# REMEDIAL INVESTIGATION WORK PLAN

## For

## 23-01 42ND ROAD
## Block 425, Lot 1
## Long Island City, New York

***Prepared For:***

**QPS 23-10 Development LLC**
**c/o Property Markets Group, Inc.**
**5 East 17th Street – 2nd Floor**
**New York, New York 10003**

***Prepared By:***

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**July 19, 2013**
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LANGAN

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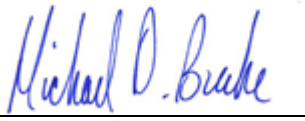
## CERTIFICATION

I, Michael Burke, certify that I am currently Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this Remedial Investigation Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).



Michael Burke, CHMM

## 1.0 INTRODUCTION

This Remedial Investigation Work Plan (RIWP) was prepared on behalf of QPS 23-10 Development LLC (the "Volunteer"), for 23-01 42nd Road, Long Island City, New York (the "Site"). The Site is subject to New York State Department of Environmental Conservation (NYSDEC) review under the Spills Program (Spill No. 1302811, reported on June 14, 2013) and the Volunteer applied for acceptance into the New York State Brownfield Cleanup Program (BCP) in July 2013. The objective of the RIWP is to investigate and characterize the nature and extent of environmental impacts on the Site and provide sufficient information to evaluate remedial actions, as required. This RIWP was developed in general accordance with the process identified in the New York State Department of Environmental Conservation (NYSDEC) DER-10 Technical Guidance for Site Investigation and Remediation (May 2010).

# 2.0 SITE BACKGROUND

## 2.1 Site Description

The Site (Block 425, Lot 1) consists of a rectangular shaped lot that is approximately 14,920 square feet (±0.34 acres) and contains a vacant two-story concrete building that was historically used for industrial manufacturing. A Site Location Map is included as Figure 1. The Site is located on the city block bordered by Queens Plaza South to the north, 24th Street to the east, 42nd Road to the south, and 23rd Street to the west. A boiler room occupies the southeastern area of the building.

## 2.2 Site Physical Conditions

### 2.2.1 Surrounding Property Land Use

The Site is located in an urban setting generally characterized by industrial development, which is summarized in the table below:

| Direction | Adjoining Properties | Surrounding Properties |
|---|---|---|
| North | Vacant five-story concrete building followed by Queens Plaza South | Multiple-story commercial and industrial buildings |
| South | 42nd Road followed by a parking lot and a vacant one-story commercial building (from west to east). | |
| East | 24th Street followed by a three-story building (Apex Technical School) | |
| West | 23rd Street followed by a parking lot. | |

The Site is located in an area primarily characterized by mixed commercial and industrial with light residential use. The area surrounding the Site was historically industrial and became blighted overtime. This area recently experienced redevelopment through the expansion and development of residential, commercial, and community facilities, and light manufacturing uses.

Sensitive receptors within a half mile of the Site include those listed below:

| Number | NAME (Approximate distance from Site) | ADDRESS |
|---|---|---|
| 1 | Academy of American Studies High School (1,320 feet northeast) | 28-04 41st Avenue, Queens, New York 11101 |
| 2 | Newcomers High School (1,584 feet northeast) | 28-01 41st Avenue, Queens, New York 11101 |
| 3 | Information Technology High School (1,373 feet southwest) | 21-16 44th Road, Queens, New York 11101 |
| 4 | PAL Western Queens Nursery School (1,690 feet northwest) | 10-26 41st Avenue, Long Island City, New York 11101 |
| 5 | Queensbridge Day Care Center (2,534 feet northwest) | 3811 27th Street, Long Island City, New York 11101 |

### 2.2.2 Topography

Ground surface elevations were obtained from a survey drawing by Earl B. Lovell – S. P. Belcher, Inc. dated February 26, 2013. All elevations presented herein are measured in feet and referenced to the Borough President of Queens Datum (BPQD)[1].

Sidewalk grades general slope up from the southwest corner to the northeast corner of the site. Sidewalk grades along 42nd Road range from about el. 12.5 at the southwest corner of the Site to about el. 15 at the southeast corner of the Site. Sidewalk grades along 23rd Street range from about el. 13.5 at the northwest corner of the Site to about el. 12.5 at the southwest corner of the Site. Sidewalk grades along 24th street range from about el. 17 at the northeast corner of the Site to about el. 15 at the southeast corner of the Site.

### 2.2.3 Geology

Pleistocene glacial activity modified the landscapes and surficial features of Brooklyn, Queens, and the remainder of Long Island. The glaciation scoured uplands areas and deposited varying amounts of till (an unsorted mixture of sand, clay and boulders) across the lowlands and valleys. The area of Queens in which the Site is located is underlain by glacial deposits known as ground moraine. The ground moraine is a widespread dense layer of till material that typically consists of clay, sand and boulders. Bedrock outcrops were not observed at the Site. According to the USGS Bedrock and Engineering Geologic Maps of New York County and Parts

[1] Elevations are referenced to Borough President of Queens Datum, which is 2.725 feet above the National Geodetic Vertical Datum (Mean sea level. at Sandy Hook, NJ 1929). [BPMD = USGS – 2.725]

of Kings and Queens Counties, New York, dated 1994, the Site is underlain by Middle Ordovician to Lower Cambrian-Ordovician Hartland Formation, which generally consists of muscovite-biotite-quartz schist with minor garnet.

The soil profile at the Site generally consists of miscellaneous uncontrolled fill underlain by silt and sand, and finally sound bedrock. The fill was observed to be about 4 to 9 feet thick. The top of sound bedrock was encountered at depths between about 12.5 and 30 feet below existing grade.

#### 2.2.4 Hydrogeology

Within the ground, water ("groundwater") is contained within the unconsolidated geologic materials and the fractured bedrock. The upper surface of the groundwater reservoir is marked by the water table surface. Groundwater flow is typically topographically influenced, as a shallow groundwater tends to originate in areas of topographic highs and flows toward areas of topographic lows, such as rivers, stream valleys, ponds, and wetlands. A broader, interconnected hydrogeologic network often governs groundwater flow at depth or in the bedrock aquifer. Groundwater depth and flow direction are also subject to hydrogeologic and anthropogenic variables such as precipitation, evaporation, extent of vegetation cover, and coverage by impervious surfaces. Other factors influencing groundwater include depth to bedrock, the presence of artificial fill, and variability in local geology and groundwater sources or sinks.

According to previous investigations at the Site, the estimated depth to groundwater is approximately seven to nine feet bgs, this depth corresponds to an elevation of about el. 4.5. Based on local topography, groundwater is expected to flow to the west-northwest towards the East River, which is located approximately 0.5 miles to the West. Groundwater in the New York City area is not used as a potable water source. Potable water is provided to the Site by the City of New York and is derived from surface impoundments in the Croton, Catskill, and Delaware watersheds.

### 2.3 Summary of Previous Environmental Investigations

Previous environmental reports were reviewed as part of this RIWP. These reports are summarized below and are included in Appendix A.

**Phase I Environmental Site Assessment (ESA) of 23-01 42 Road, 23-01 42 Road, Long Island City, New York; Cardno ATC, August 28, 2012**

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

- Historic use of the adjoining building to the north of the Site: The adjoining building to the north of the Site was identified on the following federal agency databases reviewed:

Facility Index System / Facility Registry System (FINDS) and Resource Conservation Recovery Act (RCRA) Small Quantity Generator (SQG). Although there were no reported violations, based on the known use of the property used extensively for manufacturing purposes coupled with the Environmental Data Resources, Inc. (EDR) listings and reported waste types/quantities, Cardno ATC considered the federal agency database listings to represent a REC.

- Historic use of the Site: The historical records review indicated that the Site has extensively been used for manufacturing purposes. Additionally, the Site in the past was noted to have oil staining from the on-site metal fabrication machines. Cardno ATC considered the historical uses of the Site to represent a REC.
- Potential Underground Storage Tanks (UST): At least three USTs have been identified at the Site on the 1936 through 2006 Sanborn maps. Based on the potential presence of gasoline tanks, the presumed age of the USTs (at least 75 years) and lack of any documentation of UST closure, the potential USTs were considered to represent a REC.
- Petroleum staining and sheen: Cardno ATC observed a sump adjacent to the boiler room. According to the property manager, there was a pump in the sump that was connected to the NYC municipal sewer system. In the area of the sump, minor petroleum staining was noted and a slight petroleum sheen was also noted on the standing water in the sump. The identified petroleum staining and sheen on the standing water represented a REC.

**Phase II Environmental Site Investigation (ESI) – 23-10 Queens Plaza South & 23-01 42nd Road, Block 425, Lots 1 & 5, Long Island City, New York; Cardno ATC, November 8, 2012**

This report pertains to the Site (23-01 42nd Road) and the northern-adjoining property (23-10 Queens Plaza South); therefore, only a part of the report is Site specific. The ESI evaluated potential impacts to soil and groundwater from the RECs identified by the 2012 Phase I ESA. Cardno ATC implemented the ESI between September 21 and 24, 2012. The investigation that was relevant to the Site included completion of a geophysical survey, installation of six soil borings and two temporary groundwater monitoring wells, and collection of six grab soil samples and two groundwater samples. Soil analytical data was compared with New York Codes, Rules and Regulations (NYCRR) Title 6 Part 375 (6 NYCRR Part 375) Unrestricted Use Soil Cleanup Objectives (SCO) and Restricted-Residential Use SCOs and groundwater analytical data was compared to NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Class GA Ambient Water Quality Standards (AWQS). The findings of this investigation relevant to the Site are summarized below:

- The subsurface soil profile generally consisted of historic fill predominately characterized as brown and gray, fine to medium sand with silt and clay.
- Groundwater was encountered at depths of approximately 7 to 9 feet bgs.
- Bedrock was not encountered at any boring locations at a maximum depth of 15 feet bgs.
- The geophysical survey identified two potential USTs in the northwest corner of the Site.
- Visual and olfactory evidence of potential contamination was noted during the field activities at boring location SB-10. Specifically, SB-10 had potential staining and a moderate petroleum type odor at approximately eight to ten feet bgs. Photoionization detector (PID) readings were identified at SB-10 at approximately 700 to 1,200 parts per million (ppm).
- Polychlorinated biphenyls (PCB) were not detected in any soil samples. The following constituents were detected in soil at concentrations that exceed their respective Unrestricted Use SCOs:
    - Two volatile organic compounds (VOC), including acetone and benzene
    - Six semivolatile organic compounds (SVOC), including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, and chrysene
    - Four metals, including copper, lead, mercury, and zinc
- PCBs were not detected in any groundwater samples. The following constituents were detected in groundwater at concentrations that exceed their respective TOGS Class GA AWQS:
    - Five VOCs, including benzene, chloroethane, 1,2-dichloroethane, isopropylbenzene, and total xylenes
    - Six SVOCs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, indeno(1,2,3-cd)pyrene, and chrysene
    - Thirteen metals, including arsenic, barium, beryllium, chromium, copper, iron, lead, magnesium, manganese, mercury, nickel, sodium, and zinc

The Phase II ESI also identified CVOCs, including tetrachloroethene (PCE) and trichloroethene (TCE), in groundwater at concentrations that exceed TOGS Class GA AWQS at the northern-adjoining property.

**Phase I ESA Report, dated June 2013, prepared by Langan**

The Phase I ESA identified the following RECs for the Site:

REC 1 - Historical Site Use

Prior to becoming vacant, the Site was extensively used for manufacturing purposes since at least 1947. Evidence of former industrial equipment, extensive piping, product supplies and work areas are apparent throughout the building. Discoloration and staining of the floors is present as well. Inadvertent releases of solvents, petroleum products, metals, PCBs and/or other chemicals used during manufacturing operations may have adversely impacted soil, groundwater, building components and/or soil vapor at the Site. There are known releases of petroleum and chlorinated solvents at, an in the immediate vicinity of the Site

REC 2 – On-Site Petroleum Bulk Storage

An active 5,000-gallon #2 fuel oil aboveground storage tank (AST) has been present at the Site since 1940. Potential leaks or spills of fuel oil may have adversely impacted soil, groundwater, and/or soil vapor at the Site.

REC 3 – Potential Historic Gasoline Storage

Langan did not observe USTs during the Site reconnaissance; however, at least three gasoline tanks have been identified at the Site on the 1936 through 2006 Sanborn maps. These tanks may remain at the Site and releases from the tanks may have impacted soil, groundwater, and/or soil vapor. A geophysical survey conducted as part of a Phase II ESI in 2012 identified anomalies indicative of USTs. In addition, a fill port was identified along the 23rd Street sidewalk that is presumed to be associated with these USTs. Based on the potential presence of gasoline tanks, the presumed age of the tanks (at least 75 years), and lack of any documentation of tank closure, the potential gasoline USTs are a REC.

REC 4 – Historical Use of Surrounding Properties

Potential petroleum and solvent releases associated with the following historical surrounding property uses may have adversely impacted soil, groundwater, and/or soil vapor at the Site:

- Former manufacturing at the adjoining property to the north of the Site. Prior use included the generation of hazardous wastes including various heavy metals (cadmium, lead, barium and mercury) and ignitable waste. The environmental database report provided by Environmental Data Resources, Inc. (EDR) listed the northern-adjoining property in the Resource Conservation Recovery Act (RCRA) Small Quantity Generator (SQG) database under the name Copper Wiring Devices (2004 and 2005) and in the petroleum bulk storage (PBS) database for an active 10,000-gallon fuel oil AST. Additionally, Sanborn maps identified two gasoline tanks on the property (1936). Based

on the results of a Phase II ESI performed at this Site in 2012, CVOCs, PCE and TCE were identified in groundwater at this Site at concentrations that exceed applicable New York state standards. There is also evidence of interconnections between the Site and this building so it is possible the RCRA activities occurred in both buildings.

- A filling station with two gasoline tanks on the eastern adjoining property (1947);
- An automotive repair shop on the southern adjoining property, across 42nd Road (1977); and
- A garage on the western adjoining property, across 23rd Street (1947).

REC 5 – Spills at the Site and Northern-Adjoining Property

A November 2012 Phase II ESI performed at the Site and northern-adjoining property identified the following:

- Visual and olfactory evidence of petroleum-impacts during the advancement of soil borings at both properties.
- Organic contaminants (volatile organic compounds [VOC] and semivolatile organic compounds [SVOC]) were detected at concentrations exceeding New York Codes, Rules and Regulations (NYCRR) Title 6 Part 375 (6 NYCRR Part 375) Unrestricted Use Soil Cleanup Objectives (SCO) in soil.
- Organic (petroleum and chlorinated solvent based) and metal contaminants were detected at concentrations exceeding NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Class GA Ambient Water Quality Standards (AWQS) in groundwater.
- Petroleum sheen was observed in a sump located within the building of the Site.

Based on the review of the Phase II ESI, two spills were reported to the NYSDEC; one for the Site (Spill No. 1302811) and one for the northern-adjoining property (Spill No. 1302812).

### 2.4 Areas of Concern

Based on findings and observations during previous environmental investigations listed in section 2.3, the following Areas of Concern (AOC) were identified and are shown on Figure 2:

**AOC 1: Two gasoline tanks (1936 through 2006 Sanborns) and Soil and Groundwater Contamination in Southeast Corner of the Site.**

AOC 1 represents the location of two potential gasoline tanks that were identified at the Site on the 1936 through 2006 Sanborn maps. Based on the potential presence of gasoline tanks, the

presumed age of the tanks (at least 75 years) and lack of any documentation of tank closure, the potential tanks are an AOC. Additionally, visual and olfactory evidence of petroleum-impacts and elevated concentrations of petroleum based contaminants were identified in soil and groundwater during the advancement of soil borings during a Phase II investigation performed in November 2012 (refer to Figures 3 and 4 for previous investigation data). Contaminants of concern include petroleum VOCs and SVOCs in the soil and groundwater and VOCs in the soil vapor.

**AOC 2: Potential USTs (2012 Geophysical Survey) in the Northwest Corner of the Site**

AOC 2 represents the potential location of underground storage tanks in the northwest corner of the Site. Geophysical anomalies indicative of USTs were identified during a Phase II investigation performed in November 2012. There is no documentation of proper removal or abandonment. In addition, a fill port was identified along the 23rd Street sidewalk that is presumed to be associated with these USTs. These tanks likely remain at the Site and releases from the tanks may have impacted soil, groundwater, and/or soil vapor. Contaminants of concern include petroleum VOCs and SVOCs in the soil and groundwater and VOCs in the soil vapor.

**AOC 3: Chlorinated Volatile Organic Compounds in Groundwater**

Elevated concentrations of CVOCs were identified in groundwater during a Phase II investigation performed in November 2012 (refer to Figure 4 for previous investigation data). Contaminants of concern include CVOCs in soil, groundwater and soil vapor.

## 3.0 SCOPE OF WORK

The objective of this RIWP is the "investigation and characterization of the nature and extent of the contamination within the boundary of the Site", per Environmental Conservation Law Article 27, Title 14 (Brownfield Legislation). The field investigation work will include the tasks listed below to supplement the data and findings of previous investigations. The rationale for each investigation point in relation to the AOCs is provided in Table 1. These tasks are discussed in more detail in the following sections.

- Geophysical Survey
    - The survey will attempt to identify underground utilities and potential USTs
- Soil Borings and Sampling
    - Advancement of five soil borings to approximately 10 feet below groundwater or to refusal.
    - Collection of two soil samples from each soil boring location for a total of 10 soil samples (plus quality assurance/quality control [QA/QC] sampling)
- Monitoring Wells and Sampling
    - Installation of five monitoring wells at soil boring locations
    - Collection of one groundwater sample from each monitoring well for a total of 5 groundwater samples (plus QA/QC sampling).
    - Survey and gauging of monitoring wells to evaluate flow and contour
- Soil Vapor Points and Sampling
    - Installation of five soil vapor sampling points to a depth of approximately 5 to 10 feet bgs.
    - Collection of one soil vapor sample from each soil vapor point for a total of 5 soil vapor samples (plus QA/QC sampling)

Modifications to this scope of work may be required: 1) due to Site operations, equipment or restrictions; 2) in the event that unexpected contamination is detected and additional analytical data is needed; and 3) to ensure that contamination is adequately characterized and delineated in compliance with the Brownfield Law, regulations and applicable investigation guidance documents (e.g., DER-10).

The field investigation work will be completed in accordance with the procedures specified in Langan's Health and Safety Plan (HASP) and Quality Assurance Project Plan (QAPP) provided in Appendices B and C, respectively.

Names, contact information and roles of the principal personnel who will participate in the investigation including the project manager, contractor and subcontractor contacts are listed below. Resumes for each person are provided the QAPP (Appendix C).

| Personnel | Investigation Role | Contact Information |
|---|---|---|
| Joel Landes, P.E.<br>Langan Engineering | Project Director | Phone – 212-479-5404<br>Email – jlandes@langan.com |
| Michael Burke, CHMM<br>Langan Engineering | Project Manager | Phone – 212-479-5413<br>Email – mburke@langan.com |
| Tony Moffa, CHMM<br>Langan Engineering | Langan Health & Safety Officer | Phone – 215-491-6500<br>Email – tmoffa@langan.com |
| Gerald Nicholls, PE, CHMM<br>Langan Engineering | Field Safety Officer | Phone – 212-479-5559<br>Email – gnicholls@langan.com |
| Ryan Wohlstrom<br>Langan Engineering | Field Team Leader | Phone – 212-479-5483<br>Email – rwohlstrom@langan.com |
| Jason Hayes, P.E.<br>Langan Engineering | Quality Assurance Officer | Phone – 212-479-5427<br>Email – jahayes@langan.com |

### 3.1 Geophysical Survey

We will coordinate with a geophysical contractor to clear boring locations of potential subsurface utilities and structures across the Site. A survey will also be performed to investigate for the presence of the potential gasoline USTs identified in the historic Sanborn maps. The geophysical survey will be completed using a range of geophysical instruments, including electromagnetic and utility line locator instruments, and ground-penetrating radar (GPR). The results of the survey may necessitate relocation of boring locations.

### 3.2 Soil Investigation

An environmental drilling subcontractor will advance five soil borings (designated SB01, SB02, SB03, SB04, and SB12). The purpose of these borings is to further investigate AOCs identified in Section 2.4 and supplement the environmental investigation performed in 2012 (refer to Figures 3 and 4 for previous investigation data). A plan showing the proposed boring locations is shown on Figure 2. A Langan engineer will document the work, screen the soil samples for environmental impacts, and collect environmental samples for laboratory analyses. Work will comply with the safety guidelines outlined in the HASP (Appendix B).

The soil borings will be advanced to 10 feet below groundwater or to refusal using direct push, sonic or auger drilling methodologies. Soil will be screened continuously to the boring termination depth for organic vapors with a PID equipped with a 10.6 electron volt (eV) bulb, and for visual and olfactory indications of environmental impacts (e.g., staining and odor). Soil descriptions will be recorded in a field log.

Two grab soil samples will be collected for laboratory analysis from each boring location. The sampling program is summarized in Table 1. One sample will be collected from the interval just above the water table and a second sample will be collected from the area of material exhibiting the highest degree of contamination (evidenced by discoloration, odor or PID readings above background).

The samples will be collected in laboratory-supplied containers and will be sealed, labeled, and placed in a cooler containing ice (to maintain a temperature of approximately 4 degrees Celsius) for delivery to a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified analytical laboratory. Soil samples will be analyzed for 6 NYCRR Part 375 VOCs, SVOCs, and metals. If free product is encountered, representative samples of the product will be collected for laboratory fingerprint analysis. QA/QC procedures to be followed are described in the QAPP provided as Appendix C.

### 3.3 Groundwater Investigation

Five borings (SB01, SB02, SB03, SB04, and SB12) will be converted into groundwater monitoring wells. Proposed monitoring well locations are shown on Figure 2. Soil conditions will be screened, logged and sampled as described in Section 3.2. Wells will be constructed to straddle the observed water table. The wells will be constructed with 1-inch or 2-inch diameter, threaded, flush-joint, polyvinyl chloride (PVC) casing and 0.01-inch slot screens. Clean sand or prepack sand will be used to fill the annulus around the screen up to approximately 1 foot above the top of the screened interval. A bentonite seal will be installed above the sand, and the borehole annulus will be grouted to the surface with bentonite/cement slurry.

Following installation, the well will be surged and developed by purging a minimum of three well volumes and waiting until the water becomes clear. The well will then be allowed to rest for at least 24 hours after development prior to sampling. One groundwater sample will be collected from each well. Prior to sampling, the monitoring wells will be gauged for static water levels and each well will be purged. Gauging will be completed with a dual-phase interface probe in order to detect the potential presence of free product. If free product is encountered, representative samples of the product will be collected for laboratory fingerprint analysis. Purging will consist of pumping a minimum of three well volumes and waiting until the physical and chemical parameters (e.g., temperature, dissolved oxygen, oxygen reduction potential, turbidity) stabilize, with turbidity below 50 Nephelometric Turbidity Units [NTU]. Groundwater samples will be analyzed for VOCs, SVOCs, and metals (filtered and unfiltered). QA/QC procedures are described in the QAPP provided as Appendix C.

### 3.4 Soil Vapor Investigation

A soil vapor investigation consisting of five investigation points, designated SV01, SV02, SV03, SV04, and SV12, will be completed. Proposed soil vapor sampling point locations are shown on Figure 2. Vapor sampling will be conducted in accordance with the October 2006 Guidance for Evaluating Soil Vapor Intrusion in the State of New York. An environmental driller will install each point to a depth of approximately 5 to 10 ft bgs depending on the depth of the water table. For soil vapor samples, the sampling point (a new, dedicated stainless-steel screen implant) will be connected to polyethylene or Teflon tubing that will extend to a depth approximately 2 feet above the water table. Approximately one foot of clean sand filter pack will be placed around the screen implant. The remaining annular space will be backfilled to grade with hydrated bentonite. The seal on the vapor points will be checked with a helium tracer gas test.

Prior to sampling, three well volumes will be purged from the point using a MultiRAE multi-gas monitor, which pumps air below the 0.2 liters per minute. The multi-gas monitor will also be used to screen the soil vapor for the presence of VOCs. Following purging, each soil vapor point will be sampled using laboratory-provided, 6-Liter air canisters equipped with 2-hour sample interval flow controllers. Soil vapor samples will be analyzed for VOCs by EPA Method TO-15. QA/QC procedures to be followed are described in the QAPP provided as Appendix C. Prior to sampling, soil vapor sample points will undergo a leak check using helium tracer gas. Soil vapor sampling will occur if the leak check confirms a competent seal.

### 3.5 Monitoring Well Survey

Langan will survey the location and elevation of the groundwater monitoring wells (top of casing elevations). This data will be used with the groundwater well gauging data to prepare an updated groundwater contour map and document the direction of groundwater flow. Vertical control will be established by surveying performed relative to the BPQD by a NYS-licensed land surveyor. Elevations of the top of monitoring well casings and protective well casings will be surveyed to the nearest 0.01 foot.

### 3.6 Data Management and Validation

All laboratory analyses of soil, groundwater and vapor samples will be conducted by a NYSDOH, ELAP-approved laboratory. Laboratory analyses will be conducted in accordance with USEPA SW-846 methods and NYSDEC Analytical Services Protocol (ASP) B deliverable format. Environmental data will be reported electronically using the database software application EQuIS as part of NYSDEC's Environmental Information Management System (EIMS).

Table 1 summarizes the anticipated samples and analytical methodology. We will follow the QA/QC procedures required by the NYSDEC ASP and SW-846 methods, including initial and

continuing instrument calibrations, standard compound spikes, surrogate compound spikes, and analysis of other samples (blanks, laboratory control samples, and matrix spikes/matrix spike duplicates). The laboratory will provide sample bottles, which have been pre-cleaned and preserved in accordance with the SW-846 methods. Where there are differences in the SW-846 and NYSDEC ASP requirements, the NYSDEC ASP shall take precedence.

We will perform data validation in accordance with the United State Environmental Protection Agency (USEPA) validation guidelines for organic and inorganic data review. Validation will include the following:

- Verification of QC sample results (both qualitative and quantitative).
- Verification of sample results (both positive hits and non-detects).
- Recalculation of 10% of all investigative sample results.
- Preparation of Data Usability Summary Report (DUSR).

The DUSR will be prepared and reviewed by the Program Quality Assurance Monitor (PQAM) before issuance. The DUSR will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and COC procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. A detailed assessment of each sample delivery group (SDG) will follow. Additional details on the DUSR are provided in the QAPP in Appendix C.

### 3.7 Management of Investigation-Derived Waste

Drill cuttings and other soil generated on-site during the investigation will be stored on protective sheeting and covered if the cuttings remain at the end of the day. The cuttings will be backfilled within the borehole that generated them to within 12-inches of the surface, unless the soil is grossly contaminated, a monitoring well is being installed in the borehole, the boring has penetrated a confining layer, a path for vertical migration would be completed, or the cuttings will not fit in the borehole.

All soil cuttings that cannot be backfilled and groundwater investigation-derived wastes (IDW) will be containerized and disposed properly at an off-site facility. Soils may be disposed off-site in 55-gallon, United Nations/Department of Transportation (DOT)-approved drums. Personal protective equipment and supplies will be disposed as solid waste. Fluids will be placed in UN/DOT-approved fluid drums with closed tops. All drums will be properly labeled, sealed, and characterized as necessary. The drums will be staged in a secure area on site, pending disposal to an appropriate disposal facility upon receipt of analytical results.

### 3.8 Qualitative Human Health Exposure Assessment

A Qualitative Human Health Exposure Assessment will be conducted in accordance with Appendix 3B of the NYSDEC DER-10, Technical Guidance for Site Investigation and Remediation. The assessment will be submitted in the Remedial Investigation Report.

## 4.0 REMEDIAL INVESTIGATION REPORT

Following completion of the Remedial Investigation and receipt of analytical data, a Remedial Investigation Report (RIR) will be prepared. The report will include: 1) a summary of the Site history and previous investigations; 2) description of site conditions and this remedial investigation; 3) evaluation of the results and findings; and 4) conclusions and recommendations. Additionally, the Standards, Criteria, and Guidance (SCGs) which pertain to the Site location and contaminants, as well as, potential remedial action objectives will be identified in the report. The soil boring and well/vapor point construction logs, sampling logs, and laboratory analytical reports will be appended to the report. Conclusions and recommendations will be provided that: 1) summarize the nature and extent of potential impact for each areas of concern; 2) identify unacceptable exposure pathways (as determined through a Qualitative Human Health Exposure Assessment); and 3) recommend future work or remedial actions, as required.

The sampling results that exceed unrestricted soil SCGs, the groundwater standards or other applicable unrestricted SCGs will be summarized in tables (organized by areas of concern). The tables will include sample location, media sampled, sample depth, field/laboratory identification numbers, analytical results and the applicable unrestricted SCG for comparison. Scaled Site maps will be used to show the boring, monitoring well, and soil vapor point locations, SCG exceedances, groundwater elevation contours, groundwater flow direction, and, if appropriate, groundwater contaminant concentration contours.

## 5.0 SCHEDULE

The table below presents an estimated schedule for the proposed remedial investigation and reporting. If the schedule changes, it will be updated and submitted to NYSDEC.

| Schedule Milestone | Weeks from Submittal of RIWP | Duration (weeks) |
|---|---|---|
| Prepare and submit RIWP to NYSDEC | 0 | - |
| Complete implementation of RIWP | 2 | 2 |
| Prepare and submit RIR for NYSDEC review and Approval | 8 | 6 |