	Either "Y" for detected analytes or "N" for non-detects**. MUST be "N" for NON-DETECTS**.
15	lab_qualifiers	Text (7)	Yes (3-2)	Qualifier flags assigned by the laboratory. See rt_qualifier for valid qualifiers that may be used.
16	Organic_ yn	Yes/No	Yes (0)	Must be either "Y" for organic constituents or "N" for inorganic constituents.
17	method_detection_ limit	Text (20)	Yes (0)	Laboratory determined MDL per 40 CFR Part 136, adjusted for dilutions and percent moisture (if it applies).
18	reporting_detection_ limit	Text (20)	Yes (0)	Detection limit that reflects sample analysis conditions including analysis volumes and dilution factors. This should be the laboratory PQL or standard reporting limits
19	quantitation_limit	Text (20)	No	NOT Currently used unless specifically defined for the project.
20	Result_unit	Text (15)	Yes (0)	Units of measure relates to **ALL** results including result_value, qc_original_concentration, qc_spike added, qc_spike_measured, qc_dup_orginal_conc, qc_dup_spike_added, qc_dup_spike_measured. See rt_unit for valid values.
21	detection_limit_unit	Text (15)	Yes (0)	Units of measure for detection limit(s). See rt_unit for valid values.
22	tic_retention_time	Text (8)	Yes (3-2)	Retention time in minutes for tentatively identified compounds (TICs). Populated only for TIC result_type
23	result_comment	Text (255)	NO	MUST BE LEFT BLANK BY THE LAB

RESULT TABLE				
Num	**Attribute Name**	**Column Data Type**	**Required**	**Attribute Definition**
24	qc_original_conc	Text (14)	Yes (3-3)	The concentration of the analyte in the original (unspiked) sample. Populated for matrix spike samples. Not populated where original concentration is assumed to be zero, i.e. LCS or BS samples.
25	qc_spike_added	Text (14)	Yes (3-4)	The concentration of the analyte added to the original sample. Populated for **ALL** Surrogates, and LCS, BS, and MS samples
26	qc_spike_measured	Text (14)	Yes (3-4)	The measured concentration of the analyte. Use zero for spiked compounds that were not detected in the sample. **MUST BE NUMBERIC** even if diluted out or not recovered (use “0” if diluted, matrix interference, elevated concentrations of target compounds, etc.) Populated for **ALL** Surrogates, and LCS, BS, and MS samples
27	qc_spike_recovery	Text (14)	Yes (3-4)	The percent recovery for “SUR” and “SC” results. **MUST BE NUMERIC** even if diluted out or not recovered (use “0” if diluted, matrix interference, elevated concentrations of target compounds, etc.) Report as percentage (e.g., report "120%" as "120"); DO NOT include “%” sign in field. Populated for **ALL** Surrogates, and LCS, BS, and MS samples
28	qc_dup_original conc	Text (14)	Yes (3-5)	The concentration of the analyte in the original (unspiked) sample. Populated for matrix spike duplicate samples. Not populated where original concentration is assumed to be zero, i.e. LCSD or BSD samples.
29	qc_dup_spike_added	Text (14)	Yes (3-5)	The concentration of the analyte added to the original sample. Populated for **ALL** LCSD, BSD, and MSD samples.
30	qc_dup_spike_measured	Text (14)	Yes (3-5)	The measured concentration of the analyte in the duplicate. Populated for **ALL** LCSD, BSD, and MSD samples. MUST be NUMERIC. Use zero for spiked compounds that were not recovered due to dilution, matrix interference, elevated concentrations of target compounds, etc..
31	qc_dup_spike_recovery	Text (14)	Yes (3-5)	The duplicate percent recovery. Populated for **ALL** LCSD, BSD, and MSD samples. **MUST be NUMERIC.** Use zero for spiked compounds that were not recovered due to dilution, matrix interference, elevated concentrations of target compounds, etc Report as percentage (e.g., report "120%" as "120").
32	qc_rpd	Text (8)	Yes (3-6)	The relative percent difference between MS and MSD, LCS and LCSD, BS and BSD, & primary field sample result and Lab Replicate. Populated for **ALL** LCSD, BSD, MSD, and LR samples. **MUST be NUMERIC**. Use zero for RPDs that were not calculated due to elevated concentrations of target compounds, dilution, matrix interference, etc Report as percentage (e.g., report "120%" as 120").
33	qc_spike_lcl	Text (8)	Yes (3-7)	Lower control limit for spike recovery. Required for spikes, spike duplicates, surrogate compounds, LCS and any spiked sample. Report as

RESULT TABLE				
Num	**Attribute Name**	**Column Data Type**	**Required**	**Attribute Definition**
				percentage (e.g., report "120%" as "120").
34	qc_spike_ucl	Text (8)	Yes (3-7)	Upper control limit for spike recovery. Required for spikes, spike duplicates, surrogate compounds, LCS and any spiked sample. Report as percentage (e.g., report "120%" as "120").
35	qc_rpd_cl	Text (8)	Yes (3-6)	Relative percent difference control limit. Required for any duplicated sample. Report as percentage (e.g., report "120%" as "120").
36	qc_spike_status	Text (10)	Yes (3-4)	Used to indicate whether the spike recovery was within control limits. Use the "+" character to indicate failure, otherwise leave blank.
37	qc_dup_spike_status	Text (10)	Yes (3-5)	Used to indicate whether the duplicate spike recovery was within control limits. Use the "+" character to indicate failure, otherwise leave blank.
38	qc_rpd_status	Text (10)	Yes (3-6)	Used to indicate whether the relative percent difference was within control limits. Use the "+" character to indicate failure, otherwise leave blank. Required for any duplicated sample.

BATCH TABLE				
Num	**Attribute Name**	**Column Datatype**	**Required**	**Attribute Definition**
1	sys_sample_code (PK)	Text (40)	Yes (0)	SAME AS #1 IN SAMPLE , TEST TABLE. This value is used in enforcing referential integrity between tables.
2	lab_anl_method_name (PK)	Text (35)	Yes (0)	SAME AS #2 IN TEST TABLE. See rt _analytic_method for valid values.
3	analysis_date (PK)	Date	Yes (0)	SAME AS #3 IN TEST TABLE. This value is used in enforcing referential integrity between tables. Date of sample analysis in MM/DD/YY format. May refer to either beginning or end of the analysis as required by EQuIS Chemistry project manager.
4	analysis_time (PK)	Text (5)	Yes (0)	SAME AS #4 IN TEST, AND RESULT TABLES. This value is used in enforcing referential integrity between tables.
5	total_or_dissolved (PK)	Text (1)	Yes (0)	SAME AS #5 IN TEST TABLE. This value is used in enforcing referential integrity between tables.
6	column_number (PK)	Text (2)	Yes (4-1)	SAME AS #6 IN TEST TABLE. This value is used in enforcing referential integrity between tables.
7	test_type (PK)	Text (10)	Yes (0)	SAME AS #7 IN TEST TABLE. This value is used in enforcing referential integrity between tables.
8	test_batch_type (PK)	Text (10)	Yes (0)	Lab batch type. Valid values include "Prep", "Analysis", and "Leach". Additional valid values may optionally be provided by the EQuIS Chemistry project manager. This is a required field for all batches.
9	test_batch_id	Text (20)	Yes (0)	Unique identifier for all and each lab batches. Must be unique within EQuIS Chemistry database. For example, the same identifier cannot be used for a prep batch and an analysis batch and the values must be different from one sampling event to another. THIS IDENTIFIER CANNOT BE USED FROM ONE YEAR TO THE NEXT.

ADDITIONAL INFORMATION FOR PREPARING THE 4-FILE EDD

SAMPLE FILE AND SYS_SAMPLE_CODE

1. The sys_sample_code is the unique sample ID as supplied on the Chain of Custody form with the same spacing as identified on the COC or on a supplemental Sample ID list submitted to the laboratory with the Laboratory Task Order or prior to submission of samples.

2. In order to uniquely identify MS/MSD, laboratory duplicates, TCLP, and SPLP samples, the laboratory shall add a suffix to the original sample ID listed on the chain of custody:

   Matrix Spike Sample = xxxxx MS
   Matrix Spike Duplicate Sample = xxxxx MSD
   Lab Duplicate/Replicate = xxxxx LR
   TCLP Extract Sample = xxxxx TCLP
   SPLP Extract Sample = xxxxx SPLP

   These are the only characters that are allowed to be amended to ANY sample ID as listed on the COC or the sample ID list referred to above.
   The parent_sample_code shall be entered into the parent_sample_code field of the Sample File.

3. If the sample_name field is provided it must contain the full sample ID from the chain of custody.

4. Sample_Type_Code must be appropriately applied as follows:
   "N" = normal field samples
   "FD" = field duplicates samples submitted blind to the laboratory
   "TB" = trip blanks
   "FB" = field blanks
   "EB" = rinsate or equipment blanks
   "BS" = laboratory control samples or blank spikes
   "BD" = laboratory control sample duplicates or blank spike duplicates
   "MS" = matrix spikes
   "SD" = matrix spike duplicates
   "LR" = laboratory duplicates or laboratory replicates

5. The following "**matrix_type**" codes must be used ("**SQ**" = soil QC sample and "**WQ"** = water QC sample):
   Method Blank = "SQ" or "WQ"
   MS/MSDs = "SQ" or "WQ"
   LCS/LCSDs = "SQ" or "WQ"
   BS/BSDs = "SQ" or "WQ"

6. SDG Numbers or laboratory Log Numbers (per ARCADIS PM direction) **MUST** be populated in "**sample_delivery_group**" field of the **Sample File.**

QUALITY CONTROL SAMPLES AND DATA

7. The source of Lab Duplicates, Lab Replicates, Matrix Spikes, and Matrix Spike Duplicates is the Lab not the Field even if the MS/MSD are identified on the COC by the field sampling team. The samples are spiked in the laboratory not in the field.

8. Laboratory QC data, which span more than one SDG may be submitted with each appropriate SDG.

9. Laboratory LCS and LCSD should be reported as two separate samples.

10. **Matrix Spike and Matrix Spike Duplicate recoveries must be reported as "0" if the value is not calculated due to concentrations of the spiked analyte in the sample at concentrations above the 4X factor.**

11. **All laboratory method performance site-specific and batch Quality Control sample results (i.e. Method Blanks, LCS/LCSDs, Blank Spikes, Leachate Blanks as method appropriate) must be included in the EDD.** For most projects, this does **NOT** include **non-site-specific** matrix spikes and laboratory duplicates/replicates.

12. Laboratory batch sample duplicate/replicate and MS/MSD results from **non-project specific** samples (i.e. batch QC samples) shall **NOT** be included in the EDD.

13. Surrogates populate the qc_spike fields not qc_dup_spike fields or the result_value field even if the surrogates are reported for MSD, BSD, or LCSD samples.

14. QC_Spike_Added values for Spike, IS and Surrogate compounds are REQUIRED.

15. QC_Spike_Measured values for Spike, IS and Surrogate compounds are REQUIRED.

16. RPDs for LCSDs, BSDs, MSDs, and Laboratory Duplicates must be populated in the "**qc_rpd"** field. A value of "0" or "100" must be reported, as appropriate, if the RPD is not calculated due to excessive concentrations or interference present in the sample. The "**qc_rpd**" must be a numeric entry.

17. The RPD control limit must be listed in the "**rpd_cl"** field for all parameters where an RPD is reported. This includes lab duplicate/replicate samples.

SAMPLE FILE

18. The following "**matrix_type**" codes must be used for QC samples ("**SQ**" = soil QC sample and "**WQ"** = water QC sample):

    Method Blank = "SQ" of "WQ"
    MS/MSDs = "SQ" or "WQ"
    LCS/LCSDs = "SQ" or "WQ"
    BS/BSDs = "SQ" or "WQ"

19. SDG or Laboratory Project numbers must be populated in "sample_delivery_group" field.

TEST FILE

20. Percent moisture must be reported in the "**percent_moisture**" field in the **Test File** for all solid samples (i.e., soil, sediment, and sludge).

21. Subsample weights and final volumes must be listed for all parameters as appropriate.

RESULTS FILE

22. Result_value is only populated with data for "TRG" and "TIC" detections. All other data is entered in the "qc_" fields. The field must be "NULL" for non-detects and other analyte_types. The Reporting Limit must not be entered in this field.

23. Non-detected data shall have a lab_qualifier of "U" in addition to other qualifiers deemed applicable. The Detect_Flag shall be "N" and the Result_value field shall be blank.

24. The Reporting Limit must be provided for all parameters. The RL MUST be adjusted for dilutions made during analysis.

25. Surrogate recoveries MUST BE REPORTED in the qc_spike_measured and qc_spike_recovery fields, even if the surrogate had been diluted out. List “0” as the measured and recovered amount. Control Limits must also be entered for surrogates. Surrogates are “SUR” analyte_type not “TRG”.

26. Surrogate, LCS, LCSD, BS, BSD, MS, and MSD detected concentrations, and percent recoveries must be populated with a numeric value. A value of “0” **must** be entered if the Spiked Compound is diluted out or not recovered. An “+” is unacceptable as this is a numeric field.

27. “**QC_original_concentration**” must be populated for matrix spikes and matrix spike duplicates

28. Valid entries for the reportable_result field are "Yes" or "No” only.

29. ONLY report compounds of interest for any method blank, sample, and sample duplicate, trip blank.

30. Laboratory Qualifier designation must be consistent. For an estimated concentration with blank contamination “BJ” must be used. Note that “JB”, “B J” or “J B” cannot be used.

31. Explanation of Duplicate Qualifiers:

B	Analyte found in associated blank	Organic Analysis
B	<CRDL but >= Instrument Detection Limit	Inorganic Analysis
N	Presumptive evidence of a compound	Organic Analysis
N	Sample recovery not within control limits	Inorganic Analysis

It is preferred by ARCADIS that the laboratory not qualifiers with multiple explanations. **Any qualifiers utilized in the hard copy report or the electronic report must be defined in the hard copy report. There is no exception to this requirement for explanation of qualifiers applied to electronic data.**

32. Nomenclature for tentatively identified compounds (TIC):

Use the CAS # if it is available and **REAL** **(outside verifiable source)** for TICs and enter the chemical name in the chemical_name field.

For UNKNOWN TICs follow the following protocol:

cas_rn for unkown VOA TIC = VTIC 1 through VTIC 10
cas_rn for unkown SVOA TIC = SVTIC 1 through SVTIC 20

Enter “UNKNOWN”, “UNKNOWN Hydrocarbon”, “UNKNOWN Aliphatic”, or other identifier as appropriate or applicable in “chemical_name” field.

TICs will produce errors in the ELDC/EDDP that cannot be corrected by the laboratory. These are the only acceptable errors in the data checker report unless otherwise authorized by ARCADIS.

33. TCLP or SPLP results must be submitted in units of mg/L or appropriate liquid units. **(Make sure that moisture correction is not automatically enforced).**

BATCH FILE

34. The laboratory must use unique Batch File Names for each analytical department/method and for continuing years. Electronic validation utilizes Batch IDs to link field samples with quality control data. Overlapping Batch IDs are not acceptable.

GENERAL ISSUES

35. Incomplete chain-of-custody (C-O-C) forms must be immediately communicated to the project manager. Some of the C-O-C information is used for completion of the Sample_Matrix_Code and Sample_Delivery_Group. These discrepancies must be rectified upon receipt of samples at the laboratory prior to log in.

36. **Duplicate sample IDs are not acceptable within the EQuIS database. It is imperative that samples including field blanks, trip blanks, equipment blanks, field duplicates have unique sample IDs for projects including ongoing sampling events such as quarterly groundwater monitoring.**

SUBCONTRACTED PARAMETERS

37. The EDD must be populated with **ALL** appropriate and applicable fields, including **ALL** QC data for any subcontracted parameters.

PLEASE CONTACT THE ARCADIS PROJECT CHEMIST, DATA MANAGER or PROJECT MANAGER IF THERE ARE ANY QUESTIONS REGARDING PREPARATION OR GENERATION OF THE EDD.

EXAMPLE EDD REPORTS

The following subsections provide examples of how the EQuIS EDD should be populated for QC data.

RESULT FILE FIELDS FOR A NORMAL FIELD SAMPLE, TRG AND TIC RESULTS

The table below shows some of the fields in the Result File for a normal field sample (i.e., Sample_type_code = N, TB, FD, etc.) and "TRG" or "TIC" analyte_type_code. NOTE: all QC fields are blank.

cas_rn	result value	qc original conc	qc spike added	qc spike measured	qc spike recovery	qc dup. original conc	qc dupl. spike added	qc dup. spike measured	qc dup. spike recovery
93-76-5	3.17								
94-75-7	1.56								
94-82-6	2.31								

RESULT FILE FIELDS FOR A NORMAL FIELD SAMPLE WITH SURROGATES

The following table shows some of the fields in the result file for a normal field sample (i.e., Sample_type_code = N, TB, etc.). Note that QC fields are blank except on surrogate Rows.

cas_rn	result value	result unit	result type code	qc original conc	qc spike added	qc spike measured	qc spike recovery
93-76-5	1.56	mg/L	TRG				
94-75-7	3.17	mg/L	TRG				
PHEN2F		mg/L	SUR		12.5	12.9	103

RESULT FILE FIELDS FOR A MATRIX SPIKE

The following table shows some of the fields in the result file for a matrix spike sample (i.e., Sample_type_code = MS). Note that all "dup" QC fields are blank, and that the result_value field is NULL. Also, the qc_rpd field would be blank for these rows. The parent_sample_code must contain the contents of the sys_sample_code of the original (parent) sample.

cas_rn	result value	qc original conc	qc spike added	qc spike measured	qc spike recovery	qc dup. original conc	qc dupl. Spike added	qc dup. spike measured	qc dup. spike recovery
93-76-5		1.56	4.18	5.36	90.9				
94-75-7		3.17	4.18	7.15	95.2				
94-82-6		2.31	4.22	5.66	79.3				

RESULT FILE FIELDS FOR A MATRIX SPIKE DUPLICATE

The following table shows some of the fields in the result file for a matrix spike/matrix spike duplicate considered as a single sample (i.e., Sample_type_code = MSD). Note that all QC fields are completed, and that the result_value field is not needed. Also, the qc_rpd field would be completed for these rows. The parent_sample_code must contain the contents of the sys_sample_code of the original (parent) sample.

cas_rn	result value	qc original conc	qc spike added	qc spike measured	qc spike recovery	qc dup original conc	qc dup. spike added	qc dup spike measured	qc dup spike recovery
93-76-5						1.56	4.23	5.70	97.8
94-75-7						3.17	4.23	7.62	105
94-82-6						2.31	4.13	5.33	73.1

**RESULT FILE FIELDS FOR A LCS or BS **

The following table shows some of the fields in the result file for an LCS sample (i.e., laboratory control sample, blank spike, Sample_type_code = BS). The qc_rpd field is left blank for these rows.

cas_rn	result value	qc original conc	qc spike added	qc spike measured	qc spike recovery	qc dup original conc	qc dup spike added	qc dup spike measured	qc dup spike recovery
93-76-5		1.5	5.00	5.26	105				
94-75-7		10.2	1.00	1.02	102				
94-82-6		3.4	12.5	12.9	103				

RESULT FILE FIELDS FOR A LCS DUPLICATE OR BS DUPLICATE

The following table shows some of the fields in the result file for a laboratory control sample duplicate (i.e., Sample_type_code = BD). Note that the result_value field is not required. Also, the qc_rpd field must be completed for these rows.

cas_rn	result value	qc original conc	qc spike added	qc spike measured	qc spike recovery	qc dup original conc	qc dup spike added	qc dup spike measured	qc dup spike recovery	qc_rpd
93-76-5							5.00	4.92	98	2.0
94-75-7							1.00	0.95	95	6.6
94-82-6							12.5	11.8	94	12.3

REANALYSES, REEXTRACTIONS, DILUTIONS

The following table shows how to report retests for three different circumstances. The first example, the sample was retested (for 75-25-2) because the initial result required reanalysis due to QC failure. For the second example, the initial sample result (for 95-95-4) required dilution. The third example (for 67-66-3) required both reanalysis and dilution (reanalysis supercedes dilution). The fourth example (87-86-5) shows an initial result that require re-extraction due to QC failure or elevated concentrations that could not be diluted based on the original extraction. The other results are "turned off" by setting the reportable_result field to "No".

test_type	cas_rn	result_value	reportable_result
initial	75-25-2	1.2	No
reanalysis	75-25-2	1.1	Yes
initial	95-95-4	250E	No
dilution	95-95-4	328	Yes
initial	67-66-3	3.4	No
reanalysis	67-66-3	3.3	Yes
initial	87-86-5	980E	No
reextraction	87-86-5	1500	Yes

ANALYSES REQUIRING SECOND COLUMN CONFIRMATION

Analyte identification requiring confirmation by a second analytical technique is required by certain gas chromatography (GC) methods. A common technique used to confirm the identity of an analyte is to analyze the sample using a second GC column that is dissimilar from the GC column used for the first analysis. This confirmation technique is used routinely when analyzing samples for pesticides, herbicides, and certain volatile organic compounds (e.g., BTEX), and the two analyses often are performed simultaneously using an instrument equipped with dual GC columns connected to common injection port.

The method for reporting data from dual column GC analyses is not standard throughout the environmental laboratory industry. ARCADIS recommends that laboratories use the method described in SW-846 Method 8000B, unless project-specific requirements or the method used for analysis dictate otherwise. The following table illustrates the proper format to be used to report first and second column results. The results for the first and third constituents (75-25-2 and 95-95-4) are being reported from column 1, and the result for the second constituent (67-66-3) is being reported from column 2. The other results are "turned off" by setting the reportable_result field to "No".

column_number	cas_rn	result_value	reportable_result
1C	75-25-2	6.2	Yes
1C	67-66-3	3.4	No
1C	95-95-4	5.6	Yes
2C	75-25-2	1.3	No
2C	67-66-3	33.7	Yes
2C	95-95-4	5.4	No

REFERENCE TABLES

A number of fields in each of the EDD files must be entered to correspond exactly with reference values standardized by ARCADIS. These reference values will be updated from time to time. Each laboratory will be supplied a copy of the updated document. It is the laboratory's responsibility to submit EDDs using the most current reference tables as defined by a specific project.

The following table summarizes the EDD fields where standard reference values must be used:

EDD File	EDD Field	Reference Table
Sample	sample_type_code	rt_sample_type
	sample_matrix_code	rt_matrix
Test	lab_anl_method_name	rt_anl_mthd
	lab_matrix_code	rt_matrix
	prep_method	rt_std_prep_mthd
	subsample_amount_unit	rt_unit
	final_volume_unit	rt_unit
Result	lab_anl_method_name	rt_anl_mthd
	cas_rn	rt_analyte
	chemical_name	rt_analyte
	result_type_code	rt_result_type
	lab_qualifier	rt_qualifier
	result_unit	rt_unit
	detection_limit_unit	rt_unit
Batch	lab_anl_method_name	rt_anl_mthd

IV. EDP

The EDP data checker assists the **LABORATORY** in checking EDD files to ensure that they are error-free prior to submission to ARCADIS. All laboratories providing data to ARCADIS **must use** the EDP program to verify that EDDs are without error. The EDP error reports for each file **must be** submitted with each EDD.

The use of the EDDP helps to solve common data population problems including duplicate data, incorrectly populated fields, and incorrect methods, CAS #s, and other acceptable reference values. If an EDD is received by ARCADIS containing errors it will be rejected until the EDD report is acceptable for import into the EQuIS database. Invoice payment will not be made until the EDD is acceptable.

ARCADIS will provide laboratories with the most recent version of the EDP.

Arcadis of New York, Inc.
One HSBC Plaza, 100 West Chestnut Street, Suite 1020
Rochester
New York 14604
Phone: 585 385 0090
Fax: 585 546 1973

www.arcadis.com

Appendix J

Site Inspection Forms

235 Metro Park Brighton Site
Rochester, New York
Site-Wide Inspection Form

Date:	**Weather Conditions:**
Personnel:	**Temperature:**
Time of Arrival:	**Wind Speed:**
Time of Departure:	**Wind Direction (from):**

Inspection Checklist	Yes	No	Comments
Asphalt/Grass Cover			
Intrusive Activities Being Performed?			
- Trenching?			
- Excavation?			
- Tunneling?			
- Saw cutting?			
Signs of Previous Intrusive Activities Performed?			
- New drainage feature?			
- Evidence of a new underground utility?			
- New grass/vegetation/asphalt?			
- Other (e.g., cracking, potholes, depressions)			
Monitoring Well Condition			
Covers secure?			
Casing in need of repair?			
Concrete surface seal intact?			
Settling in area around well?			
Well obstructed?			
Ponded water above well?			
Well screen silted in?			
Well in need of redevelopment?			

General Comments/Suggested Action Items:

NEW YORK STATE
DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Request to Import/Reuse Fill or Soil

This form is based on the information required by DER-10, Section 5.4(e) and 6NYCRR Part 360.13. Use of this form is not a substitute for reading the applicable regulations and Technical Guidance document.

SECTION 1 – SITE BACKGROUND

The allowable site use is: Choose an item

Have Ecological Resources been identified? Choose an item

Is this soil originating from the site? Choose an item

How many cubic yards of soil will be imported/reused? Choose an item

If greater than 1000 cubic yards will be imported, enter volume to be imported:

SECTION 2 – MATERIAL OTHER THAN SOIL

Is the material to be imported gravel, rock or stone? Choose an item

Does it contain less than 10%, by weight, material that passes a size 100 sieve? Choose an item

Is this virgin material from a permitted mine or quarry? Choose an item

Is this material recycled concrete or brick from a DEC registered processing facility? Choose an item

SECTION 3 - SAMPLING

Provide a brief description of the number and type of samples collected in the space below:

Example Text: 5 discrete samples were collected and analyzed for VOCs. 2 composite samples were collected and analyzed for SVOCs, Inorganics & PCBs/Pesticides.

If the material meets requirements of DER-10 section 5.4(e)5 (other material), no chemical testing needed.

SECTION 3 CONT'D - SAMPLING

Provide a brief written summary of the sampling results or attach evaluation tables (compare to DER-10, Appendix 5):

Example Text: Arsenic was detected up to 17 ppm in 1 (of 5) samples; the allowable level is 16 ppm.

If Ecological Resources have been identified use the "If Ecological Resources are Present" column in Appendix 5.

SECTION 4 – SOURCE OF FILL

Name of person providing fill and relationship to the source:

Location where fill was obtained:

Identification of any state or local approvals as a fill source:

If no approvals are available, provide a brief history of the use of the property that is the fill source:

Provide a list of supporting documentation included with this request:

The information provided on this form is accurate and complete.

_____ _____

Signature Date

_____

Print Name

_____

Firm

Revised April 2023

Summary of Green Remediation Metrics for Site Management

Site Name: _____ Site Code: _____
Address: _____ City: _____
State: _____ Zip Code: _____ County: _____

Initial Report Period (Start Date of period covered by the Initial Report submittal)
Start Date: _____

Current Reporting Period
Reporting Period From: _____ To: _____

Contact Information
Preparer's Name: _____ Phone No.: _____
Preparer's Affiliation: _____

I. Energy Usage: Quantify the amount of energy used directly on-site and the portion of that derived from renewable energy sources.

	Current Reporting Period	**Total to Date**
Fuel Type 1 (e.g. natural gas (cf))		
Fuel Type 2 (e.g. fuel oil, propane (gals))		
Electricity (kWh)		
Of that Electric usage, provide quantity:		
Derived from renewable sources (e.g. solar, wind)		
Other energy sources (e.g. geothermal, solar thermal (Btu))		

Provide a description of all energy usage reduction programs for the site in the space provided on Page 3.

II. Solid Waste Generation: Quantify the management of solid waste generated on-site.

	Current Reporting Period (tons)	**Total to Date (tons)**
Total waste generated on-site		
OM&M generated waste		
Of that total amount, provide quantity:		
Transported off-site to landfills		
Transported off-site to other disposal facilities		
Transported off-site for recycling/reuse		
Reused on-site		

Provide a description of any implemented waste reduction programs for the site in the space provided on Page 3.

III. Transportation/Shipping: Quantify the distances travelled for delivery of supplies and lab-supplied bottles, shipping of laboratory samples, and the removal of waste.

	Current Reporting Period (miles)	Total to Date (miles)
Standby Engineer/Contractor		
Laboratory Courier/Delivery Service (bottle and sample delivery)		
Waste Removal/Hauling		

Provide a description of all mileage reduction programs for the site in the space provided on Page 3. Include specifically any local vendor/services utilized that are within 50 miles of the site.

IV. Water Usage: Quantify the volume of water used on-site from various sources.

	Current Reporting Period (gallons)	Total to Date (gallons)
Total quantity of water used on-site (not including treated water)		
Of that total amount, provide quantity:		
Public potable water supply usage		
Surface water usage		
On-site groundwater usage		
Collected or diverted storm water usage		

Provide a description of any implemented water consumption reduction programs for the site in the space provided on Page 3.

V. Land Use and Ecosystems: Quantify the amount of land and/or ecosystems disturbed and the area of land and/or ecosystems restored to a pre-development condition (i.e. Green Infrastructure).

	Current Reporting Period (acres)	Total to Date (acres)
Land disturbed		
Land restored		

Provide a description of any implemented land restoration/green infrastructure programs for the site in the space provided on Page 3.

Description of green remediation programs reported above (Attach additional sheets if needed)
Energy Usage:
Waste Generation:
Transportation/Shipping:
Water usage:
Land Use and Ecosystems:
Recommendations/Other:

CONTRACTOR CERTIFICATION
I, _____ (**Name**) do hereby certify that I am _____ (**Title**) of _____ (**Contractor Name**), which is responsible for the work documented on this form. According to my knowledge and belief, all of the information provided in this form is accurate and the site management program complies with the DER-10, DER-31, and CP-49 policies. _____ **Date** **Contractor**

Site-Specific Climate Vulnerability Annual Evaluation Checklist
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

ARCADIS

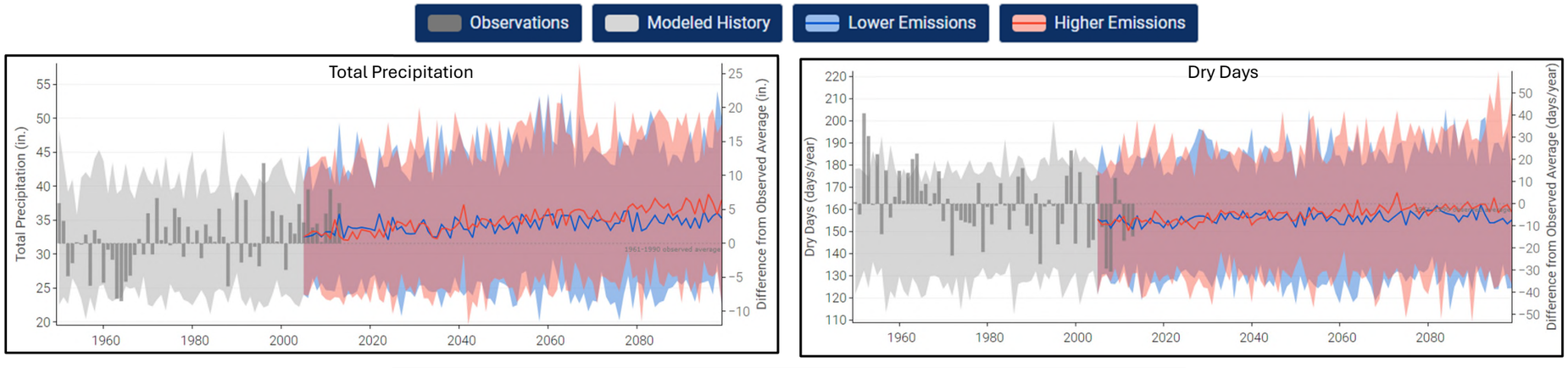
Action	Timing	Site/Remedy Assets Potentially Effected	Justification/ Requirement	Evaluation Date	Changed Condition (Yes/No)	Observations	Recommended Action/Correction
Coordinate/schedule work to avoid extreme temperatures (hot or cold) and potential severe weather events.	Planning Phase	*Groundwater Monitoring* *Soil Vapor Intrusion Monitoring* *Waste Management* *Field Staff*	Annual groundwater monitoring and the site inspection will be targeted for completion during the third quarter of the calendar year and/or as defined in the SMP. Annual Soil Vapor Intrusion monitoring will be targeted for completion during the first quarter of the calendar year and/or as defined in the SMP.				
Review travel routes to the Site and coordinate/schedule to avoid potential severe weather events (especially events that could result in potential flooding or standing water).	Planning Phase	*Transportation Network (roads for staff, sample submission, waste disposal)*	Annual monitoring and site inspections will be targeted for completion during the third quarter of the calendar year and/or as defined in the SMP.				
Site inspection for changes in groundwater use.	Field Event Phase	Institutional Control - Restricted Groundwater Usage	Groundwater usage at the Site is restricted by NYDOH or MCDOH without necessary treatment (determined by afore mentioned agencies).				
Site cover inspection to observe potential deficiencies (changes in cover thickness, ponding water, signs of erosion, animal burrows, etc.).	Field Event Phase	Engineering Control - Site Cover	The site cover will be inspected annually per the SMP and maintained as defined in the SMP.				
Monitor well inspection to observe water accumulation in the well vault that may indicate recent flooding conditions onsite.	Field Event Phase	Monitoring Wells	Monitoring wells will be inspected annually as defined in the SMP. Maintenance to repair, replace, and/or decommission wells will be conducted per the SMP.				
Review waste management procedures and document any climate-related vulnerabilities not already addressed in the SMP.	Field Event Phase and Post-Field Event Phase	*Waste Management*	Annual monitoring and site inspections will be targeted for completion during the third quarter of the calendar year and/or as defined in the SMP.				
Document any instances of action taken to address climate-related vulnerabilities of the transportation network associated with the Site and remedy implementation for future planning.	Post-Field Event Phase	*Transportation Network (roads for staff, sample submission, waste disposal)*	Annual monitoring and site inspections will be targeted for completion during the third quarter of the calendar year and/or as defined in the SMP.				

Notes:
1. MCDOH - Monroe County Department of Health
2. NYSDOH - New York State Department of Health
3. SMP - Site Management Plan

Appendix K

Climate Modeling

Climate Explorer Modeling: Precipitation

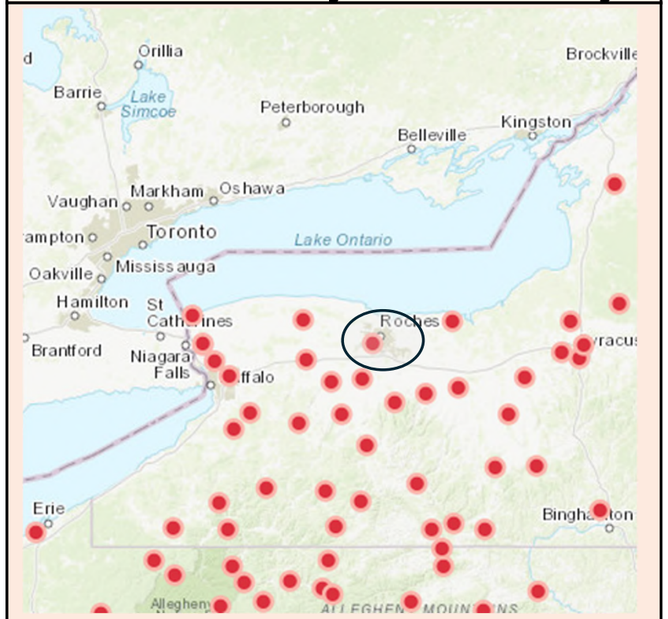


Climate Explorer data results for the Site show projected long-term precipitation changes using modeled historical data (gray), assuming reduced global greenhouse gas emissions (blue line/shading) versus increased greenhouse gas emissions (red line/shading). The blue or red line shows the weighted average of projected precipitation, and the blue or red shading shows the projected precipitation difference from the average.

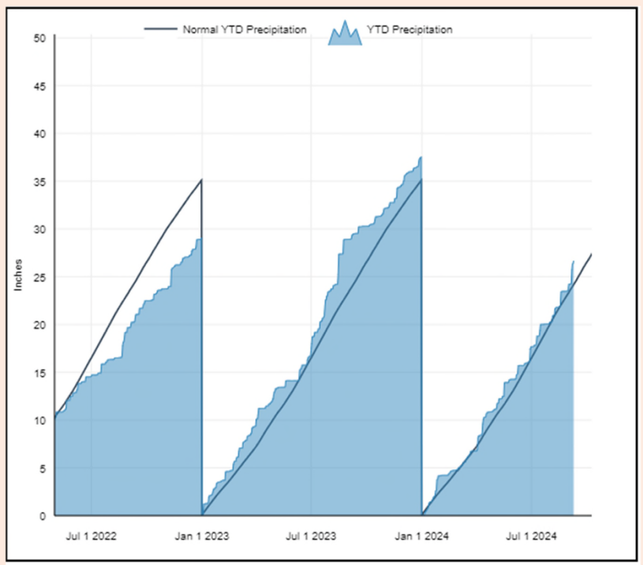
Climate Explorer precipitation data modeling for the Site supports limited exposure of the Site to drought. The modeling indicates that overall precipitation is not predicted to change much over the next several decades. However, a potential increase in more extreme precipitation events (days per year with rainfall greater than 3 inches) could result in localized storm flooding in low-lying areas limiting access to the Site. These events are not anticipated to cause onsite flooding due to the site topography and stormwater drainage system. Worker exposure to these risks will be managed using best management practices to plan the field events around predicted storm events.

Source: Climate Explorer (https://crt-climate-explorer.nemac.org)

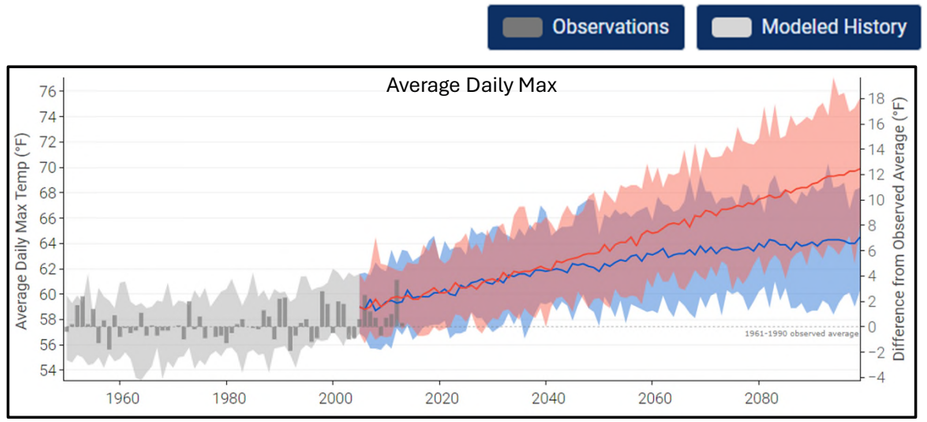
Regional Site Location: Monroe County Rochester Ny

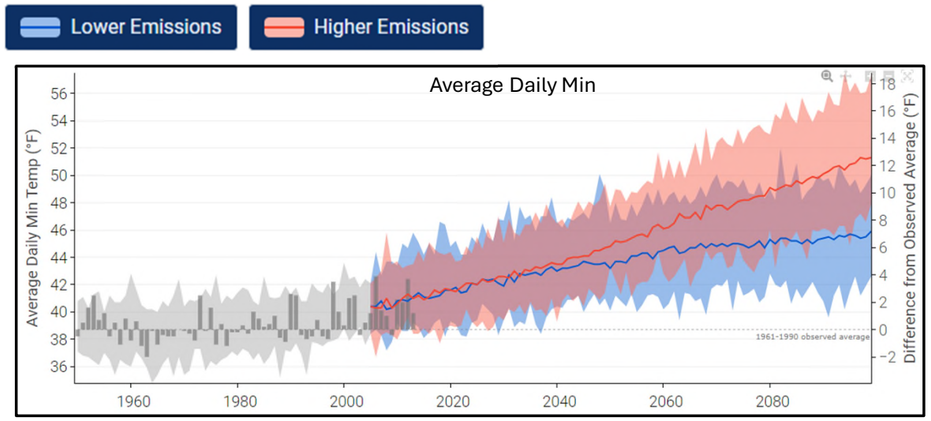


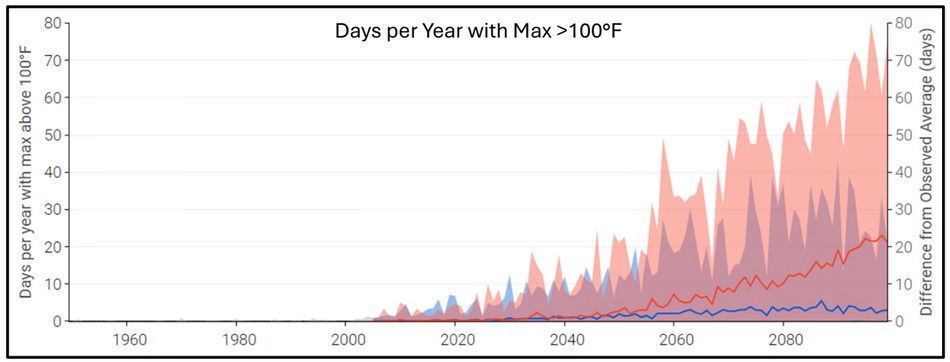
Historical Precipitation Data



Climate Explorer Modeling: Temperature







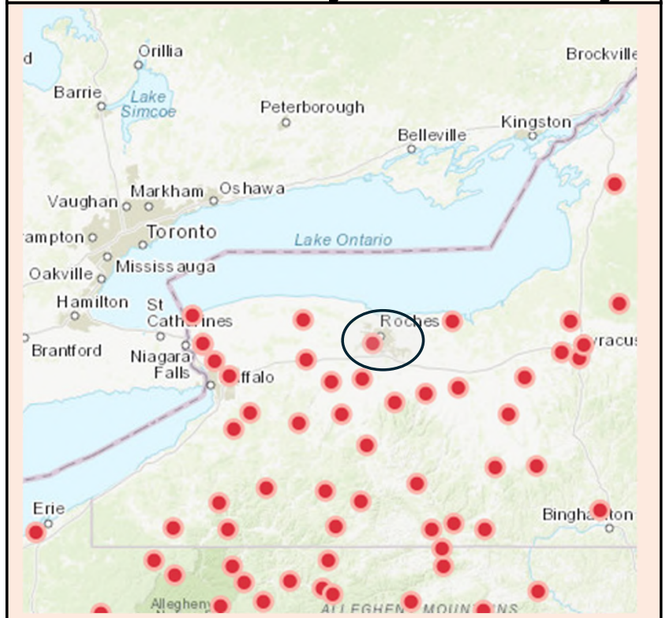
Climate Explorer data results for the Site show projected long-term temperature changes using modeled historical data (gray), assuming reduced global greenhouse gas emissions (blue line/shading) versus increased greenhouse gas emissions (red line/shading). The blue or red line shows the weighted average of projected temperature, and the blue or red shading shows the projected temperature difference from the average.

Temperature data modeling for the Site from Climate Explorer supports limited exposure of the Site to extreme heat. However, the modeling supports that there is a potential exposure to higher-than-average temperatures over the next several decades. Worker exposure to these risks will be managed using best management practices to plan the field events around high heat events.

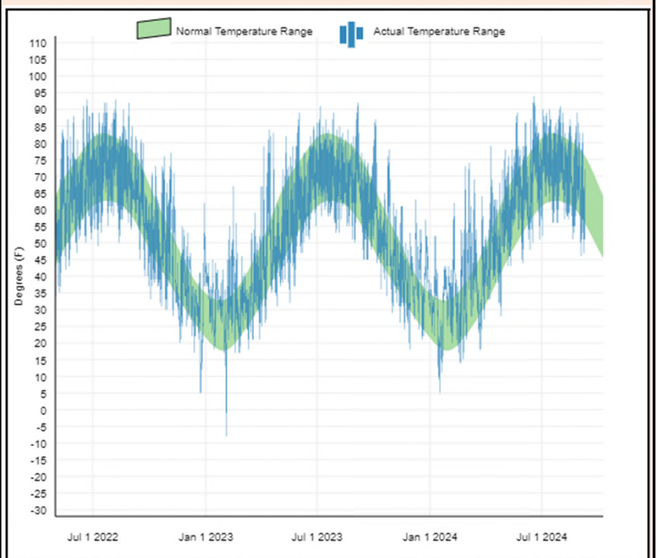
Though not represented by historical data and modeling, historical temperatures are known to oscillate below freezing during winter months, and future temperatures are assumed to continue this trend.

Source: Climate Explorer (https://crt-climate-explorer.nemac.org)

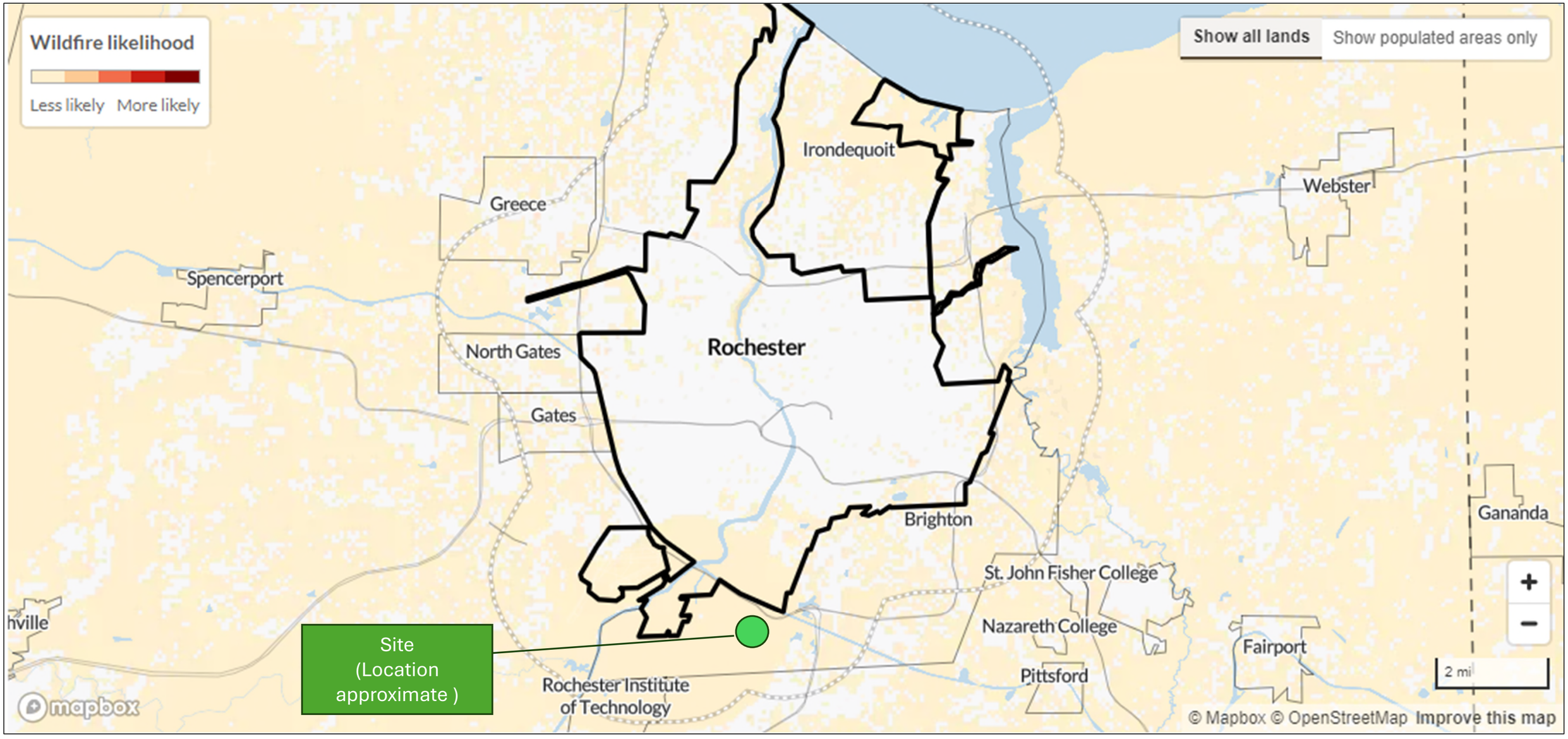
Regional Site Location: Monroe County Rochester Ny



Historical Temperature Data



Wildfire Risk Modeling



The figure shows results from the 'Wildfire Risk to Communities' analysis tool, which identifies the likelihood of a wildfire for the Site (green circle) and surrounding area. As shown on the figure above, wildfire risk for the Site is "less likely." Additionally, site maintenance (mowing) and periodic remedy monitoring (groundwater sampling) should not result in sparks or potential fire sources.

Source: Wildfire Risk to Communities (https://wildfirerisk.org)

Appendix L

Green Remediation Best Management Practices

Best Management Practice Source	Category	Best Management Practice	Core Element Addressed (at Site Level)					BMP Applicable to GR or R	Applicable to Site (Yes/No)	Applicable to Current Site Stage? (Yes/No/Future)	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems				
ASTM	Materials	Maximize the reuse of existing wells for sampling, injections, or extractions, where appropriate, and/or design wells for future reuse.	X	X		X		GR	Yes	No	No changes to the well network are proposed.
ASTM	Materials	Select products that are environmentally preferable (when compared to other products serving the same purpose) with respect to raw materials consumption, manufacturing processes and locations, packaging, distribution, recycled content and recycling capability, maintenance needs, and disposal procedures. Explore the General Services Administration Sustainable Facilities tool at https://sftool.gov/ for a list of greener options.				X		GR	Yes	Yes	
ASTM	Materials	Steam-clean or use phosphate-free detergents or biodegradable cleaning products instead of organic solvents or acids to decontaminate sampling and other equipment.				X	X	GR	Yes	Yes	Phosphate-free decontamination detergents are currently used.
ASTM	Materials	Use materials with recycled content (for example, steel made from recycled metals, concrete and/or asphalt from recycled crushed concrete and/or asphalt, respectively, and plastic made from recycled plastic; tarps made with recycled or biobased contents instead of virgin petroleum-based contents).				X		GR	Yes	Yes	
ASTM	Materials	Use biobased products (for example, erosion control fabrics containing agricultural byproducts).				X		GR	No	No	No erosion controls are being implemented.
ASTM	Materials	Use onsite/local materials, when possible (for example, wood waste for compost, rocks for drainage control).	X	X		X		GR	No	No	
ASTM	Materials	Choose suppliers that will take back scraps or unused materials.				X		GR	Yes	Yes	Laboratory takes back unused sample bottles.
ASTM	Materials	Use dedicated materials (that is, reuse of sampling equipment and non-use of disposable materials/equipment) when performing multiple rounds of sampling.				X		GR	Yes	Yes	
ASTM	Materials	Purchase materials in bulk quantities and packed in reusable/recyclable containers and drums to reduce packaging waste.				X		GR	Yes	Yes	Purchase decontamination detergent in bulk.
USEPA FE	Power and Fuel	Replace older vehicles and older equipment engines with newer ones meeting the most recent emission control standards.	X	X				GR	Yes	Yes	Current model vehicles are utilized for site visits.
USEPA FE	Power and Fuel	Manually shut down engines of vehicles not actively engaged for more than 10 seconds, except for work requiring intermittent engine use or when in traffic.	X	X				GR	Yes	Yes	
USEPA FE	Power and Fuel	Recharge laptop computers and mobile devices in vehicles that are in active motion rather than idling.	X	X				GR	Yes	Yes	
USEPA FE	Power and fuel	Use no- or low-mowing species between plantings to minimize mowing.					X	GR	No	No	The Site is managed by others.
ASTM	Project Planning and Team Management	Buy carbon offset credits (for example, for airline flights) when in-person meetings are required.	X	X				GR	No	No	The Site is local to staff working on the project, and there is no need for long-distance travel for site activities/meetings.
ASTM	Project Planning and Team Management	Choose equipment and product vendors with production and distribution centers near the Site to minimize fuel consumption associated with delivery.	X	X				GR	Yes	Yes	
ASTM	Project Planning and Team Management	Contract a laboratory that uses green practices and/or chemicals.	X	X	X	X	X	GR	Yes	Yes	
ASTM	Project Planning and Team Management	Use a local laboratory to minimize transportation impacts.	X	X				GR	Yes	Yes	The Laboratory is within 3 miles of the Site.
ASTM	Project Planning and Team Management	Designate collection points for compostable materials and routine recycling of single-use items, such as metal, plastic, and glass containers; paper and cardboard; and other items that may be recycled locally.				X		GR	No	No	
ASTM	Project Planning and Team Management	Establish green requirements (for example, standard management practices and BMPs) as evaluation criteria in the selection of contractors and include language in request for proposals/quotes, subcontracts, contracts, etc.	X	X	X	X	X	R	Yes	Yes	Laboratory.
ASTM	Project Planning and Team Management	Select facilities with green policies for worker accommodations and periodic meetings.	X	X	X	X	X	GR	No	No	
ASTM	Project Planning and Team Management	Select local waste disposal and recycling facilities to minimize transportation impacts.	X	X				GR	Yes	Yes	
Other	Project Planning and Team Management	- If feasible and approved, reduce sampling frequencies; - Reduce site visits and system checks; and - Consolidate activities to labor time.	X	X		X		GR	Yes	Future	To be evaluated in the future.
Other	Project Planning and Team Management	Bundle routine system operation checks, inspections, periodic sampling, and other site activities with other nearby sites.	X	X				GR	Yes	Yes	
ASTM	Project Planning and Team Management	Use local staff (including subcontractors), when possible, to minimize transportation impacts.	X	X				GR	Yes	Yes	
USEPA SIEM	Project Planning and Team Management	Schedule activities for suitable seasons to reduce the amount of fuel needed for heating or cooling equipment and supplies.	X	X				R	Yes	Yes	
Other	Project Planning and Team Management	Schedule field activities around high heat and predicted storm or extreme weather events to protect workers and avoid unnecessary damage to the Site during vulnerable times.					X	R	Yes	Yes	
ASTM	Project Planning and Team Management	Prepare, store, and distribute documents electronically using an environmental information management system.				X		GR	Yes	Yes	
USEPA SIEM	Project Planning and Team Management	Identify local sources of trucks and machinery equipped with advanced emission controls and of cleaner alternative fuels.	X	X				GR	No	Future	No heavy machinery is needed at this point.

See notes on last page.

Best Management Practice Source	Category	Best Management Practice	Core Element Addressed (at Site Level)					BMP Applicable to GR or R	Applicable to Site (Yes/No)	Applicable to Current Site Stage? (Yes/No/Future)	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems				
ASTM	Project Planning and Team Management	Choose equipment and product vendors with production and distribution centers near the Site, to minimize fuel consumption associated with delivery.	X	X				GR	Yes	Yes	
Other	Project Planning and Team Management	Update the conceptual site model for the project and refine the conceptual site model at each stage of the project life cycle.	X	X	X	X	X	GR	Yes	Future	
USEPA SIEM	Residual Solid and Liquid Waste	Compress the number of days needed for a given round of sampling.	X	X		X		GR	Yes	Yes	
USEPA FE	Residual Solid and Liquid Waste	Minimize the need for disposable single-use items, such as plastic bags.				X		GR	Yes	Yes	
USEPA SIEM	Residual Solid and Liquid Waste	Choose material or waste haulers that use SmartWay designated trailers and tractors and SmartWay verified technologies relating to low rolling resistance tires, idling reduction, and aerodynamic devices.	X	X		X		GR	Yes	Yes	
USEPA SIEM	Residual Solid and Liquid Waste	Designate collection points for items that are locally recyclable, such as metal, plastic, or glass containers and paper or cardboard.				X		GR	Yes	No	
ASTM	Residual Solid and Liquid Waste	Employ a closed-loop graywater washing system for the decontamination of trucks.				X		GR	No	No	
ASTM	Residual Solid and Liquid Waste	Segregate drilling or excavation waste based on location and composition to reduce the volume of drilling waste disposed offsite; collect needed analytical data to make onsite reuse decisions.				X		GR	No	No	
Other	Residual Solid and Liquid Waste	Reuse or recycle recovered product (such as the resale of captured petroleum products, precipitated metals, etc.) and materials (for example, cardboard, plastics, asphalt, concrete, etc.)				X		GR	No	No	
ASTM	Residual Solid and Liquid Waste	Use alternative drilling methods, including direct push technology or sonic technology, for well drilling to minimize drill cuttings that require disposal.	X	X		X	X	GR	No	No	
ASTM	Sampling and Analysis	Use a passive/no-purge groundwater sampling system.	X			X	X	GR	Yes	Yes	The Low-flow purge method is the regulatory approved method for the Site for monitored natural attenuation parameters.
ASTM	Sampling and Analysis	Use dedicated materials (that is, re-use of sampling equipment and non-use of disposable materials/equipment) when performing multiple rounds of sampling.				X		GR	Yes	Yes	
ASTM	Sampling and Analysis	Use an onsite mobile laboratory or other field analysis (for example, portable gas chromatography/mass spectrometry for fuel-related compounds and volatile organic compounds) to minimize the need for offsite laboratory analysis and associated sample packing and shipping.	X	X		X		GR	No	No	
USEPA SIEM	Sampling and Analysis	Choose fixed laboratories demonstrating a strong commitment to environmental performance, such as routine use of management practices identified by the International Institute for Sustainable Laboratories.	X	X	X	X		GR	Yes	Yes	
ASTM	Site Preparation/Land Restoration	For Site restoration, use a suitable mix of trees, shrubs, grasses, and forbs to preserve or improve biodiversity and related ecosystem services.				X	X	GR/R	No	No	The Site is owned and managed by others.
ASTM	Site Preparation/Land Restoration	If grass is required, use no- or low-mowing species to minimize mowing.				X	X	GR/R	No	No	The Site is owned and managed by others.
ASTM	Site Preparation/Land Restoration	Restore and/or maintain ecosystems in ways that mirror natural conditions.					X	GR/R	No	No	The Site is owned and managed by others.
ASTM	Site Preparation/Land Restoration	Restrict traffic to confined corridors to minimize soil compaction and land disturbance during site activities.					X	GR/R	No	No	
ASTM	Site Preparation/Land Restoration	Use an integrated pest management plan or green alternatives (for example, non-chemical solarizing technique) to minimize the use of chemical pesticides.					X	GR/R	No	No	The Site is owned and managed by others.
ASTM	Site Preparation/Land Restoration	Minimize clearing of trees throughout the investigation and cleanup.	X			X	X	GR/R	Yes	No	
USEPA WCSISR	Site Preparation/Land Restoration	Plan to mimic rather than alter the Site's natural landforms and topography, wherever feasible, to preserve natural drainageways and to minimize grading that disturbs land and ecosystem services, such as potable water, wildlife habitat, and carbon storage.					X	GR/R	No	No	The Site is owned and managed by others.
USEPA WCSISR	Site Preparation/Land Restoration	Integrate green infrastructure, such as infiltration basins and grassed swales, that filter and absorb stormwater where it lands, to bolster the Site's capacity to manage stormwater.					X	GR/R	No	No	The Site is owned and managed by others.
USEPA WCSISR	Site Preparation/Land Restoration	Account for the potential effects of future climate scenarios, which could include altered site conditions, such as increasing soil desiccation, water salinity, water table elevation, vulnerability to flooding, and wildlife risk.					X	GR/R	No	No	The Site is owned and managed by others.
USEPA WCSISR	Site Preparation/Land Restoration	Substitute temporary silt fences with biodegradable erosion controls, such as straw wattles and compost socks. Such devices capture sediment transported by stormwater runoff from or to adjoining slopes while building substrates for future vegetation.					X	GR/R	No	No	The Site is owned and managed by others.
USEPA WCSISR	Site Preparation/Land Restoration	Use pervious rather than impervious materials to surface required access roads and walkways, which fosters natural infiltration of rain or snowmelt.					X	GR/R	No	No	The Site is owned and managed by others.
USEPA WCSISR	Site Preparation/Land Restoration	Incorporate plant species that promote the colonization of bees and other pollinators.					X	GR/R	No	No	The Site is owned and managed by others.

See notes on last page.

Best Management Practice Source	Category	Best Management Practice	Core Element Addressed (at Site Level)					BMP Applicable to GR or R	Applicable to Site (Yes/No)	Applicable to Current Site Stage? (Yes/No/Future)	Comments
			Energy	Air	Water	Materials and Waste	Land and Ecosystems				
USEPA WCSISR	Site Preparation/Land Restoration	Seed or install native rather than non-native plant species, which typically increases the rate of plant survival and minimizes the need for soil or plant inputs.					X	GR/R	No	No	The Site is owned and managed by others.
ASTM	Surface/Storm Water	Capture rainwater for tasks such as wash water, irrigation, dust control, constructed wetlands, or other uses.			X		X	GR/R	No	No	The Site is owned and managed by others.
ASTM	Surface/Storm Water	Install and maintain silt fences and basins to capture sediment runoff along sloped areas.			X		X	GR/R	No	No	The Site is owned and managed by others.
ASTM	Vehicle and Equipment	Implement an idle reduction plan and carpooling where possible.	X	X				GR	Yes	Yes	
ASTM	Vehicle and Equipment	Use electric, hybrid, ethanol, or compressed natural gas vehicles instead of conventional vehicles.	x	X			X	GR	Yes	Yes	
ASTM	Vehicle and Equipment	Use equipment to increase automation, such as electronic pressure transducers, thermo-couples, and water quality monitoring devices coupled with an automatic data logger.	X	X	X			GR	Yes	Yes	No investigation is being conducted at this time.
ASTM	Vehicle and Equipment	Minimize diesel emissions through the use of retrofitted engines, ultra-low or low sulfur diesel or alternative fuels, or filter/treatment devices to achieve the best or maximum available control technology.		X				GR	No	No	
USEPA FE	Vehicle and Equipment	Ensure sufficient inflation and tread and proper alignment of tires to minimize rolling resistance. For example, a 10 percent reduction in rolling resistance would improve fuel economy by about 3 percent for light- and heavy-duty vehicles. Additional efficiency may be gained by replacing worn tires with models that are SmartWay verified for low rolling resistance.	X	X				GR	Yes	Yes	
USEPA FE	Vehicle and Equipment	Vehicle maintenance – Use the vehicle manufacturer's recommended grade of motor oil, which can impact fuel economy up to 2 percent. Replace filters in air and fuel systems in accordance with the vehicle manufacturer's recommended frequencies. Replace engine oil on a timely basis to avoid worn piston rings that reduce engine efficiency. Secure prompt interim maintenance when the vehicle's "check engine" light becomes illuminated. Check brake parts, such as calipers and pads, and promptly replace worn parts to avoid brake drag.	X	X				GR	Yes	Yes	
USEPA FE	Vehicle and Equipment	Facilitate staff carpooling opportunities to minimize travel to and from the Site or other destinations on a given day.	X	X				GR	Yes	Yes	
USEPA FE	Vehicle and Equipment	Combine trips to avoid unnecessary stopping and starting of engines. Multiple short trips can use twice as much fuel as one long, multi-purpose trip that covers the same distance while the engine is warm and at its most fuel-efficient temperature.	X	X				GR	Yes	Yes	
USEPA FE	Vehicle and Equipment	Reduce vehicle loads by offloading any unneeded items and avoid using rooftop cargo carriers.	X	X				GR	Yes	Yes	
USEPA FE	Vehicle and Equipment	Use overdrive gearing whenever feasible to reduce an engine's speed, which in turn reduces fuel consumption, extends engine life, and lessens engine noise.	X	X				GR	Yes	Yes	
USEPA FE	Vehicle and Equipment	Avoid rapid acceleration, excessive speed, and repetitive hard braking, which lowers gas mileage by as much as 30 percent.	X	X				GR	Yes	Yes	
ASTM	Vehicle and Equipment	Implement a telemetry system to reduce the frequency of site visits.	X	X				GR	Yes	Future	Continuous monitoring is not currently needed.
Other	Wastewater	Treat potentially contaminated purge water with an onsite treatment technique prior to reinjecting into an onsite well or discharge to a storm drain or waterway, as permissible.			X	X		GR	No	Yes	

Notes:
1. BMPs listed are from ASTM E2893-16 (Standard Guidance for Greener Cleanups), USEPA's BMPs for Green Remediation (https://clu-in.org/greenremediation/bmps), and other sources or project experience.

Acronyms and Abbreviations:
ASTM - American Society for Testing and Materials
BMP - Best Management Practice
Other - Best practice from other sources or project experience
USEPA - United States Environmental Protection Agency
USEPA FE - USEPA Clean Fuel and Emission Technologies for Site Cleanup BMP
USEPA SIEM - USEPA Site Investigation and Environmental Monitoring BMP
USEPA WCSISR - Waste Cover Systems and Integrated Site Reuse Planning BMP

Appendix M

Remedial System Optimization Report Outline

Appendix M
Remedial System Optimization Report Outline
Site Management Plan
235 Metro Park Brighton Site, Rochester, New York
Site No. 828150

REMEDIAL SYSTEM OPTIMIZATION OUTLINE FOR 235 Metro Park Brighton Site (Site No. 828150)

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