Interim Site Management Plan

Westchester County Airport

Site No. C360174

West Harrison, New York

June 2025 | Terracon Project No. JA257006

Prepared for:

County of Westchester
148 Martine Avenue
White Plains, New York 10601

Terracon

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- Facilities
- Environmental
- Geotechnical
- Materials

June 13, 2025

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau C
625 Broadway, 12th Floor
Albany, New York 12233-7014

Attn: Greta Kowalski, P.G. – Project Manager
P: (518) 402-2029
E: greta.kowalski@dec.ny.gov

Re: Interim Site Management Plan (ISMP)
Brownfield Cleanup Program
Westchester County Airport Site No. C360174
240 Airport Road, West Harrison, New York 10604
Terracon Project No. JA257006

Dear Ms. Kowalski:

Terracon Consultants-NY, Inc. (Terracon) is pleased to submit this Interim Site Management Plan (ISMP) to the New York State Department of Environmental Conservation (NYSDEC) for review and approval. Terracon has prepared this ISMP for the Westchester County Airport Brownfield site in support of ongoing and future environmental remedial actions and construction within the Airport property.

This ISMP is generally based on and conforms with the NYSDEC approved template dated October 2024, and has integrated a majority of the required language in an SMP. However, Terracon understands that this ISMP will initially support immediate environmental mitigation actions during 2025 and provide the basis for the eventual SMP that will be approved by NYSDEC and govern environmental mitigation and monitoring actions at the Westchester County Airport (HPN).

Should you have any questions or require additional information, please do not hesitate to contact our office.

Sincerely,

Terracon Consultants, Inc.

Lucas A. Barroso-Giachetti, PE*, CHMM
Sr. Env. Engineer/Regional PFAS Technical Lead
*FL, NC & SC

Michele M. Patterson-Wittman, PG*
Operations Manager/Principal
*NY

WESTCHESTER COUNTY AIRPORT

WESTCHESTER COUNTY

WEST HARRISON, NEW YORK

INTERIM SITE MANAGEMENT PLAN

NYSDEC Site Number: C360174

Prepared for:

County of Westchester

148 Martine Ave

White Plains, NY 10601

Prepared by:

Terracon Consultants-NY, Inc.

70 Vantage Point Drive

Rochester, New York 14624

585-247-3471

Revisions to Final Approved Site Management Plan:

Revision No.	Date Submitted	Summary of Revision	NYSDEC Approval Date

JUNE 2025

CERTIFICATION STATEMENT

I _MICHELE PATTERSON-WITTMAN_ certify that I am currently a Qualified Environmental Professional as in 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).

_____ P.G., QEP

_____DATE

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LIST OF ACRONYMS

AS	Air Sparging
ASP	Analytical Services Protocol
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BMP	Best Management Practice
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CAMP	Community Air Monitoring Plan
C/D	Construction and Demolition
CFR	Code of Federal Regulation
CLP	Contract Laboratory Program
COC	Certificate of Completion
CO2	Carbon Dioxide
CP	Commissioner Policy
DER	Division of Environmental Remediation
DUSR	Data Usability Summary Report
EC	Engineering Control
ECL	Environmental Conservation Law
ELAP	Environmental Laboratory Approval Program
ERP	Environmental Restoration Program
EWP	Excavation Work Plan
GHG	Greenhouse Gas
GWE&T	Groundwater Extraction and Treatment
HASP	Health and Safety Plan
IC	Institutional Control
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYCRR	New York Codes, Rules and Regulations
O&M	Operation and Maintenance
OM&M	Operation, Maintenance and Monitoring
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
P.E. or PE	Professional Engineer
PFAS	Per- and Polyfluoroalkyl Substances
PID	Photoionization Detector
PRP	Potentially Responsible Party
PRR	Periodic Review Report
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QEP	Qualified Environmental Professional
RAO	Remedial Action Objective
RAWP	Remedial Action Work Plan
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RP	Remedial Party
RSO	Remedial System Optimization
SAC	State Assistance Contract
SCG	Standards, Criteria and Guidelines
SCO	Soil Cleanup Objective
SMP	Site Management Plan

SOP	Standard Operating Procedures
SOW	Statement of Work
SPDES	State Pollutant Discharge Elimination System
SSD	Sub-slab Depressurization
SVE	Soil Vapor Extraction
SVI	Soil Vapor Intrusion
TAL	Target Analyte List
TCL	Target Compound List
TCLP	Toxicity Characteristic Leachate Procedure
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VCA	Voluntary Cleanup Agreement
VCP	Voluntary Cleanup Program

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:

Site Identification:	NYSDEC Site Number C360174, Westchester County Airport
Institutional Controls:	1. The property is anticipated to be used for commercial uses.
	2. All ECs must be operated and maintained as specified in the ISMP.
	3.Data and information pertinent to site management must be reported at the frequency and in a manner as defined in the ISMP.
	4. All future activities that will disturb potentially contaminated material must be conducted in accordance with the ISMP.
	5. 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 ISMP and the BCA.
	6. All ECs must be inspected at a frequency and in a manner defined in the ISMP.
Engineering Controls:	1. Since contamination exists at the site, Institutional Controls (ICs) and Engineering Controls (ECs) are required to protect human health and the environment. The Final SMP for the Site will include all applicable ICs/ECs as defined in the remedy for the Site. Further remedial investigation is planned.

Site Identification: NYSDEC Site Number C360174, Westchester County Airport

Inspections:	Frequency
1. No current inspections required	To Be Determined
2. Cover inspection for Site V00611 is not currently required. Evaluation of V00611 will be part of the overall site evaluation and requirement.	None
3. Extraction System/Subslab Depressurization System was formerly associated with Hanger E chlorinated spill. The system was dismantled in January 2025 and final report in process. No inspections currently required.	To Be Determined
Monitoring:	
1. Semi-Annual Groundwater Sampling	Semi-Annual
2. Other Media Sampling based on Final SMP	To Be Determined
Maintenance:	
1. Per the Final SMP	To Be Determined
Reporting:	
1. Monthly Progress Reports	Monthly
2. Periodic Review Report	Annually or Per the Final SMP

Further descriptions of the above requirements will be provided in detail in the Final Site Management Plan approved by NYSDEC.

1.0 INTRODUCTION

1.1 General

This Interim Site Management Plan (ISMP) is a required element of the remedial program for the Westchester County Airport (HPN) located in Westchester County, New York (hereinafter referred to as the "Site"). See **Figure 1**. The Site is currently in the New York State (NYS) Site No. C360174, which is administered by New York State Department of Environmental Conservation (NYSDEC or Department).

Westchester County entered into a Brownfield Cleanup Agreement (BCA) on August 10, 2021 with the NYSDEC to remediate the site. A figure showing the site location and boundaries of this site is provided in **Figure 2.**

After completion of the remedial work, some contamination may be left at this site, which is hereafter referred to as "remaining contamination." Institutional and Engineering Controls (ICs and ECs) will be incorporated into the final Site remedy to control exposure to remaining contamination to ensure protection of public health and the environment. An Environmental Easement will be issued to the NYSDEC, and recorded with the Westchester County Clerk, requiring compliance with the Final SMP and all ECs and ICs placed on the site.

This ISMP was prepared to manage remaining contamination at the Site associated with various activities including Remedial Investigation, Remedial Actions and development activities. Upon completion of remedial requirements, Final SMP will be developed and approved by NYSDEC.

This ISMP may only be revised with the approval of the NYSDEC.

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 (COC); and~~

- Failure to comply with this ISMP is also a violation of Environmental Conservation Law, 6 NYCRR Part 375 and the BCA, Site #C360174 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 **Appendix A** of this ISMP.

This ISMP was prepared by Terracon Consultants-NY, Inc., on behalf of Westchester County in accordance with the requirements of the NYSDEC's DER-10 ("Technical Guidance for Site Investigation and Remediation"), dated May 2010, and the guidelines provided by the NYSDEC. This ISMP preliminarily addresses the means for implementing the ICs and/or ECs that will be required prior to the placement of the Environmental Easement for the site per the Final SMP as well as the management of contaminated/impacted soil/fill materials, stormwater, groundwater or other media during develop activities prior to COC issuance.

1.2 Revisions and Alterations

Revisions and alterations to this plan will be proposed in writing to the NYSDEC's project manager. The NYSDEC can also make changes to this ISMP 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. In accordance with the Environmental Easement for the site, the NYSDEC project manager will provide a notice of any approved changes to the ISMP, and append these notices to the ISMP that is retained in its files.

1.3 Notifications

The Notifications will be submitted by the property owner to the NYSDEC, as needed, in accordance with NYSDEC's DER – 10 for the following reasons:

1. 60-day advance notice of any proposed changes in site use that are required under the terms of the BCA, 6 NYCRR Part 375 and/or Environmental Conservation Law.
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. 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 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 Brownfield Cleanup Agreement (BCA) and all approved work plans and reports, including this ISMP.
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.

Table 1 on the following page 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 A**.

Table 1: Notifications*

Name	**Contact Information**	**Required Notification****
Greta Kowalski, P.G. NYSEC Project Manager Remedial Bureau C	NYSDEC DER Bureau C 625 Broadway Albany, NY 12233 Greta.kowalski@dec.ny.gov 518-402-2029	All Notifications
Kiera Thompson NYSDEC Section Chief Remedial Bureau C	NYSDEC DER Bureau C 625 Broadway Albany, NY 12233 Kiera.thompson.ny.gov	All Notifications
Leia Schmidt, Esq. NYSDEC Site Control	NYSDEC Office of General Counsel 625 Broadway, 14th Floor Albany, NY 12233-1500 Leia.schmidt@dec.ny.gog	Notifications 1 and 8
Christine Vooris NYSDOH Project Manager	NYSDOH Bureau of Environmental Exposure Investigation Empire State Plane Corning Tower Room 1787 Albany, NY 12237 Christine.vooris@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.

2.0 Summary of Previous Investigations and Remedial Actions

2.1 Site Location and Description

The site is located in West Harrison, Westchester County, New York. The site is an approximate 700-acre area and is bounded by wooded land, commercial, and residential properties to the north, wooded land and commercial properties to the south, wooded land as well as the state boundary of Connecticut to the east, and wooded land, commercial, and residential properties to the west (see **Figure 2 – Site Layout Map**). The owner of the site

is The County of Westchester. The operator of the site at the time of issuance of this ISMP is Westchester County.

The location of the Site is illustrated on the United States Geological Survey (USG S) 7.5-minute Quadrangle (Glenville NY Topographic Quadrangle, 1967, Photorevised 1981) Map provided as **Figure 1**. The Site is approximately 700 acres, with about a third of the Airport located in the Kenisco watershed, as shown on **Figure 2**.

Site History

The New York Air National Guard (NYANG) was a tenant at the Airport from 1947 to 1983. As part of its operations, the NYANG performed aircraft firefighting training operations on a regular basis. These firefighting exercises and training activities were performed at a "Burn Pit" that was located near the NYANG's former hangar (hereafter referred to as the "NYANG Burn Pit") on County property adjacent to the NYANG's leasehold.

The NYANG conducted these exercises from as early as 1968 until 1983 when they vacated the Airport. The NYANG, as part of its firefighting exercises, used Aqueous Film-Forming Foam (AFFF), which historically contained compounds referred to as per- and polyfluoroalkyl substances (PFAS). Only recently has there been a reduction in the use of PFAS chemicals in AFFF. The duration of AFFF use at the NYANG Burn Pit and the fact that the NYANG Burn Pit was unlined resulted in groundwater at this location exhibiting the highest concentrations of PFAS contamination at the Site. Based on this finding, the Burn Pit has been identified as the primary source area for PFAS impacts at the site, at this time.

The Site is currently an active Airport servicing both private and commercial air traffic. The County of Westchester has been accepted into the Brownfield Cleanup Program (BCP) as a Participant in 2021.

2.2 Physical Setting

The Site is located in a mixed-use area of commercial and residential parcels. Residential housing is located to the north of the Site across Airport Road. To the east and south of the Airport are residences and commercial properties, including a golf course. Interstate 684 is

located to west of the Airport. Rye Lake is part of the Kensico Reservoir and is located northwest of the Airport.

According to the Site Characterization Report prepared by First Environment dated February 2023 (Site Characterization Report), about one-third of the Airport lies within the Rye Lake watershed, while the remainder lies within the Blind Brook watershed.

The northern portion of the Site generally slopes to the west toward Rye Lake, whereas the southern part of the Site slopes to Blind Brook. The Site is largely covered with earthen fill and vegetation with some areas covered by concrete, asphalt, and/or gravel. The main structures at the Site consist of Airport and tenant buildings of a slab-on-grade construction. The hangar facilities house aircraft and flight operations offices. The buildings house offices and infrastructure necessary to support Airport Operations, Maintenance and Administration.

The topography at the Airport changes throughout the Site, with several variations, resulting in surface and groundwater flow differentials. Alta Survey and further groundwater evaluations will be completed during Site remedial investigation work.

As noted above, Rye Lake is part of the Kensico Reservoir that serves as a drinking water reservoir for Westchester County and New York City. The west adjoining area is comprised primarily of woodlands and includes Route 120 and Interstate 684 beyond which is Rye Lake.

Surface/Stormwater Drainage

Terracon understands the Airport's surface/stormwater collection system was engineered to reduce the amount of water running off into Rye Lake by redirecting its flow to other parts of the Airport.

Stormwater from surfaces (runways, taxiways and aprons) associated with Airport Operations flows into several catch basins from specific areas of the Airport (see **Figure 3** in **Appendix B**) which discharge to Army Corp Wetland Mitigation Basins A and B, or directly to Blind Brook. Each basin is located along the southwestern boundary of the Airport. Surfaces in the area of the former NYANG site, including passengers vehicular

parking and Airport Maintenance, discharge water to Rye Lake and Blind Brook through additional stormwater management system discharge outfall locations. The Airport drainage areas are illustrated on **Figure 4** in **Appendix B**.

Stormwater outflows from the Airport drainage system are subject to the New York State Pollutant Discharge Elimination System (SPDES) Permit and are strictly monitored for compliance, as stated in the order of consent between the NYSDEC and Westchester County.

2.2.1 Land Use

The Site consists of the following: Air Operations Area (AOA), aircraft hangars, one commercial passenger terminal, several support and service buildings and landscaped areas. The Site is zoned as an industrial property, specifically Industrial AA, Campus Office, Research and Industrial Park and is currently an active airport. Site occupants include the Westchester County Airport and airport operations associated tenants.
The properties adjoining the Site and in the neighborhood surrounding the Site primarily include commercial and residential properties. The properties immediately south of the Site include commercial and residential properties; the properties immediately north of the Site include commercial and residential properties; the properties immediately east of the Site include commercial and residential properties; and the properties to the west of the Site include commercial and residential properties.

2.2.2 Geology

Based on information obtained from the Site Characterization Report, the Airport property is generally underlain by shallow overburden soil (topsoil, fill, glacial till, and glacial outwash deposits) overlying bedrock. According to the Site Characterization Report, metamorphic schist bedrock was identified at depths ranging from 1 to 20 feet below ground surface (bgs) across the borings. Weathered bedrock was observed to range in thickness from 5 feet to 10 feet.

According to a review of the USGS geologic map for the State of New York, the bedrock underlying the Site consists of Manhattan Schist. The Manhattan Schist is understood to

belong to the middle Ordovician Tippecanoe or Taconic Sequence. The Inwood Marble, which is more resistant to weathering than the younger Manhattan Schist, underlies the Manhattan Schist which terminates near the west end of the Site near Rye Lake. The Inwood Marble formation belongs to the Cambro-Ordovician Sauk Sequence. Near the contact between the Manhattan Schist and the Inwood Marble, the schistose rocks are reported to include layers of calcite marble.

2.2.3 Hydrogeology

Based on the Site Characterization Report, groundwater underlying the Site was identified as two units, an unconfined water-bearing zone consisting of unconsolidated soils and the uppermost weathered bedrock, and the confined aquifer that is comprised of schist bedrock. Locally perched groundwater, possibly a recharge zone to bedrock, may exist causing a mounding effect in the north-central portion of the Airport. The mound appears to be created by higher elevation of saprolite rock in this area, causing water to perch at a higher elevation. Further south, groundwater begins to shift and divide causing a large portion of the groundwater to flow south, away from Rye Lake.

2.3 Investigation and Remedial History

Terracon understands that in the late 1990s, and as a result of historical firefighting and training activities using flammables such as aviation fuel as the accelerant, concerns were identified regarding the potential environmental impacts to soil and groundwater in and around the former NYANG Burn Pit area. Training activities consisted of the repeated burning and extinguishing of aviation fuel at this location. According to Westchester County, the training activities were conducted by the NYANG. Training activities at the NYANG Burn Pit were permanently discontinued prior to an earlier investigation and remediation that occurred in 1999.

Initial investigations were conducted during 1999 and 2000 at the NYANG Burn Pit Area. The investigations included the collection and analysis of soil, sediment, surface water, and groundwater samples within and immediately adjacent to the Burn Pit. Laboratory analyses of soil and groundwater samples collected in this area identified impacts above NYSDEC regulatory levels for volatile organic compounds (VOCs) and semi-volatile organic

compounds (SVOCs). In early 2000, 39 study areas were identified as possible contaminant sources at the Airport and investigated to determine their potential impact to the Site.

Starting in June 2001 until 2011, a voluntary groundwater monitoring program was performed by the County at the Westchester County Airport. The monitoring program included the semi-annual sampling and analysis of between 50 to 57 monitoring wells located across the Site. The analytical parameters included VOCs, SVOCs, glycols, and total and dissolved metals. The monitoring program was performed until the first quarter of 2011, at which point the program was discontinued by the prior Westchester County administration.

At the request of the NYSDEC, to evaluate potential impacts from historic fire training activities conducted by the NYANG, monitoring well sampling was conducted in November 2017, and identified per- and polyfluoroalkyl substances (PFAS) in eight (8) monitoring wells located across the Site.

In August 2018, the County voluntarily restarted the semi-annual groundwater monitoring program and sampled 52 monitoring wells. The 2018 sampling event was the initial full sampling event under the re-started monitoring program and encompassed an expanded list of analytical parameters, including 21 PFAS compounds as well as 1,4 dioxane.

The 2018 groundwater sampling event revealed concentrations of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) exceeding the 70 parts per trillion (ppt) United States Environmental Protection Agency (USEPA) Health Advisory Level (HAL) for combined PFOA and PFOS in 26 of the 52 sampled monitoring wells. The monitoring wells exhibiting the highest concentrations of PFAS in groundwater were located in the northern portion of the Site, near the former NYANG Burn Pit. In addition, 1,4-dioxane and VOCs were also identified; however, no glycols were detected.

Based on the historical groundwater results, the highest combined PFOA and PFOS concentrations were detected in wells FMW-6 and FMW-7, which are both located immediately adjacent to the former NYANG Burn Pit area. The former NYANG Burn Pit area was considered the primary source area at the Site where AFFF was used during fire training exercises.

On April 2, 2019, sediment and surface water samples were collected at representative locations along the boundary of the Airport to further assess the presence of PFAS at the Site. The combined PFOS/PFOA results for sediment and surface water revealed elevated levels to the north of the Site near the former NYANG Burn Pit when compared to other locations of the Airport more distal from the former NYANG Burn Pit.

The sediment results are included on **Figure 10** in **Appendix B**, and the surface water results are presented on **Figure 11** in **Appendix B**.

First Environment prepared an Interim Remedial Measure (IRM) Workplan for Outfalls (OF) 4 and 7, dated September 7, 2020, to mitigate PFAS that were present in stormwater discharges to outfalls located at the Westchester County Airport. Previous sampling of the stormwater outfalls revealed elevated concentrations of PFOS and PFOA at OF-7, and to a lesser degree at OF-4. PFOS and PFOA became CERCLA-listed hazardous substances by the US EPA in July 2024.

NYSDEC is requiring the implementation of an IRM to address elevated PFAS concentrations in stormwater runoff leaving the Site.

The previous IRM-related activities conducted by First Environment summarized pilot testing studies of multiple techniques to mitigate the PFAS impacts at Outfall OF-7. First Environment prepared a report of initial pilot testing performed at OF-7 titled *TASK 1 OF-7 Pilot Tests Report, Westchester County Airport, White Plains, New York* dated September 5, 2024.

2.4 Remedial Action Objectives

The Remedial Action Objectives (RAOs) for the Site as listed 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.
- Prevent the discharge of contaminants to surface water.
- 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.

Surface Water

RAOs for Public Health Protection

- Prevent ingestion of water impacted by contaminants.
- Prevent contact or inhalation of contaminants from impacted water bodies.
- Prevent surface water contamination which may result in fish advisories.

RAOs for Environmental Protection

- Restore surface water to ambient water quality criteria for the contaminant of concern.

- Prevent impacts to biota from ingestion/direct contact with surface water causing toxicity and impacts from bioaccumulation through the marine or aquatic food chain.

Sediment

RAOs for Public Health Protection

- Prevent direct contact with contaminated sediments.
- Prevent surface water contamination which may result in fish advisories.

RAOs for Environmental Protection

- Prevent releases of contaminant(s) from sediments that would result in surface water levels in excess of (ambient water quality criteria).
- Prevent impacts to biota from ingestion/direct contact with sediments causing toxicity or impacts from bioaccumulation through the marine or aquatic food chain.
- Restore sediments to pre-release/background conditions to the extent feasible.

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

IRMs are planned for the Site, as well as completion of the RI. A summary of remaining contamination following the completion of IRMs and RI will be included in the final SMP.

2.5.1 Soil

Based on the results in Site Characterization Report conducted by First Environment in 2020, PFOS was detected across the Site at concentrations ranging from 0.5 parts per billion (ppb) to 24.9 ppb. Decreased concentrations were generally identified on the western-side of the Site, away from the former NYANG Burn Pit. Based on the 2020 assessment, the highest PFOS values are identified closest to the former NYANG Burn Pit

source area. In addition to the former NYANG Burn Pit area, First Environment identified two other areas exhibiting elevated levels of PFAS in soil, including former Hangar B area, and Active Fire Training and Testing Area.

Figure 15 shows the approximate soil boring locations and PFOS concentrations in **Appendix B**.

IRMs are planned for the Site, as well as completion of the RI. A summary of remaining contamination following the completion of IRMs and RI will be included in the final SMP.

2.5.2 Sediment

Sediment sampling was completed by First Environment during 2019 and 2020. The sediment samples were analyzed for VOCs, semi-volatile organic compounds (SVOCs), metals, pesticides and polychlorinated biphenyls (PCBs). Analytical results reported multiple metals above the NYSDEC Freshwater Sediment Guidance values (chromium, copper, lead, nickel, silver and zinc). VOCs, SVOCs, pesticides and PCBs were detected below their applicable Freshwater Sediment Guidance values.

PFAS concentrations were detected in the 18 sediment samples across the Airport property. PFOS was detected in all sediment samples across the Site ranging from 0.7 ppb to 32.4 ppb. The highest values were found at Outfall 7 and Outfall 10, which drain the former NYANG Burn Pit area. PFOA was detected in four sediment samples across the Site ranging from 0.66 ppb to 7.7 ppb.

The sediment sample locations and analytical results are provided on **Figure 22** in **Appendix B**.

IRMs are planned for the Site, as well as completion of the RI. A summary of remaining contamination following the completion of IRMs and RI will be included in the final SMP.

2.5.3 Groundwater

Groundwater quality is based on the October 2024 groundwater sampling event completed by WSP. The October 2024 sampling event included 40 groundwater monitor wells of which 35 were sampled for PFAS. In addition, samples from selected wells were analyzed for volatile organic compounds (VOCs), 1,4-dioxane and glycols (ethylene and propylene glycol).

Based on the October 2024 groundwater results, the following findings were associated with PFAS concentrations for the Site:

- The highest concentrations of total PFAS were detected in wells MW-63 (39,699 nanograms per liter (ng/L or ppt) and MW-58D (23,317 ng/L).

- The highest concentrations of PFOS were detected in wells FMW-31 (7,800 ng/L) and MW-64 (7,570 ng/L). MW-64 and FMW-31 are in the northern part of the airport near the former burn pit.

- WSP noted that groundwater quality in the area of the former burn pit reported the highest PFAS concentrations since the first site-wide sampling event in 2018.

- WSP also noted that PFAS concentrations in groundwater decrease across the site from north to south with the lowest concentrations detected in wells located on the southern half of the property.

Appendix B includes **Figure 1 through Figure 6** from the WSP October 2024 Semi-Annual Groundwater Sampling Results Report showing the monitoring well locations and groundwater quality results.

IRMs are planned for the Site, as well as completion of the RI. A summary of remaining contamination following the completion of IRMs and RI will be included in the final SMP.

2.5.4 Surface Water

Surface water sampling was completed by First Environment during 2019 and 2020. Nine sample locations were selected to evaluate surface water quality. The locations included

five outfalls (OF-1, OF-3, OF-4, OF-7, and OF-10) as well as four other surface water tributary locations (SW-1, SW-2, SW-3, and Weir 2). First Environment noted that a total of 57 surface water samples were collected and submitted for PFAS analysis; 36 of those samples were also submitted for 1,4-dioxane analysis and a subset of 13 of those samples were submitted for the full suite of chemical constituents that included VOCs, SVOCs, 1,4-dioxane), metals, pesticides, PCBs, and cyanide.

Analytical results reported non-PFAS parameters above the NYSDEC standards including 1,4-dioxane, antimony, barium and cobalt.

Analytical results reported PFOS detected in all samples across the Site ranging in concentration from 2 ppb to 4,280 ppt, with the highest concentrations consistently identified at OF-7, which drains groundwater from the former NYANG Burn Pit area. Additional high results were also obtained at OF-10, which drains the area to the east of the NYANG Burn Pit, but outside of the Rye Lake Drainage Basin. PFOA was detected in almost all samples across the Site, but at comparatively lower concentrations than PFOS, with detections ranging from 4 ppt to 793 ppt.

The PFAS surface water results are presented on **Figure 21** in **Appendix B**.

IRMs are planned for the Site, as well as completion of the RI. A summary of remaining contamination following the completion of IRMs and RI will be included in the final SMP.

3.0 INSTITUTIONAL AND ENGINEERING CONTROL PLAN

3.1 General

Since contamination exists at the site, Institutional Controls (ICs) and Engineering Controls (ECs) will likely be required to protect human health and the environment. Upon completion of RI and IRMs, as well as determination of final remedy, ICs/ECs will be determined. The final SMP for the Site will include all applicable ICs/ECs as defined in the remedy for the Site.

3.2 Institutional Controls

A series of ICs will likely be required by the RAWP or Decision Document. Generally, remedial processes are considered completed when monitoring indicates that the remedy has achieved the remedial action objectives identified by the decision document. The framework for determining when remedial processes are complete is provided in Section 6.4 of NYSDEC DER-10.

Upon completion of RI and IRMs, as well as determination of final remedy, ICs will be determined.

3.3 Engineering Controls

Upon completion of RI and IRMs, as well as determination of final remedy, ECs will be determined.

3.3.1 Cover (or Cap)

The use of a cover system may be incorporated into the site's approach to protect human health and the environment, and will be included in the final SMP.

If a cover or cap is implemented as an EC, any work conducted pursuant to the EWP must also be conducted in accordance with the procedures defined in a Health and Safety Plan (HASP) and associated Community Air Monitoring Plan (CAMP) prepared for the site and provided in **Appendix F**.

Terracon is committed to the safety of all its employees. As such, and in accordance with our Incident and Injury Free® safety goals, Terracon will conduct fieldwork under a site-specific health and safety plan. The plan will identify site-specific job hazards and proper pre-task planning procedures. Work is anticipated to be performed using U.S. EPA Level D work attire consisting of hard hats, high-visibility attire, safety glasses, protective gloves, and protective boots.

Prior to initiating any on-site intrusive activities, Terracon or its subcontractors will complete the required public utility mark-out and notifications. In addition, Terracon will prepare a site-specific health and safety plan (HASP) in accordance with NYSDEC guidance (DER-10) incorporating the tasks to be completed as outlined in this ISMP. Terracon's HASP will be consistent with that of the current Site HASP prepared by First Environment, and is included in **Appendix D.**

3.3.2 Other ECs: e.g. Groundwater Extraction and Treatment, Sub-slab Depressurization Systems; Air Sparging/Soil Vapor Extraction Systems; Monitoring Wells; etc.

Other ECs may be incorporated into the site's approach to protect human health and the environment and will be included in the final SMP.

3.3.3 Criteria for Completion of Remediation/Termination of Remedial Systems

Generally, remedial processes are considered completed when monitoring indicates that the remedy has achieved the remedial action objectives identified by the decision document. The framework for determining when remedial processes are complete is provided in Section 6.4 of NYSDEC DER-10. Unless waived by the NYSDEC, 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 (DUSR).

As discussed below, the NYSDEC 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.

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.

4.0 Monitoring and Sampling Plan

Required monitoring associated with evaluating the overall performance and effectiveness of the remedy will be determined following remedy selection and implementation. If warranted, a Monitoring and Sampling Plan will be included in the Final SMP.

Semi-annual groundwater sampling program is currently in place at the Site completed by WSP in accordance with a current contract with Westchester County. This sampling program will remain in place for the length of the current contract; however, based on IRM and RI results, the scope and term of the sampling contract can be evaluated, as amendment provided if approved by NYSDEC. Refer to **Appendix I** for the current groundwater sampling plan.

4.1 Site-Wide Inspection

The Site-wide inspections will be performed as noted in the Final SMP or at a minimum of 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, 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 (depending on the need to evaluate engineering controls).

Modification to the frequency or duration of the inspections will require 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 the Final SMP. 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 Final SMP schedule, regardless of the frequency of the Periodic Review Report. 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 the Final 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 7.0** of this plan.

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 NYCCR Part 375. 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 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.

5.0 Operation and Maintenance Plan

If operation and maintenance of any ECs are required following the final remedy, an Operation and Maintenance Plan will be included in the final SMP. Additionally, if any engineering controls are constructed on-site, the ISMP will be updated accordingly.

6.0 Periodic Assessments/Evalutions

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 assessments provide information so that the site and associated remedial systems are prepared for the impacts of the 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 Periodic Review Reports.

6.2 Green Remediation Evaluation

NYSDEC's DER-31 Green Remediation 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 the Final SMP. This section of the Final SMP ~~also provides~~ will provide a summary of green remediation evaluations to be completed for the site during site management and reported in Periodic

Review Reports (PRRs). Green remediation evaluation will be updated with respect to IRM and/or treatment systems, as appropriate.

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 Remedial Systems

Remedial systems will be operated properly considering the current site conditions to conserve materials and resources to the greatest extent possible. Consideration will be given to operating rates and use of reagents and consumables. Spent materials will be sent for recycling, as appropriate.

6.2.3 Building Operations

Structures including buildings and sheds will be operated and maintained to provide for the most efficient operation of the remedy, while minimizing energy, waste generation and water consumption.

6.2.4 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 conduct system checks and/or 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.

6.2.5 Metrics and Reporting

As discussed in **Section 7.0,** 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.

6.3 Remedial System Optimization

A Remedial System Optimization (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.

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.

7.0 Reporting Requirements

7.1 Site Management Reports

All ISMP activities will be reported in the Site's monthly progress reports.

All site management inspection, maintenance and monitoring events will be recorded on the appropriate site management forms provided in the Final SMP. These forms are subject to NYSDEC revision. All site management inspection, maintenance, and monitoring events will be conducted by a qualified environmental professional as defined in 6 NYCRR Part 375 (depending on the need to evaluate engineering controls).

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 in accordance with the requirements of the Final SMP and summarized in the Periodic Review Report.

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 Periodic Review Report (PRR) will be submitted to the NYSDEC project manager beginning sixteen (16) months after the Certificate of Completion is issued. After submittal of the initial Periodic Review Report, 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 Periodic Review Report will be prepared that addresses the site. The report will be prepared in accordance with NYSDEC's DER-10 and submitted within 30 days of the end of each certification period. Media sampling results will also be incorporated into the Periodic Review Report. 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 (groundwater, soil vapor, etc.), 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 concentration 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;
    - O&M 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. 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 (RAWP), ROD or Decision Document;
  - The operation and the effectiveness of all treatment units, etc., including identification of any needed repairs or modifications;
  - 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 and Sampling Plan;
  - An update to the climate change vulnerability assessment if site or external conditions have changed since the previous assessment, 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.
  - 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, ROD or Decision Document; and
  - The overall performance and effectiveness of the remedy.

- A performance summary for all treatment systems at the site during the calendar year, including information such as:
  - The number of days the system operated for the reporting period;
  - The average, high, and low flows per day;
  - The contaminant mass removed and the cost per pound of mass removed during the certification period and during the life of the treatment system;

- A description of breakdowns and/or repairs along with an explanation for any significant downtime;
- A description of the resolution of performance problems;
- Alarm conditions;
- Trends in equipment failure;
- A summary of the performance, effluent and/or effectiveness monitoring; and
- Comments, conclusions, and recommendations based on data evaluation. Recommendations must address how receptors would be impacted. Recommendations can include:
    - Proposals to address efficiency and costs such as: instituting remote operation, system changes to decrease maintenance costs and downtime, and system changes to decrease energy use; and
    - Proposals to modify or shut down a treatment system due to remediation completion, system performance or changed conditions. System shutdowns are addressed in Section 6.4 of DER-10.

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 (depending on the need to evaluate engineering systems) will prepare, and include in the Periodic Review Report, the required certification as per the requirements of NYSDEC DER-10 and the final SMP.

The Periodic Review Report will be submitted, in electronic format, to the NYSDEC project manager and the NYSDOH project manager. The Periodic Review Report 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 institutional or engineering control 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. 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. 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 Final SMP may also be required.

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

8.0 References

Interim Remedial Measure (IRM) Workplan *for Outfalls (OF) 4 and 7*, dated September 7, 2020 prepared by First Environment, Inc. (First Environment).

Site Characterization Report Westchester County Airport White Plains, New York, February 2023 prepared by First Environment.

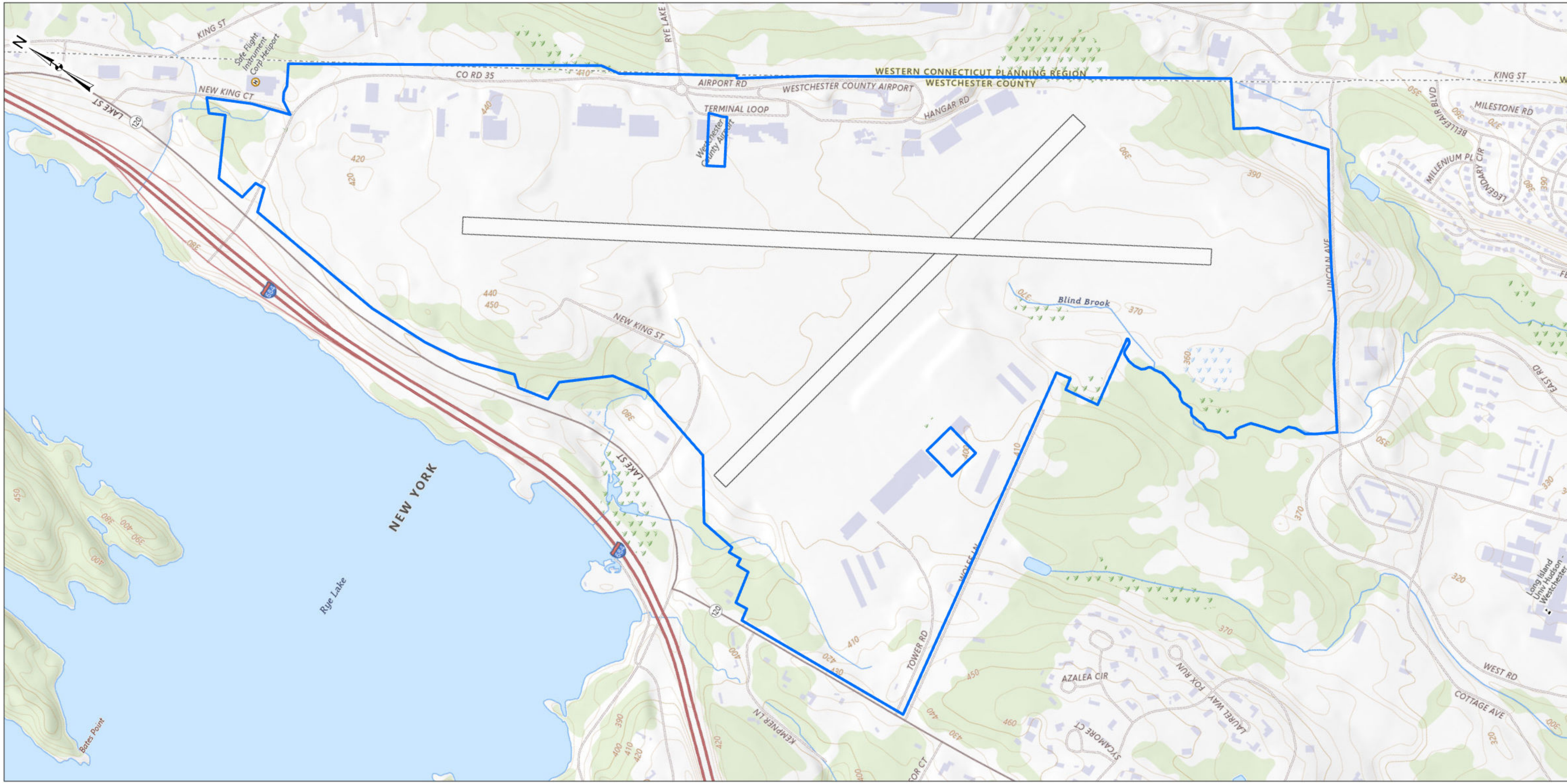
Westchester County Airport, October 2024 Semi-Annual Groundwater Sampling Results, dated January 15, 2025.

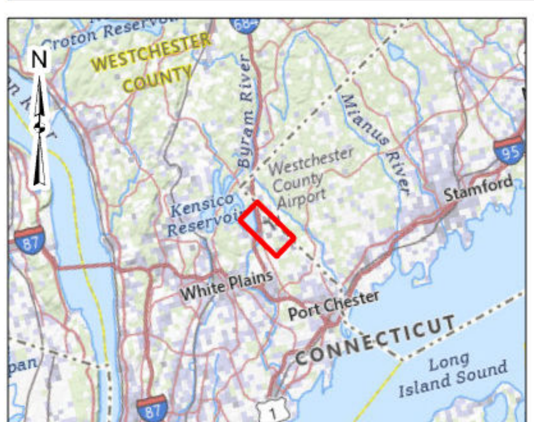
6 NYCRR Part 375, Environmental Remediation Programs. December 14, 2006.

NYSDEC DER-10 – "Technical Guidance for Site Investigation and Remediation".

NYSDEC, 1998. Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1. June 1998 (April 2000 addendum).

Figures





Legend

BCP Site Boundary

DATA SOURCES:
ESRI Basemaps
Westchester County GeoHub
New York DEC - Remediation Site Boundaries

Feet
0 500 1,000 2,000

Project No.:	JA257006
Date:	May 2025
Drawn By:	HPM
Reviewed By:	

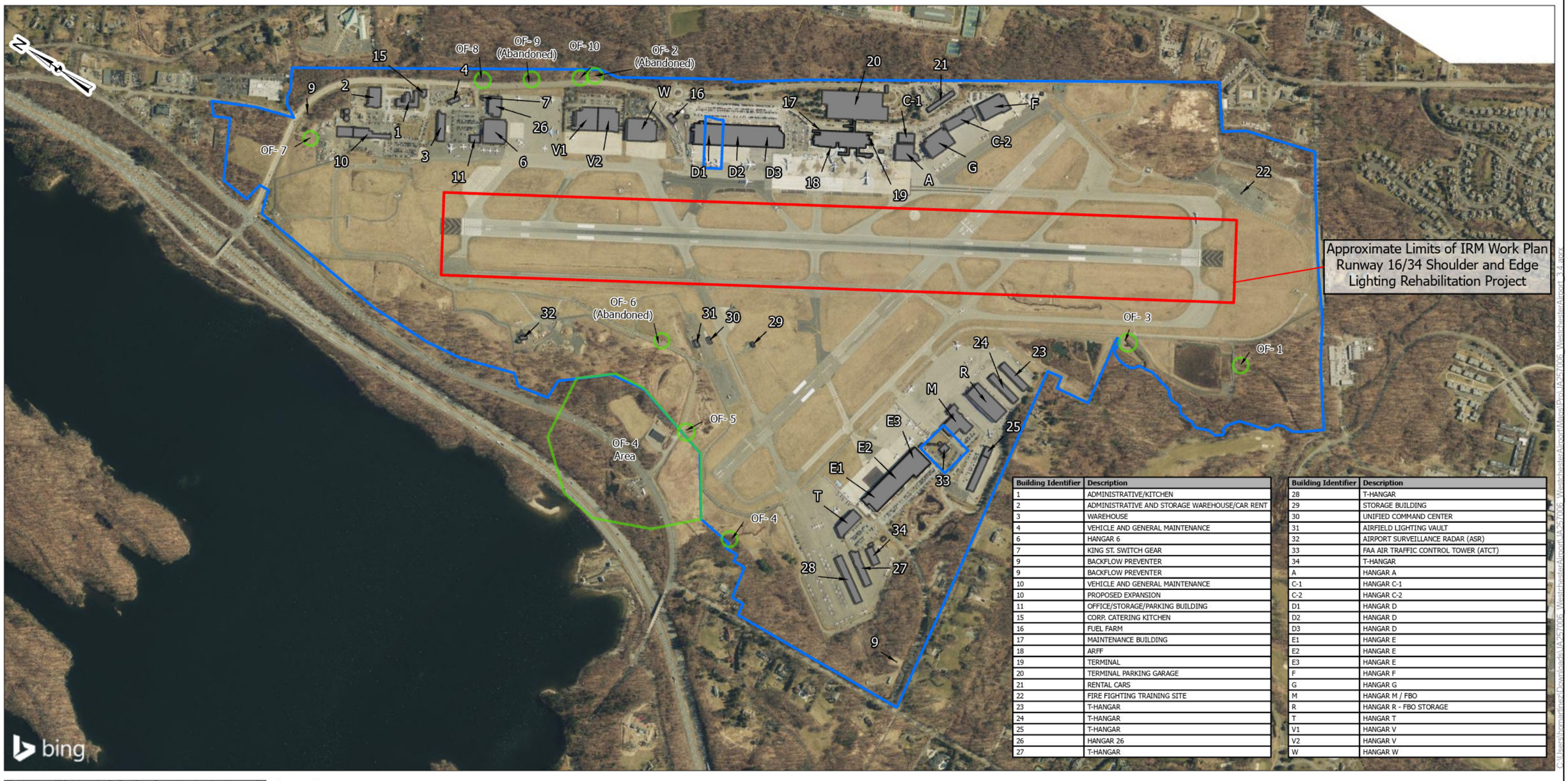
Terracon
70 Vantage Point Dr, Ste 1
Rochester, NY
PH. 585-247-3471 terracon.com

Topographic Map

Westchester County Airport
West Harrison, New York

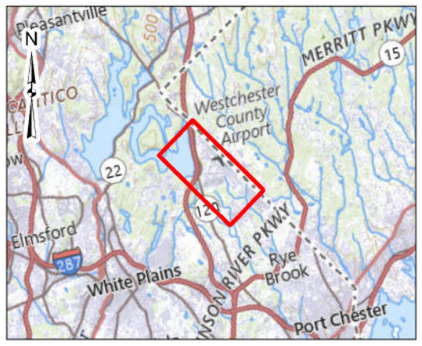
Exhibit

1



Building Identifier	Description
1	ADMINISTRATIVE/KITCHEN
2	ADMINISTRATIVE AND STORAGE WAREHOUSE/CAR RENT
3	WAREHOUSE
4	VEHICLE AND GENERAL MAINTENANCE
6	HANGAR 6
7	KING ST. SWITCH GEAR
9	BACKFLOW PREVENTER
9	BACKFLOW PREVENTER
10	VEHICLE AND GENERAL MAINTENANCE
10	PROPOSED EXPANSION
11	OFFICE/STORAGE/PARKING BUILDING
15	CORP. CATERING KITCHEN
16	FUEL FARM
17	MAINTENANCE BUILDING
18	ARFF
19	TERMINAL
20	TERMINAL PARKING GARAGE
21	RENTAL CARS
22	FIRE FIGHTING TRAINING SITE
23	T-HANGAR
24	T-HANGAR
25	T-HANGAR
26	HANGAR 26
27	T-HANGAR

Building Identifier	Description
28	T-HANGAR
29	STORAGE BUILDING
30	UNIFIED COMMAND CENTER
31	AIRFIELD LIGHTING VAULT
32	AIRPORT SURVEILLANCE RADAR (ASR)
33	FAA AIR TRAFFIC CONTROL TOWER (ATCT)
34	T-HANGAR
A	HANGAR A
C-1	HANGAR C-1
C-2	HANGAR C-2
D1	HANGAR D
D2	HANGAR D
D3	HANGAR D
E1	HANGAR E
E2	HANGAR E
E3	HANGAR E
F	HANGAR F
G	HANGAR G
M	HANGAR M / FBO
R	HANGAR R - FBO STORAGE
T	HANGAR T
V1	HANGAR V
V2	HANGAR V
W	HANGAR W



Legend

- BCP Site Boundary
- SPDES Outfall
- Buildings

DATA SOURCES:
Westchester County GeoHub
NYSDEC - BCP Site Boundary

Feet
0 500 1,000 2,000

Project No.:	JA257006
Date:	May 2025
Drawn By:	HPM
Reviewed By:	

terracon
70 Vantage Point Dr, Ste 1
Rochester, NY
PH. 585-247-3471 terracon.com

Site Diagram

Westchester County Airport
West Harrison, New York

Exhibit

2

Appendix A

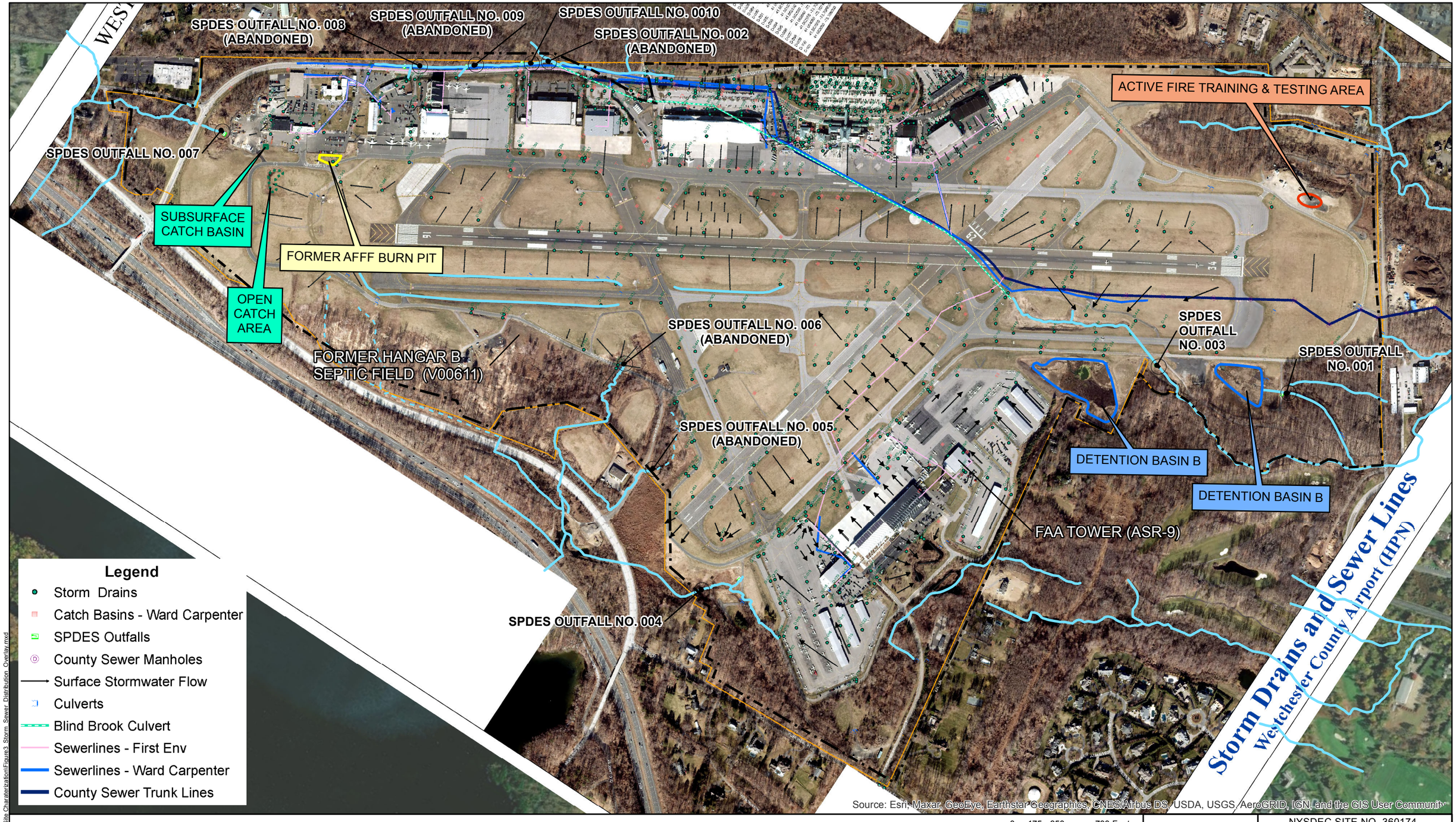
List of Site Contacts

APPENDIX 1 – LIST OF SITE CONTACTS

Name	Phone/Email Address
Site Owner Westchester County Attn. Hugh Greechan, Jr., P.E.	914-995-2546 Hjg7@westchestercountyny.gov
Remedial Party Westchester County Airport Attn: April L. Gasparri	914-995-4887 axgc@westchestercountyny.gov
Qualified Environmental Professional Michele Patterson-Wittman, P.G. Terracon Consultants-NY, Inc.	585-363-7016 Michele.wittman@terracon.com
NYSDEC DER Project Manager Greta Kowalski, P.G.	518-402-2029 greta.kowalski@dec.ny.gov
NYSDEC DER Project Manager's Supervisor Kiera Thompson	Kiera.thompson@dec.ny.gov
NYSDEC Site Control Leia Schmidt, Esq.	Leia.schmidt@dec.ny.gog
NYSDOH Project Manager Christine Voohrs	Christine.vooris@health.ny.gov
Remedial Party Attorney Westchester County Attn: John Nonna	914-995-2690 jnonna@westchestergcountyny.gov

Appendix B

ISMP Reference Figures



I:\WESCHESTER AIRPORT\Site Characterization\Figure3_Storm_Sewer_Distribution_Overlay.mxd

Legend

Source: TRC Engineers, Inc. Existing (2019) Conditions Drainage Area Map. Nov. 2010.

Outfall Location
SPDES - State Pollutant Discharge Elimination System

Subsurface Catch Basin
Open Catch Area

Active Fire Training & Testing Area
Former AFFF Burn Pit

Detention Basin
Property Boundary

Stream
Ephemeral Stream

0 175 350 700 Feet
1 inch = 700 feet

N

FIRST ENVIRONMENT
10 Park Place, Bldg 1A, Suite 504
Butler, NJ 07405

NYSDEC SITE NO. 360174
WESTCHESTER COUNTY AIRPORT
White Plains, Westchester County, New York
FIGURE 3
STORM SEWER DISTRIBUTION & SURFACE WATER FLOW

Revised	Drawn	Checked	Approved	Date
	LS	DL	SG	2/11/2022

Legend

Source: TRC Engineers, Inc. Existing (2019) Conditions Drainage Area Map. Nov. 2010.

- Outfall Location
- SPDES - State Pollutant Discharge Elimination System
- Subsurface Catch Basin
- Open Catch Area
- Detention Basin
- Active Fire Training & Testing Area
- Former AFFF Burn Pit
- Property Boundary
- Stream
- Ephemeral Stream

0 175 350 700 Feet

1 inch = 700 feet

N

FIRST ENVIRONMENT

10 Park Place, Bldg 1A, Suite 504
Butler, NJ 07405

NYSDEC SITE NO. 360174
WESTCHESTER COUNTY AIRPORT
White Plains, Westchester County, New York

FIGURE 4
SURFACE WATER DRAINAGE MAP

Revised	Drawn	Checked	Approved	Date
	LS	DL	SG	2/11/2022

I:\WESCHESTER AIRPORT\Site Characterization\Figure 4 Surface Water Drainage Map.mxd

K:\WESCHESTER AIRPORT\Site Characterization\Figure_9_PFOA\PFOS_Sediment_Concentrations.mxd

Legend

- Sediment Sample Location
- 33 - PFOA + PFOS (parts per billion)
- OF - Outfall
- SW - Surface Water
- SED - Sediment

SPDES - State Pollutant Discharge Elimination System

- Outfall Location
- Active Fire Training & Testing Area
- Former AFFF Burn Pit
- Detention Basin
- Subsurface Catch Basin
- Open Catch Area
- Property Boundary
- Stream
- Ephemeral Stream

0 175 350 700 Feet

1 inch = 700 feet

N

Sources
Outfall Locations: TRC Engineers, Inc. Existing (2019) Conditions Drainage Area Map. Nov. 2010.

FIRST ENVIRONMENT

10 Park Place, Bldg 1A, Suite 504
Butler, NJ 07405

NYSDEC SITE NO. 360174
WESTCHESTER COUNTY AIRPORT
White Plains, Westchester County, New York
FIGURE 10
SEDIMENT PFOS/PFOA
CONCENTRATIONS (APRIL 2019)

Revised	Drawn	Checked	Approved	Date
	LS	SG	SG	2/16/2022

SPDES OUTFALL NO. 008 (ABANDONED)
SPDES OUTFALL NO. 009 (ABANDONED)
SPDES OUTFALL NO. 002 (ABANDONED)
SUBSURFACE CATCH BASIN
OF-10 2,149
E10 520
OF-7B 3,523
SPDES OUTFALL NO. 0010
SPDES OUTFALL NO. 007
OF-7A 4,565
FORMER AFFF BURN PIT
OPEN CATCH AREA
ACTIVE FIRE TRAINING & TESTING AREA
SW-1 484
SPDES OUTFALL NO. 003
SW-2A 144
OF-3 118
SPDES OUTFALL NO. 001
Weir-2
SPDES OUTFALL NO. 006 (ABANDONED)
OF-1 116
FORMER HANGAR B SEPTIC FIELD (V00611)
SW-3 42
SPDES OUTFALL NO. 005 (ABANDONED)
DETENTION BASIN A
DETENTION BASIN B
E11 76
FAA TOWER (ASR-9)
SPDES OUTFALL NO. 004
RYE LAKE
SW-4 33

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Surface Water Sample Location (FE March 2019)
- Surface Water Sample Location (NYCDEP January 2019)

33 - PFOA + PFOS (parts per trillion)
OF - Outfall
SW - Surface Water

SPDES - State Pollutant Discharge Elimination System
- Outfall Location
- Active Fire Training & Testing Area
- Former AFFF Burn Pit
- Detention Basin
- Subsurface Catch Basin
- Open Catch Area
- Property Boundary
- Surface Water Flow Direction
- Stream
- Ephemeral Stream

0 175 350 700 Feet
1 inch = 700 feet

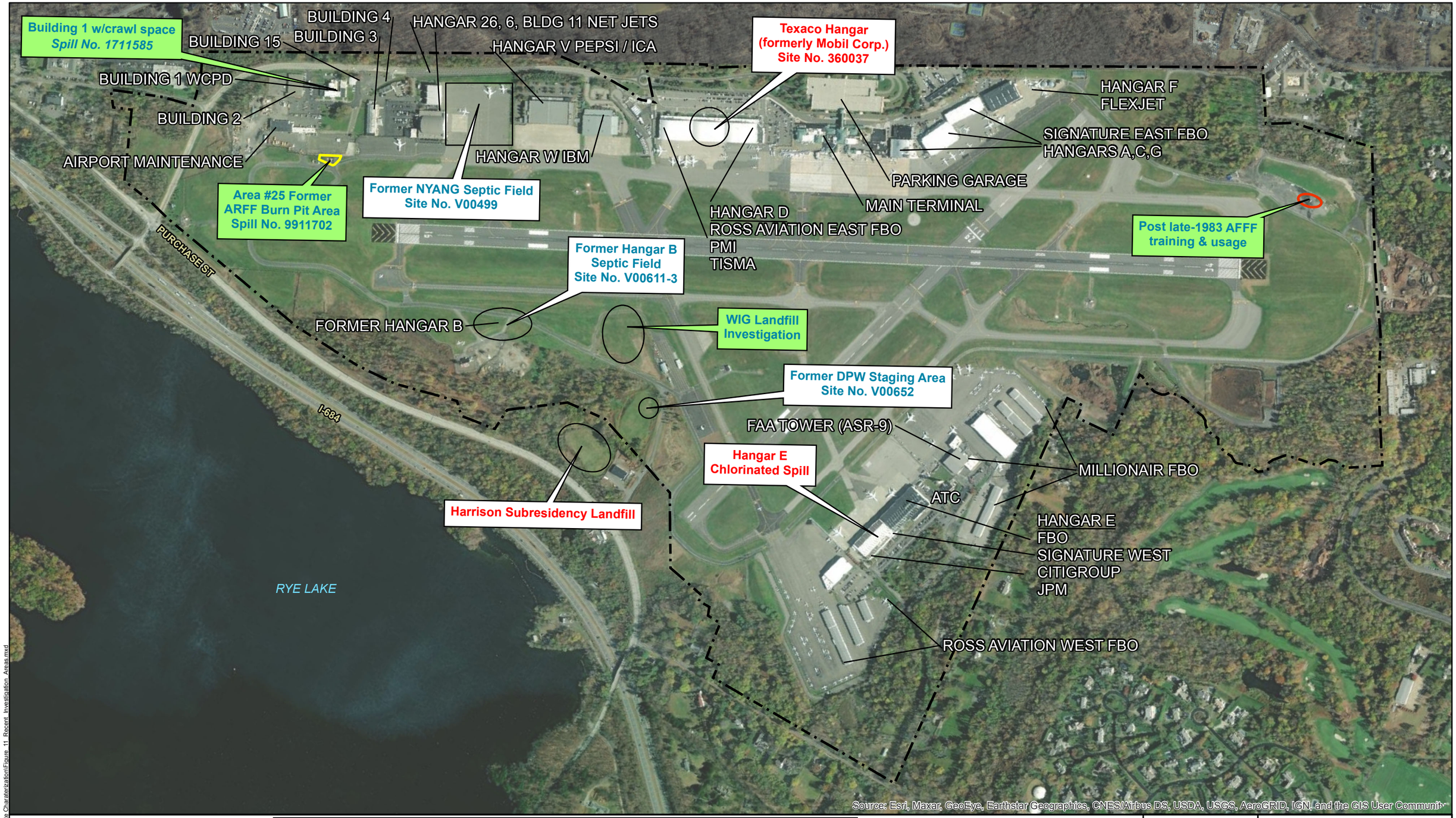
Sources
Outfall Locations: TRC Engineers, Inc. Existing (2019) Conditions Drainage Area Map. Nov. 2010.

FIRST ENVIRONMENT
10 Park Place, Bldg 1A, Suite 504
Butler, NJ 07405

NYSDEC SITE NO. 360174
WESTCHESTER COUNTY AIRPORT
White Plains, Westchester County, New York
FIGURE 11
SURFACE WATER PFOS/PFOA CONCENTRATIONS (APRIL 2019)

Revised	Drawn	Checked	Approved	Date
	LS	DL	SG	2/16/2022

J:\WESCHESTER AIRPORT\Site Characterization\Figure 12- PFOA-PFOS- Surface Water Concentrations.mxd



Legend

- Active Fire Training & Testing Area
- Former AFFF Burn Pit
- Property Boundary

Green Highlighted =NYSDEC – May require further investigation or currently under investigation

Blue Text = Inactive -Closed or Closure Requested

Red Text = Open

0 175 350 700 Feet

1 inch = 700 feet

N

FIRST ENVIRONMENT

10 Park Place, Bldg 1A, Suite 504
Butler, NJ 07405

NYSDEC SITE NO. 360174
WESTCHESTER COUNTY AIRPORT
White Plains, Westchester County, New York
FIGURE 12
RECENT INVESTIGATION AREAS

Revised	Drawn	Checked	Approved	Date
	LS	SG	SG	2/11/2022

I:\WESCHESTER AIRPORT\Site Characterization\Figure_11_Recent_Investigation_Areas.mxd

SPDES OUTFALL NO. 009 (ABANDONED)
SPDES OUTFALL NO. 008 (ABANDONED)
SPDES OUTFALL NO. 0010
SPDES OUTFALL NO. 002 (ABANDONED)
OF-10
OF-10SED
PARKING GARAGE
HANGAR D
ROSS AVIATION EAST FBO
PMI
TISMA
BUILDING 2
BUILDING 15
BUILDING 4
HANGAR 26, 8
BLDG 11 NET JETS
HANGAR V PEPSI / ICA
HANGAR W IBM
HANGAR F
FLEXJET
New King Soil 2
New King Sed 1
MW-51
BUILDING 1 WCPD
SB-16-TWP-16
BUILDING 10
AIRPORT MAINTENANCE
SB-01/TWP-01
SB-15/TWP-15
Soil 4N
Soil 4S
Soil 4W
New King Soil 4S
OF-7B
OF-7ASED
OF-7A
E10
SPDES OUTFALL NO. 007
MW-64
MW-63
MW-60
New King Soil 3
SUBSURFACE CATCH BASIN
BUILDING 3
FORMER AFFF BURN PIT
MAIN TERMINAL
SB-14/TWP-14
MW-58D
MW-58S
SIGNATURE EAST FBO
HANGARS A,C,G
ACTIVE FIRE TRAINING & TESTING AREA
SB-02/TWP-02
MW-62
DG-07
DG-06
DG-05
DG-04
DG-03
DG-02
DG-01
MW-53
MW-61
OPEN CATCH AREA
SB-03/TWP-03
DG-23
AREA OF DETAIL
SB-13/TWP-13**
MW-58S**
MW-58D*
DG-08
DG-09
DG-22
DG-10
DG-11
SB-04/TWP-04
MW-52
DG-12
DG-13
DG-14
DG-15
DG-16
DG-17
DG-18
SW-1SED
SW-1
SB-05/TWP-05
DG-19
DG-20
SB-06/TWP-06
DG-21
MW-54S
MW-54D
SB-12/TWP-12
SB-07/TWP-07
FORMER HANGAR B
SPDES OUTFALL NO. 006 (ABANDONED)
SW-2A
SW-2
SW-2SED
SPDES OUTFALL NO. 003
OF-3SED
OF-3
DETENTION BASIN B
SB-10/TWP-10
Weir-2
Weir-2
FORMER HANGAR B
SEPTIC FIELD (V00611)
SW-2B
OF-1SED
SB-11/TWP-11
OF-1
RYE LAKE
MW-55D
MW-55S
MW-56S
MW-56D
SB-08/TWP-08
SW-2C
SPDES OUTFALL NO. 001
DETENTION BASIN A
FAA TOWER (ASR-9)
SW-3SED
SW-3
MILLIONAIR FBO
SPDES OUTFALL NO. 005 (ABANDONED)
ATC
E11
HANGAR E
FBO
SIGNATURE WEST
CITIGROUP
JPM
SW-4SED/OF-4SED
SW-4/OF-4
MW-57
SPDES OUTFALL NO. 004
ROSS AVIATION WEST FBO
SB-09/TWP-09

FORMER AFF BURN PIT AREA DETAIL

Legend

- North Parcel Soil Sample Locations
- Burn Pit Investigation Sample Location
- Downgradient Investigation Sample Location
- SB: Soil Boring/TWP: Temporary Well Location
- Surface Water Sample Location
- Sediment Sample Location
- Outfall Location
- Bedrock Monitoring Well Location
- Unconsolidated Monitoring Well Location
- Stream
- Ephemeral Stream
- Detention Basin
- Subsurface Catch Basin
- Open Catch Area
- Active Fire Training & Testing Area
- Former AFFF Burn Pit
- Property Boundary

*MW-58D: Bedrock not encountered (screened 45-60 feet)
** TWP-13 & MW-58S: No groundwater encountered
Note: SB-10/TWP-10, SB-11/TWP-11, SB-12/TWP-12, & SB-13/TWP-13 locations were moved because access was not available to the proposed locations.

0 175 350 700 Feet
1 inch = 300 feet

FIRST ENVIRONMENT
10 Park Place, Bldg 1A, Suite 504
Butler, NJ 07405

NYSDEC SITE NO. 360174
WESTCHESTER COUNTY AIRPORT
WHITE PLAINS, WESTCHESTER COUNTY, NEW YORK
FIGURE 13
SAMPLE LOCATION MAP

Revised	Drawn	Checked	Approved	Date
	LS	DDL	SRG	3/2/2022

SB-01
(0.5'-1')
15.9

SB-16
(0'-0.5')
17.6

SB-15
(0.5'-1')
2.1

SB-14
(1'-1.5')
ND

SB-02
(0'-0.5')
1.3

SB-03
(0'-0.5')
1.4

SB-13
(0.5'-1')
24.9

SB-04
(0'-0.5')
0.5

SB-05
(0'-0.5')
0.6

SB-06
(0'-0.5')
5.6

SB-07
(0'-0.5')
0.6 J

SB-12
(0'-0.5')
1.1

SB-10
(0'-0.5')
0.5 J

SB-11
(0'-0.5')
7.9

SB-08
(0'-0.5')
2.0

SB-09
(0'-0.5')
0.5 J

FORMER AFFF BURN PIT
Source area for PFAS.

ACTIVE FIRE TRAINING & TESTING AREA
Area of elevated soil and groundwater PFAS.

FORMER HANGER B AREA
Area of elevated soil and groundwater PFAS.

FORMER HANGER B
SEPTIC FIELD (V00611)

FAA TOWER (ASR-9)

HANGER E AREA
Area of elevated groundwater PFAS.
AFFF release in Hanger E.

RYE LAKE

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Soil Sample Location
- Stream
- Ephemeral Stream
- Subsurface Catch Basin
- Open Catch Area
- Detention Basin
- Active Fire Training & Testing Area
- Former AFFF Burn Pit
- Property Boundary

1.1 — PFOS Concentration (parts per billion)
(0'-0.5') — Sample Depth (feet below ground surface)
J — Estimated
ND — Not Detected

0 175 350 700 Feet
1 inch = 700 feet

N

FIRST ENVIRONMENT
10 Park Place, Bldg 1A, Suite 504
Butler, NJ 07405

NYSDEC SITE NO. 360174
WESTCHESTER COUNTY AIRPORT
White Plains, Westchester County, New York
FIGURE 15
SITE WIDE SOIL
MARCH 2020 PFOS RESULTS

Revised	Drawn	Checked	Approved	Date
	LS	DL	SG	2/11/2022

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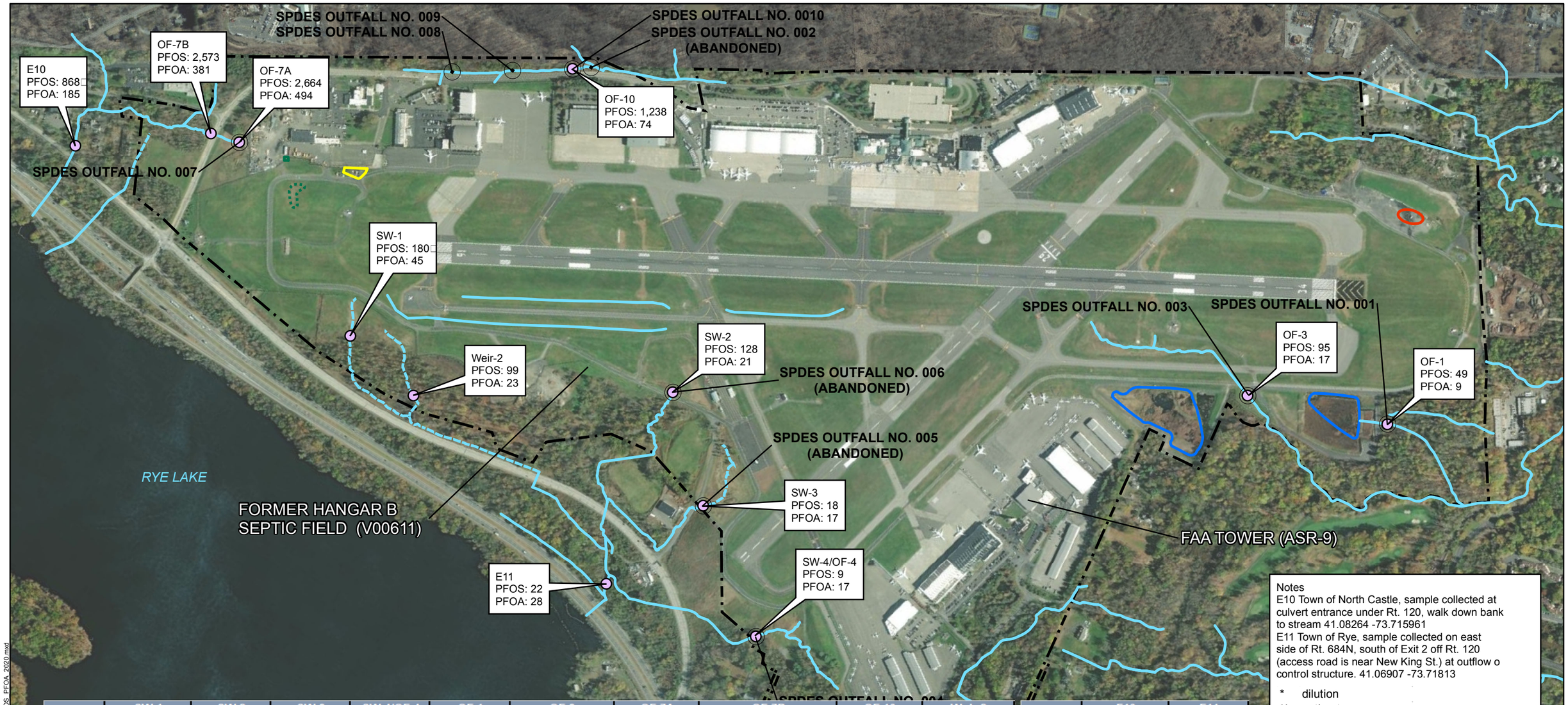

	SW-1		SW-2		SW-3		SW-4/OF-4		OF-1		OF-3		OF-7A		OF-7B		OF-10		Weir-2	
	PFOS	PFOA	PFOS	PFOA	PFOS	PFOA	PFOS	PFOA	PFOS	PFOA	PFOS	PFOA	PFOS	PFOA	PFOS	PFOA	PFOS	PFOA	PFOS	PFOA
04/02/19	375***	109*	126	18	28	15	12	21	100	16	88	20	3,990***	575***	3,070***	453***	2,040***	109	~	~
06/02/20	220	54	154	24	27	21	13	22	74	12	177	1	4,280*	793*	1,510 *	176*	2*	80	~	~
07/01/20	~	~	82	16	17	17	9	19	63	16	133	27	2,710*	469	3,140*	514*	654 *	33*	213*	54
08/03/20	~	~	93	21	17	22	9	19	40	9	127	26	2,570	554	~	~	2,270*	130	~	~
09/01/20	30*	ND	200*	24	13*	13*	5	7	22*	ND	10*	21*	360*	31*	~	~	299*	13*	59*	9*
10/1/2020	~	~	176	26	16	17	10	17	17	4	91	18	2,730*	645*	~	~	2,210*	96	~	~
11/2/2020	96	18	61	20	7	11	6	16	29	7	39	8	2,010*	389*	~	~	1,190*	56*	26	6
Average	180	45	128	21	18	17	9	17	49	9	95	17	2,664	494	2,573	381	1,238	74	99	23

Date	E10		E11	
	PFOS	PFOA	PFOS	PFOA
01/29/19	420	100	29	47
04/17/19	460	110	25	38
07/24/19	950	140	20	16
10/15/19	1300	370	20	25
10/01/20	1210	204	24	13
Average	868	185	22	28

Notes
E10 Town of North Castle, sample collected at culvert entrance under Rt. 120, walk down bank to stream 41.08264 -73.715961
E11 Town of Rye, sample collected on east side of Rt. 684N, south of Exit 2 off Rt. 120 (access road is near New King St.) at outflow o control structure. 41.06907 -73.71813

* dilution
** estimate
*** dilution & estimate
ND not detected
~ not sampled on date
ppt parts per trillion

Sources
Conditions Drainage Area Map. Nov. 2010.
Outfall Locations: TRC Engineers, Inc. Existing (2019)
Streams: Westchester County GIS & NYSDEC

Legend

Surface Water Sample Location

SW-4 Sample ID
PFOS Average of Results (ppt)
PFOA Average of Results (ppt)

SPDES - State Pollutant Discharge Elimination System
Outfall Location
Stream
Ephemeral Stream
Subsurface Catch Basin
Open Catch Area
Detention Basin
Active Fire Training & Testing Area
Former AFFF Burn Pit
Property Boundary

0 175 350 700 Feet
1 inch = 700 feet

N

FIRST ENVIRONMENT
10 Park Place, Bldg 1A, Suite 504
Butler, NJ 07405

NYSDEC SITE NO. 360174
WESTCHESTER COUNTY AIRPORT
White Plains, Westchester County, New York
FIGURE 21
SURFACE WATER PFOS/PFOA CONCENTRATIONS

Revised	Drawn	Checked	Approved	Date
	LS	DL	SG	2/15/2022

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SPDES OUTFALL NO. 009
SPDES OUTFALL NO. 008
SPDES OUTFALL NO. 0010
SPDES OUTFALL NO. 002
(ABANDONED)
OF-7SED
PFOS: 19.7
PFOA: 0.3
OF-10SED
PFOS: 7.8
PFOA: ND
SPDES OUTFALL NO. 007
SW-1SED
PFOS: 17.2
PFOA: 0.6
SW-2SED
PFOS: 4.7
PFOA: 1.4
WEIR-2
PFOS: 1.7
PFOA: ND
SPDES OUTFALL NO. 006
(ABANDONED)
SPDES OUTFALL NO. 003
OF-3SED
PFOS: 3.1
PFOA: ND
OF-1SED
PFOS: 2.8
PFOA: 2.6
SW-3SED
PFOS: 5.0
PFOA: ND
SPDES OUTFALL NO. 005
(ABANDONED)
FORMER HANGAR B
SEPTIC FIELD (V00611)
FAA TOWER (ASR-9)
SPDES OUTFALL NO. 001
SW-4SED/
OF-4SED
PFOS: 1.2
PFOA: ND
RYE LAKE
SPDES OUTFALL NO. 004

SAMPLE ID	DATE	PFOS	PFOA
OF-1SED	4/2/2019	1.6	ND
	6/1/2020	2.7	7.7
	11/2/2020	4.0	ND
	Average	2.8	2.6
OF-3SED	4/2/2019	3.0	ND
	6/1/2020	3.2	ND
	11/2/2020	3.0	ND
	Average	3.1	ND
OF-7SED	4/2/2019	13.8	ND
	6/2/2020	32.4**	0.8
	11/2/2020	12.8	ND
	Average	19.7	0.3
OF-10SED	6/2/2020	12.0	ND
	11/2/2020	3.7	ND
	Average	7.8	ND
SW-1SED	4/2/2019	30.4	1.2
	6/2/2020	1.9	ND
	11/2/2020	19.4	0.7
	Average	17.2	0.6
SW-2SED	4/2/2019	5.2	3.4
	6/3/2020	8.1	0.9*
	11/2/2020	0.7	ND
	Average	4.7	1.4
SW-3SED	4/2/2019	0.8	ND
	6/3/2020	1.4	ND
	11/2/2020	12.7	ND
	Average	5.0	ND
SW-4SED/ OF-4SED	4/2/2019	ND	ND
	6/2/2020	0.7	ND
	11/2/2020	1.7	ND
	Average	1.2	ND
WEIR-2	11/2/2020	1.7	ND

* analyte detected at or above the MDL (method detection limit) but below the RL (Reporting Limit) - data is estimated
** result is estimated and cannot be accurately reported due to levels encountered or interferences
ND not detected
ppb parts per billion

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- Sediment Sample
  - SW-4SED Sample ID
  - PFOS Average of Results (ppb)
  - PFOA Average of Results (ppb)
- SPDES - State Pollutant Discharge Elimination System
- Outfall Location
- Stream
- Ephemeral Stream
- Subsurface Catch Basin
- Open Catch Area
- Detention Basin
- Active Fire Training & Testing Area
- Former AFFF Burn Pit
- Property Boundary

0 175 350 700 Feet
1 inch = 700 feet

Sources
Conditions Drainage Area Map. Nov. 2010.
Streams: USGS National Hydrography Dataset..
Outfall Locations: TRC Engineers, Inc. Existing (2019)

N

FIRST ENVIRONMENT
10 Park Place, Bldg 1A, Suite 504
Butler, NJ 07405

NYSDEC SITE NO. 360174
WESTCHESTER COUNTY AIRPORT
White Plains, Westchester County, New York
FIGURE 22
SEDIMENT
PFOS/PFOA CONCENTRATIONS

Revised	Drawn	Checked	Approved	Date
	LS	SG	SG	2/15/2022

\\WESCHESTER AIRPORT\Site Characterization\Figure_23_Baseline_Sediment_PFOS_PFOA_2020.mxd

SPDES OUTFALL NO. 003

DETENTION BASIN A

SPDES OUTFALL NO. 006 (ABANDONED)

SPDES OUTFALL NO. 005 (ABANDONED)

SPDES OUTFALL NO. 004

34

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Legend

- 56-inch System
- French Drain
- Outfall 4
- Detention Basin A
- 56-inch System -B
- Outfall 4 B
- Hangar_E_Catch_Basins
- Overflow Structure
- Stream
- Ephemeral Stream
- Outfall Location
- Surface Stormwater Flow
- Subsurface Catch Basin
- Open Catch Area
- Detention Basin
- Active Fire Training & Testing Area
- Former AFFF Burn Pit
- Property Boundary

SPDES - State Pollutant Discharge Elimination System

All sewers noted are storm sewers.

0 87.5 175 350 Feet

1 inch = 350 feet

N

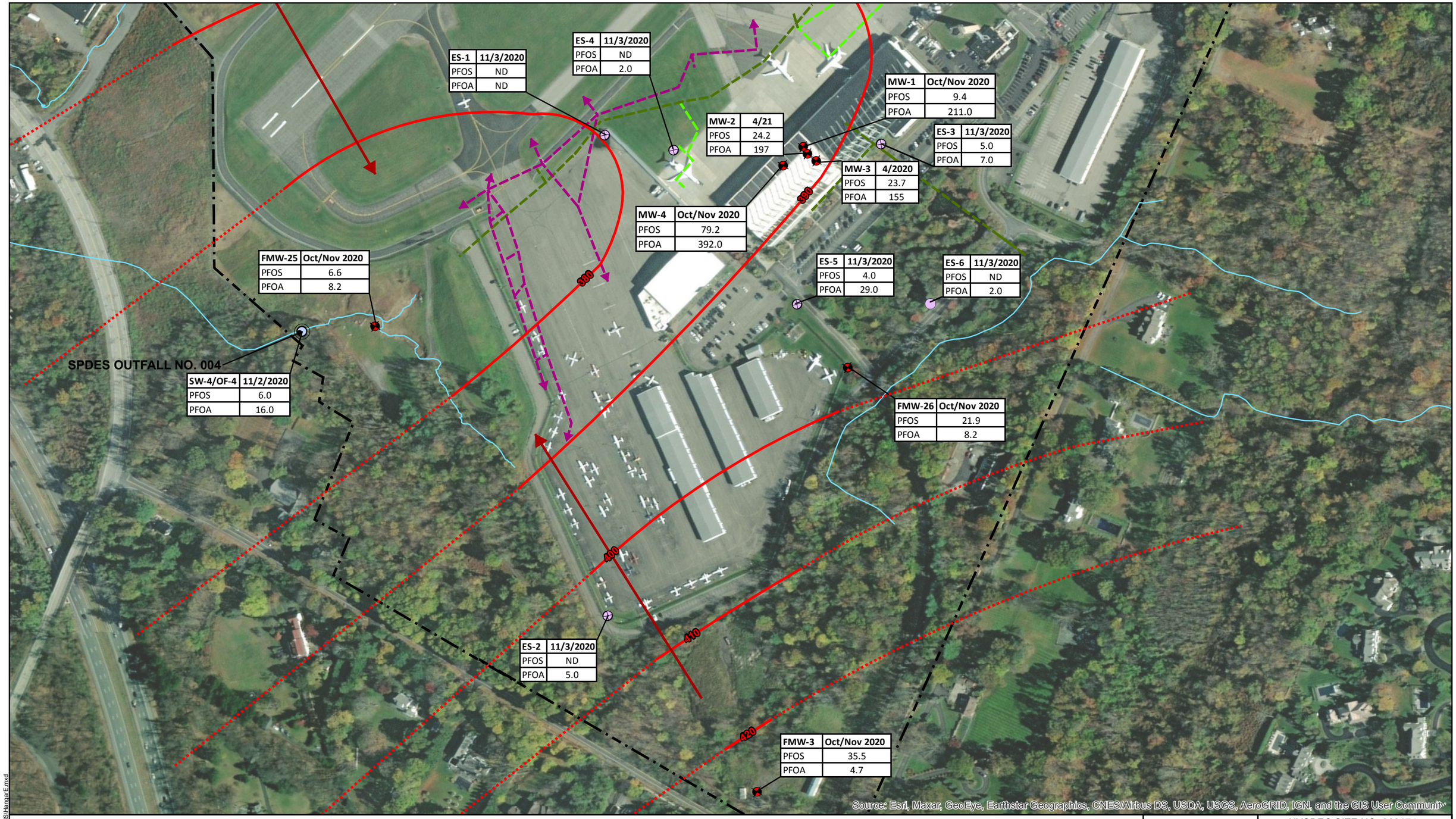
FIRST ENVIRONMENT

10 Park Place, Bldg 1A, Suite 504
Butler, NJ 07405

NYSDEC SITE NO. 360174
WESTCHESTER COUNTY AIRPORT
White Plains, Westchester County, New York
FIGURE 28
HANGAR E STORM SEWER SURVEY

Revised	Drawn	Checked	Approved	Date
	LS	DL	SG	3/2/2022

K:\WESCHESTER AIRPORT\Site Characterization\Figure 29 Geophysical Investigation.mxd



Legend

- Stream
- 56-inch System
- French Basin
- Outfall 4
- Shallow Groundwater Flow Direction
- Shallow Groundwater Elevation Contours
- Shallow Groundwater Elevation Contours (Inferred)
- Property Boundary

SPDES - State Pollutant Discharge Elimination System

- Outfall Location
- Monitoring Well (Shallow)
- Surface Water Sample Location

Sample ID	Sample Date
PFOS	Concentration (ng/L)
PFOA	Concentration (ng/L)

ND: Not Detected

0 62.5 125 250 Feet

1 inch = 250 feet

N

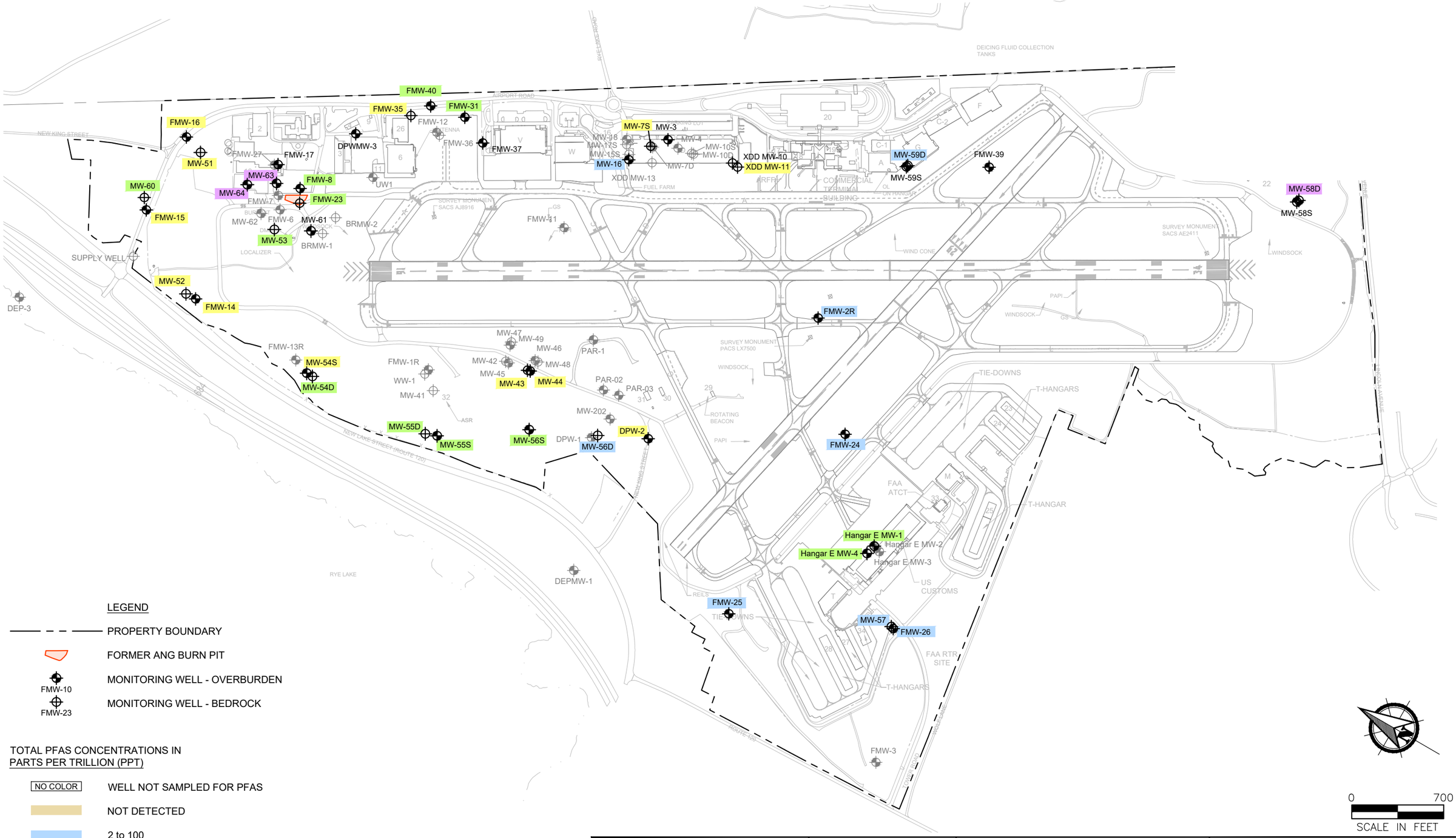
I:\WESCHESTER AIRPORT\GIS\HangarE.mxd

FIRST ENVIRONMENT

10 Park Place, Bldg 1A, Suite 504
Butler, NJ 07405

NYSDEC SITE NO. 360174
WESTCHESTER COUNTY AIRPORT
White Plains, Westchester County, New York
FIGURE 29
HANGAR E AREA - GROUNDWATER/
SURFACE WATER PFAS RESULTS

Revised	Drawn	Checked	Approved	Date
	LS	SG	SG	3/2/2022



LEGEND

- PROPERTY BOUNDARY
- FORMER ANG BURN PIT
- FMW-10 MONITORING WELL - OVERBURDEN
- FMW-23 MONITORING WELL - BEDROCK

TOTAL PFAS CONCENTRATIONS IN PARTS PER TRILLION (PPT)

- NO COLOR — WELL NOT SAMPLED FOR PFAS
- NOT DETECTED
- 2 to 100
- 101 to 1,000
- 1,001 to 10,000
- 10,001 to maximum (39,699)

B

SOURCE:
DY CONSULTANTS TEAM "EXISTING AIRPORT LAYOUT DRAWING", DATED ISSUED DEC 2017, SHEET 3 OF 16.

0 700
SCALE IN FEET

WSP USA, Inc.
500 Summit Lake Drive
Suite 450
Valhalla, New York 10595
(914) 747-1120

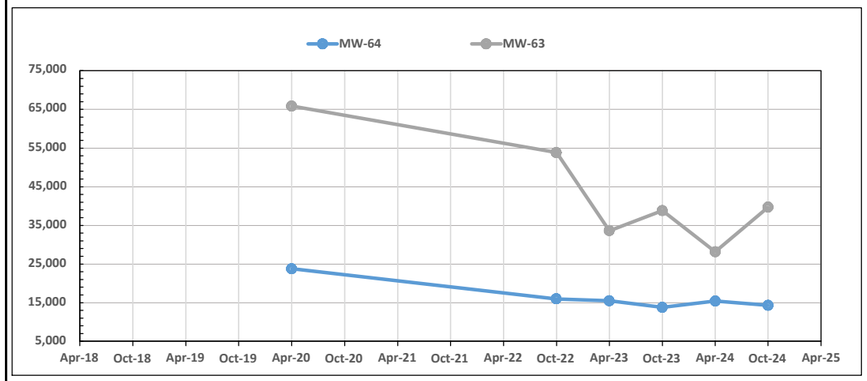
Drawn By:	RAC
Checked:	JB
Approved:	JB
DWG Date:	12/11/24

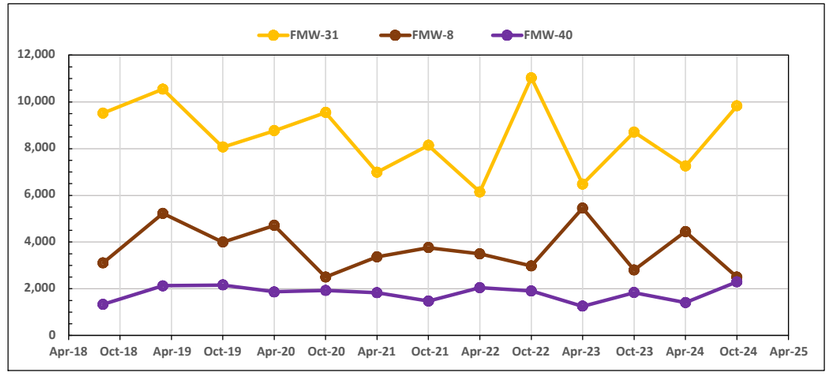
Westchester County Airport
White Plains, New York

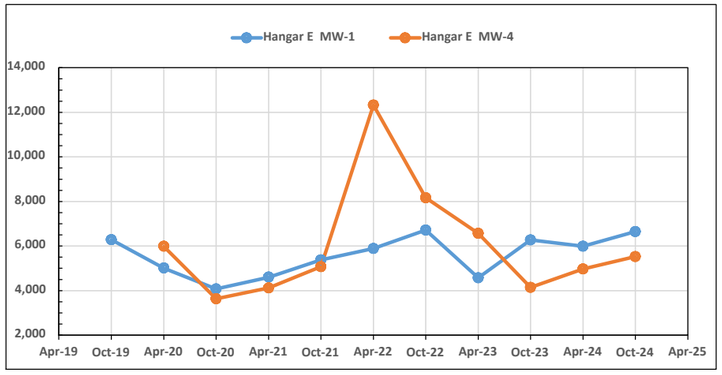
TOTAL PFAS CONCENTRATIONS - OCTOBER 2024

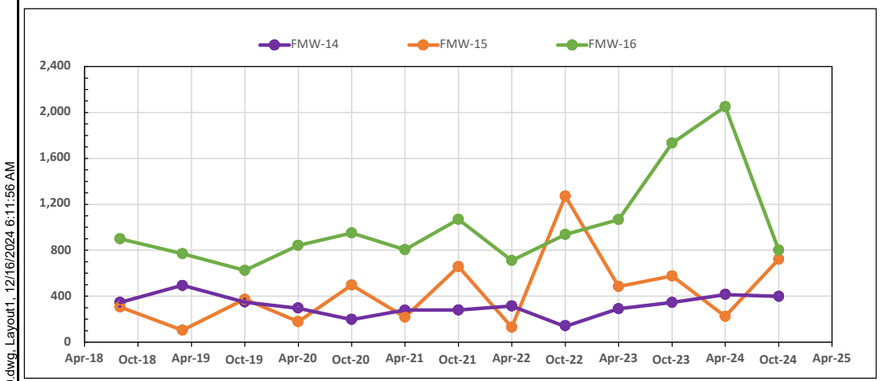
FIGURE 1

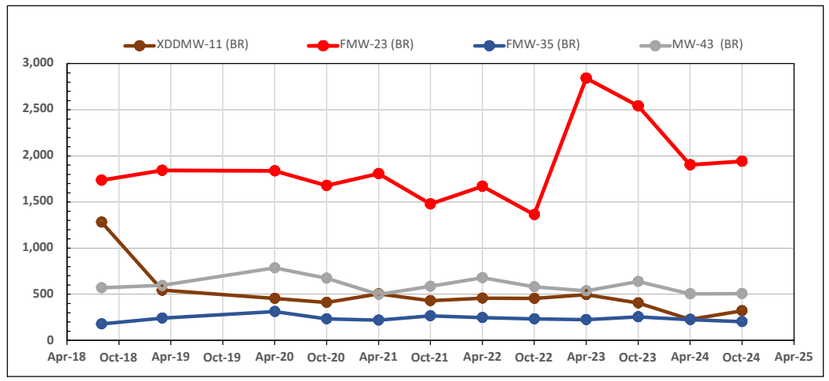
O:\DWG\Westchester County Airport\2024\F1_TotalPFAS-2410.dwg, Layout1, 12/12/2024 10:02:02 AM

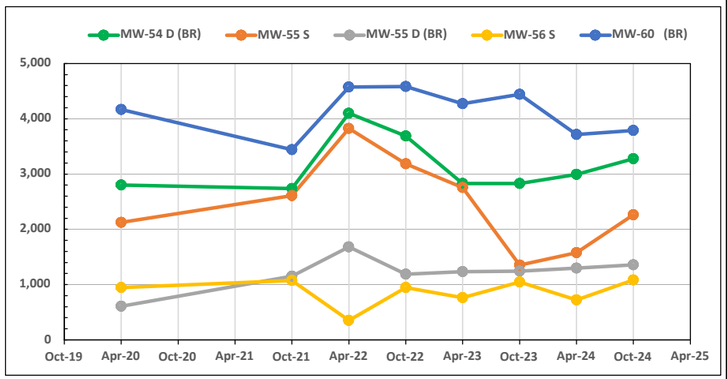












LEGEND:

X-AXIS UNITS ARE MONTH AND YEAR

Y-AXIS UNITS ARE NANO-GRAMS PER LITER

WSP USA, Inc.
500 Summit Lake Drive
Suite 450
Valhalla, New York 10595
(914) 747-1120

Drawn By:	RAC
Checked:	JB
Approved:	JB
DWG Date:	12/12/24

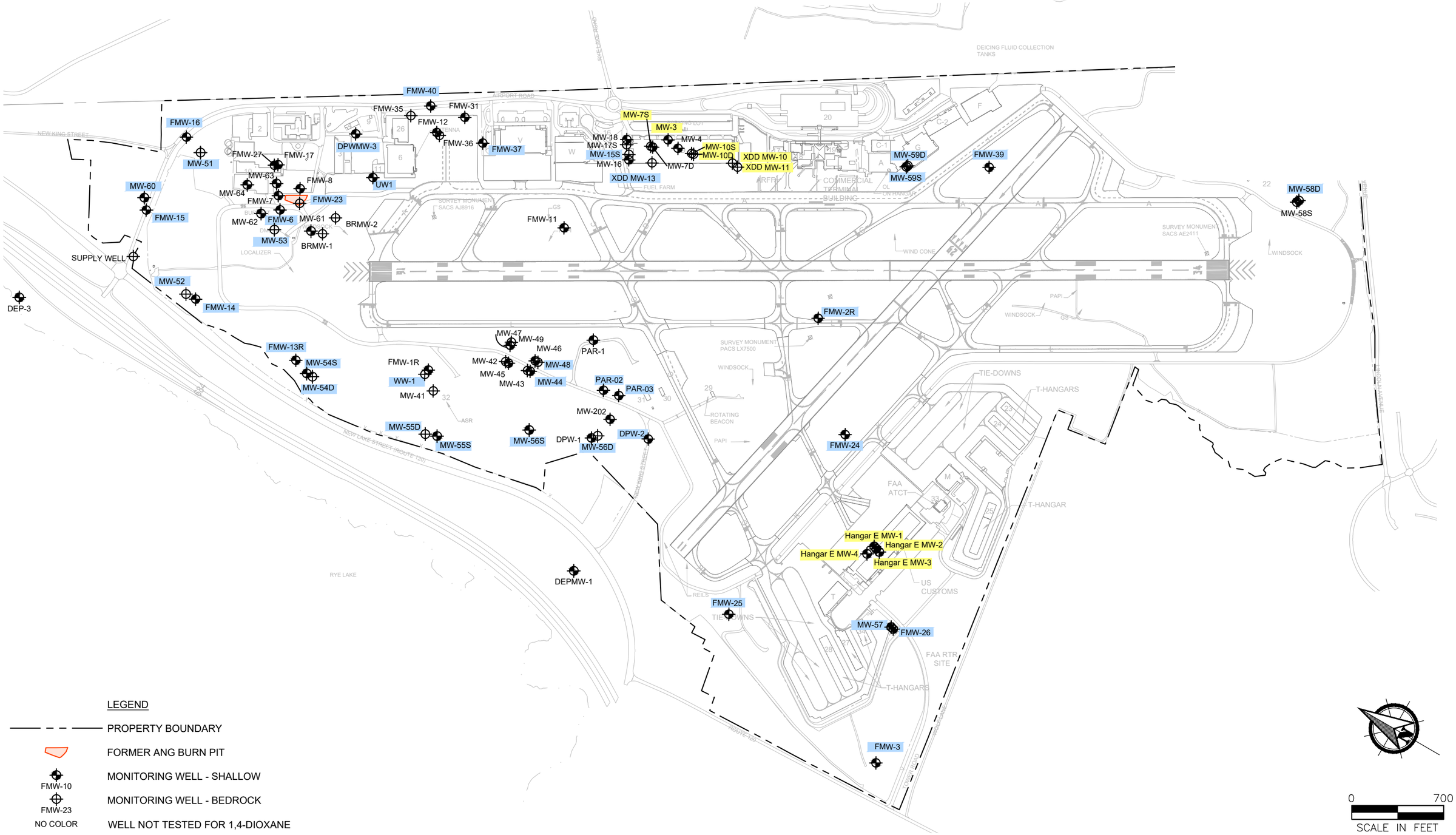
Westchester County Airport
White Plains, New York

TOTAL PFAS CONCENTRATIONS OVER TIME

FIGURE 2

B

O:\DWG\Westchester County Airport\2024\F2_TotalPFAS-Graphs2410.dwg, Layout1, 12/16/2024 6:11:56 AM



LEGEND

- PROPERTY BOUNDARY
- FORMER ANG BURN PIT
- FMW-10 — MONITORING WELL - SHALLOW
- FMW-23 — MONITORING WELL - BEDROCK
- NO COLOR — WELL NOT TESTED FOR 1,4-DIOXANE
- 1,4-DIOXANE DETECTED
- 1,4-DIOXANE NOT DETECTED

B

SOURCE:
DY CONSULTANTS TEAM "EXISTING AIRPORT LAYOUT DRAWING", DATED ISSUED DEC 2017, SHEET 3 OF 16.

0 700
SCALE IN FEET

WSP USA, Inc.
500 Summit Lake Drive
Suite 450
Valhalla, New York 10595
(914) 747-1120

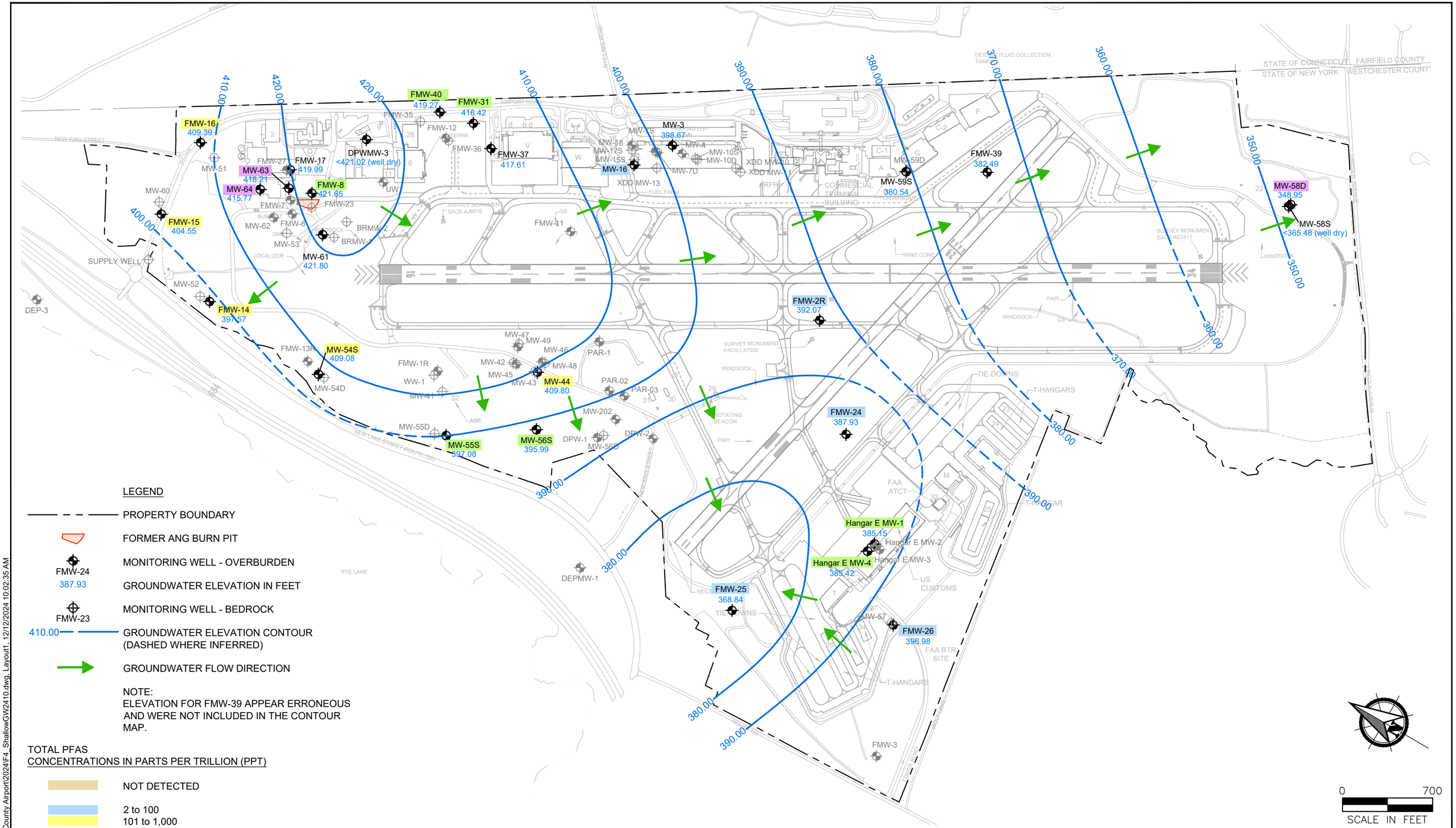
Drawn By:	RAC
Checked:	JB
Approved:	JB
DWG Date:	12/11/24

Westchester County Airport
White Plains, New York

WELLS SAMPLED FOR 1,4-DIOXANE
2018 - 2025

FIGURE 3

O:\DWG\Westchester County Airport\2024\F3_1,4-Dioxane-2410.dwg, Layout1, 12/12/2024 10:02:17 AM



LEGEND

- PROPERTY BOUNDARY
- FORMER ANG BURN PIT
- FMW-24 / 387.93 — MONITORING WELL - OVERBURDEN; GROUNDWATER ELEVATION IN FEET
- FMW-23 — MONITORING WELL - BEDROCK
- 410.00 — GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
- GROUNDWATER FLOW DIRECTION

NOTE:
ELEVATION FOR FMW-39 APPEAR ERRONEOUS AND WERE NOT INCLUDED IN THE CONTOUR MAP.

TOTAL PFAS
CONCENTRATIONS IN PARTS PER TRILLION (PPT)

- NOT DETECTED
- 2 to 100
- 101 to 1,000
- 1,001 to 10,000
- 10,001 to maximum (39,699)

B

SOURCE:
DY CONSULTANTS TEAM "EXISTING AIRPORT LAYOUT DRAWING", DATED ISSUED DEC 2017, SHEET 3 OF 16.

0 700
SCALE IN FEET

WSP USA, Inc.
500 Summit Lake Drive
Suite 450
Valhalla, New York 10595
(914) 747-1120

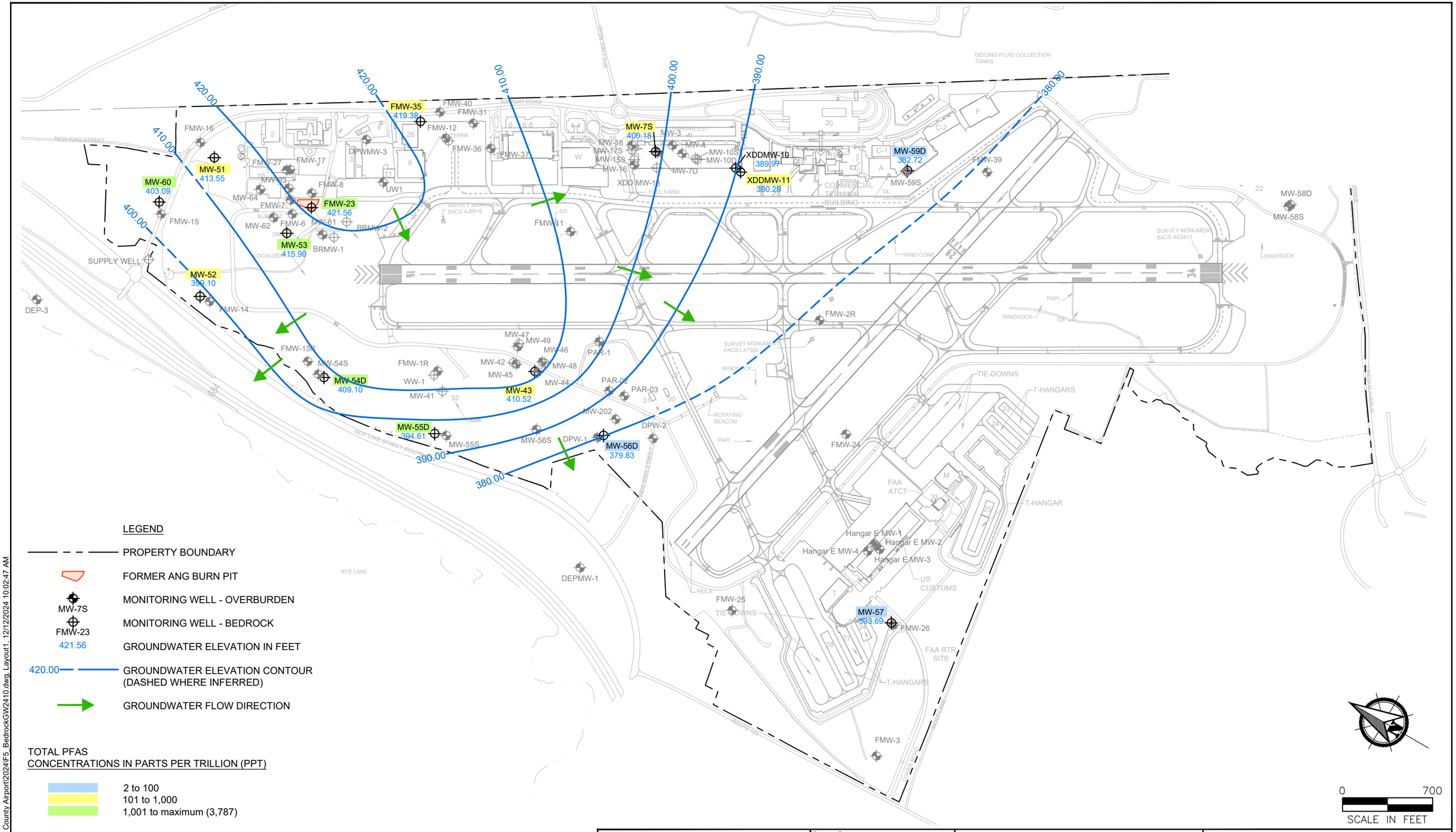
Drawn By:	RAC
Checked:	JB
Approved:	JB
DWG Date:	12/11/24

Westchester County Airport
White Plains, New York

SHALLOW AQUIFER GROUNDWATER CONTOUR MAP - OCTOBER 2024

FIGURE 4

O:\DWG\Westchester County Airport\2024\F4_ShallowGW2410.dwg, Layout1, 12/12/2024 10:02:35 AM



LEGEND

- PROPERTY BOUNDARY
- FORMER ANG BURN PIT
- MW-7S — MONITORING WELL - OVERBURDEN
- FMW-23 — MONITORING WELL - BEDROCK
- 421.56 — GROUNDWATER ELEVATION IN FEET
- 420.00 — GROUNDWATER ELEVATION CONTOUR (DASHED WHERE INFERRED)
- GROUNDWATER FLOW DIRECTION

TOTAL PFAS
CONCENTRATIONS IN PARTS PER TRILLION (PPT)

- 2 to 100
- 101 to 1,000
- 1,001 to maximum (3,787)

0 700
SCALE IN FEET

B

SOURCE:
DY CONSULTANTS TEAM "EXISTING AIRPORT LAYOUT DRAWING", DATED ISSUED DEC 2017, SHEET 3 OF 16.

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Valhalla, New York 10595
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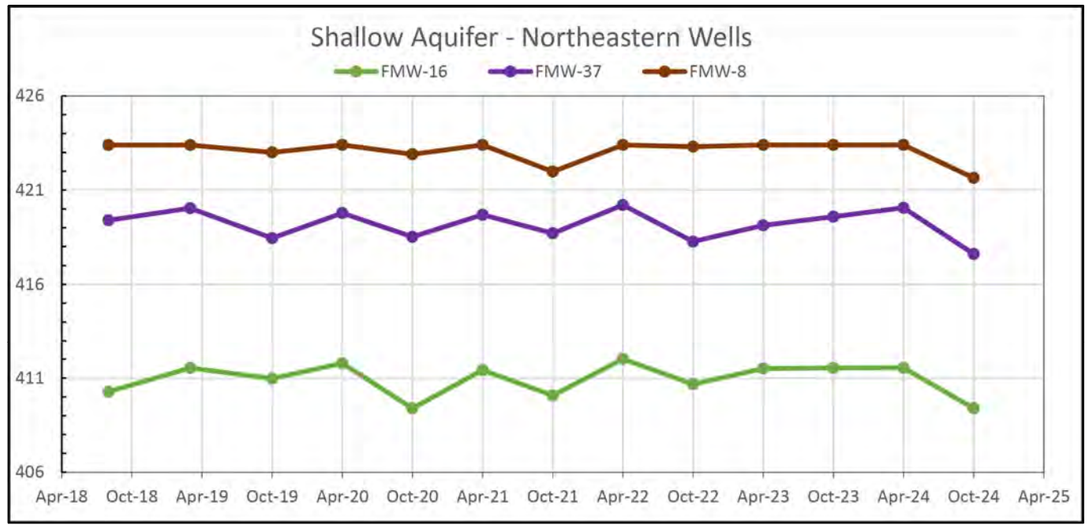
Drawn By:	RAC
Checked:	JB
Approved:	JB
DWG Date:	12/11/24

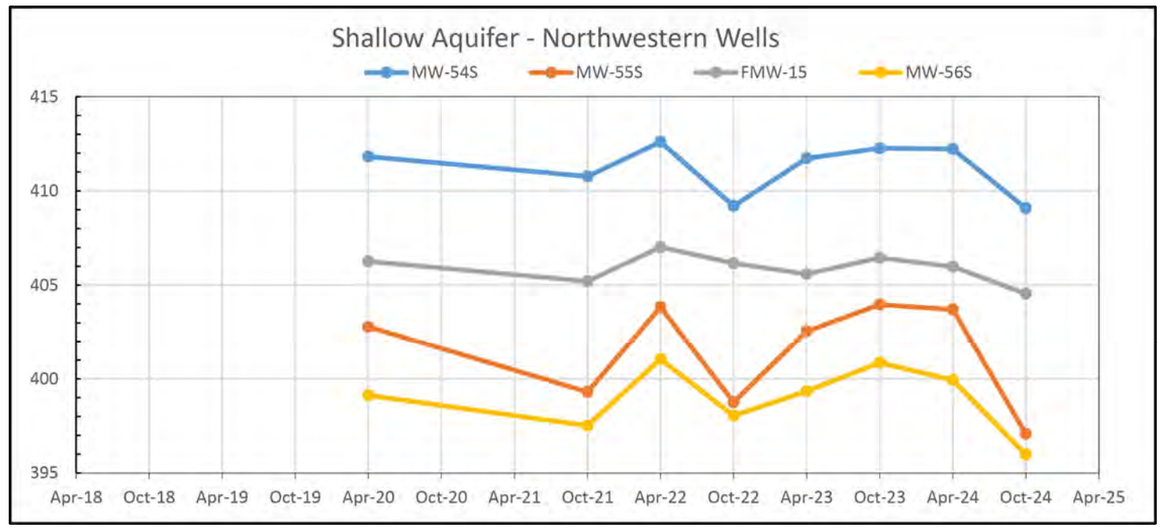
Westchester County Airport
White Plains, New York

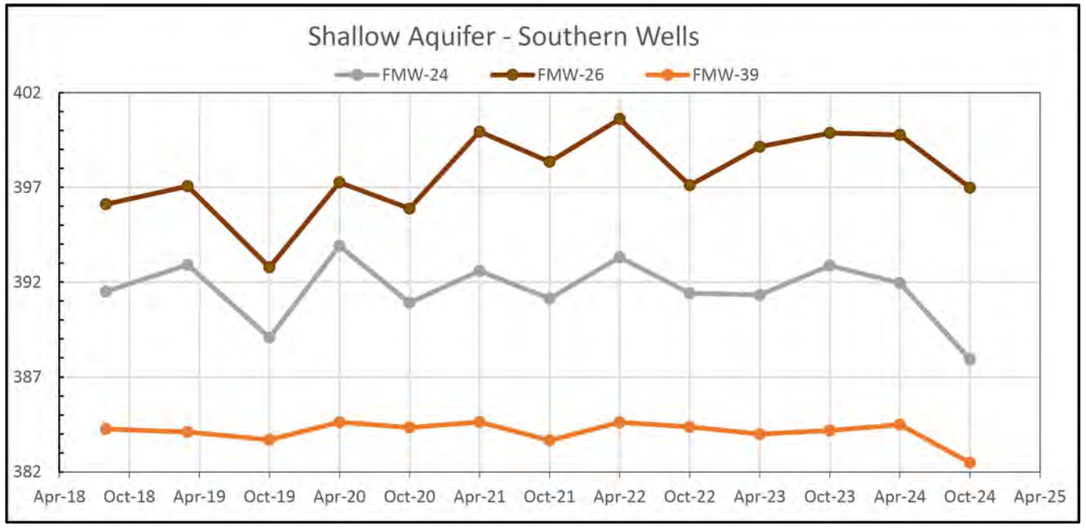
BEDROCK AQUIFER GROUNDWATER CONTOUR MAP - OCTOBER 2024

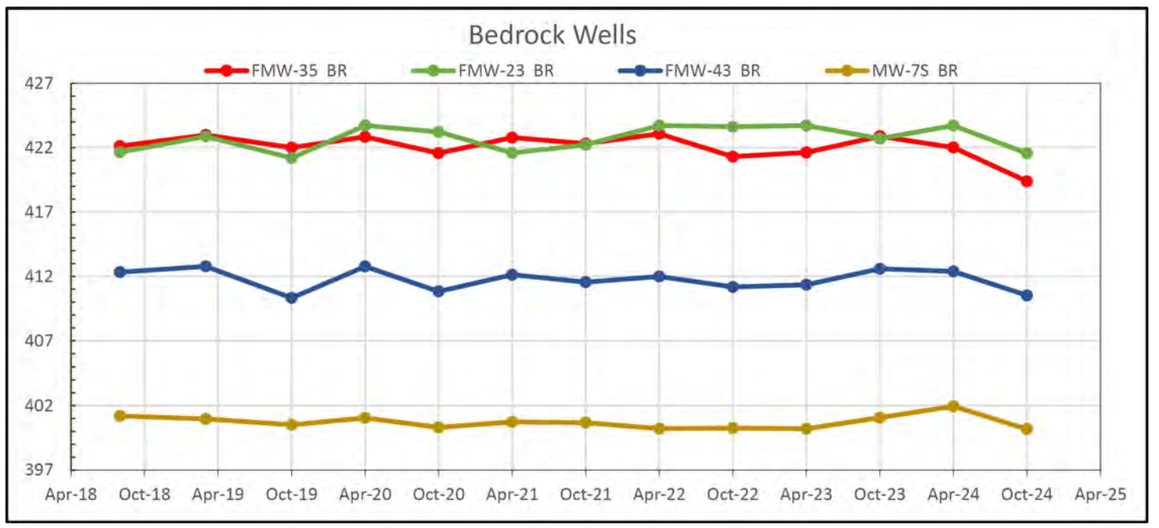
FIGURE 5

O:\DWG\Westchester County Airport\2024\F5_BedrockGW2410.dwg, Layout1, 12/12/2024 10:02:47 AM









LEGEND:

X-AXIS UNITS ARE ELEVATIONS IN FEET ABOVE MEAN SEA LEVEL

Y-AXIS UNITS ARE MONTH AND YEAR

WSP USA, Inc.
500 Summit Lake Drive
Suite 450
Valhalla, New York 10595
(914) 747-1120

Drawn By:	RAC
Checked:	JB
Approved:	JB
DWG Date:	12/11/24

Westchester County Airport
White Plains, New York

HISTORICAL WATER LEVEL ELEVATIONS

FIGURE 6

B

Appendix C

Excavation Work Plan

APPENDIX C – EXCAVATION WORK PLAN (EWP)

C-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 NYSDEC contacts listed in the table below. **Table B-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 **Appendix A**.

Table C-1: Notifications*

Name	Contact Information
Greta White, P.G. NYSEC Project Manager Remedial Bureau C	NYSDEC DER Bureau C 625 Broadway Albany, NY 12233 Greta.white@dec.ny.gov 518-402-2029
Kiera Thompson NYSDEC Section Chief Remedial Bureau C	NYSDEC DER Bureau C 625 Broadway Albany, NY 12233 Kiera.thompson.ny.gov
Leia Schmidt, Esq. NYSDEC Site Control	NYSDEC Office of General Counsel 625 Broadway, 14th Floor Albany, NY 12233-1500 Leia.schmidt@dec.ny.gog

* 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, 29 CFR 1910.120 and 29 CFR 1926 Subpart P;

- A copy of the contractor's health and safety plan (HASP), in electronic format, if it differs from the HASP provided in **Appendix E** of this ISMP;

- 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.

C-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 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 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 COC.

Soils will be segregated based on previous environmental data and screening results into material that requires off-site disposal and material that requires testing to determine if the material can be reused on-site as soil beneath a cover or if the material can be used as cover soil. Further discussion of off-site disposal of materials and on-site reuse is provided in Section **C-6** of this Appendix.

C-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 routinely inspected and damaged tarp covers will be promptly replaced.

Stockpiles will be inspected at a minimum once each 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.

C-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 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 Plan.

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 ISMP is posed by 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 NYSDOT 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 on-site, 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 off-site in an appropriate manner.

Locations where vehicles enter or exit the site shall be inspected daily for evidence of off-site 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 off-site at a permitted landfill facility in accordance with all applicable local, State, and Federal regulations.

C-5 MATERIALS TRANSPORT OFF-SITE

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 will be determined and included within project specific Interim Remedial Action Plan, 15-day activity notice and/or Change of Use requirements. All trucks loaded with site materials will exit the vicinity of the site using only these pre-approved truck routes. 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 off-site queuing of trucks entering the facility; (d) limiting total distance to major highways; (e) promoting safety in access to highways; and (f) overall safety in transport.

Trucks will be prohibited from stopping and idling in the neighborhood outside 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.

Queuing of trucks will be performed on-site in order to minimize off-site disturbance. Off-site queuing will be prohibited.

C-6 MATERIALS DISPOSAL OFF-SITE

All material excavated and removed from the site will be treated as contaminated and regulated material and will be transported and disposed off-site in a permitted facility in accordance with all local, State and Federal regulations. If disposal of material from this site is proposed for unregulated off-site 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 off-site management of materials from this site will not occur without formal NYSDEC project manager approval.

Off-site disposal locations for excavated soils will be identified in the pre-excavation notification and project specific Interim Remedial Measure work plan. 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, C&D debris

recovery facility). Actual disposal quantities and associated documentation will be reported to the NYSDEC in the monthly progress reports, project specific Construction Completion Reports, and Periodic Review Report after completion of final SMP. 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 off-site will be handled consistent with 6 NYCRR Parts 360, 361, 362, 363, 364 and 365. Material that does not meet Unrestricted SCOs is prohibited from being taken to a New York State C&D debris recovery facility (6 NYCRR Subpart 361-5 registered or permitted facility).

C-7 MATERIALS REUSE ON-SITE

The qualified environmental professional, as defined in 6 NYCRR Part 375, will ensure that procedures defined for materials reuse in this ISMP are followed and that unacceptable material (i.e. contaminated) does not remain on-site. Contaminated on-site material, including historic fill and contaminated soil, that is acceptable for reuse on-site will be placed below the demarcation layer or impervious surface, and will not be reused within the cover system or within landscaping berms. Contaminated on-site material may only be used beneath the site cover as backfill for subsurface utility lines with prior approval from the DEC project manager.

Proposed materials for reuse on-site 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 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 NYSDEC 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 dated April 2023 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 reuse on-site will be segregated and staged as described in Sections C-2 and C-3 of this EWP. The anticipated size and location of stockpiles will be provided in the 15-

day notification and project specific Interim Remedial Action Work Plan 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 on-site 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.

Any demolition material proposed for reuse on-site will be sampled for asbestos and the results will be reported to the NYSDEC for acceptance. Concrete crushing or processing on-site will not be performed without prior NYSDEC approval. Organic matter (wood, roots, stumps, etc.) 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.

C-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 off-site 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 off-site, unless prior approval is obtained from NYSDEC.

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 SPDES permit.

Project specific discharge or dewatering or other water management and treatment requirements will be included in project specific Interim Remedial Action Work Plan and obtain prior approval from NYSDEC.

C-9 COVER SYSTEM RESTORATION

The Site currently does not a cover system installed. Therefore, areas which are disturbed during approved Interim Remedial Actions or approved redevelopment will be restored to existing site grade, surfaces, or cover system as included in project specific Interim Remedial Action Work Plan.

After the completion of soil removal and any other invasive activities the cover system will be restored in a manner that complies with this ISMP. Since contamination exists at the site, Institutional Controls (ICs) and Engineering Controls (ECs) are required to protect human health and the environment. The final SMP for the Site will include all applicable ICs/ECs as defined in the remedy for the Site.

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.

C-10 BACKFILL FROM OFF-SITE 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 ISMP 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 G**.

Material from industrial sites, spill sites, 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 the use Restricted Industrial for all compounds listed. Proposed materials must be sampled for full suite analytical parameters including per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane. Soils that meet Fill Type 4 and Fill Type 5 under 6 NYCRR Part 360.13 are prohibited from reuse in Westchester County, with the exception that Fill Type 4 can be reused as described within the same county it was generated.

Based on an evaluation of the land use, protection of groundwater and protection of ecological resources criteria, the resulting soil quality standards will be listed in the final SMP. 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

NYSDEC project manager. Soil material will be sampled for the full suite of analytical parameters, including PFAS and 1, 4-dioxane. 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.

C-11 STORMWATER POLLUTION PREVENTION

A Stormwater Pollution Prevention Plan (SWPPP) may be required for each project specific Interim Remedial Action Work Plan. The SWPPP will conform to the requirements of the NYSDEC Division of Water guidelines and NYS regulations. The project specific SWPPP will be included with the project specific Remedial Action Work Plan. The SWPPP will include inspection requirements. SWPPP inspection reports will be included in Monthly Progress Report. Erosion and sediment controls for any work shall be clearly outlined in each work plan, particularly to protect streams from sedimentation and prevent surface water with high sediment load from entering Rye Lake (including SPDES discharges). Erosion and sediment controls may include, but not limited to the following:

Barriers and hay bale checks will be installed and inspected 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.

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 ISMP 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. Additional monitoring during any site construction activities will be broadly implemented. Erosion and sediment controls will include minimizing active site disturbances, stabilizing bare soils, and managing stormwater runoff. This will be managed by installing silt fencing or hay bales around the entire perimeter of the construction area. In order to protect Rye Lake and surrounding streams from sedimentation and surface water runoff with high sediment loads, Terracon will implement additional erosion and sediment controls on an as-needed basis. These controls will be specifically outlined in each submitted Work Plan.

C-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 [TAL metals, TCL volatiles and semi-volatiles (including 1,4-dioxane), TCL pesticides and PCBs, and PFAS], unless the site history and previous sampling results provide 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 two 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 Monthly Progress Report.

C-13 COMMUNITY AIR MONITORING PLAN

Community Air Monitoring Plan (CAMP) is included as Appendix H in this ISM. Project Specific Interim Remedial Action Work Plans will include figure(s) to identify location of air sapling stations based on generally prevailing wind conditions for the project details. The locations

will be adjusted on a daily or more frequent basis on actual wind direction to provide an upwind at downwind monitoring station.

Exceedances of action levels listed in the CAMP will be reported to NYSDEC and NYSDOH Project Managers.

C-13A: 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 VOCs 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 VOC 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.

C-13B: 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.

C-14 ODOR CONTROL PLAN

This odor control plan is capable of controlling emissions of nuisance odors off-site. Specific odor control methods to be used on a routine basis. 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. NYSDEC and NYSDOH will be notified of all odor events and of any other complaints about the project. 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 Periodic Review Report.

All necessary means will be employed to prevent on- and off-site 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 off-site 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 on-site 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.

C-15 DUST CONTROL PLAN

Particulate monitoring must be conducted according to the Community Air Monitoring Plan (CAMP) provided with this ISMP. 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 on-site work will include, at a minimum, the items listed below:

- Dust suppression will be achieved using a dedicated on-site 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 sites will be done in stages to limit the area of exposed, unvegetated soils vulnerable to dust production.

- Gravel will be used on roadways to provide a clean and dust-free road surface.

- On-site roads will be limited in total area to minimize the area required for water truck sprinkling.

C-16 OTHER NUISANCES

A plan for rodent control will be developed and utilized by the contractor prior to and during site clearing and site 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.

APPENDIX D

Quality Assurance Project Plan (QAPP)

Quality Assurance Project Plan

Westchester County Airport

Site No. C360174

West Harrison, New York

June 2025 | Terracon Project No. JA257006

Prepared for:

County of Westchester
148 Martine Avenue
White Plains, New York 10601

Prepared by:

Terracon Consultants-NY, Inc.
Rochester, New York

Table of Contents

List of Appendices

1.0 INTRODUCTION

This Quality Assurance Project Plan (QAPP) has been developed as part of the Interim Site Management Plan (ISMP) Plan for the Westchester County Airport (Site), located at Airport Road, West Harrison, New York, identified as BCP Site No. C360174. The scope of work associated with the various remedial investigation and remedial action activities, and specific areas of concern that will be addressed are summarized in project-specific Interim Remedial Investigation Work Plans (IRIWP), Interim Remedial Action Work Plan (IRAWP), or other work plans.

The QAPP is designed to produce data of the quality necessary to achieve the project objectives. The objective of the Quality Assurance (QA) and Quality Control (QC) protocol and procedures is to ensure the information, data, and decisions associated with the project are technically sound and properly documented. The QAPP was prepared in general accordance with the requirements of the NYSDEC DER-10, Technical Guidance for Site Investigation and Remediation, dated May 2010 (DER-10).

Procedures used in Terracon's QC program are compatible with federal, state, and local regulations, as well as appropriate industry standards. Project specific work plans may have project specific details that differ from procedures in this QAPP. In such cases, the project-specific work plan should be followed, subsequent to regulatory approval.

2.0 QUALITY CONTROL OBJECTIVES

To ensure that data generated during the various investigation and remedial action sampling events are of the highest quality, the analytical results of such sampling will be compared to appropriate data quality indicators. These indicators include precision, accuracy, representativeness, completeness, and comparability, as described below:

- Precision is the agreement or reproducibility among individual measurements on the same property, usually made under the same conditions.

- Accuracy is the degree of agreement of a measurement with the true or accepted value.

- Completeness is a measure of the amount of valid data obtained from a measurement system compared with the amount that was expected to be obtained under correct and normal conditions.

- Representativeness expresses the degree to which a measurement accurately and precisely represents a characteristic of a population, parameter, variations at a sampling point, a process condition, or an environmental condition.

- Comparability expresses the confidence with which one data set can be compared with another data set with regards to the same parameter.

2.1 Data Quality Objectives

The data quality objectives (DQO) can vary based on the specific objectives of the sampling program. The DQOs for the site sampling program are summarized below.

Levels of Quality Assurance

DQO Level	Description	Associated Activity
I	Field Screening – Portable type instruments which provide real-time data to assist in optimizing sample point locations and health and safety support. Data can be generated regarding present or absence of certain contaminants.	■ Health and Safety Monitoring (PID, FID)
II	Field Analysis – portable analytical instruments in an on-site lab or transported to the site. Depending upon types of contamination, sample matrix, and personnel skills, qualitative and quantitative data can be obtained.	■ Field analyses (pH, specific conductance, temperature, dissolved oxygen)
III	Standard Analytical Protocols – standard analytical protocols, other than the NYSDEC Analytical Services Protocol (ASP) deliverables / reportables.	■ Ongoing semi-annual groundwater sampling ■ Waste classification sampling ■ Remedial system maintenance sampling

DQO Level	Description	Associated Activity
IV	NYSDEC ASP Reportables / Deliverables – rigorous QA / QC protocols and reportables / deliverables documentation: NYSDEC ASP Category B deliverables.	■ Remedial Investigation sampling ■ Post-excavation soil sampling ■ Groundwater sampling
V	Non-Standard – Analysis which may required method modification and/or development	■ Not Applicable

Unless stated otherwise, all data will be generated in accordance with Level IV DQOs. Level III DQOs will be utilized, as necessary, for non-ASP work which may include ignitability, corrosivity, reactivity, EP toxicity, and other state approved parameters for characterization; current semi-annual groundwater sampling plan; and remedial action maintenance or performance sampling. Level I will be used throughout the RI for health and safety monitoring activities.

2.2 Sampling Procedures

The sampling program to be implemented will include each environmental medium that will be collected and analyzed in accordance with appropriate state and federal requirements. Sampling objectives, locations, and procedures have been included as the Interim Site Management Plan (ISMP) and are further described in Section 3. Details regarding specific sampling activities are provided in project specific IRIWP, IRAWP or other work plans, and the procedures for collecting samples and performing field related activities will be included in those plans.

2.3 Laboratory Certification and Coordination

The New York State Department of Health (NYSDOH) issues the Environmental Laboratory Approval Program (ELAP) certification accreditation. Accredited laboratories demonstrated consistently to ensure the accuracy and reliability of samples analyzed. All chemical analyses for samples from the site will be completed by an ELAP laboratory capable of performing project specific analyses as indicated in this QA / QC plan. The project QA / QC Officer will also be responsible for all project related laboratory coordination.

Supporting documentation related to per- and polyfluoroalkyl substances (PFAS) analysis, such as standard operating procedures (SOPs) during sampling activities, analyte lists, and method detection limits (MDLs) are provided in **Attachment A**.

2.4 Analytical Methodologies and Analytical Quality Contol

Specific analyses will be conducted according to NYSDEC ASP 2000 methodologies. The number of samples, analytical method, sample volumes, preservation techniques and holding times are provided in **Table 1**. The data will be presented in Category B reportables / deliverables format.

Analytical quality control for this Project will be consistent with the methodology and quality assurance/quality control requirements in the NYSDEC ASP 2000. **Table 1** includes detail on sample volumes, containers, preservation, and holding time for typical analytes.

2.5 Quality Control Samples

Several types of field QC samples will be collected and submitted for laboratory analysis including trip blanks, sample duplicate, matrix spike and matrix spike duplicate when conducting assessment activities under an approved IRM or other NYSDEC directed or approved assessment effort. Please note that QC samples will not be required for active treatment or remediation activities that include a sampling program for system performance evaluation. DQOs for active treatment or other remediation/mitigation measures will be defined in the IRM Work Plans for that specific remedy.

- Trip blanks – A trip blank sample monitors for potential impacts due to handling, transport, cross contamination from other samples during storage or laboratory contamination. The trip blanks, for aqueous VOCs only, will consist of analyte free reagent grade water in VOC sampling containers to be used for the project. Trip blanks will be prepared at the laboratory, sealed, transported to the Site and returned without being opened to assess contamination that may have occurred during transport.

- Blind duplicates – Blind duplicate samples are used to monitor field and laboratory precision, as well as matrix heterogeneity. The samples are separate aliquots of

the same sample, collected from the same location, at the same time, in the same manner as the first, and placed into a separate container. Each duplicate sample will be analyzed for the same parameters as the original sample collected that day.

- Matrix spike/matrix spike duplicate (MS/MSD) are used to monitor precision and accuracy of the analytical method on various matrices. The samples are spiked with known quantities of target analytes at the laboratory.

- Rinsate Blanks – Rinsate blank is used to indicate potential contamination from sample instruments used to collect and/or transfer samples. The rinsate blank will be generated by passing distilled water (or certified PFAS-free water) through and over cleaned sampling equipment. Rinsate blank samples will not be performed when dedicated disposal equipment is used.

The number of QA / QC samples generally required are shown in the following table. When there is a disagreement with QA / QC sample numbers and types, between this document and a Work Plan, the Work Plan shall prevail.

Sample Type	Analysis	Frequency
Trip blanks	VOC	One per day or 5% (1 per 20), whichever is more frequent
Blind duplicates	Same as field sample	One per day or 5% (1 per 20), whichever is more frequent
MS/MSD	Full suite	One per day or 5% (1 per 20), whichever is more frequent
Rinsate Blanks	PFAS	One per day or 5% (1 per 20), whichever is more frequent

2.6 Corrective Action

If instrument performance or data fall outside acceptable limits, then corrective actions will be taken to resolve problems and restore proper functioning of the analytical system. Actions may include recalibration or standardization of instruments, acquiring new standards, replacing equipment, repairing equipment, and reanalyzing samples or redoing sections of work. Subcontractors providing analytical services should perform their own internal laboratory audits and calibration procedures with data review conducted at a

frequency so that errors and problems are detected early, thus avoiding the prospect of redoing large segments of work.

2.7 Data Usability Summary Report

A Data Usability Summary Report (DUSR) will be prepared by a qualified third party to conduct an independent evaluation consistent with NYSDECs Guidance for the Development of Quality Assurance Plans and Data Usability Summary Reports as given in DER-10. The main objective of the DUSR is to determine whether the data presented meets the project specific needs for data quality and data use. Once data is validated, it will be submitted to the NYSDEC EQuIS database for review.

3.0 FIELD PROCEDURES

The accuracy of the data is dependent upon well-conceived and carefully implemented sampling and analysis procedures. This section presents the procedures for collecting variety of samples, which may be needed at the site.

Proposed sampling locations, and field investigation procedures will be included in project specific IRIWP, IRAWP, or other work plans. In such cases, the project-specific work plan should be followed, subsequent to regulatory approval.

3.1 Field Documentation

Daily field activities will be recorded in a bound field notebook. The field notebook will include the following daily information for Site activities:

- Date, time of arrival, time of departure, weather conditions.
- Field staff, sub-contractors or other personnel on site.
- Description of field activities and location of work area.
- Equipment used on site (such as drill rig, operator)
- Field observations and descriptions, such as soil descriptions, well/piezometer installation information, evidence of contamination, staining, odors, etc.
- Field measurements (OVM, water quality readings) and calibration
- Sampling locations, depths, identification numbers, time, etc.

- Sampling location measurements.
- Chain-of-custody information
- Modifications to scope of work or issues encountered.

Field notes may be transferred to soil boring logs, or monitoring well forms as part of the field activities. Typical forms to be utilized during the field investigation will be included in project specific IRIWP, IRAWP, or other work plans, and may include:

- Daily Field Report
- Soil Boring Log or Test Pit Log
- Monitoring Well Installation Log
- Well Development Data Sheet
- Chain-of-Custody

3.2 Sample Label and Identification

Each field and QC sample will be identified by a self-adhesive, non-removable label placed on the sample containers. The label information will include, at a minimum, client name, site location, data and time of collection, sample identification number, sampler's name, and notes, as needed recorded in waterproof ink. All sample bottles within each shipping container will be individually labeled with the laboratory provided label.

Sample identification will include, at a minimum, the following:

- Sample identification number
- Analysis required
- Sample date and time
- Initials of the individual performing the sampling

A description of the sample will be included in the field logbook.

Alphanumeric codes will be used to identify sample locations. The coding for sample identification numbers should be consistent, identify a single sample location and, unless otherwise directed, use the following naming convention:

Sample Coding and Labeling

Designation	Media Type	Sample Location	Example
SB	Soil	Soil boring number with sample depth interval (x-x')	SB1 (8-10')
MW	Groundwater	Monitoring well with well number	MW2
EX	Soil	Excavation confirmation sample with sample depth interval	EX3 (1-2')
TB	Trip blank	None – include day/month/year	TB1 – 10/25/25
RB	Rinsate blank	Any – rinsate of sampling equipment; include day/month/year	RB2 – 10/25/25
MS/MSD	Matrix spike/ matrix spike duplicate	Any – identify original sample location	SB1 MS MW2 MSD

The laboratory will provide appropriately cleaned and prepared sample containers. Reagents, preservation procedures, and analytical holding times will be in accordance with the published analytical methods.

The specific requirements for sample container preparation, sample preservation, holding times, and any special handling requirements are listed in **Table 1**. Sample containers will be kept closed until the time each set of sample containers is to be filled. After filling, the sample containers will be securely closed, residue wiped from the sides of the containers, sample identification marked on the container label, and the container immediately placed in a cooler that contains ice. Samples will be kept chilled and delivered to or picked up by the laboratory. Samples of dissimilar matrices will be shipped in separate coolers whenever possible. All reasonable effort will be used to limit the time the sample containers are on the Site to no more than two calendar days.

3.3 Field Equipment

Various field equipment will be used during the project. Calibration of the field equipment will be complete in accordance with manufacture's specifications, prior to the start of each day. Additional equipment calibration will be completed throughout the day, as necessary.

- Organic Vapor Meter (OVM) – Real-time monitoring for VOCs will be done with an OVM equipped with a PID to evaluate the nature and extent of potential petroleum or solvent impacts at the site. The OVM will be calibrated on a daily basis in accordance with manufacturer's specifications.

- Particulate Monitoring Equipment – Particulate air monitoring will be completed during soil excavation activities as part of the IRM as noted in the Community Air Monitoring Program (CAMP). Measurements will be collected along the upwind perimeter of the excavation areas to assess the amount of particulates naturally occurring in the air. The particulate meter will be regularly calibrated in accordance with the manufacturer's specifications.

- Additional Field Equipment – Additional field equipment will be used as part of the project including an electric static water level indicator and Horiba U-22 water quality meter that measures pH, specific conductivity, temperature, dissolved oxygen, oxygen reduction potential and turbidity. The meters will be calibrated in accordance with the manufacturer's specifications.

3.4 Sample Collection Procedures

Specific sampling procedures will be included in project specific IRIWP, IRAWP, or other work plans. In such cases, the project-specific work plan should be followed, subsequent to regulatory approval.

3.4.1 Surface Soil Sampling

Samples will be collected using a pre-cleaned, stainless-steel spoon or trowel. When the sample is obtained, it will be deposited into a pre-cleaned stainless-steel bowl or plastic pail for mixing prior to filling the sample containers. The soil will be mixed thoroughly until the material is homogenized. At that point, the soil will be placed into the laboratory-provided containers.

Once removed from the ground the soil will immediately be observed for soil characteristics, including general soil type (sand, silt, clay), moisture, and visual/olfactory evidence of impact such as odors or staining.

When PFAS sampling / testing is required, sampling equipment components or sample containers should not come into contact with aluminum foil, low density polyethylene (LDPE), glass, or Teflon tape. Acceptable equipment includes stainless steel spoons and bowl, high density polyethylene (HDPE) containers, and steel shovels or augers that are not coated.

3.4.2 Subsurface Soil Sampling

3.4.2.1 Soil Screening and Loging

Subsurface soil samples will be collected from direct push macro-core samplers in general accordance with American Society for Testing and Material (ASTM) D6282-98 Standard Guide for Direct Push Soil Samples for Environmental Site Characteristics. Subsurface soil sampling from split-spoon samples advanced ahead of hollow steam augers will be completed in general accordance with ASTM D1586-99. A soil boring log will be prepared for each location to include date, boring location, drill rig type, blow counts, sample identification, sample depth interval, percent recovery, OVM reading, stratigraphic boundaries, and well installation information.

Subsurface soil will be sampled by opening the split spoon sampler (borings) or slicing the core vertically down the middle with a sharp blade. Soil samples will be visually examined for evidence of suspect contamination (e.g., staining, odor) and field screened with a calibrated OVM. Portions of the soil samples may be placed in containers for future analytical testing. Different portions of the soil samples will be placed within sealable plastic bags and will be field screened the same day as collected. Prior to screening, the soil samples will be allowed to equilibrate to ambient temperature. The OVM sampling port will be placed within a corner of the bag. The peak reading will be recorded on the boring log. Portions of the soil samples may be placed in containers for future analytical testing.

3.4.2.2 Soil Sample Collection

Soil samples selected for VOC analysis will be collected using an Encore or Terracore sampling kit, limiting headspace by compacting the soil into the container. Samples for

VOC will be placed into the appropriate container immediately after opening of sampler, prior to making any field measurements or sample homogenization.

Remaining soil samples will be homogenized using a "coning and quartering" procedure. The soil will be removed from the sampling equipment and transferred to a clean surface (metal foil, steel pan, bowl, etc.) and thoroughly mixed to provide a more homogeneous sample to the lab. An aliquot of the sample will then be transferred to the required sample containers and sealed with the appropriate cap.

Due to emergent contaminant sampling requirements, at this time acceptable materials for sampling include stainless-steel, HDPE, PVC, silicone, acetate and polypropylene. Additional materials may be acceptable if pre-approved by NYSDEC. All sampling equipment components and sample containers should not come in contact with aluminum foil, LDPE, glass or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer.

Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with PFC materials must be avoided. Many food and drink packaging materials and "plumbers thread seal tape" contain PFCs.

All clothing worn by sampling personnel must have been laundered multiple times. The sampler must wear nitrile gloves while filling and sealing the sample bottles. Additionally, sunscreen brands will require approval by Terracon's PFAS Subject Matter Experts prior to application or use by sampling personnel.

3.4.2.3 Soil Borings

Soil borings will be completed using either direct push subsurface investigation techniques or rotary drilling with continuous split spoon sampling and hollow stem augers. Drilling cuttings will be visually inspected and screened with an OVM and managed consistent with DER-10 requirements. Soil sampling will be conducted to define the subsurface conditions. During continuous sampling process, soil samples will be field screened for the presence of VOCs using an OVM. Soil samples for laboratory analysis will be selected in the field based on visual/olfactory observations and OVM screening results.

The drill rig/ soil probe rig, tools, augers, etc. will be decontaminated between holes at an on-site temporary decontamination pad or area. Decontamination will be accomplished using steam cleaning or high-pressure wash equipment. Direct push sampling equipment and split spoon sampling devices will be cleaned manually with non-phosphate detergent (i.e., Alconox) wash and potable water followed by a potable water rinse or a second steam cleaning followed by a distilled/deionized water rinse. All equipment will be cleaned prior to leaving the Site.

3.4.2.4 Test Pits

Test pits will be completed using a track-mounted excavator and bucket to provide a detailed visual examination of near surface soil, and fill materials present on-site. Samples will be collected from the walls and/or floor through the use of a bucket, steel trowels and bowls. The samples will be placed directly into the appropriate containers, inspected and screened for the presence of VOCs using an OVM, and managed consistent with DER-10 requirements. Soil samples for laboratory analysis will be selected in the field based on visual and olfactory observations and OVM screening results.

Sampling equipment will be cleaned manually with non-phosphate detergent (i.e., Alconox) wash and potable water, followed by a potable water rinse or a second steam cleaning, followed by a distilled/deionized water rinse. All sampling equipment will be cleaned prior to leaving the Site. During PFAS sampling activities, equipment will be triple rinsed with certified PFAS-free water provided by the laboratory or other reputable source.

3.4.3 Monitoring Well Development and Sampling

Groundwater sampling at monitoring wells will be performed no sooner than two weeks following the development of that monitoring well unless otherwise approved by the NYSDEC. Groundwater sampling at permanent wells for one sampling event will consist of determining the casing volume, purging, and sample collection, as well as field measurement parameters such as temperature, pH, Conductivity, Dissolved Oxygen (DO), and turbidity. These procedures are described below.

3.4.3.1 Monitoring Well Development

Monitoring wells will be developed by utilizing either a dedicated tubing or new dedicated disposable bailer, depending on the field conditions. Fluids will not be added during development process. New, dedicated well development equipment will be utilized prior to development of each well. The well development procedure is listed below.

- Well cover will be unlocked. OVM will be used to survey the ambient air and air directly at the top of the well.
- Take a pre-development static water level measurement.
- Sound the bottom of the well and agitate/loosen accumulated sediment.
- Calculate water volume in the well.
- Obtain initial field water quality measurements, including pH, specific conductance, turbidity, and temperature obtained using a Horiba U-22 water quality meter (or equivalent).
- Alternate water agitation methods such as moving a bailer or pump tubing up and down inside screened interval coupled with water removal methods (pumping or bailing) in order to suspend and remove solids/sediment from the wells.
- Water quality meter measurements should be recorded every one to three gallons of water removed. Record water quantities removed and water quality measurements.
- Development can cease when the following water quality criteria are met, or at least 5 well volumes have been removed.
  - Water is clear and free of sediment and turbidity is less than 50 nephelometric turbity units (NTUs)
  - pH is +/- 0.1 standard unit between readings
  - Specific conductivities is +/-3% between readings
  - Temperature is +/-10% between readings
- Record post-development water level readings. Development information will be recorded on well development logs.

After the water level has returned to its pre-purge level (or within a maximum of two hours, if the well has recharged sufficiently to allow sampling), samples will be collected from the middle of the screened portion of the well for overburden wells. If the water

level is slow to recharge and does not reach its pre-purge level within two hours, then samples can be collected after sufficient water has recharged, and the degree of recharge indicated in field notes with time and depth to water noted.

3.4.3.2 Sampling

Groundwater samples will be collected by utilizing low-flow sampling techniques with dedicated tubing or by conventional methods using a new dedicated disposable bailer. A peristaltic pump and new disposable HDPE tubing will be used at each location. Tubing and sampling equipment will be clean upon arrival at the Site. The well will be sampled after removal of three well volumes or well purging. If low-flow sampling is being performed, then samples will be collected after certain criteria identified in Section 3.4.3.1 are met. The use of screened, shorter intervals of sampling will be implemented for low-flow wells. Conventional sampling will be collected after purging three well volumes.

A Well Data Sheet should be completed during groundwater sampling. Each well to be sampled will have designated pre-labeled, certified clean, sample bottles. When water levels are being collected for groundwater modeling, any pertinent measurements will be conducted concurrently. The following steps describe the groundwater sample procedure.

- Unlock and remove well cap. Test the air at the wellhead with the OVM.
- Measure the static water level. Determine the total well volume.
- Slowly lower the dedicated bailer or tubing into the well. Purge the well, minimum of three well volumes. If the well goes dry during bailing, allow for full recovery and sample. If recovery takes longer than 20 minutes, proceed to next well but return to sample within 24 hours. Low-flow purging will be conducted at wells with historically high-levels of PFAS contamination, using dedicated sampling equipment. Purging will minimize drawdown and mixing by using a slow, controlled rate. Conventional purging will be completed at wells less likely to have a vertical gradient of PFAS contamination, and remove three well volumes.

- Fill the appropriate sample bottles. Two or three (depending on laboratory-specific requirements) 40-ml glass vials (with Teflon septa) will be used to collect samples for VOCs. Sample collection with the following sample collection order: volatile organic compounds, semi-volatile organic compounds, PCBs/pesticides/herbicides, metals and PFAS. If the well should go dry during sampling, the well should be re-sampled the next day. The second attempt to sample the well will proceed with the same sample order.
- Samples will be collected after disconnection from any water quality meters.
- Preservative for the various sampling preservatives will be added by the laboratory provided jars. The following parameters required additional special handling.
  - VOC samples must be free of air bubbles. When the container is determined to be bubble free, the sample containers should be immediately chilled.
  - Metals analysis should be preserved with nitric acid to a pH less than 2.
- Record pertinent information in the field logbook and well data sheet. Lock well, inspect well site, and note any maintenance required.
- Purge water will be containerized for future disposal.

Per- and polyfluoroalkyl substances (PFAS) Sampling Protocol

Groundwater sample collection procedure for PFAS will be completed in accordance with NYSDEC protocol identified in "Guidelines for Sampling and Analysis of PFAS, Under NYSDEC's Part 375 Remedial Programs" dated April 2023, included in the Quality Assurance/Quality Control (QAPP) found in **Appendix B**.

During PFAS sampling activities, equipment will be triple rinsed with certified PFAS-free water provided by the laboratory or other reputable source.

3.4.4 Surface Water Sampling

To obtain a surface water sample, the sample container will be slowly lowered into the water body by hand until it is submerged and slowly brought back to the surface after filling. Should it prove infeasible to collect the sample by hand due to other conditions, a sample bottle will be attached to the end of a sampling pole using zip ties or other non-

PFAS containing method and the above procedure followed. The sample pole will be decontaminated between samples. Surface water samples will be collected from downstream to upstream to have limited effect on the water column.

All sample containers will consist of laboratory-cleaned bottles (non-glass for PFAS) that, once filled with sample, are to be properly labeled and then placed into coolers and chilled to 4°C using wet ice and not blue pack ice.

3.4.5 Soil Vapor Intrusion Sampling

Soil vapor intrusion (SVI) investigation will be completed to assess the potential for soil vapor intrusion concerns within the Site in areas with VOC impact identified. The SVI work will be in done in general accordance with NYSDOH Final document entitled "Guidance for Evaluating Soil Vapor Intrusion in the State of New York", dated October 2006, and amendments.

3.4.5.1 Building Survey

An inspection of the existing on-site facility and product inventory will be conducted to assess the current conditions in proposed sampling areas and determine the likelihood of existing chemicals of concern that may be present that would influence the vapor test results. An OVM will be used to monitor indoor air and scan vapors of individual containers that may be present. Any potential sources identified inside the facility will be removed prior to conducting the vapor test.

3.4.5.2 Site Preparation

In accordance with NYSDOH recommendations, the HVAC system should be activated.

3.4.5.3 Vapor Sampling

Three types of air samples will be collected, including sub-slab, ambient indoor air and ambient outdoor air samples, as follows:

Sub-Slab: Sub-slab sampling points will be obtained through core-drilled holes into a competent portion of the concrete floor, away from cracks or drains. Clean, dedicated ¼-inch inside diameter polyethylene tubing will be placed into the hole and will not extend further than 2-inches into the sub-slab material. The core-hole annulus will be sealed at the floor surface with modeling clay. Once it is determined that the sampling system is sealed, the sample probe and tube will be purged of one to three volumes, and sampling will be initiated.

The sub-slab soil gas sample will be collected using a 1-liter capacity Summa canister fitted with a laboratory calibrated flow regulation devise to allow the collection of the soil gas sample over an 8-hour sample collection time.

Ambient Indoor Air: An ambient indoor air sample will be collected concurrent with every sub-slab sample location from approximately 3 to 4 feet above the slab floor. Samples will be collected over an 8-hour collection period.

Ambient Outdoor Air: One ambient outdoor sample will be collected at an upwind location from approximately 4 to 5 feet above the ground surface. A sample will be collected over an 8-hour collection period.

All sampling and purging flow rates will not exceed 0.2 liters per minute. Since the ambient outdoor air sample is dependent on wind flow direction, that sample location will be determined the day of the test.

3.4.5.4 Soil Vapor Sampling Leak Testing Procedures

Leak testing will be completed prior to collection of the sub-slab sample locations using a tracer gas. The tracer gas (i.e., helium) will be released at the ground surface immediately around the sub-slab sampling location prior to sample collection. The following procedure will be used:

- A helium meter will be used to monitor the presence of helium during purging and soil gas sample collection.
- A containment unit will be constructed to cover the sub-slab sampling system. In general, the containment will include a shroud set into bentonite to create a seal. The shroud will have a hole to allow for introduction of helium and a second to allow trapped air to escape.
- Prior to soil gas purging, helium will be introduced into the shroud and helium confirmed to be present.
- The helium meter will be connected in-line with the sub-slab sampling assembly to assess for presence of helium. Should the helium meter detect the presence of

helium greater than 10 percent of the source concentration (measured under the shroud), then the sample location will not be utilized or sub-slab collection.

3.5 Decontamination Procedures

In order to reduce the potential for cross-contamination of samples collected during the project, sampling equipment will be decontaminated to ensure that data is acceptable. It is anticipated that most of the materials used in sample collection will be disposable one-time use materials, such as sampling containers, bailers, tubing, gloves, etc.

Non-dedicated material such as split spoon samples, stainless steel mixing bowls, drill rig, water-level indicator, etc., will be decontaminated by the following methods:

- Steam clean the equipment within a dedicated decontamination area; or
- Decontamination typically involves scrubbing/washing with a laboratory grade detergent (e.g. alconox) to remove visible contamination, followed by potable (tap) water and analyte-free water rinses. Tap water may be used from any treated municipal water system.

The effectiveness of the equipment decontamination of non-dedicated sampling equipment will be evaluated via analytical testing of rinsate blanks. Decontamination liquids, disposable equipment, and PPE will be containerized for future disposal. During PFAS sampling activities, equipment will be triple rinsed with certified PFAS-free water provided by the laboratory or other reputable source.

4.0 MANAGEMENT OF INVESTIGATIVE-DERIVED WASTE

The sampling methods and equipment have been selected to limit the need for decontamination and the volume of waste material to be generated. Investigation-derived material (e.g., drill cuttings and purge water) will be containerized in 55-gallon drums for testing and future off-site disposal.

Personal protective equipment and disposable sampling equipment will be placed in plastic garbage bags for disposal as a non-hazardous waste.

Decontamination water used in steam cleaning and/or spoon washing, and rinse water, including detergent, may be generated during Site work. Tap and analyte-free water used for rinsing will be allowed to percolate back into the ground.
Any waste generated during investigation and remedial actions will be collected and containerized as required for disposal according to all applicable laws and regulations.

5.0 Reporting

Upon completion of sampling and receipt of analytical results, the analytical data will be provided within the monthly progress report. Additionally, investigation sampling and results will be included within the remedial investigation report.

APPENDIX A

TABLES

TABLE 1
Sample Container, Volume, Preserving and Holding Time Requirements
Westchester County Airport
NYSDEC Brownfield Cleanup Program

PARAMETER DESCRIPTION	MATRIX	METHOD NO.	Quantity/ Bottle Type	Preservation	Holding Time
Soil / SedimentSamples					
Volatiles, TCL list	Soil	5035/3035A/8260	Encore or Terracore Samplers	Freeze within 48 hours	Freeze within 48 hours 14 days
Semi-Volatiles, TCL list	Soil	8270	(1) 4oz glass jar	Cool, 4 C	14 days
Metals, TAL (no CN)	Soil	6010/7000	(1) 4oz glass jar	none	180 days, Mercury 28 days
PCBs	Soil	8082	(1) 4oz glass jar	Cool, 4 C	365 days/40 days from extraction
Pesticides	Soil	8081	(1) 4oz glass jar	Cool, 4 C	14 days/40 days from extraction
Herbicides	Soil	8151	(1) 4oz glass jar	Cool, 4 C	14 days/40 days from extraction
1,4-Dioxane	Soil	8270-SIM	(1) 8oz glass jar	Cool, 4 C	14 days
Polyfluoroalkl Substances (PFAS)	Soil	EPA 1633	(1) 8oz glass jar	Cool, 4 C	28 days
Groundwater / Surface Water					
Volatiles, TCL list	Water	8260	(3) 40ml vial	Cool, 4 C, HCL	14 days
Semi-Volatiles, TCL list	Water	8270	(2) 1 liter amber	Cool, 4 C	7 days
PCBs	Water	8082	(2) 1 liter amber	Cool, 4 C	7 days/40 days from extraction
Pesticides	Water	8081	(2) 500ml amber	Cool, 4 C	7 days/40 days from extraction
Herbicides	Water	8151	(2) 1 liter amber	Cool, 4 C	7 days/40 days from extraction
Metals, TAL	Water	6010	(1) 250ml plastic	HNO3	180 days
Mercury, Total	Water	7000	(1) 250ml plastic	HNO3	28 days
Metals, TAL (dissolved) field filtered	Water	6010	(1) 250ml plastic	HNO3	180 days
Mercury, Dissolved	Water	7000	(1) 250ml plastic	HNO3	28 days

APPENDIX B

SAMPLING, ANALYSIS, AND ASSESSMENT OF PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS) – APRIL 2023

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

Table of Contents

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.

Appendix E

Health and Safety Plan

HEALTH & SAFETY PLAN

Westchester County Airport

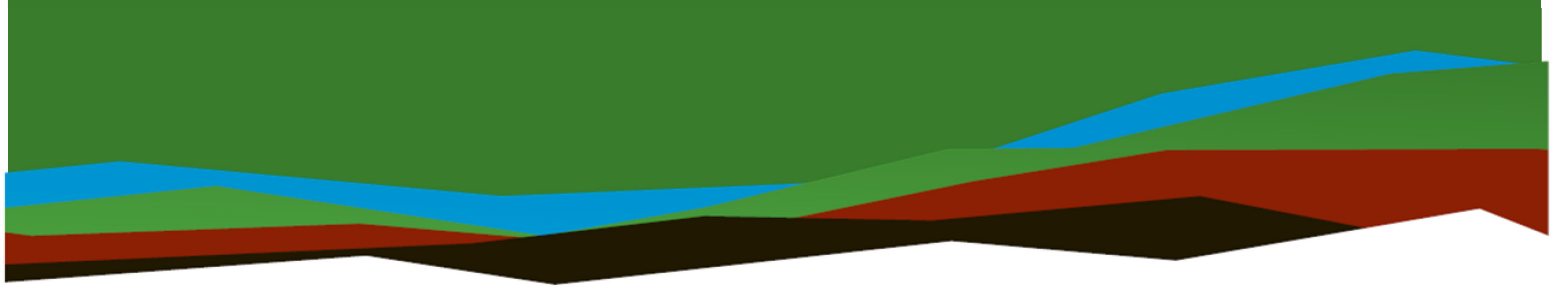
Site No. C360174

West Harrison, New York

June 2025 | Terracon Project No. JA257006

Prepared for:

County of Westchester
148 Martine Avenue
White Plains, New York 10601



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- Materials

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1.0 INTRODUCTION & BACKGROUND

Terracon Consultants, Inc. (Terracon) has prepared this Site-Specific Health & Safety Plan (SSHASP) to support ongoing environmental assessment and/or remedial response actions to be undertaken at the Westchester County Airport (the "Airport" or "Site"). The Site is located at 240 Airport Road in White Plains, Westchester County, New York.

The County of Westchester has been accepted into the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) as a Participant, Site No. C360174. The purpose of this SSHASP is to prevent adverse health effects from potential contaminants and safety hazards which may be present at this site during environmental assessment and/or remediation response actions and general construction activities on the site.

Figure 1 in **Appendix A** shows the site location on a US Geological Survey Topographic Map. A site diagram depicting the general layout of the site, and adjoining properties is provided as **Figure 2** in **Appendix A**.

1.1. Purpose

The purpose of this SSHASP is to provide information for managing known or encountered environmental conditions at the site and best management practices (BMP) associated with impacted media (soil, groundwater, and/or vapors) that may be encountered during assessment and/or remediation response actions, and excavation, redevelopment and

general construction activities on the site. This SSHASP is intended for Terracon staff and to inform General Contractors (GC), subcontractors, and site workers of conditions of potential and documented environmental impacts.

1.2. Contractor Notification

Contractors anticipated to be working at the site are hereby notified that soil, groundwater, sediments, surface waters, or soil gas/vapor they encounter could contain concentrations of regulated substances resulting from historical operations at the site. It should be understood by contractors and site workers that the concentrations of regulated substances that may be encountered can range from generally low to greater than applicable regulatory levels. Impacted material encountered may or may not exhibit visual or olfactory indications of impact. Exposure, and thereby potential hazard, can be reduced if certain work practices/precautions are followed.

1.3. Prior Report Review

Site history and conditions have been documented through multiple reports prepared by previous consultants for the Site. A summary of the site and known environmental conditions is provided below.

The topography at the Airport is generally flat and slopes gently to the south. The elevation at the northern end of the Project Area is approximately 425 feet above mean sea level (msl) and slopes to 375 feet above msl at the southern extent of the Airport property. The surface elevation of Rye Lake, located approximately 500 feet beyond Purchase Street/Route 120 to the west of the Site, is approximately 354 feet above msl. Rye Lake is part of the Kensico Reservoir that serves as a drinking water reservoir for New York City. The west adjoining area is comprised primarily of woodlands and includes Route 120 and Interstate 684 beyond which is Rye Lake.

The New York Air National Guard (NYANG) was a tenant at the Airport from 1947 to 1983. As part of its operations, the NYANG performed aircraft firefighting training operations on a regular basis. These firefighting exercises and training activities were performed at a "Burn

Pit" that was located near the NYANG's former hanger (hereafter referred to as the "NYANG Burn Pit") on County property adjacent to the NYANG's leasehold.

The NYANG conducted these exercises from as early as 1968 until 1983 when they vacated the Airport. The NYANG, as part of its firefighting exercises, used Aqueous Film-Forming Foam (AFFF), which historically contained compounds referred to as per- and polyfluoroalkyl substances (PFAS). Only recently has there been a reduction in the use of PFAS chemicals in AFFF. The duration of AFFF use at the NYANG Burn Pit and the fact that the NYANG Burn Pit was unlined resulted in groundwater at this location exhibiting the highest concentrations of PFAS contamination at the Site.

PFAS-contaminated soil, groundwater, sediments and surface waters have been documented at the site in the *Site Characterization Report* prepared for the site dated February 2023. PFAS compounds are deemed to be the primary contaminants of concern. In addition to PFAS compounds, detectable concentrations of volatile organic compounds (VOCs); semi-VOCs; metals; 1-4 dioxane have been reported during site investigations completed at the site, however, reported concentrations have been generally below applicable NYSDEC cleanup objectives applicable to the site.

2.0 SAFETY AND HEALTH ADMINISTRATION

The Project Manager is ultimately responsible for ensuring that work on this project is performed in accordance with the safety and health provisions contained in this Plan. The designated Site Safety and Health Officer (SSO) or their designee will monitor compliance with this Plan during field activities. All field team members engaged in project activities will be required to sign the "Acknowledgment of Instruction" form included in **Appendix B**. The SSO will maintain a copy of this Plan on site for the duration of project activities.

Contractors engaged in project activity at this site will comply with the applicable provisions of the Occupational Safety and Health Act of 1970, the safety and health requirements set forth in Occupational Safety and Health Administration regulation 29 CFR 1910.120, where applicable, and any applicable state, city or local safety codes. Each subcontractor will be responsible for supplying a Competent Person to oversee designated project work at this site. Each

subcontractor has primary responsibility for utilizing equipment and work practices necessary to protect the safety of the subcontractor's employees engaged in this project.

Each subcontractor will maintain an orderly and safe work area around heavy equipment to minimize the potential for accidents. In addition, the subcontractors shall provide whatever safety barricades or warning devices are deemed necessary by the General Contractor (GC) to prevent accidents or injury to site personnel and the general public.

Contractors engaged on this project site may utilize this SSHASP for their employees, or each Contractor may develop and utilize their own SSHASP provided the provisions of the Contractor's SSHASP are at least as stringent as the requirements contained in this SSHASP. Decisions regarding equivalence of safety and health requirements shall be made by the Site Safety Officer. Adoption of this HASP by subcontractor employers shall not relieve any site subcontractor for the responsibility for the health and safety of its employees.

The GC and subcontractor task leaders (if any) will be responsible for:

- Providing subordinate personnel a copy of this SSHASP and briefing them on its content.
- Enforcing the applicable provisions of this SSHASP.
- Inspecting and maintaining equipment in compliance with applicable federal, state or local safety regulations.
- Enforcement of corrective actions.
- Investigation of accidents or injuries.

The following individuals will be responsible for implementation and enforcement of Work Plan in relation to the Site. . The List of Key personnel will be updated as appropriate based on the future work, activities, and work zones at the larger HPN Site.

Table 1
Key Personnel

TITLE	NAME	PHONE
Project Manager	Michele Patterson-Wittman	(716) 574-1513
Corporate Safety & Health Manager	Jim Wright	(913) 523-5044
Site Safety & Health Officer (SSO)	Don Pomeroy	(401)-602-8959

If hazardous conditions develop during the course of project activity, the SSO will coordinate actions required to safeguard site personnel and members of the general public. Additional safety measures will be verbally communicated to all project personnel, recorded in writing and appended to this Plan.

3.0 TRAINING REQUIREMENTS & MEDICAL SURVEILLANCE

3.1. Training Requirements

In addition to Terracon staff on site, General Contractors will have a Superintendent/Foreman onsite full-time that has completed 40-hour Hazardous Waste Operations and Emergency Response (HAWOPER) Training per the requirements of OSHA 29 CFR 1910.120. In addition, any subcontractor company conducting earthwork activities, digging into the ground up to or through the impacted soils, groundwater or handling impacted materials shall have a Foreman/Supervisor onsite full-time that has completed 40-hour HAZWOPER Training. A current 8-hour annual refresher training certificate is required for all 40-hour trained personnel.

All Site workers that may be exposed to impacted soil or groundwater must be made aware of the onsite COCs. Each subcontractor shall have a written site-specific Safety Plan or Job Hazard Analysis addressing the contaminated soil and groundwater and how to protect their employees potentially from potential exposures.

Prior to the start of site activities, the SSO will conduct a pre-project Site-specific safety and health orientation for all project participants. The personnel responsible for project safety and health will be addressed, as will site history, scope of work, site control measures, emergency procedures and site communications. The briefing will address site contaminants, air monitoring protocols and results and the level of personal protective equipment to be employed for each project task.

Daily "tailgate" safety and health briefings will be presented by the SSO at the start of each workday. In addition to a general review of the proposed daily activity and safety requirements, the results of previous air monitoring and any procedural changes will be addressed. A daily tailgate safety meeting documentation form is attached in Appendix B.

3.2. Medical Surveillance

All site workers that may be exposed to COCs above established occupational exposure limits (OELs) shall be enrolled in a health monitoring program in accordance with the provisions of OSHA 29 CFR 1910.120 and 1910.134. Each project participant must be certified by a Doctor of Medicine as fit for respirator and semi-permeable/impermeable protective equipment use. The content and frequency of physical examinations will be determined by the Consulting physician in compliance with the requirements of 29 CFR 1910.120.

Follow-up medical examinations should also be provided by each employer in the event of illness or unprotected exposure to contaminants in excess of eight-hour time weighted average permissible exposure limits.

4.0 SITE HAZARDS

As discussed previously, PFAS compounds are the primary contaminant of concern (COC) currently identified at the site. In addition to PFAS compounds, detectable concentrations of

volatile organic compounds (VOCs); semi-VOCs including Polynuclear Aromatic Hydrocarbons (PAH); metals; and 1-4 dioxane have been reported during site investigations completed at the site, however, reported concentrations have been generally below applicable NYSDEC cleanup objectives applicable to the site.

Petroleum products, including but not limited to aviation fuels and fuel oils for heating, have been and continue to be stored and used on the Site. Accordingly, chemical compounds typically found in petroleum products will also be considered potential COC for the site.

Continued site investigation activities will be performed at the site to fully characterize the nature and extent of contamination, and will include PFAS, VOC, SVOC/PAH testing, as well as 'full-suite' testing in areas previously unassessed at the site. Additional COC may be determined though this continued assessment work, and new/additional COC will be considered and incorporated into future amendments of this SSHASP, as warranted.

A summary of hazards is presented in **Table 2**, below.

Environmental Media	Exposure Pathways				Chemicals of Concern
	Inhalation	Ingestion	Contact	Radiation	
Soil	✓	✓	✓		PFAS, VOC, SVOC/PAH
Groundwater (including perched water table)	✓	✓	✓		PFAS, VOC, SVOC/PAH
Sediments		✓	✓		PFAS, VOC, SVOC/PAH
Surface Waters		✓	✓		PFAS, VOC, SVOC/PAH

4.1. Chemical Hazards

The following sections identify the U.S. Occupational Safety and Health Administration (OSHA) Permissible Exposure Limits (PELs) and American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLVs) of the contaminants of concern. OSHA PELs are legally-enforceable, whereas the ACGIH TLVs are recommended exposure limits and are not enforceable, but utilized when PELs are not established or available for COCs. The PELs and TLVs may be 8-hour time-weighted average (TWA), Short-term Exposure Limits (STELs) of 15 minutes, or Ceiling Limits ©. "Skin" indicates that measures must be taken to prevent skin exposure.

***Note on Personal Hygiene* - Smoking, drinking, eating, or tobacco chewing are not allowed in the work area. Site personnel will wash face, hands and forearms as soon as possible upon completion of activities. An adequate supply of soap and water should be available for cleaning.**

4.1.1. Per- and Polyfluoroalkyl Substances (PFAS)

PFAS are a group of over 12,000 synthetic chemicals that have been used world-wide in industry and consumer products since the 1940's. This includes two perfluoroalkyl compounds, perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS), that have been found in soil and groundwater samples previously collected at the Site. Perfluoroalkyls are man-made compounds that are not naturally occurring in the environment. PFOA and PFOS are the two PFAS compounds that have been made in the largest quantities in the United States; however, they are no longer produced in the U.S. PFAS are often called "forever chemicals" because they are not easily broken down due to strong carbon-fluorine bonds. PFAS are heat, water and oil resistant, so they have been added to products to make them water-repellent, stain resistant, or nonstick. They have also been used in fire-fighting foams. Construction workers may be exposed to PFAS by breathing in or ingesting contaminated dust or through skin exposure to contaminated soil, groundwater or surface water.

Exposure to PFAS has been associated with an increased risk in development of some cancers, reproductive issues, increased cholesterol levels, and immune system effects. PFAS are an emerging public and occupational health hazard. Since thousands of PFAS congeners exist, there is currently no standardized method for characterizing PFAS in air samples. Limited occupational exposure data is available for PFAS in the construction industry. OSHA has not established a permissible exposure limit for any of the PFAS chemicals. NIOSH has not established a recommended exposure limit for any of the PFAS chemicals. The U.S. Department of Health and Human Services, Public Health Service through the Centers for Disease Control (CDC), Agency for Toxic Substances and Disease Registry (ATSDR) has published a ToxGuide™ for Perfluoroalkyls, which is included in Appendix C for reference.

The Department of Energy has established Protective Action Criteria for PFOA. The Protective Action Criteria (PAC) for chemicals is used by the U.S. DOE for planning and response to uncontrolled releases of hazardous chemicals. The PAC Database includes available Acute Exposure Guideline Level (AEGL), Emergency Response Planning Guideline ERPG), and Temporary Emergency Exposure Limits (TEEL) values.

The PAC values below are based on 60-minute exposure durations (as an emergency exposure limit). Each level (PAC-1, 2, 3) represents an increase in severity of biological effects (DOE, 2016).

PAC-1 – 1.1 mg/m3
PAC-2 – 12 mg/m3
PAC-3 – 75 mg/m3

4.1.2. Petroleum Products

Soils/groundwater at this project site may be contaminated with petroleum hydrocarbons. Benzene is the most significant health hazard contained in petroleum blends and typically comprises less than 1% of regular grade gasolines. Specific health hazard information on

petroleum and its most volatile aromatic constituents are provided below. Additional health-hazard information can be found in the chemical information sheets attached to this Plan.

GASOLINE 300 ppm ACGIH TLV

Gasoline is irritating to the skin, eyes and mucous membranes. Dermatitis may result from prolonged contact with the liquid. Gasoline acts as a central nervous system depressant. Exposure may cause staggering gait, slurred speech and mental confusion. Gasoline exposure may affect the liver, kidneys and spleen. Absorption of alkyl lead antiknock compounds contained in many gasolines poses an additional health concern, especially where there is prolonged skin contact.

DIESEL FUEL (No. 2-D) 100 mg/m3 ppm ACGIH TLV (as mist/vapor)

Diesel fuel is a skin and mucous membrane irritant and a central nervous system depressant. Poisoning may affect the liver and kidneys. Skin contact may result in drying and cracking of the skin.

FUEL OIL (No. 6) 400 ppm OSHA PEL (as petroleum distillates/naphtha)
0.2 mg/m3 OSHA PEL (Coal Tar Pitch Volatiles, "PNA's")

Fuel oil No. 6, or "Bunker Fuel", is of low volatility. It can be irritating to the eyes and skin. This substance is likely to contain polynuclear aromatic hydrocarbons (PAHs), some of which are considered carcinogenic. PAH present a skin contact hazard. Avoid skin contact with potentially contaminated site materials.

BENZENE 1 ppm OSHA PEL
5 ppm OSHA 15 min STEL
0.5 ppm OSHA Action Level

Benzene is a central nervous system depressant and an eye and skin irritant. Poisoning may cause hemorrhages and immunosuppression. A relationship has been discovered between benzene exposure and leukemia. Benzene is regulated as an occupational carcinogen. Acute exposure may cause dizziness, excitation, weakness, headache, giddiness, breathlessness and chest constriction.

TOLUENE 20 ppm ACGIH TLV (Skin Absorbable)

Toluene is an eye, skin and mucous membrane irritant and a central nervous system depressant. Poisoning may affect the liver and kidneys. Prolonged exposure may affect the heart and blood. The ingestion of alcoholic beverages may enhance the toxic effects of toluene. Symptoms of exposure include respiratory tract irritation, headache, dizziness and eye irritation. Toluene may be absorbed to the bloodstream via skin contact.

ETHYLBENZENE 20 ppm ACGIH TLV

Ethyl benzene is a skin, eye and mucous membrane irritant. It is moderately toxic by ingestion and slightly toxic by skin absorption. Ethyl benzene is a central nervous system depressant. Poisoning may affect the liver. Symptoms of exposure may include a sense of chest constriction and nervous disorders. Skin contact may result in first and second-degree burns. The odor can be detected at 140 ppm and irritation occurs at ~200 ppm.

XYLENE 100 ppm OSHA PEL

Xylene is a mild eye and mucous membrane irritant, primary skin irritant and a central nervous system depressant. Ingestion causes severe gastrointestinal upset and creates an aspiration hazard. Chronic inhalation results in symptoms that resemble acute poisoning but are more severe systemically.

Polynuclear Aromatic Hydrocarbons (PAH)

PAHs are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, or other organic substances. PAHs are usually found as a mixture containing two or more of these compounds, such as soot.

OSHA regulates occupational exposure to some PAHs under 29 CFR 1910.1000. The PEL for chrysene (as coal tar pitch volatile) is 0.2 mg/m3 as an 8-hr TWA. The PEL for naphthalene is 10 parts per million (ppm) as an 8-hr TWA. ACGIH has established a TLV for naphthalene of 10 ppm as an 8-hr TWA. ACGIH has not established TLVs for other PAHs.

4.2. Physical Hazards and Other Site Safety Hazards

Please refer to Appendix D within this document for policies and procedures regarding other site safety hazards, safety procedures and site-specific programs including but not limited to:

Trenching and Excavation Safety, Operation of Mobile Earth-Moving Equipment, Confined Space Entry, Fire Protection and Prevention, Flammable and Combustible Liquids, Slips/Trips/Falls, Lighting, Weather, and Noise. Any Spills and Biological Hazards present on site, that have not been addressed, will be taken into consideration when activities begin.

4.2.1. Heat Stress associated with Protective Clothing

Heat stress can result even when temperatures are moderate. Protective clothing decreases natural body ventilation. Working under various levels of personal protection may require the wearing of low permeability disposable suits, gloves and boots. This clothing will prevent most natural body ventilation. Discomfort due to increased sweating and body temperature (heat stress) will be expected at the work site. Whenever ambient temperature exceeds 70° F heat stress monitoring and preventive measures will be implemented.

- The use of caffeine stimulants and alcoholic beverages in off hours are discouraged.
- Employees must monitor one another for signs of heat stress (excessive perspiration, flushed skin, nausea, etc.).
- Terracon will provide ice, water and electrolyte replenishment drinks. Have at least two gallons of water available for each field employee during each day of site activity. Drinking water for site personnel will be considered an integral component of safety equipment mobilized to the site. Electrolyte replenishment drinks should be consumed in a ratio of 1 pint electrolyte fluid to 2 pints water.
- Provide cooling devices to aid in ventilation (the additional weight may affect efficiency).
- Provide water source facilities to cool clothing and body.
- Shift working hours to early morning and evening, avoiding the hottest time of the day.
- Confirm and designate emergency procedures.
- Maintain effective communication by voice, observation or electronic means.
- Provide access to shade in the form of pop-up canopy, dog house, etc.

4.2.2. Cold Stress

Cold stress can occur in any cold environment, with OSHA defining near freezing temperatures as extreme cold. Cold stress can vary across regions and environments, and many other factors such as wind speed, precipitation and humidity can all increase the effects. Decreased skin temperature, and eventually internal (core) body temperature can be fatal. This is a primary concern on-site during winter months.

- Employees must be properly trained to recognize the signs and symptoms of cold stress.
- Engineering controls, such as space heaters or sheltered areas.
- Dressing properly. Numerous layers, with extra care being given to extremities like the head, face, hands, feet, etc.
- Taking regular breaks to warm up when necessary.
- Preparing in advance and bringing extra clothes.

4.2.3 Slips/Trips/Falls

Slips, trips and falls are the most common injuries when working on-site and in the field. They can occur with anything from slick surfaces, to tools haphazardly strewn about. These incidences are always preventable, and there are many practices to implement to decrease these instances from occurring.

- Good housekeeping
- Safe walking surfaces
- Proper lighting
- Safe footwear
- Awareness and training

4.2.4 Lighting

Lighting is a necessary aspect of completing work safely, and especially important when working at night. Since the site is within the zone of an active airport, it is important to be cognizant of all possible hazards associated with improper lighting. Temporary job site lighting will be available for all work completed on-site, when necessary. Any work completed at night will be properly lit through the use of light plants, flashlights, light meters, head lamps, etc.

4.2.5 Weather

Weather will be monitored daily, with unsafe working conditions being accounted for when going out into the field. Any thunder, lightning, or extreme weather events that will disrupt working in a safe manner, will result in a stop work order.

4.2.6 Noise

Noise limits will be accounted for when completing work utilizing heavy machinery. All employees will wear ear plugs or headphones when necessary. Due to the nature of the Site, any work completed outside and in close proximity to the runway will result in the use of ear protection.

5.0 PERSONAL PROTECTIVE EQUIPMENT

Protective clothing and respiratory protection help prevent site workers from coming in contact with contaminants. It is imperative that personal protective equipment (PPE) be appropriate to protect against the known potential hazards for the Site. The selection of protective equipment will be based upon the types, concentrations, and routes of exposure that may be encountered.

There are four (4) levels of personal protection recommended by the U.S. Environmental Protection Agency (EPA). Level D is used when little or no contamination exists; however, a Modified Level D may be required for additional dermal protection. Upgrading to Level C is required when contamination levels require protection from bodily contact and the filtering of breathing air. Level B will be used when contamination requires protection from bodily contact and the use of a supplied breathable air source. Level A provides the highest available protection from bodily contact, respiratory and eye irritation. The following are descriptions of the equipment required for each level of personal protection.

Level D

Work uniform (close fitting sleeved shirt, long pants)
Hi-Vis Leather gloves (when required)
Safety boots (steel toe and shank)
Hi-Vis Safety Vests or t-shirts (reflective for night work)
Hard hat (ANSI Z.89.1 approved)
Eye protection (ANSI Z.87 approved, chemical splash goggles when operating near splash hazards)
Hearing protection (minimum NRR 20 within 10 ft. of operating equipment)

Modified Level D - Level D plus the following:

Chemical resistant, polycoat coveralls
Inner surgical gloves (latex or nitrile)
Chemical resistant outer gloves (nitrile)
Chemical resistant safety boots (steel toe and shank, rubber or nitrile)

Level C – Modified Level D plus the following:

NIOSH approved, full-face, air purifying respirator (APR)
P100 cartridges (or combination P100 and H_2S as needed)

Level B:

Chemically resistant, polycoat coveralls
Inner surgical gloves (latex or nitrile)
Chemical resistant outer gloves (nitrile)
Chemical resistant safety boots (steel toe and shank, rubber or nitrile)
NIOSH approved, full-face, airline respirator
Hard hat (ANSI Z.89.1 approved)
Hearing protection (minimum NRR 20 within 10 ft. of operating equipment)

It is recommended that site workers start in Level D PPE. Site workers should upgrade to Modified Level D PPE if they will come in contact with or will be conducting activities disturbing PFAS contaminated soils or groundwater. Depending on the levels of dust observed/measured (see Section 12.1 for Dust Control Guidelines and Ambient Monitoring

Criteria), a respirator with appropriate filters (i.e., P100 or HEPA filters) may be needed to protect against inhalation of airborne particles.

5.1. Respiratory Protection

If respirators are utilized, they shall be NIOSH approved. Cartridges and filters for air purifying respirators will be appropriate for the contaminant(s) of concern. For earthwork and excavation activities where metals and PFAS will be disturbed, air purifying respirators should be equipped with HEPA/P100 cartridges. Cartridge/filter selection will be made by each individual employer and approved by the SSO. Project personnel required to wear respiratory protection will be medically cleared for respirator use, trained and successfully fit tested in accordance with OSHA 29 CFR 1910.134. Personnel required to wear respirators will demonstrate competence in donning/doffing and inspecting the equipment prior to job assignment. All project tasks requiring the use of supplied air respirators will require properly equipped backup personnel.

At a minimum, air purifying respirator cartridges will be changed daily prior to use. More frequent change of respirator cartridges may be specified based on the results of site air monitoring. Under no circumstances will air purifying respirators be used in areas deficient in oxygen (<19.5%), in areas classified as immediately dangerous to life and health (IDLH) or in areas where contaminants have not been characterized. A full facepiece respirator will prevent eye irritation. If air concentrations are elevated, eye irritation may become a serious issue. If a half-mask respirator is used, tight fitting goggles must also be used.

Respirators will be inspected and required fit checks will be performed prior to use, and any necessary repairs will be made before proceeding to the project site. Respirators will be sanitized daily after use.

6.0 SITE CONTROL

An Exclusion Zone, Contaminant Reduction Zone and a Support Zone will be established whenever project activities require Level C or Level B personal protective equipment. Defined access and egress points will be established and personnel will enter only through those points.

As permitted by site topography, the area within a 100-foot radius of trench or excavation shall be considered the Exclusion Zone. Only those personnel designated by the Project Manager/SSO are allowed to enter the Exclusion Zone. Where practical, or where their use will prevent public injury, temporary signs or barricade fencing will be established to define the Exclusion Zone. **ABSOLUTELY NO SMOKING, EATING, OR CHEWING TOBACCO WILL BE PERMITTED WITHIN THE EXCLUSION OR CONTAMINANT REDUCTION ZONES ON THE SITE.**

If unauthorized personnel attempt to enter the exclusion zone, the SSO will verbally inform the individual(s) to leave the project site. If unauthorized individuals refuse to leave the Exclusion Zone or are considered in danger or pose danger to project personnel, the SSO will cease project activities (i.e., shut down excavation equipment, etc.) and notify the Owner's representative or the local police of the situation. Site activities will not resume until unauthorized personnel have left the project site.

7.0 AIR MONITORING AND SITE ACTION LEVELS

This air monitoring protocol is designed to prevent personnel exposure to airborne contaminants in excess of established PELs. The results of field air monitoring will be used to determine the adequacy of initial personal protective equipment selection.

Note that PFAS are not detectable with a photoionization detector (PID) or combustible gas indicator (CGI) and typically do not present odors or visible staining. Therefore, ambient dust levels will be utilized as an indicator of potential inhalation exposure to PFAS (see Section 12.0 of this SSHASP for ambient PM10 levels set for this project).

Currently known site conditions do not indicate VOC/SVOC to be a primary COC. However, petroleum storage/distribution operations of aviation fuel products are active and ongoing at the HPN. In addition, petroleum underground storage tanks (USTs) were historically in use and continue in select areas of the site until all of HPN is provided with natural gas service. As this SSHASP is intended to apply to the entire HPN site, in anticipation of future ground-intrusive excavation occurring, either as an assessment/remedial response action or as part of planned construction or redevelopment projects at the HPN, and to be consistent with the

Community Air Monitoring Plan (CAMP) for this site, air monitoring for VOC is discussed below.

7.1. Particulate Air Monitoring

Occupational exposure monitoring (air sampling) methods for PFAS are still emerging. However, worker exposure is likely to occur through inhalation of PFAS-contaminated dust. Therefore, personal breathing zone air sampling should be conducted to evaluate worker exposures to total particulate (dust), respirable dust, and PFOA dust.
Particulate air monitoring should be done with a DataRAM-4 (or similar), which will be capable of reading particles less than 10 micrometers in size (PM-10) and equipped with an audible alarm feature which will indicate exceedances. Dust monitoring devices will be recorded periodically throughout the day to assess emissions and the need for corrective actions. Particulate monitoring action levels as per *DER-10 Technical Guidance for Site Investigations and Remediation* is as follows:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter ($\mu g/m^3$) greater than background 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 ($\mu g/m^3$) above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 ($\mu g/m^3$) 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/m3 of the upwind level and in preventing visible dust migration.

7.2. VOC Air Monitoring

VOCs will be monitored at the downwind perimeter of the work area on a continuous basis and periodically during non-intrusive activities, as needed. VOC monitoring will be done

using an organic vapor meter (OVM) equipped with a photoionization detector (PID) to provide real-time recordable air monitoring data.

VOCs will also be monitored and recorded at the downwind perimeter of the immediate work area(s). Upwind concentrations will be measured at the beginning of each day before activities begin and periodically throughout the day to establish background conditions. The downwind VOC monitoring device will also be checked periodically throughout the day to assess emissions and the need for corrective action. VOC monitoring action levels as per DER-10 Technical Guidance for Site Investigations and Remediation is as follows:

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
- If the organic vapor level at the perimeter of the work area 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 take 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 than 20 feet, is below 5 ppm over background for the 15-minute average.
- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shut down.

8.0 DECONTAMINATION

Equipment decontamination is required in accordance with the Quality Assurance Project Plan (QAPP). Personnel decontamination for site workers below personal protective Level C will consist of washing off safety footwear, proper cleaning or disposal of outer and inner gloves and thorough washing of face, arms and hands. A full body shower will be required as soon

as possible upon leaving the project site. For projects involving Level C personal protective equipment, a decontamination station will be established and the following procedures enforced.

8.1. Personal Decontamination

Personnel will establish a decontamination station on the interface of the Exclusion Zone. A Contaminant Reduction Zone will be established and will extend 10 feet beyond from the decontamination station and consist of the following:

- Two Wash Tubs
- Scrub Brush
- Plastic Bags
- Water and Alconox® Detergent

The wash tub on the exclusion zone side of the site will contain a solution of water and Alconox® detergent; the second wash tub will contain clean rinse water. Personnel decontamination will consist primarily of detergent washing and rinsing of reusable exterior protective gear. Coveralls will be removed by turning the clothing inside out.

Personnel may not leave the contaminant reduction zone without proceeding through the decontamination sequence described below. Decontamination station will consist of:

- Wash work gloves, boots and polylaminated protective coveralls,
- Rinse work gloves, boots and coveralls,
- Remove tape at wrists and ankles,
- Remove protective coveralls,
- Remove respirator
- Dispose of spent cartridges, wash and rinse respirator
- Remove outer gloves
- Remove inner gloves

Expendable personal protective equipment will be placed in plastic trash bags, sealed and disposed of per client agreement. Decontamination solutions will be containerized or disposed of as arranged by Project Manager.

8.2. Equipment Decontamination

Decontamination of equipment will be performed to limit the migration of contaminants off-site. All equipment will be cleaned prior to site entry to remove grease, oil and encrusted soil.

Decontamination of large equipment will consist of physically removing gross contamination with shovels, brushes etc. followed by detergent and water high pressure wash with a clean water rinse. Decontamination of hand samplers and similar small equipment will be performed at a designated location within the Contaminant Reduction Zone. All reusable sampling equipment will be thoroughly cleaned with steam or high-pressure wash of hot water and anionic detergent prior to each use. All decontamination fluids will be disposed of as provided in the work plan. Disposable protective clothing will be placed in plastic bags, containerized and left on site. Respirators and boots will be thoroughly cleaned with hot water and anionic detergent.

8.2.1. Tracking Sediment Off-Site

A decontamination pad should be constructed in accordance with the QAPP for all equipment that comes in contact with impacted soils or groundwater. Construction stabilized exits such as rumble strips, filter fabric and 3-inch diameter rock shall be used to knock loose dirt/mud from the wheels of vehicles exiting the site. All trucks exiting the site shall ensure that no spillage of soil occurs off-site and minimize tracking of soil from the site. Truck drivers transporting waste shall be required to inspect the exterior of their trucks and brush off all loose soil. Trucks transporting waste shall limit the load of soil to allow sufficient freeboard (e.g., 6 inches) and shall cover each load prior to leaving the site.

Despite these precautions, should material be tracked off-site, the contractor will be prepared with brooms or hoses to manually clean up any residual sediments. Terracon will also perform site inspections daily, and if material is found outside of the Site limits, clean-up will be addressed within a timely fashion.

9.0 SITE COMMUNICATIONS

Communication between personnel within the Exclusion Zone will be via verbal communication or hand signals. Visual contact between members of task teams should be possible throughout the course of project activities. Contact with the SSO will be through direct verbal communication. The following hand signals will be used by personnel wherever respiratory protection and/or equipment noise limit verbal communication.

Signal	**Meaning**
Thumbs Up	OK, all is well
Grab throat with both hands	Can't breathe
Shake head, thumbs down	NO, negative
Point right (when facing equipment operator)	Move/steer left
Point left (when facing equipment operator)	Move/steer right
Grab partner's wrist	Leave area immediately

10.0 ACCIDENT PREVENTION

The Site Safety Officer has administrative responsibilities for implementing the provisions of this SSHASP, including but not limited to the following:

- The Site Safety Officer will hold daily safety briefings at the start of each workday.
- If site activities interrupt the normal flow of pedestrian or vehicular traffic, appropriate barricades will be erected field equipment. Traffic safety vests will be worn by personnel working within 10 feet of any active roadway.
- The Site Safety Officer will attempt to prevent unauthorized personnel from entering project exclusion zones. Authorized visitors will be briefed on site contaminants and personal protective equipment requirements of this Plan.
- The Site Safety Officer will periodically inspect the work area for infractions of Health and Safety requirements of this Plan.
- The Site Safety Officer will investigate and promptly report accidents to the Corporate Health and Safety Manager.

- Site activities will be conducted only during daylight hours unless adequate portable lighting is mobilized to the project site.
- The "buddy system" will be observed at all times during intrusive site investigations. A minimum of two people will work together and remain within eyesight or not greater than 100 ft. apart.

11.0 EMERGENCY RESPONSE PROCEDURES

The GC will implement emergency response procedures. Please refer to the Emergency Response Plan for Construction Sites. Emergency response procedures shall follow the Jobsite Emergency Management Manual.

11.1 Contaminated Areas

Where air monitoring indicates the absence of toxic gases or vapors, the ambulance will be directed to the affected employee by GC. If site conditions warrant and as time permits, the wheels of the ambulance will be decontaminated with high pressure wash. The SSO or GC designee will accompany the ambulance to the medical facility and provide guidance concerning additional decontamination which may be required for the injured employee, ambulance or attendants.

Whenever an injury occurs on sites with contamination requiring personal protective equipment greater than Level D modified, a minimum of two employees will don appropriate equipment and proceed to the victim. An ambulance will be called immediately. If the extent of injuries permits, the injured employee will be removed to fresh air. Appropriate first aid will be administered.

If rescuer(s) assess that the victim cannot be removed without a stretcher or other specialized equipment, the victim will be removed at the earliest possible moment by appropriately attired Terracon personnel with the direction and/or assistance of qualified medical response personnel. The injured employee will be immediately decontaminated and transported to the nearest medical facility. A crew member designated by the SSO will inform the ambulance crew of contaminants of concern and provide assistance with additional decontamination if required.

Evacuation and Shutdown Procedures

The SSO will establish and notify site personnel of emergency "rally" points. In the event of a site emergency, personnel will immediately exit the site and assemble at the designated rally point. Evacuation routes will be dependent on-site topography and wind conditions. The routes will be selected and presented by the SSO daily prior to site activity.

If emergency evacuation becomes necessary, the SSO will sound the emergency alarm to include support vehicle horn or compressed air horn with three short blasts. Personnel will safely shut down all electrical and mechanical equipment and quickly proceed to closest designated rally point. The SSO will then account for each crew member on site.

In the event that a site worker does not report to the designated rally point within 5 minutes of the evacuation alarm, the SSO will perform an immediate assessment of site conditions. If site conditions do not pose an immediate hazard to life or health, the SSO will initiate search and rescue efforts utilizing two crew members attired in appropriate personal protective equipment.

12.0 PROJECT CONTROLS

The following control measures should be implemented during earthwork activities.

12.1 Dust Control Measures

Dust generation can be caused by excavation, general movement of equipment throughout the site, stockpiling, and loading/transportation of export material. Fugitive/airborne dust, potentially impacted by PFAS and metals, can create a nuisance and/or a human health hazard for the surrounding community. Contaminants can adhere or adsorb to the dust particles, resulting in potential public exposure. Therefore, dust control measures serve to control public exposure to potential contamination from the site. Visible dust can be readily observed and controlled.

The GC and subcontractors will be responsible for taking actions to prevent, reduce, or mitigate fine particulate matter (PM10) emissions. The work areas will be monitored utilizing

a direct reading instrument (TSI DustTrak or equivalent) to PM10, per Section 7.1. Dust control measures should be employed during development activities at the site to achieve no visible emissions. Personnel operating mobile equipment at the site are instructed to drive slowly to reduce dust generation. Low tipping of excavated loads and covering of soil stockpiles should be implemented to limit the generation of visible airborne dust. Use of a water spray unit to dampen surface materials should be considered if visible dust is generated during excavation and soil movement. Construction personnel should avoid over-spraying the area to prevent runoff and muddy work surfaces. Contractors and site workers should plan their work to account for minimal soil movement and to adapt types and application of grading equipment.

This plan focuses on controlling the dispersion of contaminants by controlling dust from work areas and minimizing exposed waste. The primary tool to protect the public from exposure is continuous monitoring for visible dust. The action level for dust is "no visible dust" at the site boundary.

Please refer to Section 7.0 of this SSHASP for site action levels triggering occupational exposure monitoring for the identified COCs at the Site.

13.0 GENERAL COMMENTS AND LIMITATIONS

This document has been developed to inform contractors of the potential for encountering impacted soils, groundwater and soil vapor during redevelopment at the site and proper procedures to minimize impacts. The precautions are intended to reduce the potential for adverse health effects to personnel excavating and managing soil, groundwater, and soil vapor contamination properly at the site. Contractors engaged in activities at the project are responsible for conducting site activities in accordance with federal, state, and local environmental and safety regulations.

It is possible that site information exists beyond the scope of this SSHASP. In addition, events may occur after the preparation of this SSHASP, which may result in contamination of the site. It should not be assumed or inferred that any information presented will be accurate subsequent to the preparation of this document. Additional information that was not reviewed by Terracon prior to preparation of this document could result in a modification of the conclusions and recommendations presented herein.

Findings, conclusions, and recommendations resulting from these services are based on information derived from existing data; such information is subject to change over time. Certain indicators of the presence of hazardous substances, petroleum products, or other constituents may have been latent, inaccessible, unobservable, non-detectable, or not present during past investigations. Subsurface conditions may vary from those encountered at specific borings or wells or during other surveys, tests, assessments, investigations, or exploratory services. The data, interpretations, findings, and our recommendations are based solely upon readily available data and within the scope of these services.

14.0 REFERENCES

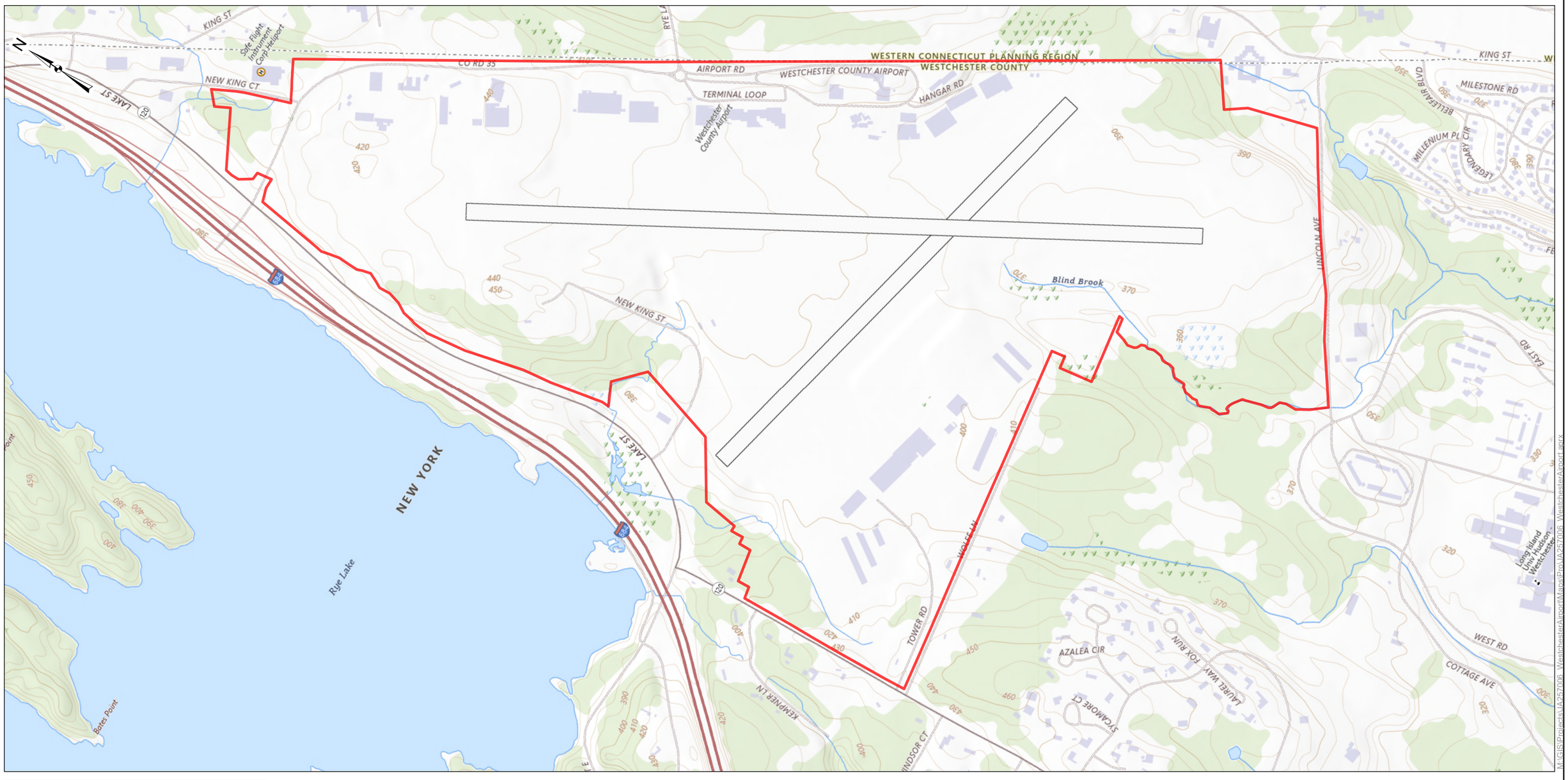
USDOE. Temporary Emergency Exposure Limits for Chemicals: Methods and Practice. DOE-HDBK-1046-2016. December 2016, Reaffirmed March 2022. https://www.standards.doe.gov/standards-documents/1000/1046-Bhdbk-2016/@@images/file

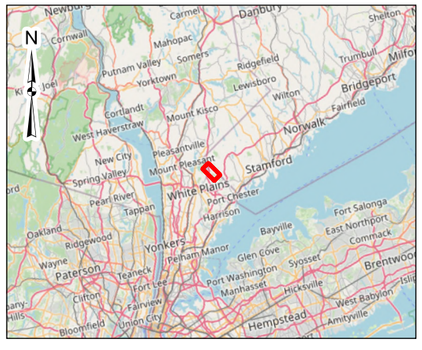
USEPA. (2024, February 8). *Listing of Specific PFAS as Hazardous Constituents*. Proposed rule. Vol.89, No. 27., Federal Register 8606-8621. https://www.federalregister.gov/documents/2024/02/08/2024-02324/listing-of-specific-pfas-as-hazardous-constituents

USEPA. (2024, April 26). PFAS National Primary Drinking Water Regulation (NPDWR): Final rule. Vol. 89. Federal Register 32532. https://www.federalregister.gov/documents/2024/04/26/2024-07773/pfas-national-primary-drinking-water-regulation

USEPA. (2024, May 8). Designation of Perfluorooctanoic Acid (PFOA) and Perfluorooctane sulfonic Acid (PFOS) as CERCLA Hazardous Substances. Final rule. Vol. 89, No. 90. Federal Register 39124. https://www.govinfo.gov/content/pkg/FR-2024-05-08/pdf/2024-08547.pdf

Appendix A - Exhibits





Legend

Airport Boundary

DATA SOURCES:
ESRI Basemaps
Westchester County GeoHub

Feet
0 500 1,000 2,000

Project No.:	JA257006
Date:	Feb 2025
Drawn By:	RS
Reviewed By:	

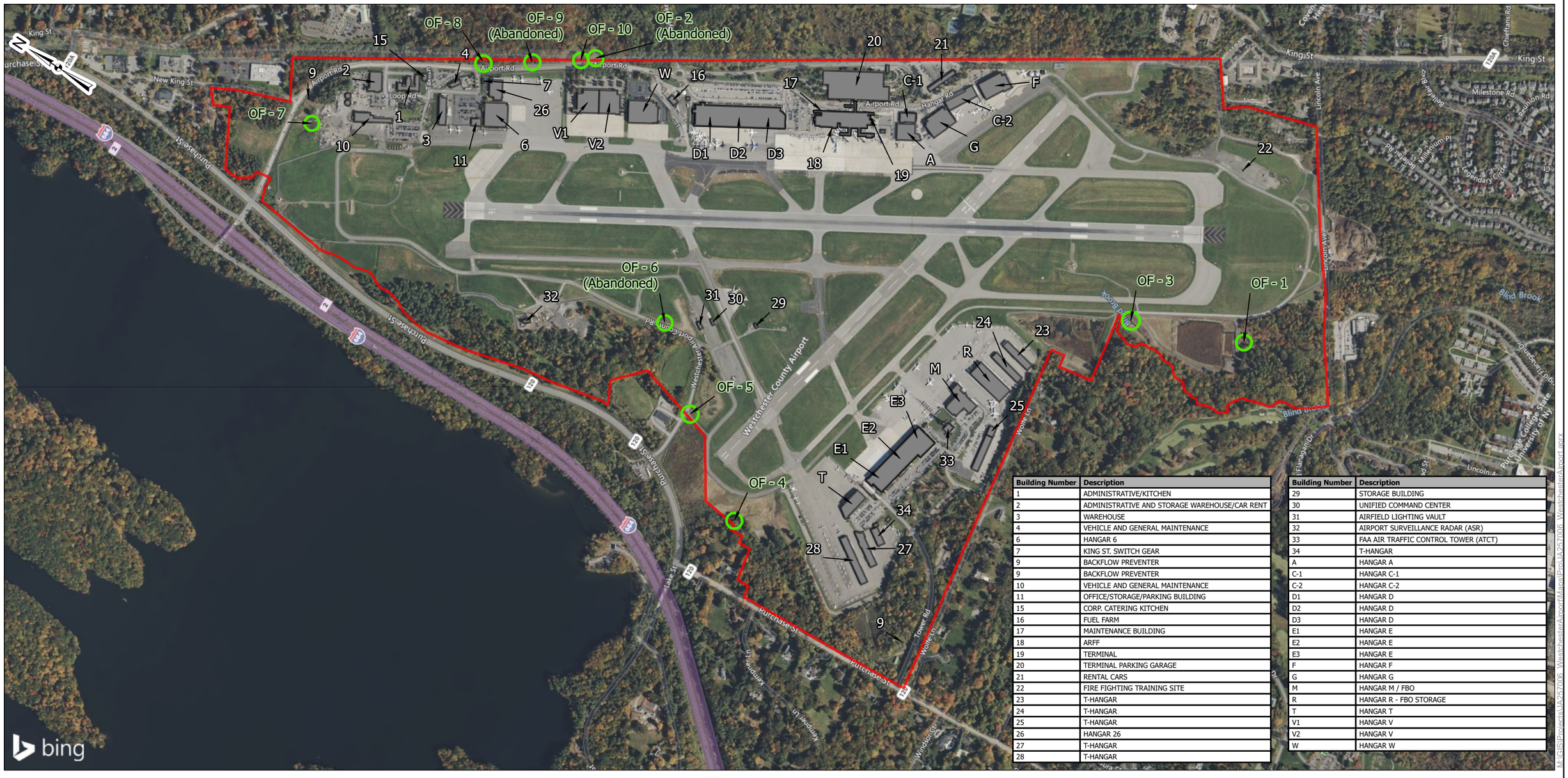
terracon
10841 S Ridgeview Rd
Olathe, KS
PH. 913-599-6886 terracon.com

Topographic Map

Westchester County Airport
West Harrison, New York

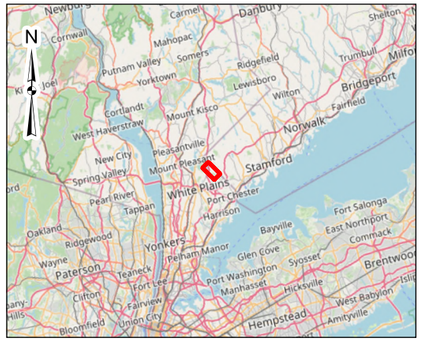
Figure

1



Building Number	Description
1	ADMINISTRATIVE/KITCHEN
2	ADMINISTRATIVE AND STORAGE WAREHOUSE/CAR RENT
3	WAREHOUSE
4	VEHICLE AND GENERAL MAINTENANCE
6	HANGAR 6
7	KING ST. SWITCH GEAR
9	BACKFLOW PREVENTER
9	BACKFLOW PREVENTER
10	VEHICLE AND GENERAL MAINTENANCE
11	OFFICE/STORAGE/PARKING BUILDING
15	CORP. CATERING KITCHEN
16	FUEL FARM
17	MAINTENANCE BUILDING
18	ARFF
19	TERMINAL
20	TERMINAL PARKING GARAGE
21	RENTAL CARS
22	FIRE FIGHTING TRAINING SITE
23	T-HANGAR
24	T-HANGAR
25	T-HANGAR
26	HANGAR 26
27	T-HANGAR
28	T-HANGAR

Building Number	Description
29	STORAGE BUILDING
30	UNIFIED COMMAND CENTER
31	AIRFIELD LIGHTING VAULT
32	AIRPORT SURVEILLANCE RADAR (ASR)
33	FAA AIR TRAFFIC CONTROL TOWER (ATCT)
34	T-HANGAR
A	HANGAR A
C-1	HANGAR C-1
C-2	HANGAR C-2
D1	HANGAR D
D2	HANGAR D
D3	HANGAR D
E1	HANGAR E
E2	HANGAR E
E3	HANGAR E
F	HANGAR F
G	HANGAR G
M	HANGAR M / FBO
R	HANGAR R - FBO STORAGE
T	HANGAR T
V1	HANGAR V
V2	HANGAR V
W	HANGAR W



Legend

- Airport Boundary
- Buildings
- SPDES Outfall

DATA SOURCES:
ESRI Basemaps
Westchester County GeoHub

Feet
0 500 1,000 2,000

Project No.:	JA257006
Date:	Feb 2025
Drawn By:	RS
Reviewed By:	

terracon
10841 S Ridgeview Rd
Olathe, KS
PH. 913-599-6886 terracon.com

Site Diagram

Westchester County Airport
West Harrison, New York

Figure

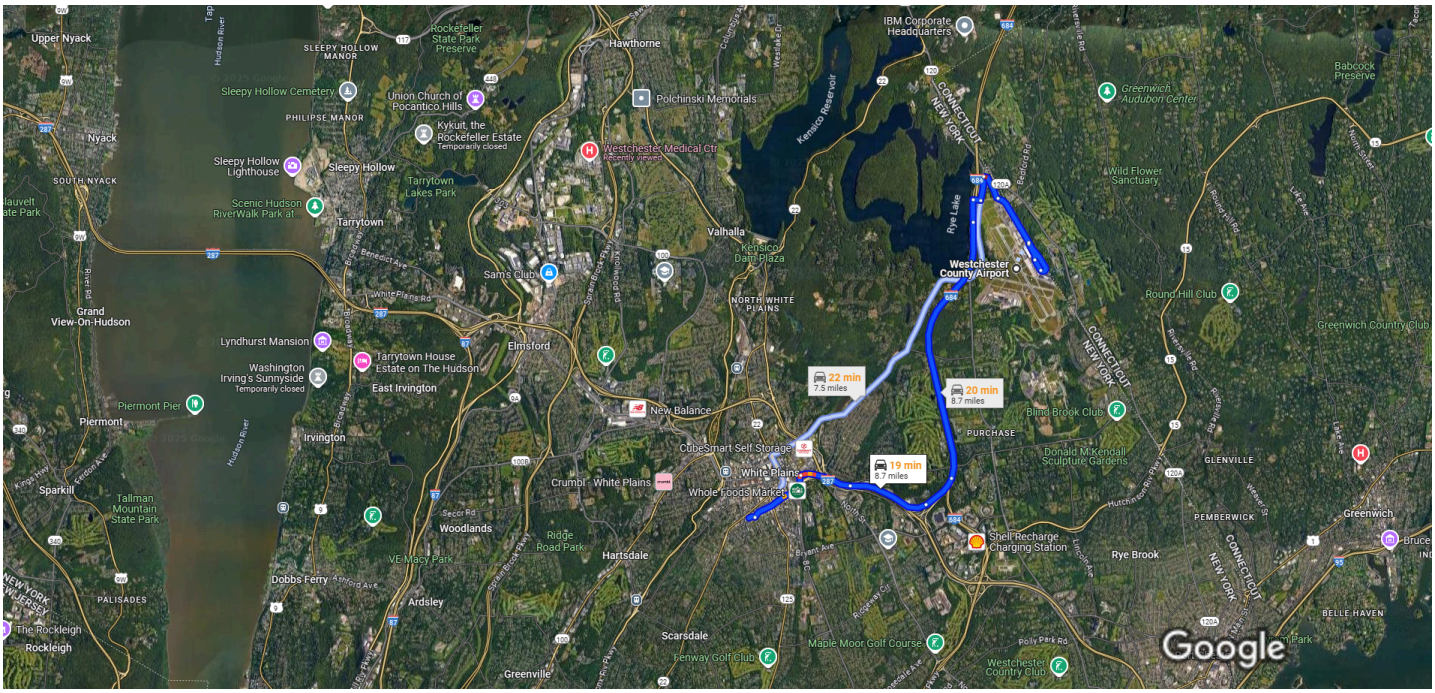
2

Appendix B - Emergency Route to Hospital

Google Maps

Westchester County Airport to White Plains Hospital

Drive 8.7 miles, 19 min



Imagery ©2025 Airbus, Landsat / Copernicus, Maxar Technologies, Map data ©2025 Google 1 mi

Westchester County Airport
240 Airport Rd, West Harrison, NY 10604

Take Airport Rd to NY-120 S in North Castle

5 min (1.8 mi)

1. Head south on Airport Rd

0.2 mi

2. Slight left

0.1 mi

3. Slight left onto Airport Rd

0.5 mi

4. At the traffic circle, continue straight to stay on Airport Rd

0.7 mi

5. Airport Rd turns slightly right and becomes New King St

0.3 mi

Take I-684 S and Westchester Ave to your destination in White Plains

12 min (6.8 mi)

6. Turn left onto NY-120 S

0.3 mi

7. Turn right onto Airport Rd

489 ft

8. Turn left onto the Interstate 684 S ramp to Interstate 287

0.3 mi

9. Merge onto I-684 S

3.3 mi

10. Use the right lane to take the exit toward White Plains

0.4 mi

11. Exit onto Westchester Ave

1.0 mi

12. Keep left to stay on Westchester Ave

0.6 mi

13. Use the 2nd from the left lane to turn left onto Bloomingdale Rd

0.2 mi

14. Turn right onto Maple Ave

0.6 mi

15. Turn right

Destination will be on the right

1 min (440 ft)

White Plains Hospital
41 E Post Rd, White Plains, NY 10601

APPENDIX C
Acknowledgement of Safety Instruction Form

ACKNOWLEDGMENT OF INSTRUCTION

I understand this project involves the excavation of soils potentially impacted by contaminants that have not been fully characterized. I have read this Health and Safety Plan and have received instructions for safe work practices, personal protective equipment, and air monitoring requirements. I further understand that if I encounter unanticipated contamination or site conditions, I am to leave the site and immediately notify the Project Manager and SSHO of the conditions observed.

PROJECT NAME:

LOCATION:

Name (Please Print)	**Signature**	**Date**

PERSONAL PROTECTIVE EQUIPMENT UTILIZED:

_____ **LEVEL D** _____ **LEVEL D MOD.** ____ **LEVEL C**

Safety briefing performed by: _____
Date:_____

APPENDIX D

TERRACON'S SAFE RIGHT PROCEDURES (SRPS) AND POLICIES

Terracon

Safe Right Procedure
Housekeeping

Task or Job:	Housekeeping	Document No:	SRP Gen 17
Analysis Conducted By:	Terracon Safety	Revision Mod:	0424

Task Requirements
Prerequisites – none
Personal Protective Equipment (PPE) – Hard Hat, Eye Protection, Safety Footwear, Gloves (Cut 3, Impact 1), HiVis Apparel (min Class II)
Job Specific Resources – none

Specific Job Steps	Potential Hazards	Tools and Equipment	Risk Assessment			Employees Required	Hazard Control
			Low	Med	High		
1. Walk the job through.	employees not focused on task		✔			all site	Start every job task with pre-task planning and update the plan when personnel or conditions change. (R2)
2. Designate storage areas for tools.	slips and trips, damaged or lost equipment		✔			all site	Return tools to storage area after use. (P4)
3. Roll up hoses or cords.	slips and trips			✔		all site	Ensure work area is free of trip hazards. (P4)
4. Clean spillage and scraps.	slips and trips, chemical, environmental	SDS		✔		all site	All spills and scraps must be cleaned immediately after detection. (P4) Reference applicable SDS. (P4)
5. Keep access/egress to/from work area clear.	slips and trips			✔		all site	Remove obstacles. (P4)
6. Isolate unsafe areas.	slips and trips	caution tape		✔		all site	Secure area if unable to render safe. (P4)
7. Obey chemical management rules.	chemical, environmental	SDS		✔		all site	Ref applicable SDS. (P4)
8. Remove protruding objects.	slips and trips			✔		all site	Remove protruding objects. (P4)
9. Chain gas cylinders. Ensure valve protection and proper separation.	explosion, fire, high pressure	chain, strap, bottle caps, SDS		✔		all site	Chain gas cylinders. (P4) Reference applicable SDS. (P4)
10. Clean, oil and inspect equipment after use. If damaged or in need of repair, tag tool “Out of Service” and secure it.	damaged or lost equipment	“Out of Service” tags		✔		all site	Inspect tools and equipment before, during and after use. If defective, repair, discard, or tag with "Do Not Use” and remove from service. Tell your supervisor. (R8)
11. Keep facilities clean.	slips and trips			✔		all site	Continuous good housekeeping requires effort from all workers. (P4)
12. Keep vehicle cabs neat and tidy.	vehicle control			✔		all site	

Notes
1. Policy documents, Safe Right Procedures, Quality Procedures, client / site specific safety plans and safety data sheets (SDS) provide additional guidance.
2. No changes to the procedures or hazard controls are permitted without the approval of a Terracon supervisor. Terracon requires Pre-Task Planning in order to prevent incidents and address site specific hazards.
3. ALL EMPLOYEES HAVE **STOP WORK** AUTHORITY. Stop work if you feel unsafe. Tell a supervisor and work together to fix the problem.
4. This document contains information concerning Terracon strategies, personnel and systems. We regard such information as confidential and request that it is not disclosed in whole or in part to any third party without first seeking our consent.

Task or Job:	Field Surveys in Remote Locations	**Document No:**	SRP GEN 30
Analysis Conducted By:	Terracon Safety	**Revision Mod Date:**	0425

Task Requirements
Prerequisites – completed TU Service Line curriculum, Supervisor approval
Personal Protective Equipment (PPE) – Eye Protection, Safety Footwear, Gloves (Cut 3), Hard Hat, Hi Vis Apparel (min Class II)
Job Specific Resources – insect repellant, sunscreen, snake chaps, cooling/hydration aids, communication devices

Specific Job Steps	Potential Hazards	Tools and Equipment	Risk Assessment			Employees Required	Hazard Control
			Low	Med	High		
*This SRP is applicable to any type of work being performed in remote locations including **but not limited to** environmental planning, wildlife observations, site assessments, wetlands delineations, archaeological studies, etc.*							
1. Pre-task planning at the office. • Evaluate staff training, medical conditions, and emergency procedures. • Confirm landowner / tenant notifications. • Verify site access points. • Confirm cellular service / communications. • Evaluate lone worker / subcontractor use. • Confirm work / rest regimen for heat stress prevention.	lack of adequate training or qualifications, improper vehicle type or use, site occupants not being aware of our presence in advance		✔			PM, APR, key field staff	When assigning personnel, follow Terracon-required safety training and get authorization before work starts. Plan for employee allergies and medical situations as remote field work can pose challenges for EMS access. (R3) Verify client has alerted all landowners of our planned presence at site. Reference Guidance Document for Landowner Encounters. Confirm property access point(s), availability of and locations of gates, whether crossing barbed wire or other fences will necessary, and other property access specific requirements. (R2) Consider ingress/egress to a project site and positioning of teams and vehicles for support in case an injury or illness is experienced. (R2) When assigning vehicles, consideration should be given to the existing or planned road layout and on-site conditions to ensure that the selected vehicles can operate within their design specifications and capabilities; the abilities and qualifications of the assigned drivers; and the design specifications and capabilities of the selected vehicles for load capacity and project expectations. (R2) Consider the hazards related to working in and on water during pre-task planning. If working on water, reference Gen39 SRP Working on Water.pdf (R2) Conduct a hazard analysis to evaluate the correct types of PPE to be used by staff as it relates to anticipated project work, work duration, site conditions, remoteness, weather, thorny/poisonous vegetation, wildlife, overhead hazards (e.g. tree branches and rocks) and other project-related considerations. (R6) Consider hunting seasons when scheduling remote field work and update PPE accordingly to include orange vests. (R2) Provide site crew with communications plan / equipment. (R2) Lone worker situations in remote locations are highly discouraged. Plan for field work using teams of two or more staff, which can include subcontractors. (P4)

Specific Job Steps	Potential Hazards	Tools and Equipment	Risk Assessment			Employees Required	Hazard Control
			Low	Med	High		
2. Pre-task planning at the site.	employees not focused on task, failure to recognize changing conditions and control associated hazards		✔			all site	Start every job task with pre-task planning and update the plan when personnel or conditions change. (R2) Inspect tools and equipment before, during and after use (R8) Follow Terracon-required safety training and get authorization before work starts. (R3) Warm-Up for work before physical activity. (P3)
3. Personal Protective Equipment • Evaluate and confirm all PPE expectations with crew. • Evaluate the need for snake boots or chaps based on risk.	personal injury from overhead tree limbs, breaking trails through brush, slips and falls, rough terrain, airborne debris	hard hat, gloves, safety glasses, safety footwear, high visibility apparel, hydration and cooling items		✔		all site	Based on injury history and risk, it is required that hard hats be carried on your person and worn during field surveys when site conditions present the risk of head injury. Such conditions include the presence of overhead hazards (e.g., tree limbs and branches) or conditions where slips, trips, or falls present a risk of head injury (e.g., working in streams with bedrock or rocky substrate, working in hilly or mountainous areas, working on or around steep creek banks). In the event such hazards are not expected to be present (e.g., open agricultural or vegetated field, marsh), hard hat use may not be necessary. A hard hat should still be carried on your person for unexpected site conditions. Using a Type 2 ventilated hard hat is approved when working in areas with uneven terrain where slips, trips, and falls, or events that could dislodge a standard hard hat could occur. (R6) Based on injury history and risk, it is Terracon's expectation that safety glasses be worn at all times. Clear, shaded, transitioning, UV protection, and polarized are all available to protect the eyes. (R6) Based on injury history and risk, it is Terracon's expectation that gloves be worn at all times. Gloves protect the hands in the events of slips and falls, or inadvertent contact with poisonous plants or animals. (R6) Foot protection may be adjusted with supervisor approval. If no dropped object hazards are present and the primary work is hiking, standard light-weight hiking boots may be substituted for heavier safety toed footwear. Work requiring hip-waders do not require safety toe protection. All safety footwear must have over the ankle support. If any dropped object hazards are present, safety toe protection must be in place during those activities. (R6)

Specific Job Steps	Potential Hazards	Tools and Equipment	Risk Assessment			Employees Required	Hazard Control
			Low	Med	High		
4. General Vehicle Operations Off-Road	uneven terrain, rollovers, encountering unstable roadway *Mechanical, Motion*	logoed Terracon vehicles		✔		all site	Wear your seat belt while vehicle is in motion and when parked adjacent to or on an active roadway. (R10) Ensure good housekeeping in vehicle cab. Secure loose items. (P1) For security, only Terracon vehicles with logos on door should be used. (R2) Turn on headlights, hazard flashers, strobes – see and be seen! Ensure all lights and windshields are cleared of dust and mud for increased visibility. (R7) Do not operate vehicle within 5' of open trenches or slopes. Maintain clearance from road shoulders. (P4) Check questionable terrain on foot, before travel with vehicle. (P1) Use caution on unsealed (gravel/dirt) roads. Avoid driving through large pools of water which could hide deep holes and ruts. (P4) Vehicles can enter a road from an unmarked road at any time. Carefully monitor blind corners. (P4)
5. Remote Field Survey Work.	plants, snakes / insects *Biological*	insect repellant, snake chaps		✔		all site	Snakes - do not reach into or under objects without using caution. Use caution when handling equipment that has rested on the ground. If snakes are encountered, do not attempt to handle or move them. Monitor the snake's whereabouts until it is away from the work site. Snake chaps must be used in areas where snakes are active. (P4) Insects - evaluate the need for treated clothing or repellants for mosquitoes and ticks. Personnel allergic to bee stings should notify supervision of the location of epinephrine medication. Watch for spiders when reaching into enclosed areas. (P4) Plants – evaluate the site for thorny plants (e.g., greenbrier or wild dewberries or blackberries) and poisonous plants (ivy, oak and sumac). Clear or flatten the site of vegetation as practical. Wear gloves and long sleeve shirts. Be aware that poisonous plant matter is an oil that can stay on clothing, tools or cut plants for long periods. (P4)
	Domestic and Wild Animals *Biological*			✔		all site	Types of animal hazard vary in specific regions of the country. Address animal risks local to the area in project specific pre-task planning. Terracon personnel must be aware of the potential for encountering wildlife such as deer, moose, elk on these project sites. Although less common mountain lions, bobcats, bears and feral hogs could also be encountered. Site workers should also be aware of domesticated animals like dogs and farm animals like cows, horses, or buffalo. (P4) Be aware of hunting season in the area. Pre-task planning must address worker safety in remote locations during any hunting season, including the use of orange high visibility apparel or safety vests. (P4) Drilling activities generate mechanical noises which will tend to drive off wildlife in the area. During quiet periods, making noise such as whistling, talking, breaking branches can help deter any wildlife in the area. (P4)

Specific Job Steps	Potential Hazards	Tools and Equipment	Risk Assessment			Employees Required	Hazard Control
			Low	Med	High		
6. Remote Field Survey Work.	Adverse Weather *Environmental*	cellular service		✔		all site	If weather conditions change during work and compromise the safety of the operation, the employees should find a safe location and stop work. Work shouldn't commence until deemed safe by the site supervisor. (P4) Reference SRP Gen22 Extreme Weather Considerations (R2) Lightning – stop work when lightning is visible or within 10 miles of the work area (P4). Rain / Floods – monitor work site, ground conditions and access for saturated soils. Evaluate whether work is occurring in or near a potential flood zone or low-lying area and move to higher elevation as appropriate. Never cross a flooded roadway (P4). Severe Storms (wind) – monitor work activities if they will be affected by high winds e.g., hoisting, work at height, working in forested areas where falling limbs or blowing debris present hazards) (P4). Use phone applications to set National Weather Service severe weather alerts (P4).
	unsafe situations (terroristic threats, confrontation with landowner)			✔		all site	In the event of any confrontation or challenge by a property owner or other 3rd party the crew should egress the site and notify the authorities, Terracon Project Manager and client representative. Reference Guidance Document for Landowner Encounters. (P2)
	Temperature Extremes	drinking water, sunscreen		✔		all site	Wear appropriate clothing for weather conditions (P4). Heat Stress - monitor for signs of heat stress / stroke (nausea, cramping, no sweat, skin hot to touch). Schedule work and break times as necessary and drink plenty of fluids. Avoid caffeine and alcohol; eat a balanced diet. If you are overheating, move to a cool location and hydrate with water. Consider the need for sunscreen or personal cooling devices (P4). Cold Stress - monitor for signs of cold stress such as reduced mental alertness, reduction in decision-making, severe shivering or loss of consciousness as temperature and wind speeds increase above 5mph and drop below 30° F. Employees may take warming breaks as necessary. (P4) Contact WorkCare 888.449.7787 if heat or cold stress is suspected (R14).

Notes
1. Policy documents, Safe Right Procedures, Quality Procedures, client / site specific safety plans and safety data sheets (SDS) provide additional guidance.
2. No changes to the procedures or hazard controls are permitted without the approval of a Terracon supervisor. Terracon requires Pre-Task Planning in order to prevent incidents and address site specific hazards.
3. ALL EMPLOYEES HAVE **STOP WORK** AUTHORITY. Stop work if you feel unsafe. Tell a supervisor and work together to fix the problem.
4. This document contains information concerning Terracon strategies, personnel and systems. We regard such information as confidential and request that it is not disclosed in whole or in part to any third party without first seeking our consent.

Biological: Poisonous Plants/Flowers

First Aid steps for spider bites: Call Workcare 888.449.7787. Wash exposure area with soap and water to cleanse the area. Take acetaminophen like aspirin or antihistamines (Benadryl) to relieve the minor signs. Monitor the area for any changes or if symptoms worsen within 24 hours. Seek medical attention when symptoms of allergic reaction manifest.

<table>
<tr>
<td> 
<u>Poison Ivy</u></td>
<td> 
<u>Poison Oak</u></td>
<td> 
<u>Poison Sumac</u></td>
<td> 
<u>Primrose</u></td>
</tr>
<tr>
<td colspan="3">These plants cause allergic contact dermatitis due to their sticky oil. You can get dermatitis by:

• Touching or brushing against any part of these plants, including the leaves, stems, flowers, berries, and roots, even if the plant is dead.
• Touching anything that has come in contact with these plants, such as clothing, personal protective equipment, tools, etc.

Symptoms: rashes, hives, mild and short-lived redness to swelling, blisters, fever, and/or headache. Call Workcare if you suspect you have contracted a poison plant dermatitis.

<u>Seek Medical Attention</u> <u>immediately if you have</u>: trouble breathing, widespread blister that ooze at a lot of fluid swelling of the face, mouth, neck, extremities and/or other body parts.

Prevention PPE: Wear long pants, long sleeves and closed toed shoes, vinyl or leather gloves, wash well or throw away anything that has contacted these plants.

Lastly DO NOT BURN THESE PLANTS. When they burn the oil attaches to the smoke particles, if inhaled this can hurt your lungs.</td>
<td>This plant causes a nondescript rash involving the hands, face, and neck. Characteristically the fingertips are affected as a result of picking off the dead flowers and leaves.
This is just an irritant, so there are no serious issues with contacting this plant.
Preventive measures for handling or working near this plant is to wear chemical resistant gloves.</td>
</tr>
</table>

		
Dog Fennel The leaves contain low levels of the toxin tremetol. The leaves are very thin. This plant also puts off a foul odor. Symptoms: Sensitization may occur, increase in sweating, diarrhea, and this could cause dermatitis Preventative measure are to wear long sleeve shirts, long pants, and gloves when handling or working near this plant.	**Cow Parsnip** This plant causes a non-allergic dermatitis. It is only poisonous if the plant sap which contains psoralen, is absorbed into the skin. Symptoms: It causes redness within 24 hours and blisters after that for several days; burning pain, which is short-lived and, reddish or brownish pigmentation to skin which is noticeable for months or years depending on exposure. If rash gets worse, a steroid cream may be prescribed. Preventative measure are to wear long sleeve shirts, long pants, and gloves when handling or working near this plant.	**Nettle** The plant is not toxic but the whole plant is covered with stinging hairs which can cause skin lesions. The hairs lining the plant contain tiny vesicles with irritant juice, which is formic acid, histamine, serotonin and acetylcholine. This poison can cause burning and itching. Side effects can be dermatitis, blisters, or vesicles. Preventative measure are to wear long sleeve shirts, long pants, and gloves when handling or working near this plant.

Biological: Snakes

Head Shape: Venomous snakes usually have a triangular or spade-shaped head. Be careful though, many non-venomous snakes, like water snakes flatten their head when threatened, this can confuse people to thinking that these snakes are venomous. Always were snake chaps when working in wetlands, or heavy forested areas.

If you are bit by a venomous snake CALL 9-1-1 IMMEIDATELY. DO NOT: CUT A BITE WOUND, ATTEMPT TO SUCK OUT VENOM, APPLY TOURNIQUET, ICE OR WATER, GIVE THE PERSON CAFFINATED DRINK OR ANY OTHER MEDICATIONS.

				
Copperhead These snakes are **venomous**. They have a coppery colored head, vertically oriented pupils and facial pits. Their back varies from copper-red to brown. Most have hour-glassed-shaped heads, chestnut-colored bands across the back. Dark spots between the bands are common. Babies tend to have a yellowish-greenish tail tip. The belly of the snake is normally pale brown. These snakes are most of the time 2ft in length, but can reach 4 ft. They first instinct of copperheads are to hide when approached. These are found in most areas of the US. These snakes are normally non-aggressive snakes. If you provoke them they will vibrate their tail and strike. The bite is painful but not life-threatening.	**Pigmy Rattlesnake** These snakes are **venomous**. These snakes are gray to grayish brown black, with dark oval-shaped spots along the back and sides. Sometimes these snakes can have a reddish stripe running down the center of their back. These snakes have a dark gray to black trip runs from their eyes to the jaw. They also have a skinny tail and a very small rattle, which sounds like the buzzing of an insect. The belly is light colored with dark blotches. Baby snakes look like adults but have a yellow tipped tail. They are normally 1.5 ft. in length. These snakes are found in wooded areas. Bite is not as dangerous as other snakes.	**Timber Rattlesnake** These snakes are **venomous**. These snakes are stocky and noted for their rattle tip. Their dorsal color can be gray, yellow, brown, or green and normally are patterned with dark crossbands or chevrons that run along the back. The belly is light in color with black dots. There are some snakes that are completely black. These snakes can be 2.5-3.5 ft. in length. These snakes are found in wooded areas**.** They remain motionless and only rattle when harassed.	**Western Cottonmouth** These snakes are **venomous**. These snakes are normally dark brown to black. In some snakes dark crossbands on the back overlay a brown background. Babies are lighter in color than the adults, normally have a yellow or green tail tip. These snakes can reach 3 ft. in total length. They are found in swamps, wetlands, lakes, and floodplains during warm months. These snakes are normally found in Mid-Western US. Crucial Information for Identification Difference between water snake and cottonmouths (commonly confused): Cottonmouths almost always swim with their heads sticking out of water, water snakes swim with their heads at the water surface. Cottonmouths always vibrate their tails when they are aggravated, water snakes never vibrate their tails. Lastly, Cottonmouths always have their mouth open when approached, aka known as “open-mouth”, most of the time water snakes do not do this.	**Water Snake** These snakes are **non-venomous**. These snakes are variable in color, pattern, and shape. The back is usually brown, gray or black with reddish brown to light brown spots or bands along the body. The snakes bely are cream-colored to yellow with half-moon spots on each belly scale. These snakes are generally 3-4 ft. in length. These snakes are found in most areas of the US. When threatened, these snakes will expand their jaw and flatten their head to make it look larger. They will strike and bite if captured.

				
Common Wormsnake These snakes are **non-venomous**. These snakes are small and slender and have a brown to grayish back with a light pink or white belly. The snakes have small heads that are pointed with tiny eyes and the end of their tails has as small harmless spine. These snakes generally range from 7 to 11 inches in length. These snakes are found in most areas of the US. These snakes do not try to bite when handled, although they will wriggle and release a pungent musk when disturbed. Additionally, they may try to poke you with their tail spine if disturbed.	**Eastern Black King Snake** These snakes are **non-venomous**. These snakes are moderate to stocky black snakes with yellowish spots on the head and back. Their bellies are a black and white checkered pattern. Their head is not distinct from their neck. Their scales are smooth and shiny. These snakes can get up to 4 feet length, but most are smaller. These snakes are found in most areas of the US. Snakes may vibrate their tails, release musk, and bite if handled or if felt in danger.	**North American Black Racer** These snakes are **non-venomous.** These snakes are long and slender with solid black to blue-gray back. Their bellies are also solid gray-black with a white patch on their hind and throat. They have a shiny appearance due to their unkeeled scales. Baby racers have gray to blue gray back mottled with dark grey, brown, or rust colored blotches down the center of their back. They are typically 3 feet long but can reach 6 feet in length. These snakes are found in most areas of the US. They usually respond to danger by rapidly fleeing, and when concerned they vibrate their tails and strike.	**Eastern Milksnake** These snakes are **non-venomous.** These snakes are normally light brown to gray, and they have black-edged, red to reddish-brown blotches down the back. They have a black and white checkered pattern on their belly. These snakes generally range around 2 to 2.5 ft. in length, but they can get larger than 3 ft. These snakes are found in most areas of the US. they will vibrate their tails, release musk, strike and bite if harassed.	**Common Gartersnake** These snakes are **non-venomous.** They are usually slender to moderately-stocky that vary in appearance. The back of most of the snakes are brown to black. Their distinguishing characteristic is 1 central and 2 lateral cream, yellowish or greenish stripes running the length of their bodies. Their bellies are usually pale yellow to greenish, often with black spots on the border of each belly scale. They also have a dark marking on the lip scales. These snakes are usually less than 2 ft. in length, though they can be longer than 40 inches. These snakes are found in most areas of the US. Most of these snakes don't bite you when threatened but they do release a pungent musk when handled. The larger snakes may attempt to bite.

Biological: Spiders

First Aid steps for spider bites: Call Workcare 888.449.7787. Identify what type of spider bit you. If you have killed it after it bit, you keep it and look at it. If unsure take the dead spider, call 9-1-1 or go to the nearest emergency room. Wash the bite area with soap and water to cleanse the bite area. Cold compress should be applied over the affected area. If the bite is on an extremity, try to elevate it. Take acetaminophen like aspirin or antihistamines (Benadryl) to relieve the minor signs. Monitor the bite for any changes or if symptoms worsen within 24 hours. Seek medical attention when symptoms of allergic reaction manifest.

				
Purseweb Spider These spiders are **non-venomous**. These spiders are medium-sized dark-colored spiders characterized by their oversized chelicerae**.** These spiders have a low stance and sprawling legs, but in addition to their larger chelicerae they are shiny black, 8 legs and 2 main body segments. They are about 1 ¼" long. They look similar to the wolf spider.	**Brown Recluse** These spiders are **venomous**. These spiders are tan, long legged spider with a dark pattern on the cephalothorax that resembles a violin or a fiddle. These spiders have 8 legs and 2 body parts. They are the size of ½" long. This spider can be confused with the Yellow Sac Spider, the difference is the yellow sac spider is lighter in color and lacks the fiddle-shaped marking. How do you know if you have been bitten by this spider? Mild stinging sensation and red mark on the area of the bite, painful swelling within the next 8 hours. More symptoms: Slight fever, rashes, nausea and restlessness.	**Cellar Spiders** These spiders are **non-venomous.** These spiders have long and skinny legs with small bodies. They are usually tan or gray in color. These spiders have 8 legs, 2 body parts, and fang-like mouthparts called chelicerae. These spiders are normally ¼" or less in size. These spiders are not known for biting people.	**American House Spider** These spiders are **non-venomous.** These spiders generally have 8 eyes, 2 body parts, and 8 legs. Generally, their abdomens are comparatively larger and more spherical than orb-weavers. These spiders very in color from black to brown. They normally have dark brown to black spots on their backs. They can get up to 1 cm in length.	**Black Widows** These spiders are **venomous.** They have shiny black bodies and bright red markings. Males have a more vibrant pattern on their abdomen than females, with many red and white spots. Male black widows are rare and are not know to bite humans. These spiders can be up to ½' in length. In the photos above, the male is in the upper photo, the female in the lower.

Biological: Stinging Insects

First Aid steps for stinging insects: Call Workcare 888.449.7787. Take the stingers out, by scraping the area with the edge of a credit card or a straight edge object to remove it. **DO NOT PINCH THE STIGER OR USE TWEEZERS, THAT CAN CAUSE MORE VENOM TO BE INJECTED INTO YOU.** Call 9-1-1 if you have trouble breathing, feelings of faintness or dizziness, hives, a swollen tongue, or history of severe allergic reaction to stings. Next, put ice on the area, to control swelling. Elevate your extremity if stung on the arm or leg. For pain, take over the counter medication, like acetaminophen and for itchiness take an antihistamine.

				
American Bumblee Bee These bees are black in color and have 1 to 3 striped of yellow that appear on the abdominal segments. They can be .39in to .91 in in length. These bees are not normally aggressive, sting when disturbed.	**Bald Faced Hornet** These hornets have a rather stout body and their markings are more white than yellow. They are mainly black from head, thorax, and abdomen and they have a pattern of white bands. They can be between 12 and 15mm in length. They are very aggressive, if disturbed or near their nest, they will sting repeatedly.	**Black and Yellow Mud Dauber** This stinging insect is black and yellow and they have a needle-thin waist, yellow and black legs, curvy antennae and they have a vibrant yellow throughout their body. This is a less aggressive bug. If disrupted but the stinger does not dis-attach from this bug. They can be 20mm to 25 mm in length.	**Blue Winged Wasp** This bug has blue-black wings and has an orange abdomen with yellow spots close to its waist. This bug is not considered aggressive but will sting you if it is disturbed. It can be 13mm to 25mm in length.	**Yellow Jackets** These stinging insects are yellow and black in color. They are extremely aggressive and will sting repeatedly their stinger as well stays attached. They can be 12mm to 16mm in length.

Task or Job:	Chemical Handling and Use	Document No:	SRP Gen46
Analysis Conducted By:	Terracon Safety	Revision Mod:	0724

Task Requirements
Prerequisites – TU Course Hazardous Communication Training, TU Course DOT Hazmat for shipping and receiving chemicals
Personal Protective Equipment (PPE) – Eye Protection (glasses and face shield), Safety Footwear, Gloves (Cut 3, Impact 1 + Chemical), Chemical Protective Coveralls, Hi Vis Shirt/Vest (min Class II)
Job Specific Resources – SDSs, Eye and Shower Stations

Specific Job Steps	Potential Hazards	Tools and Equipment	Risk Assessment			Employees Required	Hazard Control
			Low	Med	High		
1. Pre-Task Planning.	employees not focused on task unqualified Personnel	SDS	✔			all site	Start every job task with pre-task planning and update the plan when personnel or conditions change. (R2) Follow Terracon-required safety training and get authorization before receiving, shipping and handling chemicals. (R3) All Terracon employees who handle chemicals are trained, fit tested and medically certified for respirator use. (R3)
2. Chemicals (General)	Quality		✔			all site	Maintain inventory records for chemicals received, shipped, used and stored. Clean equipment immediately to prevent damage. Document weights, volume and quantities to ensure the quality of the work. Verify all chemical containers are labeled with the proper shipping name.
	chemical exposure (solid, liquid, vapor, gas, mist)	SDS, air purifying respirator			✔	employees handling chemicals	Ref applicable Safety Data Sheets required for all chemicals. Chemical resistant + cut 3 gloves, boots and aprons. Always evaluate exposure by reviewing manufacturer recommendations and SDS for selecting the correct PPE for use. Use an Air Purifying Respirator (APR) for handling muriatic acid. Only work in well-ventilated areas. Use fume hood with sufficient ventilation air flow for or any chemical with the potential for off gassing. Verify fume hood is vented away from work area. If the hood is vented outdoors, verify the venting tube condition and are constructed away from window or door openings. Ensure chemical resistant PPE is available. Ensure a clean water source for rinsing / flushing chemicals is on site. Wash slowly and carefully to reduce splashing and waste. Flush all equipment immediately after use. No Smoking, no open flame or oven use near storage and testing area.

Specific Job Steps	Potential Hazards	Tools and Equipment	Risk Assessment			Employees Required	Hazard Control
			Low	Med	High		
3. Chemicals (General, Continued)	chemical reactions	instruction sheets			✔	employees handling chemicals	Always mix acid into water supply to reduce reaction strength. Ensure proper labeling of all chemical containers (permanent and temporary). STOP WORK and contact your supervisor if there are ANY concerns. (P3) Keep covers on containers when not in use. Ensure proper mix to maintain quality and reduce waste.
	environmental releases	spill control and neutralization products		✔		employees handling chemicals	Adequate spill control and neutralization products near testing area. NEVER discharge chemicals directly into water sources such as sinks, drains, or sewer system–Consult your supervisor for disposal directions.
4. Chemical Use	fire, chemical burns, inhalation						Only use Terracon approved chemicals for laboratory testing of materials. Never use gasoline as a cleaning product for cleaning tools and equipment. Only trained and approved Terracon employees can handle and use chemicals. Only operate fume hoods if you are trained in operation and use. Never allow your head to enter the plane of the hood opening. Inspect gloves and other personal protective equipment before use. (R6)

Specific Job Steps	Potential Hazards	Tools and Equipment	Risk Assessment			Employees Required	Hazard Control
			Low	Med	High		
5. Chemical Storage	fire, pressure, combustion, gravity, chemical					all site	Store containers away from heat and sources of ignition. Store containers away from machinery and mobile equipment. (P4) Label all chemical containers with the full chemical name(s) of the contents and hazards. Return all chemicals to their assigned storage areas at the end of each workday. Properly label all waste containers. Never store incompatible chemicals together. Store liquids in unbreakable packaging located inside a form of secondary containment, such as a chemical storage cabinet. Never place cardboard inside of a flammable cabinet. Verify storage / cabinet is rated for weight of materials stored. All flammable cabinets must meet NFPA and must be vented with a self-closing door. Use a form of secondary containment when the primary container exceeds 55 gallons or when the total of multiple containers exceeds 100 gallons. Use Clear labeling and secure the secondary containment method to prevent unauthorized access. Not more than 120 gallons of Category 1, 2, 3 and 4 flammable liquids may be stored in a storage cabinet. Of this total, not more than 60 gallons may be of Category 1, 2 and 3 flammable liquids. No more than 25 gallons of flammable liquids shall be stored in a room outside of an approved storage cabinet. A constructed wooden storage cabinet must be approved by Terracon Safety. Fire extinguisher must be within 10’ of a flammable storage area. Portable tanks shall not be nearer than 20 feet from any building. Oxygen and Acet All used oil storage requires proper signage. Signs must be visible and indicate used oil and No Smoking. Oxygen cylinders in storage shall be separated from fuel-gas cylinders or combustible materials (especially oil or grease), a minimum distance of 20 feet (6.1 m) or by a noncombustible barrier at least 5 feet (1.5 m) high having a fire-resistance rating of at least one-half hour. Oxygen and Acetylene cylinders must have the required postings indicating “FLAMMABLES, OXYGEN, ACETYLENE, and EMPTY BOTTLES”.

Specific Job Steps	Potential Hazards	Tools and Equipment	Risk Assessment			Employees Required	Hazard Control
			Low	Med	High		
6. Chemicals (Shipping and Receiving)	damaged containers, lost articles, improper BOL					all site	Ref SRP LAB 01.002 Sample Handling, Receiving, Storage, and Disposal Terracon is not authorized to ship hazardous materials through Fed Ex, USPS or UPS. Confirm all employees who ship or receive chemicals have DOT HAZMAT training. Never accept or sign for a Hazmat package that was not expected or purchased by the office. Consult applicable regulations for hazardous materials before shipping. (R7) Lab staff packaging, shipping or receiving hazardous materials must have DOT Hazmat training (R3) Many samples arrive with broken glass or other sharp objects. Visually observe samples before handling and be alert for sharp objects. (R1, P6)
7. Housekeeping.	chemical exposure, use of damaged tool, slips and trips	"OUT OF SERVICE" tag		✔		all site	Inspect tools and equipment before, during and after use. If defective, repair, discard, or tag with "Do Not Use" and remove from service. Tell your supervisor. (R8) Ensure work area is free of trip hazards. Proper maintenance and repair of tools. Dispose of all trash and PPE as hazardous waste. Store chemicals in an approved container and in an designed area with required postings. Provide employees with wash basin and wipes for personal hygiene when exiting work area.

Notes
1. Policy documents, Safe Right Procedures, Quality Procedures, client / site specific safety plans and safety data sheets (SDS) provide additional guidance.
2. No changes to the procedures or hazard controls are permitted without the approval of a Terracon supervisor. Terracon requires Pre-Task Planning in order to prevent incidents and address site specific hazards.
3. ALL EMPLOYEES HAVE **STOP WORK** AUTHORITY. Stop work if you feel unsafe. Tell a supervisor and work together to fix the problem.
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Terracon

Safe Right Procedure
Extinguishing Fires

Task or Job:	**Extinguishing Fires**	**Document No:**	SRP ER 01
Analysis Conducted By:	Terracon Safety	**Revision Mod:**	0424

Task Requirements
Prerequisites – TU Portable Fire Extinguisher Safety
Personal Protective Equipment (PPE) – Eye Protection, Safety Footwear, Gloves (Cut 3, Impact 1), Hard Hat, Hi Vis Apparel (min Class II)
Job Specific Resources – incident report, fire extinguisher

Specific Job Steps	Potential Hazards	Tools and Equipment	Risk Assessment			Employees Required	Hazard Control
			Low	Med	High		
1. Immediately stop work and shut down nearby equipment.			✔			all site	
2. Notify all personnel in the area. Designate one person to summon help and sound alarms.		phone, radio	✔			all site	Alert all site personnel of incident using established site procedures. Send for professional assistance as soon as possible to reduce loss.
3. If situation puts employees at risk, follow site evacuation procedures.	personal injury		✔			all site	**Employees should only attempt to fight fire if they can do so without putting themselves at risk of injury.**
4. If situation allows employees to fight fire without putting themselves at risk, select the appropriate fire extinguisher.	fire	fire extinguisher	✔			1	
5. Release safety and test the extinguisher.	equipment non-operational		✔			1	A very short test of extinguisher to ensure operation.
6. Approach the fire from an upwind direction. Ensure a smoke free escape is available.	smoke inhalation				✔	1	Use upwind approach.
7. Activate fire extinguisher and direct towards base of fire. Sweep extinguisher stream back and forth horizontally at base of fire.					✔	1	
8. Continue until fire is out or extinguisher is spent.	fire				✔	1	Evacuate area if extinguisher content cannot handle the size of the fire.
9. Monitor the scene to ensure the fire is contained.	flare-up	fire extinguisher		✔		all site	Monitor the area until help arrives to ensure fire does not flare-up.

Specific Job Steps	Potential Hazards	Tools and Equipment	Risk Assessment			Employees Required	Hazard Control
			Low	Med	High		
10. Barricade area until hazards are eliminated and investigation is complete.	injury to bystanders	barricades, tape		✔		all site	Delineate area with CAUTION tape and post guard to prevent unauthorized entry.
11. House keeping	slips and trips			✔		all site	Inspect tools and equipment before, during and after use. If defective, repair, discard, or tag with "Do Not Use" and remove from service. Tell your supervisor. (R8)
12. Complete incident report form and submit to management. Notify client representative.		incident report	✔			1	Prevention of future incidents.

Notes
1. Plans & procedures as well as standards, codes and safety data sheets (SDS) may all provide additional information and guidance.
2. No changes to the work processes are permitted without the approval of a Terracon supervisor and Terracon Safety. Site specific hazard modifications may be added in the table below. Terracon encourages employees to make field modifications in order to prevent incidents and keep the workplace free of hazards.
3. ALL EMPLOYEES HAVE **STOP WORK** AUTHORITY. Stop work if you feel unsafe. Tell a supervisor and work together to fix the problem.
4. This document contains information concerning Terracon strategies, personnel and systems. We regard such information as confidential and request that it is not disclosed in whole or in part to any third party without first seeking our consent.

Task or Job:	Hearing Protection	Document No:	SRP PPE 06	Analysis Conducted By:	Terracon Safety	Revision Mod:	0122

Terracon Core Rule R6 states employees must, *"Wear PPE as required by project, task, and/or work environment. Inspect before and during use, repairing or discarding and replacing, if defective."* With respect to hearing protection, there are many different types of ear plugs and you don't want to use the wrong one for your job task. Traditional 'ear plugs' are not always the right choice for hearing protection. Pre-task planning, task specific safe right procedures and this guide should help identify what type of hearing protection is appropriate for your task.

Hearing protection used in Terracon operations is required to meet the requirements of the American National Standards Inc. (ANSI) standard and the Acoustical Society of America standard ANSI/ASA S12.68-2007. This standard specifies three methods, in ascending order of complexity of use and potential accuracy, for the estimation of the sound pressure levels that are effective when a hearing protector is worn. The ANSI/ASA will be marked on all hearing protection packages as an NRR (Noise Reduction Rating) that identifies the noise level protection the selected hearing protection provides.

					
Foam Ear Plugs These ear plugs are designed specifically for protecting the ear from continuous exposure to loud noises.	**Wax Balls** These completely seal off the ear canal so you get the sensation of being closed off from the outside world.	**Ear Muffs** The earmuffs cover the ear completely, giving full hearing protection.	**Silicon Plugs** It only covers the auditory canal with these earplugs, you may not insert them into your ear	**Universal Ear Plugs** These completely seal off the auditory canal, but the layer system prevents a sense of being shut off from the outside world. The filter system enables users to determine the muffling themselves	**PVC Ear Plugs** These ear plugs are stiffer, but then they soften from body heat resulting in long term comfort.
Most ear plugs have the option to either have cords or to be cordless. Do not wash your ear plugs unless the ear plugs are reusable. Most of the time ear plugs are disposable - single use only. Remember to properly insert your ear plugs in. If your using the single use foam ear plugs, roll the ear piece into a thin snake shape then lift open your ear with one hand and place the ear piece into your ear and hold it for 15 seconds as you feel the ear piece expand and fill the ear canal. After it expands you can let it go. For the Silicon Plugs you place the ear piece in your ear until it fits snugly.					

Notes
1. Policy documents, Safe Right Procedures, Quality Procedures, client / site specific safety plans and safety data sheets (SDS) provide additional guidance.
2. No changes to the procedures or hazard controls are permitted without the approval of a Terracon supervisor. Terracon requires Pre-Task Planning in order to prevent incidents and address site specific hazards.
3. ALL EMPLOYEES HAVE **STOP WORK** AUTHORITY. Stop work if you feel unsafe. Tell a supervisor and work together to fix the problem.
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Terracon

Safe Right Procedure
Night Work

Task or Job:	Night Work	Document No:	SRP Gen 20
Analysis Conducted By:	Terracon Safety	Revision Mod:	0424

Task Requirements
Prerequisites – Supervisor approval
Personal Protective Equipment (PPE) – Hard Hat, Eye Protection, Safety Footwear, Gloves (General Purpose), HiVis Apparel (min Class III)
Job Specific Resources – lighting, light meter, flashlights, vehicle strobes, cap mounted head lamp, glow sticks

Job Steps	Potential Hazards	Tools and Equipment	Risk Assessment			Employees Required	Hazard Control
			Low	Med	High		
1. Pre-task planning at the office.	training, qualification		✔			1	When assigning personnel, Follow Terracon-required safety training and get authorization before work starts. (R2) Many clients have rules regarding light colors, PPE usage and reflective striping requirements. Consult with your client before implementing any of these general precautions. (R2)
2. Pre-task planning at the site.	employees not focused on task			✔		all site	Clearly communicate your work to site foremen and other personnel in work area. Make sure there are no conflicts with operations. (R2)
3. Ensure all work area lighting is adequate.	slips, trips and falls. uneven or unstable ground for equipment poor visibility	light plant (or equivalent), flashlights, light meter			✔	all site	Lighting of minimum of 5 foot candles. (R7) Flashlights or lanterns available for site use. (P4)
4. Moving equipment.	moving equipment (site and 3rd party),	high visibility vests, vehicle strobes		✔		all site	High visibility clothing on all employees. (R6) Spotter use flashlights with traffic wands on vehicle movements. (P4) Ensure all vehicle lights are operational and clean. (P1)
5. Work operations.	poor visibility and communication	hi vis gloves		✔		all site	Use the “buddy system” for all tasks. (P4) Hi Vis gloves to monitor hand positions. (R6)
6. Other general considerations.	see and be seen	see hazard control column & Job Specific Resource box above right		✔		all site	Reflective tape on hard hats. (P4) Hard hat cap lights. (P4) ‘Glow’ sticks on personnel. (P4)
7. Housekeeping. Clean and inspect tool after use.	use of damaged tool, slips and trips	“OUT OF SERVICE” tag		✔		all site	Return tools to storage area after use. (P4) Ensure work area is free of trip hazards. (P4) Inspect tools and equipment before, during and after use. If defective, repair, discard, or tag with "Do Not Use” and remove from service. Tell your supervisor. (R8)

Notes
1. Policy documents, Safe Right Procedures, Quality Procedures, client / site specific safety plans and safety data sheets (SDS) provide additional guidance.
2. No changes to the procedures or hazard controls are permitted without the approval of a Terracon supervisor. Terracon requires Pre-Task Planning in order to prevent incidents and address site specific hazards.
3. ALL EMPLOYEES HAVE **STOP WORK** AUTHORITY. Stop work if you feel unsafe. Tell a supervisor and work together to fix the problem.
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Extreme Weather Considerations

Task or Job:	Extreme Weather Considerations	Document No:	SRP Gen 22
Analysis Conducted By:	Terracon Safety	Revision Mod:	0125

Task Requirements
Prerequisites – none
Personal Protective Equipment (PPE) – Hard Hat, Eye Protection, Safety Footwear, Gloves (General Purpose Insulated/Non Insulated), HiVis Apparel (min Class II), Ice Cleats
Job Specific Resources – weather app

Specific Job Steps	Potential Hazards	Tools and Equipment	Risk Assessment			Employees Required	Hazard Control
			Low	Med	High		
PLEASE NOTE: This SRP is a guide that establishes the general operational and shut down requirements for Terracon operations in severe weather. Every site and situation is different and may require a more stringent shut down limit. Only the onsite crew can evaluate conditions and shut down work if necessary. When there is a question – STOP WORK, contact your supervisor and err on the side of caution. Clients may have different shut down requirements. When there is a conflict, the more stringent rule will apply.							
1. Walk the job through.	employees not focused on task		✔			all site	Start every job task with pre-task planning and update the plan when personnel or conditions change. (R2)
2. Monitoring the weather.	changing conditions	cell, internet		✔		all site	If there is a question of extreme weather, monitor the local conditions by gaining internet access and logging on www.theweatherchannel.com WeatherBug App or other approved weather monitoring application. If there is no site access, contact your supervisor or client representative and ask that they monitor the local conditions. (P4)
3. Shut down levels - visibility	fog, heavy rain, snow				✔	all site	If trench, fall or overhead hazards are present i.e., cranes, concrete pump booms, drill rig masts and the crew cannot see the hazard or maintain contact of all crew members on site, shut down is required. (P4)
4. Shut down levels – temperature extremes	heat, cold	heat – water, ice cold – warming station			✔	all site	Heat – there is no maximum work temperature. Reference heat stress policies for monitoring and PPE requirements. (P6) Cold – temperatures below -20° F require shut down due to the potential of steel becoming brittle, freezing fluids and the immediate freezing of exposed skin. (P4)
5. Shut down levels – high winds	blowing debris, control of suspended loads	goggles / spoggles			✔	all site	Crew should consider the use of goggles / spoggles when the wind generates a tremendous amount of blowing debris. (P4) Tornado / Hurricane Warnings require immediate shut down and crew egress to safe location. (P4) General Operations - sustained winds of greater than 25 mph and / or gusts or 50 mph require immediate site shut down and evaluation by a supervisor to proceed. (P4) Hoisting Operations (cranes) - sustained winds of greater than 20 mph and / or gusts or 30 mph require immediate site shut down. (P4)

Specific Job Steps	Potential Hazards	Tools and Equipment	Risk Assessment			Employees Required	Hazard Control
			Low	Med	High		
PLEASE NOTE: This SRP is a guide that establishes the general operational and shut down requirements for Terracon operations. Every site and situation is different and may require a more stringent shut down limit. Only the onsite crew can evaluate conditions and shut down work if necessary. When there is a question – STOP WORK, contact your supervisor and err on the side of caution. Clients may have different shut down requirements. When there is a conflict, the more stringent rule will apply.							
6. Shut down levels - lightning	electrocution				✔	all site	Visible lightning requires immediate shutdown. Work may not resume until the area is lightning free for 30 minutes. (P4) If the crew can hear thunder, extreme caution should be taken in continuing operations. (P4)
7. Shut down levels - ice	mast failure, dropping ice				✔	all site	Ice build-up of greater than 1/8 inch on overhead equipment requires immediate shut down. (P4) Wear ice cleats in icy conditions. (P4)
8. The following weather conditions require careful evaluation, but not necessarily shut down: Heavy Rains	flash floods, unstable ground, site access				✔	all site	Continuous monitoring of changing conditions. (P4) Never attempt to drive across flooded roads. (P4)
9. The following weather conditions require careful evaluation, but not necessarily shut down: Snow storms / blizzards	site access, driving conditions, slips and trips	tire chains, ice melt, ice cleats			✔	all site	Continuous monitoring of changing conditions. (P4) Be aware of areas left untreated. Always wear ice cleats. (R6) Always take short steps, shuffle your feet, point toes slightly outward, balance with your arms and look down. (P1) Avoid carrying materials. Always use a Terracart or work vehicle to move tooling or materials. (P4)
10. In the event the site shut down is required, the crew should secure the site and equipment to the best of their ability, then take shelter or egress site based on weather conditions.	unsecured equipment				✔	all site	Secure the site and take shelter or egress site based on local conditions. (P4)
11. Housekeeping. Clean, inspect and return tools to storage area after use.	use of damaged tool, slips and trips	"OUT OF SERVICE" tag		✔		all site	Ensure work area is free of trip hazards. (P4) Inspect tools and equipment before, during and after use. If defective, repair, discard, or tag with "Do Not Use" and remove from service. Tell your supervisor. (R8)

Notes
1. Policy documents, Safe Right Procedures, Quality Procedures, client / site specific safety plans and safety data sheets (SDS) provide additional guidance.
2. No changes to the procedures or hazard controls are permitted without the approval of a Terracon supervisor. Terracon requires Pre-Task Planning in order to prevent incidents and address site specific hazards.
3. ALL EMPLOYEES HAVE **STOP WORK** AUTHORITY. Stop work if you feel unsafe. Tell a supervisor and work together to fix the problem.
4. This document contains information concerning Terracon strategies, personnel and systems. We regard such information as confidential and request that it is not disclosed in whole or in part to any third party without first seeking our consent.

Working Around Active Construction Sites

Task or Job:	Working Around Active Construction Sites	Document No:	SRP GEN 42
Analysis Conducted By:	Terracon Safety	Revision Mod Date:	0424

Task Requirements
Prerequisites – completed TU Service Line curriculum
Personal Protective Equipment (PPE) – Eye Protection, Safety Footwear, Gloves (Cut 3, Impact 1), Hard Hat, Hi Vis Apparel (min Class II)
Job Specific Resources – none

Specific Job Steps	Potential Hazards	Tools and Equipment	Risk Assessment			Employees Required	Hazard Control
			Low	Med	High		
1. Pre-task planning at the office.	Training, Qualification, Proper Vehicle		✔			1	When assigning personnel, Follow Terracon-required safety training and get authorization before work starts. (R3) When assigning vehicles, consideration should be given to the existing or planned road layout and conditions on site to ensure that the selected vehicles can operate within their design specifications and capabilities; the abilities and qualifications of the assigned drivers; and the design specifications and capabilities of the selected vehicles for load capacity and project expectations (R2).
2. Once on site, check in with the site contact to prepare for work.	struck by equipment *Motion*			✔		1	Clearly communicate daily operations to site foremen and other personnel in work area. Make sure there are no conflicts with operations. (R2) If possible, ask the site contact to stop all work in the areas you are accessing. (P4)
3. Pre-task planning at the site.	employees not focused on task		✔			all site	Start every job task with pre-task planning and update the plan when personnel or conditions change. (R2) Follow Terracon-required safety training and get authorization before work starts. (R3) Warm-Up for work before physical activity. (P3)
4. General Vehicle Operations on Construction Sites	uneven terrain, rollovers, encountering unstable roadway *Mechanical, Motion*			✔		1	Wear your seat belt while vehicle is in motion and when parked adjacent to or on an active roadway. (R10) Ensure good housekeeping in vehicle cab. Secure loose items. (P1) Turn on headlights, hazard flashers, strobes – see and be seen! Ensure all lights and windshields are cleared of dust and mud for increased visibility. (R7) Do not operate vehicle within 5' of open trenches or slopes. Maintain clearance from road shoulders. (P4) Check questionable terrain on foot, before travel with vehicle. (P1) Use caution on unsealed (gravel/dirt) roads. Avoid driving through large pools of water which could hide deep holes and ruts. (P4) Heavy equipment can enter a road from an unmarked road at any time. Carefully monitor blind corners. (P4)

Specific Job Steps	Potential Hazards	Tools and Equipment	Risk Assessment			Employees Required	Hazard Control
			Low	Med	High		
5. Sharing Roadway On-Site with Heavy Equipment	being struck by large equipment *Mechanical, Motion*			✔		1	Get operator's attention, make yourself noticed, make eye contact with operator, and communicate with hand gestures. (P4) Does the site have 2-way radio communication available? Borrow a radio if available. (P4) Large equipment always gets the right of way. Never attempt to cut in front of a piece of heavy equipment. (P4) Loaded heavy equipment operators may drive in reverse when descending hills causing an increased in blind spot. (P4)
6. Parking On-Site with Operating Heavy Equipment	heavy equipment being involved in an accident with you *Mechanical, Motion*	parking cone		✔		1	Never park in the right of ways. Park only in areas where equipment is not traveling. (P4) Operate and park vehicle to prevent the need for backing as a first move. If you *must* back use a spotter. If working alone, use Terracon-approved self-spotting techniques. (R11) Never park behind heavy machinery, avoid blind spots, park only in safe, designated parking areas, and walk to work area. (P4) Perform a 360° walkaround as your final action before moving any motor vehicle. Use a safety awareness cone or steering wheel cover when parked on Terracon business. (R12)
7. Performing Work (Pedestrian) While Heavy Equipment is Active	being struck or injured by equipment *Mechanical, Motion*			✔		1	Avoid having your back to traffic or heavy equipment. Position yourself where you can be seen e.g. operators cab side, front side. Do not work directly behind equipment. Practice good situational awareness. (P4) Get operator's attention, make eye contact with operator, and communicate with hand gestures. Remember that if you cannot see the equipment operator, the equipment operator cannot see you. (P4) If possible, ask for equipment to stop operation while heavy machinery is near your work/test area. (R2 / P4) Monitor back-up alarms or nearby equipment. Always track and keep clear of equipment moving in work areas. (R9) See and be seen. Always wear min Class II HiVis. (R6)

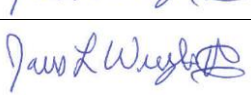
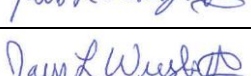
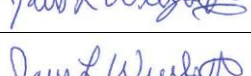
Specific Job Steps	Potential Hazards	Tools and Equipment	Risk Assessment			Employees Required	Hazard Control
			Low	Med	High		
8. Performing Work (Pedestrian) While Heavy Equipment is Active (continued)	being struck or injured by equipment *Mechanical, Motion*			✔		1	Avoid having your back to traffic or heavy equipment. Position yourself where you can be seen e.g. operators cab side, front side. Do not work directly behind equipment. Practice good situational awareness. Monitor back-up alarms or nearby equipment. (R9) In high traffic areas delineate work and parking areas using cones and tape. When possible, position support equipment between the traffic and the work area. While moving equipment, control traffic while maneuvering to the site. (R12 / P4) If night work or low light work is anticipated, carry a flashlight or glow stick for additional visibility. For extended periods in one area consider traffic control flashers and warning signs. (P4) Employees must not be distracted by mobile devices or other equipment. If your task requires the use of a mobile device, equipment, camera or even note taking, find a safe place to perform your task and stand still. Don't walk and use a device. (R2)
9. Adverse Weather	injury, equipment damage, *Motion*			✔		1	Be aware that heavy equipment can lose traction and stability during changing weather conditions e.g. snow, ice, rain. Give extra clearance in extreme weather conditions. (R2) Ensure your vehicle has the capability to handle the weather conditions. Be aware the stopping distances are increased and visibility decreased. (R2)

Notes
1. Work Procedures, Quality Procedures, client / site specific safety plans, and safety data sheets (SDS) may provide additional safety guidance.
2. No changes to the job steps or hazard controls are permitted without the approval of a Terracon supervisor. Start every job task with pre-task planning and update the plan when personnel or conditions change.
3. ALL EMPLOYEES HAVE **STOP WORK** AUTHORITY. Stop work if you feel unsafe. Tell a supervisor and work together to fix the problem.
4. This document is specific to Terracon safety processes and systems. We regard such information as confidential and request it not be distributed to any third party without first seeking our consent.

CONFINED SPACE OPERATIONS POLICY

Quality Control

Document Owner	Position	Signature

Change	Page	Mod.	Authorization		
			Name	Signature	Date
original	*all*	*0316*	*J. Wright*		*03-16*
review	*all*	*0318*	*J. Wright*		*03-18*
Subcontractor exclusion removed	*8*	*0918*	*J. Wright*		*03-18*
Subcontractor exclusion removed	*all*	*0120*	*J. Wright*		*01-20*
2021 Core R&P	*all*	*0121*	*J. Wright*		*01-21*
review-logo	*all*	*0122*	*J. Wright*		*01-22*

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Attachments

Confined Space Entry Permit

1.0 Scope

Terracon policy documents meet the needs of employees, clients, and OSHA by laying out safe work expectations; itemizing tools, resources, and methods to be used to meet them; and clarifying accountabilities associated with failure to do so.

All contractors and subcontractors engaged by Terracon must to comply with the requirements of this policy (at a minimum).

Clients may have their own policies, procedures, and forms. Where it is a requirement that client procedures and forms are used, it will be in addition to those required by this policy. This is a minimum standard which may be raised but never lowered by client policy.

Note that though policies often include crucial technical content, they *may not* replace required training.

2.0 Policy

This policy is intended to reduce the likelihood of incident or injury as a result of work in and around confined spaces. It aligns with Terracon's Safety Rules, *Our Rules To Live By*. Specific to confined space operations, the following Rules and Practices apply:

R2: Start every job task with pre-task planning and update the plan when personnel or conditions change.

R3: Follow Terracon-required safety training and get authorization before work starts.

R5: Speak up right away and redirect a co-worker performing an unsafe act to safe work practices.

R6: Wear PPE as required by project, task, and/or work environment. Inspect before and during use, repairing or discarding and replacing, if defective.

R7: Use Terracon-approved tools and equipment according to manufacturer's instructions, and never modify or override safety devices.

R8: Inspect tools and equipment before and during use. If defective, repair, discard, or tag with "Do Not Use" and remove from service. Tell a supervisor.

R14: Call WorkCare if injured and tell a supervisor right away.

P1: Take the time you need to do the job safely.

P3: Stop work if you feel unsafe. Tell a supervisor and work together to fix the problem.

P4: Manage controllable hazards and unsafe conditions in your work area. Report hazards you cannot control to a supervisor.

3.0 Definitions

Attendant - employee stationed outside the permit space who is trained in confined space procedures. Duties include:

- Understanding hazards that may be faced during entry,
- Being familiar with signs, symptoms, and consequences of exposure,
- Identifying authorized entrants and maintaining accurate count of authorized entrants in the permit space,

- Preventing unauthorized entrants from entering and informing authorized entrants and the entry supervisor if unauthorized persons do enter the permit space,
- Continuously assessing the safety of the space based on activities and conditions inside and outside,
- Communicating with authorized entrants to assess status and immediately alert them of any need to evacuate the space,
- Remaining outside the permit space until relieved by another attendant and declining assignment of other duties that might interfere with the attendant's ability to protect the authorized entrants,
- Ordering the authorized entrants to evacuate the permit space immediately if conditions warrant from inside or outside the entry space, performing non-entry rescues as specified by the employer's rescue procedure, and
- Summoning rescue and other emergency services as soon as the attendant determines that authorized entrants may need additional assistance to escape from permit space hazards.

Authorized Entrant - employee authorized to enter and perform work in a permit-required confined space. Duties include:

- Understanding hazards that may be faced during entry,
- Being familiar with signs, symptoms, and consequences of exposure
- Proper use of required equipment and attendant communication, and
- Immediate exit of the space when required.

Blanking or Blinding - absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

Competent Person - OSHA defines a competent person as, “one who can identify existing and future hazards in the work area and has the authority to take immediate actions to eliminate those hazards.” Terracon adds to that definition that the employee is approved to plan and organize work in an IIF manner, train employees and operate equipment as defined by specific policies. Example: A Competent Person may set up and operate a suspended scaffold.

Confined Space - any space:

- Large enough and configured that an employee can bodily enter and perform work,
- With limited or restricted means for entry or exit (i.e., tanks, vessels, bins, silos), and
- Not designed for continuous employee occupancy.

Controlling Contractor - company taking the lead on a confined space operation. Terracon is the controlling contractor for any work done by Terracon personnel in a permit-required confined space.

Double block and bleed - closure of a pipe, line, or duct by locking and tagging a drain or vent which is open to the atmosphere in the line between two locked-closed valves.

Emergency - any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit space that could endanger entrants.

Engulfment - surrounding and effective capture of a person by a liquid or fine particles of a solid that could cause harm by being aspirated or could exert enough force on the body to cause harm by strangulation, constriction, or crushing.

Entry - act of passing through an opening into a permit-required confined space. A person has *entered* a confined space as soon as any part of their face breaks the plane of an opening into the space.

Entry Period – duration of time for which entry is authorized in a *permit-required confined space*.

(Entry) Permit - written document provided by the *controlling contractor* to authorize entry into a permit space. Terracon's Confined Space Entry Permit may be found at the end of this document.

Entry Supervisor - employee responsible for determining if conditions are acceptable for a planned entry to a permit space, authorizing entry and overseeing entry operations, and terminating entry as required by this policy. Duties also include:

- Understanding hazards that may be faced during entry
- Being familiar with signs, symptoms, and consequences of exposure,
- Verifying appropriate entries have been made on the permit, all tests specified by the permit have been conducted, and all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin,
- Verifying that rescue services are available and means of summoning them are operable, including notifying the *controlling contractor* as soon as the services become unavailable,
- Removing unauthorized individuals from the permit space during entry operations,
- Confirming that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained whenever responsibility for a permit space entry operation is transferred, and at intervals dictated by the hazards and operations performed within the space, and
- Terminating the entry and canceling or suspending the permit as required.

An entry supervisor also may serve as an attendant or as an authorized entrant as long as that person is trained and equipped as required by this policy for each role he or she fills. The duties of entry supervisor may be passed from one individual to another during an entry operation.

Hazardous Atmosphere - atmosphere which could impair employee ability to self-rescue and/or exposes employees to risk of incapacitation, injury, acute illness, or death from one or more of the following:

- A flammable gas, vapor, or mist in excess of 10% of its lower flammable limit (LFL)
- An airborne combustible dust at a concentration at or above its LFL or that obscures vision at a distance of five feet (1.52 M) or less
- An atmospheric oxygen concentration below 19.5% or above 23%.
- An atmospheric concentration of any substance exceeding a dose published in Group 14 for Radiation and Radioactivity or a permissible exposure limit published in Title 8 CCR, Sect. 5155 for airborne contaminants,
- Any other atmospheric condition recognized as immediately dangerous to life or health.

For air contaminants for which a dose is not published in Group 14 for Radiation and Radioactivity or a permissible exposure limit is not published in CCR Title 8, Section 5155 for airborne contaminants, see other sources of information such as Material Safety Data Sheets that comply with CCR Title 8, Section 5194 and other internal documents for guidance in establishing acceptable atmospheric conditions.

High Hazard Rating - indicates presence of hazards which will cause bodily injury or harm if not appropriately mitigated before work begins in a permit-required confined space, including possible *IDLH* (see below).

Host Employer - company that 'owns' the confined space where work is performed.

Hot Work Permit - *controlling contractor's* written authorization for operations like riveting, welding, cutting, or burning which could provide a source of ignition.

Immediately Dangerous to Life or Health (IDLH) - describes any condition which poses an immediate threat to life or may result in irreversible or immediate and severe health problems including eye damage, irritation, or other conditions which could impair escape from the permit space. Note: some materials -- hydrogen fluoride gas and cadmium vapor, for example - may produce immediate transient effects that may pass without medical attention but are followed by sudden, possibly fatal collapse 12-72 hours after exposure. In hazardous quantities, such materials are considered to be "immediately" dangerous to life or health.

Inerting – act of rendering the atmosphere of a permit space non-flammable, non-explosive, and otherwise chemically non-reactive by displacing or diluting the original atmosphere with steam or a gas that is non-reactive with respect to that space. Note: inerting produces an *IDLH* oxygen-deficient atmosphere.

Isolation - separation of a permit space from unwanted forms of energy or material which could pose a serious hazard to entrants, usually accomplished by blanking or blinding, removal or misalignment of pipe sections or spool pieces, double block and bleed, or lockout / tagout.

Line Breaking - intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

Low-Hazard Permit Space - a permit space where there is an extremely low likelihood of an IDLH or engulfment hazard and where all other serious hazards have been controlled.

Low Hazard Rating - indicates limited hazards and low likelihood of bodily injury or harm or *IDLH* atmosphere.

Moderate Hazard Rating – indicates some hazards with potential to cause bodily injuries or harm but low likelihood of an *IDLH* atmosphere.

Oxygen Deficient Atmosphere - contains less than 19.5% oxygen by volume.

Oxygen Enriched Atmosphere - contains more than 23% oxygen by volume.

Qualified Person - individual who has been trained in and is knowledgeable about the task to be performed.

Permit-Required Confined Space (Permit Space) - a confined space with one or more of the following characteristics:

- Contains or has potential to contain a *hazardous atmosphere*,
- Contains a material with the potential to *engulf* an entrant,
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section, or
- Contains any other recognized serious safety or health hazard.

Permit-Required Confined Space Program (Permit Space Program) - program for controlling and protecting employees from permit space hazards and for regulating entry into permit spaces.

Permit System - the written procedure for preparing and issuing permits for confined space entry and for returning the permit space to service following termination of entry.

Prohibited Condition - any condition in a permit space disallowed by the permit during the *entry period*.

Rescue service - the personnel designated to recue employees from permit spaces.

Retrieval System - equipment such as a line or rope secured at one end to the worker by a chest-waist or full-body harness and at the other end to a lifting device or anchor point outside the entry portal to be used for non-entry rescue of persons from permit spaces.

Testing - process(es) by which hazards that may confront entrants of a permit space are identified and evaluated. Testing enables employers to devise and implement adequate control measures for the protection of authorized entrants and to determine if acceptable entry conditions are present immediately prior to, and during, entry. If electronic or thermal equipment will be used in the permit space to perform tests and there is potential for exposure to an explosive substance or *hazardous atmosphere*, testing equipment must be approved for use in explosive or flammable conditions as required by Title 8 CCR, Section 2540.2.

4.0 Regulatory Requirement

At a minimum, Terracon policies meet the applicable reporting requirements of OSHA 29 CFR 1910.146, OSHA 29 CFR 1926.1201 - .1213 and Cal-OSHA T8 CCR 5156 / 5157. When followed, they will allow Terracon personnel to work safely in and around confined spaces in compliance with OSHA regulations.

5.0 Responsibility

All Employees must work in alignment with this policy and *Our Rules to Live By*, including completing pre-task planning (see R2) and using all PPE provided by Terracon (see R6). Employees who fail to follow these Rules will be subject to disciplinary action as per Terracon's Safety Accountability Policy.

Supervisors must:

- Ensure that documentation of necessary training is on file before an employee may work in confined spaces (see R3 and Section 6.9 below),
- Confirm pre-task planning is conducted, hazards are identified, and appropriate controls are in place before work starts (see R2),
- Ensure PPE is available as required by this policy (see R6),
- Know of and enforce compliance with all relevant client requirements, and
- Make themselves available to answer questions from employees about how to work most safely.

Terracon Safety will:

- Be a resource for technical training and situational troubleshooting as needed,
- Keep all training records,
- Schedule regular auditing to ensure compliance to this policy and identify needs for revision,
- Act as administrator for the policy by being knowledgeable of its complexity, able to conduct evaluations, and up to date on appropriate training.

Management (Office Managers and above) will review all audit reports and determine accountability measures in the case of noncompliance.

In the case of confined space operations at a 3rd party location, the *host employer* will provide details about all permit space location(s), foreseeable hazards, and implemented hazard controls to Terracon as the *controlling contractor*. Terracon will provide this information to the entry contractor and/or any other entity who may enter or be affected by the *confined space*. Terracon will also provide site-specific entry procedures to the entry contractor. In return, the entry contractor must provide specific permit entry procedures. Upon completion of confined space operations, Terracon will debrief with the entry contractor and discuss any concerns noted during entry.

6.0 Procedures

6.1 Identifying Permit Spaces

A *competent person* must evaluate a space to determine if it meets the definition of a *confined space* (see 3.0 Definitions above).

The *competent person* will further evaluate if a *confined space* is a *permit-required confined space (permit space)* (see 3.0 Definitions above).

If a space is classified as a *permit space*, the *competent person* must complete a Permit Space Hazard Assessment / Entry Permit form and a confirm that a copy of this policy is available at the permit site location.

When changes in the use or configuration of a *non-permit confined space* might increase potential hazards, a *competent person* must reevaluate that space and, if appropriate, reclassify it as a *permit-required confined space* and complete the requisite Permit Space Hazard Assessment / Entry Permit form.

A *competent person* may reclassify a *permit-required confined space* as a *non-permit confined space* under the following conditions:

1. The *permit space* poses no actual or potential atmospheric hazards and all hazards in the space are eliminated without entry into the space. No atmospheric hazards will be introduced during the entry.
2. Authorized entry to the *permit space* permanently eliminates hazards therein, as confirmed by testing and inspection.

If new hazards arise within a space previously classified as a *permit space* which has since been declassified to a *non-permit space*, all entrants must exit the space immediately and a *competent person* must reevaluate the space and determine whether it must be reclassified as a *permit space*.

Permit- and *non-permit required confined spaces* common on Terracon job sites include but are not limited to:

- fluid storage tanks
- crawl spaces
- pump houses
- vaults
- caisson holes, drilled shafts
- sewer or water lines

Signs shall be posted near each *permit-required confined space* to notify employees of potential hazards and make clear that only *authorized entrants* may enter the *permit space*.

6.2 Unauthorized Entry

If an unauthorized person approaches or attempts to enter a permit space:

1. Warn the unauthorized person that they may not enter the permit space, or, if they have already done so, advise the unauthorized person that they must exit immediately, and
2. Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space.

Unauthorized entry into a permit-required confined space is dangerous and punishable with disciplinary action up to and including termination.

6.3 Entry Permits

Prior to entry of any *permit space*, an *entry permit* must be completed which identifies all conditions for safe entry. Terracon's Confined Space Entry Permit may be found at the end of this document.

An *entry permit* includes the following information:

1. Identity of the *permit space* and purpose of entry.
2. Date of the entry and duration of *entry period* (may be up to 1 year if all conditions under which the permit was issued are maintained but should be no longer than necessary to complete planned work).
3. List of *authorized entrants*, eligible *attendants*, and eligible *entry supervisors*.
4. The signature and printed name of the individual authorizing and verifying safe conditions for entry.
5. Identified actual or potential hazards in the *permit space*.
6. Measures taken for *isolation* of the *permit space* prior to entry.
7. Measures used to remove or control identified hazards such as lockout / tagout, purging, *inerting*, ventilating and flushing, etc.
8. Acceptable entry conditions quantified based on identified hazards, which must be maintained during the entire *entry period*.
9. Testing and monitoring equipment and procedures to be used to verify acceptable entry conditions.
10. Results of initial and periodic air monitoring tests performed accompanied by the names or initials of the testers and by an indication of when tests were performed.
11. The *rescue services* to be summoned in case of emergency and the means of summoning and communicating with those services.
12. Inventory of on-site rescue equipment, if relevant.
13. Communication procedures and equipment to be used by *authorized entrants* and *attendants* to maintain contact.
14. Personal protective equipment such as respirators, clothing, and retrieval lines which will be used during entry.
15. Any other information necessary to ensure employee safety.

Note: If hot work will be required inside the *permit space*, this information must be noted on either the entry permit or on a separate *hot work permit* attached to the *entry permit*.

All steps necessary to establish safe conditions for entry must be taken before the *entry supervisor* signs or initials the *entry permit*. The completed permit shall be made available at the time of entry

to all authorized entrants or their authorized representatives, by posting near the entry portal so that is available for ease of reference by all persons involved. As a second check, all *authorized entrants* should confirm that entry conditions have been met before entering the *permit space*.

The *entry supervisor* will terminate entry and cancel the *entry permit* when: (a) operations covered by the permit have been completed, or (b) a condition disallowed under the permit arises in or near the *permit space*.

Cancelled entry permits will be retained for at least 1 year to facilitate review and revision of confined space procedures. Any problems encountered during an entry operation should be noted on the associated permit.

6.4 Permit Space Entry Equipment

Equipment necessary to ensure the safety of employees entering *permit spaces* will be provided at no cost to the employee and should be maintained per manufacturer's recommendations. This equipment may include, but is not limited to:

- Testing and monitoring equipment for permit space atmosphere,
- Ventilation equipment,
- Communications equipment to summon assistance (i.e., cell phone or radio),
- Personal protective equipment (for use where engineering and work practice controls are not feasible or do not adequately protect employees),
- Lighting equipment to illuminate the work space and allow a quick exit in an emergency,
- Barriers and shields to protect authorized entrants from hazards outside the permit space,
- Equipment such as ladders for safe entry into and exit from permit spaces,
- Rescue and emergency equipment including communication devices for emergency assistance notification,
- Safety Data Sheets (SDS) for any chemical substance introduced into or held within the permit space.

Note: Atmospheric testing equipment is acquired through Terracon Safety and will be operated by employees trained on its operation and calibration. All direct reading instruments will be calibrated in accordance with manufacturer specifications. Records of equipment service, maintenance, and calibration are kept by Operations and are available for inspection upon request.

6.5 Entry Procedures – Step by Step Guidelines

Note: Terracon does not perform confined space operations which involve multiple contractors or require entry in potentially hazardous conditions due to increased threat to the safety of personnel and equipment.

The following steps must be taken before entry into a *confined space*:

1. Confirm all personnel have been trained in accordance with this policy (see 6.8 Training).
2. For a *permit-required confined space,* confirm the Confined Space Entry Permit has been completed by the *entry supervisor* per the requirements outlined in 6.3 Entry Permits.
3. Eliminate any conditions making it unsafe to remove the entrance cover before removing the cover. Once an entrance cover is removed, promptly set up guards such as a railing, temporary cover, or other barrier that will prevent an accidental fall through the opening and protect employees working in the space from foreign objects falling from above.

4. Assemble all necessary safety and monitoring equipment for atmospheric testing. Safety equipment may include full body harness for personnel retrieval, life lines, tripods, ladders, boundary markers, and emergency information. Ensure all information is correct, safety equipment is in good condition, and air monitoring equipment has been calibrated according to manufacturer's specifications.
5. Thoroughly and carefully test the atmosphere inside the *confined space* and document results on the *entry permit*. Monitoring must be performed by a *competent person* using properly calibrated instruments and established procedures. All *authorized entrants* will have the opportunity to review monitoring data prior to entry. Three types of atmospheric hazards that will be monitored in confined spaces are, in order: 1) oxygen deficiencies, 2) combustible gases, and 3) presence of toxic gases or vapors. Atmospheric testing must be conducted at two-foot (2') intervals from the top of the confined space to the bottom. This step is critical if hot work is to be performed or any ignition source is present. Monitoring should take place prior to entering the confined space and should be performed on a continuous basis throughout the work period. Results must be recorded and maintained in a permanent file for inspection and reference purposes.
6. Ensure ventilation and other engineering controls are in place and in good working condition prior to anyone entering the space. Mechanical ventilation from a clean air source and/or purging devices are necessary engineering controls if atmospheric testing indicates oxygen deficiency or the presence of flammable or toxic materials in the space. If such conditions exist, no one may enter the space until air is purged and the *hazardous atmosphere* is resolved. The atmosphere will be continually ventilated and monitored during confined space operations. If engineering controls cannot be used to eliminate the atmospheric hazard, respiratory protection is required (see Terracon Respiratory Protection Program for more information).
7. Install and secure entry and exit equipment such as ladders and rescue equipment such as tripods, lifelines, and harnesses. Assemble necessary work tools so the *attendant* does not have to leave the entry area. NOTE: ladders are required if the *confined space* reaches higher than an *authorized entrant's* shoulders.
8. Note all physical hazards and mechanical hazards in and around the *confined space*. Blank off, physically separate, cap, seal, or otherwise secure all connecting pipes. Flush, drain and *isolate* (using block and bleed connection) all pipelines carrying process materials. Mechanical hazards may include rotating equipment or equipment with moving parts (i.e. blenders, mixers, agitators, blades). Other physical hazards include thermal components or heated atmospheres (i.e. hot mixers in blending areas). Hot areas should be allowed to cool prior to entry. Where relevant, implement a comprehensive lockout / tagout program prepared in accordance with OSHA Standard for Control of Hazardous Energy (29 CFR 1910.47) (see Terracon Control of Hazardous Energy Sources Policy for more information).
9. When the *entry permit* has been completed, discuss identified hazards and review the *permit* with involved employees. Once done, the *entry supervisor*, each *authorized entrant,* and the *attendant* will sign the permit.

Work in the confined space may begin after all the above steps have been completed.

Additional notes on confined space entry:

1. Each *permit space* must have an *attendant* responsible for monitoring only that space. The attendant will be trained and immediately available to perform rescue and emergency services.

2. Once work has commenced and one or more *authorized entrant(s)* is/are inside the *permit space* the *attendant* may not leave the entry area until all entrants have exited the space.
3. If a *hazardous atmosphere* or other hazardous condition is detected at any point during entry:
   - All personnel will leave the space immediately;
   - The space will be evaluated to determine how the hazardous condition developed; and
   - Measures will be taken to protect resolve the condition and/or protect employees before any subsequent entry.
4. When the necessary work has been completed the authorizing entry supervisor will cancel the confined space entry permit.

6.6 Special Permit Spaces

Special permit spaces meet the following detailed requirements for more limited potential hazards and may therefore be subject to less stringent entry procedures. All of the following conditions must apply for a permit space to be considered a non-hazardous or special permit space:

- No mechanical hazards or entrapment hazards may be present. The only hazard posed by a special permit space is an actual or potential hazardous atmosphere.
- Monitoring and inspection data prove that continuous forced air ventilation alone is sufficient to prevent a hazardous atmosphere, rendering the special permit space safe for entry. (Any entry into the space to gather this data must be completed in accordance with standard requirements for a permit space.)
- Data satisfying the above conditions must be documented and made available to employees entering the non-hazardous or special permit space.

When all the conditions above are met, entry into the special permit space may performed using the procedures above, except that step #8 may be skipped based on the fact that no mechanical or entrapment hazards are present.

Once the atmosphere is confirmed safe, continuous forced air ventilation must ensure that a *hazardous atmosphere* does not arise in the space while an authorized entrant is inside. Accordingly, ventilation should be directed at immediate areas where an employee is or will be present within the space and must continue until all *authorized entrants* have left the space. Air supply for the forced air ventilation must be from a clean source so as to not increase hazards in the space.

Note: Even in the case of special permit spaces, Terracon does not perform confined space operations which involve multiple contractors or require entry in potentially hazardous conditions due to increased threat to the safety of personnel and equipment.

6.7 Rescue and Emergency Services

Terracon uses local emergency services as needed for rescue during a *permit space* emergency. These local services are evaluated as part of pre-task planning to ensure a timely response. Rescue services must be either:

- Provided by the host facility, or
- Provided by an outside service which has examined the entry site, practiced rescue, or declined the opportunity to do so, or
- Provided by the employer by selecting a rescue team equipped and trained to perform needed rescue services.

If a client is providing emergency services, this must be stated and agreed to in the Terracon contract for services.

Emergency services phone numbers are posted at each facility or site and included in the Confined Space Entry Permit. The *attendant* is responsible for summoning emergency services and preventing unauthorized rescue attempts.

Rescue service must be on-site for immediately dangerous to life and health (IDLH) conditions while work is being performed.

6.8 Training

Prior to any entry into a *permit space*, all parties involved will be trained on task-specific procedures required for *permit space* work and demonstrate the understanding, knowledge and skills necessary for the safe performance of their duties.

Terracon employees receive the following confined space training:

- For non-permit, low-hazard spaces training is provided through Terracon University – OSHA Confined Space.
- For permit, medium-/high-hazard space entry, employees must have hands-on training from a training provider approved by Terracon Safety.

Training will be in a language which is understandable and will include written examinations and skills tests to ensure comprehension. Training will be conducted by authorized employees and retraining will be done on a regular basis to ensure employees maintain proficiency in this area.

Employees will be trained:

- Before first being assigned *permit space* duties.
- Before a change in assigned duties will require *permit space* work.
- Whenever a change in *permit space* operations requires new equipment or identifies a new hazard not previously addressed in training.
- Whenever there is reason to believe that proper *permit space* entry procedures are not being followed or there are inadequacies in employee knowledge or use of those procedures.If it has been more than three years since their last training.

Documentation will include the names and signatures of trained employees, date of training, and the names and signatures of the trainer(s).

6.9 Record keeping

Training records will be maintained indefinitely by Terracon.

Entry permits will be retained at the local Terracon office for 1 year.

Terracon will use canceled *entry permits* to review entry operations and re-evaluate this policy whenever it seems its safety measures may not sufficiently protect employees, if unauthorized entry occurs, if a previously unidentified permit space is identified, an incident or significant near miss occurs during entry, a change in use or configuration of the permit space or there are employee complaints about the effectiveness of the program.

TRENCHING, EXCAVATION, AND GROUND DISTURBANCE POLICY

Quality Control

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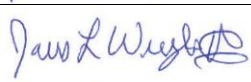
review-logo	*all*	*0122*	*J. Wright*		*01-22*
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1.0 Scope

Terracon policy documents meet the needs of employees, clients, and OSHA by laying out safe work expectations; itemizing tools, resources, and methods to be used to meet them; and clarifying accountabilities associated with failure to do so.

All contractors and subcontractors engaged by Terracon must to comply with the requirements of this policy (at a minimum).

Clients may have their own policies, procedures, and forms. Where it is a requirement that client procedures and forms are used, it will be in addition to those required by this policy. This is a minimum standard which may be raised but never lowered by client policy.

Note that though policies often include crucial technical content, they *may not* replace required training.

2.0 Policy

This policy sets out requirements and procedures for reducing Terracon employees' exposure to incidents or injuries related to trenching, excavation, and ground disturbance activities and ensuring compliance with applicable state and federal safety standards.

Terracon generally has no direct control of excavation activities. The general contractor or the excavation contractor usually acts as controlling contractor. Terracon personnel assigned to trenching/excavation projects not under Terracon control will nevertheless remain alert to potential site hazards and conduct themselves according to the standard outlined in this policy.

On rare occasions where an excavation is under the direct control of Terracon, the associated Terracon Project Manager or Office Manager will designate a *competent person* to be responsible for oversight of the excavation and compliance with this policy.

This policy aligns with Terracon's Safety Rules, *Our Rules To Live By*. Specific to trenching and excavations, the following Rules and Practices apply:

R2: Start every job task with pre-task planning and update the plan when personnel or conditions change.

R3: Follow Terracon-required safety training and get authorization before work starts.
- In excavations,
- In confined spaces,
- When working at heights,
- And before other job tasks which require it.

R5: Speak up right away and redirect a co-worker performing an unsafe act to safe work practices.

R6: Wear PPE as required by project, task, and/or work environment. Inspect before and during use, repairing or discarding and replacing, if defective.

R7: Use Terracon-approved tools and equipment according to manufacturer's instructions, and never modify or override safety devices.

P1: Take the time you need to do the job safely.

P3: Stop work if you feel unsafe. Tell a supervisor and work together to fix the problem.

P4: Manage controllable hazards and unsafe conditions in your work area. Report hazards you cannot control to a supervisor.

3.0 Definitions

Benching - method of protecting against collapse by digging the sides of an excavation to form one or more steps.

Competent Person - OSHA defines a competent person as "one who can identify existing and future hazards in the work area and has the authority to take immediate actions to eliminate those hazards." Terracon adds to that definition that the employee is approved to plan and organize work in an IIF manner, train employees, and operate equipment as defined by specific policies. A designated *competent person* must be on site at all times during trenching/excavation work and will be appointed by the controlling contractor.

Controlling Contractor - company taking the lead on an excavation or other ground disturbance operation (usually a general contractor or excavation contractor, rarely Terracon). The *controlling contractor* is responsible for designating a *competent person* to oversee operations.

Cross brace - horizontal component of a shoring system installed at a 90° angle to the sides of an excavation with ends in contact with *vertical rails, sheeting,* or *wales*.

Hazardous Atmosphere - atmosphere which could impair employee ability to self-rescue and/or exposes employees to risk of incapacitation, injury, acute illness, or death because it is explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful.

Immediate or Immediately Prior to – for the purpose of the Leica Wand expectations means within 10 minutes or beginning the excavation.

Mechanical Groundbreaking – any digging, driving, drilling, or other penetration of the ground performed by a mechanical engine powered device.

Sheeting - plywood component of a shoring system that holds back soil on the sides of an excavation and is supported by other parts of a shoring system. *Closed sheeting* is continuous along the sides of an excavation, with each plywood sheet abutting its neighbor.

Shielding – structure or system such as a trench box designed to protect workers should collapse occur.

Shoring – bracing support system for trench faces used to prevent collapse. *Shoring* is used when the location or depth of the cut makes *sloping* impractical.

Sloping - method of protecting against collapse by forming the sides of an excavation along an angle of incline informed by soil type, environmental conditions, and other factors. See Section 6.3 for more information.

Soil Types - three classes listed from most to least stable.

Type A - cohesive soil, clay, sandy clay, hardpan, caliche.

Type B - less-cohesive soil crushed rock, silt, silt loam, sandy loam, previously disturbed soil, unstable rock.

Type C - non-cohesive soil, gravel, sand, loamy sand, soil from which water is seeping.

Vertical Rail - Vertical component of a shoring system placed in contact with sheeting and cross braces.

Wale - horizontal component of a shoring system placed in contact with *sheeting* and cross braces.

4.0 Regulatory Requirement

At a minimum, Terracon policies will meet the applicable requirements of OSHA 29 1926.651 and Cal OSHA T8 CCR 1541. When followed, these requirements allow Terracon personnel to work safely and in compliance with OSHA regulation. There is no OSHA regulation for general ground disturbance activities.

5.0 Responsibility

All Employees must work in alignment with this policy and *Our Rules to Live By*, including completing pre-task planning (see R2) and using all PPE provided by Terracon (see R6). Employees who fail to follow these Rules will be subject to disciplinary action per Terracon's Safety Accountability Policy.

Supervisors must:

- Ensure that documentation of necessary training is on file before an employee may work in excavations or perform ground disturbance activities (see R3 and Section 6.4 below),
- Confirm that pre-task planning is conducted, excavation and ground disturbance hazards are identified to crews, and appropriate controls are in place before work starts (see R2),
- Ensure PPE is available as required by this policy (see R6),
- Know of and enforce compliance with all relevant client requirements, and
- Make themselves available to answer questions from employees about how to work most safely.

Terracon Safety will:

- Be a resource for technical training and situational troubleshooting as needed,
- Keep all training records,
- Schedule regular auditing to ensure compliance to this policy and identify needs for revision,
- Act as administrator for the policy by being knowledgeable of its complexity, able to conduct evaluations, and up to date on appropriate training.

Management (Office Managers and above) will review all audit reports and determine accountability measures in the case of noncompliance.

6.0 Procedures

6.1 General Excavation Requirements

All excavations greater than five (5) feet in depth must be sloped, shored, or shielded unless the excavation is made entirely in stable rock. Terracon employees will not enter unshored excavations with vertical sidewalls in excess of five (5) feet in depth unless the excavation is in stable rock or shielding is provided. Terracon personnel will not enter soil trenches with unshored

vertical sidewalls more than five (5) feet in depth until there is shielding in place and an inspection performed by a competent person approves entry.

If Terracon personnel observe situations which could result in possible cave-ins, slides, failure of protective systems, or other hazardous condition, they will immediately evacuate all personnel from the excavation and surrounding area and report site conditions to the Terracon Project Manager or their Supervisor (P3). The Terracon Project Manager (or senior-level designee) will bring dangerous site conditions to the attention of the excavation contractor and other responsible personnel responsible for prompt hazard mitigation. Terracon employees will not (re)enter the excavation until the hazardous condition has been eliminated.

The following precautions must be taken as part of pre-task planning (R2) and preparation for every excavation:

- Locate underground utilities (sewer, telephone, fuel, electric, water or other subsurface installations) before you dig by calling 811. Check with utility companies to find out where cables and lines are buried. Once uncovered, you must support, protect, or remove the lines. When utility companies or clients cannot respond to a request to locate underground utility installations within 24 hours, or cannot establish exact location of these installations, the employer may proceed, provided the employer does so with caution and provided detection equipment or other acceptable means to locate utility installations are used.
    - All excavations whether performed by subcontractor or Terracon personnel require a valid, Public Utility Locate Ticket in Terracon's and (if applicable) the excavation contractor's name.
    - All excavations whether performed by subcontractor or Terracon personnel require a thorough evaluation of needs for Private locator service.
- Test for *hazardous atmospheres* in any excavation that could contain low oxygen levels, flammable gases, or other dangerous conditions such as landfills or environmental projects. If hazardous atmospheres are detected, no one may enter the space until ventilation is established and the *hazardous atmosphere* is resolved or other mitigation put in place.
- Where there is potential for a *hazardous atmosphere*, confirm that all necessary emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, is readily available. This equipment must be attended when in use.
- Confirm that any water accumulation is removed from an excavation before entry and that employees working in and around the excavation will be protected from further accumulation by shields or other methods inspected and approved by a *competent person*.
- Where the stability of adjoining buildings, walls, or other structures may be endangered by an excavation, a registered Professional Engineer with geotechnical experience in will be consulted. At a minimum, support systems such as *shoring*, bracing, or underpinning will be provided to ensure structural stability.
- Wear reflective vests or other hi-vis material when near equipment, trucks, and cars. Post signs, barricades, and flag persons as necessary.
- Ensure the plan does not position any workers under any load being lifted or digging equipment.

- Confirm requisite PPE including a hard hat, safety shoes, and safety glasses while on or near a job site (see R6).

Once work begins:

- Perform daily inspections with a competent person who is qualified to identify potential hazards in an excavation. You may need more than one inspection in the same day if it rains or other conditions change. Competent persons should examine the possibility of cave-ins, failures or protective systems, etc. If problems are found, provisions should be made for immediate personnel removal.
- Construct temporary crossovers where employees, pedestrians, or equipment must cross over excavations. All walkways six (6) feet or more above lower levels and covering a space of more than 30 inches will have guardrails.
- Store spoil piles, surface encumbrances, or excavated material at least two (2) feet from the edge of the excavation.
- Provide access into and out of an excavation four (4) or more feet deep with a ladder or ramp. Every worker in an excavation must be within twenty-five (25) feet of a ladder or ramp at all times. Ladders must be secured from sliding or kickout and ramps must be at an incline of no more than 30°.
- Employees entering bell-bottom pier holes or other similar deep and confined footing excavations must wear a harness and lifeline. The lifeline is separate from any line used to handle materials and must be individually attended at all times while the employee is in the excavation.
- Cover or barricade all wells, pits, and shafts when not in active use.

When mobile equipment is in or around an excavation:

- Protect the excavation edge whenever mobile equipment is moving in the area. Use stop logs, barricades, and employee spotters with hand or mechanical signals. If possible, plan for mobile equipment to operate on a grade sloping away from the excavation.
- Set up ventilation in any situation where equipment driven by internal combustion engine is operated inside a shaft or is continually operated near a shaft or excavation.

6.1.1 Leica Wand Use for Excavations

For all Service Lines, all mechanical groundbreaking operations performed by Terracon staff, or subcontractors with Terracon employees on site will be checked for live electrical utilities using the Leica Wand immediately prior to breaking ground. Mechanical groundbreaking includes but is not limited to drilling, CPT, direct push, test pit excavation, concrete coring on slabs, coring asphalt or concrete pavements or parking lots when penetrating more than 6 inches into subgrade, pile installation, or any other excavation performed by mechanical methods. Non-mechanical groundbreaking or groundbreaking less than 6 inches into subgrade must be evaluated for wanding during pre-task planning. Non-mechanical groundbreaking includes but is not limited to DCP, density, shoveling, probing, and hand-augering. This act of wanding serves as a final check for the confirmation of electrical underground utilities in no way replaces the requirement to call 811 or pre-task plan for the need of private utility locate services.

Terracon does not require subcontractors to own Leica wands. Terracon will wand the location for subcontractors in advance of excavation for the protection of Terracon employees and the public. Terracon will wand the location immediately prior to excavation. If project scope does not allow this, Terracon will wand the excavation locations when staking or at a time as near as possible to the beginning of excavation work.

This wanding does not imply the location is clear of underground hazards or 'approved' for excavators. We will provide any and all information we have about the location. It is the decision of the excavator to proceed with the excavation if they are comfortable with the location.

Any deviations from this policy must be approved by an Assistant Service Line Director, Service Line Director, or Director of Safety.

6.2 Soil Classification

Classifying the stability of the soil to be excavated is an important part of all site evaluations. Soil must be classified by at least one visual analysis and one manual test. Classification will determine the degree of sloping and the type of shoring required to protect worker safety in the excavation.

6.2.1 Soil Types

Soil is divided into three classes, listed here from most to least stable.

Type A - cohesive soil such as clay, sandy clay, hardpan, or caliche.

Type B - less-cohesive soil such as crushed rock, silt, silt loam, sandy loam, previously disturbed soil, or unstable rock.

Type C - non-cohesive soil such as gravel, sand, loamy sand, or soil from which water is seeping.

6.2.2 Visual Analysis

Visual analysis must include the following:

1. Assessment of soil particle size and associated cohesion. A fine grain texture is more cohesive than a coarse grain.
2. Examination of excavated material for cohesive clumps vs. easily broken granular clumps.
3. Inspection of open trenches for wall sloughing or tension cracks.
4. Survey of area near the excavation for disturbed soil indicating utilities.
5. Evaluation of excavation and surrounding area for seeping water or high-water table.
6. Identification of any sources of vibration in the excavation area which could affect soil stability.

6.2.3 Manual Test

Manual testing must evaluate plasticity, penetration, and dry strength using the following methods:

1. Plasticity: Mold a damp sample of soil into a ball and roll it into threads as thin as possible. Type A soil can form threads 1/8" in diameter where B and C soil cannot.

2. Penetration: Press a thumb into undisturbed soil in the excavation as soon as possible after it has been excavated. Type A soil can be indented only with great effort. Type C soil can be indented and molded with light pressure. Type B soil falls between the two extremes.
3. Dry Strength: Attempt to crumble dry soil. If it crumbles under light pressure, it is granular (Types B or C). If it falls into clumps and the smaller clumps break with difficulty, it may be clay (Type A).

6.3 Sloping

When using sloping as the sole form of protection, maximum allowable slope depends on soil classification:

- Type A: maximum allowable slope 1:1 (45°)
- Type B: maximum allowable slope 1:1 (45°)
- Type C: maximum allowable slope 11/2:1 (34°)

6.4 Shoring Guidelines

In situations where *sloping* is unfeasible due to the location or depth of the cut, *shoring* will be used to protect against collapse in any excavation four (4) feet or deeper. *Shoring* must meet the following general requirements:

- Bracing against excavation walls must be of ¾ inch plywood and there must be at least one (1) foot of plywood above the top of the hole or trench to keep rocks and debris from falling in.
- Shoring must use *closed sheeting* (i.e. no soil showing between sections of plywood).
- Only use hydraulic shoring or trench jacks (cross braces). When using trench psi, substitute a 2"x 6" for a vertical rail. When using hydraulic shoring, raise the pressure to 3000 psi as shown on the pump gauge.

6.4.1 Spacing of Vertical Rails

- No more than six (6) feet apart
- No more than two (2) feet from the bottom of the excavation

6.4.2 Spacing of Cross Braces and Wales

- No more than four (4) feet apart vertically
- No more than three (3) feet from the bottom of the excavation
- No more than one and a half (1.5) feet from the top of the excavation

6.5 Training

Note: this document *may not* replace required training.

Terracon employees receive general excavation and ground disturbance training during onboarding through Terracon University in the following courses:

- OSHA Excavation, Trenching and Shoring Safety
- Leica Wand Use (excavators only)

Before being made responsible for overseeing excavations and compliance with this policy as a *competent person*, employees must demonstrate requisite knowledge, skills, and abilities through formal instruction, on-the-job experience, or a combination of both.

Employee retraining will be required if:

- This Policy is revised or there are substantive changes in regulatory compliance;
- Equipment is changed (other than replacements);
- The employee exhibits a lack of understanding or skill needed to work safely; or
- It has been more than three years since their last training.

6.6 Record keeping

Employee training records will include the content and date of training and be maintained indefinitely at Terracon Safety.

Excavation inspection records will be maintained for one year at the local Terracon office.

PERSONAL PROTECTIVE EQUIPMENT (PPE) POLICY

Quality Control

Document Owner	Position	Signature

Change	Page	Mod.	Authorization		
			Name	Signature	Date
original	*all*	*0316*	*J. Wright*		*03-16*
review	*all*	*0117*	*J. Wright*		*01-17*
PPE mods, review	*all*	*0118*	*J. Wright*		*01-18*
Hand protection chart, R1, review	*all*	*0119*	*J. Wright*		*01-19*
Hi-Vis revision, review	*all*	0120	*J. Wright*		*01-20*
R&P 2021	*all*	0121	*J. Wright*		*01-21*
review-logo	*all*	*0122*	*J. Wright*		*01-22*
Added long pants and sleeved shirt to PPE	*all*	*0822*	*J. Wright*		*08-22*
review	*all*	*0823*	*J. Wright*		*08-23*
Review, footwear ASTM, Type 2 hard hat, glove update	*all*	*0324*	*J. Wright*		*03-24*

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SRP PPE 09 High Visibility Apparel
Hand Injury Prevention Program – Supervisor Training Guide

1.0 Scope

Terracon policy documents meet the needs of employees, clients, and OSHA (“regulatory bodies?”) by laying out safe work expectations; itemizing tools, resources, and methods to be used to meet them; and clarifying accountabilities associated with failure to do so.

All contractors and subcontractors engaged by Terracon must to comply with the requirements of this policy (at a minimum).

Clients may have their own policies, procedures, and forms. Where it is a requirement that client procedures and forms are used, it will be in addition to those required by this policy. This is a minimum standard which may be raised but never lowered by client policy.

Note that though policies often include crucial technical content, they *may not* replace required training.

2.0 Policy

This policy is aligned with Terracon’s Safety Rules, *Our Rules to Live By*. PPE is addressed explicitly in:

R6: Wear PPE as required by project, task, and/or work environment. Inspect before and during use, repairing or discarding and replacing, if defective.

In addition to R6, the following Rules apply to PPE:

R2: Start every job task with pre-task planning and update the plan when personnel or conditions change.

R5: Speak up right away and redirect a co-worker performing an unsafe act to safe work practices.

R7: Use Terracon-approved tools and equipment according to manufacturer's instructions, and never modify or override safety devices.

3.0 Definitions

Hazard Assessment - a survey of a job or task to determine if hazards requiring the use of personal protective equipment are present, or likely to be present.

High Noise - is defined as where a person speaking must raise their voice for someone three feet away to hear them or vice versa.

Personal Protective Equipment (PPE) - all clothing and other work accessories designed to create a barrier against workplace hazards.

*PPE Free Zone*s - are defined as an area where employees are not required to wear PPE, such as eye protection and safety footwear. PPE Free Zones are areas in which no hazards exist, and no work is performed.

4.0 Regulatory Requirement

Guidelines in this program are based on the following standards:

29 CFR 1910.132 Personal Protective Equipment—General Requirements

29 CFR 1910.133	Eye and Face Protection
29 CFR 1910.134	Respiratory Protection
29 CFR 1910.135	Head Protection
29 CFR 1910.136	Occupational Foot Protection
29 CFR 1910.137	Electrical Protective Devices

Respiratory Protection and Hearing Protection will not be addressed in this program as the need is based on industrial hygiene monitoring results. The requirements for these two types of PPE are addressed in their own respective policies.

5.0 Responsibility

All Employees must work in alignment with this policy and *Our Rules to Live By*, including completing pre-task planning (see R2) and using all PPE provided by Terracon (see R6). Employees who fail to follow these Rules will be subject to disciplinary action per Terracon's Safety Accountability Policy. Terracon provides employees with all required PPE to perform their job function at no cost. All PPE is provided and should be used and maintained in a sanitary and reliable condition.

Supervisors (Department Managers) must:

- Supply all employees with PPE necessary for their job function,
- Ensure all PPE is sanitary and in working condition,
- Confirm that pre-task planning is conducted, hazardous work activities are identified to crews and appropriate controls are in place before work starts (see R2),
- Know of and enforce compliance with all relevant client requirements, and
- Make themselves available to answer questions from employees about how to work most safely.

Terracon Safety will:

- Identify and itemize PPE required for specific job tasks in Safe Right Procedures,
- Be a resource for technical training and situational troubleshooting as needed,
- Keep all training and medical records required for PPE use,
- Schedule regular auditing to ensure compliance to this policy and identify needs for revision,
- Act as administrator for the policy by being knowledgeable of its complexity, able to conduct evaluations, and up to date on appropriate training.

Management (Office Managers and above) will review all audit reports and determine accountability measures in the case of noncompliance.

6.0 Procedures

6.1 Personal Protective Equipment - General

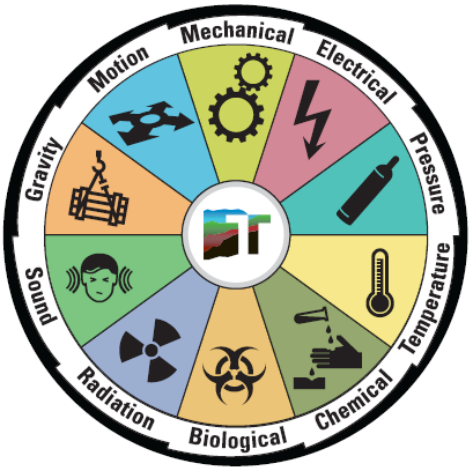
Terracon requires the use of PPE whenever there is a reasonable expectation that injury could be prevented by its use. Core employee PPE includes:

- Safety glasses with lateral protection (ANSI Z.87)

- Approved safety footwear (ASTM F2412, old ANSI Z.41)
- Gloves in accordance with the hand protection chart
- Hard hat on construction sites, around drill rigs and / or anytime overhead or projectile hazards are present (ANSI Z.89.1)
- High visibility apparel (minimum Type R Class II)
- Hearing protection in high noise areas
- Long pants and sleeved (over the shoulder to elbow) shirt

6.2 Pre-Task Planning (Hazard Assessment)

During pre-task planning supervisors must ensure that the workplace is assessed to determine which hazards are present, or are likely to be present, which necessitate the use of PPE. Supervisors must make every effort possible to eliminate or mitigate the hazard with engineering or administrative controls. If the hazard cannot be eliminated or reduced to an acceptable level, PPE must be specified for use when workers are performing tasks which will bring them in contact with the hazard(s).



Pre-Task Planning involves an analysis of the job or task for potential hazards. This analysis should consider the basic hazard categories shown on the energy wheel (right).

Additionally, the person conducting the assessment should observe:

- Sources of motion (e.g., machinery or processes where movement of machine components or flying particles could exist, movement of personnel could result in collision with stationary objects);
- Sources of high/low temperatures which may result in injury or compromise the integrity of PPE;
- Types of chemical or biological hazard exposures and associated Safety Data Sheets;
- Sources of light radiation (e.g., welding, brazing, cutting, furnaces);
- Exposure to falling objects or potential for dropping objects;
- Sharp objects which might pierce feet or cut hands;
- Sources of rolling or pinching objects which might crush feet;
- Layout of workplace and location of co-workers and/or other contractors;
- Electrical hazards;
- Statistical incident data on the task under analysis.

Pre-Task Planning should be conducted by using the Safe Right Procedure (SRP) of the associated task. If no SRP is available, PTP must be documented and include the workplace evaluated, the name of the person conducting the assessment, the date of the assessment, and

a statement identifying the document as a hazard assessment. These requirements may be met by using the form in Appendix A of this document.

6.3 Selection of PPE

If the results of a hazard assessment demonstrate hazards that necessitate the use of PPE are present or likely to be present, proper protective equipment must be specified for the task. The selection of PPE will be based on the types, concentrations, and degree of exposure to hazards or contaminants that may be encountered. Selected PPE must be properly fitted to each affected employee. Defective or damaged PPE may not be used. Required PPE will be provided at no charge to the employee.

6.3.1 Head Protection

At a minimum, employees required to wear head protection must wear a Type 1 (G) helmet. Head protection must conform to American National Standards Institute (ANSI) standard ANSI Z89.1-1997 (which replaced the Z89.1-1986 standard). The type of helmet, manufacturer, ANSI designation, and class can be identified by looking inside the shell. Helmets are date stamped by the manufacturer and should be replaced no later than the service life recommended by the manufacturer. The service life begins on the date of manufacture stamped inside the helmet. ANSI Z89.1-1997 defines the following types and classes:

- Type 1 provide protection strictly from blows to the top of the head.
- Type 2 provide protection from blows to both the top and sides of the head.

Terracon requires Type 2 hard hats with chin strap attached for the following work;

- Any work activity requiring fall protection.
- Any work on aerial lifts, scaffolds, or temporary work structures.
- Any work on or climbing of ladders.
- UTV operations (replacing DOT helmet requirement).

Z89.1-1997 also defines hard hats for the classes of electrical performance.

- Class G (General) is equivalent to the Z89.1-1986 Class A and protects against impact, penetration, and low-voltage electrical conductors. For certification, sample shells are proof tested at 2,200 volts of electrical charge.
- Class E (Electrical) is equivalent to the Z89.1-1986 Class B and protects against impact, penetration, and high-voltage electrical conductors. Sample shells are proof tested at 20,000 volts.
- Class C (Conductive) provides no electrical insulation; the alpha designation did not change from the Z89.1-1986 standard.

Note: The voltages stated in Classes G and E are not intended to be an indication of the voltage at which the headgear protects the wearer.

6.3.2 Eye and Face Protection

Suitable eye, face, or eye-and-face protection must be provided where there is a potential for injury to the eyes or face from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, potentially injurious light radiation, or a combination of these

hazards. All eye and face protection equipment must comply with ANSI Z87.1-1989. Compliance with this standard is usually indicated by “Z87.1-1989” (or similar notation) stamped somewhere on the equipment. Eye and face protective equipment include:

- Safety Glasses – have protective lenses, side shields, and special frames to protect the eyes.
- Safety Goggles – a form of eye protection with a higher degree of safety. Goggles usually completely enclose the eyes.
- Face Shields – may be either clear or tinted, flat or contoured, and come in a full-hood style to provide protection for the face and eyes against splashes and flying particles (e.g., grinding operations).
- Filter lenses -- may be necessary to protect the eyes from injurious light radiation associated with tasks such as cutting and welding.

Employees requiring prescription eyewear must wear either over-the-glass protection (OTG) or prescription safety glasses manufactured in accordance with ANSI Z87.1-1989. Adding side shields to prescription glasses **does not** meet the safety glass requirement. Terracon will offer a subsidy to purchase prescription safety eyewear for all full-time employees through a prescription safety eyewear program. Each eligible employee may purchase approved prescription safety eyewear every 12 months. Any exceptions must be approved by the Office Manager.

6.3.3 High Visibility Apparel / Body Protection

High-visibility apparel may be orange or yellow-green and must meet at a minimum ANSI 107-2015 Type R, Class II requirements.

- Employees working on project sites i.e., work locations other than Terracon offices or client office-type environments, are required to wear at minimum ANSI Type R, Class II high-visibility apparel.
- Employees working on project sites where they may be exposed to moving equipment or vehicular traffic and/or are working in temporary traffic control zones are required to wear at minimum ANSI Type R Class III high-visibility apparel. When working in low speed traffic areas such as parking lots, Type R Class II may be worn if pre-task planning finds it provides sufficient protection.
- Employees engaged in night operations exposed to motor vehicle traffic shall wear supplemental Class E trousers/leggings in addition to a Type R Class III high-visibility apparel.

Faded items are not considered highly visible and do not meet minimum standard requirements. Manufacturers allow a limited number of washings for each item; employees must follow manufacturer limits and replace items when necessary.

Other body protection includes garments and accessories intended to protect the body or body parts from exposure to chemicals, cut hazards, fire, or temperature extremes. These garments and/or accessories include fire retardant (e.g., Nomex) work clothes, chemical aprons, coveralls, or splash suits, body cooling apparel, lab coats or aprons, or even, for the highest level of protection, a ‘fully encapsulated’ suit.

6.3.4 Hand Protection

HAND PROTECTION CHART BY HAZARD TYPE

Hazards/Tasks Check the SRP for task-specific hand protection requirements.	Minimum Cut Level (ANSI)	Impact Protection	Chemical Resistant	Heat Resistant
General purpose work like cylinder handling, moving samples, density gauge operations - abrasion or scrape, back of hand protection	A3	ANSI / ISEA 138 1		
General purpose office work like moving boxes.	A3			
Concrete testing - abrasion or scrape + fluid resistance / chemical protection	A3	ANSI / ISEA 138 1	■	
Lab oven operations - burns from high temperatures	A1			■
Asbestos sampling, utility knife or other sharp edge tool usage. *Any cut or laceration hazard risk.*	A5			
Chemical Protection[1] (environmental work, lab chemicals)	A3		■	
Equipment maintenance, hand tool usage, drilling operations, hand auger, or any task with a higher impact, pinch, crush, strike hazard	A3	ANSI / ISEA 138 2		
Environmental soil sampling, ground-water, sediment, surface water [1]	A3		■	
Geotechnical soil sampling, ground-water, sediment, surface water [1,2]	A3			
Electrical	Working with live electrical, other than low voltage, requires specific PPE and electrical training (i.e., NFPA 70E).			

EN388

Abrasion
Blade Cut
Tear
Puncture

x x x x

A1 ANSI Cut Level

Gloves are rated by either the EN388 or ANSI 2016 standard on abrasion, cut, tear, and puncture resistance. Protection increases as the number increases. Please note that this is cut resistance. No glove is cut-proof.

[1] For environmental contamination / chemical protection more than one glove may be needed to mitigate a hazard. For example, a nitrile inner glove with outer glove for impact/cut protection. Determine hand protection based on the project safety plan, SRP, and pre-task planning.

[2] For logging geotechnical soil samples gloves may be temporarily removed to determine soil texture, however before doing so, logger must assess soil to be free of contamination or harmful debris.

A wide assortment of gloves is available to protect hands against burns, cuts, abrasions, and contact with chemicals. A single glove, generally, does not provide protection against all potential hand hazards, and commonly available glove materials only provide limited protection against many chemicals. Therefore, it is important to select the most appropriate glove for a particular application and to determine how long it can be worn and whether it can be reused. Consult the Terracon Hand Protection Chart (left) to assist in selection. Glove selection should also be based on information relating to hazard protection such as Safety Data Sheets for the chemical being handled, technical bulletins, pamphlets, publications, or task specific recommendations (e.g., welding gloves for welding, cutting, or brazing). It is also important to know the performance characteristics of gloves relative to the specific hazards anticipated (e.g., chemicals, cut hazards, etc.). Consideration must be given to the degree of dexterity needed, the duration, frequency, and degree of exposure to hazards, and the physical stresses to be applied to the protective material.

6.3.5 Foot Protection

Foot protection, in the form of safety shoes or boots. Safety footwear must be sturdy and have an impact-resistant toe-guard and is required to protect against impact or puncture hazards. Additional protection, such as metatarsal guards (i.e., metal shield which fits over shoe and protects instep from impact), may be found in some types of footwear.

- Safety Footwear (boots) - are required for employees that work in field operations (project sites) and are acceptable for labs, warehouses, and workshops. These boots provide ankle support for unimproved terrain and must be:
  - Lace up *(use of 'muck' style boots is approved for use in standing mud / water conditions)*
  - Over the ankle
  - Be made of a nonporous material
  - Have a defined heel *(steel / rebar inspectors may use flat sole safety footwear)*
  - Comply with ASTM F2413 compression standards (previously ANSI Z41-1991)

- Safety Footwear (other than boots) - is acceptable for employees that work in an office setting or in the lab area only. These shoes provide no ankle support and should only be used for flat, smooth work surfaces. Safety footwear other than boots shall:
    - Have a defined heel
    - Comply with ASTM F2413 compression standards (previously ANSI Z41-1991)
- Safety Toe Caps (OSHA Toe / Visitor Footwear) – Toe caps may be provided to lab visitors or Terracon employees who need to visit the lab, warehouse or workshop temporarily and not perform any testing or active work. They are not to be used for full time lab work that requires foot protection. Toe caps must be used per manufacturer's instructions and must be properly sized to the wearer, fitted over flat sole, closed toe shoes, and only used for visitors. Toe caps may not be used by children or by adults with improper footwear i.e., open toed shoes, heeled shoes, sandals.
- Chemical resistant boots must be worn when contact with a hazardous chemical is possible. Disposable, chemically protective boot covers may be used in instances where extensive decontamination would otherwise be required. These boots will be issued by Terracon.
- Footwear such as snake boots, hip waders for wetlands observations and other specialty footwear will be provided at no cost by Terracon and must be approved by the Project Manager prior to purchase.

Terracon will offer a subsidy to purchase safety footwear for all full-time employees whose work requires safety footwear. Each eligible employee may purchase Terracon-approved safety footwear every 12 months through the authorized safety footwear program vendor. Any exceptions must be approved by the Office Manager.

6.3.6 Hearing Protection

Hearing protection requirements are covered in the Terracon Hearing Conservation Policy. At a minimum, all employees are provided hearing protection (minimum NRR 20) at no charge to be worn in high noise areas.

6.3.7 Respiratory Protection

Respiratory protection requirements are covered in the Terracon Respiratory Protection Policy. At a minimum, all employees required to wear respiratory protection (based on hazard analysis) will be trained in the selected PPE, medically qualified and annually fit tested in the specific respiratory protection to be used.

6.3.8 Fall Protection

Fall protection requirements are covered in the Terracon Working at Heights Policy. Personnel working at unprotected heights above six (6) feet or as required by local regulations must have 100% fall protection which includes the following PPE:

- Full body harness
- Fall restraint lanyard with shock absorber or dual self-retracting lanyard
- Type 2 hard hat with chin strap

6.4 Access/ Egress (formerly PPE-Free) Zones

An Access/Egress Zone (formerly PPE-Free Zone) is defined as an area where employees are not required to wear PPE because minimal or exist and no work is being performed in an area primarily used for access to or egress from active work areas. Access/Egress Zones will be designated by posted maps and lines on the floor on an office-by-office basis. Terracon's policy on Access/Egress Zones can be found in the Attachments section of this Policy.

In the event a task must be performed in an Access/Egress Zone, that area becomes a work area and PPE requirements return. Reinstatement of Access/Egress Zone occurs only after the task is completed and associated hazards are no longer present.

6.5 Training

Terracon employees must be trained in the contents of this policy and receive general personal protective equipment training during onboarding through Terracon University in the following courses:

- OSHA – PPE – Eye and Face Protection
- Personal Protective Equipment (PPE) Overview (US)

Training will include the limitations, the selection, proper use, proper care / maintenance, and how to properly maintain selected PPE.

Supervisors are responsible for ensuring training is completed before an employee may use personal protective equipment.

Face-to-face personal protective equipment training must be conducted by a Competent Person.

Employee retraining will be required if:

- This Policy is revised due to changes in policy or regulatory compliance.
- Equipment is changed (other than replacements).
- The employee exhibits a lack of understanding or skill needed to work safely.
- It has been more than three years since their last training.

6.6 Record keeping

- All medical records relevant to personal protective equipment use are kept confidential and will not be released without written consent of the employee. All records will be maintained indefinitely by Terracon Safety.
- Training records will include the dates of training, the individuals in attendance, a brief summary of the program's contents and the trainer's qualifications. All records will be maintained indefinitely by Terracon Safety.
- All injuries will be investigated and documented. Corrective actions from incident analysis will be incorporated into work procedures to prevent recurrence.

Appendix F

Community Air Monitoring Plan

COMMUNITY AIR MONITORING PLAN

Westchester County Airport

Site No. C360174

West Harrison, New York

West Harrison, New York

June 2025 | Terracon Project No. JA257006

Prepared for:

County of Westchester
148 Martine Avenue
White Plains, New York 10601

Prepared by:

Terracon Consultants-NY, Inc.
Rochester, New York

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1.0 INTRODUCTION

The CAMP requires real-time monitoring of volatile organic compounds (VOCs) and particulates (dust) at downwind perimeter of each designated work area. The CAMP will be implemented during any subsurface activities associated with interim remedial actions, remedial investigation, excavation or other site actions. This CAMP will be completed in general accordance with NYSDEC DER-10 Appendix 1A, as included in Attachment A. Proposed locations include one upwind and one downwind location within the working area. Monitoring points and map locations will be determined prior to intrusive activities. In addition, wind conditions will be observed during intrusive activities, which may influence the locations of the monitoring points.

2.0 VOLATILE ORGANIC COMPOUND (VOCS) AIR MONITORING

Intrusive activities will have active VOC monitoring in the form of perimeter air monitors, running continuously throughout any soil or material disturbances. For a more detailed outline pertaining to intrusive work, refer to the Excavation Work Plan in Appendix C of the ISMP. VOC monitoring will be done using an organic vapor meter (OVM) equipped with a photoionization detector (PID) to provide real-time recordable air monitoring data. VOC air monitoring will not be required during non-intrusive activities.

VOCs will also be monitored and recorded at the downwind perimeter of the immediate work area(s). Upwind concentrations will be measured at the beginning of each day before activities begin and periodically throughout the day to establish background conditions. The downwind VOC monitoring device will also be checked periodically throughout the day to assess emissions and the need for corrective action. VOC monitoring action levels as per *DER-10 Technical Guidance for Site Investigations and Remediation* are as follows:

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per

instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

If the organic vapor level at the perimeter of the work area persists 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 take 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 than that 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shut down.

3.0 PARTICULATE AIR MONITORING

The remediation and/or investigation crew will make all efforts to suppress dust and particulate matter during the handling of contaminated soil. Fugitive dust and particulate monitoring will be completed in accordance with DER-10 Appendix 1B, as included in Attachment 1B. The following techniques have been shown to be effective for the controlling 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/or
(g) Reducing the excavation size and/or number of excavations.

Care will be taken not to use excess water, which can result in unacceptably wet site conditions. Use of atomizing sprays will prevent overly wet conditions, conserve water and provide an effective means of suppressing fugitive dust.

Weather conditions will be evaluated during remedial work. When extreme wind conditions make dust control ineffective, as a last resort, remedial actions may need to be suspended.

Dust and particulate monitoring will be conducted near approximate upwind and downwind perimeters of the work area, when possible. If visual evidence of dust is apparent in other locations, monitoring equipment will be placed where necessary. Dust monitoring may be suspended during period of precipitation and snow cover.

Particulate air monitoring will be done with a DataRAM-4 (or similar), which will be capable of reading particles less than 10 micrometers in size (PM-10) and equipped with an audible alarm feature which will indicate exceedances. Dust monitoring devices will be recorded periodically throughout the day to assess emissions and the need for corrective actions. Particulate monitoring action levels as per *DER-10 Technical Guidance for Site Investigations and Remediation* is as follows:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter ($\mu g/m^3$) greater than background for a 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 ($\mu g/m^3$) above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 ($\mu g/m^3$) 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/m3 of the upwind level and in preventing visible dust migration.

If any exceedances occur, or public health complaints filed, they will be relayed within 24-hours to NYSDEC and NYSDOH. Exceedances of any action levels listed will be reported to NYSDEC and NYSDOH Project Managers.

4.0 DOCUMENTATION

All 15-minute readings will be recorded and be available for or State (NYSDEC and NYSDOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

5.0 WIND DIRECTION

Prevailing wind direction will be recorded at the beginning of each work day by visual observations of an on-site windsock. As wind direction may change throughout the work day, direction will be reestablished if a significant change in direction is observed. The wind direction results will be utilized to determine the placement of the monitoring equipment.

APPENDIX A

Attachment 1A

GENERIC COMMUNITY AIR MONTITORING 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 B

Attachment 1B

FUGITIVE DUST AND PARTICULATE MONITORING

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 G

Site Management Forms (Vacant)

Appendix H

Request to Import/Reuse Fill Material Form

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

Site Name:

Site Number:

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:

Name and address of fill 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

Appendix I

WSP Semi-Annual Groundwater Sampling Plan

WSP was contracted to complete groundwater sampling in August 2018 by Westchester County on a semi-annual basis. It is part of a monitoring program which was reinstated in response to a November 2017 sampling event that confirmed the presence of per- and polyfluoroalkyl substances (PFAS) in previously installed airport monitoring wells. Since 2020, WSP has completed ten sampling campaigns.

WSP samples a range of monitoring wells on-site for PFAS, volatile organic compounds (VOCs), 1,4-dioxane and glycols (ethylene and propylene glycol). Due to the nature of the site and previous wells installed, some are damaged, abandoned or dry. In October 2021, 15 new monitoring wells were added to the sampling program. Per WSP,

"All wells were sampled with dedicated, disposable, high-density polyethylene (HDPE) (PFAS free) bailers. Prior to sampling, the wells were purged of three standing volumes of water, or until dry, using either a dedicated HDPE bailer or a PFAS-free submersible pump with dedicated HDPE tubing. Between sampling points the submersible pump was decontaminated with a soap and water solution followed by a distilled water rinse.

The samples were collected in laboratory-prepared containers and were kept cold until delivery the following day to York Analytical Laboratories of Stratford, CT (a New York State-certified laboratory)… Water-level measurements were made in each well prior to sampling."

The semi-annual reports have been sent directly to NYSDEC representatives. WSP states that no formal sampling plan has been drafted, as it was part of the voluntary monitoring program.