



## **Rockfarmer 37<sup>th</sup> Avenue**

82-13 37<sup>th</sup> Avenue  
Jackson Heights, Queens County, New York 11372  
Block 1456, Lots 35 & 41  
NYSDEC Site No. C241212

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# **REMEDIAL INVESTIGATION WORK PLAN**

**OCTOBER 23, 2018**

**PREPARED FOR:**

37<sup>th</sup> Avenue Owner LLC; Horizon 37<sup>th</sup> Ave, LLC; and RFC Ketcham 37<sup>th</sup> Ave, LLC  
42-01 235<sup>th</sup> Street  
Douglaston, New York 11363

**PREPARED BY:**

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**PROJECT NO: 48122**

October 23, 2018

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**RE: Remedial Investigation Work Plan  
Rockfarmer 37<sup>th</sup> Avenue  
82-13 37<sup>th</sup> Avenue  
Jackson Heights, Queens County, New York 11372  
Block 1456, Lots 35 & 41  
NYSDEC Site No. C241212**

Dear Mr. Grathwol:

Vertex Engineering, PC (VERTEX) is pleased to submit this proposed Remedial Investigation Work Plan (RIWP) for the above-referenced property (the site) on behalf of the Volunteer (37<sup>th</sup> Avenue Owner LLC, Horizon 37<sup>th</sup> Ave, LLC, and RFC Ketcham 37<sup>th</sup> Ave, LLC, tenants in common). The site is identified with New York State Department of Environmental Conservation (NYSDEC) Site No. C241212. A Brownfield Cleanup Agreement (BCA) was executed on July 25, 2018.

Please do not hesitate to contact us at your convenience should you have any questions or comments regarding this RIWP.

Sincerely,  
**Vertex Engineering, PC**



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**TABLE OF CONTENTS**

- 1.0 INTRODUCTION ..... 1**
  - 1.1 Site Description ..... 1
  - 1.2 Surrounding Land Use ..... 2
  - 1.3 Historic Use of the Site ..... 3
  - 1.4 Site Geology and Hydrogeology ..... 4
  - 1.5 Wetlands and Floodplain ..... 4
  
- 2.0 PREVIOUS VAPOR INTRUSION, SOIL, AND GROUNDWATER CHARACTERIZATION..... 6**
  - 2.1 Vapor Intrusion Investigation..... 6
  - 2.2 Soil and Groundwater Investigation ..... 7
  
- 3.0 QUALITY ASSURANCE PROJECT PLAN ..... 8**
  - 3.1 Project Technical Personnel and Contractors ..... 8
  - 3.2 Sampling Methodology ..... 8
  - 3.3 Report Logs..... 10
  - 3.4 Laboratory Summary..... 10
  - 3.5 Analytical Method/Quality Assurance ..... 10
  - 3.6 Quality Assurance Samples ..... 12
  
- 4.0 HEALTH AND SAFETY PLAN..... 13**
  
- 5.0 REMEDIAL INVESTIGATION WORK PLAN ..... 14**
  - 5.1 Citizen Participation ..... 14
  - 5.2 Utility Clearance and Geophysical Evaluation..... 14
  - 5.3 Sewer Evaluation ..... 15
  - 5.4 Soil Boring Installation..... 15
    - 5.4.1 Soil Sampling ..... 16
  - 5.5 SSDS Pilot Study..... 16
  - 5.6 Monitoring Well Installation ..... 17
    - 5.6.1 Groundwater Sampling ..... 18
  - 5.7 Investigation-Derived Waste Management ..... 19
  - 5.8 Reporting..... 20
  - 5.9 Implementation Schedule ..... 21

## **FIGURES**

Figure 1	Site Location Map
Figure 2	Land Use Summary Map
Figure 3	Former Drycleaner Locations
Figure 4	Wetlands Map
Figure 5	Soil Vapor Results Map
Figure 6	Indoor Air Results Map
Figure 7	Soil Results Map
Figure 8	Groundwater Results Map
Figure 9	Soil Vapor Results and Proposed Soil Boring Location Map
Figure 10	Groundwater Results and Proposed Well Location Map

## **TABLES**

Table 1	Sub-Slab Soil Vapor Results
Table 2	Indoor Air Results – Decision Matrix Values
Table 3	Indoor Air Results – Air Guidance Values
Table 4	Soil Results
Table 5	Groundwater Results

## **APPENDICES**

Appendix A	Health and Safety Plan
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### LIST OF ACRONYMS

Acronym	Definition
AAR	Alternative Analysis Report
AWQS	Ambient Water Quality Standards
BCA	Brownfield Cleanup Agreement
BCP	Brownfield Cleanup Program
BGS	Below Ground Surface
CLASS GA	Groundwater Effluent Limitations
CP PLAN	Citizens Participation Plan
DER	Division of Environmental Remediation
DNAPL	Dense Non-Aqueous Phase Liquid
DOT	Department of Transportation
DUSR	Data Usability Summary Report
ESA	Environmental Site Assessment
ELAP	Environmental Laboratory Accreditation Program
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FSI	Focused Site Investigation
GPR	Ground Penetrating Radar
HASP	Health and Safety Plan
HAZWOPER	Hazardous Waste Operations Emergency Response
IDW	Investigation-Derived Waste
LNAPL	Light Non-Aqueous Phase Liquid
NYCDEP	New York City Department of Environmental Protection
NYCDOB	New York City Department of Buildings
NYCDOT	New York City Department of Transportation
NYCRR	New York Codes Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
ORP	Oxidation-Reduction Potential
OSHA	United States Occupational Health and Safety Administration
PFAS	Per-and Polyfluoroalkyl Substances
PCE	Tetrachloroethene

Acronym	Definition
PE	Professional Engineer
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanesulfonic Acid
PID	Photo-Ionization Detector
PPE	Personal Protective Equipment
PPM	Parts Per Million
PVC	Poly Vinyl Chloride
QAPP	Quality Assurance Project Plan
QA / QC	Quality Assurance / Quality Control
RI	Remedial Investigation
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan
ROI	Radius of Influence
SCOs	Soil Cleanup Objectives
SSDS	Sub-Slab Depressurization System
TOGS	Technical and Operational Guidance Series
UG/L	Micrograms Per Liter
USEPA	United States Environmental Protection Agency
VI	Vapor Intrusion
VOCs	Volatile Organic Compounds

**REMEDIAL INVESTIGATION WORK PLAN**  
**Rockfarmer 37<sup>th</sup> Avenue**  
**82-13 37<sup>th</sup> Avenue**  
**Jackson Heights, Queens County, New York 11372**  
**Block 1456, Lots 35 & 41**  
**NYSDEC Site No. C241212**

## **1.0 INTRODUCTION**

This Remedial Investigation Work Plan (RIWP) has been developed for the Rockfarmer 37<sup>th</sup> Avenue property located at 82-13 37<sup>th</sup> Avenue in Jackson Heights, Queens County, New York (the site). The Volunteer (37<sup>th</sup> Owner LLC; Horizon 37<sup>th</sup> Ave, LLC; and RFC Ketcham 37<sup>th</sup> Ave, LLC) is participating in the New York State Brownfield Cleanup Program (BCP) pursuant to a Brownfield Cleanup Agreement (BCA) executed on July 25, 2018. The site is identified with New York State Department of Environmental Conservation (NYSDEC) Site No. C241212.

This RIWP has been prepared in general accordance with NYSDEC Division of Environmental Remediation (DER)-10 / Technical Guidance for Site Investigation and Remediation (May 3, 2010).

### **1.1 Site Description**

The site consists of two contiguous parcels identified as Block 1456, Lots 35 and 41. A Site Location Map is provided as Figure 1. According to the New York City Department of Buildings (NYCDOB), the site is identified with the following addresses: 82-01 to 82-09 37<sup>th</sup> Avenue, 82-11 to 82-21 37<sup>th</sup> Avenue, 35-57 to 35-65 82<sup>nd</sup> Street, and 35-64 83<sup>rd</sup> Street. The site is located in an urban area with a mix of commercial and residential buildings, located on the north side of 37<sup>th</sup> Avenue, between 82<sup>nd</sup> Street and 83<sup>rd</sup> Street. The approximate site area is 20,000 square feet (0.46 acres), which is divided equally between the two Lots.



The site is improved with an approximately 108,000-square foot (above-grade), nine-story commercial office building, with ground-floor retail (Rite Aid, nail salon, and vacant space) and a two-level parking garage. The site building is improved with a basement, which is occupied by office space, utilities and storage space. The site building is serviced by municipal water (New York City Department of Environmental Protection [NYCDEP]), municipal sanitary and storm sewer (NYCDEP), natural gas (Consolidated Edison), and electric (Consolidated Edison). The building footprint covers the entire site, and is surrounded to the south, east, and west by public sidewalks and roadways and to the north are residential structures.

The site is currently active, and there are no proposed use changes for the site. Based on a review of the New York City Department of City Planning Zoning and Land Use mapping program, the site is zoned C4-3. The C4 (commercial) zoning is described as areas mapped in regional commercial centers, outside of the central business districts. The C4 zone typically includes specialty and department stores, theaters, and other commercial and office uses. The neighboring properties are currently used for a combination of commercial and residential uses.

The site is generally flat. The entirety of the site is covered with impervious surface (building footprint, concrete sidewalks, and brick). Storm water drainage is expected to exit the site via overland flow and enter the municipal storm drains located in the adjoining roadways.

## **1.2 Surrounding Land Use**

The site is located in a highly developed urban area in Jackson Heights, New York. Adjacent properties to the north include residential buildings. Properties to the south, across 37<sup>th</sup> Avenue, include commercial/retail buildings. Located to the east, across 83<sup>rd</sup> Street, are ground-floor commercial/residential and residential buildings. Located to the west, across 82<sup>nd</sup> Street, include commercial and residential buildings.

Based on visual observations during a site reconnaissance and a review of the New York City Oasis mapping program, the following sensitive human receptors (residences and/or schools) were identified in the vicinity of the site:

Sensitive Human Receptors			
Name	Address	Distance/Direction from the Site	Gradient in Relation to the Site
Renaissance Charter School	35-59 81 <sup>st</sup> Street	175 feet West	Up-gradient
St. Joan of Arc Catholic School	3527 82 <sup>nd</sup> Street	315 feet North	Cross-gradient
82 <sup>nd</sup> Street Academics	8110 35 <sup>th</sup> Street	475 feet Northwest	Cross-gradient
Public School Q222	86-15 37 <sup>th</sup> Avenue	935 feet East	Down-gradient
Public School 212	34-25 82 <sup>nd</sup> Street	1,015 feet North	Down-gradient to Cross-gradient
Public School 69	77-02 37 <sup>th</sup> Avenue	1,100 feet West	Up-gradient
Residences	Various	Adjacent North, East, and West	Various

A map depicting the sensitive receptors in the vicinity of the site is provided as Figure 2.

### 1.3 Historic Use of the Site

According to a Draft *Phase I Environmental Site Assessment* (ESA) prepared by Merritt Environmental Consulting Corp. (Merritt), dated November 13, 2017, and VERTEX’s review of Sanborn fire insurance maps, the earliest identified use of the site included stores by at least 1930. The current commercial office building, with ground-floor retail and a parking garage, was constructed in 1993. Review of city directories identified Star Cleaning & Dyeing Co. at 82-05 37th Avenue in 1939 and Columbia Cleaners at 82-13 37th Avenue for the years 1939 to 1970. In addition, Cecil Cleaners was identified at 35-62 83rd Street from 1986 to 1994. No other

historical operations of environmental concern were identified. The locations of the former drycleaner tenant spaces are depicted on Figure 3.

#### **1.4 Site Geology and Hydrogeology**

Based upon the findings of a Phase II Focused Site Investigation (FSI) completed by The Vertex Companies, Inc. in December 2017 and February 2018, soils encountered at the site generally consist of sands from approximately 1.0 foot below ground surface (bgs) to the soil boring completion depth of 40.0 feet bgs. Bedrock was not encountered to a depth of 40 feet bgs. Groundwater was encountered at depths ranging from 32.65 to 34.19 feet bgs.

Based on review of local topography and the location of the closest water body in relation to the site, groundwater is assumed to flow to the northeast, towards Flushing Bay (Figure 4). On-site groundwater flow direction will be confirmed during the proposed Remedial Investigation (RI) activities outlined in this report. It is suspected that groundwater flow is likely impacted by the localized urban development, including subsurface utilities and building foundations.

In accordance with New York Codes, Rules and Regulations Title 6 (6 NYCRR) Part 701: Classifications -Surface Waters and Groundwater, groundwater at the site is identified as Class GA (fresh groundwater). There are no known groundwater supply wells on the site, and currently there are no known deed restrictions on the use of groundwater at the site. Groundwater in the vicinity of the site is not utilized for industrial, agriculture, or public supply purposes.

#### **1.5 Wetlands and Floodplain**

Review of the U.S. Fish & Wildlife Service, National Wetlands Inventory, Wetlands Mapper program identified no Federally-regulated wetlands on the site. The closest wetland area is located approximately 1.59 miles to the northeast. A wetland map is included as Figure 4. No

State-regulated wetlands were identified on the site or close in proximity to the site, based on a review of the NYSDEC tidal wetlands map.

No surface water bodies were observed on the site or on the adjoining properties. The closest waterbody is Flushing Bay, located approximately 1.59 miles to the northeast.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), the site is located in Zone X, which is an area of minimal flood hazard.

## **2.0 PREVIOUS VAPOR INTRUSION, SOIL, AND GROUNDWATER CHARACTERIZATION**

The following provides a summary of the site characterization activities completed to date at the site. These activities include sub-slab soil vapor, indoor air, soil, and groundwater sampling performed in December 2017 and February 2018. These investigation activities were documented in the Phase II FSI (VERTEX, March 2018), which was included in the BCP application submitted to the NYSDEC in April 2018.

### **2.1 Vapor Intrusion Investigation**

Vapor intrusion (VI) sampling conducted during the heating season in December 2017 and February 2018 included the collection of 10 sub-slab soil vapor samples (SS-1 through SS-10), 12 indoor air samples (IA-1 through IA-12), and two ambient air samples (AA). All samples were analyzed for the presence of volatile organic compounds (VOCs) by USEPA Method TO-15. Evaluation of the soil vapor analytical data identified concentrations of carbon tetrachloride and tetrachloroethene (PCE) in exceedance of the New York State Department of Health (NYSDOH) matrix sub-slab soil vapor concentration criteria. In addition, indoor air concentrations of carbon tetrachloride and PCE were identified at elevated concentrations at co-located positions with the highest sub-slab vapor samples. These contaminants are likely associated with the former on-site dry-cleaning operations. Evaluation of the soil vapor data compared to the indoor air data using the NYSDOH Vapor/Indoor Air Matrix Guidance (May 2017) identified seven sample locations where the contaminant concentrations are elevated to such levels that mitigation of the VI concern is warranted.

None of the other detected indoor air concentrations were identified in exceedance of the Indoor Air Quality Guidance Values (Table 3.1 in the NYSDOH *Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York* dated October 2006, and updated in September 2013 and August 2015).

A Soil Vapor Results Map is included as Figure 5, and the analytical results are summarized in Table 1. An Indoor Air Results Map is included as Figure 6, and the indoor air results compared to the NYSDOH matrix criteria is presented in Table 2. The indoor air results compared to the NYSDOH air guidance values is presented in Table 3.

## **2.2 Soil and Groundwater Investigation**

The soil and groundwater investigation conducted in February 2018 included the installation of three soil borings (VTW-1 through VTW-3) on the exterior of the site building. Each soil boring was converted to a temporary monitoring well for the collection of a groundwater sample. Soil and groundwater samples were collected and analyzed for VOCs.

Review of the soil analytical results identified no VOCs in exceedance of the most stringent NYSDEC Soil Cleanup Objectives (SCOs).

Review of the groundwater analytical results identified concentrations of PCE at VTW-1 (17 micrograms per liter [ug/L]) and at VTW-3 (90 ug/L) in exceedance of the NYSDEC Ambient Water Quality Standard (AWQS) and NYSDEC Groundwater Effluent Limitations (Class GA) standard of 5 ug/L. No exceedances of the applicable criteria were reported for the sample collected from the up-gradient well (VTW-2).

A Soil Results Map is included as Figure 7, and the soil analytical results are summarized in Table 4. A Groundwater Results Map is included as Figure 8, and the groundwater results are presented in Table 5.

### 3.0 QUALITY ASSURANCE PROJECT PLAN

A Quality Assurance Project Plan (QAPP) was prepared to guide the implementation of the proposed RI activities. Quality assurance/quality control (QA/QC) procedures will be used to provide performance information with regard to accuracy, precision, sensitivity, representation, completeness, and comparability associated with the sampling and analysis for the RI at the site.

#### 3.1 Project Technical Personnel and Contractors

The table below summarizes the planned principal personnel to participate in the RI activities.

Project Technical Personnel and Contractors			
Name	Company	Responsibility	Contact Information
Timothy Biercz	The Vertex Companies, Inc.	Project Manager	(908) 333-4317
Joseph Dultz	Vertex Engineering, PC	Project Manager / Technical Support	(908) 333-4312
Richard J. Tobia, P.E.	Vertex Engineering, PC	New York-licensed Professional Engineer	(908) 458-9604
Shawn Miller	Aquifer Drilling & Testing	Drilling Services	(516) 616-6026
Rhett Teller	Ground Penetrating Radar Systems Inc.	Geophysical Contractor	(347) 215-4249
Ethan Leighton	Alpha Analytical Inc.	Laboratory Contact	(508) 439-5146

#### 3.2 Sampling Methodology

All sampling will be conducted in accordance with NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, dated May 3, 2010, and Sampling Guidelines and Protocols, dated March 1991.

Soil samples will be collected by VERTEX from discrete, six-inch intervals, from unique borings advanced at the site via a track-mounted direct-push drill rig (e.g., Geoprobe®) and a jack-hammer probe. The direct-push drill rig will advance a five-foot long stainless steel macro-core sampler, while the jack-hammer probe advances two-foot samplers. Per each advancement, a dedicated, disposable polybutyl acetate liner will be used in which the soil samples are held for field assessment. Continuous soil cores will be screened with a photo-ionization detector (PID) and visually and olfactory inspected. Disposable nitrile gloves will be worn during the soil screening process and sampling collection. The soil samples will be collected in dedicated laboratory-provided Encore samplers and laboratory-provided containers.

For the collection of groundwater samples from permanent monitoring wells by VERTEX, the wells will be purged with disposable polyethylene tubing and a stainless-steel submersible pump. Three well volumes will be purged using the volume averaged sampling method. Following purging, a grab groundwater sample will be collected using a polyethylene disposable bailer.

Equipment will be operated in accordance with the manufacturer's specifications, including calibration of all field instruments, which will be performed prior to the initiation of field work and on a schedule indicated by the manufacturer.

Following the soil and groundwater sample collection, the sample containers will be secured, labeled, and placed in a storage/transportation cooler and cooled to acceptable temperatures (e.g., four degrees Celsius) with ice. Samples will then be transported by a field courier to the laboratory following proper chain of custody procedures. The courier will relinquish custody to the log-in sample custodian upon arrival at the laboratory.



### **3.3 Report Logs**

Field logs and borings logs will be completed during the course of RI activities. A field log will be completed on a daily basis, which will describe all field activities including: project number and site address; date and time; weather conditions; on-site personnel and associated affiliations; description of field activities; pertinent sample collection information (sample identification, description of sample, sample location, sample collection time, sampling methodology, name of collector, field screening results, and analysis to be conducted). A boring log will be completed for each soil boring/monitoring well, which will include the following: project number and site address; date and time; drilling company name and drilling method; boring/monitoring well identification, total boring depth and water table depth; and pertinent sample collection information (sample identification, sample depth, interval, recovery amount, color, composition, percent moisture, PID readings, and visual/olfactory observations).

### **3.4 Laboratory Summary**

All samples collected during the RI activities will be submitted under proper chain-of-custody protocols to Alpha Analytical, Inc. (Alpha) in Westborough, Massachusetts (New York Environmental Laboratory Approval Program [ELAP] No. 11148).

### **3.5 Analytical Method/Quality Assurance**

As part of the RI activities, soil and groundwater samples will be collected. The sampling, including matrix, frequency of collection, analytical parameter, analytical method, sample preservation, sample container volume and type, and holding time are provided in the summary tables below.

Based on the historic on-site dry cleaning operations and the identified contaminants of concern,

analysis of all soil and groundwater samples will be conducted for VOCs via United States Environmental Protection Agency (USEPA) Method 8260. To address the NYSDEC’s concern with emerging contaminants, initial groundwater samples will also be analyzed for 1,4-dioxane via USEPA Method 8270 selective ion monitoring (SIM) and per-and polyfluoroalkyl substances (PFAS) via USEPA Method 537. Following the review of the initial PFAS results in groundwater, consideration will be made to analyze soil samples for PFAS and/or the continued analysis of additional groundwater samples for PFAS.

Soil Sampling Summary					
Matrix Type	Analytical Parameter	Analytical Method	Sample Preservation	Sample Container	Sample Holding Time
Soil	VOC	8260	Cool, 4°C	Encore	48 Hours
Soil	1,4-Dioxane	8270	Cool, 4°C	8 oz Glass Jar	14 Days
Soil	PFAS	537 (m)	Cool, 4°C	8 oz Glass Jar	28 Days

Groundwater Sampling Summary					
Matrix Type	Analytical Parameter	Analytical Method	Sample Preservation	Sample Container	Sample Holding Time
Aqueous	VOC	8260	HCl, Cool, 4°C	40 ml Vials	14 days
Aqueous	1,4-Dioxane	8270	Cool, 4°C	500 mL Amber Glass	7/40 days
Aqueous	PFAS	537	Trizma, Cool, 4°C	(2) 250 ml Vials	14 Days

If either Light Non-Aqueous Phase Liquid (LNAPL) and/or Dense Non-Aqueous Phase Liquid (DNAPL) are detected, appropriate samples will be collected for characterization and “fingerprint analysis” and required regulatory reporting (i.e. spills hotline) will be performed.

A thorough evaluation of the laboratory data will be completed and a Data Usability Summary Report (DUSR) will be prepared. The primary objective for the evaluation of analytical data will be to determine whether or not the data, as presented, meets the site-specific criteria for data quality and use. The preparation of the DUSR will be prepared by a qualified, independent data validation expert. The DUSR will be prepared in accordance with *Appendix 2B, Guidance for Data Deliverables and the Development of Data Usability Summary Reports* included in NYSDEC *DER-10: Technical Guidance for Site Investigation and Remediation*.

### **3.6 Quality Assurance Samples**

Field blanks and trip blanks will be submitted to the laboratory to evaluate the quality and performance of the analytical laboratory's analysis and reporting of the soil and groundwater sample results. Field (equipment) blanks will be analyzed to assess any contamination contributed from sampling location conditions, and the transport, handling, and storage of the samples. The trip blank will be analyzed to determine if sample containers may have been contaminated during transportation and storage. In accordance with DER-10, field duplicates, aqueous trip blanks, and field blanks will be collected at a frequency of 1 per 20 samples and will be analyzed for VOCs.

#### **4.0 HEALTH AND SAFETY PLAN**

A Health and Safety Plan (HASP) was prepared to guide the conduct of the RI work in the event that petroleum hydrocarbons and/or hazardous substances are encountered during the performance of the field activities. A copy of the HASP is included as Appendix A. The purpose of the HASP is to minimize the likelihood of exposure of VERTEX employees to hazardous concentrations of chemicals encountered during field activities, minimize impacts to the environment, and provide safety guidelines for subcontractors.

Investigative work performed under this RIWP will be in full compliance with applicable health and safety laws and regulations, including site and Occupational Safety & Health Administration (OSHA) worker safety requirements and Hazardous Waste Operations and Emergency Response (HAZWOPER) requirements. Confined space entry, if any, will comply with OSHA requirements and industry standards, and will address potential risks. The parties performing the investigation work will ensure that performance of work is in compliance with the HASP and applicable laws and regulations. Field activities will be completed with OSHA level D personal protective equipment (PPE) consisting of hard hats, safety glasses, protective gloves and steel toed boots.

An emergency contact sheet with names and phone numbers for all pertinent project personnel as well as regulatory hotline information is included in the HASP. That document will define the specific project contacts for use in case of emergency.

Health and safety activities will be monitored throughout the RI activities, and the HASP will be subject to change, as necessary, based on new conditions that may be encountered during the field investigation.

## **5.0 REMEDIAL INVESTIGATION WORK PLAN**

The objective of the RI is to further characterize soil and groundwater conditions, including the following: installation of soil borings and the collection of soil samples to evaluate soil quality below the footprint of the site building to locate a potential source area; installation of permanent monitoring wells and the collection of groundwater samples to confirm groundwater flow direction and delineate groundwater impacts; and completion of a sub-slab depressurization system (SSDS) pilot test to evaluate the radius of influence (ROI) that a SSDS suction point can be expected to achieve reliably for the design of a VI mitigation system.

### **5.1 Citizen Participation**

In accordance with BCP requirements, a Citizens Participation Plan (CP Plan) was prepared and submitted to the NYSDEC under separate cover. The CP Plan provided a summary of the BCP and citizen participation activities, site information, project contacts, and the RI process.

### **5.2 Utility Clearance and Geophysical Evaluation**

As part of the subsurface investigation, VERTEX's drilling subcontractor will contact the New York one call system prior to initiating the drilling activities. VERTEX will also retain the services of a geophysics subcontractor to conduct a geophysical survey using ground penetrating radar (GPR) and electromagnetic evaluation to mark-out subsurface utilities, evaluate drains and subsurface piping, and "clear" any proposed soil boring locations prior to drilling. VERTEX will also coordinate with the property owners or site contacts, and/or obtain existing utility plans, if available, in an attempt to confirm that all drilling locations, if warranted, are free of underground utilities.

### **5.3 Sewer Evaluation**

VERTEX will obtain a NYCDEP sewer map of the area to ascertain the approximate locations of the current and former sewer piping and sewer connections associated with the site. VERTEX will also coordinate with the NYCDEP Bureau of Water and Sewer Operations to conduct a dye test at the site. The purpose of the dye test will be to evaluate the discharge location of floor drains observed in the basement.

Furthermore, VERTEX will coordinate with a contractor to perform a sanitary sewer evaluation, to confirm the locations of the sewer connections to the site building and below the site building footprint, the sewer locations beneath the sidewalk around the perimeter of the site building, and the location of the sewers within nearby streets. The inspection will include a video inspection of the sanitary sewer piping within and exiting the site building.

If any breeches are identified in the piping, VERTEX will advance soil borings to confirm if these breeches are potential source areas for the contaminants of concern at the site.

### **5.4 Soil Boring Installation**

This task will involve advancing up to 12 soil borings utilizing limited-access drilling equipment in the southeastern corner of the site building basement, to the maximum depth of 27 feet below the basement slab. In addition, this task will involve advancing an additional 4-6 soil borings utilizing direct push (i.e., Geoprobe®) drilling techniques in the sidewalk along 37<sup>th</sup> Avenue to the maximum depth of 35 feet bgs. The proposed boring locations are depicted on Figure 9. The location of the soil borings may need to be adjusted in the field, based on the findings of the geophysical evaluation and/or due to site access limitations (i.e. tenant operations, structural obstructions, etc.).

VERTEX will coordinate with our drilling subcontractor to obtain the required New York City Department of Transportation (NYCDOT) permits for sidewalk opening, temporary pedestrian walkway, occupancy of sidewalk, occupancy of street, and repair of the sidewalk to facilitate the soil boring activities. These permits will be obtained for the sidewalks along each street (37<sup>th</sup> Avenue, 82<sup>nd</sup> Street, and 83<sup>rd</sup> Street) where drilling is proposed. In accordance with NYCDOT permits, drilling activities will be conducted between 9 AM and 3 PM, Monday through Friday.

#### **5.4.1 Soil Sampling**

Soil samples will be collected continuously and screened in the field for the presence of total volatile organic vapors using a PID calibrated to 100 parts per million (ppm) by volume of isobutylene. The PID readings, soil lithology, and field observations will be documented in the field by VERTEX. Samples will be biased to the interval with the strongest evidence of suspected impacts based on PID readings, odors, staining, etc. In the event no field evidence of hazardous constituents is observed, soil samples will be collected from the first six-inch interval of soil present above the soil/groundwater interface or drilling refusal, as warranted by field observations and conditions.

Soil samples will be collected and analyzed for VOCs via USEPA Method 8260. All soil samples will be grab samples; no composite soil samples are proposed. Following soil sample collection, boreholes will be backfilled with soil cuttings with an upper bentonite plug and capped with concrete patch.

#### **5.5 SSDS Pilot Study**

A SSDS is proposed to mitigate potential VI concerns at the site due to the elevated chlorinated VOCs detected in the groundwater, soil gas, and indoor air. As part of the RI, VERTEX will collect measurements of interior site features to produce drawings that are needed for the design of a

SSDS and obtaining the required local permits. A walkthrough of the area and photo-documentation will be performed to determine where above-grade and below-grade piping runs can be safely installed.

Performance of pilot testing will be completed to determine the ROI that a SSDS suction point can be expected to achieve. This data will assist in determining the number and placement of SSDS suction points to ensure proper building coverage and provide flow and vacuum data for the proper design of the SSDS piping and blowers. The ROI can vary based upon the substrate below the concrete floor, soil types, and floor conditions. The site building may contain column and wall footings that will likely interfere with the ROI of the SSDS. The pilot test will require the installation of suction points and associated monitoring points in the concrete floor of the building and measuring the influence of a vacuum induced on the suction points. Pilot testing will include a minimum of three test points and a maximum of five points within the basement area.

## **5.6 Monitoring Well Installation**

This task will involve the installation of five groundwater monitoring wells utilizing hollow-stem auger drilling techniques within the City-owned sidewalks, to the maximum depth of 45 feet below sidewalk grade. The proposed monitoring well locations are depicted on Figure 10. The locations of the soil borings/monitoring wells may need to be adjusted in the field, based on the findings of the geophysical evaluation and/or due to site access limitations (i.e. parked vehicles, equipment, etc.). Three of the well locations will be placed at the previous temporary well locations VTW-1, VTW-2, and VTW-3. Two additional monitoring wells will be located down-gradient (northeast) of VTW-3, across 83<sup>rd</sup> Street, in the City-owned sidewalk.

Details of the monitoring well completion depths and construction information will be recorded by VERTEX in the field. The monitoring wells will be constructed of 2-inch diameter Schedule 40



slotted (0.010 inch) polyvinyl chloride (PVC) screen and 2-inch diameter PVC riser to grade. The well screen annulus will be filled with sand pack from the base of the screen to 1 to 2 feet above the top of the screen. A bentonite/grout slurry will be installed from the top of the sand pack to ground surface. VERTEX assumes that the monitoring wells will be installed to a depth no greater than 45 feet below grade. The screened interval for the monitoring wells (10 feet) will be installed to intersect the shallow groundwater table and will extend to the completion depth of the well. Surface finishing will consist of a flush-mount traffic-rated manhole with a bolt-on lid set into a concrete pad. Additionally, an expandable locking cap will be fitted to the top of the PVC riser in the well.

The monitoring wells will be developed following installation to improve the hydraulic efficiency, by the removal of the fine-grained material generated during the drilling process. The monitoring wells will be developed following installation. Groundwater will be purged from the monitoring wells using disposable polyethylene tubing and a submersible pump, until turbid-free water is observed.

The monitoring wells are positioned so that groundwater flow direction can be triangulated from the elevation information obtained following the gauging and surveying of the wells. VERTEX will coordinate with a licensed surveyor to obtain the elevation of each monitoring well casing.

#### **5.6.1 Groundwater Sampling**

The newly installed monitoring wells will be allowed to stabilize and sampled a minimum of one week following installation and development. The groundwater sampling event will begin with groundwater level measurements from each well using a product/water interface probe. Purging of the wells prior to sampling will be conducted using low-flow purging methodologies with disposable polyethylene tubing and a stainless-steel submersible pump. Field parameters to be measured before and during the sampling will consist of pH, specific conductance, oxidation-

reduction potential (ORP), temperature, dissolved oxygen, and turbidity. The groundwater will be inspected for the presence of any odor and/or surface sheen. Sample collection will be conducted following a three well volume purge.

Groundwater samples will initially be analyzed for VOCs and the emerging contaminants PFAS and 1,4-dioxane. A second groundwater sampling event will be conducted 30 days following the initial sampling event. The monitoring well sampling will be conducted as outlined above.

An additional two rounds of quarterly groundwater sampling will be conducted following the initial characterization events, to obtain sufficient data to document contaminant concentration trends over time. If not detected above the AWQS, the parameters including the emerging contaminants will be removed from the subsequent proposed sampling events.

## **5.7 Investigation-Derived Waste Management**

Investigation-derived waste (IDW) generated during the RI activities would include soil cuttings generated during the soil boring and/or monitoring well installations and purge development water generated during monitoring well development and sampling.

Soil cuttings generated during the installation of the permanent monitoring wells will be placed in sealed and labeled U.S. Department of Transportation (DOT)-approved 55-gallon drums pending off-site disposal at a permitted facility.

Based on the documented groundwater impacts at the site, purge development water will be containerized in DOT-approved 55-gallon drums for off-site disposal at a permitted facility.

During the installation of soil borings, the soil will be disposed at the site, within the borehole that generated them, unless free product or grossly contaminated soil are present in the cuttings.

Contaminated soil cuttings, if encountered, will be placed in sealed and labeled DOT-approved 55-gallon drums pending off-site disposal at a permitted facility. All boreholes which require drill cuttings disposal would ultimately be filled with bentonite chips and hydrated.

Disposable sampling equipment including, spoons, gloves, bags, paper towels, etc. that came in contact with environmental media will be double bagged and disposed as municipal trash in a facility trash dumpster as general refuse.

## **5.8 Reporting**

VERTEX will prepare an Interim Remedial Measures (IRM) Work Plan to document the proposed mitigation measures to address vapor intrusion concerns at the site (SSDS installation). Information obtained during the SSDS pilot study will be used to design an SSDS to impart a negative pressure below the site building slab and vent VOC sub-slab vapors to the exterior of the building. The design of the system, sufficient for permitting and construction purposes, will be prepared and finalized by a New York-licensed professional engineer (PE).

VERTEX will prepare a Remedial Investigation Report (RIR) / Alternative Analysis Report (AAR) in accordance with NYSDEC *DER-10: Technical Guidance for Site Investigation and Remediation*. The RIR/AAR will present the findings of the RI activities, evaluate remedial alternatives, and provide a recommendation for a remedial strategy to address soil, groundwater, and/or vapor intrusion concerns.

Soil analytical results will be compared to the NYSDEC Part 375-6.8(a) Unrestricted Used Soil Cleanup Objectives and appropriate Part 375-6.8(b) Restricted Soil Cleanup Objectives. Groundwater analytical results will be compared to the NYSDEC Part 703 Groundwater Quality Standards (Class GA) and Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1 AWQS.

A thorough evaluation of the laboratory data will be completed and a DUSR will be prepared by a qualified, independent data validation expert. The DUSR will be prepared in accordance with *Appendix 2B, Guidance for Data Deliverables and the Development of Data Usability Summary Reports* included in NYSDEC DER-10: *Technical Guidance for Site Investigation and Remediation*.

The report will include site location and sample location figures, color photographic documentation, summary of methods, laboratory reports and data summaries, and other pertinent support documentation as required by applicable NYSDEC and NYSDOH regulations.

## 5.9 Implementation Schedule

The following is the estimated schedule to implement the RI activities.

Implementation Schedule	
Task	Estimated Completion Date
Submit RIWP and CP Plan to NYSDEC	October 25, 2018
Public Comment Period and NYSDEC Review for RIWP	November 30, 2018
Address NYSDEC Comments to RIWP & Submit Response to NYSDEC	December 14, 2018
NYSDEC Approval of RIWP	December 21, 2018
Implement RI Activities	February 5, 2019
Submit IRM Work Plan	March 5, 2019
Submit RIR/AAR	April 19, 2019

# FIGURES

# **TABLES**

# **APPENDIX A: HEALTH AND SAFETY PLAN**