

QUALITY ASSURANCE PROJECT PLAN (QAPP)

**Fernbrook Park & Commuter Parking
70 Fernbrook Street**

**Section: 1, Block: 615, Lot: 1 & Section: 1, Block: 600, p/o Lot: 1
Yonkers, Westchester County, NY 10705**

DEC Site No. C360264

Brownfield Cleanup Agreement (BCA) C360264-11-25

Prepared for:

**City of Yonkers
40 S Broadway
Yonkers, New York 10701**

February 2026

PREPARED BY:



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J.S. Held PROJECT No. 23022270

TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
1.0 PROJECT DESCRIPTION	1
1.1 INTRODUCTION	1
1.2 PROJECT OBJECTIVES	1
1.3 SCOPE OF WORK.....	1
2.0 NAME AND CONTACT INFORMATION FOR PRINCIPAL PERSONNEL	4
3.0 DATA QUALITY OBJECTIVES AND PROCESS.....	5
4.0 QUALITY ASSURANCE OBJECTIVES COLLECTION OF DATA.....	7
4.1 PRECISION	7
4.2 ACCURACY.....	7
4.3 COMPLETENESS.....	7
4.4 REPRESENTATIVENESS	8
4.5 COMPARABILITY.....	8
4.6 SENSITIVITY	9
5.0 SAMPLE COLLECTION AND FIELD DATA ACQUISITION PROCEDURES	10
5.1 FIELD DOCUMENTATION PROCEDURES	10
5.1.1 Field Data and Notes.....	10
5.1.2 Sample Labeling	11
5.2 EQUIPMENT CALIBRATION AND PREVENTATIVE MAINTENANCE.....	11
5.3 SAMPLE COLLECTION	12
5.4 SAMPLE CONTAINERS AND HANDLING	14
5.5 SPECIAL CONSIDERATIONS FOR EMERGING CONTAMINANT SAMPLE COLLECTION	14
5.6 SAMPLE PRESERVATION.....	14
5.7 SAMPLE SHIPMENT	15
5.7.1 Packaging.....	15
5.6.2 Shipping.....	15
5.7 DECONTAMINATION PROCEDURES	15
5.8 RESIDUALS MANAGEMENT	15
5.9 CHAIN OF CUSTODY PROCEDURES.....	16
5.10 LABORATORY SAMPLE STORAGE PROCEDURES.....	17
6.0 DATA REDUCTION, VALIDATION, AND REPORTING.....	18
6.1 INTRODUCTION.....	18
6.2 DATA REDUCTION	18
6.3 DATA VALIDATION.....	18
6.4 REPORTING	19
7.0 QUALITY ASSURANCE PERFORMANCE AUDITS AND SYSTEM AUDITS	20
7.1 INTRODUCTION.....	20
7.2 SYSTEM AUDITS.....	20
7.3 PERFORMANCE AUDITS	20

7.4	FORMAL AUDITS.....	20
8.0	CORRECTIVE ACTION.....	22
8.1	INTRODUCTION.....	22
8.2	PROCEDURE DESCRIPTION.....	22

LIST OF APPENDICES

A	ANALYTICAL METHODS AND QUALITY ASSURANCE SUMMARY TABLE
B	SAMPLE CHAIN-OF-CUSTODY FORMS
C	CORRECTIVE ACTION REQUEST FORM

1.0 PROJECT DESCRIPTION

1.1 INTRODUCTION

This Quality Assurance Project Plan (QAPP) was prepared by J.S. Held, LLC (J.S. Held) in connection with the property identified under DEC Site No. C360264 as Fernbrook Park & Commuter Parking, located at 70 Fernbrook Street in Yonkers, New York (the “subject property” or “Site”). The Site is 2.87 acres in size and is identified on local tax maps as Section 1 Block 615 Lot 1 and Section 1 Block 600 p/o Lot 1.

This QAPP specifies analytical methods to be used to ensure that data collected during site investigation activities are precise, accurate, representative, comparable, complete, and meet the sensitivity requirements of the project.

1.2 PROJECT OBJECTIVES

The objective of the RIWP is to further characterize subsurface soil quality throughout the extent of the Site, investigate potential contaminant migration pathways, and to further investigate contamination hotspots identified in soils during the SI phase; further delineate and define the impacted groundwater plume via the installation of additional permanent monitoring wells; and assess whether a vapor concern exists at the site.

1.3 SCOPE OF WORK

Soil Investigation

Soil Boring Advancement

Approximately twenty-five (25) soil borings are planned to be advanced throughout the site as part of J.S. Held’s proposed RI activities. Specifically, three (3) soil borings are proposed throughout the northernmost portion of the site, two (2) soil borings are proposed along the northwest side of the Site, ten (10) soil borings are proposed throughout the central/eastern portion of the site, and ten (10) soil borings are proposed throughout the southern portion of the site. As mentioned, proposed RI soil borings will be used to fill in data gaps where soil sampling has not yet been performed at the site, and to generate additional data to the depth of the regional confining unit or top of bedrock.

Borings will be advanced using a track-mounted GeoProbe rotary sonic rig to bedrock or natural refusal. Soils will be field screened with a photoionization detector (PID) and for visual and olfactory signs of gross contamination.

Soil Sampling

Up to three (3) soil samples will be collected from each boring. One (1) sample will be collected at the depth interval of greatest observed contamination. If signs of gross contamination are not observed, a soil sample will be collected at the half-foot interval above the observed water table. One (1) deeper vertical delineation sample will be collected from below the depth interval of greatest observed contamination and above the observed confining layer. Up to five (5)

representative surficial samples will be collected at the 0-2 inch interval directly beneath asphalt or concrete or in areas of exposed surface soil.

Soil samples will be collected in accordance with the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (Version April 2019). All soil samples will be immediately placed on ice and submitted to a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratory. Soil samples will be analyzed for VOCs, SVOCs, Metals, Pesticides, PCBs, and PFAS.

Groundwater Investigation

Monitoring Well Installation

J.S. Held plans to install approximately fourteen (14) additional permanent groundwater monitoring wells throughout the site. Of the fourteen (14) permanent monitoring wells, twelve (12) wells are proposed to be installed as overburden groundwater monitoring wells and two (2) wells are proposed to be installed as bedrock groundwater monitoring wells. Of the fourteen (14) permanent monitoring wells, twelve (12) wells are proposed to be installed as overburden groundwater monitoring wells and two (2) wells are proposed to be installed as bedrock groundwater monitoring wells. The proposed overburden groundwater monitoring wells will be installed to screen the water table (soil/water interface). However, if a confining layer is identified at the site during RI activities, J.S. Held proposes to screen three (3) of these wells at the 5-foot depth interval immediately above the observed confining layer, in an effort to better characterize the overburden groundwater bearing zone. As described above, the objective of the RI groundwater investigation is to further define and delineate the extent of the impacted groundwater plume at the Site.

After installation, all monitoring wells will be properly developed to remove any accumulated fines and establish hydraulic connection with the surrounding aquifer. Wells will be developed using a peristaltic pump with dedicated tubing until groundwater runs clear. All water generated during well development will be drummed for off-site disposal. The drums will be securely staged, pending appropriate disposal to a permitted off-site facility.

After installation of all proposed groundwater monitoring wells is completed, the groundwater monitoring wells will be surveyed by a licensed New York surveyor.

Groundwater Sampling

Following the survey of the newly installed wells, the full monitoring well network at the site will be sampled. Prior to sampling, each well will be gauged with an interface probe to record a depth to groundwater (1/100 foot). Each well will be purged prior to sampling. Purging will consist of pumping until the physical and chemical parameters (e.g. temperature, dissolved oxygen, oxygen reduction potential, and turbidity) stabilize within the ranges specified in the USEPA's Low Stress Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells, Dated July 30, 1996 and revised January 19, 2010. All water generated during well purging will be drummed for offsite disposal. The drums will be securely staged, pending appropriate disposal to a permitted off-site facility. Samples will be collected with a submersible or peristaltic pump

and dedicated polyethylene tubing. If either LNAPL and/or DNAPL are observed, appropriate samples will be collected using a bailer for characterization and “fingerprint analysis.”

Groundwater samples will be collected in accordance with the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation (Version April 2019). All groundwater samples will be immediately placed on ice and submitted to a NYSDOH ELAP-certified laboratory within 48 hours of sample collection. Groundwater samples will be analyzed for VOCs, SVOCs, 1,4-Dioxane, PCBs, Pesticides, Metals and PFAS.

Soil Vapor Investigation

Soil Vapor Sampling

The RI will include a soil vapor intrusion investigation of the site. Approximately seven (7) soil vapor samples will be collected at the site, focused on the following areas:

- Where VOCs were identified in soil above applicable SCOs.
- Where VOCs were identified in groundwater above TOGS-GAs.
- Areas planned for future development of office or storage structures.

The objective of the soil vapor intrusion investigation is to assess whether a vapor concern exists at the site. Proposed locations will be evaluated using soil vapor samples. Proposed soil vapor sample locations are depicted on **Figure 10**. Please note, actual soil vapor locations will be selected following a review of soil and groundwater data and may differ from the locations depicted on **Figure 10**. Soil vapor probes will be installed up to 5 feet bgs, as depth to groundwater has been observed at approximately 6 feet bgs during groundwater sampling events.

Redevelopment plans for the Site include demolition of all existing structures. Therefore, sub-slab vapor probes are not warranted at this time. Soil vapor samples collected as part of this RI will be used to evaluate future sampling to be done as part of construction. If elevated soil vapor concentrations are identified, a soil vapor intrusion (SVI) evaluation will be conducted in any future buildings with a potential VI exposure pathway.

Soil vapor samples will be collected in accordance with the New York State Department of Health (NYSDOH) Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006). All soil vapor samples will be submitted to a NYSDOH ELAP-certified laboratory. Sub-slab vapor and soil vapor samples will be collected in 1-liter Summa cannisters over an approximate 8-hour period and will be analyzed for VOCs via EPA Method TO-15.

2.0 NAME AND CONTACT INFORMATION FOR PRINCIPAL PERSONNEL

The RIWP objectives will be documented by J.S. Held on behalf of the City of Yonkers. For the scope of work described in the RAWP, sampling will be conducted by J.S. Held and the analytical services will be performed by an New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratory.

Key Contacts for this project are as follows:

Site Owner:	City of Yonkers (914) 377-6000
Project Manager:	Seamus Kelly (551) 355-6318
Quality Assurance Manager:	Leah DeEgidio (551) 355-6282
J.S. Held Health & Safety Officer:	Thomas Sumner (504) 420-1898
Site Safety Coordinator:	Danielle Pomponio (551) 355-6273
Certified Professional Engineer (PE):	Eric Keller, PE #065234-1 (551) 355-6318
Field Team Leader:	Jake Twill (646) 628-8496
Laboratory Representatives:	SGS North America Inc. Viktoriya Pushkova (732) 755-0219 Pace Analytical Services Stephen Reduker (973) 227-0422

3.0 DATA QUALITY OBJECTIVES AND PROCESS

Data Quality Objectives (DQOs) are qualitative and quantitative statements to help ensure that data of known and appropriate quality are obtained during the project. DQOs for sampling activities are determined by evaluating five factors:

- Data needs and uses: The types of data required and how the data will be used after it is obtained.
- Parameters of Interest: The types of chemical or physical parameters required for the intended use.
- Level of Concern: Levels of constituents, which may require remedial actions or further investigations.
- Required Analytical Level: The level of data quality, data precision, and QA/QC documentation required for chemical analysis.
- Required Detection Limits: The detection limits necessary based on the above information.

The quality assurance and quality control objectives for all measurement data include:

- **Precision** – an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Field sampling precision will be determined by analyzing coded duplicate samples and analytical precision will be determined by analyzing internal QC duplicates and/or matrix spike duplicates.
- **Accuracy** – a measure of the degree of agreement of a measured value with the true or expected value of the quantity of concern. For soil and groundwater samples, accuracy will be determined through the assessment of the analytical results of field blanks and trip blanks for each sample set. Analytical accuracy will be assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), internal standards, laboratory method blanks, instrument calibration, and the percent recoveries of matrix spike compounds added to selected samples and laboratory blanks.
- **Representativeness** – expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is dependent upon the adequate design of the sampling program and will be satisfied by ensuring that the scope of work is followed and that specified sampling and analysis techniques are used. Representativeness in the laboratory is ensured by compliance to nationally-recognized analytical methods, meeting sample holding times, and maintaining sample integrity while the samples are in the laboratory's possession. This is accomplished by following all applicable methods, laboratory-issued standard operating procedures (SOPs), the laboratory's Quality Assurance Manual, and this QAPP. The laboratory is required to be properly certified and accredited.
- **Completeness** – the percentage of measurements made which are judged to be valid. Completeness will be assessed through data validation. The QC objective for completeness is generation of valid data for at least 90 percent of the analyses requested.

- **Comparability** – expresses the degree of confidence with which one data set can be compared to another. The comparability of all data collected for this project will be ensured using several procedures, including standard methods for sampling and analysis as documented in the QAPP, using standard reporting units and reporting formats, and data validation.
- **Sensitivity** – the ability of the instrument or method to detect target analytes at the levels of interest. The project manager will select, with input from the laboratory and QA personnel, sampling and analytical procedures that achieve the required levels of detection.

Data quality objectives, sampling procedures, analytical methods, quality assurance/quality control requirements, and reporting for emerging contaminants, including per- and polyfluoroalkyl substances (PFAS) and 1,4-Dioxane, will be implemented in accordance with applicable New York State Department of Environmental Conservation (NYSDEC) Emerging Contaminants guidance, including PFAS-specific QAPP, sampling, and analysis requirements, and DER-10 Technical Guidance for Site Investigation and Remediation.

4.0 QUALITY ASSURANCE OBJECTIVES COLLECTION OF DATA

The quality assurance and quality control objectives for all measurement data include precision, accuracy, representativeness, completeness, comparability, and sensitivity. These objectives are defined in following subsections. Variances from the quality assurance objectives at any stage of the investigation will result in the implementation of appropriate corrective measures and an assessment of the impact of corrective measures on the usability of the data.

4.1 PRECISION

Precision is a measure of the degree to which two or more measurements are in agreement. Field precision is assessed through the collection and measurement of field duplicates. Laboratory precision and sample heterogeneity also contribute to the uncertainty of field duplicate measurements. This uncertainty is taken into account during the data assessment process. For field duplicates, results less than 5x the reporting limit (RL) meet the precision criteria if the absolute difference is less than $\pm 2x$ the RL for soil or $\pm 1x$ for groundwater. For results greater than 5x the RL, the acceptance criteria is a relative percent difference (RPD) of $\leq 50\%$ (soil) or $\leq 30\%$ (groundwater).

4.2 ACCURACY

Accuracy is the measurement of the reproducibility of the sampling and analytical methodology. It should be noted that precise data may not be accurate data. For the purpose of this QAPP, bias is defined as the constant or systematic distortion of a measurement process, which manifests itself as a persistent positive or negative deviation from the known or true value. This may be due to (but not limited to) improper sample collection, sample matrix, poorly calibrated analytical or sampling equipment, or limitations or errors in analytical methods and techniques.

Accuracy in the field is assessed through the use of field blanks and through compliance to all sample handling, preservation, and holding time requirements. All field blanks should be non-detect when analyzed by the laboratory. Any contaminant detected in an associated field blank will be evaluated against laboratory blanks (preparation or method) and evaluated against field samples collected on the same day to determine potential for bias. Trip blanks are not required for non-aqueous matrices but are planned for non-aqueous matrices where high concentrations of VOCs are anticipated.

Laboratory accuracy is assessed by evaluating the percent recoveries of matrix spike/matrix spike duplicate (MS/MSD) samples, laboratory control samples (LCS), surrogate compound recoveries, and the results of method preparation blanks. MS/MSD, LCS, and surrogate percent recoveries will be compared to either method-specific control limits or laboratory-derived control limits. Sample volume permitting, samples displaying outliers should be reanalyzed. All associated method blanks should be non-detect when analyzed by the laboratory.

4.3 COMPLETENESS

Laboratory completeness is the ratio of total number of samples analyzed and verified as acceptable compared to the number of samples submitted to the fixed-base laboratory for analysis, expressed as a percent. Three measures of completeness are defined:

- Sampling completeness, defined as the number of valid samples collected relative to the number of samples planned for collection;
- Analytical completeness, defined as the number of valid sample measurements relative to the number of valid samples collected; and
- Overall completeness, defined as the number of valid sample measurements relative to the number of samples planned for collection.

Soil and groundwater data will meet a 90% completeness criterion. If the criterion is not met, sample results will be evaluated for trends in rejected and unusable data. The effect of unusable data required for determination of compliance will also be evaluated.

4.4 REPRESENTATIVENESS

Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. Representativeness is dependent upon the adequate design of the sampling program and will be satisfied by ensuring that the scope of work is followed and that specified sampling and analysis techniques are used. This is performed by following applicable SOPs and this QAPP. All field technicians will be given copies of appropriate documents prior to sampling events and are required to read, understand, and follow each document as it pertains to the tasks at hand.

Representativeness in the laboratory is ensured by compliance to nationally-recognized analytical methods, meeting sample holding times, and maintaining sample integrity while the samples are in the laboratory's possession. This is performed by following all applicable EPA methods, laboratory-issued SOPs, the laboratory's Quality Assurance Manual, and this QAPP. The laboratory is required to be properly certified and accredited.

4.5 COMPARABILITY

Comparability is an expression of the confidence with which one data set can be compared to another. Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the sampling plan is followed and that sampling is performed according to the SOPs or other project-specific procedures. Comparability is also dependent on similar quality assurance objectives. Previously collected data will be evaluated to determine whether they may be combined with contemporary data sets. The comparability of all data collected for this project will be ensured by:

- Using identified standard methods for both sampling and analysis phases of this project;
- Requiring traceability of all analytical standards and/or source materials to the USEPA or National Institute of Standards and Technology (NIST);
- Requiring that all calibrations be verified with an independently prepared standard from a source other than that used for calibration (if applicable);

- Using standard reporting units and reporting formats including the reporting of QC data;
- Requiring that all validation qualifiers be used any time an analytical results is used for any purpose.

These steps will ensure all future users of either the data or the conclusions drawn from them will be able to judge the comparability of these data and conclusions.

4.6 SENSITIVITY

Sensitivity is the ability of the instrument or method to detect target analytes at the levels of interest. The project director will select, with input from the laboratory and QA personnel, sampling and analytical procedures that achieve the required levels of detection and QC acceptance limits that meet established performance criteria. Concurrently, the project director will select the level of data assessment to ensure that only data meeting the project DQOs are used in decision-making.

Field equipment will be used that can achieve the required levels of detection for analytical measurements in the field. In addition, the field sampling staff will collect and submit full volumes of samples as required by the laboratory for analysis, whenever possible. Full volume aliquots will help ensure achievement of the required limits of detection and allow for reanalysis if necessary. The concentration of the lowest level check standard in a multi-point calibration curve will represent the reporting limit.

The frequency of associated field blanks and duplicate samples will be based on the recommendations listed in DER-10, and as described in Section 5.3.

Site-specific MS and MSD samples will be prepared and analyzed by the analytical laboratory by spiking an aliquot of submitted sample volume with analytes of interest. Additional sample volume is not required by the laboratory for this purpose. An MS/MSD analysis will be analyzed at a rate of 1 out of every 20 samples, or one per analytical batch. MS/MSD samples are only required for soil and groundwater samples.

5.0 SAMPLE COLLECTION AND FIELD DATA ACQUISITION PROCEDURES

Soil sampling will be conducted in accordance with the established NYSDEC protocols contained in DER-10 *Technical Guidance for Site Investigation and Remediation* (Version April 2019) and the NYSDEC’s “Guidance for Sampling, Analysis and Assessment of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC’s Part 375 Remedial Programs” (April 2023). Soil vapor sampling will be conducted in accordance with the established NYSDOH protocols contained in the *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (October 2006, updated February 2024). The following sections describe procedures to be followed for specific tasks.

5.1 FIELD DOCUMENTATION PROCEDURES

Field documentation procedures will include summarizing field data in field books, logging soil borings and monitoring well construction, completing forms for groundwater and sub-slab/soil vapor sampling, and proper sample labeling. These procedures are described in the following sections.

5.1.1 Field Data and Notes

Field notebooks contain the documentary evidence regarding procedures conducted by field personnel. Hard cover, bound field notebooks will be used because of their compact size, durability, and secure page binding. The pages of the notebook will not be removed.

Entries will be made in waterproof, permanent blue or black ink. No erasures will be allowed. If an incorrect entry is made, the information will be crossed out with a single strike mark and the change initialed and dated by the team member making the change. Each entry will be dated. Entries will be legible and contain accurate and complete documentation of the individual or sampling team’s activities or observations made. The level of detail will be sufficient to explain and reconstruct the activity conducted. Each entry will be signed by the person(s) making the entry.

The following types of information will be provided for each sampling task, as appropriate:

- Project name and number
- Reasons for being on-site or taking the sample
- Date and time of activity
- Sample identification numbers
- Geographical location of sampling points with references to the site, other facilities or a map coordinate system. Sketches will be made in the field logbook when appropriate
- Physical location of sampling locations such as depth below ground surface

- Description of the method of sampling including procedures followed, equipment used and any departure from the specified procedures
- Description of the sample including physical characteristics, odor, etc.
- Readings obtained from health and safety equipment
- Weather conditions at the time of sampling and previous meteorological events that may affect the representative nature of a sample
- Photographic information including a brief description of what was photographed, the date and time, the compass direction of the picture and the number of the picture on the camera
- Other pertinent observations such as the presence of other persons on the site, actions by others that may affect performance of site tasks, etc.
- Names of sampling personnel and signature of persons making entries

Field records will also be collected on field data sheets including boring logs, which will be used for geologic and drilling data during soil boring activities. Field data sheets will include the project-specific number and stored in the field project files when not in use. At the completion of the field activities, the field data sheets will be maintained in the central project file.

5.1.2 Sample Labeling

Each sample collected will be assigned a unique identification number and placed in an appropriate sample container. Each sample container will have a sample label affixed to the outside with the date and time of sample collection and project name. In addition, the label will contain the sample identification number, analysis required and chemical preservatives added, if any. All documentation will be completed in waterproof ink.

5.2 EQUIPMENT CALIBRATION AND PREVENTATIVE MAINTENANCE

A PID will be used during the sampling activities to evaluate work zone action levels and screen soil and sub-slab/soil vapor samples. Field calibration and/or field checking of the PID will be the responsibility of the field team leader and the site HSO, and will be accomplished by following the procedures outlined in the operating manual for the instrument. At a minimum, field calibration and/or field equipment checking will be performed once daily, prior to use. Field calibration will be documented in the field notebook. Entries made into the logbook regarding the status of field equipment will include the following information:

- Date and time of calibration
- Type of equipment serviced and identification number (such as serial number)

- Reference standard used for calibration
- Calibration and/or maintenance procedure used
- Other pertinent information

A water quality meter (Horiba U-52 or similar) will be used during purging of groundwater to measure pH, specific conductance, temperature, dissolved oxygen, turbidity and oxidation reduction-potential (ORP), every five minutes. Water-quality meters should be calibrated and the results documented before use each day using standardized field calibration procedures and calibration checks.

Equipment that fails calibration or becomes inoperable during use will be removed from service and segregated to prevent inadvertent utilization. The equipment will be properly tagged to indicate that it is out of calibration. Such equipment will be repaired and recalibrated to the manufacturer's specifications by qualified personnel. Equipment that cannot be repaired will be replaced.

Off-site calibration and maintenance of field instruments will be conducted as appropriate throughout the duration of project activities. All field instrumentation, sampling equipment and accessories will be maintained in accordance with the manufacturer's recommendations and specifications and established field equipment practice. Off-site calibration and maintenance will be performed by qualified personnel. A logbook will be kept to document that established calibration and maintenance procedures have been followed. Documentation will include both scheduled and unscheduled maintenance.

5.3 SAMPLE COLLECTION

Soil Samples

Soil samples will be visually classified, and field screened using a PID to assess potential impacts from VOCs and for health and safety monitoring. Soil samples collected for analysis of VOCs will be collected using either EnCore® or Terra Core® sampling equipment. For analysis of non-volatile parameters, samples will be homogenized and placed into glass jars. After collection, all sample jars will be capped and securely tightened and placed in iced coolers and maintained at 4°C ±2°C until they are transferred to the laboratory for analysis, in accordance with the procedures outlined in Section 5.4. In addition, analysis of collected soil samples will meet all quality assurance criteria set forth by this QAPP and DER-10.

Groundwater Samples

Groundwater sampling will be conducted using low-flow sampling procedures following USEPA guidance ("Low Stress [low flow] Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells", EQASOP-GW4, dated July 30, 1996, revised September 19, 2017).

During purging, field parameters should be measured, including: water level drawdown, purge rate, pH, specific conductance, temperature, dissolved oxygen, turbidity and ORP, every five

minutes using a water quality meter (Horiba U-52 or similar) and a depth-to-water interface probe that should be decontaminated between wells. Samples should generally not be collected until the field parameters have stabilized. Field parameters will be considered stable once three sets of measurements are within ± 0.1 standard units for pH, $\pm 3\%$ for conductivity and temperature, ± 10 millivolts for ORP, and $\pm 10\%$ for turbidity and dissolved oxygen. Purge rates should be adjusted to keep the drawdown in the well to less than 0.3 feet, as practical. Additionally, an attempt should be made to achieve a stable turbidity reading of less than 10 Nephelometric Turbidity Units (NTU) prior to sampling. If the turbidity reading does not stabilize at reading less than 10 NTU for a given well, then both filtered and unfiltered samples should be collected from that well. If necessary, field filtration should be performed using a 0.45 micron disposable in-line filter. Groundwater samples should be collected after parameters have stabilized as noted above or the readings are within the precision of the meter. Deviations from the stabilization and drawdown criteria, if any, should be noted on the sampling logs.

Samples should be collected directly into pre-cleaned laboratory-supplied jars. After collection, sample jars will be capped and securely tightened and placed in iced coolers to attempt to maintain a temperature of $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$ until they are transferred to the laboratory for analysis, in accordance with the procedures outlined in Section 5.4 and 5.6. Analysis and/or extraction and digestion of collected groundwater samples will meet the holding times required for each analyte. In addition, analysis of collected groundwater samples will meet all quality assurance criteria set forth by this QAPP and DER-10.

Sub-slab and Soil Vapor Samples

Soil vapor samples will be collected into laboratory-supplied, batch certified clean Summa® canisters calibrated for a sampling rate of six hours. The pressure gauges on each calibrated flow controller should be monitored throughout sample collection. Sample collection should be stopped when the pressure reading reaches -4 millimeters of mercury (mmHg).

Sample Field and Trip Blanks and Duplicates

Field blanks will be collected for quality assurance purposes at a rate of one per 20 soil investigations samples per analysis. Field blanks will be obtained by pouring laboratory-demonstrated analyte-free water on or through a decontaminated sampling device following use and implementation of decontamination protocols. The water will be collected off of the sampling device into a laboratory-provided sample container for analysis. Field blank samples will be analyzed for the complete list of analytes on the day of sampling. Trip blanks will be collected for quality assurance purposes for samples analyzed for VOCs. Trip blanks will be collected at a minimum frequency of one per shipment/cooler containing VOC samples. Results of trip blank analyses will be evaluated to assess potential cross-contamination during sample handling, transport, and storage.

Duplicate soil samples will be collected and analyzed for quality assurance purposes. Duplicate samples will be collected at a frequency of 1 per 20 investigative soil samples per analysis and will be submitted to the laboratory as “blind” samples. If less than 20 samples are collected during a particular sampling event, one duplicate sample will be collected.

5.4 SAMPLE CONTAINERS AND HANDLING

Certified, commercially clean sample containers will be obtained from the analytical laboratory. If soil or groundwater samples are being collected, the laboratory will also prepare and supply the required trip blanks and field blank sample containers and reagent preservatives. Sample bottle containers, including the field blank containers, will be placed into plastic coolers by the laboratory. These coolers will be received by the field sampling team within 24 hours of their preparation in the laboratory. Prior to the commencement of field work, J.S. Held field personnel will fill the plastic coolers with ice in Ziploc® bags (or equivalent) to maintain a temperature of $4^{\circ} \pm 2^{\circ} \text{C}$.

Soil and groundwater samples collected in the field for laboratory analysis will be placed directly into the laboratory-supplied sample containers. Samples will then be placed and stored on-ice in laboratory provided coolers until shipment to the laboratory. The temperature in the coolers containing samples and associated field blanks will be maintained at a temperature of $4^{\circ} \pm 2^{\circ} \text{C}$ while on-site and during sample shipment to the analytical laboratory.

Possession of samples collected in the field will be traceable from the time of collection until they are analyzed by the analytical laboratory or are properly disposed. Chain-of-custody procedures, described in Section 5.10, will be followed to maintain and document sample possession. Samples will be packaged and shipped as described in Section 5.7.

5.5 SPECIAL CONSIDERATIONS FOR EMERGING CONTAMINANT SAMPLE COLLECTION

The following special considerations would apply to the collection of groundwater samples for PFAS analysis to prevent cross-contamination:

- Field equipment will not contain Teflon®
- All sampling material will be made from stainless steel, HDPE, acetate, silicon, or polypropylene
- No waterproof field books will be used
- No plastic clipboards, binders, or spiral hard cover notebooks will be used
- No adhesives will be used
- No sharpies or permanent markers will be used; ball point pens are acceptable
- Aluminum foil will not be used
- PFAS samples will be kept in a separate cooler from other sampling containers
- Coolers will be filled only with regular ice

PFAS will be analyzed by modified USEPA Method 1633 for the PFAS target analyte list developed by the DER.

5.6 SAMPLE PRESERVATION

Sample preservation measures will be used in an attempt to prevent sample decomposition by contamination, degradation, biological transformation, chemical interactions and other factors during the time between sample collection and analysis. Preservation will commence at the time of sample collection and will continue until analyses are performed. Should chemical preservation

be required, the analytical laboratory will add the preservatives to the appropriate sample containers before shipment to the office or field.

5.7 SAMPLE SHIPMENT

5.7.1 Packaging

Sub-slab and soil vapor samples canisters can be stored and transported without additional packaging. Soil and groundwater sample containers will be placed in plastic coolers. Ice in Ziploc® bags (or equivalent) will be placed around sample containers. Cushioning material will be added around the sample containers if necessary. Chains-of-custody and other paperwork will be placed in a Ziploc® bag (or equivalent) and placed inside the cooler. The cooler will be taped closed and custody seals will be affixed to one side of the cooler at a minimum. If the samples are being shipped by an express delivery company (e.g. FedEx) then laboratory address labels will be placed on top of the cooler.

5.6.2 Shipping

Standard procedures to be followed for shipping environmental samples to the analytical laboratory are outlined below.

- All environmental samples will be transported to the laboratory by a laboratory-provided courier under the chain-of-custody protocols described in Section 5.10.
- Prior notice will be provided to the laboratory regarding when to expect shipped samples. If the number, type or date of shipment changes due to site constraints or program changes, the laboratory will be informed.

5.7 DECONTAMINATION PROCEDURES

Decontamination procedures will be used for non-dedicated sampling equipment. Decontamination of field personnel is discussed in the site-specific HASP included in the RIWP. Field sampling equipment that is to be reused will be decontaminated in the field in accordance with the following procedures:

- Laboratory-grade glassware detergent and tap water scrub to remove visual contamination
- Generous tap water rinse
- Distilled/de-ionized water rinse

Sample equipment used to collect PFAS samples will be decontaminated via a standard two step decontamination procedure using PFAS-free water. Decontamination water will be verified to be PFAS-free via laboratory analysis or certification in accordance with NYSDEC's "Sampling, Analysis, and Assessment of PFAS Under NYSDEC's Part 375 Remedial Programs" (April 2023).

5.8 RESIDUALS MANAGEMENT

Debris (e.g., paper, plastic and disposable PPE) will be collected in plastic garbage bags and disposed of as non-hazardous industrial waste. Debris is expected to be transported to a local municipal landfill for disposal. If applicable, residual solids (e.g., leftover soil cuttings) will be placed back in the borehole from which it was sampled. If gross contamination is observed, soil will be collected and stored in Department of Transportation (DOT)-approved 55-gallon drums in a designated storage area at the Site. The residual materials stored in a designated storage area at the site for further characterization, treatment or disposal.

Residual fluids (e.g., purge water, development water, and decontamination water) will not be discharged to the ground surface. All residual fluids will be collected, containerized in DOT-approved (or equivalent) containers, and managed as investigation-derived waste (IDW). Residual fluids will be stored in a designated on-site staging area and either characterized and disposed of off-site at an appropriately permitted facility or treated and managed in accordance with applicable federal, state, and local regulations.

5.9 CHAIN OF CUSTODY PROCEDURES

A chain-of-custody protocol has been established for collected samples that will be followed during sample handling activities in both field and laboratory operations. The primary purpose of the chain-of-custody procedures is to document the possession of the samples from collection through shipping, storage and analysis to data reporting and disposal. Chain-of-custody refers to actual possession of the samples. Samples are considered to be in custody if they are within sight of the individual responsible for their security or locked in a secure location. Each person who takes possession of the samples, except the shipping courier, is responsible for sample integrity and safekeeping. Chain-of-custody procedures are provided below:

- Chain-of-custody will be initiated by the laboratory supplying the pre-cleaned and prepared sample containers. Chain-of-custody forms will accompany the sample containers.
- Following sample collection, the chain-of-custody form will be completed for the sample collected. The sample identification number, date and time of sample collection, analysis requested and other pertinent information (e.g., preservatives) will be recorded on the form. All entries will be made in waterproof, permanent blue or black ink.
- J.S. Held field personnel will be responsible for the care and custody of the samples collected until the samples are transferred to another party, dispatched to the laboratory, or disposed. The sampling team leader will be responsible for enforcing chain-of-custody procedures during field work.
- When the form is full or when all samples have been collected that will fit in a single cooler, the sampling team leader will check the form for possible errors and sign the chain-of-custody form. Any necessary corrections will be made to the record with a single strike mark, dated, and initialed.

Sample coolers will be accompanied by the chain-of-custody form, sealed in a Ziploc® bag (or equivalent) and placed on top of the samples or taped to the inside of the cooler lid. If applicable,

a shipping bill will be completed for each cooler and the shipping bill number recorded on the chain-of-custody form.

Samples will be packaged for shipment to the laboratory with the appropriate chain-of-custody form. A copy of the form will be retained by the sampling team for the project file and the original will be sent to the laboratory with the samples. Bills of landing will also be retained as part of the documentation for the chain-of-custody records, if applicable. When transferring custody of the samples, the individuals relinquishing and receiving custody of the samples will verify sample numbers and condition and will document the sample acquisition and transfer by signing and dating the chain-of-custody form. This process documents sample custody transfer from the sampler to the analytical laboratory.

Laboratory chain-of-custody will be maintained throughout the analytical processes as described in the laboratory's Quality Assurance Manual. The analytical laboratory will provide a copy of the chain-of-custody in the analytical data deliverable package. The chain-of-custody becomes the permanent record of sample handling and shipment.

5.10 LABORATORY SAMPLE STORAGE PROCEDURES

The subcontracted laboratory will use a laboratory information management system (LIMS) to track and schedule samples upon receipt by the analytical laboratories. Any sample anomalies identified during sample log-in must be evaluated on individual merit for the impact upon the results and the data quality objectives of the project. When irregularities do exist, the environmental consultant must be notified to discuss recommended courses of action and documentation of the issue must be included in the project file.

For samples requiring thermal preservation, the temperature of each cooler will be immediately recorded. Each sample and container will be assigned a unique laboratory identification number and secured within the custody room walk-in coolers designated for new samples. Samples will be, as soon as practical, disbursed in a manner that is functional for the operational team. The temperature of all coolers and freezers will be monitored and recorded using a certified temperature sensor. Any temperature excursions outside of acceptance criteria (i.e., below 2°C or above 6°C) will initiate an investigation to determine whether any samples may have been affected. Samples for VOCs will be maintained in satellite storage areas within the VOC laboratory. Following analysis, the laboratory's specific procedures for retention and disposal will be followed as specified in the laboratory's SOPs and/or QA manual.

6.0 DATA REDUCTION, VALIDATION, AND REPORTING

6.1 INTRODUCTION

Data collected during the field investigation will be reduced and reviewed by the laboratory QA personnel, and a report on the findings will be tabulated in a standard format. The criteria used to identify and quantify the analytes will be those specified for the applicable methods in the USEPA SW-846 and subsequent updates. The data package provided by the laboratory will contain all items specified in the USEPA SW-846 appropriate for the analyses to be performed, and be reported in standard format.

The completed copies of the chain-of-custody records (both external and internal) accompanying each sample from time of initial bottle preparation to completion of analysis shall be attached to the analytical reports.

6.2 DATA REDUCTION

The Analytical Services Protocol (ASP) Category B data packages and an electronic data deliverable (EDD) will be provided by the laboratory after receipt of a complete sample delivery group. The Project Manager will immediately arrange for archiving the results and preparation of result tables. These tables will form the database for assessment of the site contamination condition.

Each EDD deliverable must be formatted using a Microsoft Windows operating system and the NYSDEC data deliverable format for EQUIS. To avoid transcription errors, data will be loaded directly into the ASCII format from the laboratory information management system (LIMS). If this cannot be accomplished, the consultant should be notified via letter of transmittal indicating that manual entry of data is required for a particular method of analysis. All EDDs must also undergo a QC check by the laboratory before delivery. The original data, tabulations, and electronic media are stored in a secure and retrievable fashion.

The Project Manager or Task Manager will maintain close contact with the QA reviewer to ensure all non-conformance issues are acted upon prior to data manipulation and assessment routines. Once the QA review has been completed, the Project Manager may direct the Team Leaders or others to initiate and finalize the analytical data assessment.

6.3 DATA VALIDATION

Data validation will be performed in accordance with the USEPA validation guidelines for organic and inorganic data review and validated by an independent third-party validator. Validation will include the following:

- Holding times;
- Instrument tuning;
- Instrument calibrations;
- Blank results;
- Interference check sample;
- Laboratory check samples;
- Duplicates;

- Matrix Spike;
- Furnace atomic absorption analysis QC;
- ICP serial dilutions;
- System monitoring compounds or surrogate recovery compounds (as applicable);
- Internal standard recovery results;
- MS and MSD results;
- Target compound identification;
- Chromatogram quality;
- Pesticide cleanup (if applicable);
- Compound quantitation and reported detection limits;
- System performance; and
- Verification of the QC sample results,
- Verification of the identification of sample results (both positive hits and non-detects),
- Recalculation of 10% of all investigative sample results,

A DUSR will be prepared and reviewed by the Quality Assurance Manager before issuance. The DUSR will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain-of-custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method.

Based on the results of data validation, the validated analytical results reported by the laboratory will be assigned one of the following usability flags:

- “U” - Not detected. The associated number indicates the approximate sample concentration necessary to be detected significantly greater than the level of the highest associated blank;
- “UJ” - Not detected. Quantitation limit may be inaccurate or imprecise;
- “J” - Analyte is present. Reported value may be associated with a higher level of uncertainty than is normally expected with the analytical method
- “N” – Tentative identification. Analyte is considered present in the sample;
- “R” – Unreliable result; data is rejected or unusable. Analyte may or may not be present in the sample; and
- No Flag - Result accepted without qualification.

6.4 REPORTING

Upon receipt of validated analytical results, NYSDEC format EDDs, compatible with EQUIS, will be prepared and submitted to the NYSDEC.

7.0 QUALITY ASSURANCE PERFORMANCE AUDITS AND SYSTEM AUDITS

7.1 INTRODUCTION

Quality assurance audits may be performed by the project quality assurance group under the direction and approval of the QAO. These audits will be implemented to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation of the measurement system(s). Functioning as an independent body and reporting directly to corporate quality assurance management, the QAO may plan, schedule, and approve system and performance audits based upon procedures customized to the project requirements. At times, the QAO may request additional personnel with specific expertise from company and/or project groups to assist in conducting performance audits. However, these personnel will not have responsibility for the project work associated with the performance audit.

7.2 SYSTEM AUDITS

System audits may be performed by the QAO or designated auditors, and encompass a qualitative evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field and laboratory quality control procedures and associated documentation may be system audited. These audits may be performed once during the performance of the project. However, if conditions adverse to quality are detected or if the Project Manager requests, additional audits may occur.

7.3 PERFORMANCE AUDITS

The laboratory may be required to conduct an analysis of Performance Evaluation samples or provide proof that Performance Evaluation samples submitted by USEPA or a state agency have been analyzed within the past twelve months.

7.4 FORMAL AUDITS

Formal audits refer to any system or performance audit that is documented and implemented by the QA group. These audits encompass documented activities performed by qualified lead auditors to a written procedure or checklists to objectively verify that quality assurance requirements have been developed, documented, and instituted in accordance with contractual and project criteria. Formal audits may be performed on project and subcontractor work at various locations.

Audit reports will be written by auditors who have performed the site audit after gathering and evaluating all data. Items, activities, and documents determined by lead auditors to be in noncompliance shall be identified at exit interviews conducted with the involved management. Non-compliances will be logged, and documented through audit findings, which are attached to and are a part of the integral audit report. These audit-finding forms are directed to management to satisfactorily resolve the noncompliance in a specified and timely manner.

The Project Manager has overall responsibility to ensure that all corrective actions necessary to resolve audit findings are acted upon promptly and satisfactorily. Audit reports must be submitted to the Project Manager within fifteen days of completion of the audit. Serious deficiencies will be

reported to the Project Manager within 24 hours. All audit checklists, audit reports, audit findings, and acceptable resolutions are approved by the QAO prior to issue. Verification of acceptable resolutions may be determined by re-audit or documented surveillance of the item or activity. Upon verification acceptance, the QAO will close out the audit report and findings.

8.0 CORRECTIVE ACTION

8.1 INTRODUCTION

The following procedures have been established to ensure that conditions adverse to quality, such as malfunctions, deficiencies, deviations, and errors, are promptly investigated, documented, evaluated, and corrected.

8.2 PROCEDURE DESCRIPTION

When a significant condition adverse to quality is noted at site, laboratory, or subcontractor location, the cause of the condition will be determined and corrective action will be taken to preclude repetition. Condition identification, cause, reference documents, and corrective action planned to be taken will be documented and reported to the QAO, Project Manager, Field Team Leader and involved contractor management, at a minimum. Implementation of corrective action is verified by documented follow-up action.

All project personnel have the responsibility, as part of the normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality. Corrective actions will be initiated as follows:

- When predetermined acceptance standards are not attained;
- When procedure or data compiled are determined to be deficient;
- When equipment or instrumentation is found to be faulty;
- When samples and analytical test results are not clearly traceable;
- When quality assurance requirements have been violated;
- When designated approvals have been circumvented;
- As a result of system and performance audits;
- As a result of a management assessment;
- As a result of laboratory/field comparison studies; and
- As required by USEPA SW-846, and subsequent updates, or by the NYSDEC ASP.

Project management and staff, such as field investigation teams, remedial response planning personnel, and laboratory groups, monitor on-going work performance in the normal course of daily responsibilities. Work may be audited at the sites, laboratories, or contractor locations. Activities, or documents ascertained to be noncompliant with quality assurance requirements will be documented. Corrective actions will be mandated through audit finding sheets attached to the audit report. Audit findings are logged, maintained, and controlled by the Task Manager.

Personnel assigned to quality assurance functions will have the responsibility to issue and control Corrective Action Request (CAR) Forms. The CAR identifies the out-of-compliance condition, reference document(s), and recommended corrective action(s) to be administered. The CAR is issued to the personnel responsible for the affected item or activity. A copy is also submitted to the Project Manager. The individual to whom the CAR is addressed returns the requested response promptly to the QA personnel, affixing his/her signature and date to the corrective action block, after stating the cause of the conditions and corrective action to be taken. The QA

personnel maintain the log for status of CARs, confirms the adequacy of the intended corrective action, and verifies its implementation. CARs will be retained in the project file for the records.

Any project personnel may identify noncompliance issues; however, the designated QA personnel are responsible for documenting, numbering, logging, and verifying the close out action. The Project Manager will be responsible for ensuring that all recommended corrective actions are implemented, documented, and approved.

APPENDIX A:
Analytical Methods and Quality Assurance Summary Table

Analytical Methods and Quality Assurance Summary
 Fernbrook Park and Commuter Parking
 70 Fernbrook Street, Yonkers, NY 10705
 DEC Site No. C360264



Analytical Methods and Quality Assurance Summary Table										
Area of Concern	Matrix	No. of Remedial Investigation Samples	No. of Field Blank Samples	No. of Trip Blank Samples	No. of Duplicate Samples	Parameter	Sample Container Type/Volume	Sampling Preservation	Maximum Holding Time	Analytical Method
Soil	SO	75	4	NA	4	VOCs	2 x 40 mL glass vials w/Teflon-lines septa	Cool ≤ 4°C	14 days	EPA 8260
						SVOCs, Pesticides, PCBs	1 x 8 oz amber glass jar	Cool ≤ 4°C	7 days extraction; 40 days analysis	EPA 8270 / 8081 / 8082
						TAL Metals	1 x 8 oz wide-mouth HDPE jar	Cool ≤ 4°C	6 months (Hg: 28 days)	EPA 6010 / 6020 / 7471
						PFAS	2 x 8 oz HDPE jars (no Teflon lids/liners)	Cool ≤ 4°C, no preservatives	28 days	EPA 1633
						1,4-Dioxane	1 x 8 oz amber glass jar (no preservative)	Cool ≤ 4°C	14 days	EPA 8270
Groundwater	AQ	18	1	1	1	VOCs	2 x 40 mL glass vials w/Teflon-lines septa	Cool ≤ 4°C, HCl to pH < 2	14-days	EPA 8260
						SVOCs, Pesticides, PCBs	1 x 1 L amber glass bottle	Cool ≤ 4°C	7 days extraction; 40 days analysis	EPA 8270 / 8081 / 8082
						TAL Metals	1 x 500 mL HDPE bottle	HNO3 to pH < 2, Cool ≤ 4°C	6 months (Hg: 28 days)	EPA 6010 / 6020 / 7471
						PFAS	2 x 250 mL HDPE bottles (no Teflon lids/liners)	Cool ≤ 4°C, no preservatives	28 days	EPA 1633
						1,4-Dioxane	2 x 500 mL amber glass bottles (no preservative)	Cool ≤ 4°C	14 days	EPA 8270 SIM

APPENDIX B:
Sample Chain-of-Custody Forms

**APPENDIX C:
Corrective Action Request Form**

Corrective Action Request (CAR) Form

CORRECTIVE ACTION REQUEST						
Number					Date	
To	_____					
You are hereby requested to take corrective actions indicated below and as otherwise determined by you to (a) resolve the noted condition and (b) to prevent it from recurring. Your written response is to be returned to the project quality assurance manager by _____						
Condition:						
Reference Documents:						
Recommended Corrective Actions:						
_____	_____	_____	_____	_____	_____	
Originator	Date	Approval	Date	Approval	Date	
Response:						
Cause of Condition						
Corrective Action						
A) Resolution B) Prevention C) Affected Documents						
C.A. Follow up:						